R-unit

IAI
Quality and Innovation

RCON System

Instruction Manual Fifth Edition ME0384-5D

IAI Corporation

Please Read Before Use

Thank you for purchasing our product.

This instruction manual explains the handling methods, structure and maintenance of this product, providing the information you need in order to use the product safely.

Before using the product, be sure to read this manual and fully understand the contents explained herein to ensure safe use of the product.

The DVD enclosed with the product contains instruction manuals for IAI products.
When using the product, refer to the necessary sections of the applicable instruction manual by printing them out or displaying them on a PC.

After reading the instruction manual, keep it in a convenient place so that whoever is handling the product can refer to it quickly when necessary.

[Important]

- This instruction manual is an original document dedicated for this product.
- This product cannot be used in ways not shown in this instruction manual. IAI shall not be liable for any result whatsoever arising from the use of the product in any other way than what is noted in the manual.
- The information contained in this instruction manual is subject to change without notice for the purpose of product improvement.
- If any issues arise regarding the information contained in this instruction manual, contact our customer center or the nearest sales office.
- Use or reproduction of this instruction manual in full or in part without permission is prohibited.
- The company names, names of products and trademarks of each company shown in the text are registered trademarks.

Configuration of manuals related to RCON system

Product name	Instruction manual name	Control number
RCON Gateway Unit	First Step Guide	ME0382
RCON Motion Gateway Unit	First Step Guide	ME0433
RCON 24V Driver Unit	First Step Guide	ME0383
RCON 200V Power Supply / Driver Unit	First Step Guide	ME0397
REC System	First Step Guide	ME0395
RCON System	Instruction Manual (this document)	ME0384
REC System	REC-GW/RCON-EC Instruction Manual	ME0394
SCON-CB Controller	SCON-CB/CGB/LC/LCG Instruction Manual	ME0340
RCON Motion Gateway Unit	RCON-MECHATROLINK-III Instruction Manual	ME0426
RCON Motion Gateway Unit	RCON EtherCAT Motion Instruction Manual	ME0427
RCON Motion Gateway Unit	RCON SSCNET III/H Instruction Manual	ME0428
PC Software	RCM-101-MW/RCM-101-USB Instruction Manual	ME0155
PC Software	IA-OS First Step Guide * For how to operate, refer to the guiding features installed in IA-OS	ME0391
Touch Panel Teaching Pendant	TB-02/02D Instruction Manual	ME0355
Touch Panel Teaching Pendant	TB-03 Instruction Manual	ME0376
24V Power Supply Unit	PSA-24 Instruction Manual	ME0379
Network Startup Guide (Japanese Only)	Quick Start Guide	Download from IAI homepage

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Safety Guide

"Safety Guide" has been written to use the machine safely and so prevent personal injury or property damage beforehand. Make sure to read it before the operation of this product.

Safety Precautions for Our Products

The common safety precautions for the use of any of our robots in each operation.

No.	Operation Description	Description
1	Model Selection	● This product has not been planned and designed for the application where high level of safety is required, so the guarantee of the protection of human life is impossible. Accordingly, do not use it in any of the following applications. 1) Medical equipment used to maintain, control or otherwise affect human life or physical health. 2) Mechanisms and machinery designed for the purpose of moving or transporting people (For vehicle, railway facility or air navigation facility) 3) Important safety parts of machinery (Safety device, etc.) ● Do not use the product outside the specifications. Failure to do so may considerably shorten the life of the product. ● Do not use it in any of the following environments. 1) Location where there is any inflammable gas, inflammable object or explosive 2) Place with potential exposure to radiation 3) Location with the ambient temperature or relative humidity exceeding the specification range 4) Location where radiant heat is added from direct sunlight or other large heat source 5) Location where condensation occurs due to abrupt temperature changes 6) Location where there is any corrosive gas (sulfuric acid or hydrochloric acid) 7) Location exposed to significant amount of dust, salt or iron powder 8) Location subject to direct vibration or impact ● For an actuator used in vertical orientation, select a model which is equipped with a brake. If selecting a model with no brake, the moving part may drop when the power is turned OFF and may cause an accident such as an injury or damage on the work piece.

No.	Operation Description	Description
2	Transportation	● When carrying a heavy object, do the work with two or more persons or utilize equipment such as crane. ● When the work is carried out with 2 or more persons, make it clear who is to be the "leader" and who to be the "follower(s)" and communicate well with each other to ensure the safety of the workers. ● When in transportation, consider well about the positions to hold, weight and weight balance and pay special attention to the carried object so it would not get hit or dropped. ● Transport it using an appropriate transportation measure. The actuators available for transportation with a crane have eyebolts attached or there are tapped holes to attach bolts. Follow the instructions in the instruction manual for each model. ● Do not step or sit on the package. ● Do not put any heavy thing that can deform the package, on it. ● When using a crane capable of 1t or more of weight, have an operator who has qualifications for crane operation and sling work. ● When using a crane or equivalent equipments, make sure not to hang a load that weighs more than the equipment's capability limit. ● Use a hook that is suitable for the load. Consider the safety factor of the hook in such factors as shear strength. ● Do not get on the load that is hung on a crane. ● Do not leave a load hung up with a crane. ● Do not stand under the load that is hung up with a crane.
3	Storage and Preservation	● The storage and preservation environment conforms to the installation environment. However, especially give consideration to the prevention of condensation. ● Store the products with a consideration not to fall them over or drop due to an act of God such as earthquake.
4	Installation and Start	(1) Installation of Robot Main Body and Controller, etc. ● Make sure to securely hold and fix the product (including the work part). A fall, drop or abnormal motion of the product may cause a damage or injury. Also, be equipped for a fall-over or drop due to an act of God such as earthquake. ● Do not get on or put anything on the product. Failure to do so may cause an accidental fall, injury or damage to the product due to a drop of anything, malfunction of the product, performance degradation, or shortening of its life. ● When using the product in any of the places specified below, provide a sufficient shield. 1) Location where electric noise is generated 2) Location where high electrical or magnetic field is present 3) Location with the mains or power lines passing nearby 4) Location where the product may come in contact with water, oil or chemical droplets

No.	Operation Description	Description
4	Installation and Start	(2) Cable Wiring ● Use our company's genuine cables for connecting between the actuator and controller, and for the teaching tool. ● Do not scratch on the cable. Do not bend it forcibly. Do not pull it. Do not coil it around. Do not insert it. Do not put any heavy thing on it. Failure to do so may cause a fire, electric shock or malfunction due to leakage or continuity error. ● Perform the wiring for the product, after turning OFF the power to the unit, so that there is no wiring error. ● When the direct current power (+24V) is connected, take the great care of the directions of positive and negative poles. If the connection direction is not correct, it might cause a fire, product breakdown or malfunction. ● Connect the cable connector securely so that there is no disconnection or looseness. Failure to do so may cause a fire, electric shock or malfunction of the product. ● Never cut and/or reconnect the cables supplied with the product for the purpose of extending or shortening the cable length. Failure to do so may cause the product to malfunction or cause fire.
		(3) Grounding ● The grounding operation should be performed to prevent an electric shock or electrostatic charge, enhance the noise-resistance ability and control the unnecessary electromagnetic radiation. ● For the ground terminal on the AC power cable of the controller and the grounding plate in the control panel, make sure for grounding work. For security grounding, it is necessary to select an appropriate wire thickness suitable for the load. Perform wiring that satisfies the specifications (electrical equipment technical standards). For details, follow the instructions in the instruction manual for each controller. ● Perform Class D Grounding (former Class 3 Grounding with ground resistance 100Ω or below).

No.	Operation Description	Description
4	Installation and Start	(4) Safety Measures ● When the work is carried out with 2 or more persons, make it clear who is to be the “leader” and who to be the “follower(s)” and communicate well with each other to ensure the safety of the workers. ● When the product is under operation or in the ready mode, take the safety measures (such as the installation of safety and protection fence) so that nobody can enter the area within the robot’s movable range. When the robot under operation is touched, it may result in death or serious injury. ● Make sure to install the emergency stop circuit so that the unit can be stopped immediately in an emergency during the unit operation. ● Take the safety measure not to start up the unit only with the power turning ON. Failure to do so may start up the machine suddenly and cause an injury or damage to the product. ● Take the safety measure not to start up the machine only with the emergency stop cancellation or recovery after the power failure. Failure to do so may result in an electric shock or injury due to unexpected power input. ● When the installation or adjustment operation is to be performed, give clear warnings such as “Under Operation; Do not turn ON the power!” etc. Sudden power input may cause an electric shock or injury. ● Take the measure so that the work part is not dropped in power failure or emergency stop. ● Wear protection gloves, goggle or safety shoes, as necessary, to secure safety. ● Do not insert a finger or object in the openings in the product. Failure to do so may cause an injury, electric shock, damage to the product or fire. ● When releasing the brake on a vertically oriented actuator, exercise precaution not to pinch your hand or damage the work parts with the actuator dropped by gravity.
5	Teaching	● When the work is carried out with 2 or more persons, make it clear who is to be the “leader” and who to be the “follower(s)” and communicate well with each other to ensure the safety of the workers. ● Perform the teaching operation from outside the safety protection fence, if possible. In the case that the operation is to be performed unavoidably inside the safety protection fence, prepare the “Stipulations for the Operation” and make sure that all the workers acknowledge and understand them well. ● When the operation is to be performed inside the safety protection fence, the worker should have an emergency stop switch at hand with him so that the unit can be stopped any time in an emergency. ● When the operation is to be performed inside the safety protection fence, in addition to the workers, arrange a watchman so that the machine can be stopped any time in an emergency. Also, keep watch on the operation so that any third person can not operate the switches carelessly. ● Place a sign “Under Operation” at the position easy to see. ● When releasing the brake on a vertically oriented actuator, exercise precaution not to pinch your hand or damage the work parts with the actuator dropped by gravity. * Safety protection Fence : In the case that there is no safety protection fence, the movable range should be indicated.

No.	Operation Description	Description
6	Trial Operation	● When the work is carried out with 2 or more persons, make it clear who is to be the "leader" and who to be the "follower(s)" and communicate well with each other to ensure the safety of the workers. ● After the teaching or programming operation, perform the check operation one step by one step and then shift to the automatic operation. ● When the check operation is to be performed inside the safety protection fence, perform the check operation using the previously specified work procedure like the teaching operation. ● Make sure to perform the programmed operation check at the safety speed. Failure to do so may result in an accident due to unexpected motion caused by a program error, etc. ● Do not touch the terminal block or any of the various setting switches in the power ON mode. Failure to do so may result in an electric shock or malfunction.
7	Automatic Operation	● Check before starting the automatic operation or rebooting after operation stop that there is nobody in the safety protection fence. ● Before starting automatic operation, make sure that all peripheral equipment is in an automatic-operation-ready state and there is no alarm indication. ● Make sure to operate automatic operation start from outside of the safety protection fence. ● In the case that there is any abnormal heating, smoke, offensive smell, or abnormal noise in the product, immediately stop the machine and turn OFF the power switch. Failure to do so may result in a fire or damage to the product. ● When a power failure occurs, turn OFF the power switch. Failure to do so may cause an injury or damage to the product, due to a sudden motion of the product in the recovery operation from the power failure.

No.	Operation Description	Description
8	Maintenance and Inspection	● When the work is carried out with 2 or more persons, make it clear who is to be the “leader” and who to be the “follower(s)” and communicate well with each other to ensure the safety of the workers. ● Perform the work out of the safety protection fence, if possible. In the case that the operation is to be performed unavoidably inside the safety protection fence, prepare the “Stipulations for the Operation” and make sure that all the workers acknowledge and understand them well. ● When the work is to be performed inside the safety protection fence, basically turn OFF the power switch. ● When the operation is to be performed inside the safety protection fence, the worker should have an emergency stop switch at hand with him so that the unit can be stopped any time in an emergency. ● When the operation is to be performed inside the safety protection fence, in addition to the workers, arrange a watchman so that the machine can be stopped any time in an emergency. Also, keep watch on the operation so that any third person can not operate the switches carelessly. ● Place a sign “Under Operation” at the position easy to see. ● For the grease for the guide or ball screw, use appropriate grease according to the instruction manual for each model. ● Do not perform the dielectric strength test. Failure to do so may result in a damage to the product. ● When releasing the brake on a vertically oriented actuator, exercise precaution not to pinch your hand or damage the work parts with the actuator dropped by gravity. ● The slider or rod may get misaligned OFF the stop position if the servo is turned OFF. Be careful not to get injured or damaged due to an unnecessary operation. ● Pay attention not to lose the removed cover or screws, and make sure to put the product back to the original condition after maintenance and inspection works. Use in incomplete condition may cause damage to the product or an injury. * Safety protection Fence : In the case that there is no safety protection fence, the movable range should be indicated.
9	Modification and Dismantle	● Do not modify, disassemble, assemble or use of maintenance parts not specified based at your own discretion.
10	Disposal	● When the product becomes no longer usable or necessary, dispose of it properly as an industrial waste. ● When removing the actuator for disposal, pay attention to drop of components when detaching screws. ● Do not put the product in a fire when disposing of it. The product may burst or generate toxic gases.
11	Other	● Do not come close to the product or the harnesses if you are a person who requires a support of medical devices such as a pacemaker. Doing so may affect the performance of your medical device. ● See Overseas Specifications Compliance Manual to check whether complies if necessary. ● For the handling of actuators and controllers, follow the dedicated instruction manual of each unit to ensure the safety.

Alert Indication

The safety precautions are divided into “Danger”, “Warning”, “Caution” and “Notice” according to the warning level, as follows, and described in the instruction manual for each model.

Level	Degree of Danger and Damage	Symbol
Danger	This indicates an imminently hazardous situation which, if the product is not handled correctly, will result in death or serious injury.	⚠ Danger
Warning	This indicates a potentially hazardous situation which, if the product is not handled correctly, could result in death or serious injury.	⚠ Warning
Caution	This indicates a potentially hazardous situation which, if the product is not handled correctly, may result in minor injury or property damage.	⚠ Caution
Notice	This indicates lower possibility for the injury, but should be kept to use this product properly.	❗ Notice

Precautions for Handling

1. Make sure to follow the usage condition, environment and specification range of the product.
   In case it is not secured, it may cause a drop in performance or malfunction of the product.

2. Use the correct teaching tool.
   Refer to the following item and use compatible tools for PC software and teaching pendant usable for this controller.
   [Refer to Startup Section Chapter 1, 1.2 Tools to Use]

3. Back up data in order to be prepared for a breakdown.
   Non-volatile memory is used for backup memory of this controller. Registered position data and parameters are written in this memory and backed up. Therefore, these data will normally not be lost even if the power is turned off. However, be sure to save the latest data to enable a quick recovery process in case this controller needs to be replaced with a substitute due to breakdown, etc.

   How to save
   (1) Save to an external memory or a hard disk using PC software
   (2) Record position table and parameters in writing

4. Perform initial operation setting.
   This controller is compatible with 7 types of field network to support various applications, and provided with 6 types of operation modes (Note). These settings can be made during initial setting. Set operation mode to suit the application at startup.
   [Refer to Startup Section Chapter 4 Network Configuration]
   Note: It is not available to select an operation mode in the EC connection unit.

Warning

- It is dangerous if operation settings of the control sequence and field network are not matched, as it will not only prevent normal operation but can also lead to unpredictable operation.

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5. Except for the EC connection unit, servo ON signal SON must be entered to enable operation. The SON signal puts the actuator into an operable status.

6. Turn on MON Signal in the gateway control signals after the link with the PLC is established. Turn MON Signal on otherwise the control from PLC should not be available for those other than the EC connection units. [Refer to 3.7 Address Configuration in Chapter 3 Gateway Unit in Specification Edition]

7. Calendar function time setting

   Gateway alarm code 84A "Real Time Clock Oscillation Stop Detected" may occur when turning the power on for the first time after delivery. In that case, set the current time with the teaching tool.

   When fully charged, time data can be retained approximately 10 days after the power is turned OFF.

   At shipment, time will be set but the unit will not be fully charged. Therefore, even if the above-mentioned number of days has not passed from shipment, the time data may be lost.

8. Be careful of rubbing or twisting when using the through hole of the rotary actuator.

   If using a rotary actuator with rotational center through hole, with cables, etc. inserted to the through hole, take measures against wear due to rubbing, or wire disconnection due to twisting. Be particularly cautious if the actuator is 360-degree specification, as it can infinitely rotate in the same direction.

9. There are restrictions on index mode operation of the rotary actuator.

   With use of Parameter No. 79 "Rotary Axis Mode Select", rotary actuators with 360-degree specification allow selection of normal mode which provides limited rotation operation, or index mode which enables multi-rotation control.

   [Refer to Startup Section Chapter 6, 6.1 Parameter]

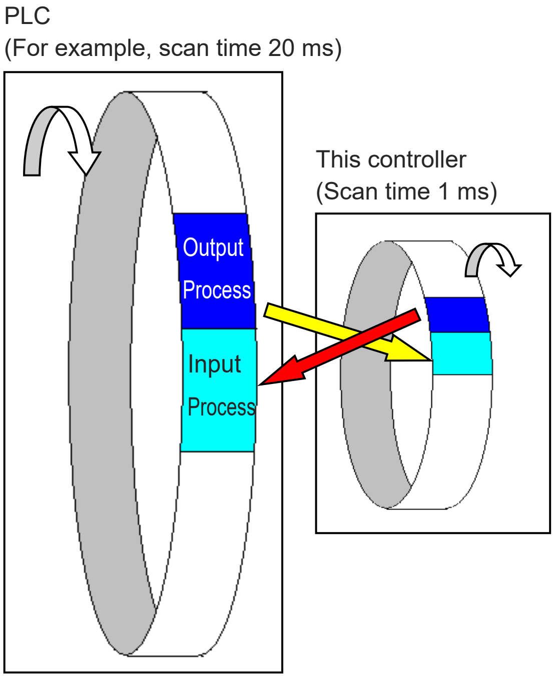
   The index mode has the following restrictions.

   (1) In jog or inching operation using teaching tools such as PC software, etc., the one-time command range enables a maximum of 360° in jog operation, or 1° in inching operation.
   (2) Pushing cannot be performed. For push torque, settings other than 0 cannot be made.
   (3) Do not repetitively execute positioning commands around 0 degree numerous times while traveling in the vicinity of 0 degree. The rotation direction may switch, or operation may become unstable.
   (4) Software stroke limit is disabled in index mode.

10. Creation of sequence programs

When creating a sequence program, be careful of the following.

If exchanging data between devices with different scan time, the length of time required for a reliable signal reading process is greater than the longer scan time. (In order to safely perform the reading process on the PLC side, we recommend using a timer set value of at least twice the longer scan time.)



- Operational image

As shown in the diagram, if exchanging data between 2 devices with different scan time, obviously the I/O timing will not match.

When the signal of this controller turns ON, there is no guarantee that the PLC will read it immediately.

In cases like this, in order to achieve reliable reading, set the PLC side to read after a period greater than the longer scan time has passed.

This also applies when the reading is performed on the controller side.

On this occasion, make sure the safety factor of the timer setting is 2 to 4 times or more of the scan time.

As the timer is also processed within the scanning process, setting below the scan time is dangerous.

The example shown in the diagram indicates that even if this controller performs output process once every 1 ms, the PLC can only recognize once every 20 ms.

The PLC only performs the output process once every 20 ms, meaning that it keeps recognizing the same output status for that period.

Also, if reading is performed while the other device is rewriting output, incorrect signals may be read at times. Wait until the rewriting is completely finished (allow interval of 2 scans or more), then perform reading. In terms of the output-side device, do not allow its output to change until the other device finishes the reading. Additionally, an input constant is set for the input component to prevent mistaken detection of noise, etc. so it only accepts signals that last more than a certain period of time. It is necessary to add this period of time as well.

11. PLC timer setting

    The PLC timer setting should not be at minimum set value.

    If "1" is set, some PLCs turn ON somewhere between 0 and 100 ms with a 100 ms timer, or between 0 and 10 ms with a 10 ms timer.

    Consequently, the process which will be performed is the same as when a timer is not set, which may lead to failures such as failing to position to a specified position No. in positioner mode, etc.

    The minimum set value of the 10 ms timer should be "2", and when required to set to 100 ms, use the 10 ms timer and set it to "10".

12. Battery-less absolute specification actuators

    (1) For stepper motor specification, parameter setting allows switching between absolute specification and incremental specification.

    · Parameter No. 83 "Absolute Unit" 0: Not in use (incremental specification)
    1: In use (absolute specification)

    (2) RCP5 series actuators will perform slight position adjustment operation due to characteristics of the stepper motor during initial servo ON only, after the power is turned ON.
    Maximum travel during position adjustment operation is 0.025 x lead length [mm].
    Additionally, until servo turns ON, the present position displayed on the teaching tool will be the coordinates prior to the adjustment operation.

    (3) After the power is turned ON followed by the initial servo ON, home return complete signal HEND will be output.

    (4) If the initial servo ON is executed outside range of the software limit, no error will be output.
    After traveling within the range, monitoring of the software limit will start.

    (5) If the motor unit is removed from the actuator for motor replacement, etc., be sure to perform home return motion (absolute reset).

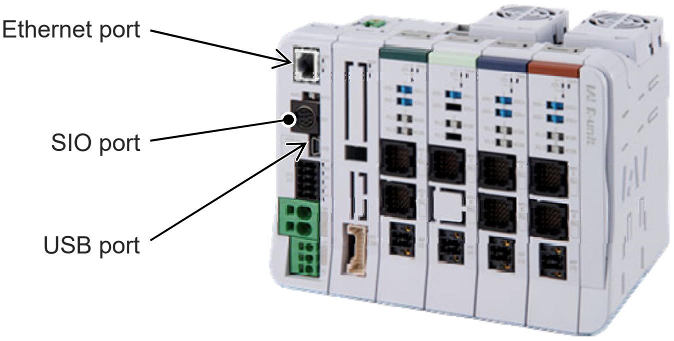
13. External communication ports

    The RCON gateway unit has 3 types of communication port.

    · SIO port (RS-485 round connector)
    · USB port (USB mini-B connector)
    · Ethernet port

    Do not connect multiple ports and perform communication simultaneously.
    This may result in following errors:

    · Occurrence of communication error
    · Occurrence of unpredictable operation



14. Supported standards for CC-Link IE

    Our product supports CC-Link IE Field only.

15. Handling of Built-in Drive Cutoff Relay and Cautions in Caution in Handling

    The drive cutoff solid-state relay installed in this system requires a special care in handling. Understand well about the contacts below before use.

    - The drive cutoff solid-state relay built in RCON-SC is assumed to be used in small frequency such as emergency stop of a system and not intended for frequent use. Therefore, in a condition to require high frequency of use of the drive cutoff relay such as a case to turn OFF/ON the driving source in every setup change, the life of the relay may reach to the end in early stage.

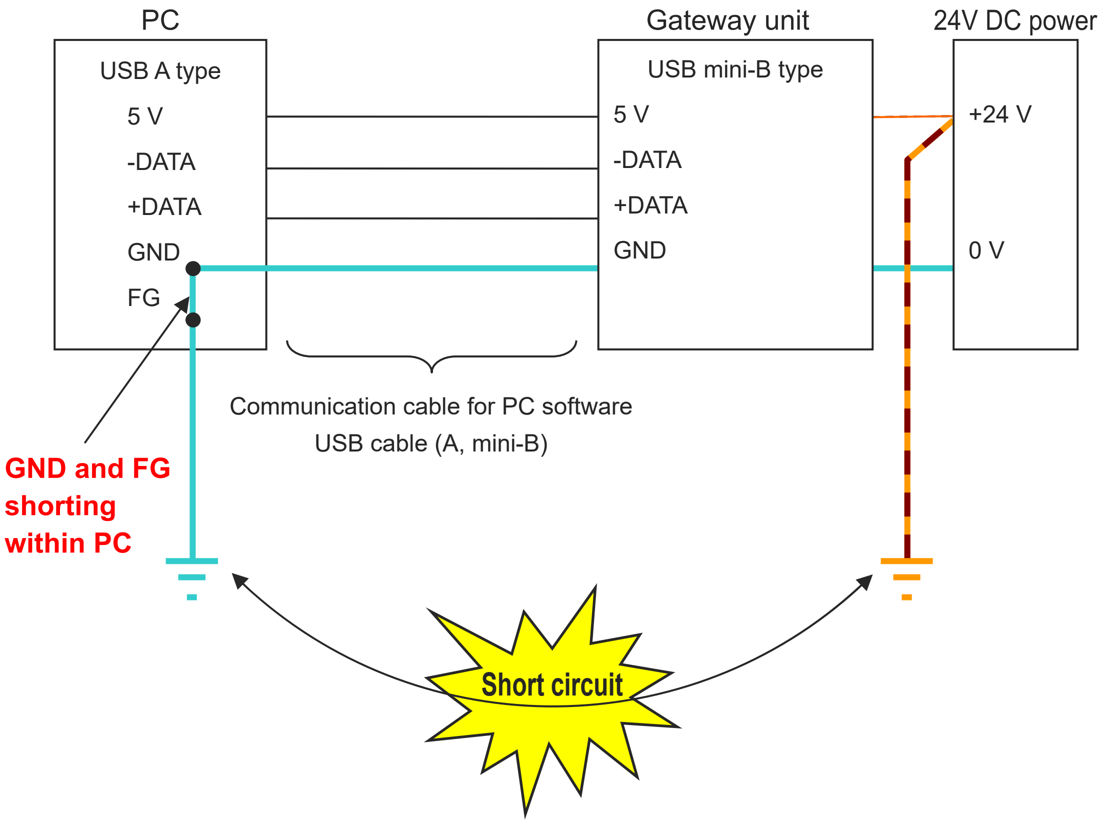
      As a reference, have the number of turning on and off at five times per day at the most. Also, have a cooling time of approximately 30 minutes after the drive cutoff.

16. The REC system is not capable of operating ELECYLINDER in the single solenoid system. ELECYLINDER may not operate as commanded by a host system if Parameter No. 9 Select Electromagnetic Valve System (Operation System) is changed to Single.

Precautions for PC connection to RCON gateway unit grounded at positive terminal of 24V DC power supply

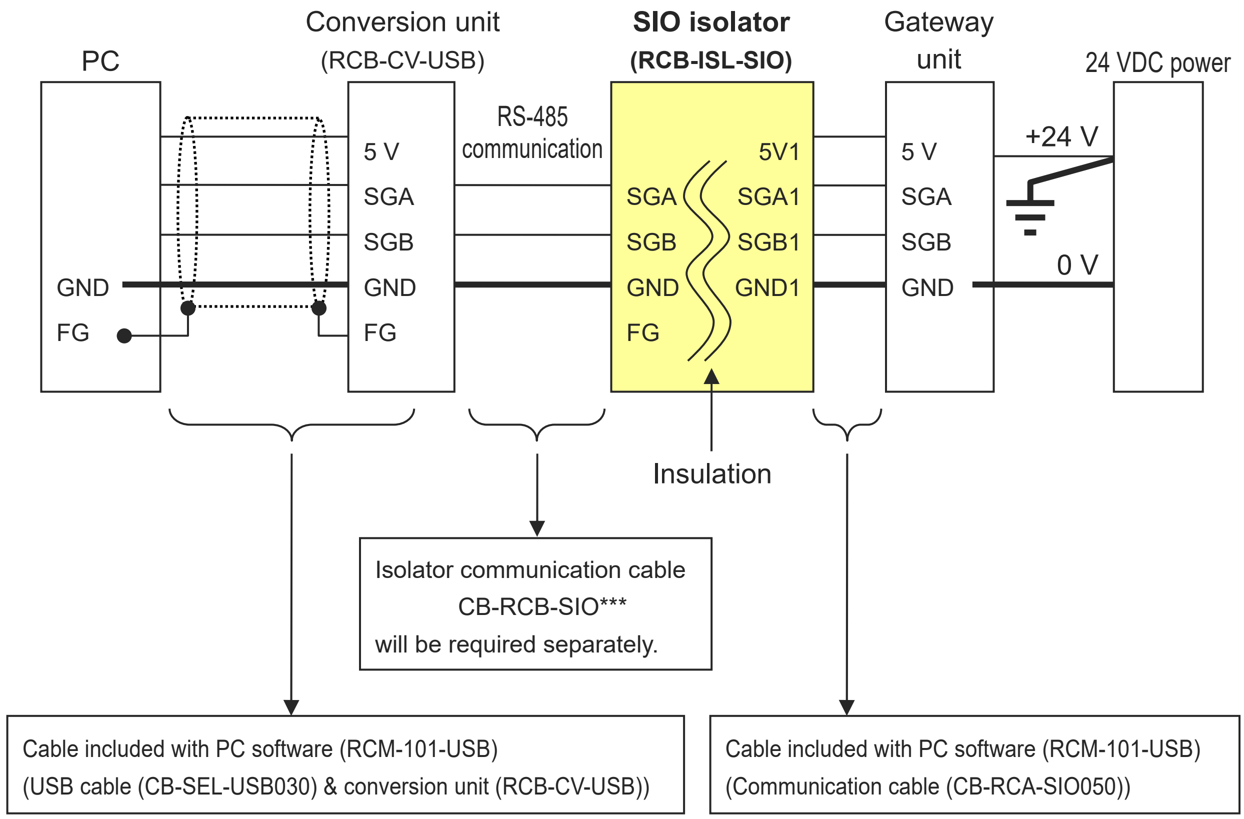
If the RCON gateway unit is grounded at the positive terminal of the 24V DC power supply, a PC cannot be connected to the USB connector (mini-B) of the gateway unit.

If connected directly, short-circuiting of the power will occur as shown in the diagram below, causing malfunction of the PC.



Precautions for PC connection to RCON gateway unit grounded at positive terminal of 24V DC power supply

If the gateway unit is grounded at the positive terminal of the 24V DC power supply, use an SIO isolator (RCB-ISL-SIO) as shown in the diagram below when connecting a PC to the SIO connector of the gateway unit.
If a PC is connected to the gateway unit without using an SIO isolator, the power will short-circuit and cause the PC to malfunction.



Isolator communication cable
CB-RCB-SIO***
will be required separately.

Cable included with PC software (RCM-101-USB)
(USB cable (CB-SEL-USB030) & conversion unit (RCB-CV-USB))

Cable included with PC software (RCM-101-USB)
(Communication cable (CB-RCA-SIO050))

Caution

- RS-232 conversion unit (RCB-CV-MW) cannot be used.

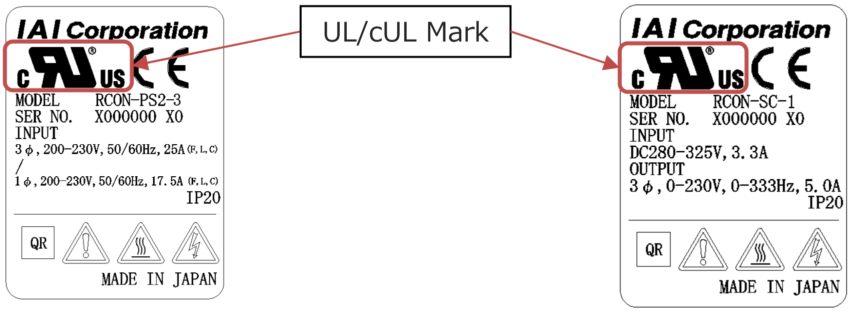
International Standard Compliance

This product complies with the following overseas standards.
Refer to the Overseas Standard Compliance Manual (ME0287) for more detailed information.

Revised RoHS Directive	CE Marking	UL Certification
○	○	○ (Note 1)

Note 1: In the driver units "RCON-SC-1" and "RCON-PS2-3", only the models with UL/cUL mark applied in the model code label are complied.

[200V Power Supply Unit] **[200V Driver Unit]**



About UL/cUL

1. Environment of Use

- Use in an environment of Pollution Degree 2 is available.
- Use it in an environment with the peripheral temperature at 55°C or below.

2. Overload Protection

RCON-PS2-3, RCON-SC-1 is quipped with a built-in servomotor overload protection feature. The overload protection function activates at 115% of all the load current on the servomotor as a criteria.

3. Short Circuit Current Rating (SCCR: Short Circuit Current Rating)

This product should be used with connectivity to the power supply environment of 5,000Arms or less. Also, the maximum voltage available to use is as shown below:

- AC230V

* The R-unit products except for RCON-PS2-3 and RCON-SC-1 should be connected to the power supply environment with 24V and 100A or less.

4. About Wiring Protection

The short-circuit protection circuit built in the product is for a purpose of the branch circuit protection. For the branch circuit protection, follow the NEC standards and regulations in each region to conduct.

5. About Circuit Breaker

In order to comply with the UL, it is necessary to figure out the power supply input current of the controller from the connected motor capacity and to use a circuit breaker certified as the UL listed.

* Circuit Breaker Used When RCON-SC Certified for UL
Supplier : Mitsubishi Electric Corporation
Model : NF50-SVFU330

Warranty

1. Warranty period

Whichever of the following periods is shorter:

- 18 months after shipment from IAI
- 12 months after delivery to a specified location
- 2,500 operational hours

2. Scope of the warranty

Our products are covered by warranty when all of the following conditions are met.
Faulty products covered by warranty will be replaced or repaired free of charge:

(1) The breakdown or malfunction in question pertains to our product as delivered by IAI or our authorized dealer.
(2) The breakdown or malfunction in question occurred during the warranty period.
(3) The breakdown or malfunction in question occurred while the product was in use for an appropriate purpose under the operating conditions and operating environment specified in the instruction manual and catalog.
(4) The breakdown or malfunction in question was caused by a specification defect, malfunction, or poor product quality.

Note that breakdowns due to any of the following reasons are excluded from the scope of warranty:

(1) Anything other than our product
(2) Modification or repair performed by a party other than IAI (unless approved by IAI)
(3) Anything that could not be easily predicted with the level of science and technology available at the time of shipment from IAI
(4) Natural disaster, unnatural disaster, incident or accident for which we are not liable
(5) Natural fading of paint or other symptoms of aging
(6) Wear, depletion or other expected results of use
(7) Operation noise, vibration or other subjective sensations not affecting function or maintenance

Note that the warranty only covers our product as delivered and that any secondary loss arising from a breakdown of our product is excluded from the scope of warranty.

3. Honoring the warranty

As a rule, the product must be consigned to IAI for repair under warranty.

4. Limited liability

(1) We assume no liability for any special damage, consequential loss or passive loss such as a loss of expected profit arising from or in connection with our product.

(2) We assume no liability for any program or control method created by the customer to operate our product or for the results of any such program or control method.

5. Conformance with applicable standards/regulations, etc., and application conditions

(1) If our product is combined with another product or any system, equipment, etc., used by the customer, the customer must first check the applicable standards, regulations and/or rules.
The customer is also responsible for confirming that such combination with our product conforms to the applicable standards, etc.
In such a case we assume no liability for the conformance of our product with the applicable standards, etc.

(2) Our product is for general industrial use. It is not intended or designed for the applications specified below, which require a high level of safety. Accordingly, as a rule our product cannot be used in these applications.
Contact IAI if you must use our product for any of these applications:
  (1) Medical equipment used to maintain, control or otherwise affect human life or physical health
  (2) Mechanisms and machinery designed for the purpose of moving or transporting people (vehicles, railway facilities, aviation facilities etc.)
  (3) Machinery components essential for safety (safety devices etc.)
  (4) Equipment used to handle cultural assets, art or other irreplaceable items

(3) Contact IAI in advance if our product is to be used in any condition or environment that differs from that specified in the catalog or instruction manual.

6. Other items excluded from warranty

The price of the product delivered to you does not include expenses associated with programming, the dispatch of engineers, etc. Accordingly, a separate fee will be charged in the following cases even during the warranty period:

(1) Guidance for mounting/adjustment and witnessing of test operation
(2) Maintenance and inspection
(3) Technical guidance and education on operating/wiring methods, etc.
(4) Technical guidance and education on programming and other items related to programs

Actuator Coordinate System

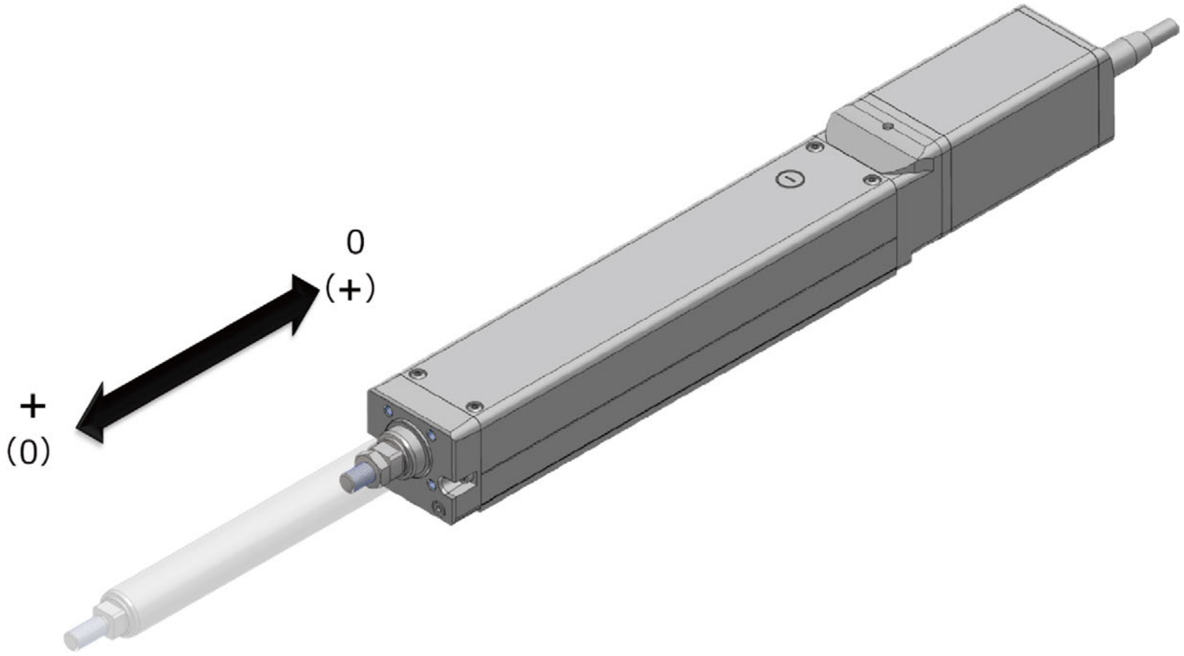
Unless indicated as home reverse specification (option), the direction of home return for the linear axis is on the motor side, the rotary axis is on the counterclockwise side, and the gripper is on the outside (open side).

Caution

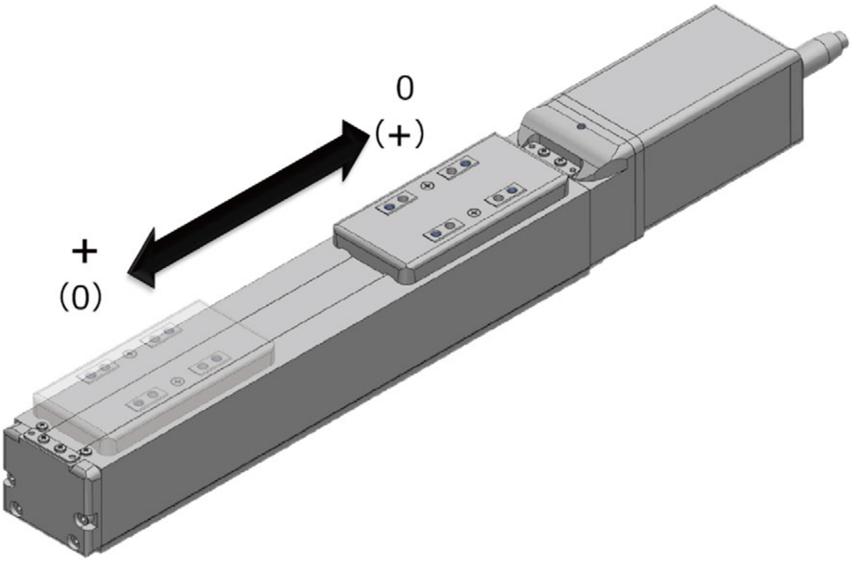
- Homing direction cannot be changed with some models.
- If it becomes necessary to reverse the homing direction after assembly to equipment, check the model of the applicable actuator to ensure that the homing direction is changeable.
- For models with which change is not possible, the actuator must be replaced. Contact IAI if anything is unclear.

The 0 in the figure below shows home. The parentheses show home reverse specification.

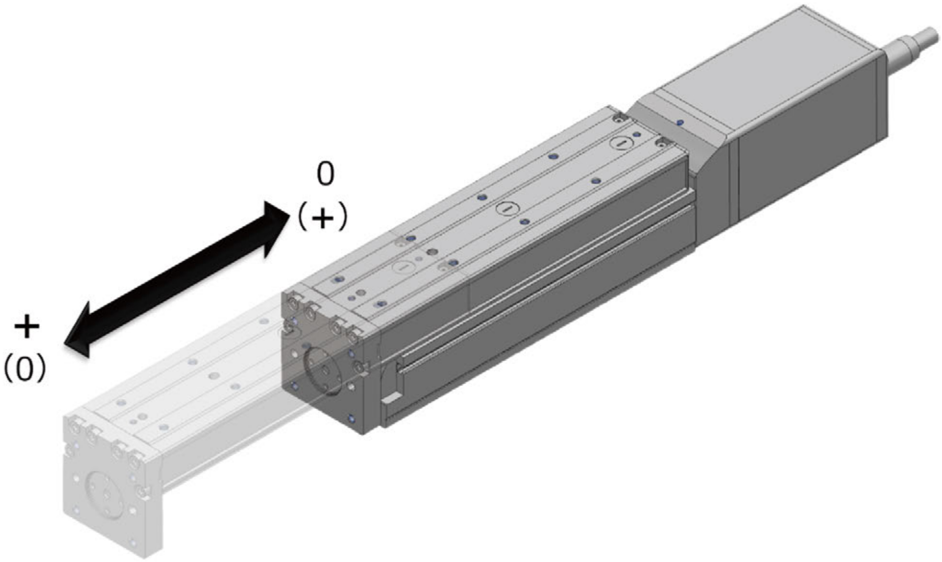
(1) Rod type



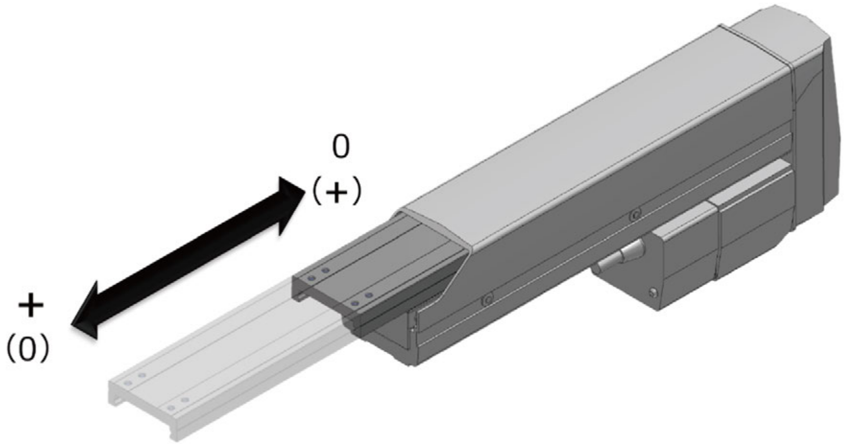
(2) Slider type



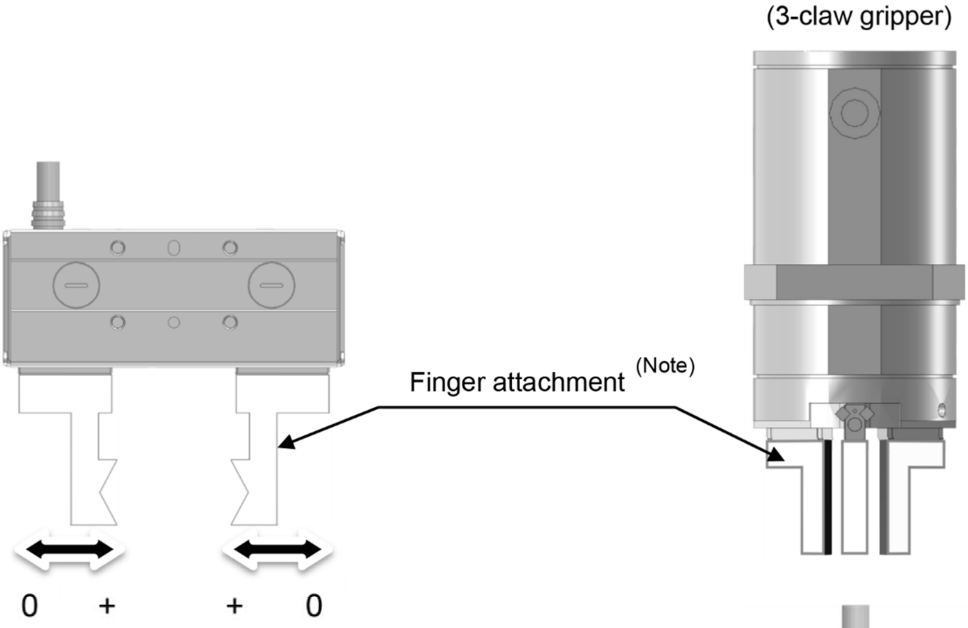
(3) Table type



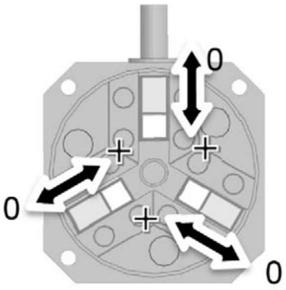
(4) Arm type



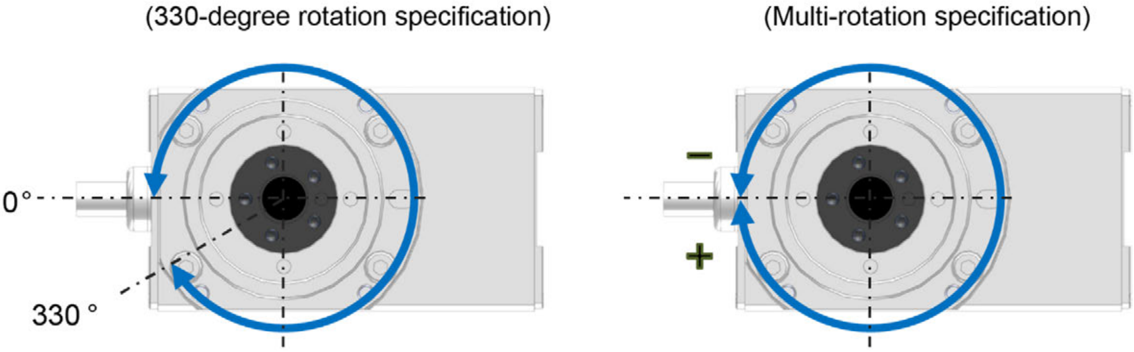
(5) Gripper type



Note: The finger attachment is not an accessory for the actuator. It is to be prepared by the customer.



(6) Rotary type



In the home reverse specification for the multi-rotation specification, the +/- directions are the reverse of the figure.

Specifications Section

Chapter 1

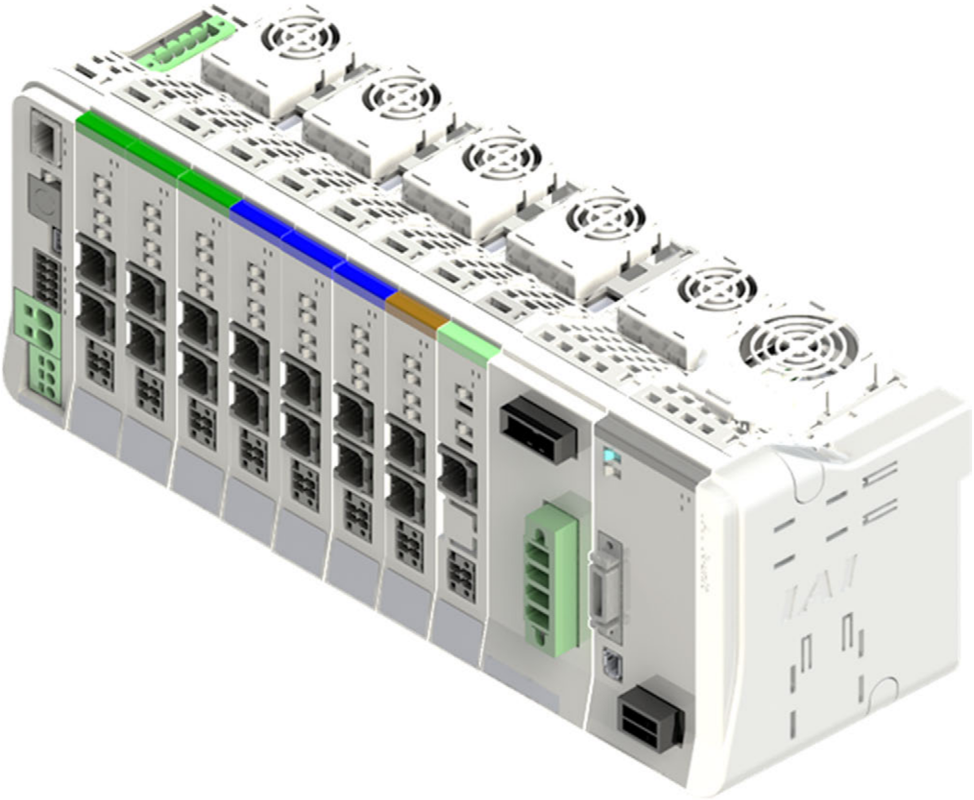
RCON Overview

1.1 Overview

RCON is a host programmable controller (hereafter PLC) dedicated for operating a ROBO Cylinder or commercial robots using a field network.

1 gateway unit set serves as the field network connection interface to which multiple driver units can be freely configured for control of up to 16 axes (Note 1).

There are 10 types of gateways, for CC-Link, CC-Link IE Field, DeviceNet, EtherCAT, EtherNet /IP, PROFIBUS-DP and PROFINET IO, MECHATROLINK- Ⅲ, EtherCAT Motion, SSCNET-Ⅲ/H. Also, there are 5 types of driver units, for RCP Series, for High-Thrust RCP Series, for RCA Series, for RCD Series and for 200V Servo-motor. The unit for ELECYLINDER connection is also available for combination.



Driver unit × 9 (16-axis specifications) + 200V Power Supply Unit, with fan unit

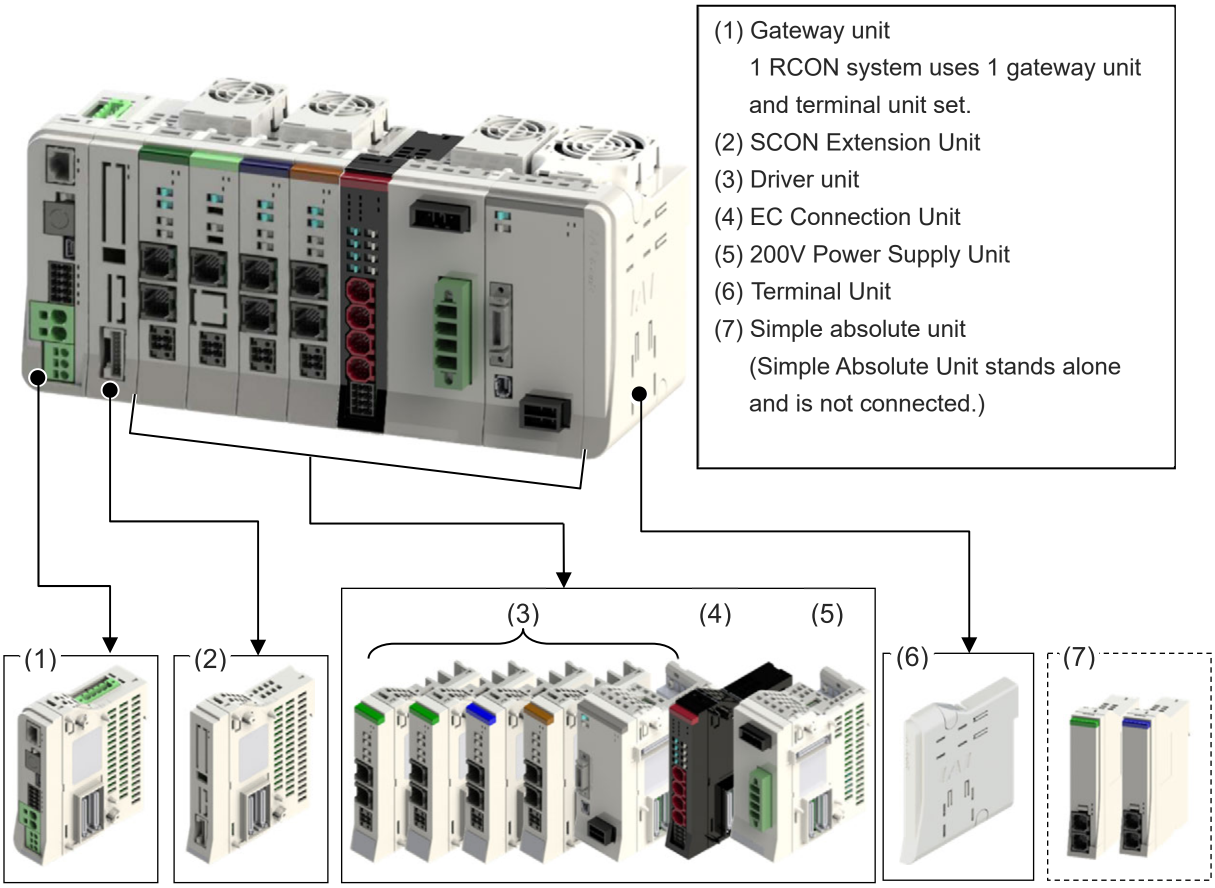
Note 1: The maximum number of connectable axes in the direct numerical mode in the field network except for CC-Link and CC-Link IE Field and for the motion controllers should be eight axes.

1.2 Features

(1) Modular connections with excellent expansibility
The following 7 types of units can be freely combined to build the RCON system.
Max. number of connectable axes is 16 axes (Note 1).

It is available to connect each type of ROBO Cylinder (RCP/High-Thrust RCP Series, RCA/RCL Series, RCD Series and RCS Series) and actuator (ISA series, ISB series and NSA series etc.). In addition, it is available to increase the types of robots to connect by using SCON extension units.

Each driver unit can also connect to a simple absolute unit to support simple absolute type ROBO Cylinders.



(1) Gateway unit
1 RCON system uses 1 gateway unit and terminal unit set.
(2) SCON Extension Unit
(3) Driver unit
(4) EC Connection Unit
(5) 200V Power Supply Unit
(6) Terminal Unit
(7) Simple absolute unit
(Simple Absolute Unit stands alone and is not connected.)

Note 1: The maximum number of connectable axes in the direct numerical mode in the field network except for CC-Link and CC-Link IE Field and for the motion controllers should be eight axes.

(2) Ultra-compact size

Gateway units/driver units have an ultra-compact size of width 30 mm/22.6 mm x height 115 mm x depth 95 mm.

The smallest combination with 16 axes connected has width 223.4 mm x height 115 mm x depth 95 mm.

This contributes to control panel miniaturization.

(3) High performance

Adopts total frame communication for a communication cycle time within 4 ms even with 16 axes connected. This is the same even if SCON is connected via an extension unit. (except when EC connection unit is connected)

A high-heat dissipation structure is adopted to support ambient temperatures up to 55°C.

Duty cycle is restricted at 55°C environments, but there is no duty restriction with a fan unit mounted.

The operating temperatures of the simple absolute unit and SCON are up to 40°C.

(4) Enhanced preventive and predictive maintenance functions

The present position and motor current value can be monitored, as well as the travel count, travel distance, and motor overload status.

In addition, there are functions for predicting the life using the internal capacitor temperature and operation time, and for monitoring decreases in fan rotation speed.

The actuator body can register individual actuator information. The individual information can be checked at IAI even if the actuator is removed from the controller and returned.

(5) Improved usability

Equipped with a USB port as standard. Connection to a PC is possible using a commercial USB cable. Ethernet port is also available to mount in an option.

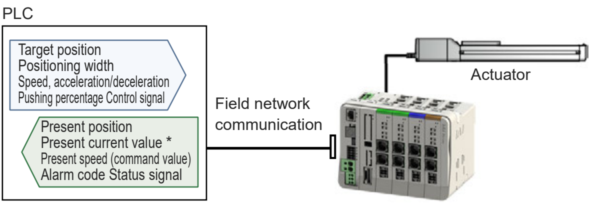
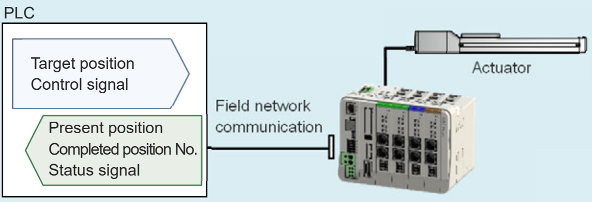
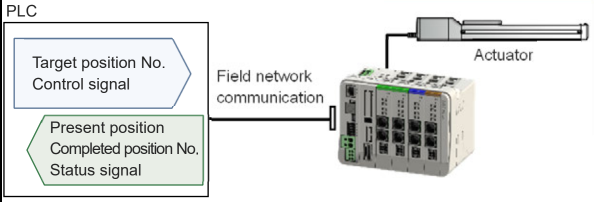
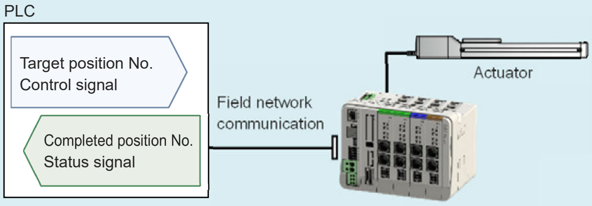
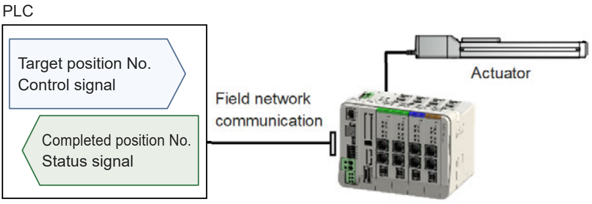
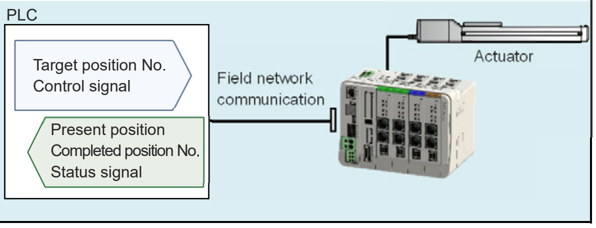
A JOG switch and brake release switch are equipped on the front of the driver unit and EC Connection Unit. Operation is easy even without a teaching tool.

(6) 6 types of operation modes

The following 6 operation modes can be used with RCON regardless of the host field network type. Operation mode can be selected to suit the application. (It is not available to select the operation mode in EC connection unit.)

Field network operation mode

In the field network, the following operations are available for selection.
(except when motion network and EC connection unit is connected)
Data required for operation (target position, speed, acceleration, push current value, etc.) are written by a connected PLC or other host controller into the specified addresses.

Operation mode	Content	Overview
Direct numerical control mode	This mode allows designating the target position, speed, acceleration/deceleration, and current limit value for pushing numerically. Also, it is capable of monitoring the present position, present speed, and the present current value (*) with 0.01mm increments.	
Simple direct mode	The target position can be indicated directly by a number. Both modes allow monitoring of the present position numerically with 0.01mm increments.	
Positioner 1 mode	Registers up to 128 points of position data, and can stop at the registered position. Both modes allow monitoring of the present position numerically with 0.01mm increments.	
Positioner 2 mode	Registers up to 128 points of position data, and can stop at the registered position. This mode does not allow monitoring of the present position. This mode has less in/out data transfer volume than the Positioner 1 mode.	
Positioner 3 mode	Registers up to 128 points of position data, and can stop at the registered position. This mode does not allow monitoring of the present position. This mode has less in/out data transfer volume than the Positioner 2 mode, and controls travel with the minimum of signals.	
Positioner 5 mode	Registers up to 16 points of position data, and can stop at the registered position. This mode has less in/out data transfer volume and fewer positioning tables than the Positioner 2 mode, and allows monitoring of the present position numerically with 0.1mm increments.	

* The present current value should be the command current value for the stepper motor and be the feedback current value for the AC servomotor (including AC servomotor connected to SCON-CB).

List of functions by operation mode

	Direct numerical control mode	Simple direct mode	Positioner 1 mode	Positioner 2 mode	Positioner 3 mode	Positioner 5 mode
Number of positioning points	Unlimited	Unlimited	128 points	128 points	128 points	16 points
Home return motion	○	○	○	○	○	○
Positioning operation	○	○	△	△	△	△
Speed, acceleration/ deceleration settings	○	△ (Note 1)	△	△	△	△
Different acceleration and deceleration settings	×	△	△	△	△	△
Pitch feed (Incremental)	○	△	△	△	×	△
JOG operation	△	△	△	△	×	△
Position data Reading Signal	×	×	○	○	×	×
Push-motion operation	○	△	△	△	△	△
Speed changes while traveling	○	△	△	△	△	△
Pausing	○	○	○	○	○	○
Zone signal output	△ (2 points)	△ (2 points)	△ (2 points)	△ (2 points)	△ (1 point)	△ (2 points)
Position zone signal output	×	△	△	△	×	×
Overload warning output	○	○	○	○	×	○
Vibration control (Note 2)	×	△	△	△	△	△
Collision Detection Feature (Note 3)	×	△	△	△	△	△
Present position reading (Note 4) (Resolution)	○ (0.01mm)	○ (0.01mm)	○ (0.01mm)	×	×	○ (Note 5) (0.1mm)

* ○: Direct setting is possible, △: Position data or parameter input is required, ×: The operation is not supported.

Note 1: The number of settable position data is 128 points at the maximum.

Note 2: This function is limited to the AC servo motor specification.

Note 3: It is a feature dedicated for the pulse motor type.

Note 4: DD motor is 0.001 degree (0.01 degree for positioner 5 mode only).

Note 5: The maximum output value in positioner 5 mode is 3,276.7 mm (327.67 degrees for DD motor). To control the actuator in an operation range exceeding the maximum value, select a different operation mode.

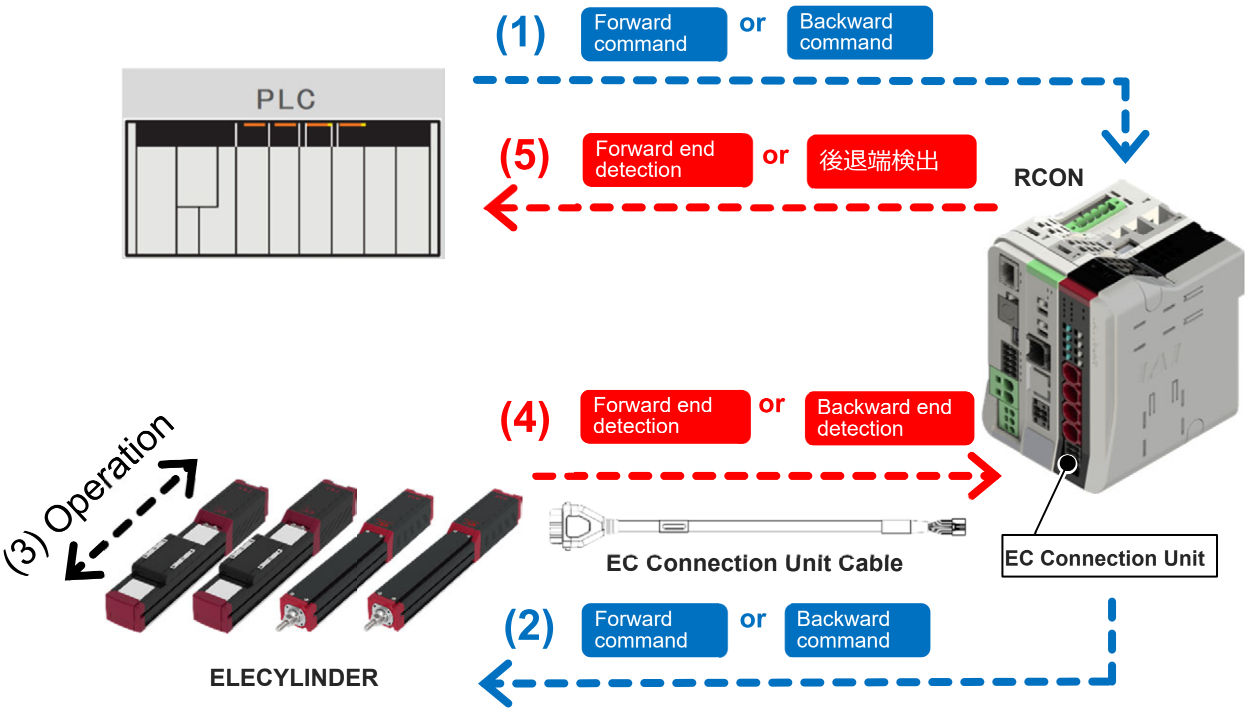
Operation of ELECYLINDER

ELECYLINDER can be operated by inputting a signal from the host device to ELECYLINDER via the EC connection unit.

Also, the status of ELECYLINDER can be grasped by having ELECYLINDER output signals and the host device receive them via the EC connection unit.

[Image of Connection] Connection between PLC and ELECYLINDER

(1) Input a movement signal (forward or backward) from PLC to RCON (EC connection unit).
(2) Input the movement signal from RCON (EC connection unit) to each unit of ELECYLINDER.
(3) ELECYLINDER units start moving.
(4) A position detection signal gets output from ELECYLINDER. (Forward end or backward end)
(5) The position detection signal gets output from RCON (EC connection unit) to PLC.



ELECYLINDER continues its operation while a movement command signal (ST0/ST1) is on, and a position detection signal (LS0/LS1) turns on after the operation is complete.

If the movement command signal gets turned off before the operation completes, the operation gets cancelled and an actuator decelerates and stops.

1.3 General Specifications

RCON system general specifications are listed below.

Item	Specifications
Power supply voltage	DC24V±10% AC200-230V±10%
Power supply current	Differs with system configuration (refer to [2.3 Specifications/Power supply capacity (page A2-10)] for details)
Power Supply Frequency	50/60Hz (only for 200V system)
Current Amperage	Refer to [2.3 Specifications / Power supply capacity (Page A2-10)]
In-rush Current	Refer to [2.3 Specifications / Inrush current (Page A2-18)]
Instantaneous Power Outage Durability	24V System : By 24V power source 200V System : Control power supply is by 24V power source Described as follows for motor power supply 20ms (50Hz) 16.6ms (60Hz)
Electric Shock Protection	24V System : Class III 200V System : Class I
Leakage Current	3.0mA or less (only for 200V system)
Number of controlled axes	1~16 axes (Note 1) (driver unit can be freely combined)
Supported field networks	CC-Link, CC-Link IE Field, DeviceNet, EtherCAT, EtherNet/IP, PROFIBUS-DP, PROFINET IO (slave station) EtherCAT Motion, MECHATROLINK- III, SSCNET III/H
Configuration units	Gateway unit, driver unit, EC connection unit, 200V power supply unit, simple absolute unit and SCON extension unit (refer to [2.2 Configuration Unit List (Page A2-3)] for detail)
Emergency stop/Enable operation	STOP Signal input on gateway unit applied to driver unit and EC connection unit at the same time, connectors equipped to cut off driving power source to each axis on each driver unit and EC connection unit
Ambient operating temperature	From 0 to 55degC, however from 0 to 40degC for simple absolute unit and SCON (refer to [2.3 Specifications / Operating temperature range (Page A2-20)] for detail)
Regulation/standard	CE Marking, UL Certification
External dimensions	Differ with system configuration
Connections between each unit	Unit connection method (refer to [Startup Section 2.1 Installation/Unit connection (page B2-5)] for details)
Installation/mounting method	DIN rail (35 mm) mounting

Note 1: Maximum number of connectable axes

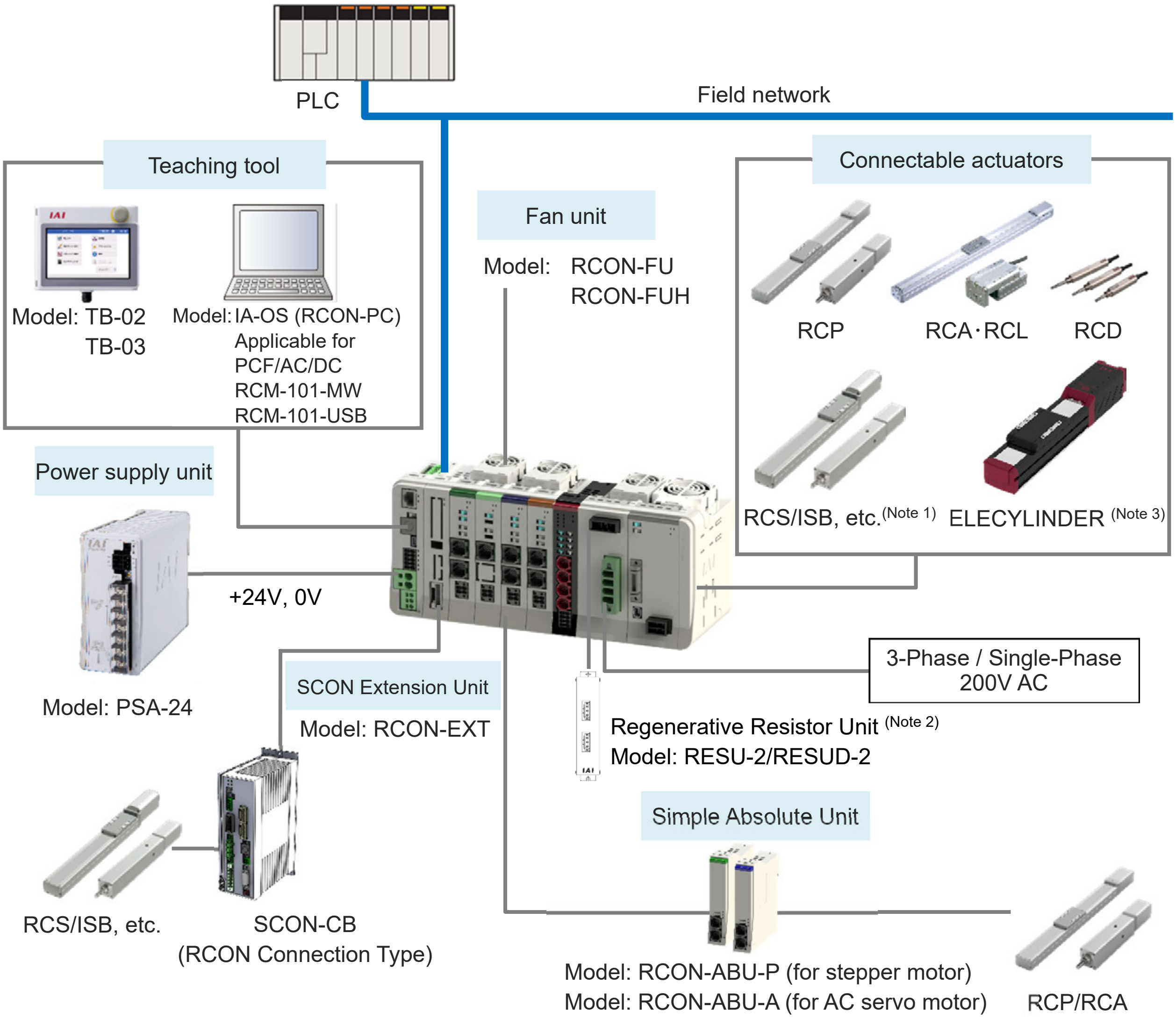
Specifications Section

Chapter 2

System Configuration and Specifications

2.1 System Configuration

The following shows Athe system configuration.



Note1: In case of the following 200V servomotor actuators and the case that the maximum wattage exceeds the following, it is not available to establish connectivity to RCON-SC.

1) Motor types other than those from 60W to 750W
2) Encoder types other than battery-less absolute, incremental, spurious absolute or index absolute type
3) For 3-Phase 200V ·········· Combination that exceeds 2400W for total wattage of actuators connected to 200V driver unit
4) For Single-Phase 200V ··· Combination that exceeds 1600W for total wattage of actuators connected to 200V driver unit
5) Servo Press types
6) SCARA Robot
7) CT4 Series
8) ZR Series

When (1) to (4) above, use SCON extension unit and SCON-CB.
Also, DD/DDA and LSA-W21S are not applicable for the single-phase 200V.

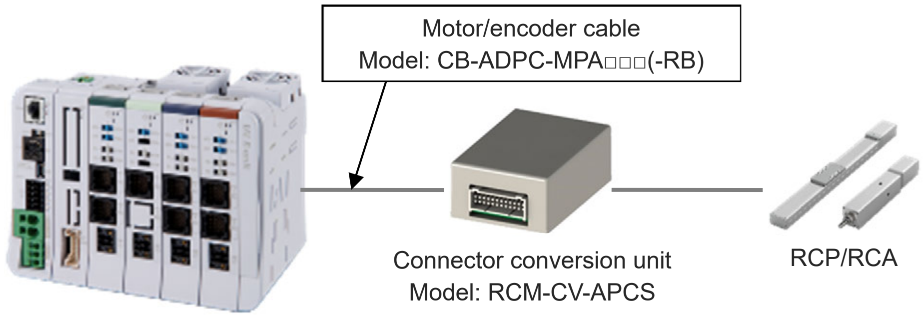
Note2: There is a built-in regenerative resistor of 60W equipped in 200V driver unit and 200V power supply unit. The regenerative resistor is basically not necessary, but use an external regenerative resistor unit in case of shortage in regenerative resistor.

Note3: ELECYLINDER is available for operation only in the double solenoid system.

[Precautions when selecting a motor/encoder cable]

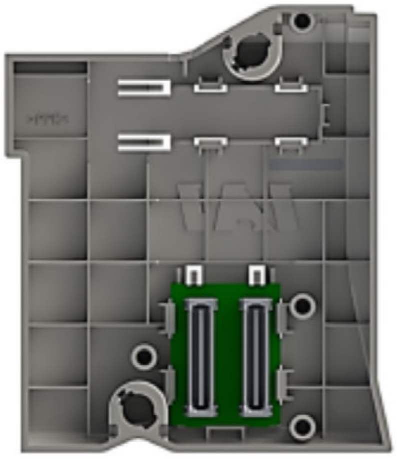
Depending on the actuator model, a connector conversion unit and a motor/encoder cable, etc., may be required to connect the driver unit and the simple absolute unit.

For details, refer to [2.5 Connection Diagrams / Motor/encoder circuit (page A2-42)].

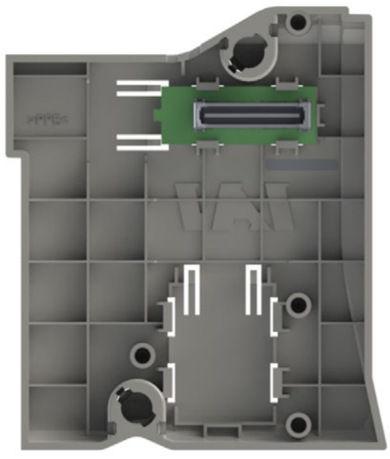


[Caution when Connecting Terminal Unit]

The terminal unit to be connected on the right end should differ depending on the cases when the system consists of only the 24V driver units and when it consists of the 200V driver units. When the 200V driver units are to be used, make sure to use the terminal unit for 200V (RCON-GW-TRS) enclosed in the 200V power supply unit. The terminal unit for 24V has a structure that does not allow itself connected to the 200V driver unit, however, it could be forcefully inserted, which could cause fire on the connector as well as damage on it.



Terminal Unit (for 24V)
RCON-GW-TR



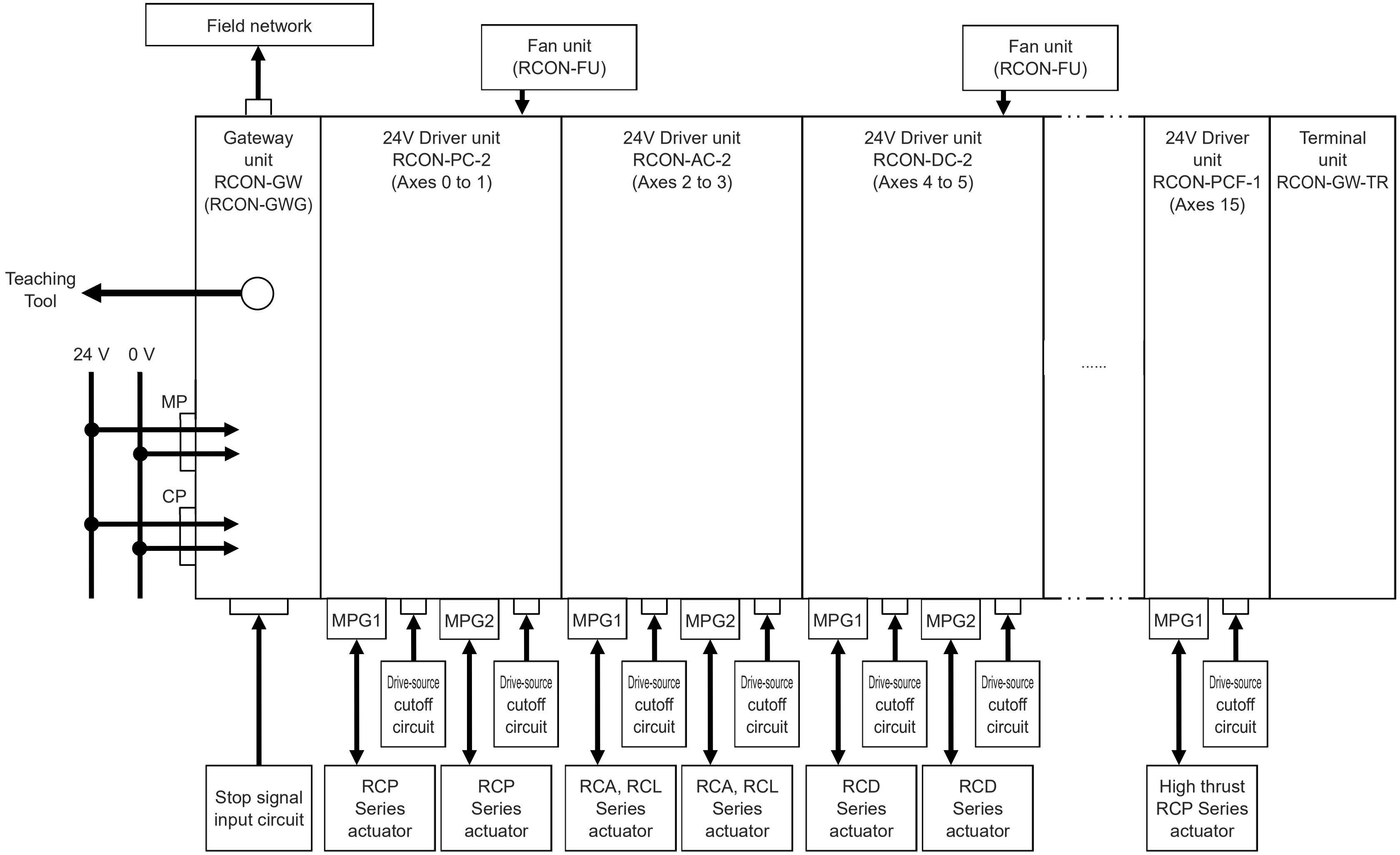
Terminal Unit for 200V
RCON-GW-TRS

2.2 Configuration Unit List

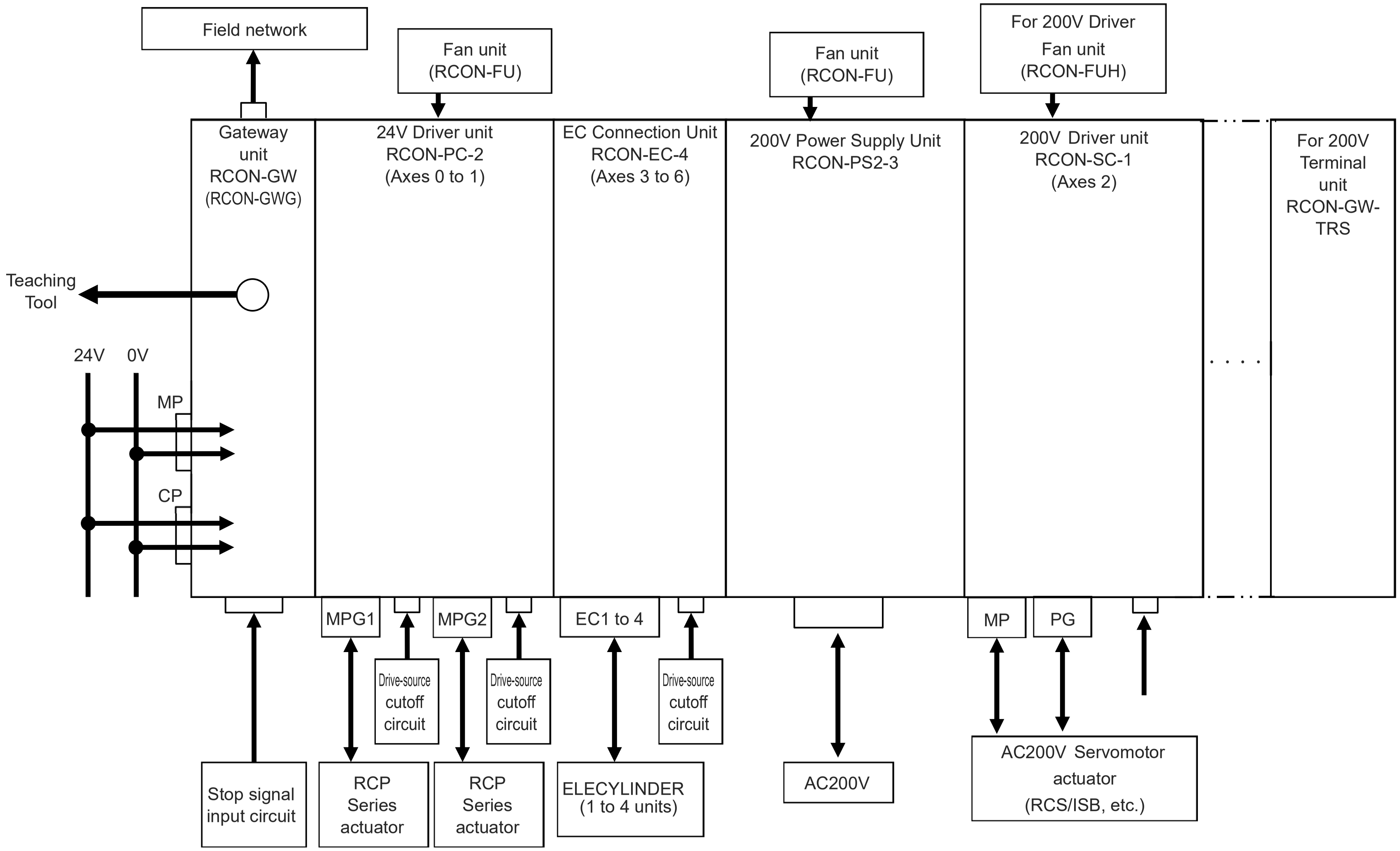
The units that configure the RCON system are listed below.

Product name			Model
Gateway unit (GWG: Safety category type)		CC-Link connection type	RCON-GW(GWG)-CC
		CC-Link IE Field connection type	RCON-GW(GWG)-CIE
		DeviceNet connection type	RCON-GW(GWG)-DV
		EtherCAT connection type	RCON-GW(GWG)-EC
		EtherNet/IP connection type	RCON-GW(GWG)-EP
		PROFIBUS-DP connection type	RCON-GW(GWG)-PR
		PROFINET IO connection type	RCON-GW(GWG)-PRT
		EtherCAT Motion connection type	RCON-GW(GWG)-ECM
		MECHATROLINK-IIIconnection type	RCON-GW(GWG)-ML3
		SSCNET III/H connection type	RCON-GW(GWG)-SSN
Driver unit	24V	Stepper motor 1-axis specification	RCON-PC-1
		Stepper motor 2-axis specification	RCON-PC-2
		High thrust stepper motor 1-axis specification	RCON-PCF-1
		AC servo motor 1-axis specification	RCON-AC-1
		AC servo motor 2-axis specification	RCON-AC-2
		DC brush-less motor 1-axis specification	RCON-DC-1
		DC brush-less motor 2-axis specification	RCON-DC-2
	200V	AC Servo-motor Single-axis Type	RCON-SC-1
EC Connection Unit		ELECYLINDER 4-axis Type	RCON-EC-4
200V Power Supply Unit		Power Supply for 200V AC Input	RCON-PS2-3
Terminal Unit		Terminal Resistor for 24V (enclosed in Gateway Unit)	RCON-GW-TR
Terminal Unit for 200V		Terminal Resistor for 200V (enclosed in 200V power supply unit)	RCON-GW-TRS
SCON Extension Unit		SCON-CB Connection Unit	RCON-EXT
		Terminal Connector (enclosed in SCON-CB terminal resistor and SCON extension unit)	RCON-EXT-TR
Simple Absolute Unit (1-axis specification)		For Pulse Motor	RCON-ABU-P
		For AC Servo-motor	RCON-ABU-A
Fan unit		•One unit available to install for two units of 24V driver unit (number of enclosed unit to be indicated in gateway unit) •One unit to be installed for one unit of 200V power supply unit (enclosed in 200V power supply unit)	RCON-FU
200V Driver Fan Unit		One unit to be installed for one unit of 200V driver unit (enclosed in 200V driver unit)	RCON-FUH

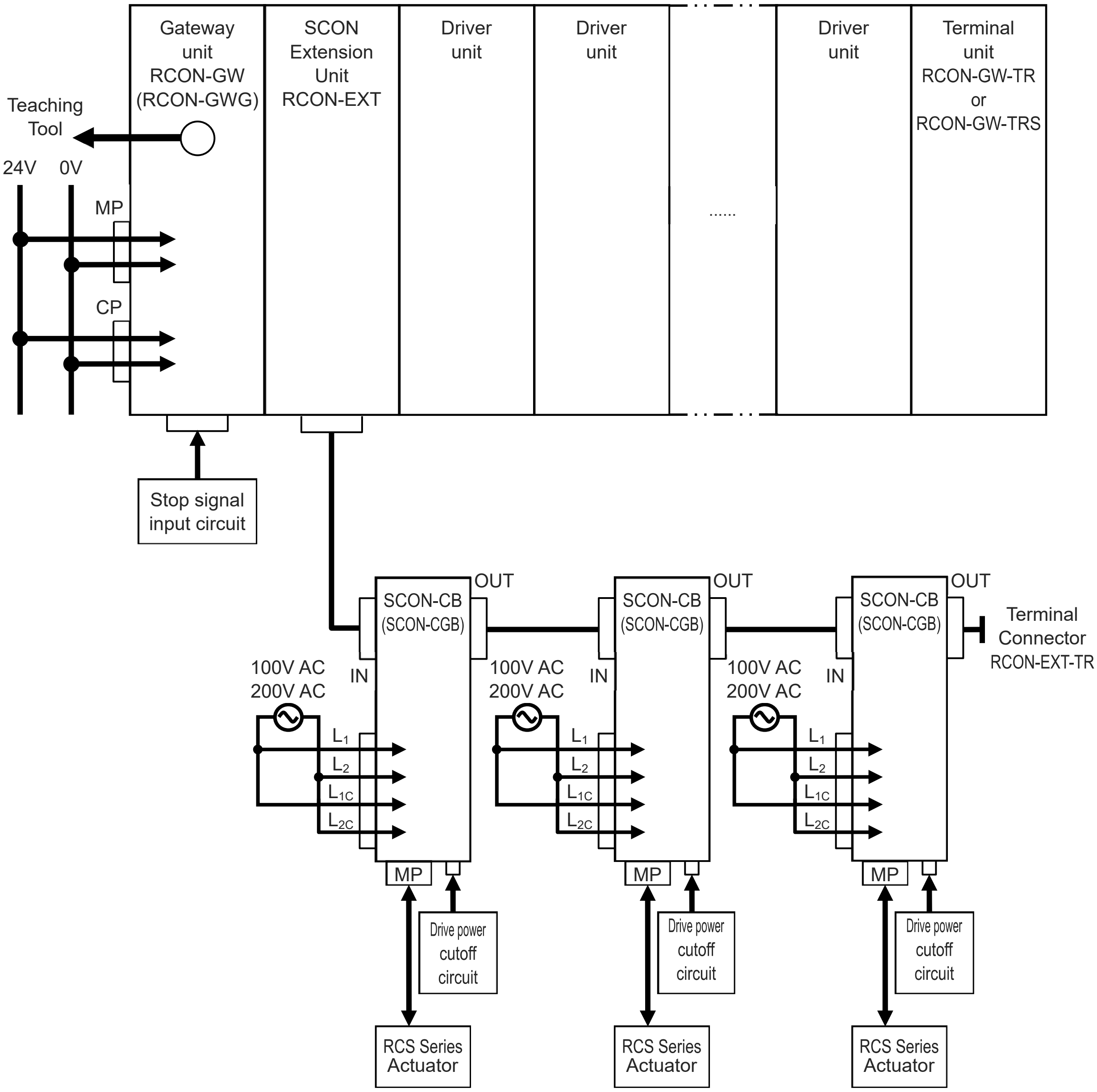
RCON configuration example (1)   When SCON-CB is not connected



RCON configuration example (2) 24V System and 200V System Actuators Mixed with No SCON-CB Connected



RCON configuration example (3) When SCON-CB is connected



(Note) The diagram above shows a figure when only SCON-CB is to be connected.
The RCON system is capable of having SCON-CB and RCON-SC connected via the SCON extension units exist together.

2.3 Specifications

Basic specifications

The specifications regarding installation conditions are listed below.

Item	Specifications		
Ambient operating temperature	0~55°C (with temperature derating) (0~40°C for simple absolute units) → Refer to [Operating temperature range (page A2-20)] for details		
Ambient operating humidity	5% RH to 85% RH, but non-condensing or freezing		
Ambient storage temperature	-20~70℃ (0~40°C for simple absolute units)		
Operating atmosphere	Avoid corrosive gas and in particular avoid excessive dust		
Altitude	1,000m		
Vibration resistance	Frequency: 10~57 Hz/Amplitude: 0.075mm, Frequency: 57~150 Hz/ Acceleration: 9.8m/s^2 XYZ directions Sweep time: 10 minutes Number of sweeps: 10 times		
Shock resistance	Drop height: 800mm 1 corner, 3 edges, 6 faces		
Overvoltage category	24V System: I 200V System: II		
Electric shock protection mechanism	24V System: Class III 200V System: Class I		
Pollution degree	II		
Degree of protection	IP20		
Insulation withstanding voltage	500V DC 10MΩ		
Generated heat (per unit)	RCON-GW	-	4.0W
	RCON-PC	PowerCON: No	5.0W
		PowerCON: Yes	8.0W
	RCON-PCF	PowerCON: No	19.2W
	RCON-AC	Standard / High accel/decel / Energy saving	4.5W
	RCON-DC	Standard	3.0W
	RCON-SC	Standard	54W
	RCON-PS2	-	42W
Cooling method	Natural air cooling and forced air cooling by fan unit		

The specifications regarding control are listed below.

Item	Specifications				
Number of controlled axes	1 to 16 axes (The maximum number of connectable axes in the direct numerical mode in the field network except for CC-Link and CC-Link IE Field and for the motion controllers should be eight axes.)				
Encoder resolution [pulse/r]	Stepper motor	Battery-less Absolute	RCP6		8,192
		Battery-less Absolute	RCP4/RCP5/EC		800
		Incremental			
	24V AC servo motor	Battery-less Absolute	RCA		16,384
		Incremental			800
		Incremental	RCA2-***N/NA		1,048
			Other than RCA2-***N/NA		800
			RCL-SA1/4、RA1/4		715
			RCL-SA2/5、RA2/5		855
			RCL-SA3/6、RA3/6		1,145
	DC brush-less motor	Incremental	RCD-RA1D/GRSN		400
			RCD-RA1DA/GRSNA		480
	200V AC servo motor	Battery-less Absolute	RCS4/RCS3		16,384
		Incremental			
		Incremental	RCS2	□□5N	1,600
		Incremental		SR□7BD	3,072
		Incremental		Other Models than Above	16,384
		Battery-less Absolute			
		Battery-less Absolute	ISB/ISDB/ISDBCR		131,072
		Incremental			16,384
		Incremental	SSPA/ISA/ISDA/IF/FS		16,384
		Battery-less Absolute	NSA		131,072
		Incremental	NS	S□M□	2,400
		Incremental		Other Models than Above	16,384
		Incremental	LSA/LSAS		Resolution 0.001mm
		Index Absolute	DD/DDA	□18S	131,072
		Index Absolute		□18P	1,048,576

Item	Specifications		
Cable length	Motor/encoder cable: 20 m or less (10 m or less for RCD), Motor Cable for 200V Motor: 30m or less Encoder Cable for 200V Motor: 30m or less SCON connection cable: 3 m or less per cable, total length of 10 m or less EC Connection Cable: 10m or less		
Field network interface	CC-Link, CC-Link IE Field, DeviceNet, EtherCAT, EtherNet/IP, PROFIBUS-DP, PROFINET IO, EtherCAT Motion, SSCNET III/H, MECHATROLINK-III		
SIO interface	Teaching port	Communication method	RS485
		Communication speed	9.6/19.2/38.4/57.6/115.2/230.4 kbps
	USB port	Communication method	USB
		Communication speed	12Mbps
	EtherNet port (Option)	Communication method	EtherNet
		Communication speed	10M/100Mbps
Data recording device	FRAM 256kbit (Gateway Unit, 24V Unit) SRAM 4Mbit (200V Driver unit)		
Calendar function	Retention function: About 10 days Charging time: About 100 hours		
Safety category compatibility	B (The safety category specification can support up to 4 external circuits)		
Drive-source cutoff method	Internal Semiconductor Cutoff, External Lumping Axes Cutoff, External Axis-Specific Cutoff (Note 1)		
Protection functionality	Overcurrent, abnormal temperature, encoder disconnection, overload		
Preventive/ predictive maintenance functions	Low electrolytic capacitor capacity and low fan rotation speed		

Note 1 RCON-SC is not available for external cutoff on each axis.
It is available to cut off the power supply to the motor at the cutoff circuit in the controller by using the driver stop circuit.

Power supply capacity

Power capacity is divided into two parts, control power capacity and motor power capacity.
24V DC power supply is to be input from the control power supply connector and the motor power supply connector on the gateway unit. The user must make sure that 0 V of the control and motor power is used in common.
The motor power supply to the 200V AC actuator is to be input from the 200V power supply unit (RCON-PS2).

The necessary power capacity is calculated from adding the "total control power capacity of the unit in use" and the "total motor power capacity of the connected actuator". However, the 200V driver unit is to be calculated from the "sum-up of the control current amperage of used units" and separated from the motor power supply.

The current rating for 24V DC power must exceed the total current rating for motor power capacity, and the peak current must exceed the total motor power capacity. However, when multiple axes are connected, provided that not all of the actuators' operation timing is the same, the resulting value is not a simple total, because the rated current/maximum current do not flow simultaneously.

Also, for the 24V system, "Calculator Software" is available that enables to automatically calculate the necessary current amperage as soon as the actuator operation conditions and operation patterns are set up.
Refer to [Calculator Instruction Manual (ME0381)] for details such as how to operate.

(Reference) Selection of Circuit Breaker for Power Supply Protection

[For 24V System]

It is recommended that protection of the power supply is performed on the primary side (AC power source side) in the 24V DC power supply unit.
Be mindful of the in-rush current of the 24V DC power supply unit and the rated interrupting current of the circuit breaker when select.
Rated Interrupting Current > Short-Circuit Current = Primary Side Current Amperage ÷ Power Supply Voltage

[In-Rush Current of IAI Power Supply Unit PSA-24]

Item	Conditions	Specifications	
In-Rush Current	At Cold Start (25°C)	100V AC	17A (typ)
		200V AC	34A (typ)
	At Cold Start (40°C)	100V AC	27.4A (typ)
		200V AC	54.8A (typ)

The pulse width that the in-rush current flows in is 5ms or less. Also, in parallel operation, the in-rush current is added for number of units. Confirm the characteristics when select so the breaker would not work at the in-rush current.

[For 200V System]

For selection of the circuit breaker, follow the instructions below.

- Three times higher current than the rated flows to the controller at acceleration / deceleration. Select a breaker that would not trip when this much current flows. In case it trips, it is necessary to select a breaker with rated current one rank higher. (Check with the operation characteristic curves shown in a catalog provided by the manufacturer.)
- Select a breaker that would not trip with the in-rush current. (Check with the operation characteristic curves shown in a catalog provided by the manufacturer.)
- Select the rated cutoff current that surely cuts off the current even when short-circuit current flows.
  Rated Cutoff Current > Short-Circuit Current = Primary Current Amperage / Power Voltage
  Have enough margin to the rated current when you select a circuit breaker.

For Single-Phase 200V AC:

Rated Current of Circuit Breaker > Motor Current Amperage (VA) ÷ AC Input Voltage × Margin (1.2 ~ 1.4)

For 3-Phase 200V AC:

Rated Current of Circuit Breaker > Motor Current Amperage (VA) ÷ AC Input Voltage × Margin (1.2 ~ 1.4) ÷ √3

*Selection of Leakage Breaker

- The leakage current may vary depending on the wattage of motor, cable length and other ambient environment. In case of leakage protection, measure the leakage current at the position to install a leakage breaker.
- Select a leakage breaker applicable for higher harmonics.

The specifications regarding power capacity are listed below.

[Gateway Unit Control Power]

Item	Specifications	Power supply current
Control power capacity	Gateway unit (includes terminal unit)	0.8 A (Ethernet option: No) 1.0 A (Ethernet option: Yes)

[Driver/Extension/Absolute Unit Control Power]

Item	Specifications		Power supply current
Control power capacity (per unit)	24V Driver unit	Brake: No	0.2A
		Brake: Yes (1-axis specification)	0.4A
		Brake: Yes (2-axis specification)	0.6A
	200V Driver unit	Brake: No	0.2A
		Brake: Yes	0.5A
	SCON extension unit		0.1A
	Simple absolute unit (common to all types)		0.2A

Note: As the control supply current consumed in the 200V power supply unit is very little, it is not necessary to consider in the calculation.

[24V Driver Unit Motor Power Supply]

Item	Actuator / Driver Unit				Rated Current	Max. current	
		Series	Motor type			When energy-saving is set	
Motor power capacity (1 axis per actuator)	Stepper motor /RCON-PC	RCP2 RCP3	20P/20SP/28P	Without PowerCON	0.8A	–	–
			28P (Note 1)/35P/42P/56P		1.9A	–	–
		RCP4 RCP5 RCP6	28P/35P/42P/42SP/56P	Without PowerCON	1.9A	–	–
				With PowerCON	2.3A	–	3.9A
	Stepper motor /RCON-PCF	RCP2 RCP4 RCP5 RCP6	56SP/60P/86P	Without PowerCON	5.7A	–	–
	24V AC servo motor /RCON-AC	RCA RCA2	5W	Standard / Hi-accel./decel.	1.0A	–	3.3A
			10W	Standard / Hi-accel./decel. / Energy-saving	1.3A	2.5A	4.4A
			20W		1.3A	2.5A	4.4A
			20W(20 S)		1.7A	3.4A	5.1A
			30W		1.3A	2.2A	4.0A
		RCL	2W	Standard / Hi-accel./decel.	0.8A	–	4.6A
			5W		1.0A	–	6.4A
			10W		1.3A	–	6.4A
	DC brush-less motor /RCON-DC	RCD	3W	Standard	0.7A	–	1.5A

Note 1 Applicable Models: RCP2-RA3, RCP2-RGD3

The restrictions regarding the control power/motor power supplies are as shown below.

Item	Current limit values for selection calculation
Control power (CP)	9.0A or less
Motor power (MP)	37.5A or less

For the 24V system, based on the RCON system configuration, make sure for each unit that the calculated result for control power and motor power does not exceed the current limit value for selection calculation.
Note that the gateway unit is not included in the calculations.

[200V Driver Unit Motor Power Supply]

Wattage of Actuator Motor	Motor power capacity [VA]	Transient max. motor current amperage [VA]
60	138	414
60 (RCS3-CTZ5)	197	591
100	234	702
100S (LSA)	283	851
150	328	984
200	421	1263
200S (DD)	503	1509
200S (Other LSA (S) - N15H)	486	1458
200S (LSA (S) - N15H)	773	2319
300S (LSA)	662	1986
400	920	2760
400 (RCS3-CT8)	1230	3690
600	1164	2328
600 (DD)	1462	4386
750	1521	3042
750S	1521	4563

For the actuators listed below, have the motor wattages for calculation when you calculate the supplies.

Actuator model number	Motor wattage for calculation
RCS3-CTZ5	120W
LSA-S6S□/S8S□/S8H□/N10S□	300W / 1 slider
LSA-S10S□/S10H□/H8S□/H8H□/L15S□/N15S□/N15H□/N19S□	600W / 1 slider
LSA-W21S□, RCS3-CT8	800W / 1 slider

For the 200V driver unit, the restriction regarding the motor power supply is as described below.

Item	Total of Max. connected axes output
3-Phase 200V AC	2,400W
Single-Phase 200V AC	1,600W

Check that the total of the motor wattage of the connected actuators does not exceed the maximum connectable axes output for the 200V systems.

[24V Specification ELECYLINDER Control Power/Motor Power Supply]

Item	Specifications		Power supply current
Control power capacity	EC Connection Unit (per unit)	RCON-EC-4	0.1A
	24V Specification ELECYLINDER (per axis)	Brake: No	0.3A
		Brake: Yes	0.5A

Item	Actuator /EC Connection Unit				Rated Current	Max. current
		Series	Motor type	Type		
Motor power capacity (per axis)	Pulse Motor /RCON-EC	EC	35P/42P/56P	When Power Saving Setting Invalid	2.3A	3.9A
				When Power Saving Setting Valid	–	2.2A
			28P	S3□/RR3□Type	–	2.2A
				Slim and Small Type	–	2.0A

[200V Specification ELECYLINDER Control Power/Motor Power Supply]

Item	Specifications		Power supply current
Control power capacity (24V)	EC Connection Unit (per unit)	RCON-EC-4	0.1A
	24V Specification ELECYLINDER (per axis)	Brake: No	0.32A
		Brake: Yes	1.2A

Item	Actuator model number	Motor Wattage	Motor power capacity [VA]	Transient max. motor current amperage [VA]
Motor power capacity (per axis)	EC-S13□, EC-S13X□	200	402	1206
	EC-S15□, EC-S15X□	400	772	2316

The restrictions regarding the power supply for the 200V ELECYLINDER drive are as shown below.

Specifications	Max. number of connectable axes	Max. motor wattage of connectable
AC100V power supply specifications	6 axes	800W
AC200V power supply specifications	6 axes	1,600W

Check that the number of axes of the 200V ELECYLINDER does not exceed the maximum number of the connectable axes and the motor wattage not exceed the maximum connectable motor wattage.

Calculation examples are shown below.

[Control power] * The gateway unit is not included in the calculations.

Ex. 1	24V System Actuator × 16-Axis, All Axes Equipped with Brake (2 axes/unit)
	24V Driver Unit Equipped with Brake (2-axis specification) 0.6A × 8 = 4.8A ⇒ **OK**
Ex. 2	24V System Actuator × 16-Axis, All Axes Equipped with Brake (1 axes/unit)
	24V Driver Unit Equipped with Brake (1-axis specification) 0.4A × 16 = 6.4A ⇒ **OK**
Ex. 3	24V System Actuator × 8-Axis, All Axes Equipped with Brake (1 axes/unit), All Axes Simple Absolute
	24V Driver Unit Equipped with Brake (1-axis specification) 0.4A × 8 = 3.2A Simple Absolute 0.2A × 8 = 1.6A **Total** 4.8A ⇒ **OK**
Ex. 4	200V System Actuator × 8-Axis, All Axes Equipped with Brake
	200V Driver Unit Equipped with Brake 0.5A × 8 = 4.0A ⇒ **OK**
Ex. 5	24V System Actuator × 7-Axis, All Axes Equipped with Brake (1 axes/unit), All Axes Simple Absolute 200V System Actuator × 1-Axis, Equipped with Brake SCON Extension Unit × 1 unit
	24V Driver Unit Equipped with Brake (1-axis specification) 0.4A × 7 = 2.8A Simple Absolute 0.2A × 7 + 200V Driver unit Equipped with Brake 0.5A × 1 = 1.9A SCON Extension Unit 0.1A × 1 = 0.1A **Total** 4.8A ⇒ **OK**
Ex. 6	24V System Actuator × 6-Axis, All Axes Equipped with Brake (2 axes/unit), All Axes Simple Absolute, EC Connection Unit × 1 unit, 24V Specification Equipped with Brake ELECYLINDER × 2-Axis, 200V Specification Equipped with Brake ELECYLINDER × 2-Axis
	24V Driver Unit Equipped with Brake (2-axis specification) 0.6A × 3 = 1.8A Simple Absolute 0.2A × 6 + EC Connection Unit 0.1A × 1 = 1.3A 24V Specification Equipped with Brake ELECYLINDER 0.5A × 2 = 1.0A 200V Specification Equipped with Brake ELECYLINDER 1.2A × 2 = 2.4A **Total** 6.5A ⇒ **OK**
Ex. 7	24V System Actuator × 16-Axis, All Axes Equipped with Brake (1 axes/unit), All Axes Simple Absolute
	24V Driver Unit Equipped with Brake (1-axis specification) 0.4A × 16 = 6.4A Simple Absolute 0.2A × 16 = 3.2A **Total** 9.6A ⇒ **NG**

[24V System Motor Power Supply]

Ex. 8	RCON-PC (with PowerCON) × 16-Axes
	RCON-PC (with PowerCON) rated current 2.3 A × 16-Axes = 36.8 A ⇒ **OK**
Ex. 9	For RCON-PCF × 7-axes or 6-axes
	RCON-PCF rated current 5.7 A × 7-Axes = 39.9 A ⇒ **NG** RCON-PCF rated current 5.7 A × 6-Axes = 34.2 A ⇒ **OK**
Ex. 10	RCON-PC (with PowerCON), RCON-AC, RCON-DC
	RCON-PC (with PowerCON) rated current 2.3A, RCON-AC rated current Max. 1.7A Does not exceed the current limit even with 16 axes as the rated current of RCON-DC is 0.7A ⇒ **OK**
Ex. 11	RCON-PCF × 3-Axes, RCON-PC (with PowerCON) × 6-Axes, and RCON-AC (30W) × 3-Axes, RCON-EC (Power Saving Setting Invalid) × 1 unit (4-Axes)
	RCON-PCF rated current 5.7A × 3-Axes + RCON-PC (with PowerCON) rated current 2.3A × 6-Axes = 30.9 A RCON-AC (30W) 1.3A × 3-Axes + RCON-EC (Power Saving Setting Invalid) 2.3A × 4= 13.1A **Total** 44.0A ⇒ **NG**

[200V System Motor Power Supply]

Ex. 12	1 axis of actuator each of 200W, 300W and 600W motors
	200W × 1-axis + 300W × 1-axis + 600W × 1-axis = 1,100W ⇒ Single-Phase **OK**, 3-Phase **OK**
Ex. 13	RCS-CTZ5 × 1-axis, actuator of 200W motor × 7-axes
	120W + 200W × 7-axes = 1,520W ⇒ Single-Phase **OK**, 3-Phase **OK**
Ex. 14	Actuator of 200W motor × 6-axes, LSA-S10SM (Multiple Slider) × 1-axis
	200W × 6-axes + 400W × 2 = 2,000W ⇒ Single-Phase **NG**, 3-Phase **OK**
Ex. 15	Actuator of 200W motor × 16-axes
	200W × 16-axes = 3,200W ⇒ Single-Phase **NG**, 3-Phase **NG**

Caution

- For those with no description of the rated current for the motor current amperage, calculate with the maximum current.
- Supposing that the operation pattern is that all axes only perform acceleration/deceleration simultaneously, and operating duty is 100%, the motor power must be calculated by using the maximum current value.
  Refer to [Calculator Instruction Manual (ME0381)] for details such as how to operate.

Power ON sequence

The procedure from turning on the RCON system to the home return command is as follows.

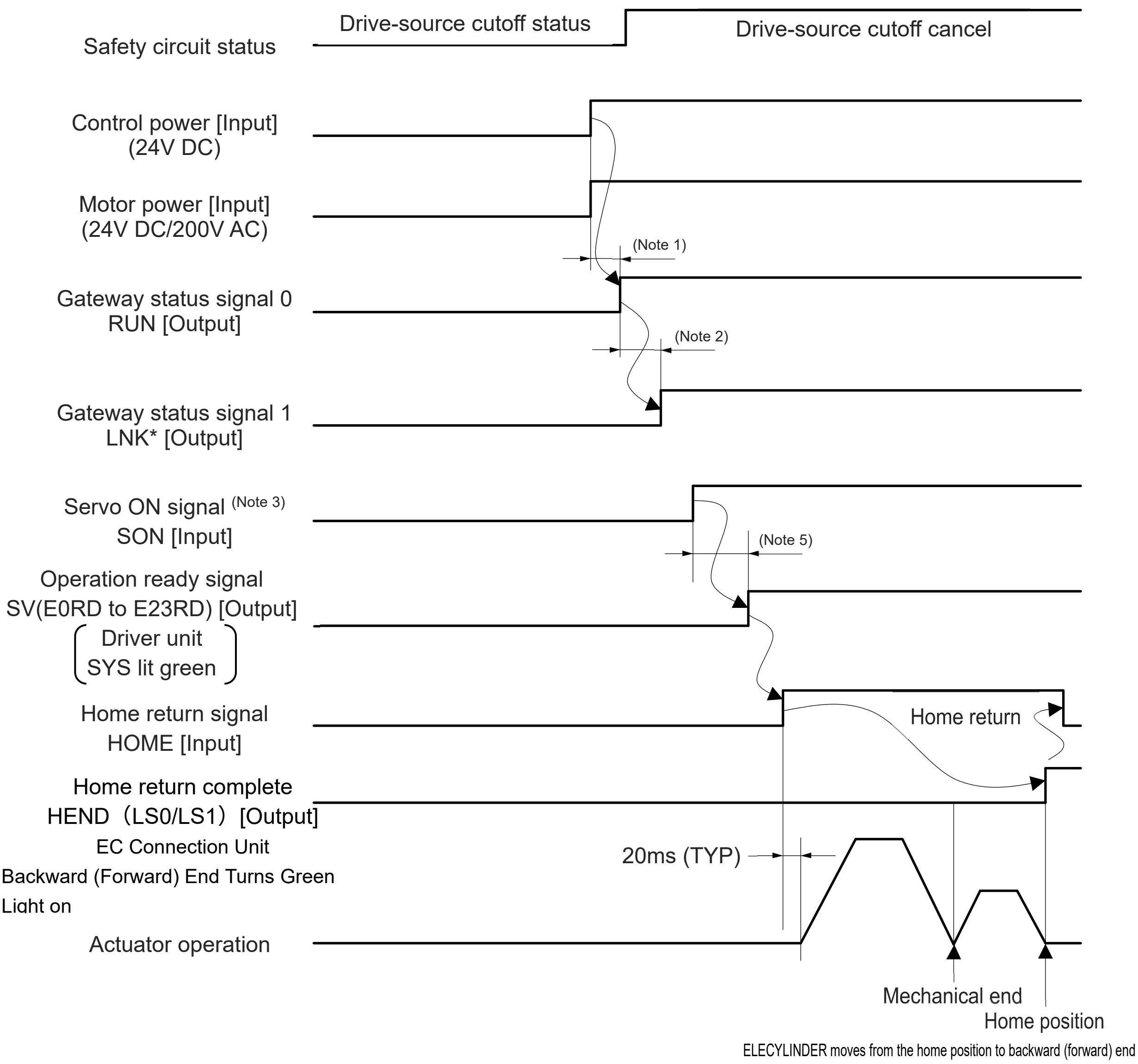
(1) Supply the control power and motor power (24V DC/200V AC).

(2) Turn ON the STOP signal input to cancel the drive shutoff status and set to conductive status.

(3) After confirming that the gateway status signals 0 "RUN" and 1 "LNK*" are ON, input the servo ON signal "SON".

(4) After confirming that the operation ready signal SV is ON, input the home return signal "HOME". home return motion begins. When home return is completed, the home return complete signal "HEND" is output.
For the EC connection unit, confirm that the gateway status signal 0 "RUN" and operation standby complete signals "E0RD" to "E3RD" are turned on, and then input either forward or backward signal "ST0/ST1". The home-return operation starts. Once the home-return operation ends and moved to the backward (or forward) end, the forward/backward signal "LS0/LS1" should be output.

Note: There is no "LNK*" or "SON" signal for the EC connection unit.
Once the power is supplied, the servo on ELECYLINDER automatically turns on.



For details on the gateway status signal, refer to [3.7 Address Configuration / Gateway control / status signals (page A3-32)].

Note 1: When the power is turned ON, the RCON system starts up. When field network communication between the gateway unit and host device is established, the gateway status signal 0 "RUN" turns ON. After confirming that the "RUN" is ON, begin communication with the gateway unit.

Note 2: If the gateway unit and driver unit are communicating normally, the gateway status signal 1 "LNK* (* is axis number)" turns ON.

If a communication error occurs between the gateway unit and driver unit, "LNK*" turns OFF. However, the ERRT alarm is not generated until the "communication retry count" set in the gateway parameter configuration tool is exceeded, until which retries are repeated.
If the communication becomes normal after repeated retries, "LNK*" turns ON.
The signal may also turn ON after temporarily turning OFF due to sudden noise.

Regarding the "communication retry count", refer to [3.9 Gateway Parameter Configuration Tool / Special parameter setting function descriptions (page A3-159)].

Note 3: There is no "LNK*" for the EC connection unit.

Note 4: Confirm "RUN" and "LNK*" before inputting "SON". The actuator turns the servo on. Also for the EC connection unit, there is no "SON". The servo on ELECYLINDER automatically turns on.

Note 5: When the first "SON" signal is input after power ON, the motor performs excitation phase detection operation (stepper motor specification) or magnetic pole phase detection operation (AC servo motor specification).
After confirming that the operation ready signal "SV" (E0RD to E3RD) is ON, input the travel command or home return command.

Caution

- If the servo is turned ON in the vicinity of the mechanical end, the magnetic pole phase will not be properly detected, causing abnormal operation, uncertain magnetic pole error or excitation detection error.
  Turn ON the servo in a position away from the mechanical end.
- If the power has been turned OFF, wait 1 second or more before rebooting the power. Otherwise, the product may malfunction.

Inrush current

In-rush current would occur only on the driver unit and the EC connection unit.
The inrush current values are listed below.

Item	Specifications	
Inrush current (About 5 ms)	RCON-PC	8.3A
	RCON-PCF	10.0A
	RCON-AC	10.0A
	RCON-DC	10.0A
	RCON-SC	25A
	RCON-EC	Max.40A(Note)

Note: When 4 axes max. of ELECYLINDER are connected

When multiple driver units are used, depending on the capacity of the 24V DC power source, a voltage drop might occur when the units are turned on.

In the RCON system, the timing can be adjusted with the following two parameters to reduce the risk of voltage drop due to inrush current. Inrush current lasts for about 5 ms per axis. Adjust the timing as warranted, within a range such that the offset does not affect operation.

[Driver shutdown release delay time]
The gateway parameter configuration tool is equipped with a function that offsets the release timing of the drive source cutoff circuit of each driver unit. It offsets the release timing, which allows it to suppress any possible voltage drops.

- 5 ms per axis has been set for the initial value.
- The minimum for each axis should be 50ms for the 200V driver unit.
- The release timing of the drive cutoff circuit for one unit (four axes) should be misaligned for the EC connection unit.

For details, refer to [3.9 Gateway Parameter Configuration Tool / Special parameter setting function descriptions (page A3-159)].

Stepper motor specification only

[Servo ON Delay Time Adjustment (Parameter No. 190)]

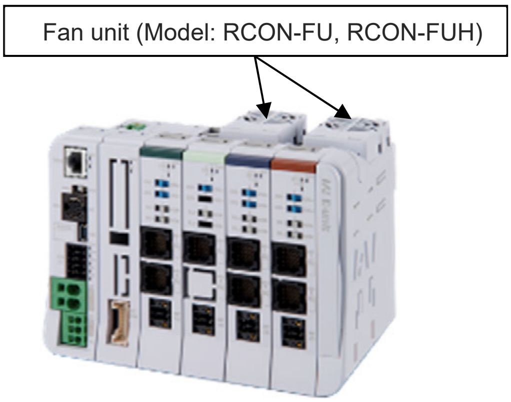
No.	Name	Unit	Input range	Default initial value setting
190	Servo ON delay time adjustment	ms	0 to 9,999	0

This parameter adjusts the time from when servo ON command signal SON is input until servo ON. By shifting the timing of each actuator, instantaneous power can be suppressed when the servo ON command is applied at the same time.

Operating temperature range

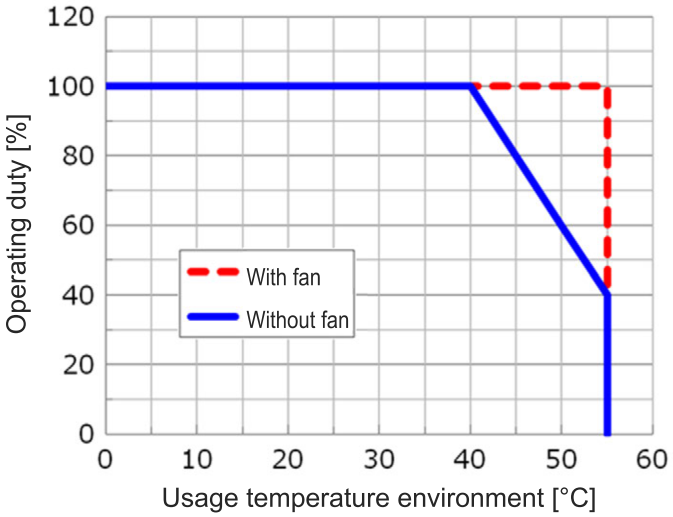
The operating temperature of the gateway unit/driver unit is within the range of 0 to 55°C. However, there is the temperature debating depending on with or without the fan unit for the 24V driver unit.

*It is mandatory to have a fan unit mounted on the 200V driver unit and the 200V power supply unit.



Operation without derating is possible without a fan unit at 0 to 40°C; however, at 40 to 55°C, actuator operating duty must be reduced by 20% every 5°C.

With fan unit, operation is possible up to 55°C without derating.



Caution

- Under conditions where the temperature is higher than 55°C, the unit cannot be used, regardless of the operating duty.
- When used under unsuitable conditions, the alarm code 0CA "Heating error" may be generated, causing the actuator to stop.
- The operating temperature of the simple absolute unit and SCON controller is within the range of 0 to 40°C. It cannot be used under conditions where the temperature is higher than 40°C.

Installation conditions

[Installation Environment]

Usage is possible in environments of pollution degree 2[*1] or equivalent.

*1 Pollution degree 2: Environment in which generally only nonconductive pollution occurs, but temporary conductive pollution may occur due to condensation. (IEC60664-1)

(1) Installation environment

Avoid the following locations for installation.

- Where the ambient temperature exceeds the range of 0 to 55℃ (If there is no fan unit, derating is available.)
  For simple absolute units and SCON, where the ambient temperature exceeds the range of 0 to 40℃
- Where the temperature changes rapidly and condensation occurs
- Where the relative humidity exceeds the range of 5%RH to 85%RH
- Where the unit is exposed to odorous or combustible gases
- Where the unit is exposed to significant amounts of dust, salt or iron powder
- Where the unit is subject to direct vibration or impact
- Where the unit receives direct sunlight
- Where the unit may come in contact with water, oil or chemical spray
- Where vents are blocked [see the section for installation and noise countermeasures]

If the unit is used in any of the following locations, provide sufficient shielding measures:

- Where noise is generated due to static electricity, etc.
- Where there are strong electrical or magnetic fields
- Where mains or power lines pass nearby

(2) Storage/preservation environment

For the storage and preservation environment, see the installation environment. However, give especial consideration to the prevention of condensation.

Unless especially specified, desiccant is not included in the package at shipping. If the product is to be stored/preserved in an environment where condensation is anticipated, take condensation preventive measures for the package overall from the exterior, or directly after opening the package.

[Installation and mounting]

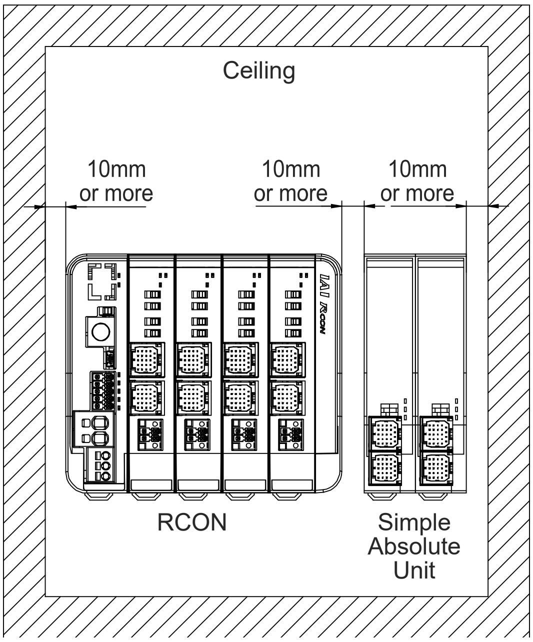
Consider the size of the control panel, placement of the RCON controller, cooling and the like when designing and manufacturing so that the ambient temperature is 0 to 55°C.
(If it has no fan unit, there is derating.)
When installing a simple absolute unit or SCON on the same control panel, design and manufacture so that the ambient temperature is 0 to 40°C.

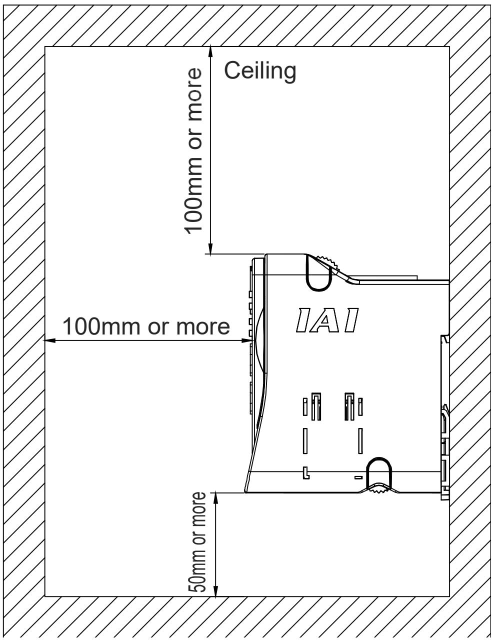
In particular, the performance may deteriorate when the temperature around the simple absolute unit (battery) is too low or too high. Make sure that the temperature is as close to room temperature as possible. (The recommended temperature is about 20°C.)

Item	Specifications
Installation direction	Vertical mounting (exhaust side on top)
Installation method	DIN rail mounting
Installation conditions	See figure below

Item		Specifications
Ambient operating temperature	With fan unit	0 to 55°C
	Without fan unit	0 to 55°C (Note 1)
Ground		Class D grounding

Note 1: If there is no fan unit, derating is available.



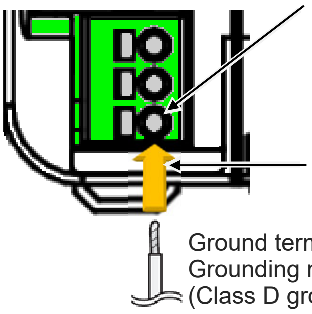


* Simple absolute units can be installed in close contact with each other.

[Noise countermeasures and mounting method]

(1) Grounding for noise countermeasures (frame ground)

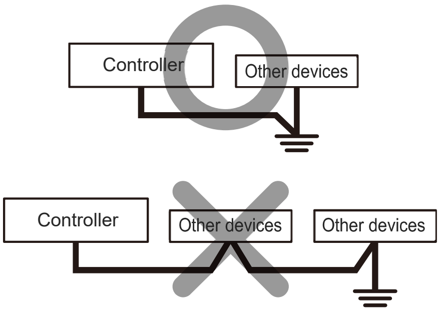
[DC24V]



Connect the ground wire to the FG terminal block of the main body.
Push in the square hole with a screwdriver or the like to connect.

Annealed copper wire: 1.6 mm diameter
Connect with a ground wire of (2 mm ^{2}: AWG14)

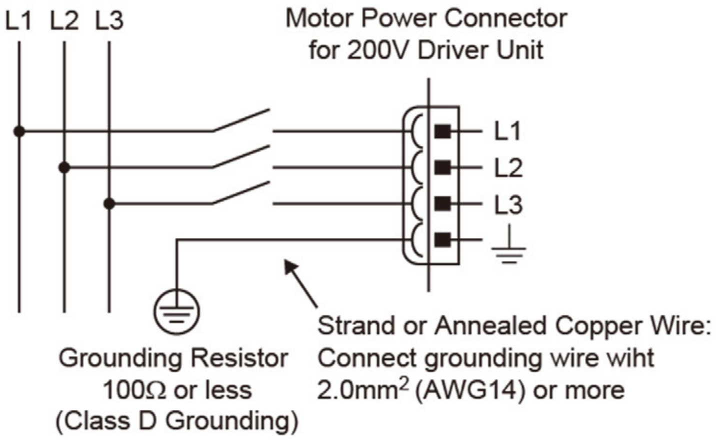
Ground terminal
Grounding resistance: 100 Ω or less
(Class D grounding construction)



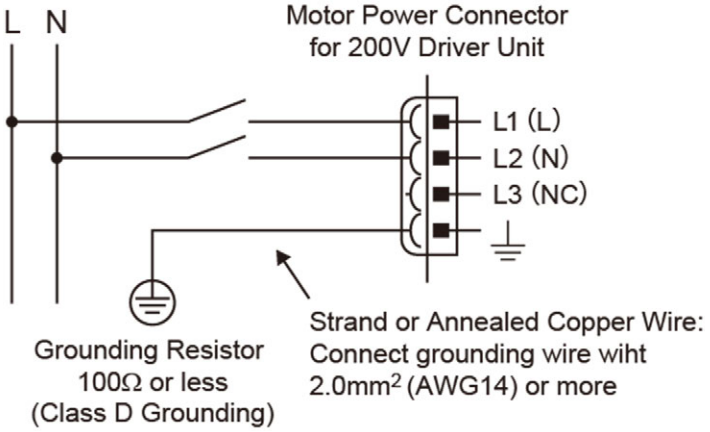
Grounding wires should not be connected in common with other devices and separate controllers should be grounded.

(2) Installation for Safety

[200V 3-Phase Type]



[200V Single-Phase Type]



(3) Notes on wiring method

1) Have the power supply wires twisted.

2) Separate the wiring of signal wires and encoders from power supply lines and power lines.

(4) Noise sources and noise prevention

For the same power supply path and power supply device in the same device, take measures against noise.

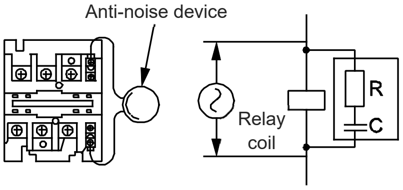
Countermeasure examples for noise sources are shown below.

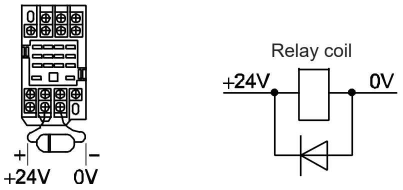
1) AC solenoid valve / magnetic switch / relay

[Measure] Install an anti-noise device in parallel with the coil.

2) DC solenoid valve / magnetic switch / relay

[Measure] Install a diode in parallel with the coil or use the diode built-in type.



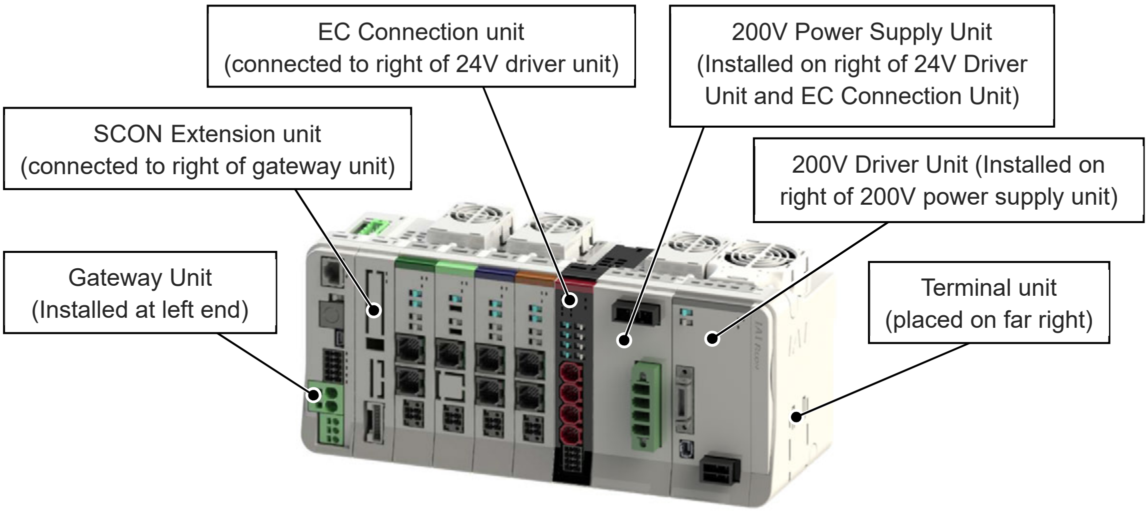


Unit connection restrictions

The RCON system has the following restrictions.
Check the following descriptions and then make a selection for each unit.

(1) Unit arrangement
RCON System possesses a locking structure with unit linking system. Units available for linking to each other have the same connectors, and they can be laid out freely. However, the arrangement of the following units is restricted.

Gateway unit: Placed on the far left of the RCON system.
Terminal unit: Placed on the far right of the RCON system.
The terminal unit for the 24V driver unit and the terminal unit for the 200V driver unit are different.
200V Power Supply Unit : Install on the right side of the SCON extension unit and 24V driver unit (RCON-PC/AC/DC) and the EC connection unit, or gateway unit if there is no SCON extension unit and 24V driver unit or EC connection unit.
200V Driver Unit : Install on the right side of the 200V power supply unit.
SCON Extension unit : Connected to the right of the gateway unit.



Gateway unit, SCON extension unit and terminal unit can only be linked to one unit for each set of the systems.

(2) Number of Connectable Units of Driver Unit and EC Connection Unit

Up to 16 axes (Note 1) can be controlled with each gateway unit.

In the perspective of the unit structure, there is no upper limit to the number of connectable.

Keep it at 16 axes at minimum for the driver unit and EC extension unit. If 17 or more actuators are to be controlled, use a configuration of 2 or more gateway units.

The EC connection unit can be connected for four units at maximum, however, it cannot be connected if the top axis number exceeds 0 to 15. (The axes numbers for the EC connection unit should be assigned from the back of those in the driver unit and the SCON extension unit.)

No matter if ELECYLINDER is connected or not, the EC connection unit occupies domains and axes numbers for four axes by one unit.

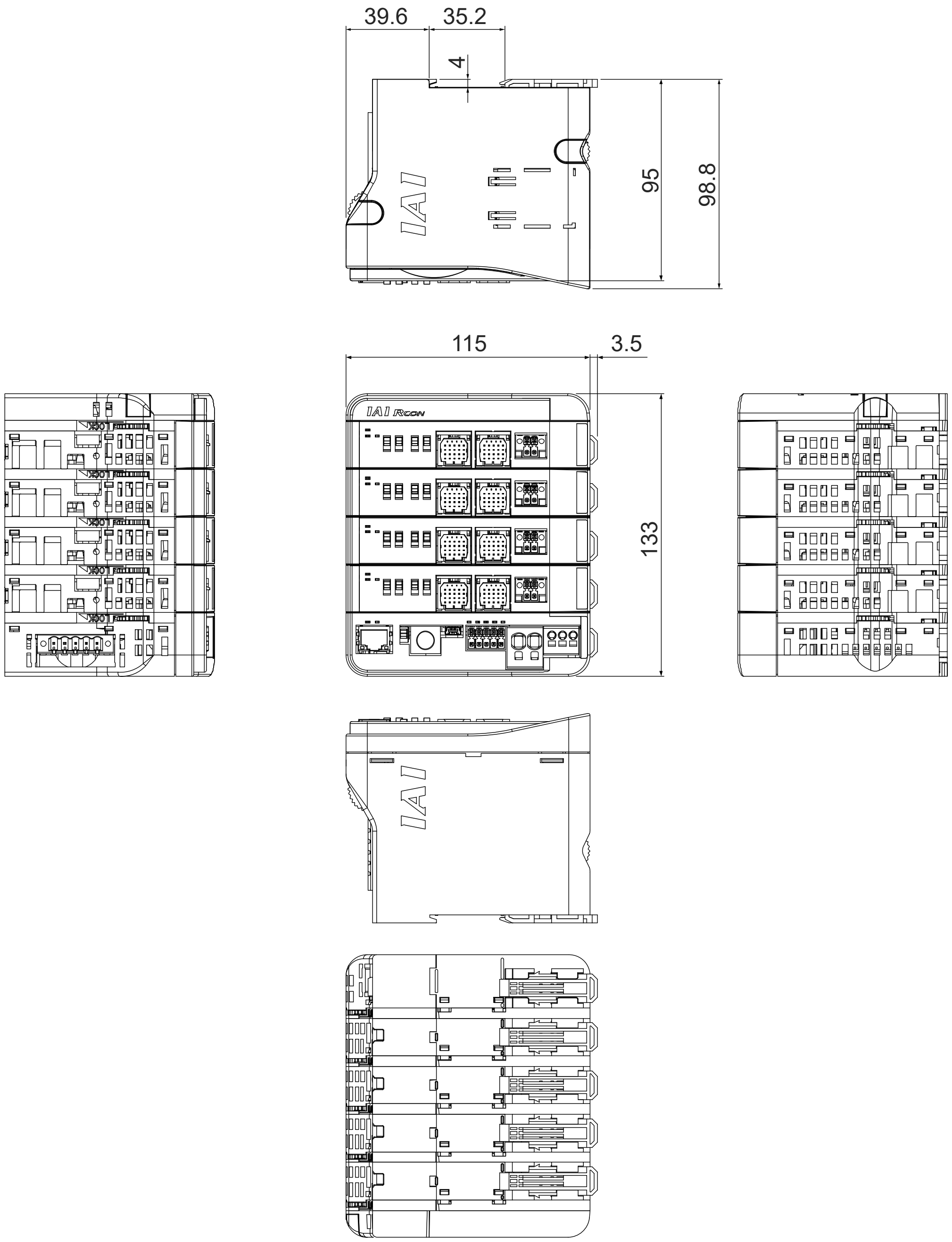
Note 1: When direct numerical control mode is used with field networks other than CC-Link or CC-Link IE Field, up to 8 axes can be connected.

Mode **Field network**	**Direct numerical control mode**	**Simple direct mode**	**Positioner 1 mode**	**Positioner 2 mode**	**Positioner 3 mode**	**Positioner 5 mode**
CC-Link	16 axes	16 axes	16 axes	16 axes	16 axes	16 axes
CC-Link IE Field	16 axes	16 axes	16 axes	16 axes	16 axes	16 axes
DeviceNet	8 axes	16 axes	16 axes	16 axes	16 axes	16 axes
EtherCAT	8 axes	16 axes	16 axes	16 axes	16 axes	16 axes
EtherNet/IP	8 axes	16 axes	16 axes	16 axes	16 axes	16 axes
PROFIBUS-DP	8 axes	16 axes	16 axes	16 axes	16 axes	16 axes
PROFINET-IO	8 axes	16 axes	16 axes	16 axes	16 axes	16 axes

2.4 External Dimensions

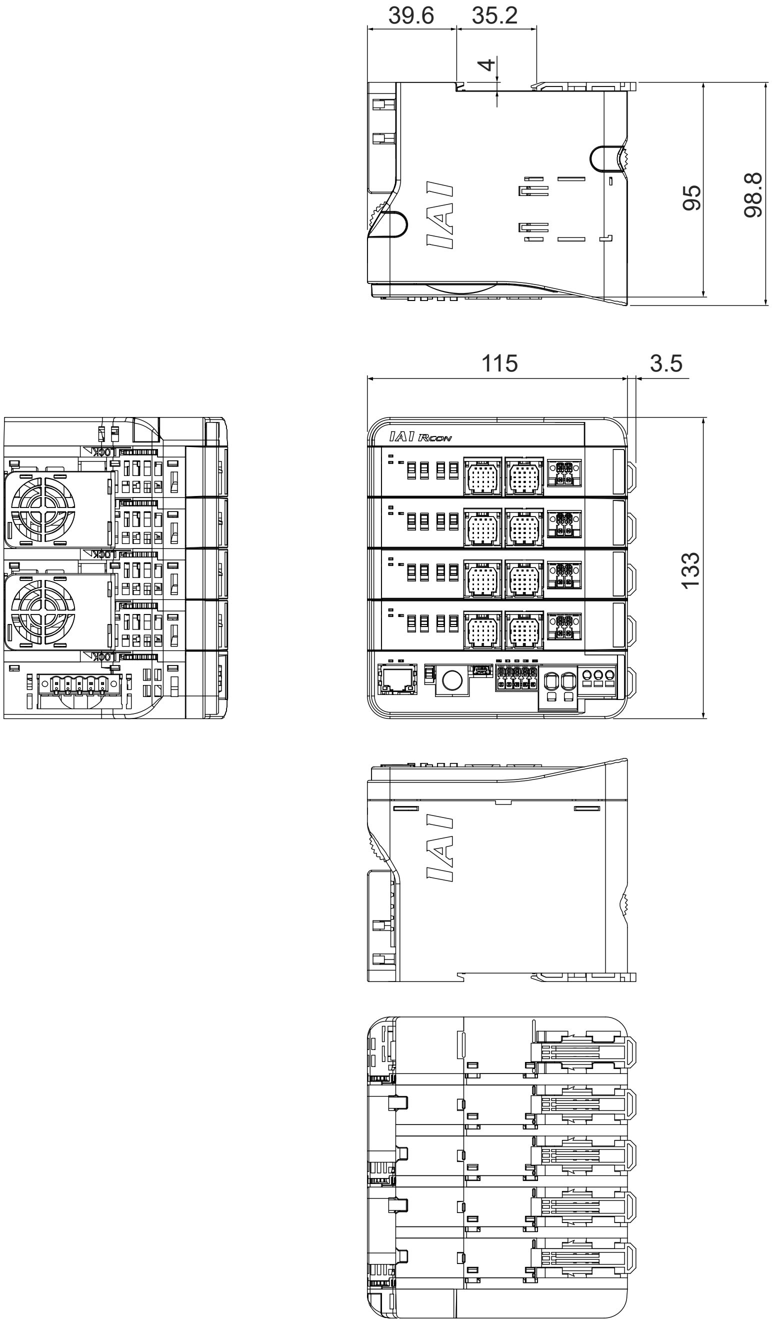
Controller (24V Driver Unit 8-axis without fan)

Item	Specifications
External dimensions	W 133 × H 115 × D 95 mm
Mass	Approx. 938 g ((gateway unit + 24V Driver Unit 2-axis Type × 4 + terminal unit)
External view	See figure below



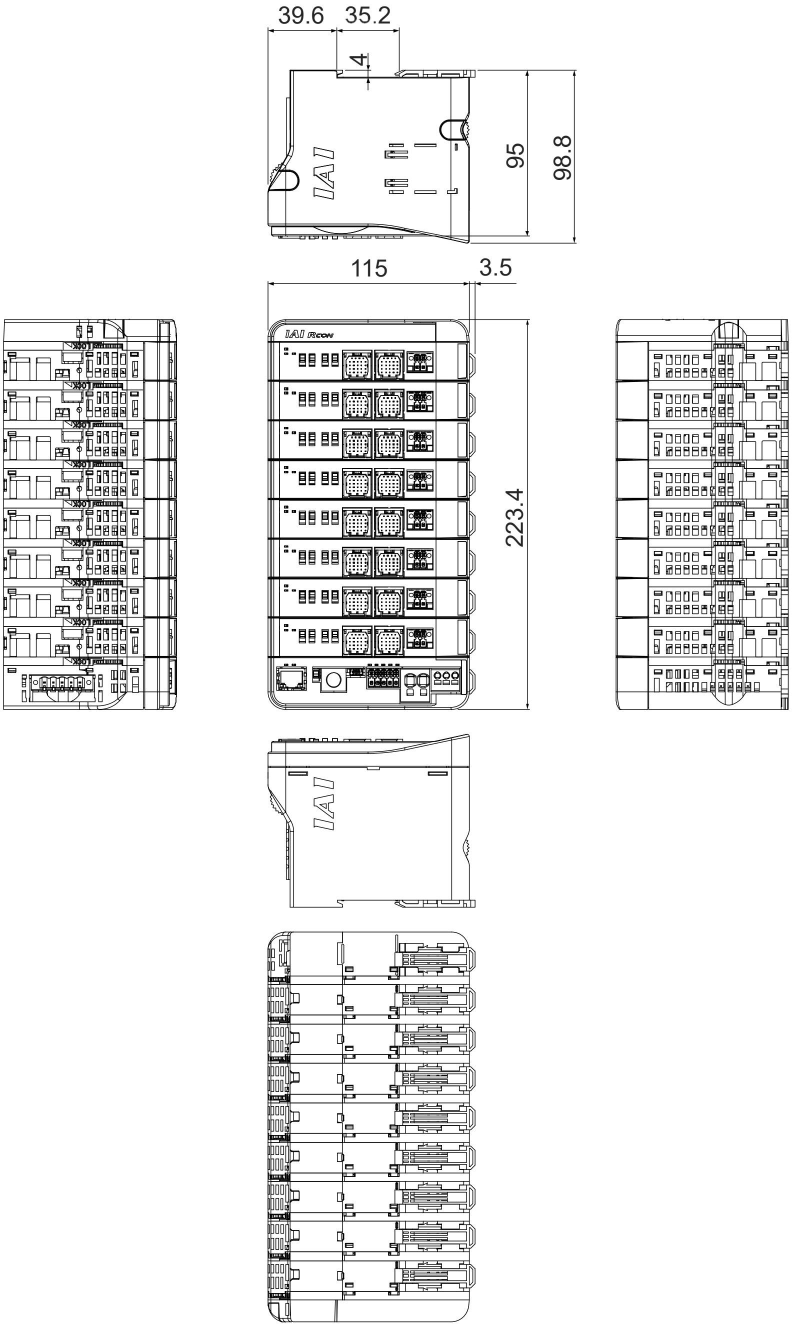
Controller (24V Driver Unit 8-axis with fan)

Item	Specifications
External dimensions	W 133 × H 115 × D 95 mm
Mass	Approx. 970 g (gateway unit + 24V Driver Unit 2-axis Type × 4+ fan unit × 2 + terminal unit)
External view	See figure below



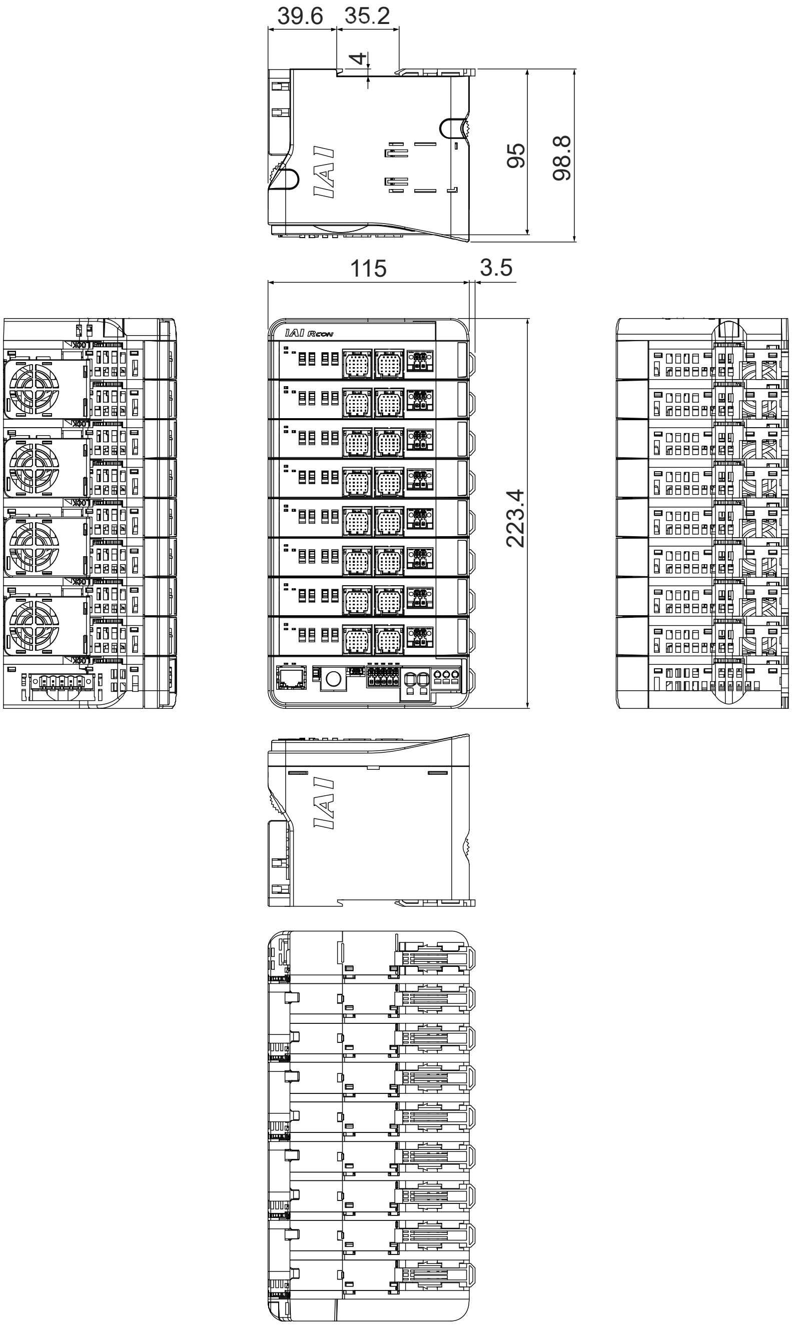
Controller (24V Driver Unit 16-axis without fan)

Item	Specifications
External dimensions	W 223.4 × H 115 × D95 mm
Mass	Approx. 1,658 g (gateway unit + 24V Driver Unit 2-axis Type × 8 + terminal unit)
External view	See figure below



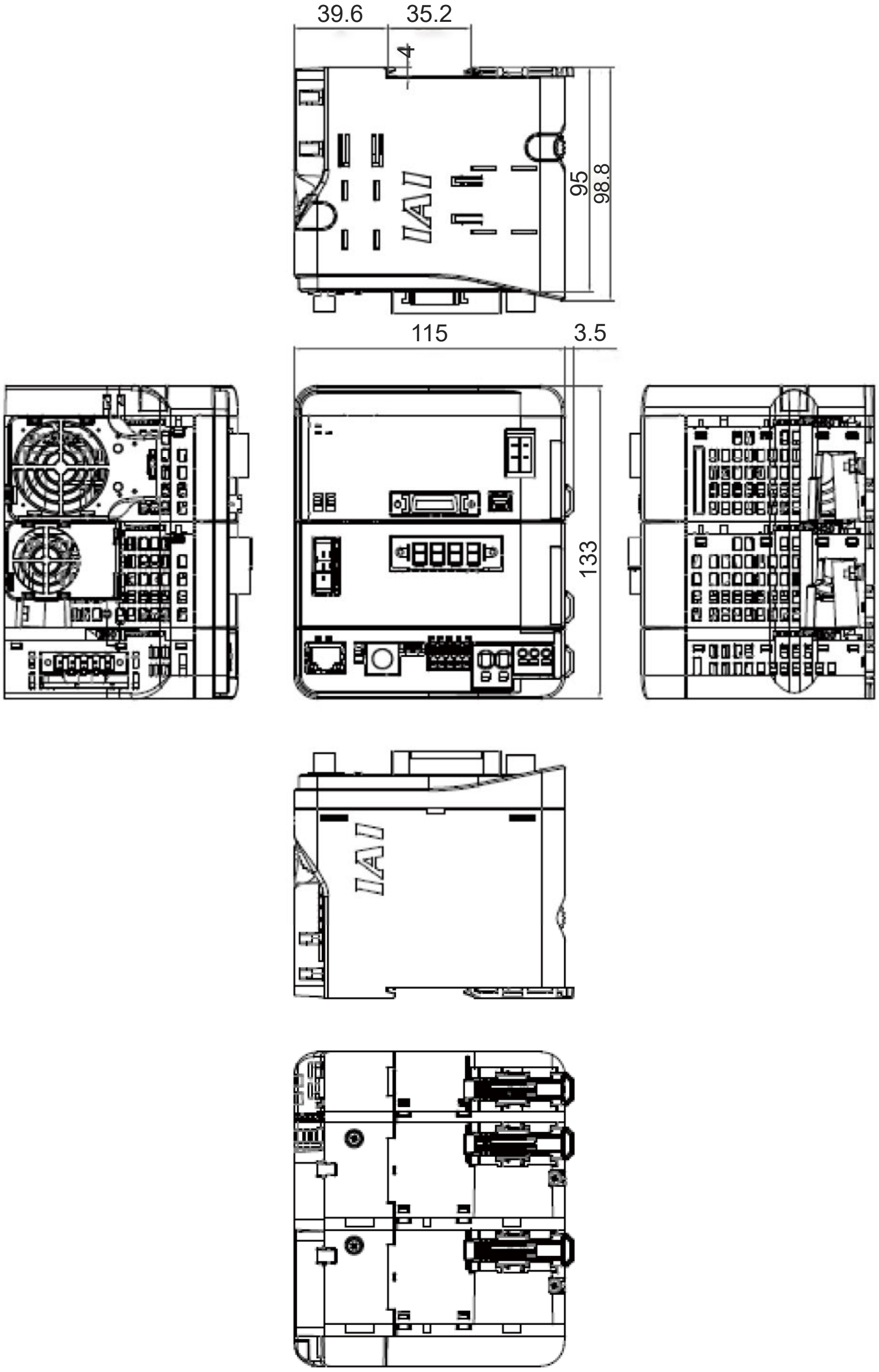
Controller (24V Driver Unit 16-axis with fan)

Item	Specifications
External dimensions	W 223.4 × H 115 × D95 mm
Mass	Approx. 1,722 g (gateway unit + 24V Driver Unit 2-axis Type × 8 + fan unit × 4 + terminal unit)
External view	See figure below



Controller (200V Driver Unit 1-axis with fan)

Item	Specifications
External dimensions	W 133 × H 115 × D 95 mm
Mass	約 1,077g (Gateway Unit + 200V Power Supply Unit × 1 + 200V Driver Unit × 1 + Fan Unit × 1 + Fan Unit for 200V Driver Unit × 1 + 200V Terminal Unit)
External view	See figure below



2.5 Connection Diagrams

Sample connection arrangement diagrams are shown below.

Power Supply and Stop Circuit / Drive Cutoff Circuit

The circuit related to RCON's drive-source cutoff is shown below. RCON gets the motor power supplied from the gateway unit for the 24V system and from the 200V power supply unit for the 200V system, however, the circuit related to drive cutoff is on the driver unit side.

- A driver unit possesses a drive cutoff circuit by the semiconductor for each axis and an EC connect unit for every four axes. Also, the motor power supply should be cut off by STOP Signal. The drive source cutoff circuit via semiconductor has an overcurrent detection function and an inrush current restriction function.

[For 24V System Driver Unit (RCON-PC/PCF/AC/DC)]

- Each driver unit has an interface (Drive-source cutoff connector: MPI/MPO) that can shut off the external drive source of each axis.

[For 200V System Driver Unit (RCON-SC)]

- Each driver unit possesses a drive cutoff circuit and the driver stop circuit by the internal semiconductor instead of an external drive cutoff connector.
- The driver stop circuit (DRV STOP) cuts off the energy supply to the motor by the cutoff circuit in the controller after a reaction time (8ms or less) in response to the input signal.

[For EC Connection Unit (RCON-EC)]

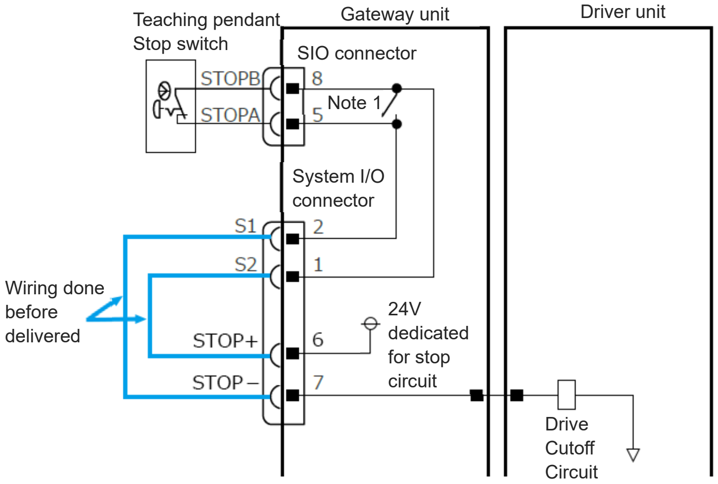
- There are some interfaces (drive cutoff connectors: MPI/MPO) available which enables to cut off drive externally for each axis of each EC connection unit.

Three conditions below are shown as an example of circuit.

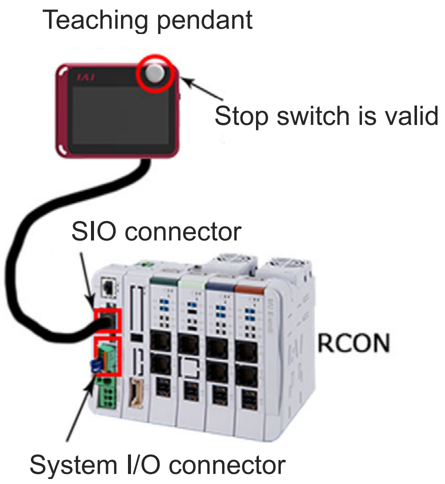
(1) When operating an actuator by using the stop input on the teaching pendant
(2) When operating an actuator with the stop input activated on the equipment and teaching pendant
(3) When reflecting the stop switch on the teaching pendant to the stop circuit in the equipment

(1) When operating an actuator by using the stop input on the teaching pendant

[Example of Circuit]



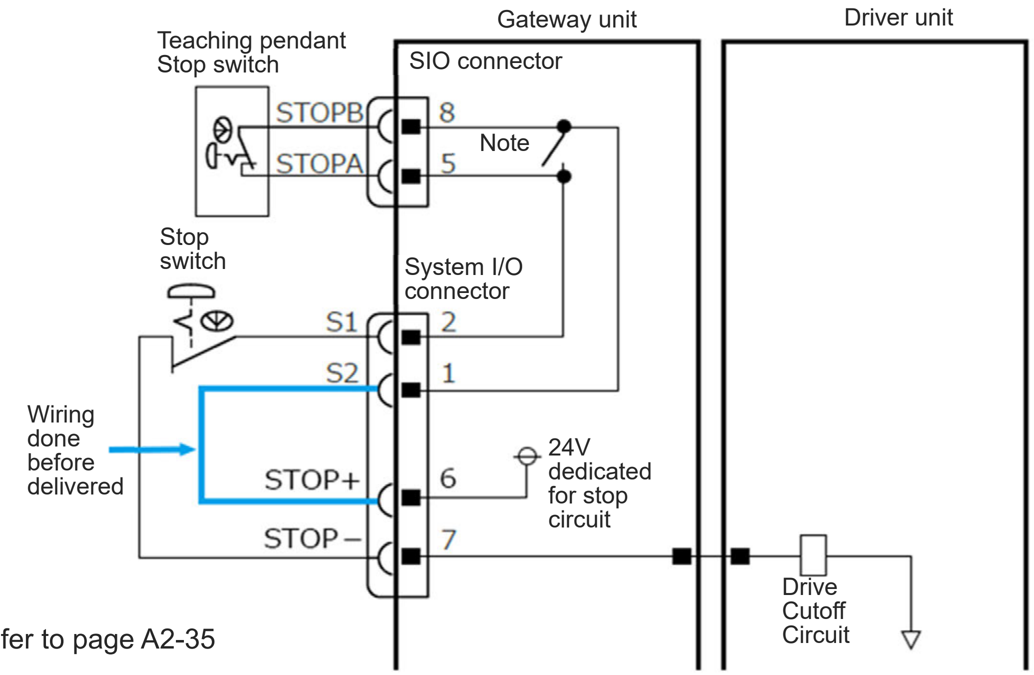
[Wiring Layout Image]



Note1: Refer to A2-35

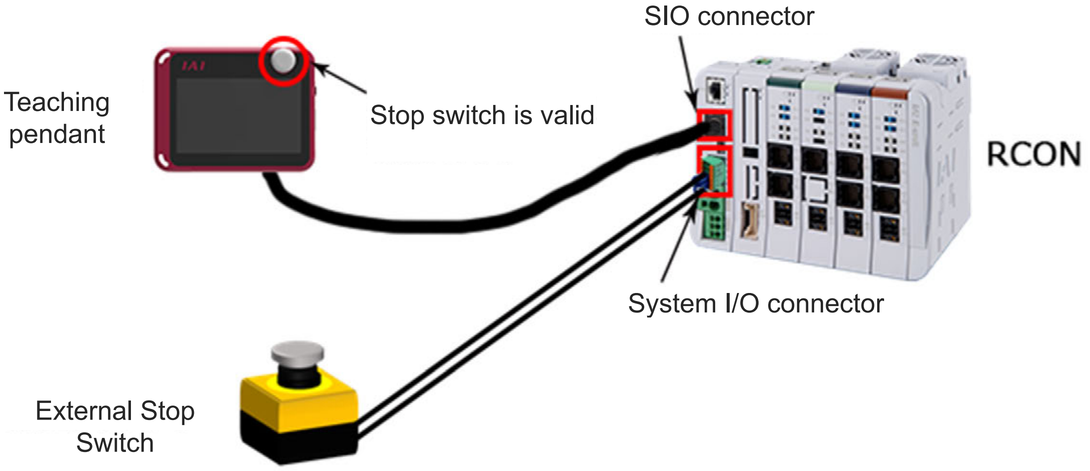
(2) When operating an actuator with the stop input activated on the equipment and teaching pendant

[Example of Circuit]



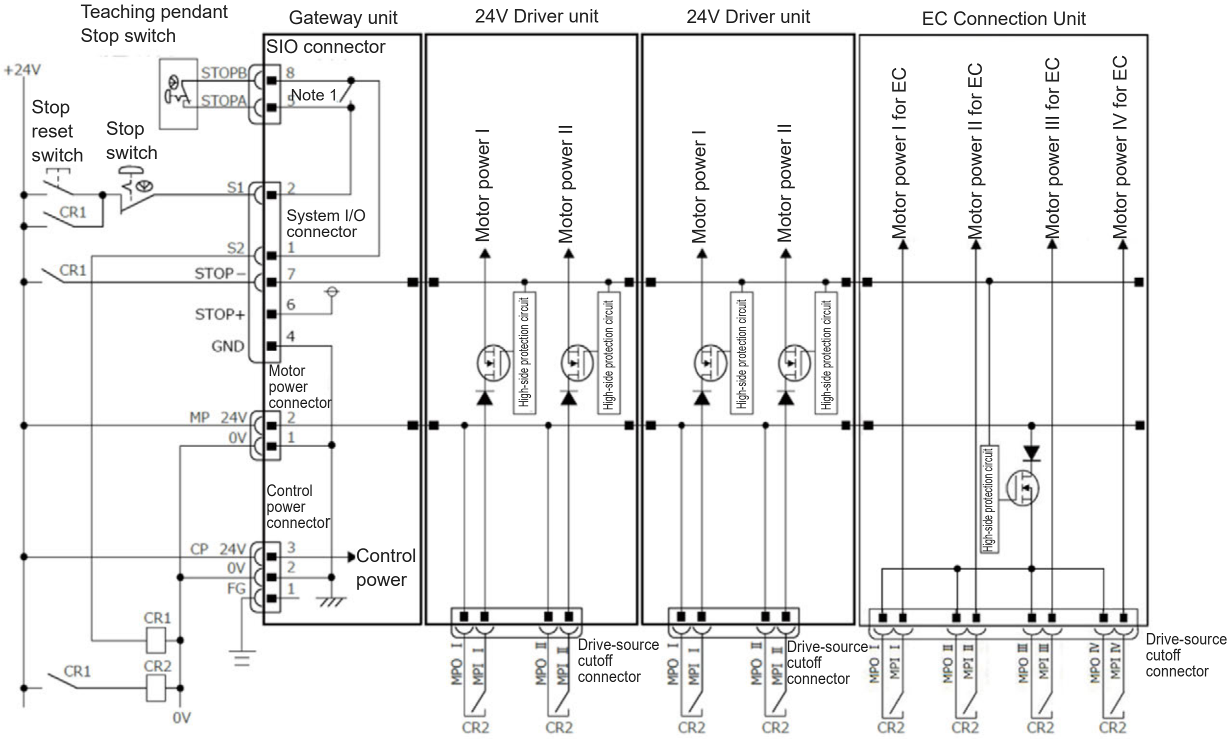
Note 1 : Refer to page A2-35

[Wiring Layout Image]

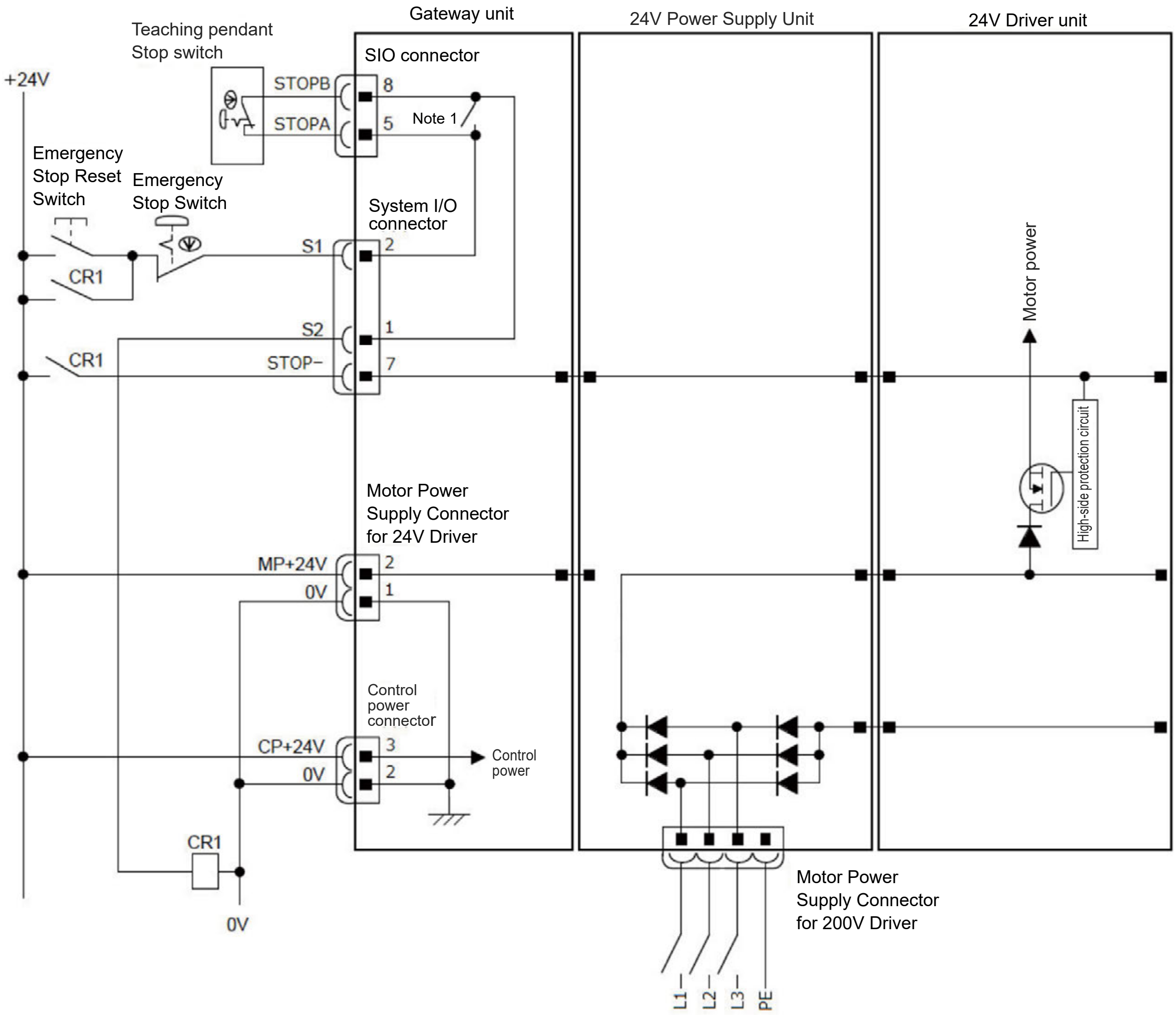


(3) When reflecting the stop switch on the teaching pendant to the stop circuit in the equipment

[Example of Circuit (For 24V System)]



[Example of Circuit (for 200V System)]

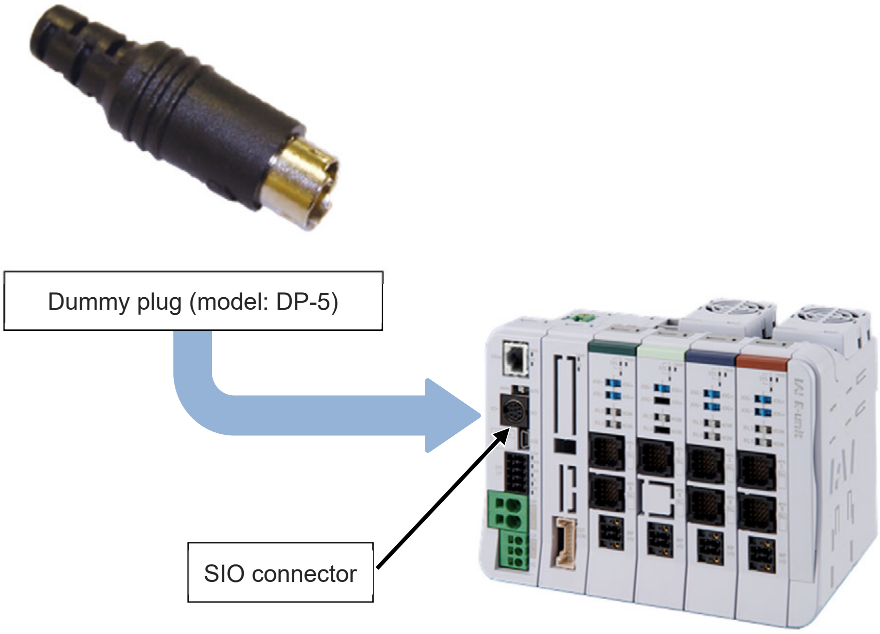


Wiring diagram: Stop and drive-source cutoff

Item	Specifications
STOP-input	24V DC ±10% / 10mA or less
S1 and S2 input	24V DC ±10% / 0.1A or less

Note 1: RCON-GW : If nothing is connected to the SIO connector, S1 and S2 will be short-circuited in the controller.

RCON-GWG : If nothing is connected to the SIO connector, S1 and S2 will not be short-circuited in the controller.
To short-circuit, connect the supplied dummy plug DP-5 to the SIO connector.



Note :• When externally shutting off the motor drive source to comply with the safety category or the like, connect a contact such as a relay to the wiring between the MPI* and MPO* terminals.

- The rating of the STOP-signal to be turned ON/OFF with the contact CR1 is 24V DC / 10mA or less.
- The CR1 coil current must be 0.1A or less.
- When supplying power by turning ON/OFF 24V DC, leave 0V connected and supply/cut off +24V.
- Consider the wire diameter and length for the drive cutoff connector wiring so the voltage would not drop.
- There may be a case that an alarm gets generated due to the voltage drop supplied to the controller caused by inappropriate wire diameter and length. In such a case, adjust the output voltage of the power supply to secure 24V for the voltage supplied to the controller.

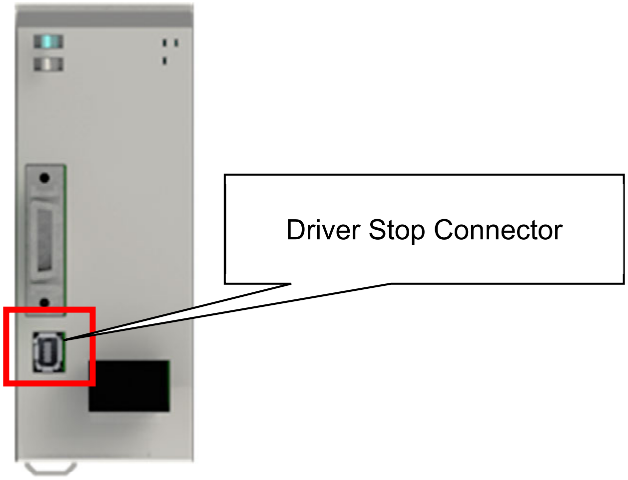
Warning

● The stop switch on a teaching pendant can stop all the actuators connected to RCON, however, it cannot stop the system.

Driver Stop Circuit

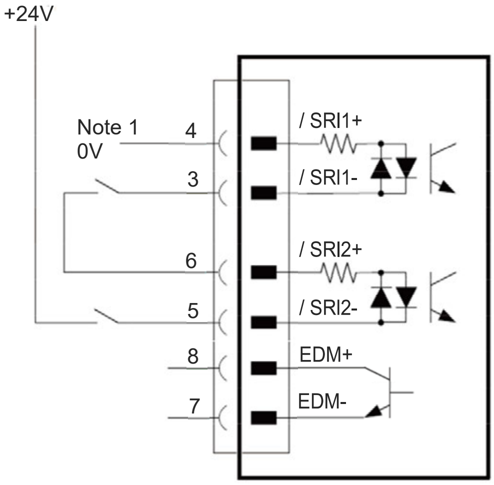
The 200V driver unit (RCON-SC0 possesses a drive cutoff circuit and the driver stop circuit by the internal semiconductor instead of an external drive cutoff connector.
The driver stop circuit (DRV STOP) is a feature that cuts off the energy supply to the motor by the cutoff circuit in the controller after a reaction time (8ms or less) in response to the input signal and makes a safe stop.
Shown below is an example for wiring for the driver stop feature.

[Connector Position]



Front View of RCON-SC

[Example for Wiring]



By wiring a shown in the diagram above, the driver features can be stopped when the switch is turned off.

Note 1: Have the 0V in common with the 24V power supply of the gateway unit.

[Signals on Driver Stop Connector]

Connector Name on Driver unit Side: 2294417-1 (Tyco Electronics)

Pin No.	Signal name	Name	Explanation
1	NC	–	Do not apply
2	NC	–	Do not apply
3	/SRI1-	Stop Input Signal 1	Stop input signal should be input. On: DRV STOP released Off: In DRV STOP (Motor current cutoff)
4	/SRI1+		
5	/SRI2-	Stop Input Signal 2	Stop input signal should be input. On: DRV STOP released Off: In DRV STOP (Motor current cutoff)
6	/SRI2+		
7	EDM-	External Device Monitor Output Signal	It is an output signal to show the stop feature is in operation with no failure.
8	EDM+		

[Electrical Specifications]

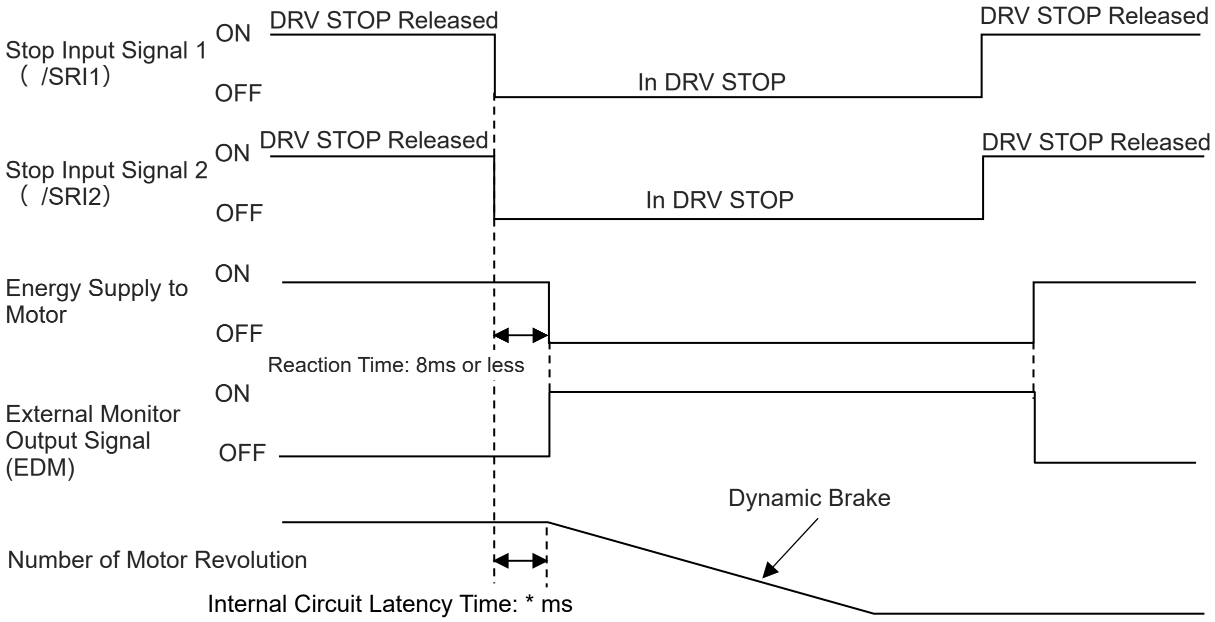
Item	Specifications	Remarks
Stop Input Signal (SRI)		
On Input Voltage Range	24V±10%	
Off Input Voltage Range	0-2V	
Input Current	7.6mA (Typ)	It is a value per 1ch.
Reaction Time	8ms or less	
External Device Monitor Output Signal (EDM)		
Voltage Range	24V±10%	
Output Current	100mA (Max)	

[Test Pulse of Stop Input Signal]

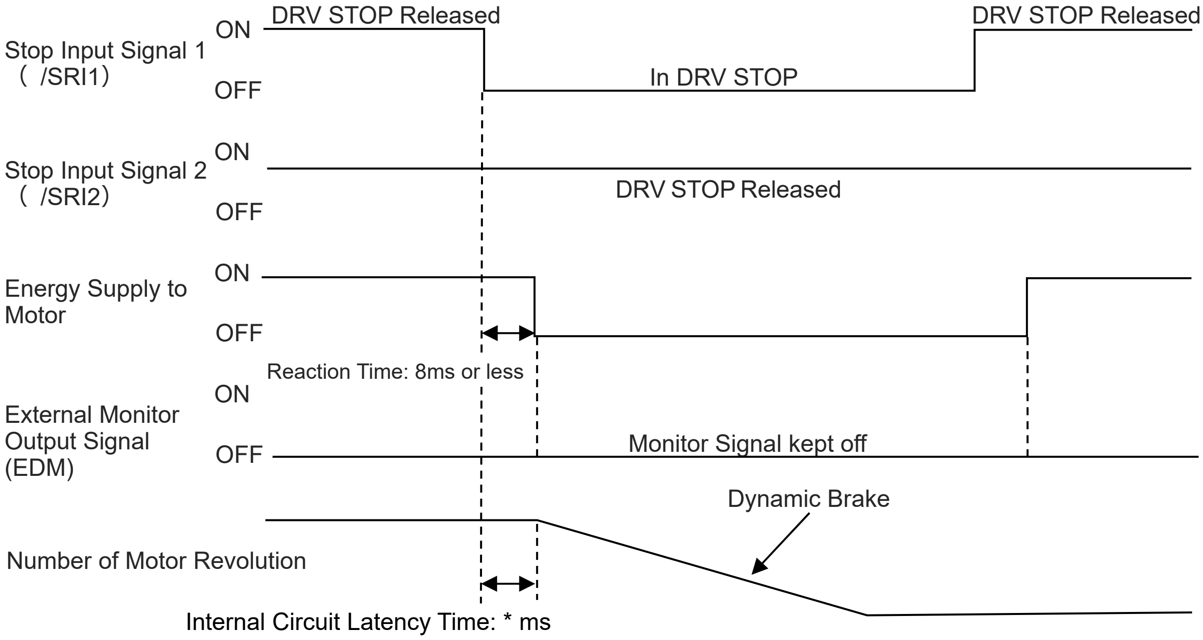
Set the test pulse off time input externally at 1ms or less.

[Operating Sequence]

●Normal Operation



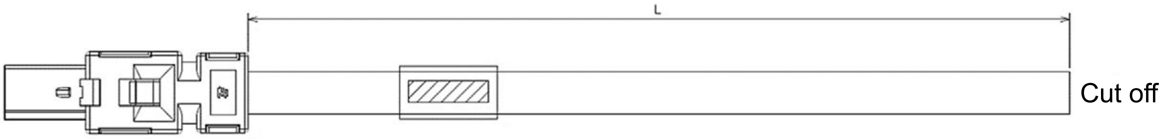
● Operation in malfunction



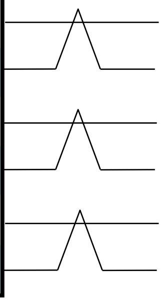
Operation in malfunction should be as shown in the diagram above when switches are reduplicated as shown in the example of wiring.
When having one switch, the driver stop feature at malfunction should get invalid.

[Cable for Driver Stop Feature] (Sold separately)

Model Code	Cable Model	Wiring Diameter
CB-SC-STO□□□	2464C BIOS-CL3-2603P-B (BANDO DENSEN)	AWG26×3P



Controller Side Connector Name：2013595-1（Tyco Electronics）			
Pin No.	Signal Name	Wiring	Color
1	-	AWG26	-
2	-		-
3	/SRI1-		Black
4	/SRI1+		Black/ White
5	/SRI2-		Red
6	/SRI2+		Red/ White
7	EDM-		Green
8	EDM+		Green/ White



[Dummy Plug for Driver Stop Connector] (Enclosed)

It is a short-circuit plus to unable the function by connecting to the driver stop connector when the driver stop feature is not in use.

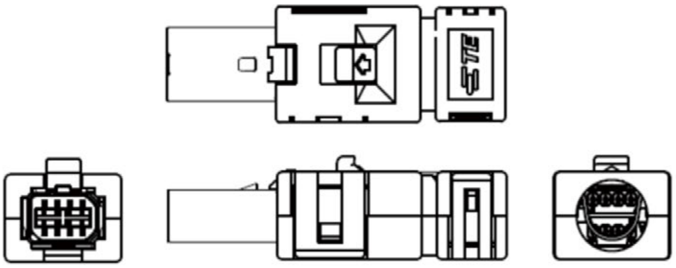
Model : DP-6

[Driver Stop Connector (Cable Side)] (To be prepared by user)

There is the following model code available for a connector unit on the cable side when a cable for driver stop feature is to be built up.

Manufacturer: Tyco Electronics

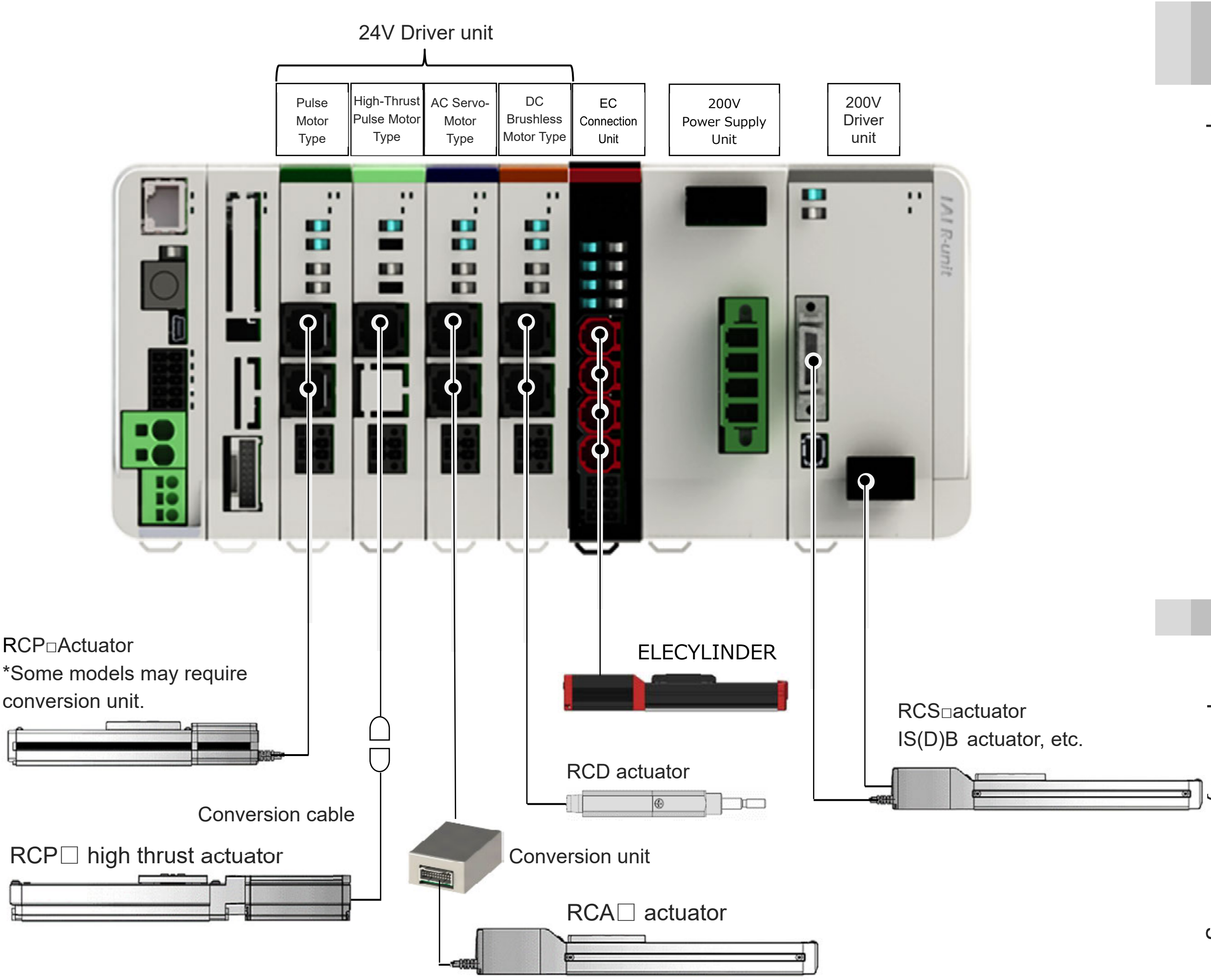
Model Code: 2013595-1 (Soldering Type) * There is cold-welding type also available.



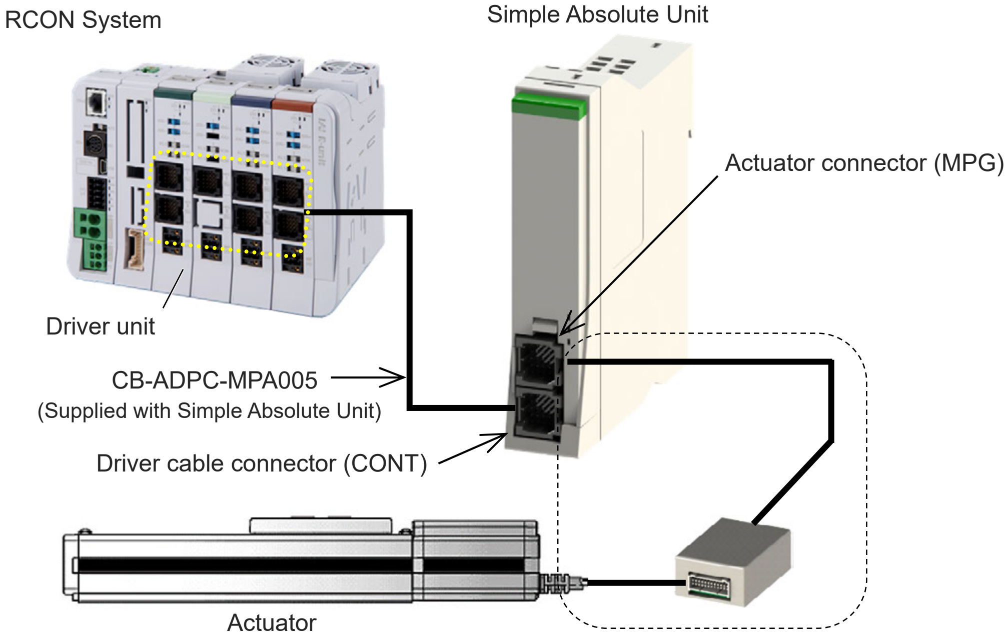
Cramping Tool
2229737-1

it is necessary to have a cramping tool 2229737-1 (for both soldering and cold-welding types).

Motor/encoder circuit



[Simple Absolute Unit Wiring]



For the wiring of this section, refer to the RCON connection cable list on the next page.

RCON Connection Cable List

[24V Driver Unit Connection Cable]

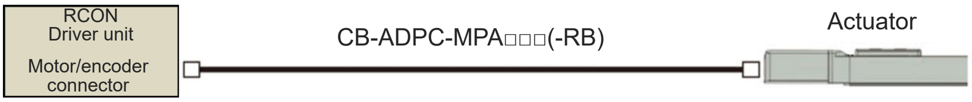
No.	Actuator		Applicable controller code	RCON connection cable (Note 2) (-RB: Robot cable) [Each actuator connection cable]	Conversion unit	Wiring diagram
	Series	Target type				
(1)	RCP6 RCP6CR RCP6W RCP5 RCP5CR RCP5W	Other than high thrust type (Note 1)	P5	CB-ADPC-MPA□□□(-RB)	-	**A**
(2)		High thrust type (Note 1)	P6	CB-ADPC-MPA□□□(-RB) CB-CAN-AJ002 (conversion cable)	-	**B**
(3)	RCP4 RCP4CR RCP4W	Gripper (GR*), ST4525E, SA3/RA3	P5	CB-ADPC-MPA□□□(-RB)	-	**A**
(4)		High thrust type (Note 1)	P6	CB-ADPC-MPA□□□(-RB) CB-CAN-AJ002 (conversion cable)	-	**B**
(5)		Other than (3), (4)	P5	CB-ADPC-MPA□□□(-RB) CB-CAN-AJ002 (conversion cable)	-	**B**
(6)	RCP3		P5	CB-RCAPC-MPA□□□(-RB)	-	**C**
(7)	RCP2 RCP2CR RCP2W	RCP2 (standard type) Rotary compact type RCP2-RTBS/RTBSL/RTCS/RTCSL	P5	CB-ADPC-MPA□□□(-RB) [CB-RPSEP-MPA□□□]	Required	**D**
(8)		RCP2CR (clean room type), RCP2W (dust-proof/splash-proof type) Rotary (RT*) of above types GRS/GRM/GR3SS/GR3SM of above types	P5	CB-ADPC-MPA□□□-RB	-	**A**
(9)		All (standard / clean room / dust-proof/splash-proof) types of GRSS/GRLS/GRST/GRHM/GRHB Short type (RCP2 only) RCP2-SRA4R/SRGS4R/SRGD4R	P5	CB-RCAPC-MPA□□□(-RB)	-	**C**
(10)		High thrust type (Note 1)	P6	CB-ADPC-MPA□□□(-RB) [CB-CFA-MPA□□□(-RB)]	Required	**D**
(11)		Other than (7) to (10)	P5	CB-ADPC-MPA□□□(-RB) [CB-PSEP-MPA□□□]	Required	**D**
(12)	RCA2/RCA2CR/RCA2W, RCL		A6	CB-RCAPC-MPA□□□(-RB)	-	**C**
(13)	RCA2/RCA2CR/RCA2W (CNS option)		A6	CB-ADPC-MPA□□□(-RB)	-	**A**
(14)	RCA RCACR RCAW	Short type (RCA only) RCA-SRA4R/SRGS4R/SRGD4R	A6	CB-RCAPC-MPA□□□(-RB)	-	**C**
(15)		Other than (14)	A6	CB-ADPC-MPA□□□(-RB) [CB-ASEP2-MPA□□□]	Required	**D**
(16)	RCD	RCD-RA1DA, RCD-GRSNA	D6	CB-ADPC-MPA□□□(-RB)	-	**A**

Note 1: Actuators using high-thrust pulse motor (56SP, 60P and 86P)

Note 2: The cable length from each driver unit to actuators should be 20m at maximum regardless of the conversion unit.
However, for the DC brushless motor type, the maximum length from the driver unit (RCON-DC) to RCD actuator should be 10m.

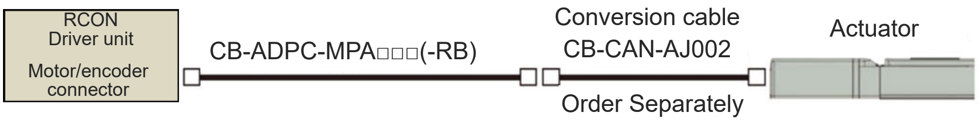
Wiring diagram A

(1) RCP6/RCP6CR/RCP6W/RCP5/RCP5CR/RCP5W (other than high thrust type (Note 1))
(3) RCP4 Gripper (GR*), ST4525E, SA3/RA3
(8) RCP2CR/RCP2W rotary (RT*) and GRS/GRM/GR3SS/GR3SM
(13) RCA2/RCA2CR/RCA2W (CNS option)
(16) RCD-RA1DA, RCD-GRSNA



Wiring diagram B

(2) RCP6/RCP6CR/RCP6W/RCP5/RCP5W high thrust type (Note 1)
(4) RCP4/RCP4W high thrust type (Note 1)
(5) RCP4/RCP4CR/RCP4W (gripper, ST4525E, SA3/RA3, other than high thrust type (Note 1))

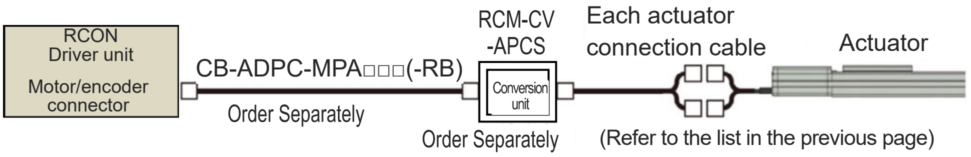


Wiring diagram C

(6) RCP3
(9) RCP2/RCP2CR/RCP2W-GRSS/GRLS/GRST/GRHM/GRHB,
RCP2-SRA4R/SRGS4R/SRGD4R
(12) RCA2/RCA2CR/RCA2W, RCL
(14) RCA short type (RCA-SRA4R/SRGS4R/SRGD4R)

Wiring diagram D

(7) RCP2-RTBS/RTBSL/RTCS/RTCSL
(10) RCP2/RCP2CR/RCP2W high thrust type (Note 1)
(11) RCP2/RCP2CR/RCP2W, excluding some (Refer to the list in the previous page for details)
(15) RCA/RCACR/RCAW (other than RCA-SRA4R/SRGS4R/SRGD4R)



Note 1: Actuators using high-thrust pulse motor (56SP, 60P and 86P)

[200V Driver Unit Connection Cable]

No.	Actuator		Applicable Controller Symbol	RCON Connection Cable				
	Series	Applicable Type		Applicable controller code	Motor Cable	Motor Robot Cable	Encoder Cable	Encoder Robot Cable
(1)	RCS4 RCS4CR		T4	20	CB-RCC1-MA□□□	CB-X2-MA□□□	—	CB-X1-PA□□□
(2)	RCS3(P) RCS3(P)CR	CTZ5C CT8C	T4	20	CB-RCC1-MA□□□	CB-X2-MA□□□	—	CB-X1-PA□□□
		Other than those above					CB-RCS2-PA□□□	CB-X3-PA□□□
(3)	RCS2 RCS2CR RCS2W	RTC□L RT6	T4	20	CB-RCC1-MA□□□	CB-X2-MA□□□	CB-RCS2-PLA□□□	CB-X2-PLA□□□
		Other than those above					CB-RCS2-PA□□□	CB-X3-PA□□□
(4)	RCS2 With no Loadcell	RA13R	T4	20	CB-RCC1-MA□□□	CB-X2-MA□□□	CB-RCS2-PLA□□□	CB-X2-PLA□□□
		RA13R Equipped with Brake (with brake box)					[From Actuator to Brake Box] CB-RCS2-PLA□□□ [From Brake Box to Controller] CB-RCS2-PLA□□□	[From Actuator to Brake Box] CB-X2-PLA□□□ [From Brake Box to Controller]】 CB-X2-PLA□□□
		RA13R Equipped with Brake (with no brake box)					[From Actuator to Brake Box] CB-RCS2-PLA□□□	[From Actuator to Brake Box] CB-X2-PLA□□□
(5)	IS(P)B IS(P)DB IS(P)DBCR		T4	30	—	CB-X2-MA□□□	—	CB-X1-PA□□□ *Cable length at 21m or more and 30m or less in battery-less absolute type should be CB-X1-PA□□□-AWG24
		Option: Limit Switch Equipped Type (Note 1)						CB-X1-PLA□□□ *Cable length at 21m or more and 30m or less in battery-less absolute type should be CB-X1-PLA□□□-AWG24
(6)	IS(P)A IS(P)DA IS(P)DACR SSPA SSPDACR IF FS RS		T4	30	—	CB-X2-MA□□□	—	CB-X1-PA□□□
		Option: Limit Switch Equipped Type (Note 1)						CB-X1-PLA□□□
(7)	NSA		T4	30	—	CB-X2-MA□□□	—	CB-X1-PA□□□
(8)	NS		T4	30	—	CB-X2-MA□□□	—	CB-X3-PA□□□
		Option: Limit Switch Equipped Type (Note 1)						CB-X2-PLA□□□
(9)	DD(A) DD(A)CR DDW	T18□ LT18□	T4	30	—	CB-X2-MA□□□	—	CB-X3-PA□□□
		H18□ LH18□				CB-XMC1-MA□□□		
(10)	LSA	W□□□	T4	20	—	CB-XMC1-MA□□□	—	CB-X2-PLA□□□
		Other than those above				CB-X2-MA□□□		CB-X3-PA□□□
(11)	LSAS		T4	20	—	CB-X2-MA□□□	—	CB-X1-PA□□□
(12)	IS(P)WA		T4	30	—	CB-XEU1-MA□□□	—	CB-X1-PA□□□-WC

Note 1: When it is required to operate an actuator equipped with a limit switch, it should be the cable equipped with a limit switch. (It has a limit switch built inside.)

[EC Connection Unit Cable (Common for All Types)]

Standard Connector Cable Code : CB-REC-PWBIO□□□-RB
4-way Connector Cable Code : CB-REC2-PWBIO□□□-RB

*The cable lengths should be 1m at shortest and 10m at longest. Order can be made in every 1m of length.

*Shown below is an example for the model types.

Cable Length 1m → CB-REC-PWBIO010-RB

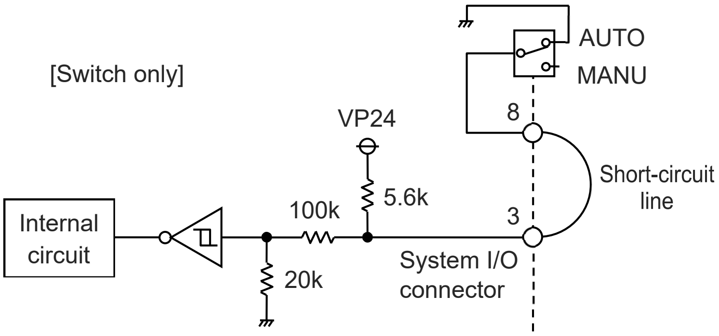
Cable Length 3m → CB-REC-PWBIO030-RB

Cable Length 10m → CB-REC-PWBIO100-RB

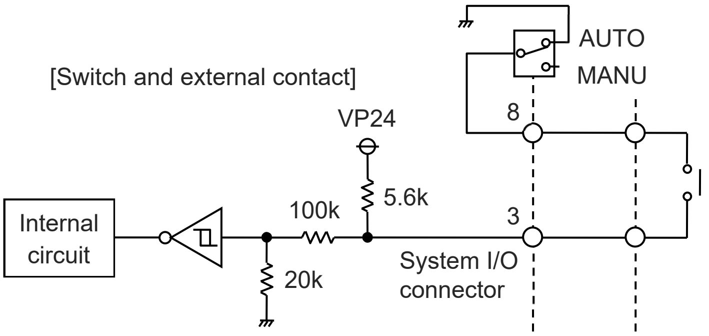
AUTO/MANU mode switching circuit wiring

You can also switch AUTO/MANU by connecting the PLC/contact to the AUTO/MANU (automatic/manual operation) input of the system I/O connector of the gateway unit.
There are 3 types of AUTO/MANU mode switching circuit, as shown below.

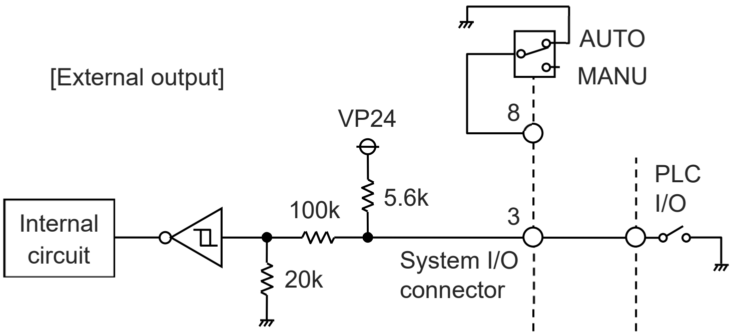
(1) Switch only
The configuration is such that the AUTO/MANU input (3, 8-pin) in the system I/O connector is short-circuited with a short-circuited line and switched only with the switch.



(2) Switch and external contact
Connect the switch and external contact in series as shown in the figure. It is AUTO if both are connected and MANU if one is open.



(3) External output
Connect the AUTO/MANU signal input 3-pin in the system I/O connector to the PLC, etc. It is AUTO at PLC I/O output ON (0 V) and MANU at OFF (open).
In this case, the AUTO/MANU switch will be disabled.



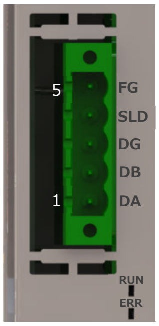
Note that the specification of the system I/O connector is as follows.

Item	Specifications
Input current	5mA
Leakage current	Max. 1 mA
Isolation method	Non-isolated

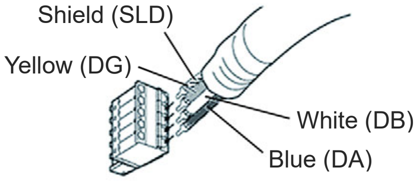
Field network wiring

For details of the connection method, follow the instruction manuals of the master unit of each field network and the PLC configured.

[CC-Link]

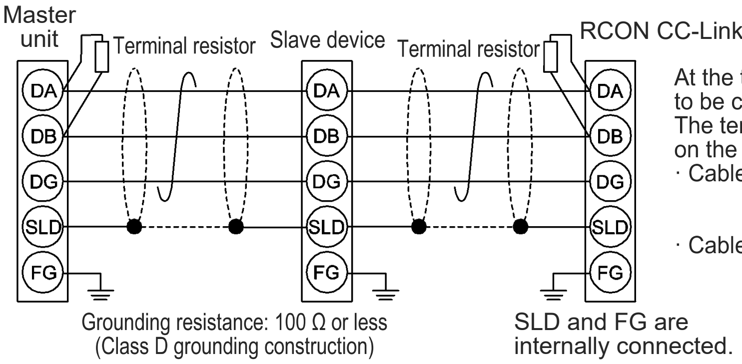


Controller side
Connector top view



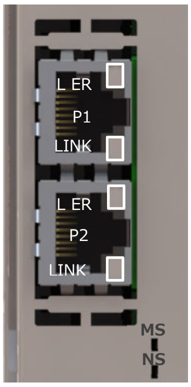
Connector name	CC-Link cable connector	Remarks
Cable side	MSTB2.5/5-STF-5.08 AU (Phoenix Contact)	Standard accessories
Controller side	MSTB2.5/5-GF-5.08 AU (Phoenix Contact)	

Pin No.	Signal name (color scheme)	Description	Compatible wire diameter
1	DA (blue)	Signal line A	CC-Link dedicated cable
2	DB (white)	Signal line B	
3	DG (yellow)	Digital ground	
4	SLD	Connects the shield of shielded cables (5-pin FG and control power connector 1-pin FG connected internally)	
5	FG	Frame ground (4-pin SLD and control power connector 1-pin FG connected internally)	



At the terminal, a terminal resistor needs to be connected.
The terminal resistor varies depending on the type of CC-Link dedicated cable.
- Cable FANC-SBH: 130 Ω 1/2 W (CC-Link dedicated high performance cable)
- Cable FANC-SB: 110 Ω 1/2 W (CC-Link dedicated cable)

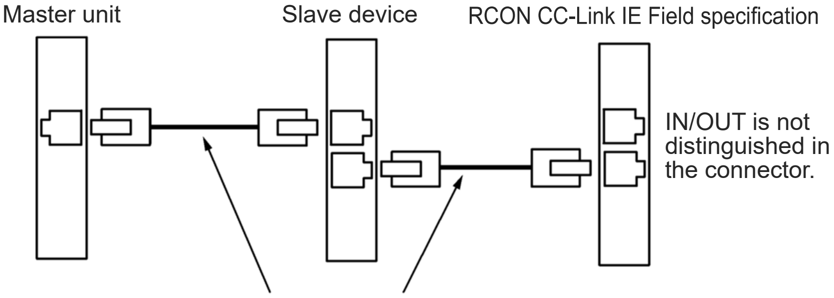
[CC-Link IE Field]



Controller side
Connector top view

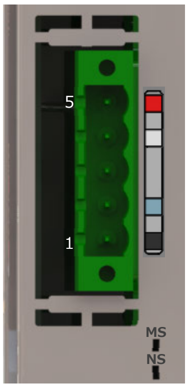
Connector name	CC-Link IE Field cable connector	Remarks
Cable side	Ethernet ANSI/TIA/EIA-568-B Category 5e or higher shielded 8P8C modular plug (RJ-45)	To be prepared by the customer
Controller side	Ethernet ANSI/TIA/EIA-568-B Category 5e or higher shielded 8P8C modular jack (RJ-45)	

Pin No.	Signal name	Description	Compatible wire diameter
1	TD+	Transmit data +	For the Ethernet cable, use a straight STP cable of Category 5e or higher.
2	TD-	Transmit data -	
3	RD+	Receive data +	
4	–	Not used	
5	–	Not used	
6	RD-	Receive data -	
7	–	Not used	
8	–	Not used	

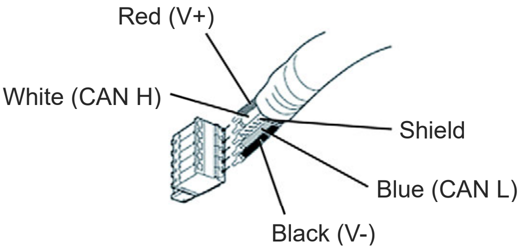


Ethernet straight cable, Category 5e or higher
Aluminum tape and braided double cutoff shielded cable recommended
(Note) Terminal resistor is not required.

[DeviceNet]



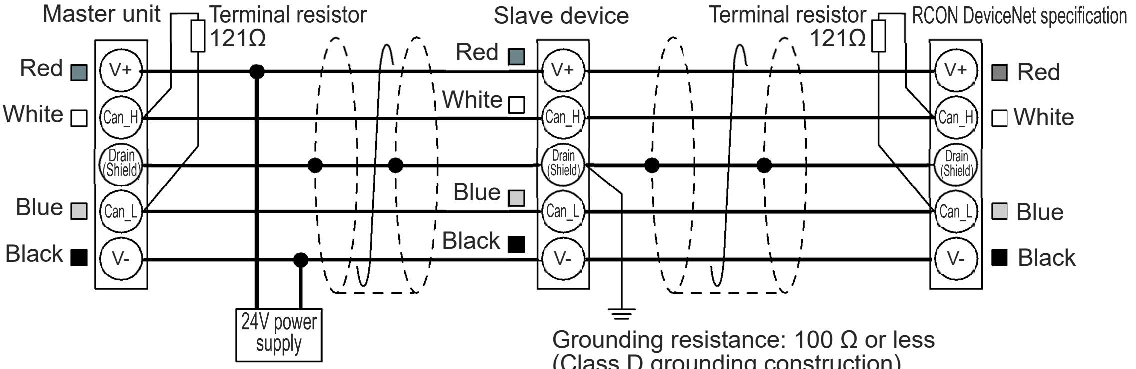
Controller side
Connector top view



Connector name	DeviceNet cable connector	Remarks
Cable side	MSTB2.5/5-STF-5.08 AU M (Phoenix Contact)	Standard accessories
Controller side	MSTB2.5/5-GF-5.08 AU (Phoenix Contact)	

Pin No.	Signal name (color scheme)	Description	Compatible wire diameter
1	V- (black)	Power supply cable - side	DeviceNet dedicated cable
2	CAN L (blue)	Signal data Low side	
3	–	Digital ground	
4	CAN H (white)	Signal data High side	
5	V+ (red)	Power supply cable + side	

At the terminal, a terminal resistor needs to be connected.



Grounding resistance: 100 Ω or less
(Class D grounding construction)

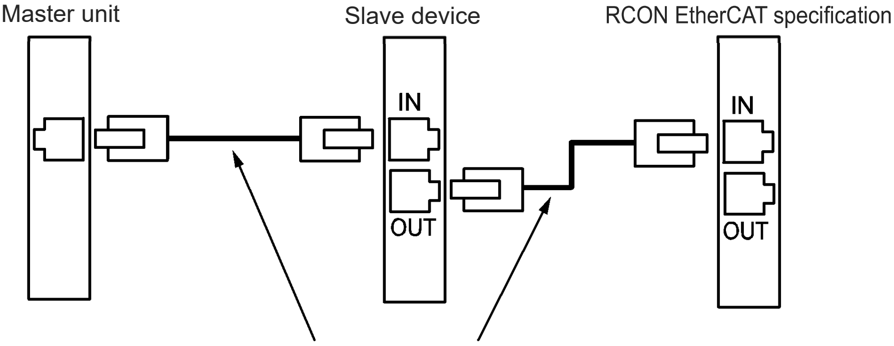
The communication power must be supplied from the outside.

[EtherCAT]

Controller side
Connector top view

Connector name	EtherCAT cable connector	Remarks
Cable side	Ethernet ANSI/TIA/EIA-568-B Category 5 or higher shielded 8P8C modular plug (RJ45)	To be prepared by the customer
Controller side	Ethernet ANSI/TIA/EIA-568-B Category 5 or higher shielded 8P8C modular jack (RJ45)	

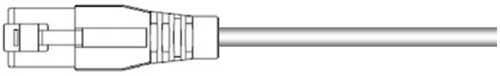
Pin No.	Signal name	Description	Compatible wire diameter
1	TD+	Transmit data +	For the Ethernet cable, use a straight STP cable of Category 5 or higher.
2	TD-	Transmit data -	
3	RD+	Receive data +	
4	–	Not used	
5	–	Not used	
6	RD-	Receive data -	
7	–	Not used	
8	–	Not used	



Ethernet straight cable, Category 5 or higher
Aluminum tape and braided double cutoff shielded cable recommended
(Note) Terminal resistor is not required.

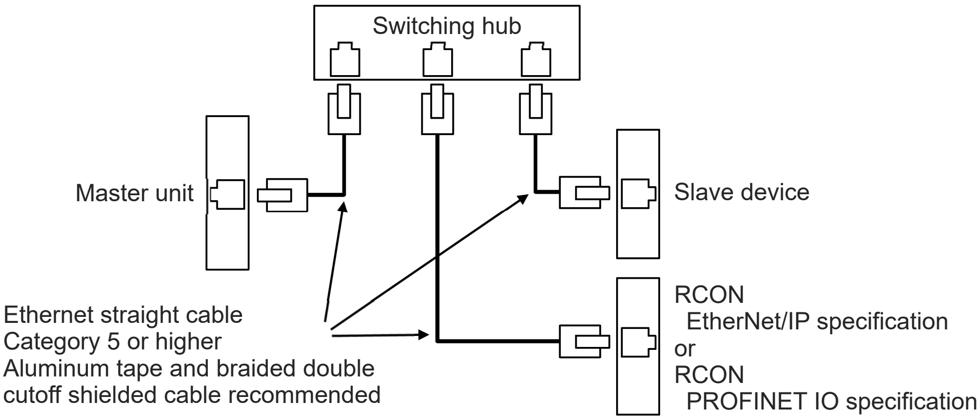
[EtherNet/IP] [PROFINET IO]

Controller side
Connector top view



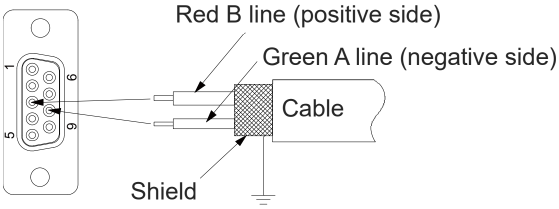
Connector name	EtherNet/IP, PROFINET IO cable connector	Remarks
Cable side	Ethernet ANSI/TIA/EIA-568-B Category 5 or higher shielded 8P8C modular plug (RJ45)	To be prepared by the customer
Controller side	Ethernet ANSI/TIA/EIA-568-B Category 5 or higher shielded 8P8C modular jack (RJ45)	

Pin No.	Signal name	Description	Compatible wire diameter
1	TD+	Transmit data +	For the Ethernet cable, use a straight STP cable of Category 5 or higher.
2	TD-	Transmit data -	
3	RD+	Receive data +	
4	–	Not used	
5	–	Not used	
6	RD-	Receive data -	
7	–	Not used	
8	–	Not used	



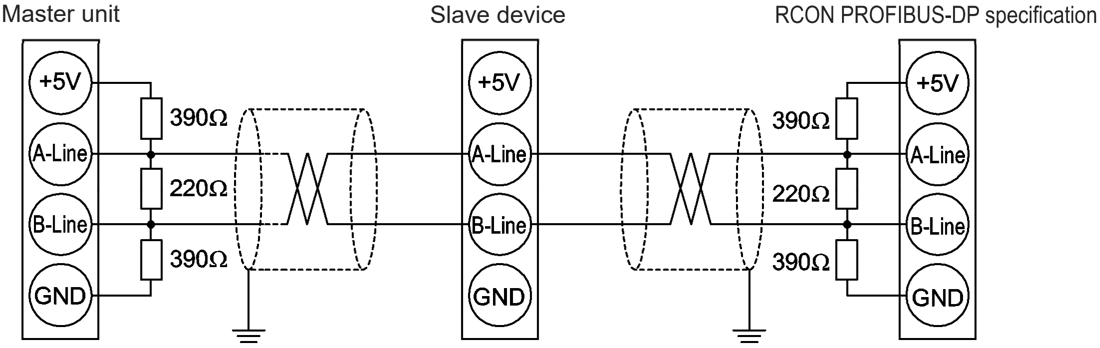
[PROFIBUS-DP]

Controller side
Connector top view



Connector name	PROFIBUS-DP cable connector	Remarks
Cable side	9-pin D sub connector (male)	To be prepared by the customer
Controller side	9-pin D sub connector (female)	

Pin No.	Signal name	Description	Compatible wire diameter
1	NC	Not connected	PROFIBUS-DP dedicated cable (Type A: EN5017)
2	NC	Not connected	
3	B-Line	Signal line B (RS-485)	
4	RTS	Transmission request	
5	GND	Signal GND (insulation)	
6	+5 V	+5 V output (isolated)	
7	NC	Not connected	
8	A-Line	Signal line A (RS-485)	
9	NC	Not connected	



Grounding resistance: 100 Ω or less
(Class D grounding construction)

[EtherCAT Motion]

Refer to RCON EtherCAT Motion Instruction Manual [ME0427] for the EtherCAT Motion connection type.

[MECHATROLINK-Ⅲ]

Refer to RCON MECHATROLINK-Ⅲ Instruction Manual [ME0426] for the MECHATROLINK-Ⅲ connection type.

[SSCNET Ⅲ/H]

Refer to RCON SSCNET Ⅲ/H Instruction Manual [ME0428] for the SSCNET Ⅲ/H connection type.

Specifications Section

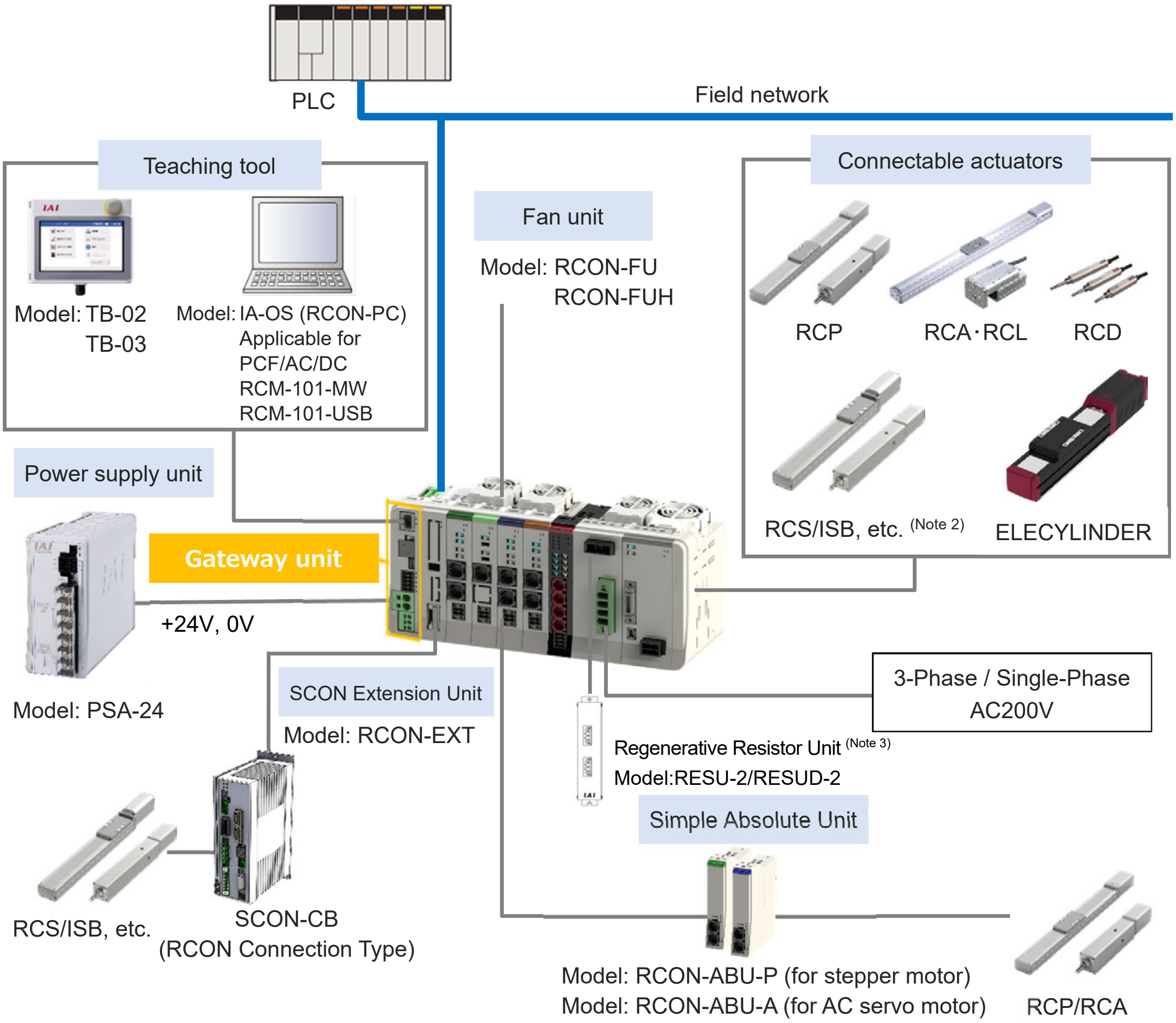
Chapter 3

Gateway Unit

3.1 Overview

The gateway unit is a slave station with a gateway function for connecting the ROBO Cylinder and industrial robot to the field network of the host PLC. It supports 10 kinds of field networks (CC-Link, CC-Link IE Field, DeviceNet, EtherCAT, EtherNet/IP, PROFIBUS-DP, PROFINET IO, MECHATROLINK-III, EtherCAT Motion, SSCNET III/H).

Combination of driver units (RCON-PC/PCF/AC/DC/SC) dedicated for R Unit, EC connection units, SCON external unit and others can be built up to 16 axes (Note 1) connections at the maximum. In addition to controlling each connected actuator, operating status and various information can be monitored.



Note 1: The maximum number of connectable axes in the direct numerical mode in the field network except for CC-Link and CC-Link IE Field and for the motion controllers should be eight axes.

Note2: The following 200V servo-motor actuators cannot be connected to the 200V driver units.

1) Motor types other than those from 60W to 750W
2) Encoder types other than battery-less absolute, incremental, spurious absolute or index absolute type
3) For 3-Phase 200V ·········· Combination that exceeds 2400W for total wattage of actuators connected to 200V driver unit
4) For Single-Phase 200V ··· Combination that exceeds 1600W for total wattage of actuators connected to 200V driver unit
5) Servo Press types
6) SCARA Robot
7) CT4 Series
8) ZR Series

When connecting the actuators described in (1) to (4) above, use SCON extension unit and SCON-CB. Also, DD/DDA and LSA-W21S are not applicable for the single-phase 200V.

Note3: There is a built-in regenerative resistor of 60W equipped in 200V driver unit and 200V power supply unit. The regenerative resistor is basically not necessary, but use an external regenerative resistor unit in case of shortage in regenerative resistor.

3.2 How to Read the Model Number

The model of the gateway unit is as follows.

Gateway unit model

RCON – ☐ – ☐ – ☐

Type – I/O Type – Options

Type

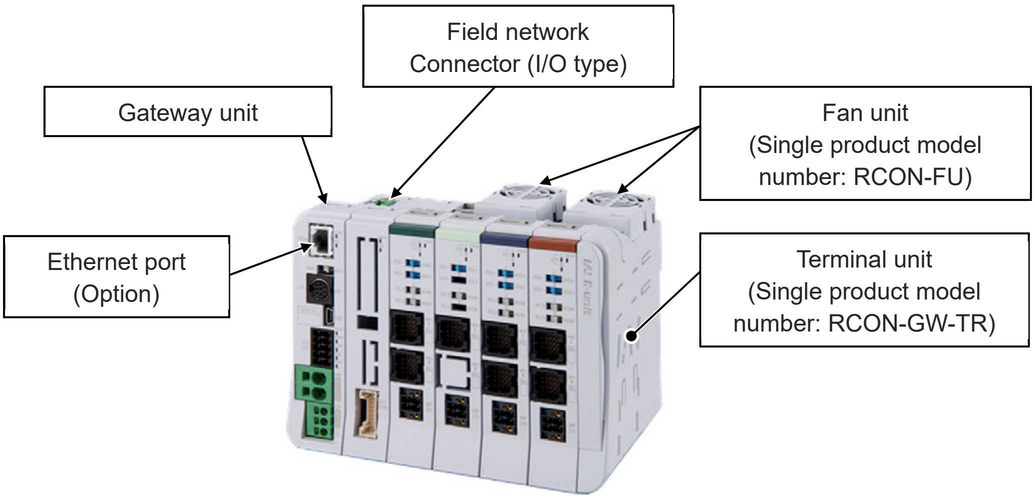
GW	Standard type
GWG	Safety category Type

I/O Type

CC	CC-Link connection specification
CIE	CC-Link IE Field connection specification
DV	DeviceNet connection specification
EC	EtherCAT connection specification
EP	EtherNet/IP connection specification
PR	PROFIBUS-DP connection specification
PRT	PROFINET IO connection specification
ECM	EtherCAT Motion connection specification
ML3	MECHATROLINK-Ⅲconnection specification
SSN	SSCNET Ⅲ/H connection specification

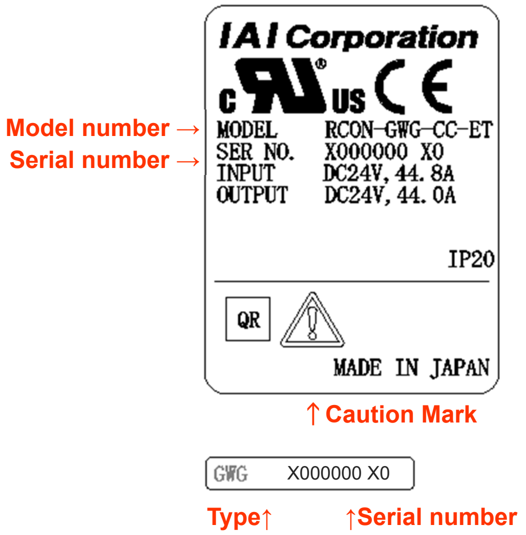
Options

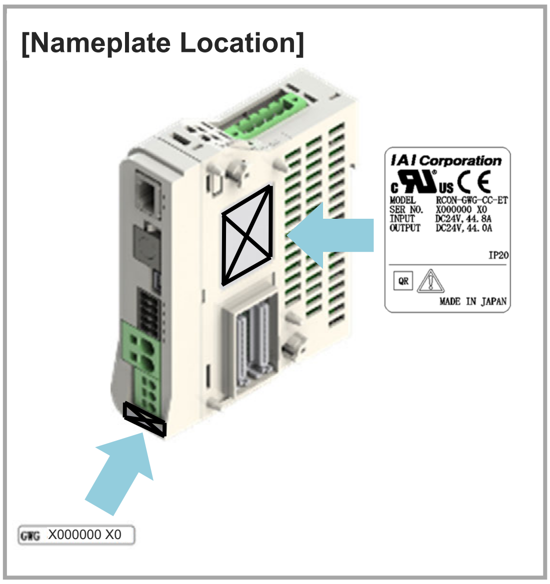
ET	Ethernet port installation specification
FU*	Fan unit mounting (*: Specify the number of units, 1 to 8)
TRN	Without terminal unit



How to read the model nameplate

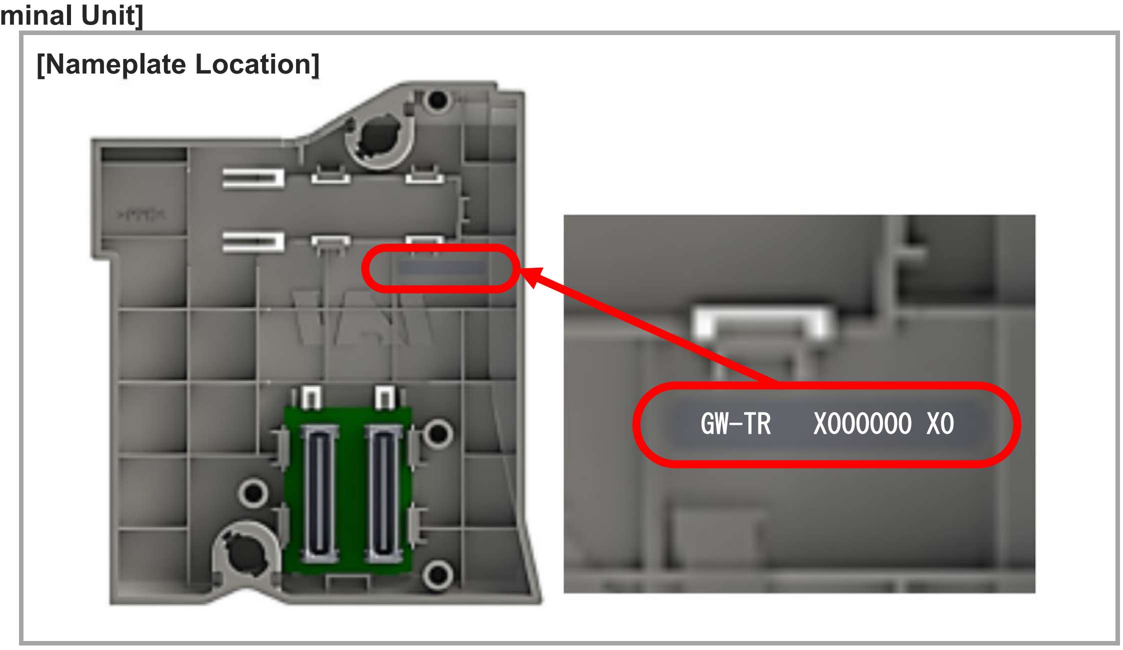
[Gateway Unit]





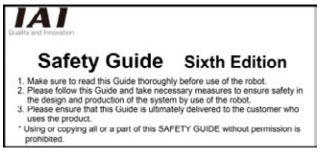
Mark	Explanation of Mark
⚠	Use IAI specified cables only.

[Terminal Unit]



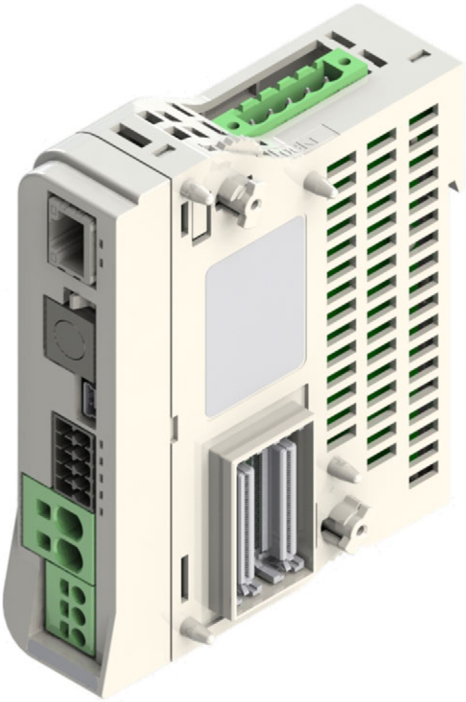
3.3 Gateway Unit and Accessories

The following table shows the product configuration for the standard specification.
See the packing list for the details of the enclosed components. In the unlikely case that any model number errors or missing parts come to light, contact your local IAI distributor.

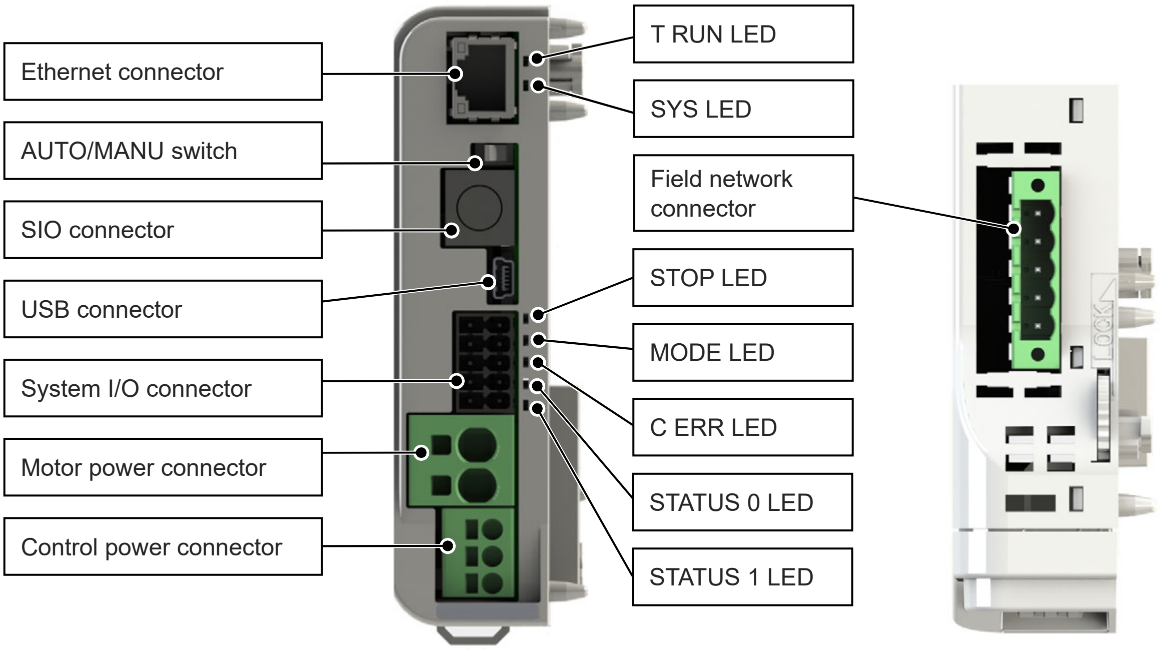
Part name	Shape	Quantity	Remarks
Gateway unit		1	Model example: RCON-GW/GWG
Terminal unit		1	Single product model number: RCON-GW-TR (Not supplied with TRN specification)
System I/O connector		1	Single product model number: DFMC1.5/5-ST-3.5 (Phoenix Contact)
Field network connector		1	Depends on I/O type
Dummy plug		1	Model Name: DP-5 (Supplied with GWG specification)
First Step Guide	 IAI RCON-PC/PCF/AC/DC, RCON-FU RCON-ABU-A/P, RCON-EXT Driver Unit, Fan Unit, Simple Absolute Unit, Extension Unit First Step Guide First Edition	1	
Safety Guide	 IAI Quality and Innovation Safety Guide Sixth Edition 1. Make sure to read this Guide thoroughly before use of the robot. 2. Please follow this Guide and take necessary measures to ensure safety in the design and production of the system by use of the robot. 3. Please ensure that this Guide is ultimately delivered to the customer who uses the product. * Using or copying all or a part of this SAFETY GUIDE without permission is prohibited.	1	
Instruction Manual DVD		1	

3.4 Part Names/Functions and External Dimensions

Part names

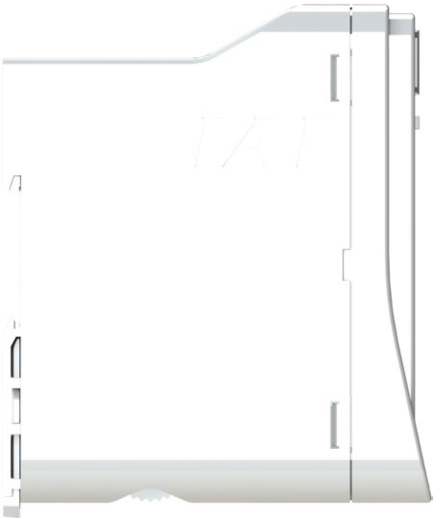


RCON-GW

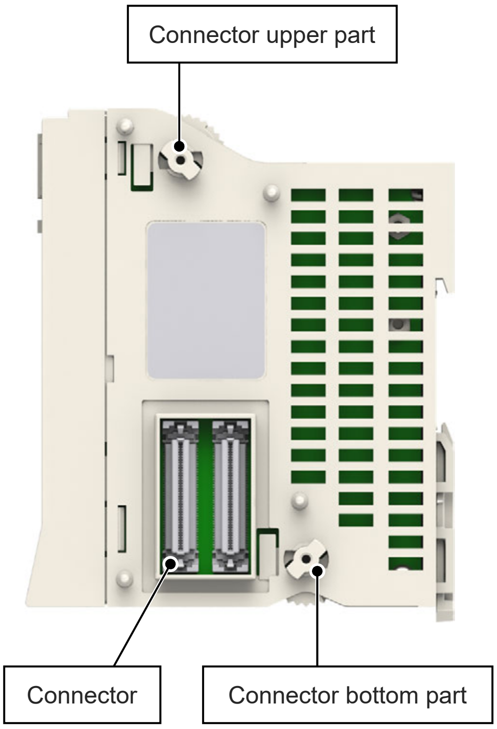


Front

Top



Left side



Right side

Rear

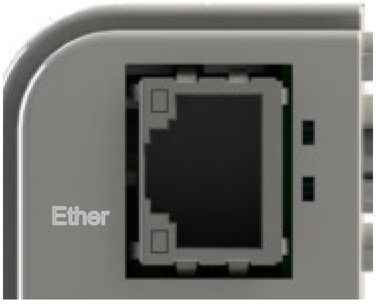
LED display

LED for indicating gateway unit status and field network status.

Panel notation	Display color	Status	Description
T RUN	Green	Light ON	Normal internal bus communication
		Blinking	Waiting for initialization signal
	Orange	Light ON	Bus communication error generated
SYS	Green	Light ON	Normal operation (It also lights up green when an alarm is generated in the driver unit or simple absolute unit)
	Orange	Light ON	Gateway alarm triggered
STOP	Red	Light ON	STOP signal input OFF (driver unit drive power cut-off)
		Light OFF	STOP signal input ON
MODE	Green	Light ON	AUTO (automatic operation) mode ON
		Light OFF	MANU (manual operation) mode ON
C ERR	Orange	Light ON	Field network error generated
		Light OFF	Field network operating normally
STATUS 0	–	–	Differs with field network Refer to "3.5 Field Network General Specifications (page A3-19)"
STATUS 1	–	–	Differs with field network Refer to "3.5 Field Network General Specifications (page A3-19)"

Ethernet connector

A connector for connecting to Ethernet. Equipped only when the Ethernet option is selected.



Pin No.	Signal name	Description
1	TXP	Transmit data + side
2	TXN	Transmit data - side
3	RXP	Receive data + side
4	NC	Not connected
5	NC	Not connected
6	RXN	Receive data - side
7	NC	Not connected
8	NC	Not connected

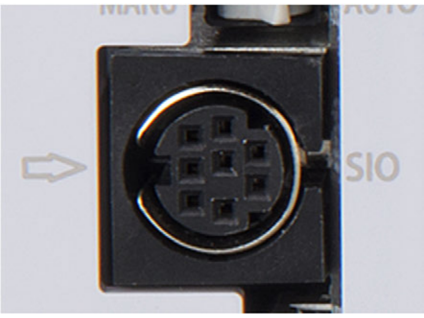
AUTO/MANU switch

Switches between automatic and manual operation. System I/O connector AUTO/MANU input is connected in series.

Symbol	Description
AUTO	Online operation mode that enables reception of commands from host devices such as PLCs
MANU	Teaching operation mode that enables reception of commands from host devices such as PLCs

SIO connector

A connector for connecting the teaching pendant to PC software. PC software can also be connected with a USB.



Pin No.	Signal name	Description
1	TP_SD+	Teaching pendant/PC RS-485 differential signal + side
2	TP_SD-	Teaching pendant/PC RS-485 differential signal - side
3	T5V	Teaching pendant 5 V output
4	ENB	Enable signal input
5	STOPA	Stop line A
6	T24V	Teaching pendant 24 V output
7	GND	0 V
8	STOPB	Stop line B
9 (shell)	GND	0 V

USB connector

It is a connector to be connected to the PC software or gateway parameter configuration tool.
For use, it is necessary to install the USB connection driver for RCON.
For how to install the driver, refer to “Startup Section, Chapter 4, 4.1 [Installing USB Connection Driver for RCON] (page B4-14)”.

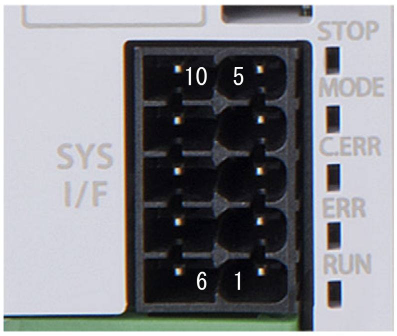
Connector name: 51387-0530 (Molex)

Pin No.	Signal name	Description
1	VBUS	USB power
2	D-	USB signal line -
3	D+	USB signal line +
4	NC	Not connected
5	GND	0 V
Shell	GND	0 V

System I/O connector

External AUTO/MANU switching input, STOP input, PSA-24 serial communication line equipped.

Note that the following pin No. are short-circuited at shipment. (Pins #1 and #6, pins #2 and #7, pins #3 and #8)



Cable connector name: DFMC1.5/5-ST-3.5 (Phoenix Contact)

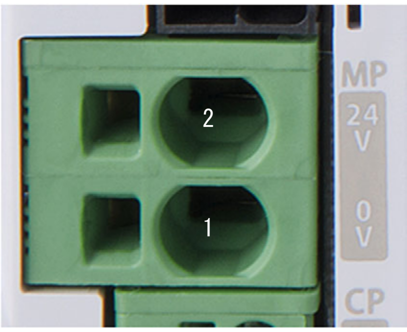
Pin No.	Signal name	Description
1	S2	Teaching pendant STOP switch input contact
2	S1	Teaching pendant STOP switch output contact
3	AUTO/MANU-	AUTO/MANU signal input
4	GND	0 V
5	PS24_SD-	PSA-24 RS-485 differential signal - side
6	STOP+	STOP signal +24 V power supply output
7	STOP-	STOP signal input
8	AUTO/MANU+	AUTO/MANU power supply
9	NC	Not connected
10	PS24_SD+	PSA-24 RS-485 differential signal + side

Cable side connector compatible wire

Item	Specifications
Compatible wire	AWG24 to 16 (Copper Wire)
Strip length	10.0mm
Rated Temperature on Isolation Coating	60degC or more

Motor power connector

Motor power +24 V supply connector. Supplies power to the motor of the 24V driver unit linked to the gateway unit.



Pin No.	Signal name	Description
1	GND	0 V
2	MP	Motor power +24 V input

Motor power connector compatible wire

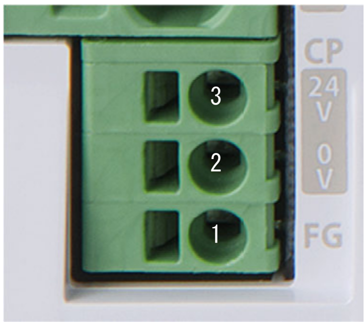
Item	Specifications
Compatible wire	AWG20 to 8 (Copper Wire)
Strip length	15.0mm
Rated Temperature on Isolation Coating	60degC or more

Caution

- Select a wire with thickness that tolerates the rated current total value obtained in "2.3 Specifications/Power supply capacity (page A2-10)".

Control power connector

Control power +24 V and FG connector. Supplies power for the control power of all units linked to the gateway unit and for the actuator brake.



Pin No.	Signal name	Description
1	FG	Frame ground
2	GND	0 V
3	CP	Control power +24 V input

Control power connector compatible wire

Item	Specifications
Compatible wire	AWG24 to 12 (Copper Wire), Frame ground is AWG14-16 (Copper wire)
Strip length	10.0mm
Rated Temperature on Isolation Coating	60degC or more

Caution

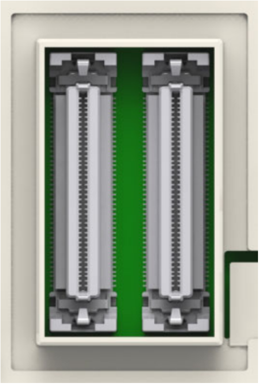
- Select a wire with thickness that tolerates the rated current total value obtained in "2.3 Specifications/Power supply capacity (page A2-10)".

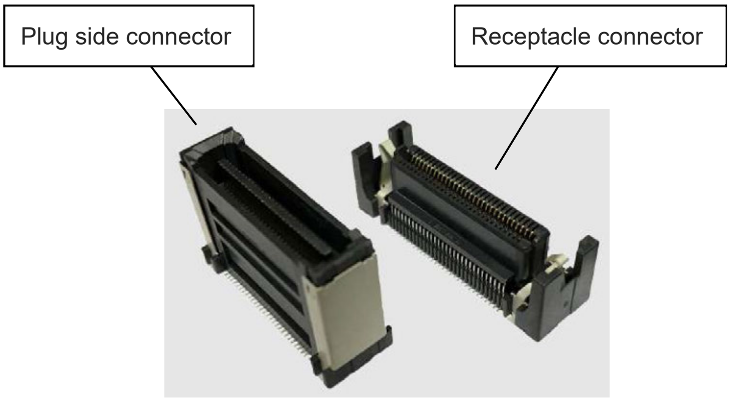
Field network connector

A connector for connecting to field networks. Field network details are listed in "3.5 Field Network General Specifications (page A3-19)".

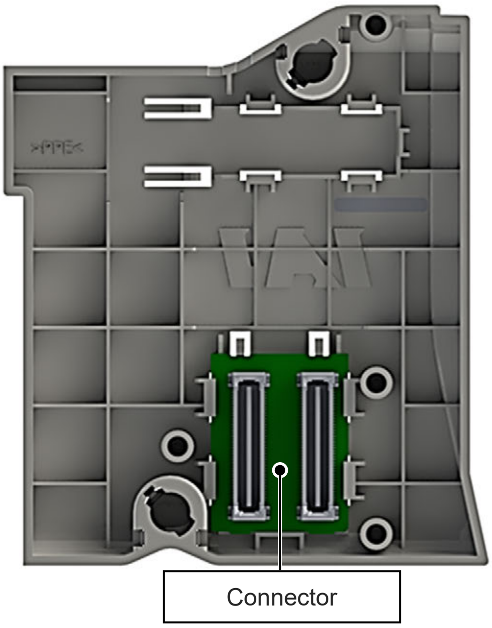
Connectors

A connector for use between units. Two identical connectors are used. The connectors have a floating structure that absorbs connector misalignment due to housing mating or mounting misalignment between connectors.

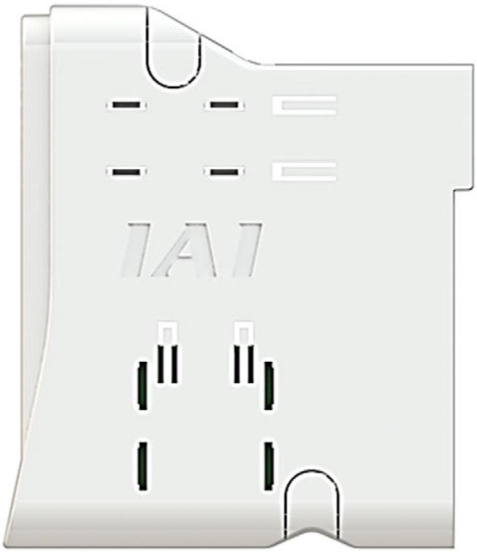




Terminal unit



Left side



Right side

Rear

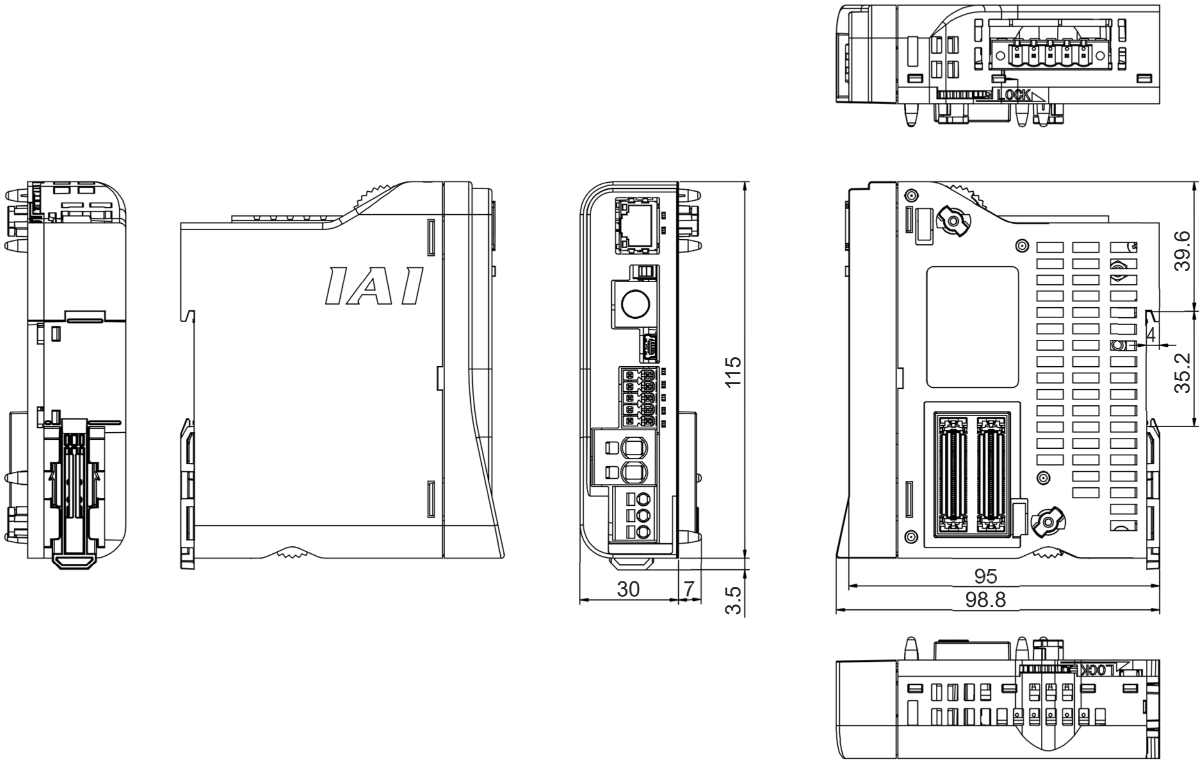
Danger

- The terminal unit to be used should differ depending on the cases when the 200V driver unit is not connected and when it is. the terminal unit (RCON-GW-TR) shown in this page is a terminal unit for 24V that is to be used when the 200V driver unit is not to be connected.
  When the 200V driver units are to be connected, make sure to use the terminal unit for 200V (RCON-GW-TRS) enclosed in the 200V power supply unit. This terminal unit for 24V has a structure that does not allow itself connected to the 200V driver unit, however, it could be forcefully inserted, which could cause fire on the connector as well as damage on it. [Refer to A5-20]

External dimensions

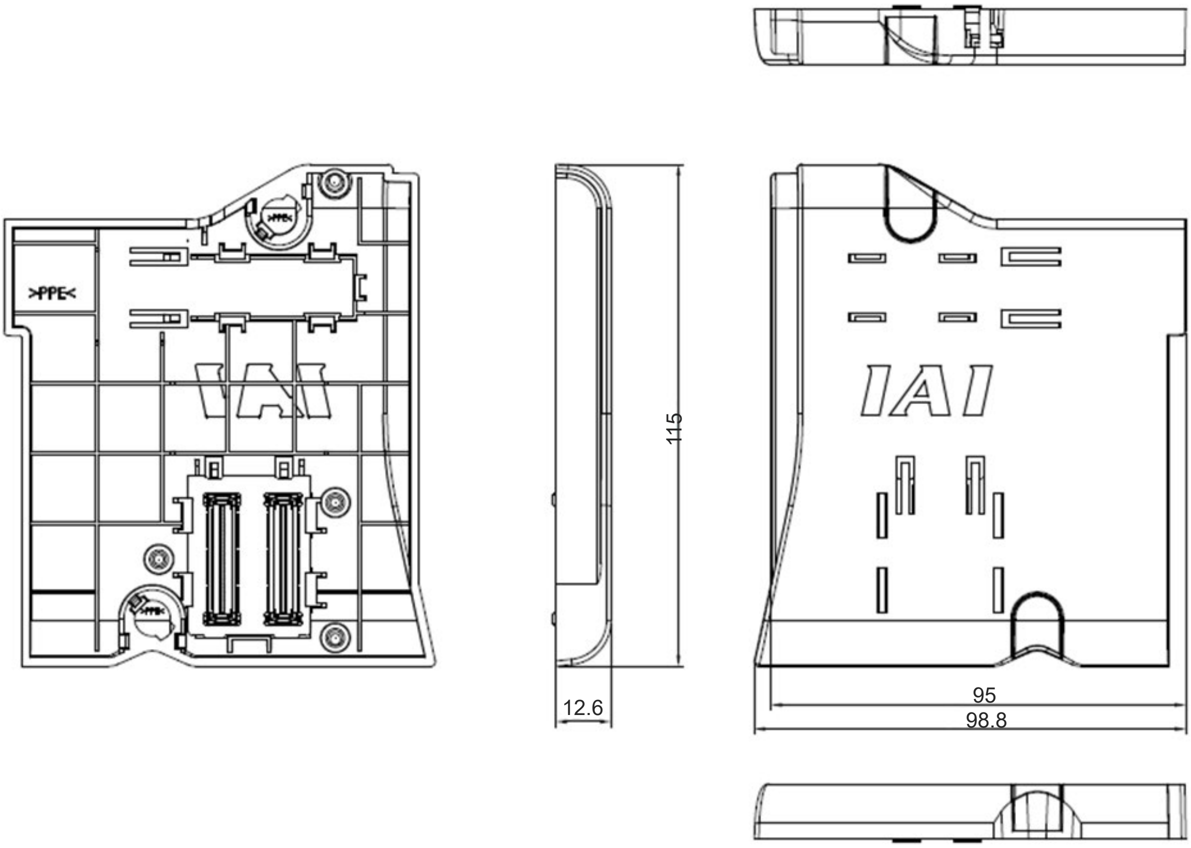
Gateway unit

Item	Specifications
External dimensions	W 30 mm × H 115 mm × D 95 mm
Mass	About 170g
External view	See figure below



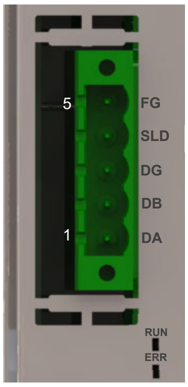
Terminal unit

Item	Specifications
External dimensions	W 12.6 mm × H 115 mm × D 95 mm
Mass	About 48g
External view	See figure below



3.5 Field Network General Specifications

CC-Link



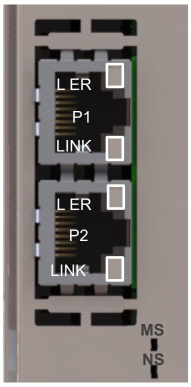
Cable connector name: MSTB2.5/5-STF-5.08 AU (Phoenix Contact)

Pin No.	Signal name	Description
1	DA	Signal line A
2	DB	Signal line B
3	DG	Digital ground
4	SLD	Connects the shield of shielded cables (This connector's 5-pin FG and the control power connector's 1 pin FG are connected internally)
5	FG	Frame ground (This connector's 4-pin SLD and the control power connector's 1 pin FG are connected internally)

LED display

Name	Panel notation	Display color	Status	Description
STATUS 0	RUN	Green	Light ON	After joining the network, refresh & poll normal reception or refresh normal reception
			Light OFF	1. Network not joined 2. Channel carrier detected 3. Timeout 4. Hardware reset in progress
STATUS 1	ERR	Orange	Light ON	1. CRC error 2. Station number setting error when reset canceled (0 or 65 stations or more, including occupied stations) 3. Baud rate setting error when reset canceled
			Blinking (0.4 s blinking)	Value of station number or baud rate setting changed when reset canceled
			Light OFF	1. Normal communication 2. Hardware reset in progress

CC-Link IE Field

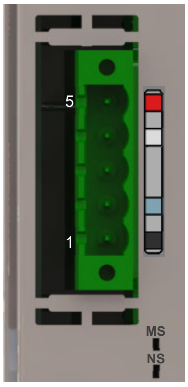


Cable/connector specifications: Ethernet ANSI/TIA/EIA-568-B Category 5e or higher, shielded 8P8C modular plug (RJ45)
* It is to be prepared by the customer.

LED display

Name	Panel notation	Display color	Status	Description
STATUS 0	MS	Green	Light ON	Normal operation
			Light OFF	Hardware error generated
		Orange	Light ON	Error generated
			Light OFF	Normal operation
STATUS 1	NS	Green	Light ON	Cyclic transmission ON
			Blinking	Cyclic transmission OFF
			Light OFF	Cyclic transmission not yet implemented, fragmented
		Orange	Light ON	Receive data error
			Light OFF	Receive data normal
LINK	–	Green	Light ON	Link up
			Light OFF	Link down
L.ER	–	Orange	Light ON	Receive data error
			Light OFF	Receive data normal

DeviceNet



Cable connector name: MSTB2.5/5-STF-5.08 AU M (Phoenix Contact)

Pin No.	Pin color scheme	Description
1	Black	Power supply cable - side
2	Blue	Signal data Low side
3	–	Shield
4	White	Signal data High side
5	Red	Power supply cable + side

LED display

Name	Panel notation	Display color	Status	Description
STATUS 0	MS	Green	Light ON	Normal operation
			Blinking (1 Hz)	No configuration information, incomplete information, or device test operation required
		Orange	Light ON	Non-recoverable fault
			Blinking (1 Hz)	Recoverable fault
		Green/orange	Alternate blinking	Self-diagnosis
STATUS 1	NS	Green	Light ON	Online, connection established
			Blinking (1 Hz)	Online, connection not established
		Orange	Light ON	Fatal error
			Blinking (1 Hz)	Connection timeout
		Orange/green	Alternate blinking	Self-diagnosis
			Light OFF	Offline

EtherCAT

Cable/connector specifications: Ethernet ANSI/TIA/EIA-568-B Category 5 or higher, shielded 8P8C modular plug (RJ45)
* It is to be prepared by the customer.

LED display

Name	Panel notation	Display color	Status	Description
STATUS 0	ERR	Orange	Light ON	Signal component (module) error
			Blinking (continuous)	Configuration information (settings) error ON: 200 ms / OFF: 200 ms
			Blinking (2 times)	Watchdog timer/timeout ON: 200 ms x 2 / OFF: 1,000 ms
			Light OFF	Initialized status
STATUS 1	RUN	Green	Light ON	Normal operation (OPERATION) status
			Blinking (continuous)	PRE-OPERATION status ON: 200 ms / OFF: 200 ms
			Blinking (1 time)	SAFE OPERATION status ON: 200 ms / OFF: 1,000 ms
		Orange	Blinking	Signal component (module) error

EtherNet/IP

Cable/connector specifications: Ethernet ANSI/TIA/EIA-568-B Category 5 or higher, shielded
8P8C modular plug (RJ45)
* It is to be prepared by the customer.

LED display

Name	Panel notation	Display color	Status	Description
STATUS 0	MS	Green	Light ON	Normal operation
			Blinking	No configuration information, or scanner in idle status
		Orange	Light ON	Non-recoverable fault
			Blinking	Recoverable fault
STATUS 1	NS	Green	Light ON	Online, connection established
			Blinking	Online, connection not established
		Orange	Light ON	Fatal error, IP address duplication error
			Blinking	Connection timeout
		Green/orange	Light OFF	No IP address

PROFIBUS-DP

Cable side connector name: 9-pin D sub connector (male)

* It is to be prepared by the customer.

Pin No.	Signal name	Description
1	NC	Not connected
2	NC	Not connected
3	B-Line	Signal line B (RS-485)
4	RTS	Transmission request
5	GND	0 V (isolated)
6	+5 V	+5 V output (isolated)
7	NC	Not connected
8	A-Line	Signal line A (RS-485)
9	NC	Not connected
Housing	FG	Frame ground (control power connector 1-pin FG connected internally)

LED display

Name	Panel notation	Display color	Status	Description
STATUS 0	MS	Green	Light ON	Initialization complete
			Blinking	Initialization complete, diagnosis event found
		Orange	Light ON	Exception error
		Green/orange	Light OFF	Uninitialized
STATUS 1	NS	Green	Light ON	Online, data exchange
			Blinking	Online, clear status
		Orange	Light ON	Parameter error
			Blinking	Configuration information error
		Green/orange	Light OFF	Offline

PROFINET IO

Cable/connector specifications: Ethernet ANSI/TIA/EIA-568-B Category 5 or higher, shielded
8P8C modular plug (RJ45)
* It is to be prepared by the customer.

LED display

Name	Panel notation	Display color	Status	Description
STATUS 0	MS	Green	Light ON	Normal communication
			Blinking (1 time)	Network being diagnosed
			Blinking (2 times)	Engineering tool is identifying the node
		Orange	Light ON	Exception error generated (hardware failure)
			Blinking (1 time)	Settings and actual network configuration differ
			Blinking (2 times)	IP address not set
			Blinking (3 times)	Station name not set
			Blinking (4 times)	Internal error generated
		Green/orange	Light OFF	Initializing
STATUS 1	NS	Green	Light ON	Online status (normal communication: RUN)
			Blinking	Online status (STOP)
		Green/orange	Light OFF	No connection

Motion network

[EtherCAT Motion]

Refer to RCON EtherCAT Motion Instruction Manual [ME0427] for the EtherCAT Motion connection type.

[MECHATROLINK-III]

Refer to RCON MECHATROLINK-III Instruction Manual [ME0426] for the MECHATROLINK-III connection type.

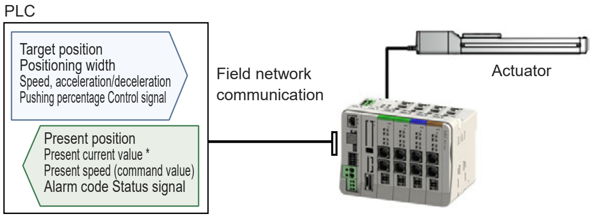
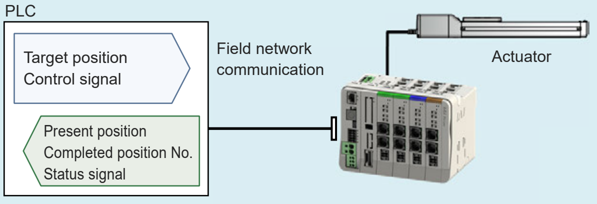
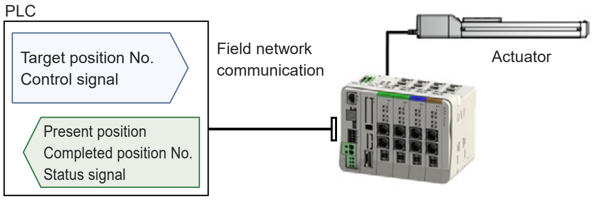
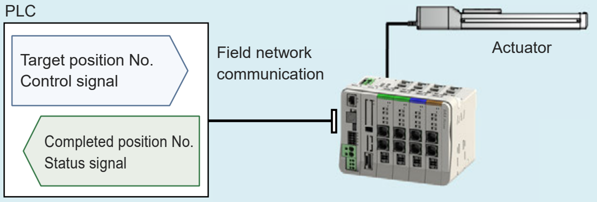
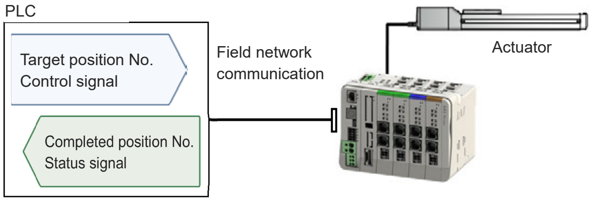
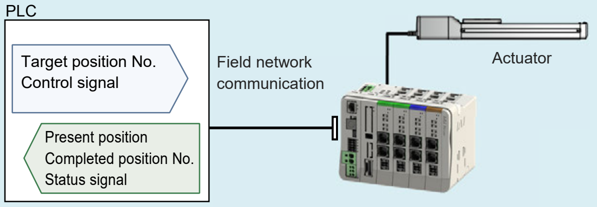
[SSCNET III/H]

Refer to RCON SSCNET III/H Instruction Manual [ME0428] for the SSCNET III/H connection type.

3.6 Operation Function List

Field network operation mode

The field network can be selected from the following operation modes.
(except when motion network and EC connection unit is connected)
Data required for operation (target position, speed, acceleration, push current value, etc.) are written by a connected PLC or other host controller into the specified addresses.

Operation mode	Content	Overview
Direct numerical control mode	This mode allows designating the target position, speed, acceleration/deceleration, and current limit value for pushing numerically. Also, it is capable of monitoring the present position, present speed, and the present current value (*) with 0.01mm increments.	
Simple direct mode	The target position can be indicated directly by a number. Both modes allow monitoring of the present position numerically with 0.01mm increments.	
Positioner 1 mode	Registers up to 128 points of position data, and can stop at the registered position. Both modes allow monitoring of the present position numerically with 0.01mm increments.	
Positioner 2 mode	Registers up to 128 points of position data, and can stop at the registered position. This mode does not allow monitoring of the present position. This mode has less in/out data transfer volume than the Positioner 1 mode.	
Positioner 3 mode	Registers up to 128 points of position data, and can stop at the registered position. This mode does not allow monitoring of the present position. This mode has less in/out data transfer volume than the Positioner 2 mode, and controls travel with the minimum of signals.	
Positioner 5 mode	Registers up to 16 points of position data, and can stop at the registered position. This mode has less in/out data transfer volume and fewer positioning tables than the Positioner 2 mode, and allows monitoring of the present position numerically with 0.1mm increments.	

* The present current value should be the command current value for the stepper motor and be the feedback current value for the AC servomotor (including AC servomotor connected to SCON-CB).

○ List of functions by operation mode

	Direct numerical control mode	**Simple direct mode**	**Positioner 1 mode**	**Positioner 2 mode**	**Positioner 3 mode**	**Positioner 5 mode**
Number of positioning points	Unlimited	Unlimited	128 points	128 points	128 points	16 points
Home return motion	○	○	○	○	○	○
Positioning operation	○	○	△	△	△	△
Speed, acceleration/ deceleration settings	○	△ (Note 1)	△	△	△	△
Different acceleration and deceleration settings	×	△	△	△	△	△
Pitch feed (Incremental)	○	△	△	△	×	△
JOG operation	△	△	△	△	×	△
Position data write Reading Signal	×	×	○	○	×	×
Push-motion operation	○	△	△	△	△	△
Speed changes while traveling	○	△	△	△	△	△
Pausing	○	○	○	○	○	○
Zone signal output	△ (2 points)	△ (2 points)	△ (2 points)	△ (2 points)	△ (1 point)	△ (2 points)
Position zone signal output	×	△	△	△	×	×
Overload warning output	○	○	○	○	×	○
Vibration control (Note 2)	×	△	△	△	△	△
Collision Detection Feature (Note 3)	×	△	△	△	△	△
Present position reading (Note 4) (Resolution)	○ (0.01mm)	○ (0.01mm)	○ (0.01mm)	×	×	○ (Note 5) (0.1mm)

* ○: Direct setting is possible, △: Position data or parameter input is required, ×: The operation is not supported.

Note 1: The number of settable position data is 128 points at the maximum.

Note 2: This function is limited to the AC servo motor specification.

Note 3: It is a feature dedicated for the pulse motor type.

Note 4: DD motor is 0.001 degree (0.01 degree for positioner 5 mode only).

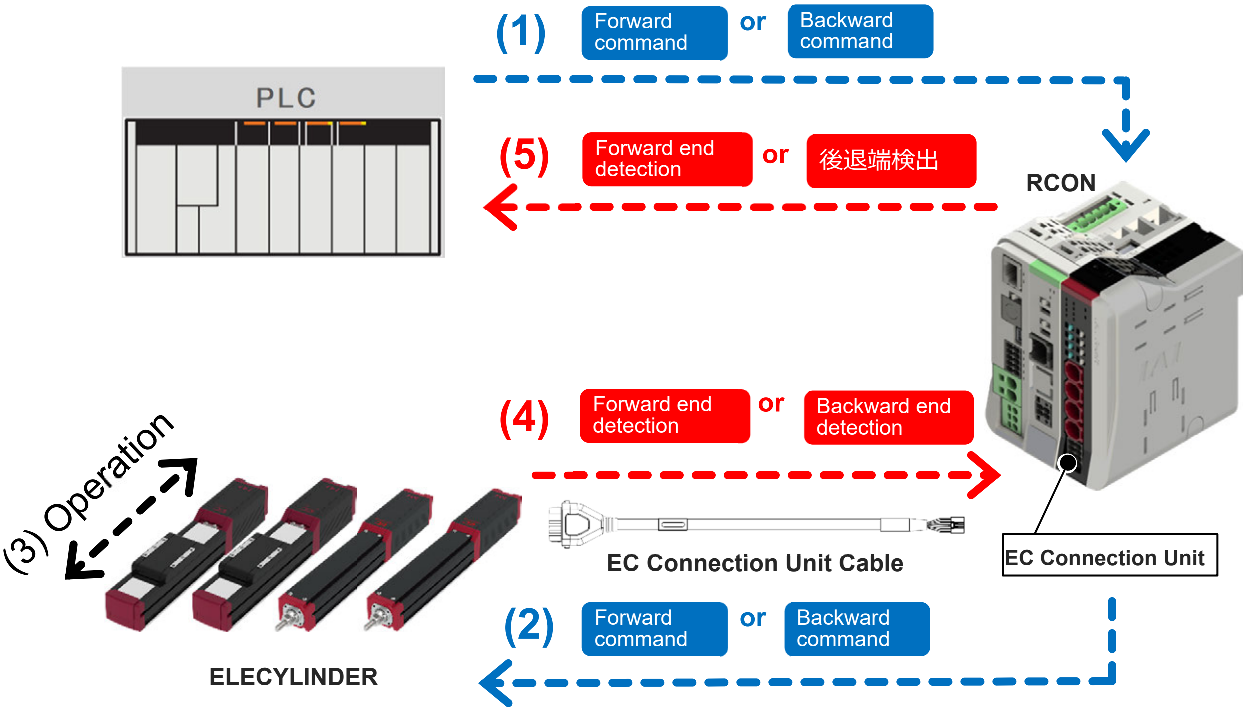
Note 5: The maximum output value in positioner 5 mode is 3,276.7 mm (327.67 degrees for DD motor). To control the actuator in an operation range exceeding the maximum value, select a different operation mode.

Operation of ELECYLINDER

ELECYLINDER can be operated by inputting a signal from the host device to ELECYLINDER via the EC connection unit.
Also, the status of ELECYLINDER can be grasped by having ELECYLINDER output signals and the host device receive them via the EC connection unit.

[Image of Connection] Connection between PLC and ELECYLINDER

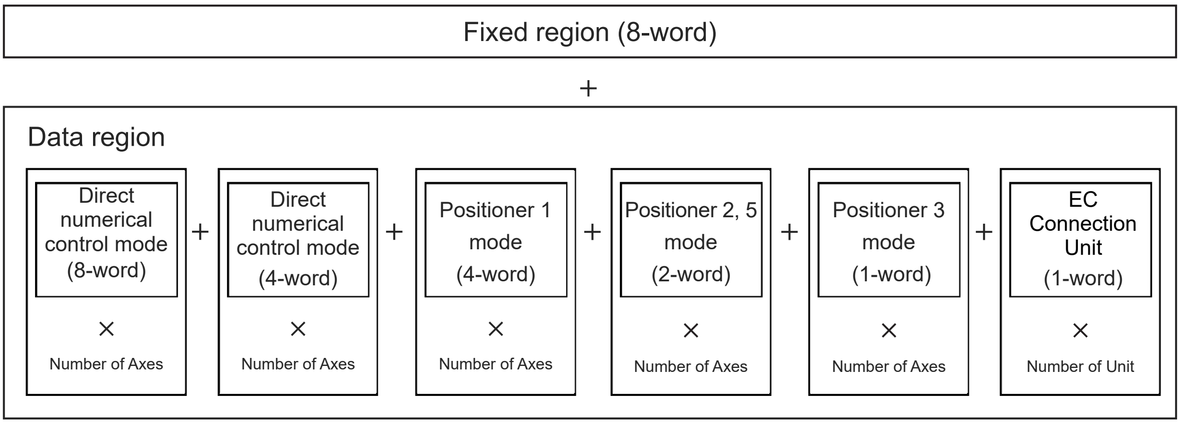
(1) Input a movement signal (forward or backward) from PLC to RCON (EC connection unit).
(2) Input the movement signal from RCON (EC connection unit) to each unit of ELECYLINDER.
(3) ELECYLINDER units start moving.
(4) A position detection signal gets output from ELECYLINDER. (Forward end or backward end)
(5) The position detection signal gets output from RCON (EC connection unit) to PLC.



ELECYLINDER continues its operation while a movement command signal (ST0/ST1) is on, and a position detection signal (LS0/LS1) turns on after the operation is complete.
If the movement command signal gets turned off before the operation completes, the operation gets cancelled and an actuator decelerates and stops.

3.7 Address Configuration

The RCON address configuration is the same for all driver units regardless of field network type. The addresses occupied by the network consist of eight words of the fixed domains, data domains that vary depending on the operation mode and number of axes and the data domains for the EC connection unit. Each operation mode and occupied data region is as follows.
Direct numerical control mode, simple direct mode and positioner 1 to 3 and 5 modes can be mixed for use and the model for each axis can be selected arbitrarily.
It is not available to select an operation mode in the EC connection unit.

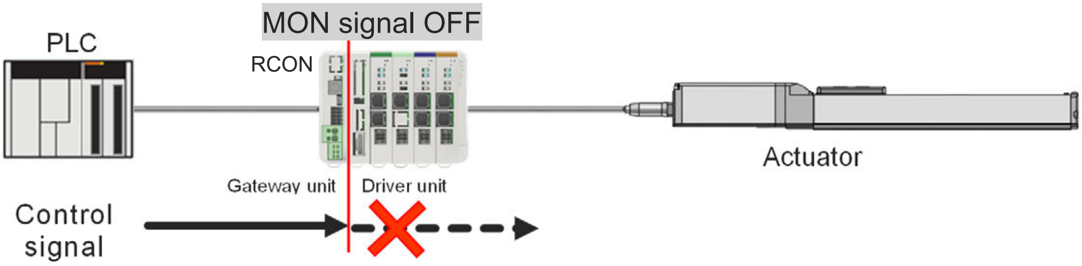


Caution

- About MON Signal

Turn on MON Signal in the gateway control signals after the link with the PLC is established.
Turn MON Signal on otherwise the control from PLC should not be available for those other than the EC connection units.

Refer below for the detail of MON Signal and Enable/Disable settings.
Detail: [(1) Gateway control/status signals PLC Setting] in next page
Enable/Disable Settings: [3.9 Gateway Parameter Configuration Tool GW Parameters]



Fixed region configuration

	PLC output ⇒ RCON			RCON ⇒ PLC input		
	High byte	Low byte	Word count	High byte	Low byte	Word count
Gateway control region	Gateway control signal 0		2	Gateway status signal 0		2
	Gateway control signal 1			Gateway status signal 1		
Power supply unit region *	Not available.		6	Power supply unit status signal 0		6
	Not available.			Power supply unit status signal 1		
	Not available.			Power supply unit status signal 2		
	Not available.			Power supply unit status signal 3		
	Not available.			Power supply unit status signal 4/ Light malfunction maintenance signal (Note1)		
	Not available.			Not available.		

* Occupied as a data region even if a power supply unit is not connected.

Note 1: This signal can change the feature by switchover in the gateway parameter.

(1) Gateway control/status signals

The first 2 words in each of input and output in the address configuration in the gateway unit are the signals to control the gateway unit and to monitor the status.

PLC output

Gateway Control signal 0	b15	b14	b13	b12	b11	b10	b9	b8
	MON	—	RTE	—	—	—	—	—
	b7	b6	b5	b4	b3	b2	b1	b0
	—	—	—	—	—	—	—	—
Gateway Control signal 1	b15	b14	b13	b12	b11	b10	b9	b8
	—	—	—	—	—	—	—	—
	b7	b6	b5	b4	b3	b2	b1	b0
	—	—	—	—	—	—	—	—

Address *			
CC-Link, CC-Link IE Field	DeviceNet	PROFIBUS-DP, EtherNet/IP, EtherCAT	PROFINET-IO
—	Relative CH	Relative byte	Relative module
RY 0*	+0	+0	+0
		+1	
RY 1*	+1	+2	
		+3	

PLC input

									Address *			
									CC-Link, CC-Link IE Field	DeviceNet	PROFIBUS-DP, EtherNet/IP, EtherCAT	PROFINET-IO
									—	Relative CH	Relative byte	Relative module
Gateway Status signal 0	b15	b14	b13	b12	b11	b10	b9	b8	RX 0*	+0	+0	+0
	RUN	LERC	ERRT	MOD	ALMH	ALML	—	SEMG				
	b7	b6	b5	b4	b3	b2	b1	b0			+1	
	ALMC128	ALMC64	ALMC32	ALMC16	ALMC8	ALMC4	ALMC2	ALMC1				
Gateway Status signal 1	b15	b14	b13	b12	b11	b10	b9	b8	RX 1*	+1	+2	
	LNK15	LNK14	LNK13	LNK12	LNK11	LNK10	LNK9	LNK8				
	b7	b6	b5	b4	b3	b2	b1	b0			+3	
	LNK7	LNK6	LNK5	LNK4	LNK3	LNK2	LNK1	LNK0				

*Address is the address relative to the gateway head.
CC-Link, CC-Link IE Field, and DeviceNet have word addresses while PROFIBUS-DP, EtherNet/IP, and EtherCAT use byte addresses. PROFINET-IO uses 4-word module addresses.
The * in CC-Link and CC-Link IE Field bit register addresses is 0 to F.
For CC-Link and CC-Link IE Field, b10 to b15 are bA to bF. (Hexadecimal notation)
For PROFIBUS-DP, EtherNet/IP, and EtherCAT, b8 to b15 are b0 to b7. (Byte addresses)

I/O signal list

Signal type		Bit	Symbol name	Content
PLC output	Control signal 0	15	MON	PLC control output is enabled when ON ("1") (PLC output is reflected on controller unit) and disabled when OFF ("0"). * It should be used only for control of driver units
		14	–	Not available. Keep this OFF ("0") normally.
		13	RTE	Turn it on and the hold status of ERR-T or ERR-C during operation gets released: Release signal when ERR-T or ERR-C was set to latch in the gateway parameter setting seal
		12-0	–	Not available. Keep this OFF ("0") normally.
	Control signal 1	15-0	–	Not available.
PLC input	Status signal 0	b15	RUN	Turns ON when gateway is in normal operation.
		b14	LERC	Turns ON and stays ON when an ERR-C error is generated while operating. Enabled when ERR-C generation is configured with the gateway parameter configuration tool.
		b13	ERRT	Turns ON if a gateway or axis communication error is detected.
		b12	MOD	Turns ON if MANU is selected with the unit front operation mode setting switch, and turns OFF when AUTO is selected.
		b11	ALMH	Turns ON if an error occurs that requires the gateway to be restarted. (Likely due to a mistaken parameter setting. Confirm as needed.)
		b10	ALML	Turns ON if a minor error caused by the gateway occurs. (Likely that calendar data has been deleted. Confirm as needed.)
		b9	–	Not available
		b8	SEMG	Turns ON when the system I/O connector STOP signal input is OFF (stop). All connected axes will go to stop status if this bit turns ON.
		b7 b6 b5 b4 b3 b2 b1 b0	ALMC 1 to 128	Outputs alarm codes caused by the gateway. [For details, refer to "Maintenance Section Chapter 2, 2.3 Gateway Unit Alarm Causes and Countermeasures"]
	Status signal 1	b15	LNK15	When communication between the gateway unit and the driver unit is solidly established, the bit No. that the gateway recognizes as enabled turns ON. Axis No. 0 = LNK0 to Axis No. 15 = LNK15 * It is not available in EC connection unit
		b14	LNK14	
		b13	LNK13	
		b12	LNK12	
		b11	LNK11	
		b10	LNK10	
		b9	LNK9	
		b8	LNK8	
		b7	LNK7	
		b6	LNK6	
		b5	LNK5	
		b4	LNK4	
		b3	LNK3	
		b2	LNK2	
		b1	LNK1	
		b0	LNK0	

(2) Power supply unit (PSA-24) status signal

Eight words of input and output from the top address of the gateway unit are the fixed domains. Six words in these domains should be assigned as the power supply unit status signal domains and the condition of the IAI 24V DC power supply unit PSA-24 can be checked.

■ Address configuration

Request command region and response command region comprise 6 words for each I/O. Address is the address relative to the gateway head.

(1) For CC-Link and CC-Link IE Field

Bit	PLC output ⇒ gateway ⇒ each axis input		Each axis output ⇒ gateway ⇒ PLC input		Bit
Address	b15 High byte b8	b7 Low byte b0	b15 High byte b8	b7 Low byte b0	Address
RY 2F~20	Not available		Power supply unit status signal 0		RX 2F~20
RY 3F~30	Not available		Power supply unit status signal 1		RX 3F~30
RY 4F~40	Not available		Power supply unit status signal 2		RX 4F~40
RY 5F~50	Not available		Power supply unit status signal 3		RX 5F~50
RY 6F~60	Not available		Power supply unit status signal 4/ Light malfunction maintenance signal		RX 6F~60
RY 7F~70	Not available		Not available		RX 7F~70

(2) For DeviceNet

Word	PLC output ⇒ gateway ⇒ each axis input		Each axis output ⇒ gateway ⇒ PLC input	
Address	b15 High byte b8	b7 Low byte b0	b15 High byte b8	b7 Low byte b0
+2	Not available		Power supply unit status signal 0	
+3	Not available		Power supply unit status signal 1	
+4	Not available		Power supply unit status signal 2	
+5	Not available		Power supply unit status signal 3	
+6	Not available		Power supply unit status signal 4/ Light malfunction maintenance signal	
+7	Not available		Not available	

(3) For PROFIBUS-DP, EtherNet/IP, and EtherCAT

*1 Byte Address	PLC output ⇒ gateway ⇒ each axis input		Each axis output ⇒ gateway ⇒ PLC input	
	b15 High byte b8	b7 Low byte b0	b15 High byte b8	b7 Low byte b0
+4/+5	Not available		Power supply unit status signal 0	
+6/+7	Not available		Power supply unit status signal 1	
+8/+9	Not available		Power supply unit status signal 2	
+10/+11	Not available		Power supply unit status signal 3	
+12/+13	Not available		Power supply unit status signal 4/ Light malfunction maintenance signal	
+13/+14	Not available		Not available	

*1 b8 to b15 of the high byte are b0 to b7.

(4) For PROFINET-IO

*2 Module Address	PLC output ⇒ gateway ⇒ each axis input		Each axis output ⇒ gateway ⇒ PLC input	
	b15 High byte b8	b7 Low byte b0	b15 High byte b8	b7 Low byte b0
+0	Not available		Power supply unit status signal 0	
	Not available		Power supply unit status signal 1	
	Not available		Power supply unit status signal 2	
	Not available		Power supply unit status signal 3	
+1	Not available		Power supply unit status signal 4/ Light malfunction maintenance signal	
	Not available		Not available	

*2 PROFINET-IO uses 4-word unit module addresses.

■ I/O signal

The details of the power supply unit status signal address configuration are as follows.

PLC input

Power supply unit Status signal 0~4	b15	b14	b13	b12	b11	b10	b9	b8
	LNK	—	—	—	—	OPMV	FANW	FANA
	b7	b6	b5	b4	b3	b2	b1	b0
	PSMV							

I/O signal list

Signal type		Bit	Symbol name	Content
PLC input	Power unit Status signal 0 ~ 4	b15	LNK	When communication between the gateway unit and the power supply unit is solidly established, it turns ON when the gateway unit recognizes it as enabled.
		b14 ~ 11	–	Not available
		b10	OPMV	ON when a reading error occurs in monitored data.
		b9	FANW	Generates a message level alarm (alarm code 04C "Fan rotation speed drop") when the fan rotation speed decreases 30%. ON when an alarm occurs and OFF when the alarm is canceled.
		b8	FANA	If the fan rotation speed drops 50%, an operation cancel level alarm (alarm code 0D6 "Fan error detection") is generated, and the actuator stops. ON when an alarm occurs and OFF when the alarm is canceled.
		b7 b6 b5 b4 b3 b2 b1 b0	PSMV	Monitors the item selected using the gateway parameter configuration tool. For details of the selection method, refer to [3.9 Gateway Parameter Configuration Tool (page A3-156)] One of the following seven items can be monitored. (1) Output voltage: 0~255 V (2) Voltage of auxiliary winding: 0~255 V (3) Output current: 0~25.5 A (0.1 A increments) (4) Peak hold current: 0~25.5 A (0.1 A increments) (5) Load factor: 0~255% (6) FAN rotation speed: 0~25,500 r/min (100 r/min increments) (7) PCB temperature: 0~255°C

Monitored items

Item	Content
(1) Output voltage	This power supply can vary the output voltage according to the load. The output voltage monitoring value changes, but this is not abnormal.
(2) Voltage of auxiliary winding	Control power supply voltage inside the power supply unit. As with the output voltage, it changes according to the load on the output voltage side.
(3) Output current	Instantaneous value of output current.
(4) Peak hold current	Peak value of output current.
(5) Load factor	Ratio of integral value of output current and rated output current. If this value exceeds 100%, the output voltage is cut off as an overload error.
(6) FAN rotation speed	It is the speed of the fan rotation.
(7) PCB temperature	Internal temperature: Temperature in the vicinity of the output capacitor on the secondary side.

(3) Light Malfunction Maintenance Output Feature (Light Malfunction Maintenance Signal)

The light malfunction maintenance output feature is a feature that outputs light malfunction alarms output from each driver unit and maintenance warnings output from ELECYLINDER connected to the EC connection unit (RCON-EC) to the host PLC. (Note1)

Power Supply Unit Status Signal 4 in the power supply unit status signal domain should be assigned as the domain of the maintenance signals.

This feature gets enabled by having the number of the connected power supply units assigned to the gateway to four units or less. Refer to [3.9 Gateway Parameter Configuration Tool].

This signal can be utilized as a predictive maintenance feature.

■I/O signal

The details of light malfunction maintenance signal address configuration are as follows.

PLC input

Light Malfunction Maintenance Signal	b15	b14	b13	b12	b11	b10	b9	b8
	MNT15	MNT14	MNT13	MNT12	MNT11	MNT10	MNT9	MNT8
	b7	b6	b5	b4	b3	b2	b1	b0
	MNT7	MNT6	MNT5	MNT4	MNT3	MNT2	MNT1	MNT0

I/O signal list

Signal type		Bit	Symbol name	Content
PLC input	Light Malfunction Maintenance Signal	b15	MNT15	ALML bit of ELECYLINDER connected via a driver and EC connection unit should be assigned in order of axis numbers. Axis No.0 = MNT0 ~ Axis No.15 = MNT15
		b14	MNT14	
		b13	MNT13	
		b12	MNT12	
		b11	MNT11	
		b10	MNT10	
		b9	MNT9	
		b8	MNT8	
		b7	MNT7	
		b6	MNT6	
		b5	MNT5	
		b4	MNT4	
		b3	MNT3	
		b2	MNT2	
		b1	MNT1	
		b0	MNT0	

Note1 Gateway version should be V0009 or later

Data region configuration

(1) Direct numerical control mode data region configuration

	PLC output ⇒ each axis input			Each axis output ⇒ PLC input		
	High byte	Low byte	Word count	High byte	Low byte	Word count
Direct specified region	Specified position data (L) *		2	Present position data (L)) *		2
	Specified position data (H)) *			Present position data (H)) *		
	Specified positioning width (L)) *		2	Present current value (L)) * (Note 1)		2
	Specified positioning width (H)) *			Present current value (H)) * (Note 1)		
	Specified speed		1	Present speed data		1
	Specified acceleration/deceleration		1	Not available.		1
	Pushing current limit value		1	Alarm code		1
Control signal region	Control signal		1	Status signal		1

*(L) is the low word of a 2-word datum while (H) is the high word of a 2-word datum.

Note 1: The present current value should be the command current value for the stepper motor and be the feedback current value for the AC servomotor (including AC servomotor connected to SCON-CB).

(2) Simple direct mode and positioner 1 mode data region configuration

	PLC output ⇒ each axis input					Each axis output ⇒ PLC input				
	High byte	Low byte	Word count	Simple direct mode	Positioner 1 mode	High byte	Low byte	Word count	Simple direct mode	Positioner 1 mode
Position data specified region	Specified position data (L)		2	○	x*	Present position data (L)		2	○	○
	Specified position data (H)					Present position data (H)				
Position specified region	Command position No.		1	○	○	Completed position No.		1	○	○
Control signal region	Control signal		1	○	○	Status signal		1	○	○

* Positioner 1 mode does not use the position data specified region (PLC ⇒ each axis input), but it is occupied as a data region.

(3) Positioner 2 mode data region configuration

	High byte	Low byte	Word count	High byte	Low byte	Word count
Position specified region	Command position No.		1	Completed position No.		1
Control signal region	Control signal		1	Status signal		1

(4) Positioner 3 mode data region configuration

	High byte	Low byte	Word count	High byte	Low byte	Word count
Control signal region	Control signal	Command position No.	1	Status signal	Completed position No.	1

(5) Positioner 5 mode data region configuration

	High byte	Low byte	Word count	High byte	Low byte	Word count
Position specified region	Command position No.		1	Present position data (0.1 mm increments)		1
Control signal region	Control signal		1	Status signal		1

(6) EC connection unit data region configuration

	High byte	Low byte	Word count	High byte	Low byte	Word count
Control signal region	Control signal (for four axes).		1	Status signal (for four axes)		1

Overall address configuration example

Here shows an example for the overall address configuration when four-word mode axes (Simple Direct / Positioner 1) are connected for 12 axes, eight-word mode axes (Direct Indication) for two axes are connected, and also the overall address configuration when two-word mode axes (Positioner 2 / Positioner 5) for 12 axes and one unit of the EC connection unit are connected.
Note that CC-Link and DeviceNet are assigned with word addresses while PROFIBUS uses byte addresses.

[For CC-Link]
The following page shows a CC-Link configuration example.
Fixed 8-word region is assigned to the bit register (RX/RY), while the region for each axis is assigned to the word register (RWr/RWw).

- CC-Link overall address configuration example (direct numerical control mode + simple direct mode/positioner 1 mode) shows direct numerical control mode connection for 2 axes and simple direct or positioner 1 mode connection for 12 axes.

PLC output ⇒ RCON — RCON ⇒ PLC input

	Output register	High byte Low byte	Input register	High byte Low byte	
	RY0F to 00	Gateway control signal 0	RX0F to 00	Gateway status signal 0	8 words each Fixed region
	RY1F to 10	Gateway control signal 1	RX1F to 10	Gateway status signal 1	
	RY2F to 20	(Not available)	RX2F to 20	Power supply unit status signal 0	
	RY3F to 30	(Not available)	RX3F to 30	Power supply unit status signal 1	
	RY4F to 40	(Not available)	RX4F to 40	Power supply unit status signal 2	
	RY5F to 50	(Not available)	RX5F to 50	Power supply unit status signal 3	
	RY6F to 60	(Not available)	RX6F to 60	Power supply unit status signal 4/ Light malfunction maintenance signal	
	RY7F to 70	(Not available)	RX7F to 70	(Not available)	
*1 PLC master extended cyclic settings	Output register		Input register		
	RWw 00H	(Axis 0) Specified position data (L)	RWr 00H	(Axis 0) Present position data (L)	4 words each Positioner 1 /simple direct
16-word 1x multiplier *2	RWw 01H	(Axis 0) Specified position data (H)	RWr 01H	(Axis 0) Present position data (H)	
	RWw 02H	(Axis 0) Command position No.	RWr 02H	(Axis 0) Completed position No.	
	RWw 03H	(Axis 0) Control signal	RWr 03H	(Axis 0) Status signal	
	RWw 04H	(Axis 1) Specified position data (L)	RWr 04H	(Axis 1) Present position data (L)	4 words each
	RWw 05H	(Axis 1) Specified position data (H)	RWr 05H	(Axis 1) Present position data (H)	
	RWw 06H	(Axis 1) Command position No.	RWr 06H	(Axis 1) Completed position No.	
	RWw 07H	(Axis 1) Control signal	RWr 07H	(Axis 1) Status signal	
	RWw 08H	(Axis 2) Specified position data (L)	RWr 08H	(Axis 2) Present position data (L)	4 words each
	RWw 09H	(Axis 2) Specified position data (H)	RWr 09H	(Axis 2) Present position data (H)	
	RWw 0AH	(Axis 2) Command position No.	RWr 0AH	(Axis 2) Completed position No.	
	RWw 0BH	(Axis 2) Control signal	RWr 0BH	(Axis 2) Status signal	
	RWw 0CH	(Axis 3) Specified position data (L)	RWr 0CH	(Axis 3) Present position data (L)	4 words each
	RWw 0DH	(Axis 3) Specified position data (H)	RWr 0DH	(Axis 3) Present position data (H)	
	RWw 0EH	(Axis 3) Command position No.	RWr 0EH	(Axis 3) Completed position No.	
	RWw 0FH	(Axis 3) Control signal	RWr 0FH	(Axis 3) Status signal	
32-word 4x multiplier setting 2 stations	⋮	⋮		⋮	4 words each
	RWw 1FH	(Axis 7) Control signal	RWr 1FH	(Axis 7) Status signal	
	⋮	⋮	⋮	⋮	
	RWw 2FH	(Axis 11) Control signal	RWr 2FH	(Axis 11) Status signal	
64-word 8x multiplier	RWw 30H	(Axis 12) Specified position data (L)	RWr 30H	(Axis 12) Present position data (L)	8 words each Direct numerical control mode
	RWw 31H	(Axis 12) Specified position data (H)	RWr 31H	(Axis 12) Present position data (H)	
	RWw 32H	(Axis 12) Specified positioning width (L)	RWr 32H	(Axis 12) Present current value (L)	
	RWw 33H	(Axis 12) Specified positioning width (H)	RWr 33H	(Axis 12) Present current value (H)	
	RWw 34H	(Axis 12) Specified speed	RWr 34H	(Axis 12) Present speed data	
	RWw 35H	(Axis 12) Specified acceleration/deceleration	RWr 35H	(Not available)	
	RWw 36H	(Axis 12) Pushing current limit value	RWr 36H	(Axis 12) Alarm code	
	RWw 37H	(Axis 12) Control signal	RWr 37H	(Axis 12) Status signal	
	RWw 38H	(Axis 13) Specified position data (L)	RWr 38H	(Axis 13) Present position data (L)	8 words each
	RWw 39H	(Axis 13) Specified position data (H)	RWr 39H	(Axis 13) Present position data (H)	
	RWw 3AH	(Axis 13) Specified positioning width (L)	RWr 3AH	(Axis 13) Present current value (L) *3	
	RWw 3BH	(Axis 13) Specified positioning width (H)	RWr 3BH	(Axis 13) Present current value (H)	
	RWw 3CH	(Axis 13) Specified speed	RWr 3CH	(Axis 13) Present speed data	
	RWw 3DH	(Axis 13) Specified acceleration/deceleration	RWr 3DH	(Not available)	
	RWw 3EH	(Axis 13) Pushing current limit value	RWr 3EH	(Axis 13) Alarm code	
	RWw 3FH	(Axis 13) Control signal	RWr 3FH	(Axis 13) Status signal	

*1 Extended cyclic settings are performed based on the occupancy information displayed with the gateway parameter configuration tool.

*2 Operation is also possible with CC-Link Ver.1.10 if extended cyclic 1x multiplier settings (4 stations occupied) are within the usable range.

*3 The present current value should be the command current value for the stepper motor and be the feedback current value for the AC servomotor (including AC servomotor connected to SCON-CB).

■ CC-Link overall address configuration example (positioner 2 mode + EC Connection Unit)

This is an example for connection of 12 axes of Positioner 2 axes and one unit of the EC connection unit (for four axes).

PLC output ⇒ RCON / RCON ⇒ PLC input

Output register	High byte Low byte	Input register	High byte Low byte	
RY0F to 00	Gateway control signal 0	RX0F to 00	Gateway status signal 0	8 words each Fixed region
RY1F to 10	Gateway control signal 1	RX1F to 10	Gateway status signal 1	
RY2F to 20	(Not available)	RX2F to 20	Power supply unit status signal 0	
RY3F to 30	(Not available)	RX3F to 30	Power supply unit status signal 1	
RY4F to 40	(Not available)	RX4F to 40	Power supply unit status signal 2	
RY5F to 50	(Not available)	RX5F to 50	Power supply unit status signal 3	
RY6F to 60	(Not available)	RX6F to 60	Power supply unit status signal 4/ Light malfunction maintenance signal	
RY7F to 70	(Not available)	RX7F to 70	(Not available)	

*1 PLC master extended cyclic settings	Output register		Input register		
	RWw 00H	(Axis 0) Command position No.	RWr 00H	(Axis 0) Completed position No.	2 words each
16-word 1x multiplier setting 4 *2	RWw 01H	(Axis 0) Control signal	RWr 01H	(Axis 0) Status signal	
	RWw 02H	(Axis 1) Command position No.	RWr 02H	(Axis 1) Completed position No.	
	RWw 03H	(Axis 1) Control signal	RWr 03H	(Axis 1) Status signal	
	RWw 04H	(Axis 2) Command position No.	RWr 04H	(Axis 2) Completed position No.	
	RWw 05H	(Axis 2) Control signal	RWr 05H	(Axis 2) Status signal	
	RWw 06H	(Axis 3) Command position No.	RWr 06H	(Axis 3) Completed position No.	
	RWw 07H	(Axis 3) Control signal	RWr 07H	(Axis 3) Status signal	
	RWw 08H	(Axis 4) Command position No.	RWr 08H	(Axis 4) Completed position No.	
	RWw 09H	(Axis 4) Control signal	RWr 09H	(Axis 4) Status signal	
	RWw 0AH	(Axis 5) Command position No.	RWr 0AH	(Axis 5) Completed position No.	
	RWw 0BH	(Axis 5) Control signal	RWr 0BH	(Axis 5) Status signal	
	RWw 0CH	(Axis 6) Command position No.	RWr 0CH	(Axis 6) Completed position No.	
	RWw 0DH	(Axis 6) Control signal	RWr 0DH	(Axis 6) Status signal	
	RWw 0EH	(Axis 7) Command position No.	RWr 0EH	(Axis 7) Completed position No.	
	RWw 0FH	(Axis 7) Control signal	RWr 0FH	(Axis 7) Status signal	
32-word 4x multiplier setting 2	RWw 10H	(Axis 8) Command position No.	RWr 10H	(Axis 8) Completed position No.	
	RWw 11H	(Axis 8) Control signal	RWr 11H	(Axis 8) Status signal	
	RWw 12H	(Axis 9) Command position No.	RWr 12H	(Axis 9) Completed position No.	
	RWw 13H	(Axis 9) Control signal	RWr 13H	(Axis 9) Status signal	
	RWw 14H	(Axis 10) Command position No.	RWr 14H	(Axis 10) Completed position No.	
	RWw 15H	(Axis 10) Control signal	RWr 15H	(Axis 10) Status signal	
	RWw 16H	(Axis 11) Command position No.	RWr 16H	(Axis 11) Completed position No.	
	RWw 17H	(Axis 11) Control signal	RWr 17H	(Axis 11) Status signal	
	RWw 18H	(Axis 12 to Axis 15) Control signal	RWr 18H	(Axis 12 to Axis 15) Status signal	1 word *3

*1 Extended cyclic settings are performed based on the occupancy information displayed with the gateway parameter configuration tool.

*2 Operation is also possible with CC-Link Ver.1.10 if extended cyclic 1x multiplier settings (4 stations occupied) are within the usable range.

*3 The EC connection unit occupies domains and axis numbers for four axes (one word) even though not all of four axes are connected.
The axis numbers for the EC connection unit should be assigned from after axes connected to driver units (RCON-PC/AC/DC/PC/SC) and SCON extension unit.

[For CC-Link IE Field]

Fixed 8-word region is assigned to the bit register (RX/RY), while the region for each axis is assigned to the word register (RWr/RWw).

- CC-Link IE Field overall address configuration example (direct numerical control mode + simple direct mode/positioner 1 mode) shows direct numerical control mode connection for 2 axes and simple direct or positioner 1 mode connection for 12 axes.

PLC output ⇒ RCON RCON ⇒ PLC input

Output register	High byte Low byte	Input register	High byte Low byte	
RY0F to 00	Gateway control signal 0	RX0F to 00	Gateway status signal 0	8 words each Fixed region
RY1F to 10	Gateway control signal 1	RX1F to 10	Gateway status signal 1	
RY2F to 20	(Not available)	RX2F to 20	Power supply unit status signal 0	
RY3F to 30	(Not available)	RX3F to 30	Power supply unit status signal 1	
RY4F to 40	(Not available)	RX4F to 40	Power supply unit status signal 2	
RY5F to 50	(Not available)	RX5F to 50	Power supply unit status signal 3	
RY6F to 60	(Not available)	RX6F to 60	Power supply unit status signal 4/ Light malfunction maintenance signal	
RY7F to 70	(Not available)	RX7F to 70	(Not available)	

Output register		Input register		
RWw 00H	(Axis 0) Specified position data (L)	RWr 00H	(Axis 0) Present position data (L)	4 words each Positioner 1 /simple direct
RWw 01H	(Axis 0) Specified position data (H)	RWr 01H	(Axis 0) Present position data (H)	
RWw 02H	(Axis 0) Command position No.	RWr 02H	(Axis 0) Completed position No.	
RWw 03H	(Axis 0) Control signal	RWr 03H	(Axis 0) Status signal	
RWw 04H	(Axis 1) Specified position data (L)	RWr 04H	(Axis 1) Present position data (L)	4 words each
RWw 05H	(Axis 1) Specified position data (H)	RWr 05H	(Axis 1) Present position data (H)	
RWw 06H	(Axis 1) Command position No.	RWr 06H	(Axis 1) Completed position No.	
RWw 07H	(Axis 1) Control signal	RWr 07H	(Axis 1) Status signal	
RWw 08H	(Axis 2) Specified position data (L)	RWr 08H	(Axis 2) Present position data (L)	4 words each
RWw 09H	(Axis 2) Specified position data (H)	RWr 09H	(Axis 2) Present position data (H)	
RWw 0AH	(Axis 2) Command position No.	RWr 0AH	(Axis 2) Completed position No.	
RWw 0BH	(Axis 2) Control signal	RWr 0BH	(Axis 2) Status signal	
RWw 0CH	(Axis 3) Specified position data (L)	RWr 0CH	(Axis 3) Present position data (L)	4 words each
RWw 0DH	(Axis 3) Specified position data (H)	RWr 0DH	(Axis 3) Present position data (H)	
RWw 0EH	(Axis 3) Command position No.	RWr 0EH	(Axis 3) Completed position No.	
RWw 0FH	(Axis 3) Control signal	RWr 0FH	(Axis 3) Status signal	
⋮	⋮		⋮	4 words each
RWw 1FH	(Axis 7) Control signal	RWr 1FH	(Axis 7) Status signal	
⋮	⋮		⋮	
RWw 2FH	(Axis 11) Control signal	RWr 2FH	(Axis 11) Status signal	
RWw 30H	(Axis 12) Specified position data (L)	RWr 30H	(Axis 12) Present position data (L)	8 words each Direct numerical control mode
RWw 31H	(Axis 12) Specified position data (H)	RWr 31H	(Axis 12) Present position data (H)	
RWw 32H	(Axis 12) Specified positioning width (L)	RWr 32H	(Axis 12) Present current value (L) *1	
RWw 33H	(Axis 12) Specified positioning width	RWr 33H	(Axis 12) Present current value (H) *1	
RWw 34H	(Axis 12) Specified speed	RWr 34H	(Axis 12) Present speed data	
RWw 35H	(Axis 12) Specified acceleration/deceleration	RWr 35H	(Not available)	
RWw 36H	(Axis 12) Pushing current limit value	RWr 36H	(Axis 12) Alarm code	
RWw 37H	(Axis 12) Control signal	RWr 37H	(Axis 12) Status signal	
RWw 38H	(Axis 13) Specified position data (L)	RWr 38H	(Axis 13) Present position data (L)	8 words each
RWw 39H	(Axis 13) Specified position data (H)	RWr 39H	(Axis 13) Present position data (H)	
RWw 3AH	(Axis 13) Specified positioning width (L)	RWr 3AH	(Axis 13) Present current value (L) *1	
RWw 3BH	(Axis 13) Specified positioning width	RWr 3BH	(Axis 13) Present current value (H) *1	
RWw 3CH	(Axis 13) Specified speed	RWr 3CH	(Axis 13) Present speed data	
RWw 3DH	(Axis 13) Specified acceleration/deceleration	RWr 3DH	(Not available)	
RWw 3EH	(Axis 13) Pushing current limit value	RWr 3EH	(Axis 13) Alarm code	
RWw 3FH	(Axis 13) Control signal	RWr 3FH	(Axis 13) Status signal	

*1 The present current value should be the command current value for the stepper motor and be the feedback current value for the AC servomotor (including AC servomotor connected to SCON-CB).

■ CC-Link IE Field overall address configuration example (positioner 2 mode + EC Connection Unit)

This is an example for connection of 12 axes of Positioner 2 axes and one unit of the EC connection unit (for four axes).

PLC output ⇒ RCON　　RCON ⇒ PLC input

Output register	High byte Low byte	Input register	High byte Low byte
RY0F to 00	Gateway control signal 0	RX0F to 00	Gateway status signal 0
RY1F to 10	Gateway control signal 1	RX1F to 10	Gateway status signal 1
RY2F to 20	(Not available)	RX2F to 20	Power supply unit status signal 0
RY3F to 30	(Not available)	RX3F to 30	Power supply unit status signal 1
RY4F to 40	(Not available)	RX4F to 40	Power supply unit status signal 2
RY5F to 50	(Not available)	RX5F to 50	Power supply unit status signal 3
RY6F to 60	(Not available)	RX6F to 60	Power supply unit status signal 4/ Light malfunction maintenance signal
RY7F to 70	(Not available)	RX7F to 70	(Not available)

8 words each
Fixed region

Output register		Input register	
RWw 00H	(Axis 0) Command position No.	RWr 00H	(Axis 0) Completed position No.
RWw 01H	(Axis 0) Control signal	RWr 01H	(Axis 0) Status signal
RWw 02H	(Axis 1) Command position No.	RWr 02H	(Axis 1) Completed position No.
RWw 03H	(Axis 1) Control signal	RWr 03H	(Axis 1) Status signal
RWw 04H	(Axis 2) Command position No.	RWr 04H	(Axis 2) Completed position No.
RWw 05H	(Axis 2) Control signal	RWr 05H	(Axis 2) Status signal
RWw 06H	(Axis 3) Command position No.	RWr 06H	(Axis 3) Completed position No.
RWw 07H	(Axis 3) Control signal	RWr 07H	(Axis 3) Status signal
RWw 08H	(Axis 4) Command position No.	RWr 08H	(Axis 4) Completed position No.
RWw 09H	(Axis 4) Control signal	RWr 09H	(Axis 4) Status signal
RWw 0AH	(Axis 5) Command position No.	RWr 0AH	(Axis 5) Completed position No.
RWw 0BH	(Axis 5) Control signal	RWr 0BH	(Axis 5) Status signal
RWw 0CH	(Axis 6) Command position No.	RWr 0CH	(Axis 6) Completed position No.
RWw 0DH	(Axis 6) Control signal	RWr 0DH	(Axis 6) Status signal
RWw 0EH	(Axis 7) Command position No.	RWr 0EH	(Axis 7) Completed position No.
RWw 0FH	(Axis 7) Control signal	RWr 0FH	(Axis 7) Status signal
RWw 10H	(Axis 8) Command position No.	RWr 10H	(Axis 8) Completed position No.
RWw 11H	(Axis 8) Control signal	RWr 11H	(Axis 8) Status signal
RWw 12H	(Axis 9) Command position No.	RWr 12H	(Axis 9) Completed position No.
RWw 13H	(Axis 9) Control signal	RWr 13H	(Axis 9) Status signal
RWw 14H	(Axis 10) Command position No.	RWr 14H	(Axis 10) Completed position No.
RWw 15H	(Axis 10) Control signal	RWr 15H	(Axis 10) Status signal
RWw 16H	(Axis 11) Command position No.	RWr 16H	(Axis 11) Completed position No.
RWw 17H	(Axis 11) Control signal	RWr 17H	(Axis 11) Status signal
RWw 18H	(Axis 12 to Axis 15) Control signal	RWr 18H	(Axis 12 to Axis 15) Status signal

2 words each

1 word *1

*1 The EC connection unit occupies domains and axis numbers for four axes (one word) even though not all of four axes are connected.
The axis numbers for the EC connection unit should be assigned from after axes connected to driver units (RCON-PC/AC/DC/PC/SC) and SCON extension unit.

[For DeviceNet]

■ DeviceNet overall address configuration example (direct numerical control mode + simple direct mode/positioner 1 mode)
Shows direct numerical control mode connection for 2 axes and simple direct or positioner 1 mode connection for 12 axes.

	PLC output ⇒ RCON	RCON ⇒ PLC input	
Relative CH *	High byte Low byte	High byte Low byte	
0	Gateway control signal 0	Gateway status signal 0	8 words each Fixed region
1	Gateway control signal 1	Gateway status signal 1	
2	(Not available)	Power supply unit status signal 0	
3	(Not available)	Power supply unit status signal 1	
4	(Not available)	Power supply unit status signal 2	
5	(Not available)	Power supply unit status signal 3	
6	(Not available)	Power supply unit status signal 4/ Light malfunction maintenance signal	
7	(Not available)	(Not available)	
8	(Axis 0) Specified position data (L)	(Axis 0) Present position data (L)	4 words each Positioner 1 /simple direct mode
9	(Axis 0) Specified position data (H)	(Axis 0) Present position data (H)	
10	(Axis 0) Command position No.	(Axis 0) Completed position No.	
11	(Axis 0) Control signal	(Axis 0) Status signal	
12	(Axis 1) Specified position data (L)	(Axis 1) Present position data (L)	4 words each
13	(Axis 1) Specified position data (H)	(Axis 1) Present position data (H)	
14	(Axis 1) Command position No.	(Axis 1) Completed position No.	
15	(Axis 1) Control signal	(Axis 1) Status signal	
16	(Axis 2) Specified position data (L)	(Axis 2) Present position data (L)	4 words each
17	(Axis 2) Specified position data (H)	(Axis 2) Present position data (H)	
18	(Axis 2) Command position No.	(Axis 2) Completed position No.	
19	(Axis 2) Control signal	(Axis 2) Status signal	
20	(Axis 3) Specified position data (L)	(Axis 3) Present position data (L)	4 words each
21	(Axis 3) Specified position data (H)	(Axis 3) Present position data (H)	
22	(Axis 3) Command position No.	(Axis 3) Completed position No.	
23	(Axis 3) Control signal	(Axis 3) Status signal	
⋮	⋮	⋮	4 words each
39	(Axis 7) Control signal	(Axis 7) Status signal	
⋮	⋮	⋮	
55	(Axis 11) Control signal	(Axis 11) Status signal	
56	(Axis 12) Specified position data (L)	(Axis 12) Present position data (L)	8 words each Direct numerical control mode
57	(Axis 12) Specified position data (H)	(Axis 12) Present position data (H)	
58	(Axis 12) Specified positioning width (L)	(Axis 12) Present current value (L) *1	
59	(Axis 12) Specified positioning width (H)	(Axis 12) Present current value (H) *1	
60	(Axis 12) Specified speed	(Axis 12) Present speed data	
61	(Axis 12) Specified acceleration/deceleration	(Not available)	
62	(Axis 12) Pushing current limit value	(Axis 12) Alarm code	
63	(Axis 12) Control signal	(Axis 12) Status signal	
64	(Axis 13) Specified position data (L)	(Axis 13) Present position data (L)	8 words each
65	(Axis 13) Specified position data (H)	(Axis 13) Present position data (H)	
66	(Axis 13) Specified positioning width (L)	(Axis 13) Present current value (L) *1	
67	(Axis 13) Specified positioning width (H)	(Axis 13) Present current value (H) *1	
68	(Axis 13) Specified speed	(Axis 13) Present speed data	
69	(Axis 13) Specified acceleration/deceleration	(Not available)	
70	(Axis 13) Pushing current limit value	(Axis 13) Alarm code	
71	(Axis 13) Control signal	(Axis 13) Status signal	

* Relative CH is the CH number relative to the gateway head CH

*1 The present current value should be the command current value for the stepper motor and be the feedback current value for the AC servomotor (including AC servomotor connected to SCON-CB).

■ DeviceNet overall address configuration example (positioner 2 mode + EC Connection Unit)

This is an example for connection of 12 axes of Positioner 2 axes and one unit of the EC connection unit (for four axes).

	PLC output ⇒ RCON	RCON ⇒ PLC input	
Relative CH *	High byte Low byte	High byte Low byte	
0	Gateway control signal 0	Gateway status signal 0	8 words each Fixed region
1	Gateway control signal 1	Gateway status signal 1	
2	(Not available)	Power supply unit status signal 0	
3	(Not available)	Power supply unit status signal 1	
4	(Not available)	Power supply unit status signal 2	
5	(Not available)	Power supply unit status signal 3	
6	(Not available)	Power supply unit status signal 4/ Light malfunction maintenance signal	
7	(Not available)	(Not available)	
8	(Axis 0) Command position No.	(Axis 0) Completed position No.	2 words each
9	(Axis 0) Control signal	(Axis 0) Status signal	
10	(Axis 1) Command position No.	(Axis 1) Completed position No.	
11	(Axis 1) Control signal	(Axis 1) Status signal	
12	(Axis 2) Command position No.	(Axis 2) Completed position No.	
13	(Axis 2) Control signal	(Axis 2) Status signal	
14	(Axis 3) Command position No.	(Axis 3) Completed position No.	
15	(Axis 3) Control signal	(Axis 3) Status signal	
16	(Axis 4) Command position No.	(Axis 4) Completed position No.	
17	(Axis 4) Control signal	(Axis 4) Status signal	
18	(Axis 5) Command position No.	(Axis 5) Completed position No.	
19	(Axis 5) Control signal	(Axis 5) Status signal	
20	(Axis 6) Command position No.	(Axis 6) Completed position No.	
21	(Axis 6) Control signal	(Axis 6) Status signal	
22	(Axis 7) Command position No.	(Axis 7) Completed position No.	
23	(Axis 7) Control signal	(Axis 7) Status signal	
24	(Axis 8) Command position No.	(Axis 8) Completed position No.	
25	(Axis 8) Control signal	(Axis 8) Status signal	
26	(Axis 9) Command position No.	(Axis 9) Completed position No.	
27	(Axis 9) Control signal	(Axis 9) Status signal	
28	(Axis 10) Command position No.	(Axis 10) Completed position No.	
29	(Axis 10) Control signal	(Axis 10) Status signal	
30	(Axis 11) Command position No.	(Axis 11) Completed position No.	
31	(Axis 11) Control signal	(Axis 11) Status signal	
32	(Axis 12 to Axis 15) Control signal	(Axis 12 to Axis 15) Status signal	1 word *1

* Relative CH is the CH number relative to the gateway head CH

*1 The EC connection unit occupies domains and axis numbers for four axes (one word) even though not all of four axes are connected.

The axis numbers for the EC connection unit should be assigned from after axes connected to driver units (RCON-PC/AC/DC/PC/SC) and SCON extension unit.

[For PROFIBUS-DP, EtherNet/IP, EtherCAT]

■ Overall address configuration example (direct numerical control mode + simple direct mode/positioner 1 mode)
Shows direct numerical control mode connection for 2 axes and simple direct or positioner 1 mode connection for 12 axes.

	PLC output ⇒ RCON	RCON ⇒ PLC input	
Relative byte *	High byte Low byte	High byte Low byte	
0	Gateway control signal 0	Gateway status signal 0	8 words each Fixed region
2	Gateway control signal 1	Gateway status signal 1	
4	(Not available)	Power supply unit status signal 0	
6	(Not available)	Power supply unit status signal 1	
8	(Not available)	Power supply unit status signal 2	
10	(Not available)	Power supply unit status signal 3	
12	(Not available)	Power supply unit status signal 4/ Light malfunction maintenance signal	
14	(Not available)	(Not available)	
16	(Axis 0) Specified position data (L)	(Axis 0) Present position data (L)	4 words each Positioner 1 /simple direct mode
18	(Axis 0) Specified position data (H)	(Axis 0) Present position data (H)	
20	(Axis 0) Command position No.	(Axis 0) Completed position No.	
22	(Axis 0) Control signal	(Axis 0) Status signal	
24	(Axis 1) Specified position data (L)	(Axis 1) Present position data (L)	4 words each
26	(Axis 1) Specified position data (H)	(Axis 1) Present position data (H)	
28	(Axis 1) Command position No.	(Axis 1) Completed position No.	
30	(Axis 1) Control signal	(Axis 1) Status signal	
32	(Axis 2) Specified position data (L)	(Axis 2) Present position data (L)	4 words each
34	(Axis 2) Specified position data (H)	(Axis 2) Present position data (H)	
36	(Axis 2) Command position No.	(Axis 2) Completed position No.	
38	(Axis 2) Control signal	(Axis 2) Status signal	
40	(Axis 3) Specified position data (L)	(Axis 3) Present position data (L)	4 words each
42	(Axis 3) Specified position data (H)	(Axis 3) Present position data (H)	
44	(Axis 3) Command position No.	(Axis 3) Completed position No.	
46	(Axis 3) Control signal	(Axis 3) Status signal	
⋮	⋮	⋮	4 words each
78	(Axis 7) Control signal	(Axis 7) Status signal	
⋮	⋮	⋮	
110	(Axis 11) Control signal	(Axis 11) Status signal	
112	(Axis 12) Specified position data (L)	(Axis 12) Present position data (L)	8 words each Direct numerical mode
114	(Axis 12) Specified position data (H)	(Axis 12) Present position data (H)	
116	(Axis 12) Specified positioning width (L)	(Axis 12) Present current value (L) *1	
118	(Axis 12) Specified positioning width (H)	(Axis 12) Present current value (H) *1	
120	(Axis 12) Specified speed	(Axis 12) Present speed data	
122	(Axis 12) Specified acceleration/deceleration	(Not available)	
124	(Axis 12) Pushing current limit value	(Axis 12) Alarm code	
126	(Axis 12) Control signal	(Axis 12) Status signal	
128	(Axis 13) Specified position data (L)	(Axis 13) Present position data (L)	8 words each
130	(Axis 13) Specified position data (H)	(Axis 13) Present position data (H)	
132	(Axis 13) Specified positioning width (L)	(Axis 13) Present current value (L) *1	
134	(Axis 13) Specified positioning width (H)	(Axis 13) Present current value (H) *1	
136	(Axis 13) Specified speed	(Axis 13) Present speed data	
138	(Axis 13) Specified acceleration/deceleration	(Not available)	
140	(Axis 13) Pushing current limit value	(Axis 13) Alarm code	
142	(Axis 13) Control signal	(Axis 13) Status signal	

* Relative byte is the byte address relative to the gateway head

*1 The present current value should be the command current value for the stepper motor and be the feedback current value for the AC servomotor (including AC servomotor connected to SCON-CB).

■ Overall address configuration example (positioner 2 mode + EC Connection Unit)

This is an example for connection of 12 axes of Positioner 2 axes and one unit of the EC connection unit (for four axes).

	PLC output ⇒ RCON		RCON ⇒ PLC input		
Relative byte *	High byte	Low byte	High byte	Low byte	
0	Gateway control signal 0		Gateway status signal 0		8 words each Fixed region
2	Gateway control signal 1		Gateway status signal 1		
4	(Not available)		Power supply unit status signal 0		
6	(Not available)		Power supply unit status signal 1		
8	(Not available)		Power supply unit status signal 2		
10	(Not available)		Power supply unit status signal 3		
12	(Not available)		Power supply unit status signal 4/ Light malfunction maintenance signal		
14	(Not available)		(Not available)		
16	(Axis 0) Command position No.		(Axis 0) Completed position No.		2 words each
18	(Axis 0) Control signal		(Axis 0) Status signal		
20	(Axis 1) Command position No.		(Axis 1) Completed position No.		
22	(Axis 1) Control signal		(Axis 1) Status signal		
24	(Axis 2) Command position No.		(Axis 2) Completed position No.		
26	(Axis 2) Control signal		(Axis 2) Status signal		
28	(Axis 3) Command position No.		(Axis 3) Completed position No.		
30	(Axis 3) Control signal		(Axis 3) Status signal		
32	(Axis 4) Command position No.		(Axis 4) Completed position No.		
34	(Axis 4) Control signal		(Axis 4) Status signal		
36	(Axis 5) Command position No.		(Axis 5) Completed position No.		
38	(Axis 5) Control signal		(Axis 5) Status signal		
40	(Axis 6) Command position No.		(Axis 6) Completed position No.		
42	(Axis 6) Control signal		(Axis 6) Status signal		
44	(Axis 7) Command position No.		(Axis 7) Completed position No.		
46	(Axis 7) Control signal		(Axis 7) Status signal		
48	(Axis 8) Command position No.		(Axis 8) Completed position No.		
50	(Axis 8) Control signal		(Axis 8) Status signal		
52	(Axis 9) Command position No.		(Axis 9) Completed position No.		
54	(Axis 9) Control signal		(Axis 9) Status signal		
56	(Axis 10) Command position No.		(Axis 10) Completed position No.		
58	(Axis 10) Control signal		(Axis 10) Status signal		
60	(Axis 11) Command position No.		(Axis 11) Completed position No.		
62	(Axis 11) Control signal		(Axis 11) Status signal		
64	(Axis 12 to Axis 15) Control signal.		(Axis 12 to Axis 15) Status signal		1 word *1

* Relative byte is the byte address relative to the gateway head

*1 The EC connection unit occupies domains and axis numbers for four axes (one word) even though not all of four axes are connected.

The axis numbers for the EC connection unit should be assigned from after axes connected to driver units (RCON-PC/AC/DC/PC/SC) and SCON extension unit.

[For PROFINET-IO]

■ PROFINET-IO overall address configuration example (direct numerical control mode + simple direct mode/positioner 1 mode)
Shows direct numerical control mode connection for 2 axes and simple direct or positioner 1 mode connection for 12 axes.

	PLC output ⇒ RCON	RCON ⇒ PLC input	
4-word Module count	High byte Low byte	High byte Low byte	
1	Gateway control signal 0	Gateway status signal 0	8 words each Fixed region
	Gateway control signal 1	Gateway status signal 1	
	(Not available)	Power supply unit status signal 0	
	(Not available)	Power supply unit status signal 1	
2	(Not available)	Power supply unit status signal 2	
	(Not available)	Power supply unit status signal 3	
	(Not available)	Power supply unit status signal 4/ Light malfunction maintenance signal	
	(Not available)	(Not available)	
3	(Axis 0) Specified position data (L)	(Axis 0) Present position data (L)	4 words each Positioner 1 /simple direct mode
	(Axis 0) Specified position data (H)	(Axis 0) Present position data (H)	
	(Axis 0) Command position No.	(Axis 0) Completed position No.	
	(Axis 0) Control signal	(Axis 0) Status signal	
4	(Axis 1) Specified position data (L)	(Axis 1) Present position data (L)	4 words each
	(Axis 1) Specified position data (H)	(Axis 1) Present position data (H)	
	(Axis 1) Command position No.	(Axis 1) Completed position No.	
	(Axis 1) Control signal	(Axis 1) Status signal	
5	(Axis 2) Specified position data (L)	(Axis 2) Present position data (L)	4 words each
	(Axis 2) Specified position data (H)	(Axis 2) Present position data (H)	
	(Axis 2) Command position No.	(Axis 2) Completed position No.	
	(Axis 2) Control signal	(Axis 2) Status signal	
6	(Axis 3) Specified position data (L)	(Axis 3) Present position data (L)	4 words each
	(Axis 3) Specified position data (H)	(Axis 3) Present position data (H)	
	(Axis 3) Command position No.	(Axis 3) Completed position No.	
	(Axis 3) Control signal	(Axis 3) Status signal	
⋮	⋮	⋮	4 words each
14	(Axis 11) Specified position data (L)	(Axis 11) Present position data (L)	4 words each
	(Axis 11) Specified position data (H)	(Axis 11) Present position data (H)	
	(Axis 11) Command position No.	(Axis 11) Completed position No.	
	(Axis 11) Control signal	(Axis 11) Status signal	
15	(Axis 12) Specified position data (L)	(Axis 12) Present position data (L)	8 words each Direct numerical mode
	(Axis 12) Specified position data (H)	(Axis 12) Present position data (H)	
	(Axis 12) Specified positioning width (L)	(Axis 12) Present current value (L) *1	
	(Axis 12) Specified positioning width (H)	(Axis 12) Present current value (H) *1	
16	(Axis 12) Specified speed	(Axis 12) Present speed data	
	(Axis 12) Specified acceleration/deceleration	(Not available)	
	(Axis 12) Pushing current limit value	(Axis 12) Alarm code	
	(Axis 12) Control signal	(Axis 12) Status signal	
17	(Axis 13) Specified position data (L)	(Axis 13) Present position data (L)	8 words each
	(Axis 13) Specified position data (H)	(Axis 13) Present position data (H)	
	(Axis 13) Specified positioning width (L)	(Axis 13) Present current value (L) *1	
	(Axis 13) Specified positioning width (H)	(Axis 13) Present current value (H) *1	
18	(Axis 13) Specified speed	(Axis 13) Present speed data	
	(Axis 13) Specified acceleration/deceleration	(Not available)	
	(Axis 13) Pushing current limit value	(Axis 13) Alarm code	
	(Axis 13) Control signal	(Axis 13) Status signal	

*1 The present current value should be the command current value for the stepper motor and be the feedback current value for the AC servomotor (including AC servomotor connected to SCON-CB).

■ PROFINET-IO overall address configuration example (positioner 2 mode + EC Connection Unit)

This is an example for connection of 12 axes of Positioner 2 axes and one unit of the EC connection unit (for four axes).

	PLC output ⇒ RCON	RCON ⇒ PLC input	
4-word Module count	High byte　Low byte	High byte　Low byte	
1	Gateway control signal 0	Gateway status signal 0	8 words each Fixed region
	Gateway control signal 1	Gateway status signal 1	
	(Not available)	Power supply unit status signal 0	
	(Not available)	Power supply unit status signal 1	
2	(Not available)	Power supply unit status signal 2	
	(Not available)	Power supply unit status signal 3	
	(Not available)	Power supply unit status signal 4/ Light malfunction maintenance signal	
	(Not available)	(Not available)	
3	(Axis 0) Command position No.	(Axis 0) Completed position No.	2 words each
	(Axis 0) Control signal	(Axis 0) Status signal	
	(Axis 1) Command position No.	(Axis 1) Completed position No.	
	(Axis 1) Control signal	(Axis 1) Status signal	
4	(Axis 2) Command position No.	(Axis 2) Completed position No.	
	(Axis 2) Control signal	(Axis 2) Status signal	
	(Axis 3) Command position No.	(Axis 3) Completed position No.	
	(Axis 3) Control signal	(Axis 3) Status signal	
5	(Axis 4) Command position No.	(Axis 4) Completed position No.	
	(Axis 4) Control signal	(Axis 4) Status signal	
	(Axis 5) Command position No.	(Axis 5) Completed position No.	
	(Axis 5) Control signal	(Axis 5) Status signal	
6	(Axis 6) Command position No.	(Axis 6) Completed position No.	
	(Axis 6) Control signal	(Axis 6) Status signal	
	(Axis 7) Command position No.	(Axis 7) Completed position No.	
	(Axis 7) Control signal	(Axis 7) Status signal	
7	(Axis 8) Command position No.	(Axis 8) Completed position No.	
	(Axis 8) Control signal	(Axis 8) Status signal	
	(Axis 9) Command position No.	(Axis 9) Completed position No.	
	(Axis 9) Control signal	(Axis 9) Status signal	
8	(Axis 10) Command position No.	(Axis 10) Completed position No.	
	(Axis 10) Control signal	(Axis 10) Status signal	
	(Axis 11) Command position No.	(Axis 11) Completed position No.	
	(Axis 11) Control signal	(Axis 11) Status signal	
9	(Axis 12 to Axis 15) Control signal	(Axis 12 to Axis 15) Status signal	1 wprd *1

*1 The EC connection unit occupies domains and axis numbers for four axes (one word) even though not all of four axes are connected.

The axis numbers for the EC connection unit should be assigned from after axes connected to driver units (RCON-PC/AC/DC/PC/SC) and SCON extension unit.

Position table

Each driver unit can operate in 6 types of modes, direct numerical control mode, simple direct mode, positioner 1~3 and 5 modes, depending on the gateway unit.
Simple direct mode and positioner mode require the creation of a position table in advance, using a teaching tool, in order to perform positioning.

The position table is explained using a sample PC software screen.
(The displayed contents differ for teaching pendants)

No.	Position [mm]	Speed [mm/s]	Acceleration [G]	Deceleration [G]	Push [%]	Threshold [%]	Positioning width [mm]	Zone+ [mm]	Zone- [mm]	Acceleration/ deceleration Mode	Incremental	Gain set	Stop Mode	Vibration damping No.	Drive torque limit [%]	Connected No.	Wait time [s]	Comment
0	0.00	100.00	0.30	0.30	0	0	0.10	0.00	0.00	0	0	0	0	0	100	1	10.00	Test 1
1	100.00	100.00	0.30	0.30	0	0	0.10	0.00	0.00	0	0	0	0	0	100	0	5.00	Test 2
2	1-line comment can be input																	
3																		

- PC software operating method
  Refer to [PC software (RCM-101-*-*) manual (ME0155)]
  Refer to [Guiding Features Installed in PC Teaching Software (IA-OS)]
- Teaching pendant operating method
  Refer to [Touch Panel Teaching Pendant manual TB-02/02D (ME0355)]
  Refer to [Touch Panel Teaching Pendant manual TB-03 (MJ0376)]

Refer to [LECYLINDER Position Table (Pg. A3-87)] for the EC connection unit.

Caution

- When using the rotary type or gripper type, be sure to confirm the following.
  "3.8 Precautions for Rotary Type (page A3-151)"
  "3.8 Precautions for Gripper Type (page A3-154)"

(1) No.
Displays the position data No.

Caution

- Do not use position No. 0 if the position has play.
- Even if not at Position No. 0 at the first servo ON after power ON, the complete position number output will be 0 and the status will be the same as when positioning to Position No. 0. The complete position No. output is 0 while the actuator is moving.
- To use position No. 0, take the command log with the sequence program and check the complete position No. 0 in accordance with the log.

(2) Position [mm]
Input the target position to which the actuator is to travel.

Absolute coordinates specification : Input the distance from the actuator home position.

Relative coordinates specification : This means the relative amount treating the present position as the home position and feeding by equivalent pitch.

No.	Position [mm]			Incremental	
0	5.00			0	
1	10.00			1	
2	-10.00			1	

Absolute coordinates specification
Target position is 5 mm from home

Relative coordinates specification
Plus 10 mm from present position

Relative coordinates specification
Minus 10 mm from present position

(3) Speed [mm/s]
Input the speed at which the actuator is to travel.
Initial values differ depending on the actuator type.

Caution

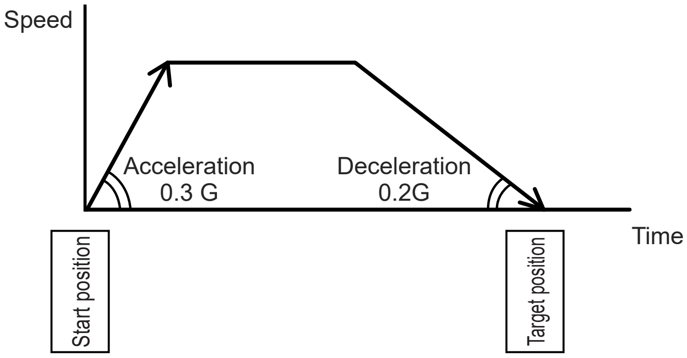
- Do not attempt to set above the maximum speed or below the minimum speed. Setting above the maximum speed or below the minimum speed may lead to abnormal noise or unstable speeds.
- For the maximum speed and minimum speed, refer to [Appendix Chapter 2 Connectable Actuators].
- The minimum speed can be calculated with the equation below.
  Minimum speed [mm/s] = Lead [mm/r] / Encoder resolution [pulse/r] x 1000 [1/s]

(4) Acceleration/deceleration [G]

Input the acceleration/deceleration rate at which the actuator is to travel. Use a value within the rated range.

Take care, as it is possible to input a number larger that the catalog rated value.

Reduce the number if the object to be conveyed vibrates during acceleration/deceleration, causing problems.



Acceleration/deceleration is rapid when the number is increased and gradual when it is decreased.

Caution

- For acceleration/deceleration, refer to [Appendix Chapter 2 Connectable Actuators], or to the actuator catalog or instruction manual, and set so that the specified acceleration/deceleration is not exceeded.
- Input appropriate values so that excessive shock and vibration are not applied to the actuator, in consideration of the installation conditions and the shape of the conveyed object.
- Increasing this number greatly affects the allowable payload. Also, take care as this can cause failure.

---

(5) Push [%]

Select "positioning" or "push-motion operation".

The factory default setting is 0.

0	: Normal positioning operation
Non-0	: Displays the current limit value. Setting this will configure push-motion operation mode.

Caution

- Changing the push speed may result in a force different from the original push force.
- When the push speed is changed, measure and check the actual push force.
- For the push force, refer to [Appendix Chapter 2 Connectable Actuators].

---

(6) Threshold [%]

[1] Set the threshold for pressing torque

Load output judgment status (LOAD) turns on when the torque (load current) reaches this value or higher in the range of the positioning zone during pressing operation. This feature is to be used to monitor the load current in a performance that uses pressing operation such as press-fitting, and see if the operation goes well or not.

Use this as a reference output for those other than the pulse motor type high-thrust actuators.

For details, refer to [3.8 I/O Signals/Other basic operations/Push-motion Operation (7) Pressing operation commanded torque level detection (page A3-135)].

[2] Sets the threshold value for collision judgment.

When the present position is within the position zone range and the time set in parameter No. 50 "Load output judgment time" is exceeded and the command torque value set in the position table "Threshold" is exceeded, a collision is judged to have happened.

The load output judgment status (LOAD) should turn on after judgment. For the pulse motor type, the collision detection alarm gets generated and the servo gets turned off.

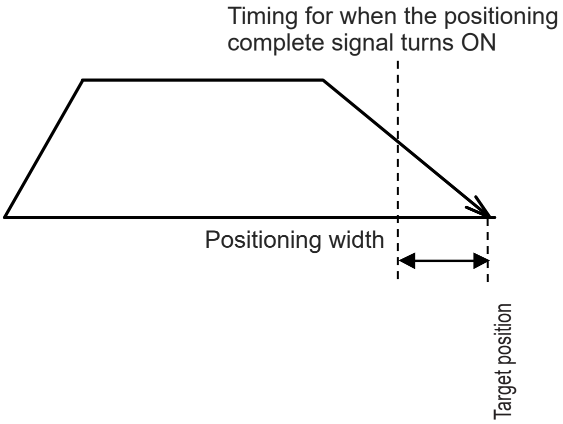
For details, refer to [6.2 Various Functions / Collision detection function (page B6-73)].

(7) Positioning width [mm]

Handling of set value differs between "positioning" and "push-motion operation".

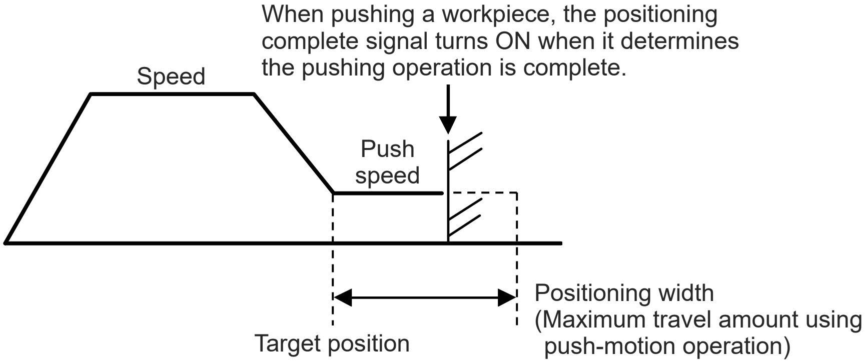
[Positioning operation]

Defines how far before the target position the positioning complete signal should turn ON.
Even if the positioning complete turns ON, the actuator will continue to move to the target position.
Increasing the positioning width value will speed up the next sequence operation, which will shorten the tact time. Set the optimum value by looking at the overall balance of the equipment.



[Push-motion Operation]

Defines the maximum travel amount using push-motion operation from the target position. Considering the mechanical variation of the workpieces, set the positioning width so as not to complete positioning before pressing against the workpiece.

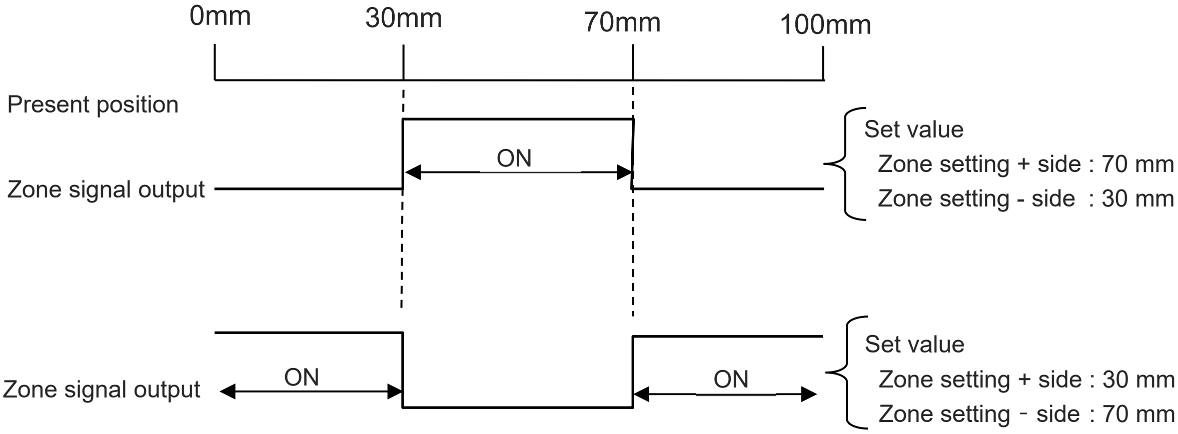


For the 24V driver unit, parameter No. 181 "Push Mode" enables SEP push-motion operation. Refer to page B6-51 for more information.

(8) Zone +/- [mm]

Defines the region in which the zone output signal turns ON.
This can be set individually for each target position.
Only the zone setting of the position No. traveling is enabled, and the zone settings of other position No. are disabled.

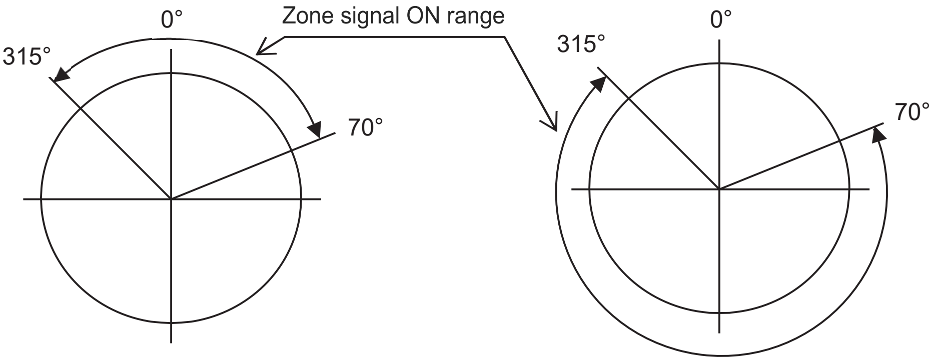
For linear axis



Caution

- Unless the zone signal detection range is set at a value above minimum resolution, a signal will not be output.
- The minimum resolution can be calculated with the equation below.
  Minimum resolution [mm/pulse] = Actuator lead [mm/r] / Encoder resolution [pulse/r]

For rotary actuator in index mode



Set value

Zone setting + side: 70°
Zone setting – side: 315°

Set value

Zone setting + side: 315°
Zone setting – side: 70°

(9) Acceleration/deceleration mode

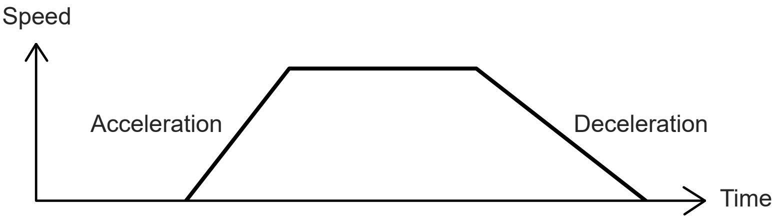
Defines acceleration/deceleration pattern characteristics.

The factory default setting is 0.

- 0: Trapezoid pattern
- 1: S-motion
- 2: First-order delay filter

[Trapezoid pattern]

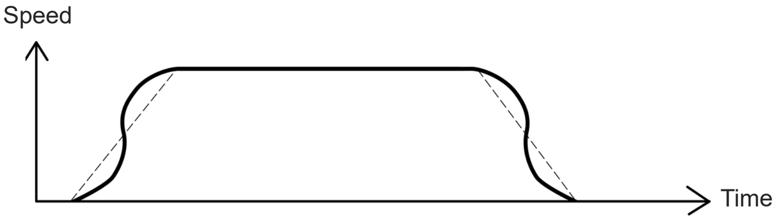
Acceleration and deceleration are configured in the "Acceleration" and "Deceleration" fields of the position table.



[S-motion]

When accelerating, a curve which starts gently then sharply increases partway through is drawn.

This should be used when fast tact time is required so high acceleration/deceleration is wanted, yet a gradual start and stop are required.



The degree of S-motion ratio setting is set with parameter No. 56 "S-motion Ratio Setting".

Setting unit is % and the setting range is 0 to 100.

(The figure above is a graph when set to 100%.)

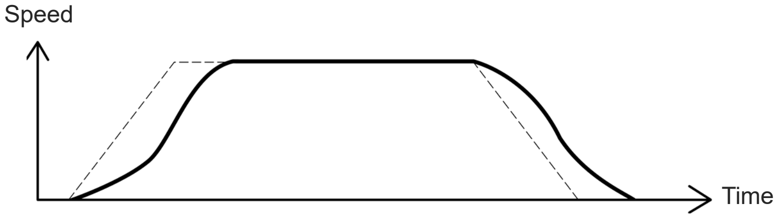
However, this is not reflected for jogging/inching operations via a PC or teaching pendant.

Caution

- In the following cases S-motion becomes disabled.
  (1) When a position command or direct numerical value command with S-motion is set during actuator operation.
  (2) When using a rotary actuator in index mode.
  (3) When set such that the acceleration time or deceleration time exceeds 2 seconds.
  (4) When parameter No. 56 is set to 0.
- The acceleration/deceleration time does not change, but as per the figure above, the acceleration/deceleration exceeds that set in the position table. (Max. 2x)
- Avoid pauses during acceleration or deceleration operation. Speed changes (acceleration) will occur, which may be dangerous.

[First-order delay filter]

This draws a more gentle acceleration/deceleration curve compared to trapezoidal patterns. The shock at acceleration/deceleration is relieved, but the cycle time becomes longer. Use for applications where minor vibrations to the workpiece during acceleration/deceleration are to be avoided.



The amount of first-order delay is set by parameter No. 55 "Position command primary filter time constant". The setting unit is ms and can be set from 0.0 to 100.0 in 0.1ms increments. However, this is not reflected for jogging/inching operations via a PC or teaching pendant.

Caution

- In the following cases the first-order delay filter becomes disabled.
  (1) When a position command or direct numerical value command with the first-order delay filter is set during actuator operation.
  (2) When using a rotary actuator in index mode.
  (3) When parameter No. 55 is set to 0.

(10) Incremental

Defines whether using absolute coordinate specifications or relative coordinate specifications. The factory default setting is 0.

0: Absolute coordinates specified
1: Relative coordinates specified

Caution

- When performing relative movement, do not output a travel command smaller than the minimum resolution value (actuator lead length / encoder resolution). Also, do not use a travel command smaller than the positioning repeatability.
- As the travel command is for the same position as the positioning complete status, deviation occurs, but normal positioning control is not possible.

(11) Transported load/Gain set

This item has different functions depending on motor specifications.

Motor specification	Function
Stepper motor specification	Transported load
Servo motor specification	Gain set

[Transported load] Stepper motor specification function only

Registers four types of load weight with the teaching tool and registers which of them to use by number (0 to 3). Based on the number (load weight) set in this section, the smart tuning function calculates the optimum speed and acceleration/deceleration.

Setting	Name
0	Transported load pattern No. 0
1	Transported load pattern No. 1
2	Transported load pattern No. 2
3	Transported load pattern No. 3

[Gain set] Servo motor specification function only

6 parameters required for servo gain adjustment are collected together as 1 set. 4 kinds of sets can be registered, enabling the servo gain to be switched for each positioning operation. By using the PC software's offboard tuning function, it is possible to obtain a setting close to the optimum setting.

When using this function and setting for high-speed operation, or when setting a payload exceeding the rated value, it may be necessary to set the home return gain.

For details on the setting method and precautions of the load weight, smart tuning function and off-board tuning function, refer to the following instruction manuals.

- PC software operating method
  Refer to [PC software (RCM-101-*-*) manual (ME0155)]
  Refer to [Guiding Features Installed in PC Teaching Software (IA-OS)]
- Teaching pendant operating method
  Refer to [Touch Panel Teaching Pendant manual TB-02/02D (ME0355)]
  Refer to [Touch Panel Teaching Pendant manual TB-03 (MJ0376)]

Parameters configured in 1 set are as follows.

- Servo gain number (position gain)
- Positional feedforward gain
- Velocity loop proportional gain
- Velocity loop integral gain
- Torque filter constant
- Current control band number

Set the gain corresponding to the position No. to be operated with the specified gain setting.

For details about each gain parameter, refer to [6.1 Parameters/Servo gain adjustment (page B6-63)].

Setting	Parameter set selection	Parameter No.
0	Gain set 0	7, 71, 31 to 33, 54
1	Gain set 1	120 ~ 125
2	Gain set 2	126 ~ 131
3	Gain set 3	132 ~ 137

(12) Stop mode

The servo can be turned OFF automatically at a fixed time after completion of positioning, for power saving.

Time setting is performed with parameter No. 36 to 38 Automatic servo OFF delay time 1 to 3, enabling three time options to be selected.

Servo motor specification and DC brush-less motor specification allow selection from 0 to 3.

Stepper motor specification allows selection from 0 to 7.

Set value	Operation after positioning complete	Selectable specifications
0	Servo ON as is	All specifications
1	After a fixed time (parameter No. 36 set value) AUTO servo OFF	All specifications
2	After a fixed time (parameter No. 37 set value) AUTO servo OFF	All specifications
3	After a fixed time (parameter No. 38 set value) AUTO servo OFF	All specifications
4	Full servo control	Stepper motor specification
5	Fixed time (parameter No. 36 set value) After full servo control, AUTO servo OFF	Stepper motor specification
6	Fixed time (parameter No. 37 set value) After full servo control, AUTO servo OFF	Stepper motor specification
7	Fixed time (parameter No. 38 set value) After full servo control, AUTO servo OFF	Stepper motor specification

Caution

- There is no holding torque during AUTO servo OFF. Take care with this setting, as the actuator will move if external force is applied.
- Do not use AUTO servo OFF when the next travel command is relative specifications (pitch feed). Misalignment may occur.
- Do not use AUTO servo OFF with push-motion operation. The pushing force will be lost.
- AUTO servo OFF does not function if operating in teaching mode with PC software.

[Full servo control method]

Holding current can be reduced by using servo control with stepper motors.

While the degree of reduction varies depending on the actuator model and load conditions, the holding current drops to about 1/2 to 1/4.

No position deviation will occur as the system maintains the servo ON status. The actual holding current can be checked using the current monitor screen within PC software.

(13) Vibration damping No.

Servo motor specification function only
Not available with direct numerical control

Suppresses vibration (resonance) of the load attached to the actuator.

Handles 3 types of vibrations.

For each vibration, 4 parameters are established and treated as 1 set.

The position table configures parameter sets that correspond to the position No. that needs vibration damping.

For details, refer to [6.2 Various Functions/Vibration damping control function (page B6-67)].

Setting	Vibration damping frequency (natural frequency)	Parameter No.
0	Normal position control (no vibration damping)	-
1	Vibration damping parameter set 1	97 ~ 100
2	Vibration damping parameter set 2	101 ~ 104
3	Vibration damping parameter set 3	105 ~ 108

This function is limited to servo motor specification actuators.

For stepper motor specification or DC brush-less motor specification actuators, this should be set to 0.

Caution

- The vibration frequency that can be suppressed (targeted natural frequency) is 0.5Hz to 30Hz.
- Vibration of the load to which vibration is induced due to the actuator connected to this controller is applicable. Other vibrations cannot be damped.
- Vibration in the same direction as the direction of movement of the actuator is applicable. Other vibration directions cannot be damped.
- Home return and push-motion operation are not applicable.
- If the vibration frequency setting is low, the tact time may increase. At less than about 6 Hz, the positioning convergence time will be over 150ms.

(14) Drive torque limit [%] / Push speed [mm/s]

The expansion function can be switched by setting parameter No. 191 "Position data expansion function setting".

Parameter No.191 set value	Available expansion functions
0	Not displayed (disabled)
1	Drive torque limit
2	Push speed

Drive torque limit : Sets the travel current limit value during position travel. [%]
Push speed : Sets the push speed for push-motion operation. [mm/s]

Warning

- The drive torque limit function changes the output of the actuator.
- The actuator may display unexpected behavior depending on the application, setting, operation and control.
- This indicates a potentially hazardous situation which, if the product is not handled correctly, could result in death or serious injury. Make sure that safety is ensured and operation is stable before use.

[Examples of unexpected behavior]

■ When mounted vertically and used in applications where the workpiece is moved vertically
If the "drive torque limit" is set too low, not only does it become impossible to move the workpiece, but the unit stops and becomes unable to support the workpiece, which may cause it to fall.

■ When a travel command to a position number is given while moving to a different position number
When the "drive torque limit" of the position number commanded afterward is high, the unit may suddenly start moving.

(15) Connection No.

After completing travel, this sets the position No. to continue traveling.
If "wait time" is not set, this function will be disabled.

This function is subject to the following precautions. Be sure to check before use.

(1) AUTO/MANU mode

- This function can only be enabled in AUTO mode. When performing continuous operation with PC software, use the easy programming function.

(2) Gateway operation mode

- In simple direct mode, this function is disabled.
- An alarm is generated when a position number exceeding the maximum number of positions according to the operation mode of the gateway unit is set as the connection destination during position linking travel.
- An alarm is generated when the operation mode of the gateway unit is changed to a mode with fewer position numbers, if the linked position numbers are out of range during position linking travel after position data editing.

(3) Position linking operation

- If the destination is set so that the linked positions are looped, operation will continue endlessly.
  For example, if a multi-rotation specification rotary actuator is set to repeat incremental movement in index mode, it continues to rotate.
- Set appropriate wait times, etc., in order not to exceed the duty limit.
- Also, when operating endlessly, position travel will not be completed.
  In order to stop the unit, pause it by turning ON pause signal STP, then input reset signal RES and perform remaining travel distance cancel or turn OFF the servo.
- When a travel command is issued to the linked position, the cycle time displayed on the tool is added up to the command complete signal MEND output of the travel complete position including the wait time.
  Also, when looping a linked destination position, the cycle time continues to be added.
  When the counter upper limit value is exceeded, the count will start again from 0.000 sec.

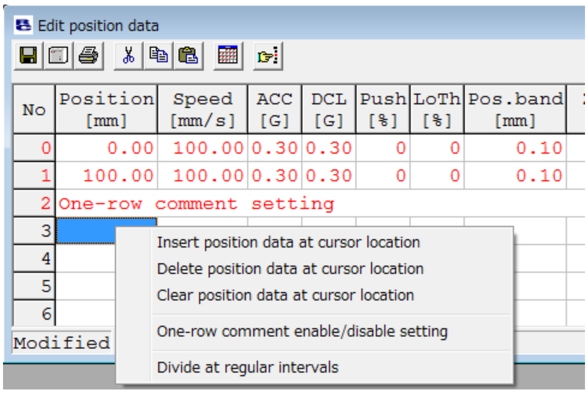
(16) Wait time [s]
After completing travel, this sets the standby time until the next position No. operation starts. Enabled only when "Connection No." is set.

This function can only be enabled in AUTO mode. When performing continuous operation with PC software, use the easy programming function.

(17) Comments
Up to 20 alphanumeric characters can be input.
Input comments are saved to the controller.

(18) 1-line comment
Up to 56 alphanumeric characters can be input.

Right-clicking on the position data and enabling [One-row comment enable/disable setting] will allow you to enter 1-line comments. Disabling it will clear any comment you have entered.



No	Position [mm]	Speed [mm/s]	ACC [G]	DCL [G]	Push [%]	LoTh [%]	Pos.band [mm]
0	0.00	100.00	0.30	0.30	0	0	0.10
1	100.00	100.00	0.30	0.30	0	0	0.10
2	One-row comment setting						
3							
4							
5							
6							

To edit a comment, type in the comment to display the setting screen. Enter a comment on the setting screen and click OK.

Direct numerical control mode assignment

Assigning the direct numerical control mode is as follows.
Set the current limit value in push-motion, acceleration/deceleration and speed within the range of the applicable actuator specifications, and set the target position data within the software stroke range.

Setting units: Current limit value = 1%, Acceleration/deceleration = 0.01 G, Speed = 1.0 mm/s or 0.1 mm/s, Position data/Positioning width = 1/100 mm

PLC output = Axis control signal
Address *

CC-Link, CC-Link IE Field	DeviceNet	PROFIBUS-DP, EtherNet/IP, EtherCAT	PROFINET-IO	1 word = 16 bits															
				b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
RWw m+0	n + 0	(High byte) n + 0 (Low byte) n + 1	p+0																
				Specified position data (signed integer)															
RWw m+1	n + 1	n + 2 n + 3																	
				Specified position data (signed integer)															
RWw m+2	n + 2	n + 4 n + 5		32,768	16,384	8,192	4,096	2,048	1,024	512	256	128	64	32	16	8	4	2	1
				Positioning width															
RWw m+3	n + 3	n + 6 n + 7		–	–	–	–	–	–	–	–	–	–	–	–	524,288	262,144	131,072	65,536
				Positioning width															
RWw m+4	n + 4	n + 8 n + 9	p+1	32,768	16,384	8,192	4,096	2,048	1,024	512	256	128	64	32	16	8	4	2	1
				Speed															
RWw m+5	n + 5	n + 10 n + 11		32,768	16,384	8,192	4,096	2,048	1,024	512	256	128	64	32	16	8	4	2	1
				Acceleration/deceleration															
RWw m+6	n + 6	n + 12 n + 13		–	–	–	–	–	–	–	256	128	64	32	16	8	4	2	1
				Pushing current limit value															
RWw m+7	n + 7	n + 14 n + 15	From next word p+2	BKRL	INC	DIR	PUSH	–	–	–	JOG+	JOG-	JVEL	JISL	SON	RES	STP	HOME	CSTR
				Control signal															

* m is the head register address of each axis. n is the head relative address of each axis.
p is the head module address of each axis.
CC-Link, CC-Link IE Field, and DeviceNet have word addresses, PROFIBUS-DP, EtherNet/IP, and EtherCAT use byte addresses, and PROFINET-IO uses 4-word module addresses.

PLC input = Axis status signal

Address [1]

CC-Link, CC-Link IE Field	DeviceNet	PROFIBUS-DP, EtherNet/IP, EtherCAT	PROFINET-IO	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
RWr m+0	n + 0	(High byte) n + 0 (Low byte) n + 1	p+0																
				Present position data (signed integer)															
RWr m+1	n + 1	n + 2 n + 3																	
				Present position data (signed integer)															
RWr m+2	n + 2	n + 4 n + 5																	
				Present current value [2] (signed integer)															
RWr m+3	n + 3	n + 6 n + 7																	
				Present current value [2] (signed integer)															
RWr m+4	n + 4	n + 8 n + 9	p+1	32,768	16,384	8,192	4,096	2,048	1,024	512	256	128	64	32	16	8	4	2	1
				Present speed															
RWr m+5	n + 5	n + 10 n + 11		–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
				(Not available)															
RWr m+6	n + 6	n + 12 n + 13																	
				Alarm code															
RWr m+7	n + 7	n + 14 n + 15	(From next word p+2)	EMGS	CRDY	ZONE2	ZONE1	–	–	–	MEND	ALML	–	PSFL	SV	ALM	MOVE	HEND	PEND
				Status signal															

1 word = 16 bits

*1 m is the head register address of each axis. n is the head relative address of each axis. p is the head module address of each axis. CC-Link, CC-Link IE Field, and DeviceNet have word addresses, PROFIBUS-DP, EtherNet/IP, and EtherCAT use byte addresses, and PROFINET-IO uses 4-word module addresses.

*2 The present current value should be the command current value for the stepper motor and be the feedback current value for the AC servomotor (including AC servomotor connected to SCON-CB).

Note: The maximum number of connectable axes in CC-Link and CC-Link IE Field should be 16 axes. For others, the maximum number of connectable axes should be eight axes.

[I/O Signal List] Direct numerical control mode (ON = corresponding bit is "1", OFF = corresponding bit is "0")

Signal type		Bit	Signal name	Content	Details
PLC output	Position specified data	32-bit data	–	32-bit signed integer (unit: 0.01 mm; 0.001° for DD motor). Ex) For +25.40 mm, specify as 2540. ● The maximum set value is +9,999.99 mm = 999999. ● Set the position data within the software stroke range. ● For negative numbers, specify with 2's complement when input is made in a hexadecimal number.	Page A3-124
	Positioning width	32-bit data	–	32-bit integer (unit: 0.01 mm; 0.001° for DD motor). Ex) For +25.40 mm, specify as 2540. ● Set the position data within the software stroke range. ● Specify the direction of push-motion operation with DIR. ● Note that when the specified positioning width data is not set, the parameter No.10 "Positioning width initial value" will not be applied.	Page A3-124
	Speed	16-bit data	–	16-bit integer (unit: 1.0 mm/s or 0.1 mm/s). Ex) For 200mm/s, specify as 200 when unit = 1.0mm/s ● If the speed is not set or set as "0", it will remain stopped. Alarm will not be triggered. If the speed is changed by setting to "0" during travel, it will decelerate and stop. ● The unit can be switched with the gateway parameter configuration tool. (It is set to 1.0 mm/s by default.)	Page A3-124
	Acceleration/ deceleration	16-bit data	–	16-bit integer (unit: 0.01G). Ex) When setting at 0.20 G, specify as 20. ● Note that when the acceleration/deceleration is not set, the parameter No.9 "Acceleration/deceleration initial value" will not be applied. ● The acceleration and deceleration cannot be individually set. They will be set together as acceleration/deceleration.	Page A3-124

[I/O Signal List] Direct numerical control mode (ON = corresponding bit is "1", OFF = corresponding bit is "0")

Signal type		Bit	Signal name	Content	Details
PLC output	Pushing current limit value	16-bit data	–	Set the current limit value in push-motion operation. (Unit %) The setting range is 0 to 200%, where 255 = 100% and 510 = 200%. Ex) To set to 50%, specify 255 × 50% = 127.	Page A3-124
	Control signal	b15	BKRL	Forced brake release	3.8 [15]
		b14	INC	Incremental [OFF: absolute position command, ON: relative position command]	3.8 [20]
		b13	DIR	Specified push direction [ON : travel in home reverse direction, OFF: travel in home direction] (Note) This signal is enabled when CON push-motion method is selected.	3.8 [17]
		b12	PUSH	Push-motion specification [ON: push-motion operation, OFF: positioning operation]	3.8 [16]
		b11	–	Not available	–
		b10			
		b9			
		b8	JOG+	+Jog [ON: travel in home reverse direction, OFF: Stop]	3.8 [10]
		b7	JOG-	-Jog [ON: travel in home direction, OFF: Stop]	
		b6	JVEL	Jog velocity/inching distance switchover [OFF: Uses RCON parameter No. 26 "Jog velocity" and No. 48 "Inching setting value" ON: Uses RCON parameter No. 47 "Jog velocity 2 setting value or command vel. setting value" (Note 1) and No. 49 "Inching 2 setting value"]	3.8 [11]
		b5	JISL	Jog/Inching switching [ON: Inching, OFF: Jog]	3.8 [12]
		b4	SON	Servo ON command [ON: Servo ON, OFF: Servo OFF]	3.8 [5]
		b3	RES	Reset [ON to execute reset]	3.8 [4]
		b2	STP	Pausing [ON: Pause, OFF: Pause cancel]	3.8 [8]
		b1	HOME	Home return [ON to execute home return command. Even when turned OFF midway, it will run until completion]	3.8 [6]
		b0	CSTR	Positioning start [ON to execute travel command. Even when turned OFF midway, it will run until completion]	3.8 [7]

Note 1: When command speed setting = 0: operates at the value of RCON parameter No. 47 "PIO Jog velocity 2". When command speed setting ≠ 0: operates at the command speed set value.

[I/O Signal List] Direct numerical control mode (ON = corresponding bit is "1", OFF = corresponding bit is "0")

Signal type		Bit	Signal name	Content	Details
PLC input	Present position data	32-bit data	–	Present position data is output in 32-bit signed integer (unit: 0.01mm and 0.001deg for DD motor). Ex) For +25.4 mm, it will be 2540. ● For negative numbers, 2′s complement will be displayed when reading is made in a hexadecimal number.	Page A3-124
	Present current value (Note 1)	32-bit data	–	Motor command current value data is output in 32-bit signed integer (unit: mA). Ex) For +1A (+1000mA), it will be 1000. ● For negative numbers, 2′s complement will be displayed when reading is made in a hexadecimal number.	Page A3-124
	Present speed	16-bit data	–	Output in 16-bit integer (unit: 1.0 mm/s or 0.1 mm/s). Change the unit using the gateway parameter configuration tool. Ex) For 125mm/s, 1,250 will be displayed when unit = 1.0mm/s ● It should be 2's complement when operating in negative direction.	Page A3-124
	Alarm code	16-bit data	–	Outputs the currently generated alarm code. (ALM is ON.) For the alarm contents, refer to [Maintenance Section Chapter 2 Troubleshooting]. Note that this is not the same as the simple alarm code.	Page A3-124
	Status signal	b15	EMGS	Emergency stop status [ON: Emergency stop status]	3.8 [2]
		b14	CRDY	Controller ready [ON: Ready]	3.8 [1]
		b13	ZONE2	Zone output monitor 2 [ON: Present position is within the setting range of zone 2, OFF: Limit position is not within the setting range]	3.8 [9]
		b12	ZONE1	Zone output monitor 1 [ON: Present position is within the setting range of zone 1, OFF: Limit position is not within the setting range]	
		b11	–	Not available.	–
		b10			
		b9			
		b8	MEND	Command complete [ON: When in positioning complete, push-motion complete or idling status after travel, OFF: Travel start or servo OFF]	3.8 [19]
		b7	ALML	Minor malfunction alarm output [ON: When overload warning or message level alarm occurs]	3.8 [21]
		b6	–	Not available	–

Note 1 The present current value should be the command current value for the stepper motor and be the feedback current value for the AC servomotor (including AC servomotor connected to SCON-CB).

[I/O Signal List] Direct numerical control mode (ON = corresponding bit is "1", OFF = corresponding bit is "0")

Signal type		Bit	Signal name	Content	Details
PLC input	Status signal	b5	PSFL	Push-motion operation contactless [ON: push-motion operation completed contactless]	3.8 [18]
		b4	SV	Operation ready [ON: Operation ready (Servo ON)]	3.8 [5]
		b3	ALM	Alarm [ON: Alarm generated, OFF: No alarm]	3.8 [3]
		b2	MOVE	Traveling [ON: Traveling, OFF: Stopped]	3.8 [6] [7]
		b1	HEND	Home return complete [ON: Maintaining home after home return complete]	3.8 [6]
		b0	PEND	Positioning complete [ON : After completion, stopped at servo ON, OFF: For contactless push-motion, stopped at servo OFF]	3.8 [5] ~ [7]

Simple direct mode assignment

Assigning the simple direct mode is as follows.

PLC output = Axis control signal

Address *

CC-Link, CC-Link IE Field	DeviceNet	PROFIBUS-DP, EtherNet/IP, EtherCAT	PROFINET-IO	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	
RWw m + 0	n + 0	(High byte) n + 0 (Low byte) n + 1	p+0																	Specified position data (signed integer)
RWw m + 1	n + 1	n + 2 n + 3																		Specified position data (signed integer)
RWw m + 2	n + 2	n + 4 n + 5		-	-	-	-	-	-	-	-	-	PC64	PC32	PC16	PC8	PC4	PC2	PC1	Command position No.
RWw m + 3	n + 3	n + 6 n + 7	From next word p+1	BKRL	-	-	-	-	-	-	JOG+	JOG-	JVEL	JISL	SON	RES	STP	HOME	CSTR	Control signal

1 word = 16 bits

PLC input = Axis status signal

Address *

CC-Link, CC-Link IE Field	DeviceNet	PROFIBUS-DP, EtherNet/IP, EtherCAT	PROFINET-IO	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0	
RWr m + 0	n + 0	(High byte) n + 0 (Low byte) n + 1	p+0																	Present position data (signed integer)
RWr m + 1	n + 1	n + 2 n + 3																		Present position data (signed integer)
RWr m + 2	n + 2	n + 4 n + 5		-	-	-	-	-	-	-	-	-	PM64	PM32	PM16	PM8	PM4	PM2	PM1	Completed position No.
RWr m + 3	n + 3	n + 6 n + 7	From next word p+1	EMGS	CRDY	ZONE2	ZONE1	PZONE	-	-	MEND	ALML	LOAD	PSFL	SV	ALM	MOVE	HEND	PEND	Status signal

* m is the head register address of each axis. n is the head relative address of each axis.
p is the head module address of each axis.
CC-Link, CC-Link IE Field, and DeviceNet have word addresses, PROFIBUS-DP, EtherNet/IP, and EtherCAT use byte addresses, and PROFINET-IO uses 4-word module addresses.

[I/O Signal List] Simple direct mode (ON = corresponding bit is "1", OFF = corresponding bit is "0")

Signal type		Bit	Signal name	Content	Details
PLC output	Position specified data	32-bit data	–	32-bit signed integer (unit: 0.01 mm; 0.001° for DD motor). Ex) For +25.40 mm, set as 2540. ● The maximum set value is +9,999.99 mm = 999999. ● For negative numbers, specify with 2′s complement when input is made in a hexadecimal number.	Page A3-126
	Command position No.	b6-b0	PC**	The travel data not specified by the position data are set in the position table. This position No. will be specified in binary.	Page A3-126
	Control signal	b15	BKRL	Forced brake release [ON: forced brake, OFF: brake enabled]	3.8 [15]
		b14	–	Not available	–
		b13			
		b12			
		b11			
		b10			
		b9			
		b8	JOG+	+Jog [ON: travel in home reverse direction, OFF: Stop]	3.8 [10]
		b7	JOG-	-Jog [ON: travel in home direction, OFF: Stop]	
		b6	JVEL	Jog velocity/inching distance switchover [OFF: Use RCON parameter No. 26 "Jog velocity" and No. 48 "Inching set value" ON : Use RCON parameter No. 47 "Jog velocity 2" and No. 49 "Inching 2 set value"]	3.8 [11]
		b5	JISL	Jog/Inching switching [ON: Inching, OFF: Jog]	3.8 [12]
		b4	SON	Servo ON [ON: Servo ON, OFF: Servo OFF]	3.8 [5]
		b3	RES	Reset [ON to execute reset]	3.8 [4]
		b2	STP	Pausing [ON: Pause, OFF: Pause cancel]	3.8 [8]
		b1	HOME	Home return [ON to execute home return command. Even when turned OFF midway, it will run until completion]	3.8 [6]
		b0	CSTR	Positioning start [ON to execute travel command. Even when turned OFF midway, it will run until completion]	3.8 [7]

[I/O Signal List] Simple direct mode (ON = corresponding bit is "1", OFF = corresponding bit is "0")

Signal type		Bit	Signal name	Content	Details
PLC input	Present position data	32-bit data	–	32-bit signed integer (unit: 0.01 mm; 0.001° for DD motor). Ex) For +25.40 mm, outputs as 2540. ● The maximum output value is +9,999.99 mm = 999999. ● For negative numbers, 2′s complement will be displayed when reading is made in a hexadecimal number.	Page A3-126
	Complete position No.	b6-b0	PM**	Reads the completed position No. in binary. Outputs the simple alarm code while alarm is generated. (Maintenance Section 2.4 Driver Unit/Simple Absolute Unit Alarm Causes and Countermeasures/Simple Alarm Codes)	Page A3-126
	Status signal	b15	EMGS	Emergency stop status [ON: Emergency stop status]	3.8 [2]
		b14	CRDY	Controller ready [ON: Ready]	3.8 [1]
		b13	ZONE2	Zone output monitor 2 [ON : Present position is within the setting range of zone 2, OFF: Limited position is not within the setting range]	3.8 [9]
		b12	ZONE1	Zone output monitor 1 [ON : Present position is within the setting range of zone 1, OFF: Limited position is not within the setting range]	
		b11	PZONE	Position zone output monitor [ON when the present position is within the position zone setting]	
		b10	–	Not available.	–
		b9			
		b8	MEND	Command complete [ON : When in positioning complete, push-motion complete or idling status after travel, OFF: Travel start or servo OFF]	3.8 [19]
		b7	ALML	Minor malfunction alarm output [ON: When overload warning or message level alarm occurs]	3.8 [21]
		b6	LOAD	Load output judgment status [ON: When collision is detected]	3.8 [22]
		b5	PSFL	Push-motion operation contactless [ON: push-motion operation completed contactless]	3.8 [18]
		b4	SV	Operation ready [ON: Operation ready (Servo ON)]	3.8 [5]
		b3	ALM	Alarm [ON: Alarm generated, OFF: No alarm]	3.8 [3]
		b2	MOVE	Traveling [ON: Traveling, OFF: Stopped]	3.8 [6] [7]

[I/O Signal List] Simple direct mode (ON = corresponding bit is "1", OFF = corresponding bit is "0")

Signal type		Bit	Signal name	Content	Details
PLC input	Status signal	b1	HEND	Home return complete [ON: Maintaining home after home return complete]	3.8 [6]
		b0	PEND	Positioning complete [ON : After completion, stopped at servo ON, OFF: For contactless push-motion, stopped at servo OFF]	3.8 [5] ~ [7]

Positioner 1 mode assignment

Assigning the positioner 1 mode is as follows.

PLC output = Axis control signal
Address *

1 word = 16 bits

CC-Link, CC-Link IE Field	DeviceNet	PROFIBUS-DP, EtherNet/IP, EtherCAT	PROFINET-IO	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
RWw m + 0	n + 0	(High byte) n + 0 (Low byte) n + 1	p+0																
				(Not available)															
RWw m + 1	n + 1	n + 2 n + 3																	
				(Not available)															
RWw m + 2	n + 2	n + 4 n + 5		-	-	-	-	-	-	-	-	-	PC64	PC32	PC16	PC8	PC4	PC2	PC1
				Command position No.															
RWw m + 3	n + 3	n + 6 n + 7	From next word p+1	BKRL	-	-	-	-	MODE	PWRT	JOG+	JOG-	JVEL	JISL	SON	RES	STP	HOME	CSTR
				Control signal															

PLC input = Axis status signal
Address *

CC-Link, CC-Link IE Field	DeviceNet	PROFIBUS-DP, EtherNet/IP, EtherCAT	PROFINET-IO	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
RWr m + 0	n + 0	(High byte) n + 0 (Low byte) n + 1	p+0																
				Present position data (signed integer)															
RWr m + 1	n + 1	n + 2 n + 3																	
				Present position data (signed integer)															
RWr m + 2	n + 2	n + 4 n + 5		-	-	-	-	-	-	-	-	-	PM64	PM32	PM16	PM8	PM4	PM2	PM1
				Completed position No.															
RWr m + 3	n + 3	n + 6 n + 7	From next word p+1	EMGS	CRDY	ZONE2	ZONE1	PZONE	MODES	WEND	MEND	ALML	LOAD	PSFL	SV	ALM	MOVE	HEND	PEND
				Status signal															

* m is the head register address of each axis. n is the head relative address of each axis.
p is the head module address of each axis.
CC-Link, CC-Link IE Field, and DeviceNet have word addresses, PROFIBUS-DP, EtherNet/IP, and EtherCAT use byte addresses, and PROFINET-IO uses 4-word module addresses.

[I/O Signal List] Positioner 1/2 mode (ON = corresponding bit is "1", OFF = corresponding bit is "0")

Signal type		Bit	Signal name	Content	Details
PLC output	Command position No.	b6-b0	PC**	Specifies the command position No. in binary.	Page A3-126
	Control signal	b15	BKRL	Forced brake release [ON: forced brake, OFF: brake enabled]	3.8 [15]
		b14	–	Not available	–
		b13			
		b12			
		b11			
		b10	MODE	Teaching mode command [OFF: Normal operation mode, ON: Teaching mode]	3.8 [13]
		b9	PWRT	Position data import command [ON: Position data import]	3.8 [14]
		b8	JOG+	+Jog [ON: travel in home reverse direction, OFF: Stop]	3.8 [10]
		b7	JOG-	-Jog [ON: travel in home direction, OFF: Stop]	
		b6	JVEL	Jog velocity/inching distance switchover [OFF: Use RCON parameter No. 26 Jog velocity and No. 48 Inching set value ON : Use RCON parameter No. 47 Jog velocity 2 and No. 49 Inching 2 set value]	3.8 [11]
		b5	JISL	Jog/Inching switching [ON: Inching, OFF: Jog]	3.8 [12]
		b4	SON	Servo ON [ON: Servo ON, OFF: Servo OFF]	3.8 [5]
		b3	RES	Reset [ON to execute reset]	3.8 [4]
		b2	STP	Pausing [ON: Pause, OFF: Pause cancel]	3.8 [8]
		b1	HOME	Home return [ON to execute home return command. Even when turned OFF midway, it will run until completion]	3.8 [6]
		b0	CSTR	Positioning start [ON to execute travel command. Even when turned OFF midway, it will run until completion]	3.8 [7]

[I/O Signal List] Positioner 1/2 mode (ON = corresponding bit is "1", OFF = corresponding bit is "0")

Signal type		Bit	Signal name	Content	Details
PLC input	Present position data	32-bit data	–	32-bit signed integer (unit: 0.01 mm; 0.001° for DD motor). Ex) For +25.40 mm, outputs as 2540. ● The maximum output value is +9,999.99 mm = 999999. ● For negative numbers, 2′s complement will be displayed when reading is made in a hexadecimal number.	Page A3-126
	Complete position No.	b6-b0	PM**	Reads the completed position No. in binary. Outputs the simple alarm code while alarm is generated. [Refer to Pg. C2-11]	Page A3-126
	Status signal	b15	EMGS	Emergency stop status [ON: Emergency stop status]	3.8 [2]
		b14	CRDY	Controller ready [ON: Ready]	3.8 [1]
		b13	ZONE2	Zone output monitor 2 [ON : Present position is within the setting range of zone 2, OFF: Limited position is not within the setting range]	3.8 [9]
		b12	ZONE1	Zone output monitor 1 [ON : Present position is within the setting range of zone 1, OFF: Limited position is not within the setting range]	
		b11	PZONE	Position zone output monitor [ON when the present position is within the position zone setting]	
		b10	MODES	Teaching mode status [ON for teaching mode]	3.8 [13]
		b9	WEND	Position data import complete [ON when position data import completes]	3.8 [14]
		b8	MEND	Command complete [ON : When in positioning complete, push-motion complete or idling status after travel, OFF: Travel start or servo OFF]	3.8 [19]
		b7	ALML	Minor malfunction alarm output [ON: When overload warning or message level alarm occurs]	3.8 [21]
		b6	LOAD	Load output judgment status [ON: When collision is detected]	3.8 [22]
		b5	PSFL	Push-motion operation contactless [ON: push-motion operation completed contactless]	3.8 [18]
		b4	SV	Operation ready [ON: Operation ready (Servo ON)]	3.8 [5]
		b3	ALM	Alarm [ON: Alarm generated, OFF: No alarm]	3.8 [3]
		b2	MOVE	Traveling [ON: Traveling, OFF: Stopped]	3.8 [6] [7]
		b1	HEND	Home return complete [ON: Maintaining home after home return complete]	3.8 [6]
		b0	PEND	Positioning complete [ON : After completion, stopped at servo ON, OFF: For contactless push-motion, stopped at servo OFF]	3.8 [5] ~ [7]

Positioner 2 mode assignment

Assigning the positioner 2 mode is as follows.

PLC output = Axis control signal

Address *

1 word = 16 bits

CC-Link, CC-Link IE Field	DeviceNet	PROFIBUS-DP, EtherNet/IP, EtherCAT	PROFINET-IO	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
RWw m + 0	n + 0	(High byte) n + 0 (Low byte) n + 1	p+0	–	–	–	–	–	–	–	–	–	PC64	PC32	PC16	PC8	PC4	PC2	PC1
				Command position No.															
RWw m + 1	n + 1	n + 2 n + 3	The word which is four words ahead is p+1	BKRL	–	–	–	–	MODE	PWRT	JOG+	JOG-	JVEL	JISL	SON	RES	STP	HOME	CSTR
				Control signal															

PLC input = Axis status signal

Address *

CC-Link, CC-Link IE Field	DeviceNet	PROFIBUS-DP, EtherNet/IP, EtherCAT	PROFINET-IO	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
RWr m + 0	n + 0	(High byte) n + 0 (Low byte) n + 1	p+0	–	–	–	–	–	–	–	–	–	PM64	PM32	PM16	PM8	PM4	PM2	PM1
				Completed position No.															
RWr m + 1	n + 1	n + 2 n + 3	The word which is four words ahead is p+1	EMGS	CRDY	ZONE2	ZONE1	PZONE	MODES	WEND	MEND	ALML	LOAD	PSFL	SV	ALM	MOVE	HEND	PEND
				Status signal															

* m is the head register address of each axis. n is the head relative address of each axis.
p is the head module address of each axis.
CC-Link, CC-Link IE Field, and DeviceNet have word addresses, PROFIBUS-DP, EtherNet/IP, and EtherCAT use byte addresses, and PROFINET-IO uses 4-word module addresses.

I/O signal list and alarm content list are all the same except for "Present position data" in positioner 1 mode. In positioner 1 mode, the "Present position data" is included in the PLC input signal. It is not included in positioner 2 mode. Refer to pages A3-77 to A3-79.

Positioner 3 mode assignment

Assigning the positioner 3 mode is as follows.

PLC output = Axis control signal

Address *

CC-Link, CC-Link IE Field	DeviceNet	PROFIBUS-DP, EtherNet/IP, EtherCAT	PROFINET-IO
RWw m + 0	n + 0	(High byte) n + 0 (Low byte) n + 1	p+0

1 word = 16 bits

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
BKRL	–	–	SON	RES	STP	HOME	CSTR	–	PC64	PC32	PC16	PC8	PC4	PC2	PC1
Control signal								Command position No.							

PLC input = Axis status signal

Address *

CC-Link, CC-Link IE Field	DeviceNet	PROFIBUS-DP, EtherNet/IP, EtherCAT	PROFINET-IO
RWr m + 0	n + 0	(High byte) n + 0 (Low byte) n + 1	p+0

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
EMGS	ZONEI	PSFL	SV	ALM	MOVE	HEND	PEND	–	PM64	PM32	PM16	PM8	PM4	PM2	PM1
Status signal								Completed position No.							

* m is the head register address of each axis. n is the head relative address of each axis. p is the head module address of each axis. CC-Link, CC-Link IE Field, and DeviceNet have word addresses, PROFIBUS-DP, EtherNet/IP, and EtherCAT use byte addresses, and PROFINET-IO uses 4-word module addresses.

[I/O Signal List] Positioner 3 mode (ON = corresponding bit is "1", OFF = corresponding bit is "0")

Signal type		Bit	Signal name	Content	Details
PLC output	Control signal	b15	BKRL	Forced brake release [ON: forced brake, OFF: brake enabled]	3.8 [15]
		b14	–	Not available	–
		b13			
		b12	SON	Servo ON [ON: Servo ON, OFF: Servo OFF]	3.8 [5]
		b11	RES	Reset [ON to execute reset]	3.8 [4]
		b10	STP	Pausing [ON: Pause, OFF: Pause cancel]	3.8 [8]
		b9	HOME	Home return [ON to execute home return command. Even when turned OFF midway, it will run until completion]	3.8 [6]
		b8	CSTR	Positioning start [ON to execute travel command. Even when turned OFF midway, it will run until completion]	3.8 [7]
	Command position No.	b7	–	Not available	–
		b6-b0	PC**	Specifies the command position No. in binary.	Page A3-128

[I/O Signal List] Positioner 3 mode (ON = corresponding bit is "1", OFF = corresponding bit is "0")

Signal type		Bit	Signal name	Content	Details
PLC input	Status signal	b15	EMGS	Emergency stop status [ON: Emergency stop status]	3.8 [2]
		b14	ZONE1	Zone output monitor 1 [ON : Present position is within the setting range of zone 1, OFF: Limited position is not within the setting range]	3.8 [9]
		b13	PSFL	Push-motion operation contactless [ON: push-motion operation completed contactless]	3.8 [18]
		b12	SV	Operation ready [ON: Operation ready (Servo ON)]	3.8 [5]
		b11	ALM	Alarm [ON: Alarm generated, OFF: No alarm]	3.8 [3]
		b10	MOVE	Traveling [ON: Traveling, OFF: Stopped]	3.8 [6] [7]
		b9	HEND	Home return complete [ON: Maintaining home after home return complete]	3.8 [6]
		b8	PEND	Positioning complete [ON : After completion, stopped at servo ON, OFF: For contactless push-motion, stopped at servo OFF]	3.8 [5] ~ [7]
	Complete position No.	b7	–	Not available	–
		b6-b0	PM**	Reads the completed position No. in binary. Outputs the simple alarm code while alarm is generated. [Refer to Pg. C2-11]	Page A3-128

Positioner 5 mode assignment

Assigning the positioner 5 mode is as follows.

PLC output = Axis control signal

Address *

1 word = 16 bits

CC-Link, CC-Link IE Field	DeviceNet	PROFIBUS-DP, EtherNet/IP, EtherCAT	PROFINET-IO	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
RWw m + 0	n + 0	(High byte) n + 0 (Low byte) n + 1	p+0	–	–	–	–	–	–	–	–	–	–	–	–	PC8	PC4	PC2	PC1
				Command position No.															
RWw m + 1	n + 1	n + 2 n + 3	The word which is four words ahead is p+1	BKRL	–	–	–	–	–	–	JOG+	JOG-	JVEL	JISL	SON	RES	STP	HOME	CSTR
				Control signal															

PLC input = Axis status signal

Address *

CC-Link, CC-Link IE Field	DeviceNet	PROFIBUS-DP, EtherNet/IP, EtherCAT	PROFINET-IO	b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
RWr m + 0	n + 0	(High byte) n + 0 (Low byte) n + 1	p+0																
				Present position data (signed integer)															
RWr m + 1	n + 1	n + 2 n + 3	The word which is four words ahead is p+1	EMGS	CRDY	ZONE2	ZONE1	PM8	PM4	PM2	PM1	MEND	ALML	PSFL	SV	ALM	MOVE	HEND	PEND
				Status signal/completed position No.															

* m is the head register address of each axis. n is the head relative address of each axis.
p is the head module address of each axis.
CC-Link, CC-Link IE Field, and DeviceNet have word addresses, PROFIBUS-DP, EtherNet/IP, and EtherCAT use byte addresses, and PROFINET-IO uses 4-word module addresses.

Caution

- The maximum present position data that can be output in positioner 5 mode is 3,276.7 mm (327.67° for DD motor).
- If the maximum value is exceeded, the present position data will not be correctly output.
  This may lead to display or operation malfunction, resulting in personal injury or device damage.
- For use in an operation range exceeding the maximum value, select a different operation mode.

[I/O Signal List] Positioner 5 mode (ON = corresponding bit is "1", OFF = corresponding bit is "0")

Signal type		Bit	Signal name	Content	Details
PLC output	Command position No.	b3-b0	PC**	Specifies the command position No. in binary.	Page A3-128
	Control signal	b15	BKRL	Forced brake release [ON: forced brake, OFF: brake enabled]	3.8 [15]
		b14	–	Not available	–
		b13			
		b12			
		b11			
		b10			
		b9			
		b8	JOG+	+Jog [ON : travel in home reverse direction, OFF: Stop]	3.8 [10]
		b7	JOG-	-Jog [ON: travel in home direction, OFF: Stop]	
		b6	JVEL	Jog velocity/inching distance switchover [OFF: Use RCON parameter No. 26 Jog velocity and No. 48 Inching set value ON : Use RCON parameter No. 47 Jog velocity 2 and No. 49 Inching 2 set value]	3.8 [11]
		b5	JISL	Jog/Inching switching [ON: Inching, OFF: Jog]	3.8 [12]
		b4	SON	Servo ON [ON: Servo ON, OFF: Servo OFF]	3.8 [5]
		b3	RES	Reset [ON to execute reset]	3.8 [4]
		b2	STP	Pausing [ON: Pause, OFF: Pause cancel]	3.8 [8]
		b1	HOME	Home return [ON to execute home return command. Even when turned OFF midway, it will run until completion]	3.8 [6]
		b0	CSTR	Positioning start [ON to execute travel command. Even when turned OFF midway, it will run until completion]	3.8 [7]

[I/O Signal List] Positioner 5 mode (ON = corresponding bit is "1", OFF = corresponding bit is "0")

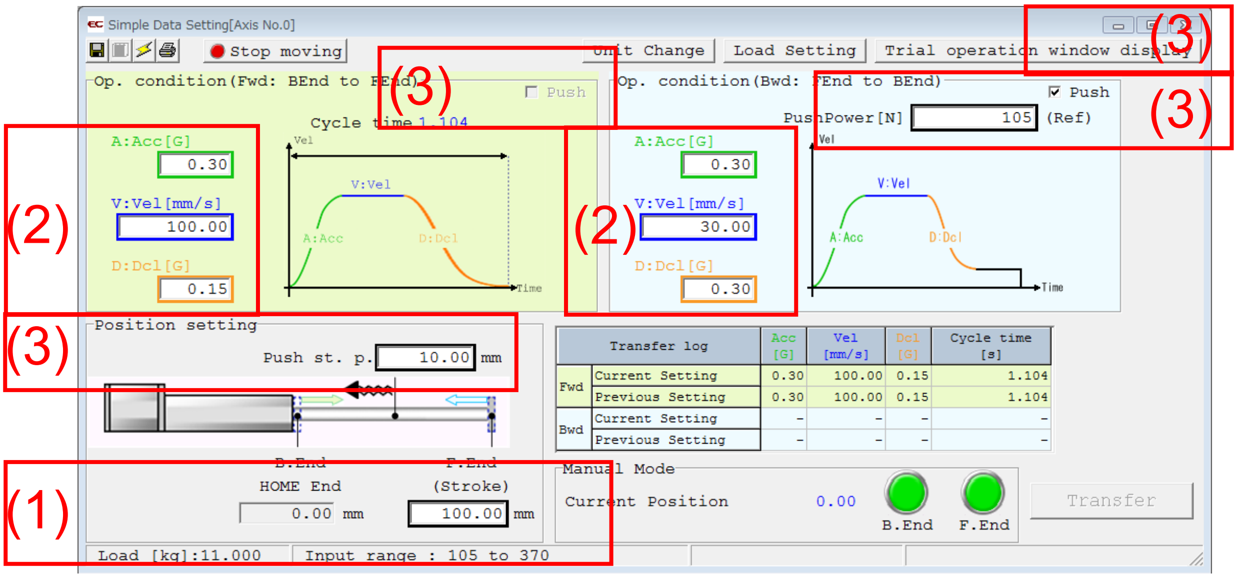
Signal type		Bit	Signal name	Content	Details
PLC input	Present position	16 bits	–	16-bit signed integer (unit: 0.1 mm; 0.01° for DD motor). Ex) For +25.40 mm, outputs as 254. ● The maximum output value is +3,276.7 mm = 32767. ● For negative numbers, 2's complement will be displayed when reading is made in a hexadecimal number.	Page A3-128
	Status signal, complete position No.	b15	EMGS	Emergency stop status [ON: Emergency stop status]	3.8 [2]
		b14	CRDY	Controller ready [ON: Ready]	3.8 [1]
		b13	ZONE2	Zone output monitor 2 [ON : Present position is within the setting range of zone 2, OFF: Limited position is not within the setting range]	3.8 [9]
		b12	ZONE1	Zone output monitor 1 [ON : Present position is within the setting range of zone 1, OFF: Limited position is not within the setting range]	
		b11-b8	PM**	Reads the completed position No. in binary. Outputs the simple alarm code while alarm is generated. [Refer to Maintenance Section Pg. C2-11]	Page A3-127
		b7	MEND	Command complete [ON : When in positioning complete, push-motion complete or idling status after travel, OFF: Travel start or servo OFF]	3.8 [19]
		b6	ALML	Minor malfunction alarm output [ON: When overload warning or message level alarm occurs]	3.8 [21]
		b5	PSFL	Push-motion operation contactless [ON: push-motion operation completed contactless]	3.8 [18]
		b4	SV	Operation ready [ON: Operation ready (Servo ON)]	3.8 [5]
		b3	ALM	Alarm [ON: Alarm generated, OFF: No alarm]	3.8 [3]
		b2	MOVE	Traveling [ON: Traveling, OFF: Stopped]	3.8 [6] [7]
		b1	HEND	Home return complete [ON: Maintaining home after home return complete]	3.8 [6]
		b0	PEND	Positioning complete [ON : After completion, stopped at servo ON, OFF: For contactless push-motion, stopped at servo OFF]	3.8 [5] ~ [7]

ELECYLINDER Position Table

The stop position and operating condition settings are established in ELECYLINDER at the delivery.
The stop position and the operation conditions can be adjusted with a teaching tool in the simple data setting window.

Here shows an example of a screen in the PC software (model code: RCM-101-*-*) about the position table. (The contents of display is the same for the teaching pendant)

[Simple Data Setting Window]



Op. condition(Fwd: BEnd to FEnd)
☐ Push
Cycle time 1.104
A:Acc[G] 0.30
V:Vel[mm/s] 100.00
D:Dcl[G] 0.15

Op. condition(Bwd: FEnd to BEnd)
☑ Push
PushPower[N] 105 (Ref)
A:Acc[G] 0.30
V:Vel[mm/s] 30.00
D:Dcl[G] 0.30

Position setting
Push st. p. 10.00 mm
B.End HOME End 0.00 mm
F.End (Stroke) 100.00 mm

Transfer log		Acc [G]	Vel [mm/s]	Dcl [G]	Cycle time [s]
Fwd	Current Setting	0.30	100.00	0.15	1.104
	Previous Setting	0.30	100.00	0.15	1.104
Bwd	Current Setting	-	-	-	-
	Previous Setting	-	-	-	-

Current Position 0.00

Load [kg]:11.000 Input range : 105 to 370

For how to operate on each teaching tool, refer to the instruction manuals stated below.

- PC software operating method
  Refer to [PC software (RCM-101-*-*) manual (ME0155)]
  Refer to [Guiding Features Installed in PC Teaching Software (IA-OS)]
- Teaching pendant operating method
  Refer to [Touch Panel Teaching Pendant manual TB-02/02D (ME0355)]
  Refer to [Touch Panel Teaching Pendant manual TB-03 (MJ0376)]

Caution

- Make sure to touch the “Transfer” key after setting or adjusting the data.
- Switching the screen without making a transfer, the data will go back to that before change.
  Also, without transfer, the “Manual Operation” button should not be able to activate.
- ELECYLINDER is not available for operation in the single solenoid system. Make sure to apply the double solenoid system.

---

(1) Backward End / Forward End [mm]

It is the coordinate values for positioning. Input values from the home position.
Registration is available in 0.01mm unit.

(2) Acceleration / Velocity / Deceleration

- Acceleration [% or G]
  Acceleration at the start of operation should be set in a value from 1 to 100%.
  Touch [Switch Unit] and the unit switches to G and can be registered in 0.01G unit.

- Velocity [% or mm/s]
  The velocity to perform the positioning operation should be set in a value from 1 to 100%
  If there is a check mark at "Pressing", it should be the movement speed from the movement start position (forward end or backward end) to the pressing start position.
  When the velocity is set to a value lower than the pressing speed, the pressing operation should be performed in the set velocity. The pressing speed should differ depending on the models. Refer to an instruction manual of each ELECYLINDER or a catalog for detail.
  Touch [Switch Unit] and the unit switches to mm/s and can be registered in 0.01mm/s unit.

- Deceleration [% or G]
  Deceleration at the stop of operation should be set in a value from 1 to 100%.
  If there is a check mark at "Pressing", it should be the deceleration from the movement start position (forward end or backward end) to the pressing start position.
  Touch [Switch Unit] and the unit switches to G and can be registered in 0.01G unit.

Caution

In case there is any abnormal noise, vibration or mechanical shock in operation of ELECYLINDER, revise and decrease the acceleration and deceleration.
Continuing to use without revising could cause malfunction.

(3) Pressing / Pressing Start Point / Pressing Force

- Pressing
  Selection can be made from “Positioning Operation” and “Pressing Operation”.
  When there is a check mark at “Pressing”, it should perform the pressing operation.

- Pressing Start Point [mm] *Displayed only in pressing operation
  It is the position to start the pressing operation. Input values from the home position.
  Registration is available in 0.01mm unit

- Pressing Force [% or N] *Displayed only in pressing operation
  It is the current limit value at the pressing operation. Set in a value from 20 to 70% (Note).
  Touch [Switch Unit] and input in N unit is also available.
  Note: The input range available for the pressing current limit value should differ depending on the models.
  Refer to an instruction manual of each ELECYLINDER for detail.

Caution

- The pressing force displayed in N unit is a reference.
  Refer to an instruction manual of each ELECYLINDER or a catalog for detail.
- When the pressing speed is set lower than the pressing speed of each model, the pressing force could get unstable.
  It could cause the performance not work properly.

Assignment of EC Connection Unit

The assignment of the EC connection unit should be as shown below.
The EC connection unit occupies domains for four axes (one word) even though not all of four axes are connected.

PLC output = Axis control signal
Address *

CC-Link, CC-Link IE Field	DeviceNet	PROFIBUS-DP, EtherNet/IP, EtherCAT	PROFINET-IO
RWw m+0	n+0	(High byte) n+0 (Low byte) n+1	p+0

1 word = 16 bits

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
–	RES	ST1	ST0	–	RES	ST1	ST0	–	RES	ST1	ST0	–	RES	ST1	ST0
control signal (4th Axis)				control signal (3th Axis)				control signal (2nd Axis)				control signal (1st Axis)			

PLC input = Axis status signal
Address *

CC-Link, CC-Link IE Field	DeviceNet	PROFIBUS-DP, EtherNet/IP, EtherCAT	PROFINET-IO
RWr m+0	n+0	(High byte) n+0 (Low byte) n+1	p+0

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
E3RD	*ALM	LS1/PE1	LS0/PE0	E2RD	*ALM	LS1/PE1	LS0/PE0	E1RD	*ALM	LS1/PE1	LS0/PE0	E0RD	*ALM	LS1/PE1	LS0/PE0
Status signal (4th Axis)				Status signal (3th Axis)				Status signal (2nd Axis)				Status signal (1軸目)			

* m is the head register address of each unit. n is the head relative address of each unit.
p is the head module address of each unit.
CC-Link, CC-Link IE Field, and DeviceNet have word addresses, PROFIBUS-DP, EtherNet/IP, and EtherCAT use byte addresses, and PROFINET-IO uses 4-word module addresses.

[I/O Signal List] EC Connection Unit (ON = corresponding bit is "1", OFF = corresponding bit is "0")

Signal type		Bit	Signal name	Content	Details
PLC output	Control signal (4th Axis)	b15	–	Not available	–
		b14	RES	Alarm Cancel [Alarm cancelled with on]	Page A3-117
		b13	ST1	Drive Forward [Drives forward with on (drives forward after home-return operation when home return not complete), decelerate and stop on the way with off]	Page A3-116
		b12	ST0	Drive Backward [Drives backward with on (drives backward after home-return operation when home return not complete), decelerate and stop on the way with off]	Page A3-116
	Control signal (3th Axis)	b11	–	Not available	–
		b10	RES	Alarm Cancel [Alarm cancelled with on]	Page A3-117
		b9	ST1	Drive Forward [Drives forward with on (drives forward after home-return operation when home return not complete), decelerate and stop on the way with off]	Page A3-116
		b8	ST0	Drive Backward [Drives backward with on (drives backward after home-return operation when home return not complete), decelerate and stop on the way with off]	Page A3-116
	Control signal (2nd Axis)	b7	–	Not available	–
		b6	RES	Alarm Cancel [Alarm cancelled with on]	Page A3-117
		b5	ST1	Drive Forward [Drives forward with on (drives forward after home-return operation when home return not complete), decelerate and stop on the way with off]	Page A3-116
		b4	ST0	Drive Backward [Drives backward with on (drives backward after home-return operation when home return not complete), decelerate and stop on the way with off]	Page A3-116
	Control signal (1st Axis)	b3	–	Not available	–
		b2	RES	Alarm Cancel [Alarm cancelled with on]	Page A3-117
		b1	ST1	Drive Forward [Drives forward with on (drives forward after home-return operation when home return not complete), decelerate and stop on the way with off]	Page A3-116
		b0	ST0	Drive Backward [Drives backward with on (drives backward after home-return operation when home return not complete), decelerate and stop on the way with off]	Page A3-116

[I/O Signal List] EC Connection Unit (ON = corresponding bit is "1", OFF = corresponding bit is "0")

Signal type		Bit	Signal name	Content	Details
PLC input	Status signal (4th Axis)	b15	E3RD	Operation Ready [On: Operation ready (servo on)]	Page A3-119
		b14	*ALM	Alarm (break contact) [ON：No alarm、OFF：Alarm generated]	Page A3-119
		b13	LS1/PE1	Driving Forward Complete / Pressing Complete [It turns on when an actuator gets in the detection range of the forward end. It turns on when pressing operation completes.]	Page A3-118 ~ 119
		b12	LS0/PE0	Driving Backward Complete / Pressing Complete [It turns on when an actuator gets in the detection range of the backward end. It turns on when pressing operation completes.]	Page A3-118 ~ 119
	Status signal (3th Axis)	b11	E2RD	Operation Ready [On: Operation ready (servo on)]	Page A3-119
		b10	*ALM	Alarm (break contact) [ON：No alarm、OFF：Alarm generated]	Page A3-119
		b9	LS1/PE1	Driving Forward Complete / Pressing Complete [It turns on when an actuator gets in the detection range of the forward end. It turns on when pressing operation completes.]	Page A3-118 ~ 119
		b8	LS0/PE0	Driving Backward Complete / Pressing Complete [It turns on when an actuator gets in the detection range of the backward end. It turns on when pressing operation completes.]	Page A3-118 ~ 119
	Status signal (2nd Axis)	b7	E1RD	Operation Ready [On: Operation ready (servo on)]	Page A3-119
		b6	*ALM	Alarm (break contact) [ON：No alarm、OFF：Alarm generated]	Page A3-119
		b5	LS1/PE1	Driving Forward Complete / Pressing Complete [It turns on when an actuator gets in the detection range of the forward end. It turns on when pressing operation completes.]	Page A3-118 ~ 119
		b4	LS0/PE0	Driving Backward Complete / Pressing Complete [It turns on when an actuator gets in the detection range of the backward end. It turns on when pressing operation completes.]	Page A3-118 ~ 119
	Status signal (1st Axis)	b3	E0RD	Operation Ready [On: Operation ready (servo on)]	Page A3-119
		b2	*ALM	Alarm (break contact) [ON：No alarm、OFF：Alarm generated]	Page A3-119
		b1	LS1/PE1	Driving Forward Complete / Pressing Complete [It turns on when an actuator gets in the detection range of the forward end. It turns on when pressing operation completes.]	Page A3-118 ~ 119
		b0	LS0/PE0	Driving Backward Complete / Pressing Complete [It turns on when an actuator gets in the detection range of the backward end. It turns on when pressing operation completes.]	Page A3-118 ~ 119

3.8 I/O Signals

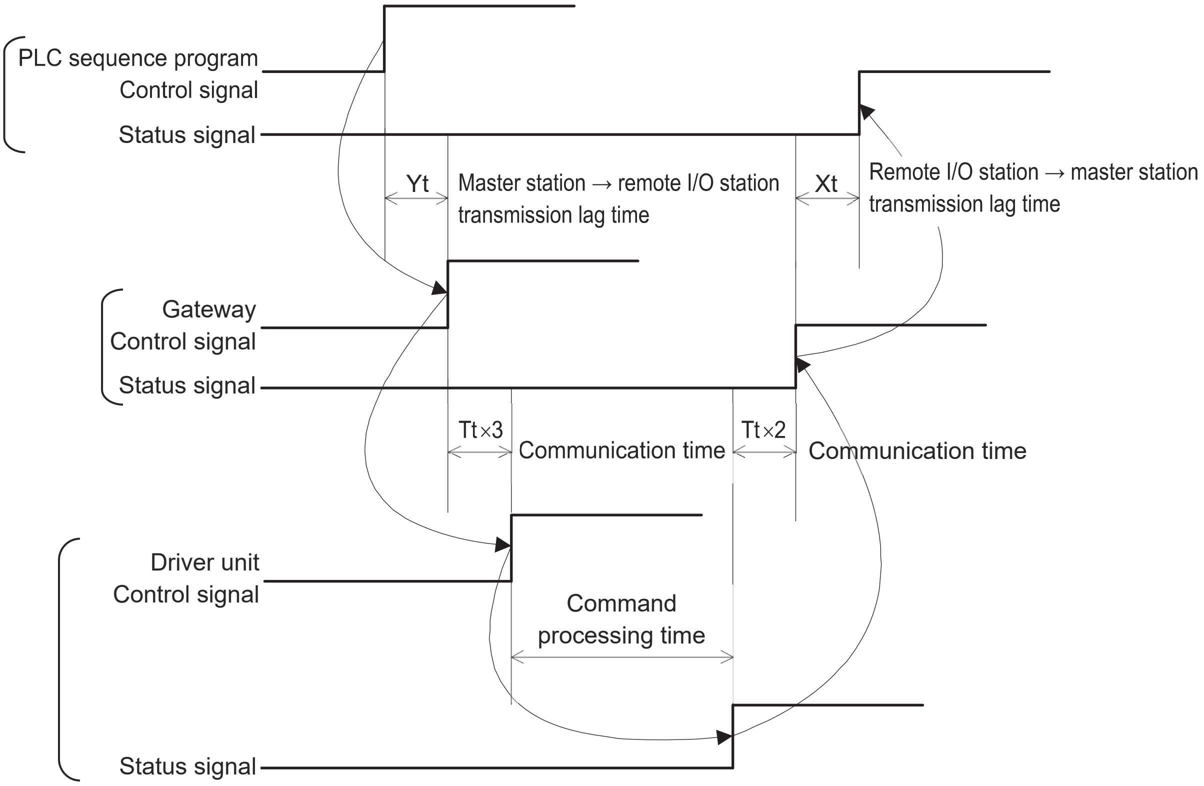
Timing of I/O signals

In order to operate the actuator with a PLC sequence program, various control signals are turned ON; the maximum response time until their response (status) signals return to the PLC is expressed with the following formula.
The PLC is the master station and the gateway unit the remote I/O station.

Maximum response time (ms) = Yt + (Tt × 3) + command processing time + (Tt × 2) + Xt

Tt = Transmission time: 1 to 4 axes 1ms, 5 to 9 axes 2ms, 10 to 14 axes 3ms, 15 to 16 axes 4ms
Yt : Master station → remote I/O station transmission lag time
Xt : Remote I/O station → master station transmission lag time
} Field network transmission lag time

For the transmission lag time from the master station to the remote I/O station (Yt) and from the remote I/O station to the master station (Xt), refer to the instruction manuals for the field network master units and mounted PLC.
Also, refer to [Caution when Connecting EC Connection Unit (Pg. A3-120)] when the EC connection unit is to be connected.



If a communication error occurs for such a reason as a problem on the transmission path, the duration of communication time (Tt × 3 / Tt × 2) should be extended for amount of Transmission Time (Tt) × Number of Error Occurrence Times.
If communication cannot be normally performed, an operation cancel level alarm (alarm code 8DE "Driver unit communication error") is generated, and the actuator stops.

Function of I/O signals

I/O signals are prepared for each axis No.

ON means that the corresponding bit is "1" and OFF means the corresponding bit is "0".
Refer to [Features of Input and Output Signals for EC Connection Unit (Pg. A3-117)] for the EC connection unit.

[1] Controller ready (CRDY) PLC input signal

Operation mode	Direct numerical control	Simple direct	Positioner 1	Positioner 2	Positioner 3	Positioner 5
○: Y ×: N	○	○	○	○	×	○

Regardless of the alarm status, servo status and the like, when the power is turned ON, driver unit initialization normally completes, and control is enabled, it turns ON.
It will turn ON even during alarm status if the driver unit is enabled.

[2] Emergency stop (EMGS) PLC input signal

Operation mode	Direct numerical control	Simple direct	Positioner 1	Positioner 2	Positioner 3	Positioner 5
○: Y ×: N	○	○	○	○	○	○

This signal turns ON when the condition gets to the motor drive cutoff status.

(1) STOP Signal Input: OFF

(2) MP 24V: OFF

(3) MPI1 or MPI2 Signal: OFF (EMGS: ON only on axis with motor drive source cut off)

(4) 200V Power Supply input：OFF

It turns OFF once the motor drive cutoff status gets cancelled.
Also, the SYS of the driver unit LED lights up in red.
On the host device such as a PLC, apply appropriate safety measures such as interlocking using this signal.
It is not an output signal caused by the driver unit alarm.

[3] Alarm (ALM) PLC input signal

Operation mode	Direct numerical control	Simple direct	Positioner 1	Positioner 2	Positioner 3	Positioner 5
○: Y ×: N	○	○	○	○	○	○

It is a signal that turns OFF when it is normal and turns ON when an alarm of operation cancel level or higher is generated.
This signal turns OFF when the reset signal RES is turned ON while the operation cancel level alarm is generated. (For a cold start level alarm, the power must be turned on again.)
Also, the SYS of the driver unit LED lights up in red.
For details on alarms, refer to [Maintenance Section Chapter 2, 2.4 Driver Unit/Simple Absolute Unit Alarm Causes and Countermeasures].

[4] Reset (RES) PLC output signal

Operation mode	Direct numerical control	Simple direct	Positioner 1	Positioner 2	Positioner 3	Positioner 5
○: Y ×: N	○	○	○	○	○	○

The reset signal RES has two functions: it resets the alarm when an alarm is generated and suspends operation when it is in pause.

(1) If this signal is turned ON while an alarm of operation cancel level is being generated, the alarm will be canceled. (For a cold start level alarm, the power must be turned on again.) Check the cause of the alarm and resolve the cause before resetting the alarm. Resetting the alarm repeatedly without resolving the cause and repeating the activation may cause serious malfunction such as motor burnout.

(2) If this signal is turned from OFF to ON while paused, it is possible to cancel the remaining travel distance and interrupt the operation.

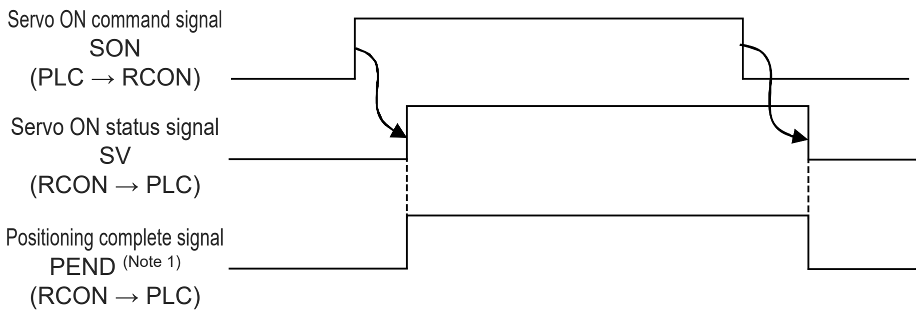
[5] Servo ON command (SON) PLC output signal
Servo ON status (SV) PLC input signal
Positioning complete (PEND) PLC input signal

Operation mode	Direct numerical control	Simple direct	Positioner 1	Positioner 2	Positioner 3	Positioner 5
○: Y ×: N	○	○	○	○	○	○

(1) The servo ON command signal SON is a signal that puts the actuator into an operable status.

(2) When servo is turned ON and operation is enabled, the servo ON signal SV turns ON. At the same time, the positioning complete signal PEND turns ON.
Also, the SYS of the driver unit LED of the corresponding axis No. on the front panel lights up in green.

(3) Even if power is supplied to the controller, it cannot be operated while the SV signal is OFF. When the SON signal is turned OFF while the actuator is in operation, the actuator stops and the servo turns OFF.
For actuator with brake, the brake will activate.



Note 1: PEND is not turned on while in pause.

[6] Home return (HOME) PLC output signal

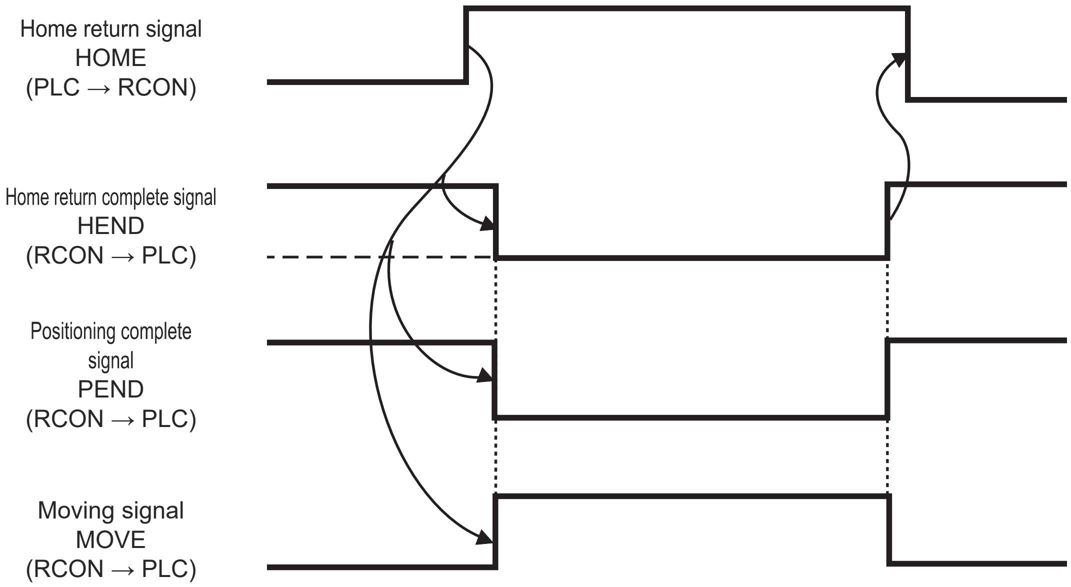
Home return complete (HEND) PLC input signal

Positioning complete (PEND) PLC input signal

Traveling (MOVE) PLC input signal

Operation mode	Direct numerical control	Simple direct	Positioner 1	Positioner 2	Positioner 3	Positioner 5
○: Y ×: N	○	○	○	○	○	○

Home return signal HOME is a signal for performing home return motion.
When the HOME signal is turned ON, home return motion starts as the signal starts up (ON edge). When the home return motion is completed, the home return complete signal HEND turns ON. The HEND signal will stay ON unless the home is lost. During home return motion, the positioning complete signal PEND turns OFF and the moving signal MOVE turns ON.

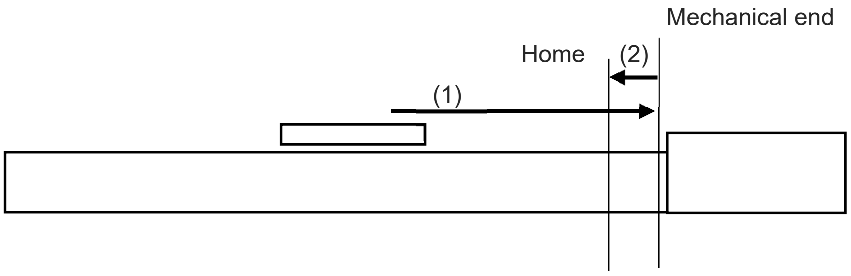


Caution

- In the positioner mode and simple direct mode, when an actuator with incremental specification is connected and the positioning command is made to the position without performing home return at power on, positioning is executed after home position is automatically restored after the power is turned on (first time only).
- Note that in the direct numerical control mode, when a positioning command to the position is made without executing home return at power-on, alarm code 083 "Absolute position travel command in home return uncompleted status" is generated and operation is canceled.

Unless indicated as home reverse specification (option), the direction of home return for the linear axis is on the motor side, the rotary axis is on the counterclockwise side, and the gripper is on the outside (open side).
For details, refer to [Actuator Coordinate System (page Intro-18)].

(1) Home return operation of slider type/rod type/table type actuator



(1) With the HOME signal ON, the unit begins traveling toward the mechanical end at the home return speed.
The travel speed is 20 mm/s for most actuators, with some exceptions by model.

(2) The unit reverses at the mechanical end and stops at the home position. The travel distance at this time will be the set value of parameter No. 22 "Homing offset".

Caution

- In the home reverse specification, the unit moves in the reverse direction.
- When changing Parameter No. 22 "Homing offset", be sure to refer to [page B6-16].

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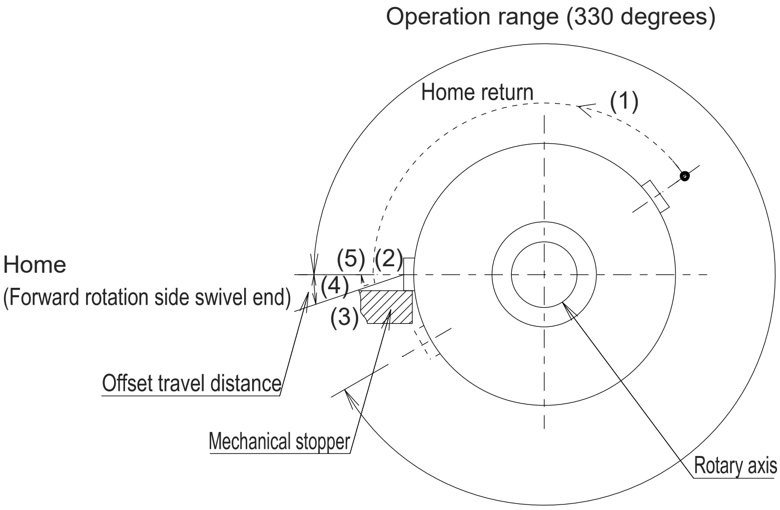
(2) Home return operation of rotary actuator

[330° rotation specification]

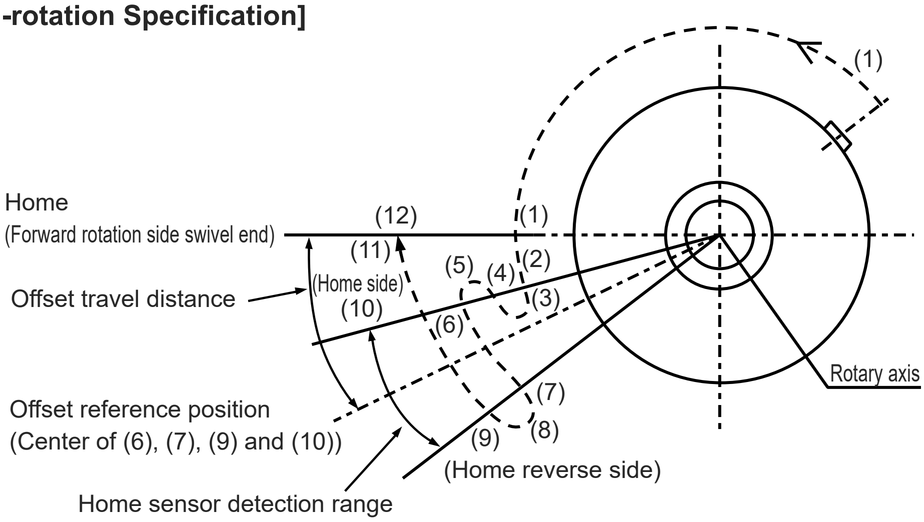


(1) When home return is commanded, the rotary part rotates in the CCW（counterclockwise）direction as seen from the load side.
The speed is 20 deg/s.
(2) Detects mechanical stopper.
(3) It travels in reverse.
(4) Moves from the position of (3) for the amount set in Parameter No. 22 “Homing Offset” and stops.
(5) The position stopped in (4) should be the home position.

Caution

- When changing Parameter No. 22 "Homing offset", be sure to refer to [page B6-16].

[Multi-rotation Specification]



(1) When home return is commanded, the rotary part rotates in the CCW (counterclockwise) direction as seen from the load side.
The speed is 20 deg/s.
(2) The home sensor turns ON.
(3) It travels in reverse.
(4) Confirm that the home sensor turns OFF as it returns to the position beyond the detection range of the home sensor.
(5) It travels in reverse.
(6) Check again that the home sensor is ON.
(7) Confirm that the home sensor turns OFF beyond the detection range on the home reverse side of the home sensor.
(8) It travels in reverse.
(9) Check that the home sensor is ON.
(10) Confirm that the home sensor turns OFF beyond the detection range on the home side of the home sensor.
(11) Calculate the detection range center of the home sensor from the results of (6), (7), (9) and (10).
(12) Moves from the position of (11) for the amount set in Parameter No. 22 “Homing Offset” and stops.
This stopped position should be the home position.

⚠ **Caution**

- In the reverse rotation specification, the unit moves in the reverse direction.
- When changing Parameter No. 22 "Homing offset", be sure to refer to [page B6-16].

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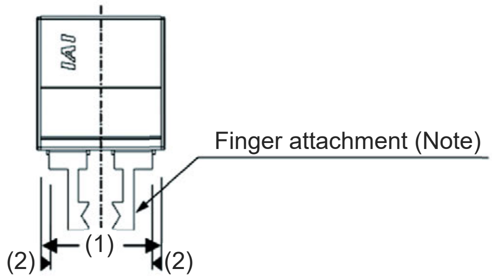
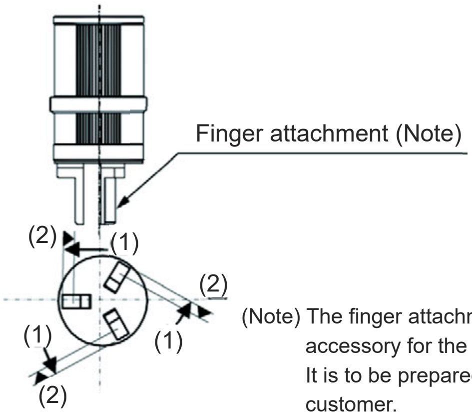
(3) Home return operation of gripper





(Note) The finger attachment is not an accessory for the actuator. It is to be prepared by the customer.

(1) The unit travels toward the mechanical end (outside) at the home return speed.

(2) The unit reverses at the mechanical end and stops at the home position. The travel distance at this time is a fixed value for each actuator and cannot be changed.

Caution

- When changing Parameter No. 22 "Homing offset", be sure to refer to [page B6-16].

[7] Positioning start (CSTR) PLC output signal
Traveling (MOVE) PLC input signal
Positioning complete (PEND) PLC input signal

Operation mode	Direct numerical control	Simple direct	Positioner 1	Positioner 2	Positioner 3	Positioner 5
○: Y ×: N	○	○	○	○	○	○

The positioning start signal CSTR is processed at the startup edge (ON edge) and positioned at the target position of the specified position No. or the position set in the target position register of the PLC.

(1) When the CSTR signal is turned ON, the actuator starts acceleration based on the data in the specified position table for positioning to the target position.
(2) When the operation is started, the positioning complete signal PEND turns OFF. At this time, turn OFF the CSTR signal. If the CSTR signal is not turned OFF, output of the complete position No. and PEND signal will not turn ON when positioning is completed.
(3) When positioning is completed, the position No. of the positioning complete is output in binary data by complete position No. PM1 to PM**, and at the same time the PEND signal will turn ON.
(4) The moving signal MOVE turns ON at the same time as the travel starts, and the PEND signal turns ON, or turns OFF when the travel command output is completed.
(5) The PEND signal turns ON when the remaining travel distance enters the positioning width range. Once turned ON, the PEND signal will remain ON unless the CSTR signal is turned ON again, or servo is turned OFF.

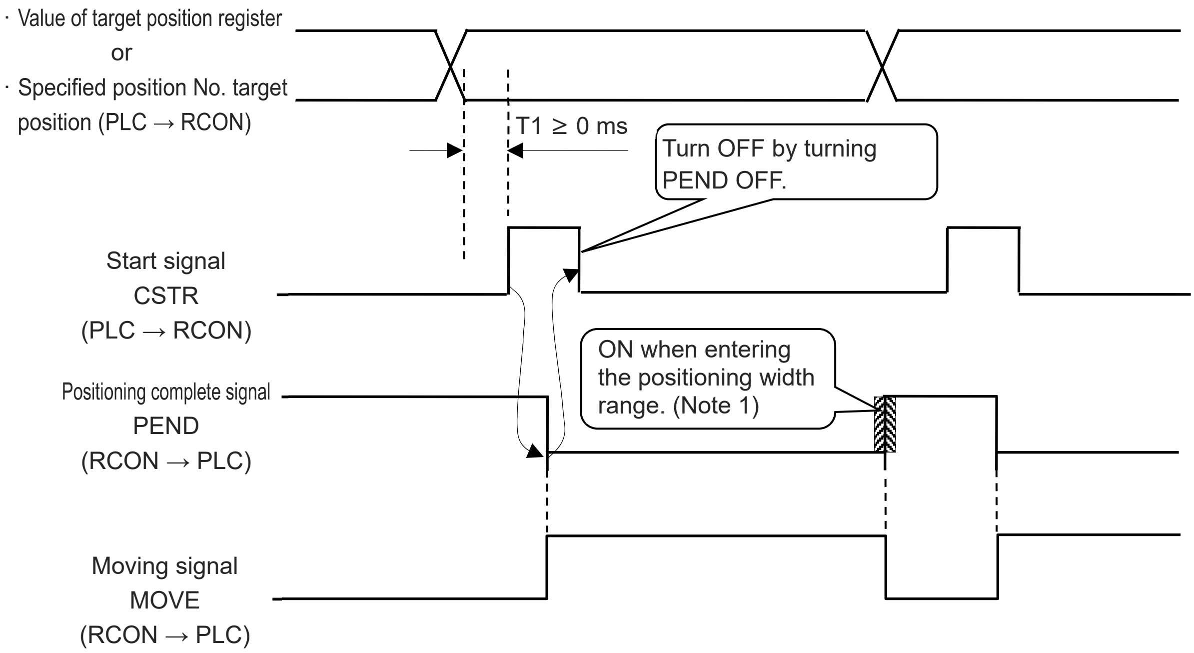
The PEND signal output method can be switched in parameter No. 39 "Positioning complete signal output method".

No.	Name	Unit	Input range	Default initial value setting
39	Positioning complete signal output method	–	0: PEND 1: INP	0

A parameter to select the positioning complete signal type.
Output status after positioning complete varies according to whether the servo is ON or OFF.

Set value	Signal identification	During servo ON (during positioning complete)	During servo OFF
0	PEND	Will not turn OFF even if present position is outside the range of positioning width	Unconditional OFF
1	INP	Will turn ON if present position is within the range of positioning width and OFF outside the range.	

Output format will be the same for the complete position No. output PM1 to PM **.



Note 1: The MOVE signal turns ON simultaneously as PEND signal is turned OFF, and it turns OFF when command from the controller to the motor is completed. Therefore, if the positioning width is set high, the PEND signal may turn ON before the MOVE signal turns OFF. If the positioning width is set low, the MOVE signal may turn OFF before the PEND signal turns ON.

Caution

- The PEND signal turns OFF once it enters servo OFF status or emergency stop while stopped at the target position.
- If the CSTR signal remains ON, the PEND signal will not turn ON even if positioning is completed.

---

[8] Pause (STP) PLC output signal

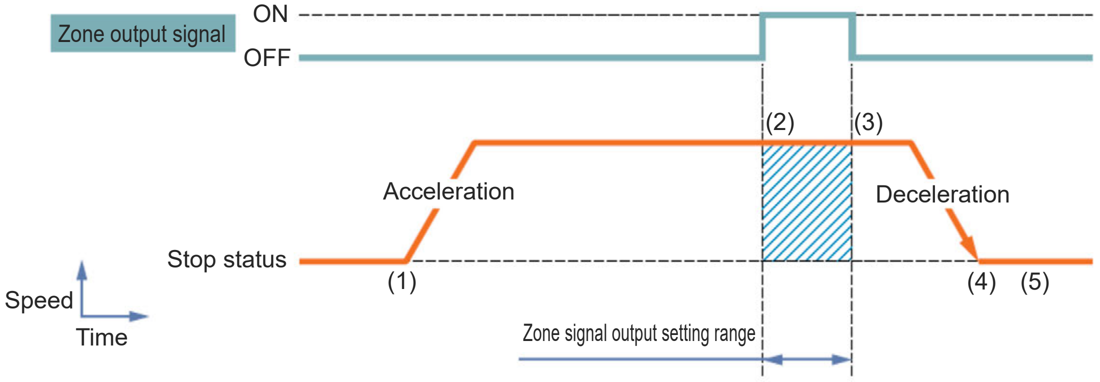
Operation mode	Direct numerical control	Simple direct	Positioner 1	Positioner 2	Positioner 3	Positioner 5
○: Y ×: N	○	○	○	○	○	○

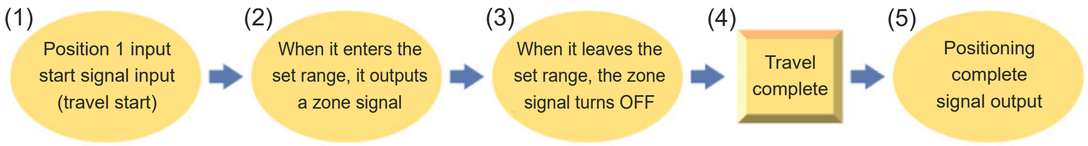
When this signal is turned ON, the axis decelerates and stops. If it is turned OFF, the axis travel will resume.

The acceleration value at restart of operation and deceleration value at stop are values in acceleration/deceleration of the position No. set in the specified position No. register in the positioner mode and simple direct mode, and are values in the acceleration/deceleration register in the direct numerical control mode.

[9] Zone 1 (ZONE1) PLC input signal
Zone 2 (ZONE2) PLC input signal
Position zone (PZONE) PLC input signal

Operation mode	Direct numerical control	Simple direct	Positioner 1	Positioner 2	Positioner 3	Positioner 5
○: Y ×: N	△ (PZONE not available)	○	○	○	△ (ZONE 1 only)	△ (PZONE not available)





The signal turns ON while the actuator is passing through a specified position (zone range) or while the actuator is stopped.
There are two types of zone signals.

They can judge pass/fail of the completion position at push-motion completion, set the continuous operation range in pitch feed, perform operation interlock of other devices within the setting range, and so on.

(1) Zone signal (ZONE1, ZONE2)
Turns ON in any range set in the parameter.
Set the zone range in the following parameters.

(1) ZONE1 : Parameter No. 1 (zone boundary 1 + side), parameter No. 2 (zone boundary 1 - side)
(2) ZONE2 : Parameter No. 23 (zone boundary 2 + side), parameter No. 24 (zone boundary 2 - side)

The zone signal is valid during drive source cutoff after home return is completed as long as the home is not lost due to an alarm or the like.

(2) Position zone signal (PZONE)
Turns ON in any range set in the position table.

No.	Position [mm]	Speed [mm/s]	Acceleration [G]	Deceleration [G]	Push [%]	Threshold [%]	Positioning width [mm]	Zone+ [mm]	Zone- [mm]	Acceleration/ deceleration mode	Incremental	Gain set	Stop mode
0													
1	0.00	250.00	0.20	0.20	0	0	0.10	50.00	30.00	0	0	0	0
2	100.00	250.00	0.20	0.20	0	0	0.10	70.00	60.00	0	0	0	0
3	50.00	250.00	0.20	0.20	50	0	20.00	60.00	65.00	0	0	0	0

Setting the zone range

The zone range is set in the position table.
During the execution of the position No. for which the zone range is set, its set value will be enabled. It is valid during drive source cutoff even after it is stopped as long as the actuator is operated and the home is not lost due to an alarm or the like.

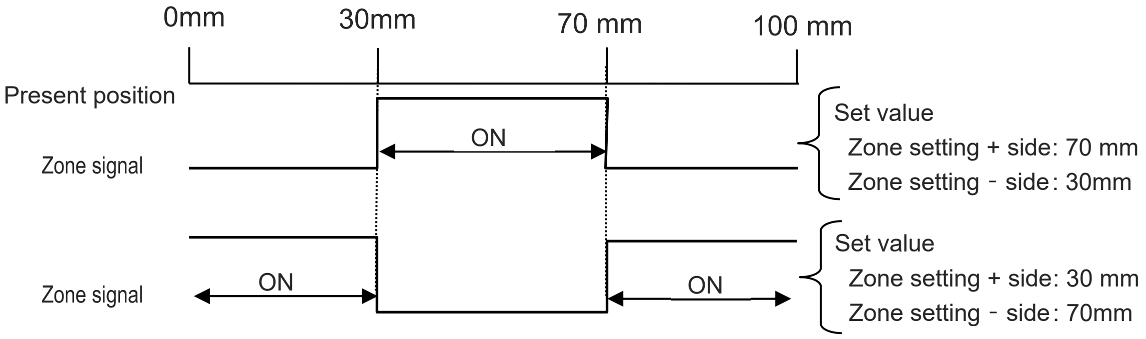
(3) Set value and signal output range

The zone output range varies depending on the difference between the set value on the + side and - side of the zone.

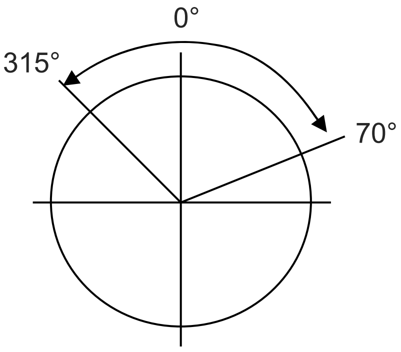
(1) + side set value > - side set value: zone signal ON within the range of - side set value to + side set value, OFF when out of range

(2) + side set value < - side set value: zone signal OFF within the range of + side set value to - side set value, ON when out of range

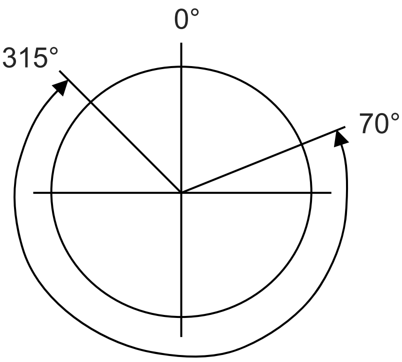
[For linear axis]



[For rotary actuator of multi-rotation specification in index mode]



Set value
Zone setting + side: 70°
Zone setting – side: 315°



Set value
Zone setting + side: 315°
Zone setting – side: 70°

Caution

- This signal is enabled after home return is completed. It will not be output only by turning on the power.

[10] + Jog (JOG+) PLC output signal
- Jog (JOG -) PLC output signal

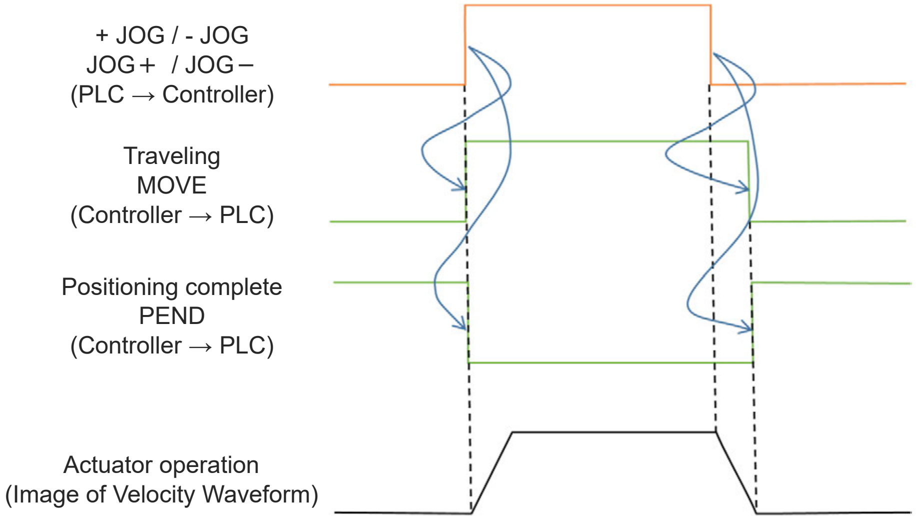
Operation mode	Direct numerical control	Simple direct	Positioner 1	Positioner 2	Positioner 3	Positioner 5
○: Y ×: N	○	○	○	○	×	○

It is a start command for jog or inching operation.
The + command operates in the home reverse direction, and the - command in the home direction.

(1) Jog operation
The jog operation is available when the jog/inching switching signal JISL is OFF.
While the JOG+ signal is ON, the actuator moves in the home reverse direction, and when it is OFF it decelerates and stops.
While the JOG- signal is ON, the actuator moves in the home direction, and when it is OFF it decelerates and stops.

The operation is performed with the set values of the following parameters.

- Travel is at the following speeds, depending on the ON/OFF position of the jog speed/inching distance switching signal JVEL.
  When JVEL signal is OFF: operates in the value of parameter No. 26 "PIO Jog velocity".
  When JVEL signal is ON: operates in the value of parameter No. 47 "PIO Jog velocity 2".
- Note that when the JVEL signal is ON, it operates at the following speed in direct numerical control mode.
  When speed setting value = 0: operates at the value of parameter No. 47 "PIO Jog velocity 2".
  When speed setting value ≠ 0: operates at the speed set value.
  For details, see [3.7 Address Configuration / Direct numerical control mode assignment (page A3-69)].
- Acceleration/deceleration operate at the rated acceleration/deceleration (dependent on actuator).
- When both JOG+ and JOG- signal turn ON, it decelerates and stops.



(2) Inching (incremental) operation

Inching operation is available when the JISL signal is ON.

When the jog signal is turned ON once, it travels a fixed distance for the inching distance set in the parameter.

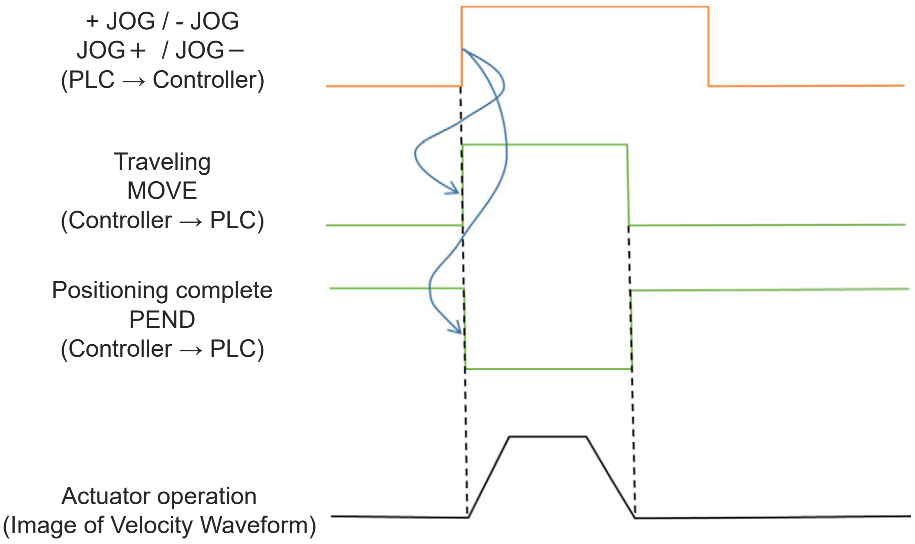
When the JOG+ signal is ON, it moves in the home reverse direction, and when the JOG- signal is ON, it moves in the home direction.

The operation is performed with the set values of the following parameters.

- It moves with the following speeds depending on the ON/OFF position of the JVEL signal.
  When JVEL signal is OFF: operates in the value of parameter No. 26 "PIO Jog velocity".
  When JVEL signal is ON: operates in the value of parameter No. 47 "PIO jog velocity 2".
- The travel distance will be set according to separate parameters depending on ON/OFF of the JVEL signal.
  When JVEL signal is OFF: operates in the value of parameter No. 48 "PIO inching distance".
  When JVEL signal is ON: operates in the value of parameter No. 49 "PIO inching distance 2".
- Acceleration/deceleration operate at the rated acceleration/deceleration (dependent on actuator).

During normal operation, even if JOG+ or JOG- signal is turned ON, normal operation will continue. (Jog signal will be ignored)

While paused, it will not operate even if JOG+ signal or JOG- signal is turned ON.



Caution

- Beware of collision with the mechanical end since the software stroke limit is disabled before home return completes.

[11] Jog speed / inching distance switching (JVEL) PLC output signal

Operation mode	Direct numerical control	Simple direct	Positioner 1	Positioner 2	Positioner 3	Positioner 5
○: Y ×: N	○	○	○	○	×	○

This is a parameter switching signal that specifies the speed and inching distance during jog and inching (incremental) operation.

It changes as follows according to the JVEL signal, JISL signal and field network control mode.

JVEL signal	Jog operation: JISL = OFF	Inching operation: JISL = ON
OFF	Parameter No.26 "PIO Jog velocity"	Parameter No.26 "PIO Jog velocity" Parameter No.48 "PIO inching distance"
ON	Parameter No.47 "PIO Jog velocity 2" (Note 1)	Parameter No.47 "PIO Jog velocity 2" Parameter No.49 "PIO inching distance 2"

Note 1: For direct numerical control mode, it operates at the following speed.

When speed setting value = 0 : operates at the value of parameter No. 47 "PIO Jog velocity 2"

When speed setting value ≠ 0 : operates at the speed set value

For details, see [3.7 Address Configuration / Direct numerical control mode assignment (page A3-67)].

[12] Jog/inching switching (JISL) PLC output signal

Operation mode	Direct numerical control	Simple direct	Positioner 1	Positioner 2	Positioner 3	Positioner 5
○: Y ×: N	○	○	○	○	×	○

It is a switching signal between jog operation and inching (incremental) operation.

When JISL signal is OFF : Jog operation
When JISL signal is ON : Inching operation

If the JISL signal is switched to ON (inching) during jog operation, it decelerates and stops, and switches to the inching function.

If the JISL signal is switched to OFF (jog) during inching operation, it switches to the jog function after the travel is completed.

		Jog operation	Inching operation
JISL		OFF	ON
JVEL = OFF	Speed	Parameter No. 26 "Jog velocity"	Parameter No. 26 "Jog velocity"
	Travel distance	–	Parameter No. 48 "Inching"
	Acceleration/ deceleration	Rated value (dependent on actuator)	Rated value (dependent on actuator)
JVEL = ON	Speed	Parameter No. 47 "Jog velocity 2" (Note 1)	Parameter No. 47 "Jog velocity 2"
	Travel distance	–	Parameter No. 49 "Inching 2"
	Acceleration/ deceleration	Rated value (dependent on actuator)	Rated value (dependent on actuator)
Operation		While JOG+ / JOG- is ON	When the rising edge (ON edge) of JOG+ / JOG- is detected

Note 1: For direct numerical control mode, it operates at the following speed.
When speed setting value = 0 : operates at the value of parameter No. 47 "PIO Jog velocity 2"
When speed setting value ≠ 0 : operates at the speed set value
For details, see [3.7 Address Configuration / Direct numerical control mode assignment (page A3-67)].

[13] Teaching mode command (MODE) PLC output signal
Teaching mode signal (MODES) PLC input signal

Operation mode	Direct numerical control	Simple direct	Positioner 1	Positioner 2	Positioner 3	Positioner 5
○: Y ×: N	×	×	○	○	×	×

When the teaching mode command signal MODE is turned ON, it changes from the normal operation mode to the teaching mode.
Teaching mode signal MODES turns ON when it switches to the teaching mode.
On the PLC side, confirm that the teaching mode signal MODES is turned ON before performing teaching operation.

In order to switch from the normal operation mode to the teaching mode, the following status is required.
- Actuator operation (motor) is stopped
- JOG+ signal and JOG- signal are OFF
- The position data import command signal PWRT and positioning start signal CSTR are OFF

(Note) If the PWRT signal is not OFF, it will not return to the normal operation mode.

[14] Position data import command (PWRT) PLC output signal
Position data import complete (WEND) PLC input signal

Operation mode	Direct numerical control	Simple direct	Positioner 1	Positioner 2	Positioner 3	Positioner 5
○: Y ×: N	×	×	○	○	×	×

Position data import command signal PWRT is enabled when the teaching mode signal MODES is ON.

When the PWRT signal is turned ON (Note 1), the present position data will be written in the position field of the position number set in the PLC's specified position number channel. (Note 2)

When writing is completed, the position data import complete signal WEND turns ON.

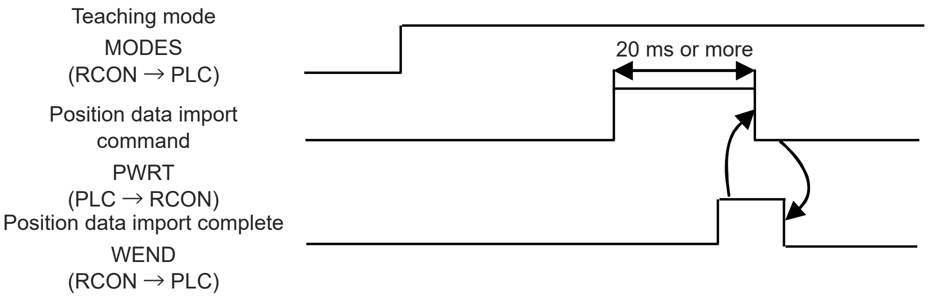
Make sure that the WEND signal is turned ON in the host PLC, then turn OFF the PWRT signal.

If PWRT signal is turned OFF before WEND signal turns ON, WEND signal will not turn ON.

When PWRT signal is turned OFF, WEND signal will turn OFF.

Note 1: Be sure to keep ON continuously for 20 ms or more. If it is less than 20 ms, writing may not be executed.

Note 2: If data other than the position data is undefined, the parameter initial value will be written.
For details, refer to [Startup Section Chapter 6, 6.1 Parameter (page B6-1)].



[15] Forced brake release (BKRL) PLC output signal

Operation mode	Direct numerical control	Simple direct	Positioner 1	Positioner 2	Positioner 3	Positioner 5
○: Y ×: N	○	○	○	○	○	○

While the forced brake release signal BKRL is ON, the brake will be released. For an actuator with brake, the brake is automatically controlled by servo ON/OFF. When assembling to a device, performing direct teaching (Note 1) or the like, it may be necessary to release the brake in order to move the slider or rod by hand.

Note 1 Direct teaching: Operation where the slider or rod is moved by hand and the coordinate values imported into the position table

⚠ Warning

- Be careful when releasing the brake. Releasing carelessly may cause injury or damage to the actuator body, workpiece or surrounding devices due to the slider or rod falling.
- After releasing the brake, be sure to return the brake to the enabled status. It is very dangerous to operate with the brake released. It may cause injury or damage to the actuator body, workpiece or surrounding devices due to the slider or rod falling.

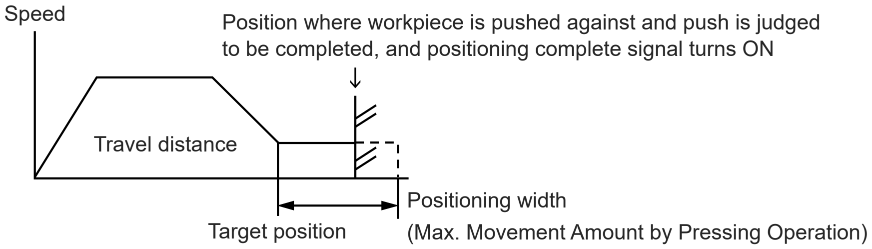
[16] Push-motion specification (PUSH) PLC output signal

Operation mode	Direct numerical control	Simple direct	Positioner 1	Positioner 2	Positioner 3	Positioner 5
○: Y ×: N	○	×	×	×	×	×

Executing a travel command after turning this signal ON will activate push-motion operation. When this signal is OFF, normal positioning operation will be performed.
The 24V driver unit is capable to select the pressing method in Parameter No. 181 “Pressing Type” from the pressing type same as the CON system such as PCON controller and the pressing type same as the SEP system such as PSEP. (Note) Refer to [page B6-51] for the selection method.
Note : The pressing method for the 200V driver unit is the CON type only.

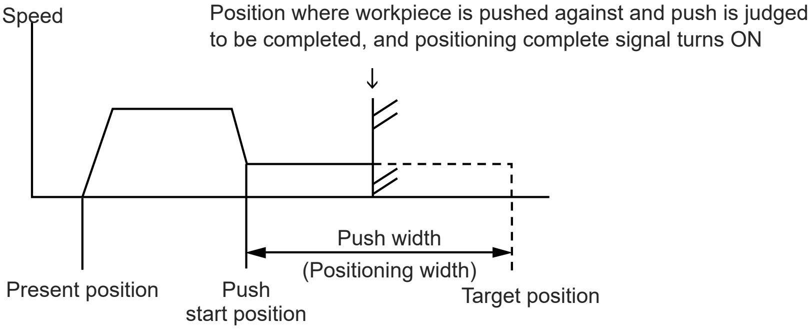
(1) CON mode push

After reaching the target position (Note 1) from the current position, the actuator moves with the pressing speed for the distance set as the positioning band width (Note 2).
During push motion, once the workpiece is pushed against and the push is judged to be completed, positioning complete signal PEND will turn ON.



(2) SEP mode push

Push-motion operation is performed at the distance set in the positioning width (Note 2) (direct numerical control mode) from the target position (Note 1) as the start position. Note that there is no pull-operation mode.
During push motion, once the workpiece is pushed against and the push is judged to be completed, PEND will turn ON.



Note 1 : It should be the value input in the position data indication register for direct indication and the simple direct mode.

Note 2 : It should be the value input in the positioning band width indication register in the direct indication mode.

[17] Push direction specification (DIR) **PLC output signal**

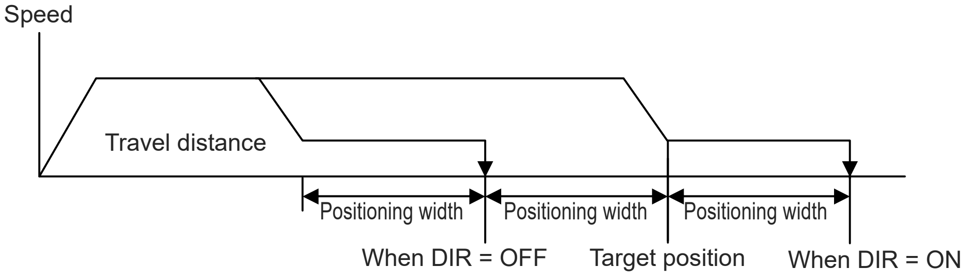
Operation mode	Direct numerical control	Simple direct	Positioner 1	Positioner 2	Positioner 3	Positioner 5
○: Y ×: N	○	×	×	×	×	×

Specifies the direction of push-motion.

When this signal is turned OFF, push-motion is performed toward the value obtained by subtracting the positioning width from the target position.

When this signal is turned ON, push-motion is performed toward the value obtained by adding the positioning width to the target position.

This signal is disabled when normal positioning operation is selected.



[18] Push-motion contactless (PSFL) **PLC input signal**

Operation mode	Direct numerical control	Simple direct	Positioner 1	Positioner 2	Positioner 3	Positioner 5
○: Y ×: N	○	○	○	○	○	○

ON when push-motion operation is performed but does not touch the workpiece, even after traveling the distance set by the positioning width of the controller's position table or positioning width register of the PLC.

[19] Command complete signal (MEND) **PLC input signal**

Operation mode	Direct numerical control	Simple direct	Positioner 1	Positioner 2	Positioner 3	Positioner 5
○: Y ×: N	○	○	○	○	×	○

This signal turns ON when the travel to the target position commanded from the host is completed.

It is almost the same control as the positioning complete PEND signal, but this signal will turn ON even if in push-motion contactless.

It turns OFF at servo OFF and drive source cutoff. Also, if positioning start signal CSTR is ON, it will not turn ON even if movement to the target position is completed.

[20] Incremental specification (INC) PLC output signal

Operation mode	Direct numerical control	Simple direct	Positioner 1	Positioner 2	Positioner 3	Positioner 5
○: Y ×: N	○	×	×	×	×	×

When this signal is ON, if a travel command is executed, it will travel by the value input in the target position register of the PLC with the present position as a reference. (Relative travel)
When the signal is off, movement should be made to the position of the PLC target position register value.

[21] Minor malfunction alarm (ALML) PLC input signal

Operation mode	Direct numerical control	Simple direct	Positioner 1	Positioner 2	Positioner 3	Positioner 5
○: Y ×: N	○	○	○	○	×	○

This signal turns ON when an overload warning or message level alarm is generated.
For details, refer to [Parameter No. 151 "Minor Trouble Alarm Output Select" (page B6-46)].

[22] Load output judgment status (LOAD) PLC input signal

Operation mode	Direct numerical control	Simple direct	Positioner 1	Positioner 2	Positioner 3	Positioner 5
○: Y ×: N	×	○	○	○	×	×

[1] Pressing operation commanded torque level detection signal
It turns on when the actuator gets in the pressing operation range and also in the position zone range, and the pressing current exceeds the current value set in “Threshold” in the position data for the period of time set in Parameter No. 50 “Load output judgment time”. For details, refer to [3.8 I/O Signals/Other basic operations/Push-motion Operation (7) Pressing operation commanded torque level detection (page A3-135)].

[2] Load output judgment signal
When the present position is within the position zone range and the time set in parameter No. 50 "Load output judgment time" is exceeded and the command torque value set in the position table "Threshold" is exceeded, a collision is judged to have happened.
The load output judgment status (LOAD) should turn on after judgment. For the pulse motor type, the collision detection alarm gets generated and the servo gets turned off.
For details, refer to [6.2 Various Functions/Collision detection function (page B6-73)].

Features of Input and Output Signals for EC Connection Unit

The input and output signals for the EC connection unit are as shown below.
On means the applicable bit is "1" while off means "0".

[1] Movement command input backward end/forward end (ST0/ST1) PLC output signal

The ST signal function automatically switches depending on whether the unit has completed home return or not.

Signal name	Signal abbreviation	Function overview by status	
		Home return: Not complete	Home return: Complete
Backward	ST0	Home return operation	Backward
Forward	ST1		Forward

[Home return status: Not complete]

- When the [ST0] signal is turned ON, home return operation begins.
- When the [ST1] signal is turned ON, as with the [ST0] signal, home return operation begins.
- Turning the ST signal OFF midway through home return operation will cause a gradual stop.

[Home return status: complete]

- When the ST signal is turned ON, the ELECYLINDER moves [Backward] and [Forward].
- While the ST signal is ON, operation will continue until the [Backward end] or [Forward end] is reached.
- Turning the ST signal OFF midway through operation will cause a gradual stop.

Caution

- If stopped when the LS or PE signals are not ON, the ELECYLINDER may be stopped on the way to the backward or forward end, or it may have stopped at the backward or forward end during pressing operation with no contact.
  We recommend first inputting the [ST0] signal and then performing the following actions after returning to the backward end.
- If battery-less absolute specification (option) is selected, the home return complete status is retained.
  However, if the [Change home return direction] or [Adjust home position] parameters are changed, home return status will be not-complete; perform homing (absolute reset).
- ELECYLINDER is not available for operation in the single solenoid system.

[2] Alarm clear input (RES) PLC output signal

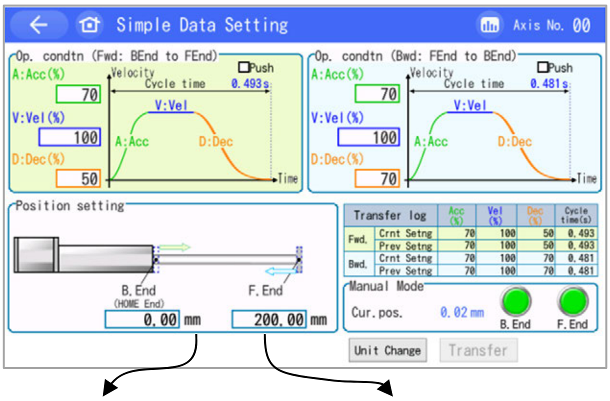
- When the [RES] signal is turned ON, the currently triggered alarm will be cleared.
- Alarm clear may not be possible depending on the alarm itself.
  Refer to [Maintenance Section Chapter 2, 2.5 Troubleshooting for ELECYLINDER alarm groups (Page C2-31)] for detail.

[3] Position detection output backward end/forward end (LS0/LS1) PLC input signal

- The LS signals perform the same operation as an air cylinder automatic switch.
  They are not positioning complete signals.
- The LS signals turn ON when the current ELECYLINDER position is within the detection range configured at the backward and forward ends.
- They turn ON when within the detection range regardless of whether the servo is ON or OFF.

The backward end and forward end set values' relationship to [LS0] and [LS1] signals ON is as follows.

In this example, the LS signal detection range is ±0.10mm.



Simple Data Setting

Axis No. 00

Op. condtn (Fwd: BEnd to FEnd)

☐Push

A:Acc(%) 70

V:Vel(%) 100

D:Dec(%) 50

Cycle time 0.493s

Op. condtn (Bwd: FEnd to BEnd)

☐Push

A:Acc(%) 70

V:Vel(%) 100

D:Dec(%) 70

Cycle time 0.481s

Position setting

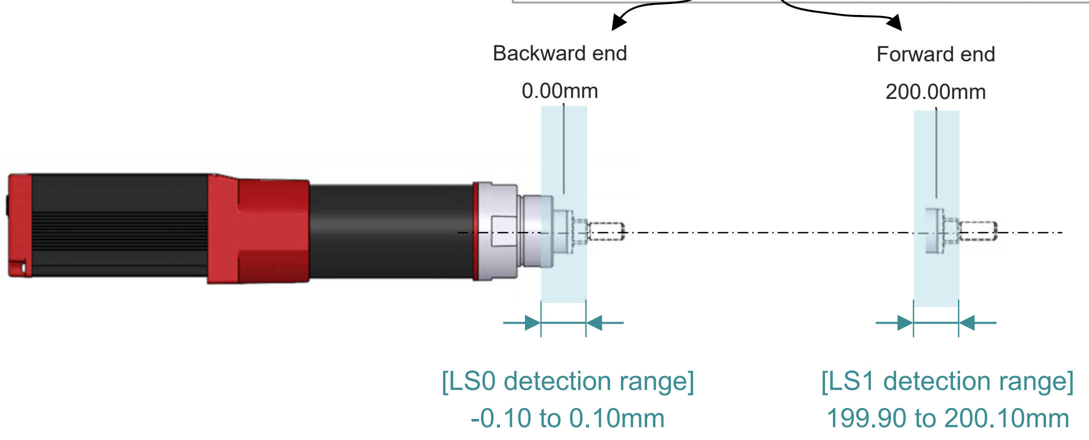
B.End (HOME End) 0.00 mm

F.End 200.00 mm

Transfer log		Acc (%)	Vel (%)	Dec (%)	Cycle time(s)
Fwd.	Crnt Setng	70	100	50	0.493
	Prev Setng	70	100	50	0.493
Bwd.	Crnt Setng	70	100	70	0.481
	Prev Setng	70	100	70	0.481

Manual Mode

Cur.pos. 0.02 mm



To adjust the LS signal detection range, open the [Edit parameters window]. Parameter No.2 [Auto switch LS signal detection range adjustment] can be used to make adjustments.

Parameter

Axis No. 00

1. Operation Range Adjustment	Descrptn	200.00 mm
2. AutSwitch"LS" Signl Detctn Rng Adjst	Descrptn	0.10 mm
3. HOME Direction Change	Descrptn	○Opposite ●Default
4. HOME Position Adjustment	Descrptn	3.00 mm
5. Smooth accel/decel Setting	Descrptn	●Invalid ○Valid
6. Current control setting while stop	Descrptn	●Invalid ○Valid
7. Reserve		
8. Reserve		

By touching Descrptn (Description) button, the description of the parameter will be displayed.

[4] Pressing complete output backward end/forward end (PE0/PE1) PLC input signal

- Turns ON when "pressing complete" is determined during pressing operation.
- Turns OFF if no contact can be made.

[5] Alarm output (*ALM) PLC input signal

- Turns ON when the ELECYLINDER is in normal status.
  Turns OFF when an alarm occurs.
- Always monitor the *ALM signal using the master device.
  If it turns OFF, immediately take appropriate safety countermeasures with the equipment as a whole.

[6] Operation ready (E*RD) PLC input signal

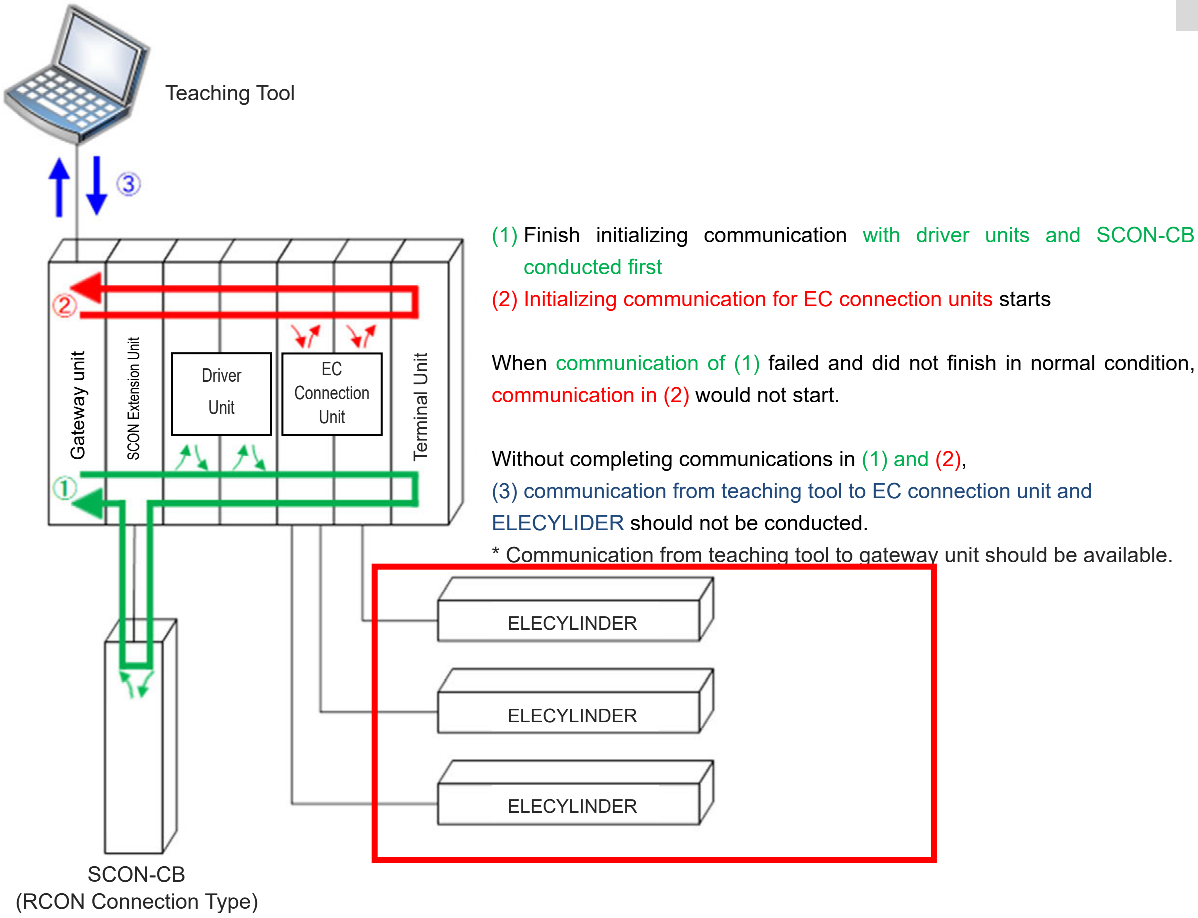
- It turns on when the operation is ready (servo on).
- It shows "*" = 0: 1st axis on EC connection unit ready for operation
  1: 2nd axis on EC connection unit ready for operation
  2: 3rd axis on EC connection unit ready for operation
  3: 4th axis on EC connection unit ready for operation

Caution when Connecting EC Connection Unit

Described below is the caution notes when the gateway unit and the EC connection unit are connected.

- The EC connection unit occupies domains for four axes (one word) even though not all of four axes are connected. Also, an axis number that an axis is not connected should not be pulled one number forward.
- The axis numbers for the EC connection unit should be assigned from after axes connected to driver units (RCON-PC/AC/DC/PC/SC) and SCON extension unit.
- The EC connection unit can be connected for four units at maximum, however, it cannot be connected if the top axis number exceeds 0 to 15 and an alarm should get generated.
- When the EC connection unit is connected, the initialization time should be longer compared to when only the driver unit is connected (by approx. 60ms).
- For the structure with driver units and EC connection units existing together, communication from a teaching tool to EC connection units and ELECYLINDER will not start unless the initialization communication to all the units has finished.

[Initializing Communication when EC Connection Unit Existed Together]



(1) Finish initializing communication with driver units and SCON-CB conducted first

(2) Initializing communication for EC connection units starts

When communication of (1) failed and did not finish in normal condition, communication in (2) would not start.

Without completing communications in (1) and (2),
(3) communication from teaching tool to EC connection unit and ELECYLIDER should not be conducted.

* Communication from teaching tool to gateway unit should be available.

- Time taken for the movement command (ST* Signal) reaching from PLC to ELECYLINDER should be approximately 20ms.
- When the EC connection unit is connected, the time taken for data update for the PC software should be longer compared to when only the driver unit is connected in the structure.

Timing of basic operation

[Operation preparation]

The procedure from turning on the RCON system to the home return command is as follows.

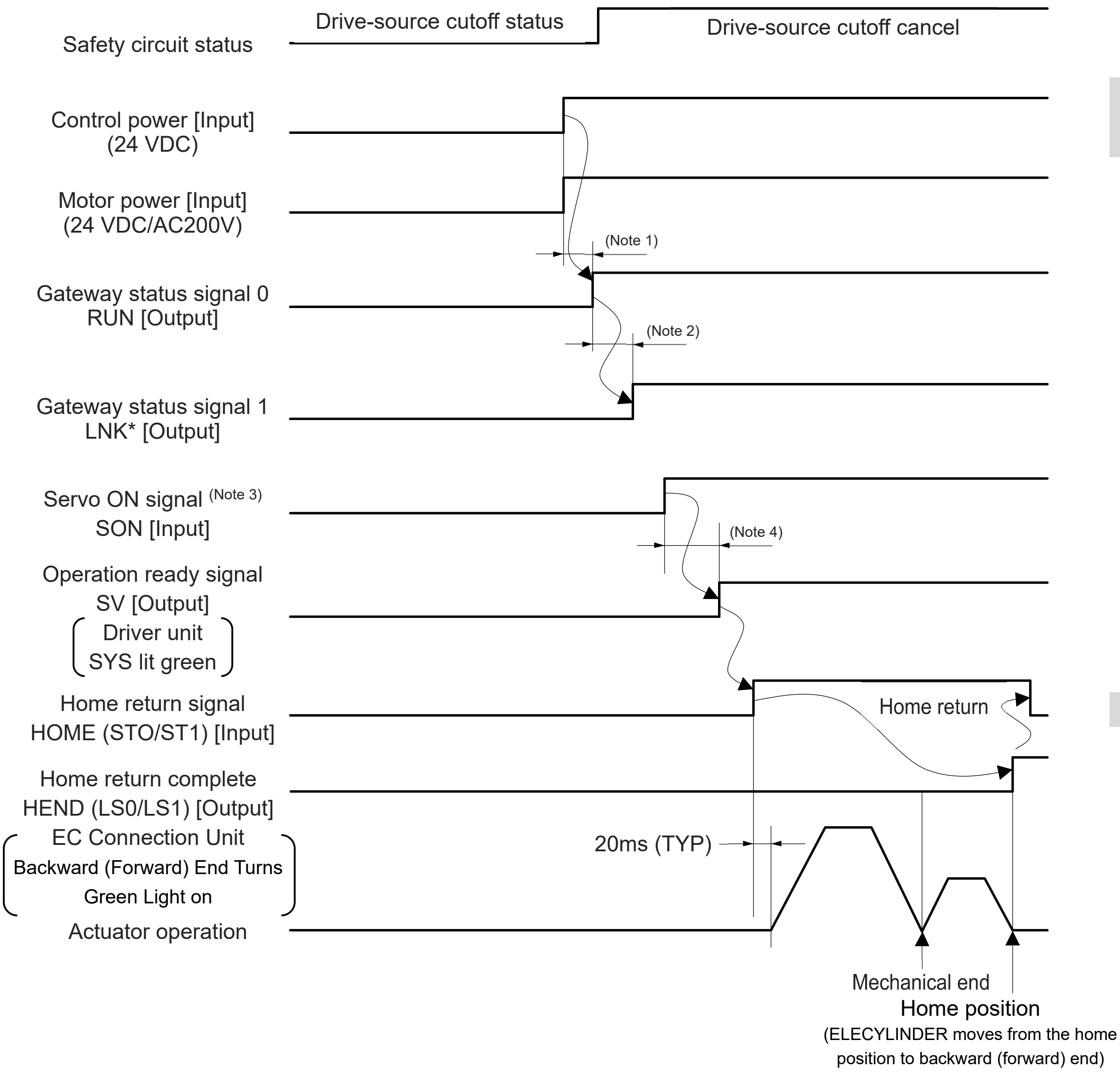
(1) Supply the control power and motor power (24 VDC/AC200V).

(2) Turn on the STOP signal input to cancel the drive shutoff status and set to conductive status.

(3) After confirming that the gateway status signals 0 "RUN" and 1 "LNK*" are ON, input the servo ON signal "SON". (Note)

(4) After confirming that the operation ready signal SV is "ON", input the home return signal "HOME". home return motion begins. When home return is completed, the home return complete signal HEND is output.
For the EC connection unit, confirm that the gateway status signal 0 "RUN" and operation standby complete signals "E0RD" to "E3RD" are turned on, and then input either forward or backward signal "ST0/ST1". The home-return operation starts. Once the home-return operation ends and moved to the backward (or forward) end, the forward/backward signal "LS0/LS1" should be output.

Note: There is no "LNK*" or "SON" signal for the EC connection unit. Once the power is supplied, the servo on ELECYLINDER automatically turns on.



For details on th e gateway status signal, refer to [3.7 Address Configuration / Gateway control / status signals (page A3-32)].

Note 1: When the power is turned ON, the RCON system starts up. When field network communication between the gateway unit and host device is established, the gateway status signal 0 "RUN" turns ON. After confirming that the "RUN" is ON, begin communication with the gateway unit.

Note 2: If the gateway unit and driver unit are communicating normally, the gateway status signal 1 "LNK* (* is axis number)" turns ON.

If a communication error occurs between the gateway unit and driver unit, "LNK* " turns OFF. However, the ERRT alarm is not generated until the "communication retry count" set in the gateway parameter configuration tool is exceeded, until which retries are repeated.
If the communication becomes normal after repeated retries, "LNK* " turns ON.
The signal may also turn ON after temporarily turning OFF due to sudden noise.

Regarding the "communication retry count", refer to [3.9 Gateway Parameter Configuration Tool / Special parameter setting function descriptions" (page A3-158)].

Note 3: After checking the "RUN" and "LNK* ", input the "SON". The actuator goes into servo ON status.

Note 4: When the first "SON" is input after power ON, the motor performs excitation phase detection operation (stepper motor specification) or magnetic pole phase detection operation (AC servo motor specification).
After confirming that the operation ready signal "SV" is ON, input the travel command or home return command.

Caution

- If the servo is turned ON in the vicinity of the mechanical end, the magnetic pole phase will not be properly detected, causing abnormal operation, uncertain magnetic pole error or excitation detection error.
  Turn ON the servo in a position away from the mechanical end.
- If the power has been turned OFF, wait 1 second or more before rebooting the power. Otherwise, the product may malfunction.

[Operation in direct numerical control mode]

Specify the data in the PLC position data specification register, positioning width register, speed register, acceleration/deceleration register and push-motion current limit value register.

- Operation example (push-motion operation)

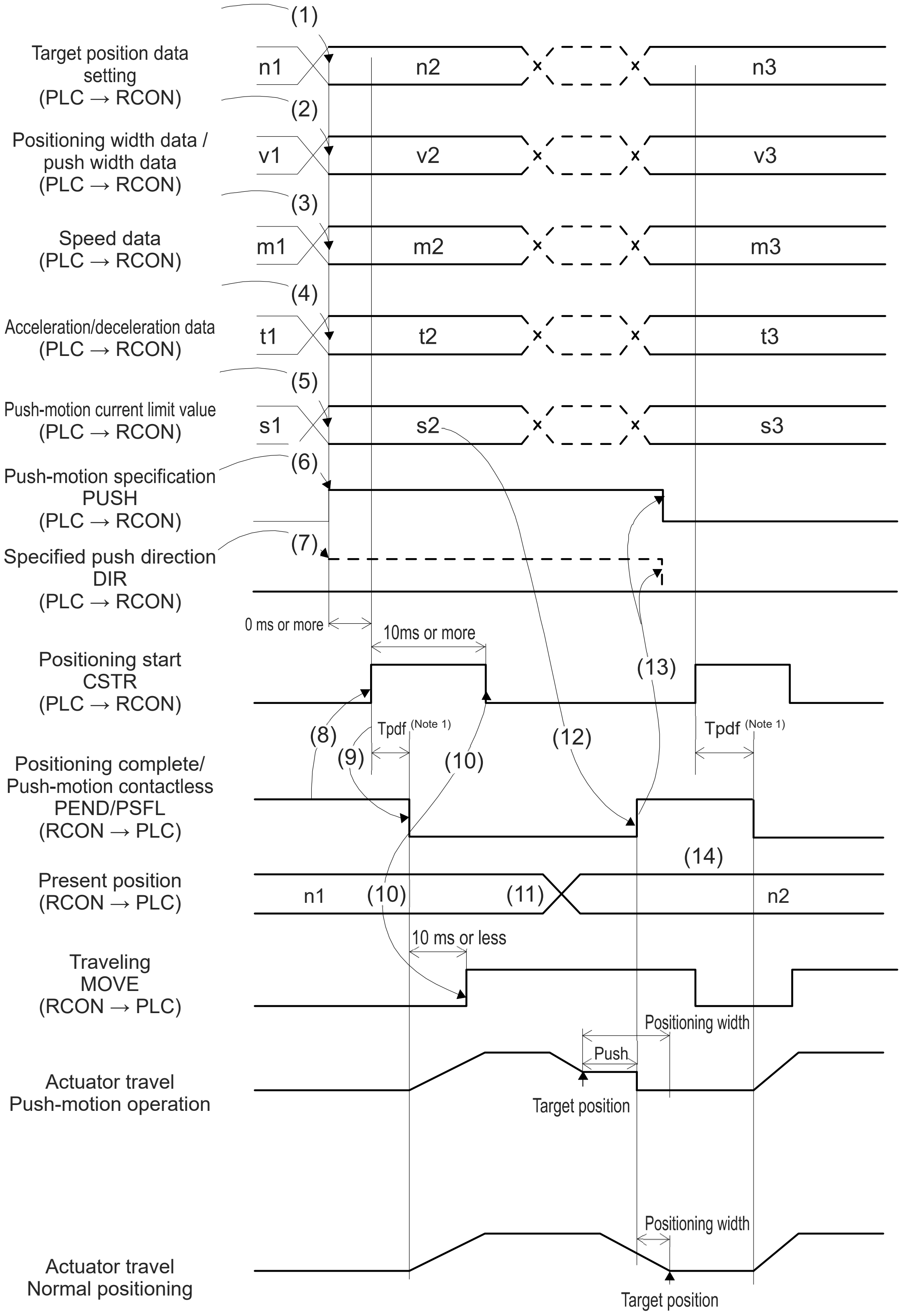
<Preparation> Using the gateway parameter configuration tool, set the axis number to be used in the direct numerical control mode. For details, refer to [3.9 Gateway Parameter Configuration Tool / Operation mode setting (page A3-167)].

(1) Set the target position data in the position data specification register.
(2) Set the push width data in the positioning width register.
(3) Set the speed data in the speed register.
(4) Set the acceleration/deceleration data in the acceleration/deceleration register.
(5) Set the push-motion current limit data in the push-motion current limit value register.
(6) Set the push-motion specification signal PUSH to ON.
(7) Specify the push-motion direction with the push-motion direction specification signal DIR.
(8) While the positioning complete signal PEND is ON or the moving signal MOVE is OFF, turn ON the positioning start signal CSTR.
The data set in (1) to (5) are read into the RCON at the rising edge of the CSTR signal.
(9) After the CSTR signal is turned ON, the PEND signal turns OFF after Tpdf.
(10) Confirm that the PEND signal is OFF or the MOVE signal is ON, then turn OFF the CSTR signal. However, be sure to set an interval of 10 ms or more from CSTR signal ON until signal OFF. Do not change the value of each register until the CSTR signal is turned OFF.
(11) The present position data is constantly being updated.
(12) The PEND signal turns ON when the CSTR signal is OFF and the motor current reaches the current limit value set in (5). (Push-motion complete)
Even if the push width set in (2) is reached, if the motor current does not reach the current limit value set in (5), the push-motion contactless signal PSFL turns ON. In this case, the PEND signal will not turn ON. (Push-motion contactless)
(13) After the PEND signal or PSFL signal turns ON, turn OFF the PUSH signal.

- Operation example (normal positioning operation)

For normal positioning operation, turn the PUSH signal OFF.

When the remaining travel distance enters the positioning width range set in the positioning width register, the PEND signal turns ON when the CSTR signal is OFF.



Note 1 Tpdf : Response time
For details of the response time, refer to [Timing of I/O signals (page A3-93)].

[Simple direct mode/positioner 1 operation]

Set the target position data to PLC position data specification register (in simple direct mode) or register the target position to the RCON position table (in positioner 1 mode), and register other data such as speed, acceleration/deceleration, positioning width and push-motion force in the position table for operation.

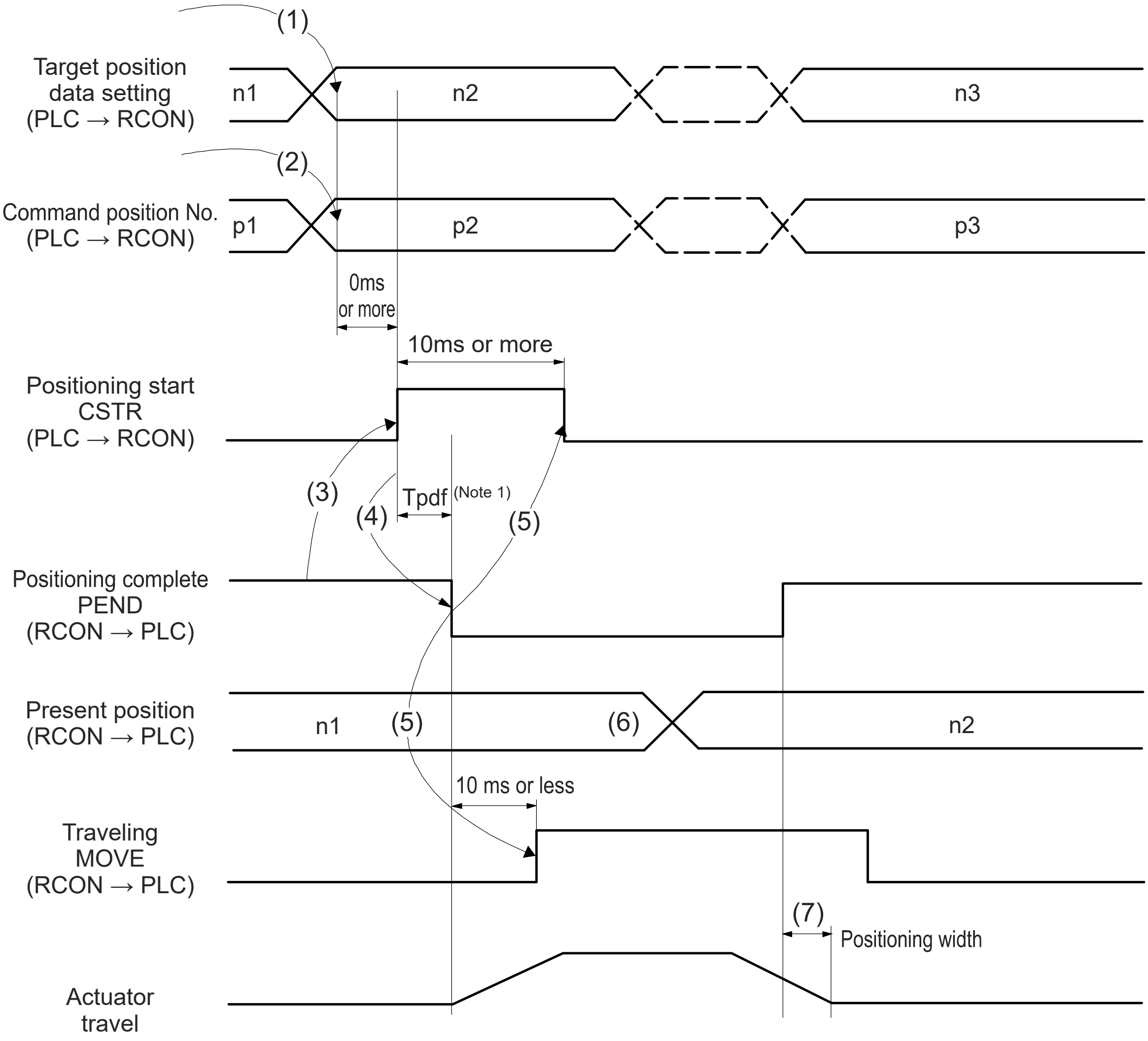
● Operation example (normal positioning operation in simple direct mode)

<Preparation> Using the gateway parameter configuration tool, set the axis number to be used in the simple direct mode. For details, refer to [3.9 Gateway Parameter Configuration Tool / Operation mode setting (page A3-167)].
Register the position data (speed, acceleration/deceleration, push width, etc.) other than the target position in the position table.

(1) Set the target position data in the position data specification register.
(2) Register the position No. for which the speed, acceleration/deceleration and the like are set in the command position No. register.
(3) While the positioning complete signal PEND is ON or the moving signal MOVE is OFF, turn ON the positioning start signal CSTR
The data set in (1) and (2) are read into the RCON at the rising edge of the CSTR signal.
(4) After the CSTR signal is turned ON, the PEND signal turns OFF after Tpdf.
(5) Confirm that the PEND signal is OFF or the MOVE signal is ON, then turn OFF the CSTR signal. However, be sure to set an interval of 10 ms or more from CSTR signal ON until signal OFF. Do not change the value of each register until the CSTR signal is turned OFF.
(6) The present position data is constantly being updated.
(7) When the remaining travel distance of the actuator enters the positioning width range set in the position data, the PEND signal turns ON when the CSTR signal is OFF, and the complete position number is output to the complete position number register.
The present position data may slightly change due to vibration or the like even while it is stopped.
(8) The target position data can be changed while traveling.
To change the target position, change the target position data and turn ON the CSTR signal once the PLC scan time has elapsed.
Turn OFF the CSTR signal after satisfying the same conditions as (5) above.

● Operation example (push-motion operation)

For push-motion operation, set the current limit value in the push-motion force field and push width in the positioning width field of the position table in the <Preparation> step. If positioning is performed on this set position No., push-motion operation will be activated.



Note 1 Tpdf : Response time
For details of the response time, refer to "Timing of I/O signals (page A3-91)".

[Operation in positioner 2, 3, and 5 modes]

Register the target position, speed, acceleration/deceleration, positioning width, push-motion and the like to the RCON position table.

● Operation example (positioning operation)

<Preparation> Using the gateway parameter configuration tool, set the axis number to be used in the positioner 2, 3 or 5 mode. For details, refer to [3.9 Gateway Parameter Configuration Tool / Operation mode setting (page A3-167)].

Register the position data (target position, speed, acceleration/deceleration etc.) in the position table.

(1) Register the position No. for which the speed, acceleration/deceleration and the like are set in the command position No. register.

(2) While the positioning complete signal PEND is ON or the moving signal MOVE is OFF, turn ON the positioning start signal CSTR.

The data set in (1) are read into the RCON at the rising edge of the CSTR signal.

(3) After the CSTR signal is turned ON, the PEND signal turns OFF after Tpdf.

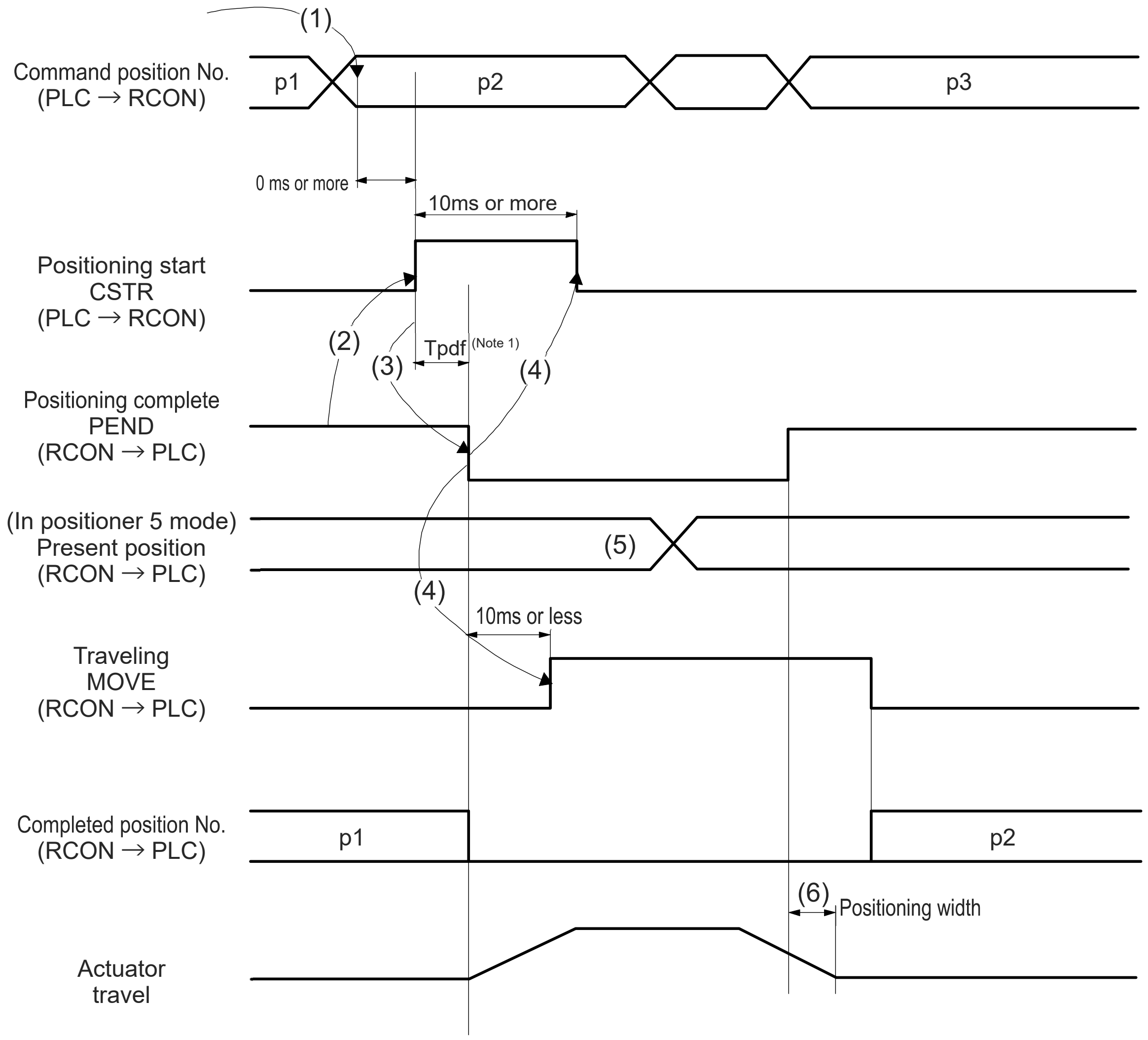
(4) Confirm that the PEND signal is OFF or the MOVE signal is ON, then turn OFF the CSTR signal. However, be sure to set an interval of 10 ms or more from CSTR signal ON until signal OFF. Do not change the value of each register until the CSTR signal is turned OFF.

(5) In positioner 5 mode, the present position data is constantly being updated.

(6) When the remaining travel distance of the actuator enters the positioning width range set in the position data, the PEND signal turns ON when the CSTR signal is OFF, and the complete position number is output to the complete position number register.

● Operation example (push-motion operation)

For push-motion operation, set the current limit value in the push-motion field and push width in the positioning width field of the position table in the preparation step. If positioning is performed on this set position No., push-motion operation will be activated.



Note 1 Tpdf : Response time

For details of the response time, refer to "Timing of I/O signals (page A3-91)".

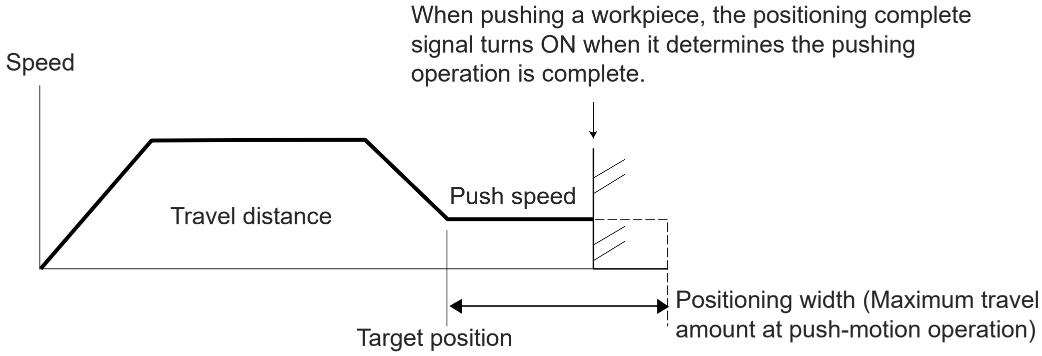
Other basic operations

[Push-motion Operation]

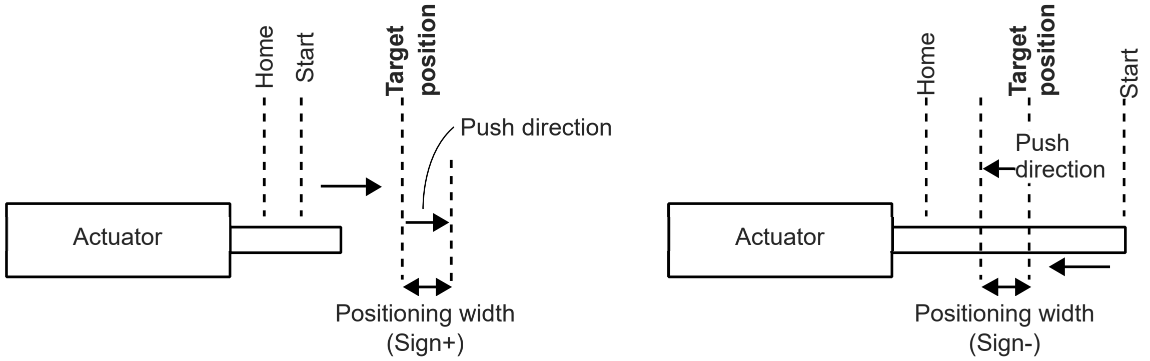
(1) Basic operation

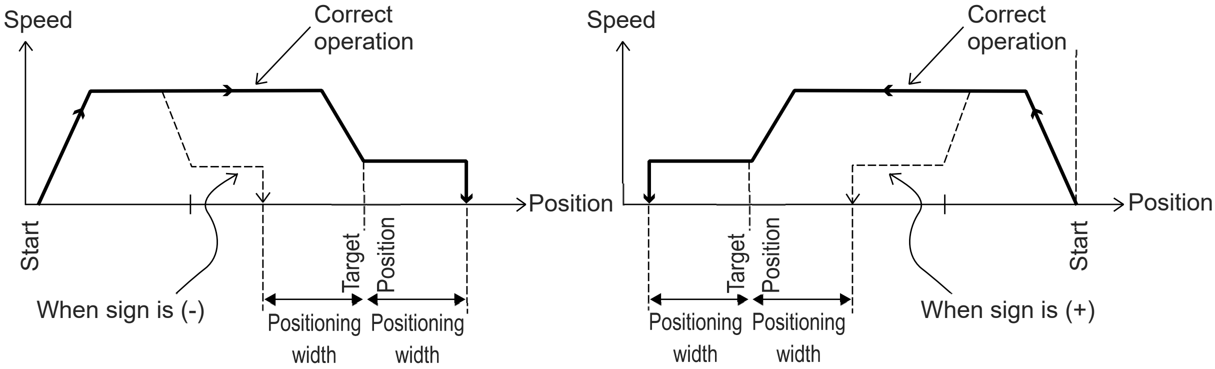
After moving to the set target position as shown below, advance at the set push speed with push motion by the positioning width set as the maximum travel amount.

When the pushing force reaches a certain value during push motion, it is judged that pushing is completed and the positioning complete signal PEND becomes "1" (ON).



Concept of push direction





As shown in the figure above, when pushing from the start point toward the target position in the direction in which the coordinate value increases, the push direction is positive (+), and when pushing in the direction in which the coordinate value decreases, the push direction is negative (-). Pushing in the wrong direction will lead to improper operation, as the push-motion operation will start at the start point and continue to the distance (positioning width × 2); take care.

■ Push mode specification

- For positioner 1 to 3 and 5 mode and simple direct mode, set a numerical value to something other than 0 in the "Push" column of the position table. (Pushing current limit value)
- For direct numerical control mode, set the value to the current limit value area at the time of pushing (8-bit), and set the control signal PUSH (bit 12) to "1" (ON).

■ Push speed

Set Parameter No. 34 "Push velocity".
(Individually set for each actuator model at shipment.)

■ Maximum travel amount at push-motion operation

- For positioner 1 to 3 and 5 mode and simple direct mode, set in the "Positioning width" column of the position table.
- For direct numerical control mode, set a numerical value for the positioning width area. (When setting, consider the workpiece installation positioning error and the indentation of elastic workpieces.)

■ Push direction

- For positioner 1to3 and 5 mode and simple direct mode, the sign in the "Positioning width" column of the position table.
- For direct numerical control mode, set the control signal DIR (bit 13) to "0" (OFF) or "1" (ON).

■ Pushing complete recognition

- Recognition of pushing complete is done by motor generated torque (pushing force) and push time.
- Set the push current limit value (%) in the "Push" column of the position table. • For direct numerical control mode, set in the push current limit value register.
  Determine the push force from the workpiece characteristics (shape, material etc.) and then the push current limit value from the actuator "Push force - Current limit value" relationship diagram.
- Set the value of Pushing Stop Recognition Time in Parameter No. 6.
  (The factory default setting is 255 ms. The default is set to 70ms for some models of the gripper type.)

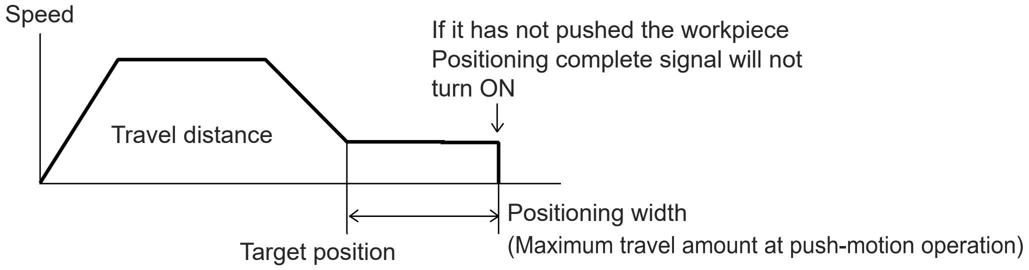
■ Continuous pushing

- When it is determined that push-motion operation is complete, positioning complete signal PEND becomes "1" (ON), but continuous push-motion operation is performed until the next travel command (command position number and positioning start signal CSTR) is issued.

(2) For push-motion contactless

Even if it travels the distance set for positioning width, positioning complete signal PEND will not be output if it has not pushed the workpiece (the current of the motor has not reached the current limit value at the time of pushing). However, completed position No. is output.

At this time, PSFL of status signal bit 5 becomes "1" (ON).

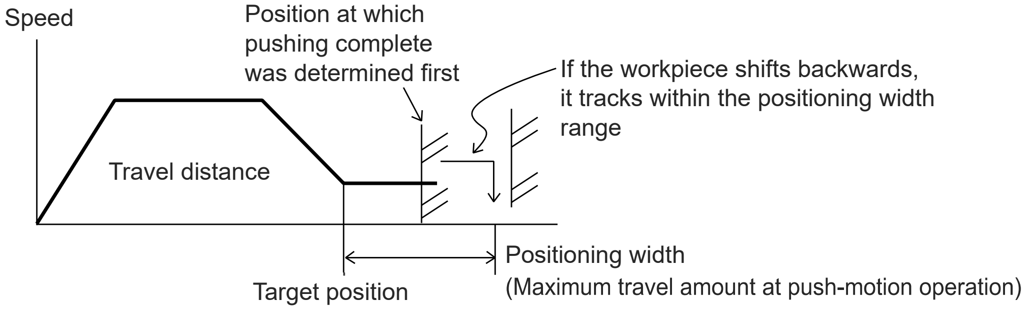


(3) If the workpiece moves after pushing

- ■ If the workpiece moves in the pushing direction

  Once the workpiece moves in the pushing direction after pushing is completed, the actuator tracks the workpiece within the range of the positioning width.

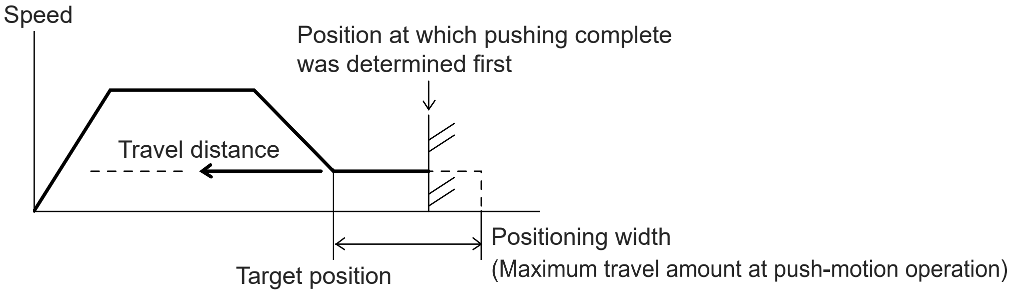
  If the traveling current value becomes smaller than the pushing current limit value, the positioning complete signal PEND will be "0" (OFF). When it reaches the current limit value again, it becomes "1" (ON).



- ■ If the workpiece moves in the direction opposite to the push direction (when the reaction force from the workpiece is too strong and it is pushed back)

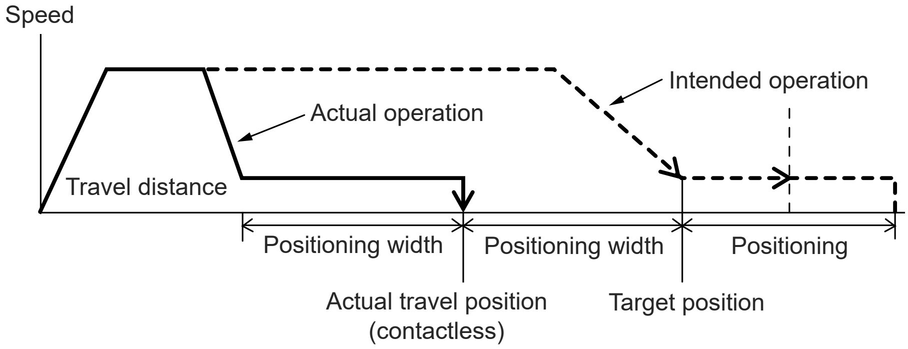
  If pushed back due to reaction force from the workpiece after pushing is completed, the actuator is pushed back to the utmost until the pushing force and the reaction force from the workpiece are balanced.

  At this time, the positioning complete signal PEND remains "1" (ON). When pushed back to the target position, an alarm is generated.



(4) If push direction is set incorrectly

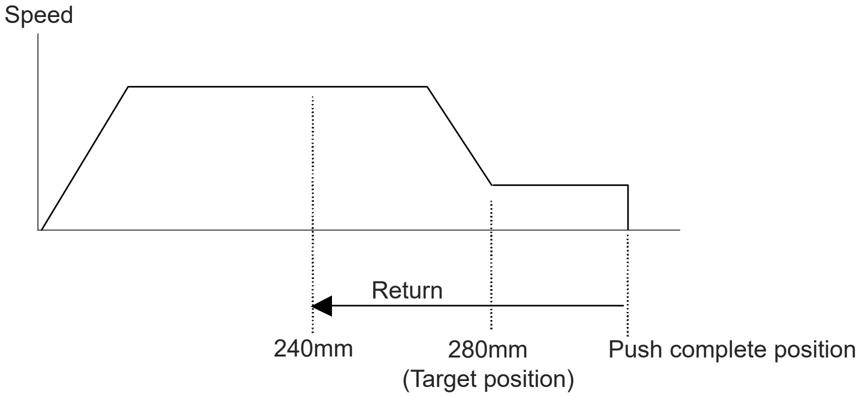
If the push direction is set incorrectly, be careful as it will be displaced by (positioning width x 2) as shown below.



(5) If return after pushing is performed by relative coordinate specification

Be aware that for relative coordinate specification, the reference position is the target position of the position No. that pushed, not the current position where pushing has stopped after completion.

In this example, if you set the position No. to -40 mm of the relative coordinate, it will move to the position 280 - 40 = 240 mm. However, if pushing is specified, it will move relatively from the stop position.



(6) When SEP is set as push mode

The 24V driver unit is capable to change the pressing method to SEP type by setting Parameter No. 181 to "1". (Note)

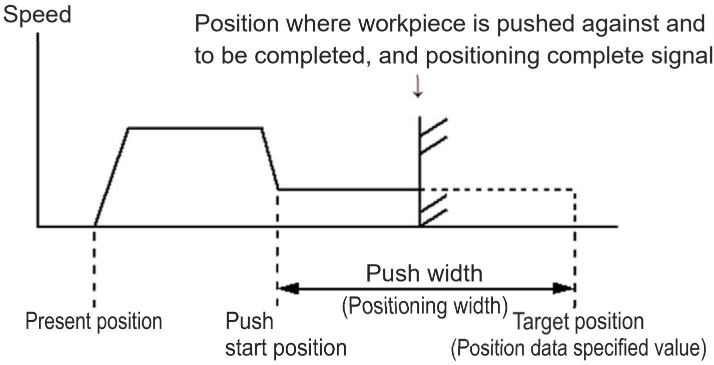
Note: The pressing method for the 200V driver unit is the CON type only.

[Push Mode (Parameter No. 181)]

No.	Name	Unit	Input range	Default initial value setting
181	Push mode	–	0: CON mode 1: SEP mode	0

Push-motion operation is performed with the position obtained by subtracting the distance set for the positioning width from the target position (Note 1) (position data specified value) (Note 2) as the start position. Pull-motion operation is not available.

During push motion, once the workpiece is pushed against and the push is judged to be completed, PEND will turn ON.



Note 1: It should be the value input in the position data indication register for direct indication and the simple direct mode.

Note 2: It should be the value input in the positioning band width indication register in the direct indication mode.

Stepper motor specification function only

(7) Pressing operation commanded torque level detection

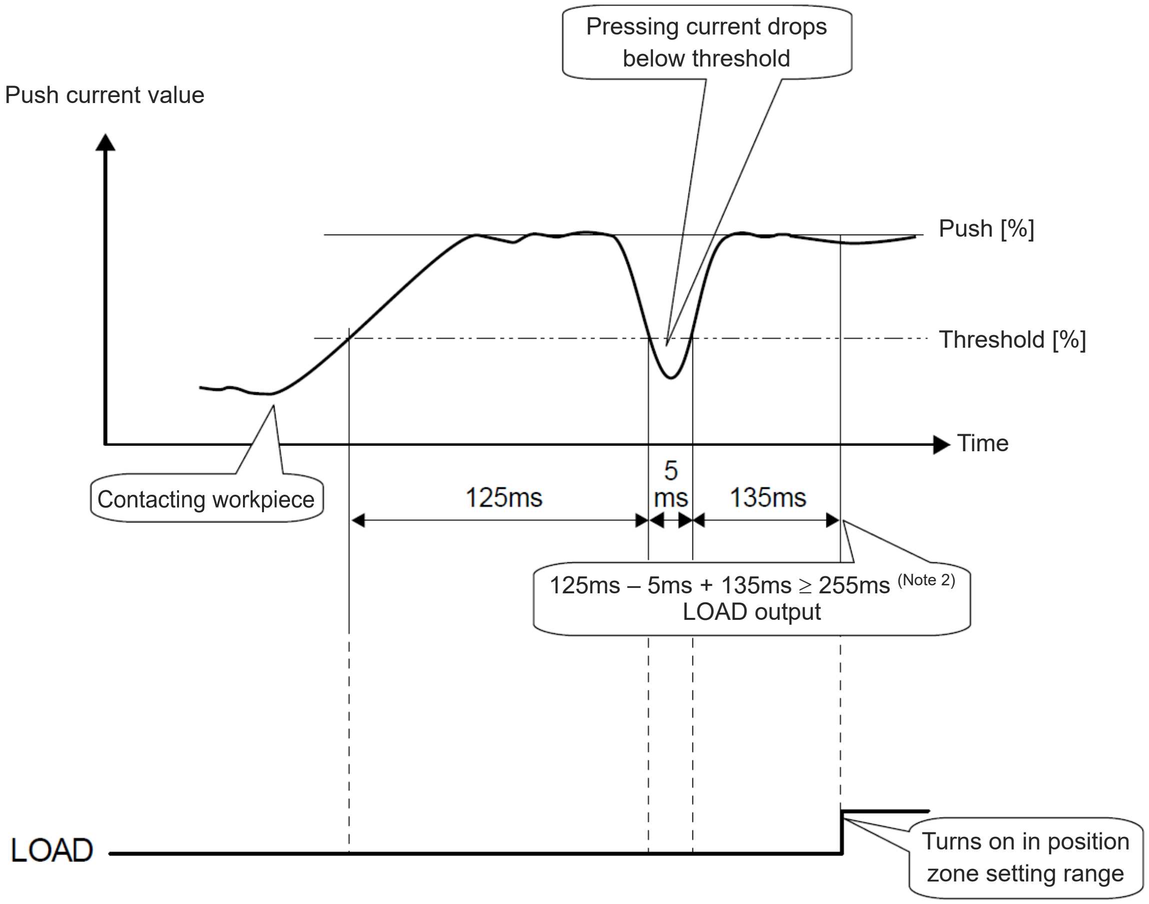
It is a signal dedicated for the high-thrust actuator that possesses the stepper motor specification (PCF Type). It should be used as a reference for output when it is used for an actuator other than the motor specification high-thrust type.

This is a feature to detect that specified load is applied on an actuator by checking the torque by the loaded current during the press-fitting operation when press-fitting is performed with the pressing operation. As no load is applied when there is no press-fitting resistance applied, it is available to generate an alarm from PLC to alert that press-fitting is not being performed in normal condition.

The load output judgment status (LOAD) gets turned on when the pressing current exceeds the current value [%] set in “Threshold” in the position data for the period of time set as judgment time (Note 1) in the pressing operation range (excluding the approach motion range) and also in the range set as [Position Zone] in the position data.

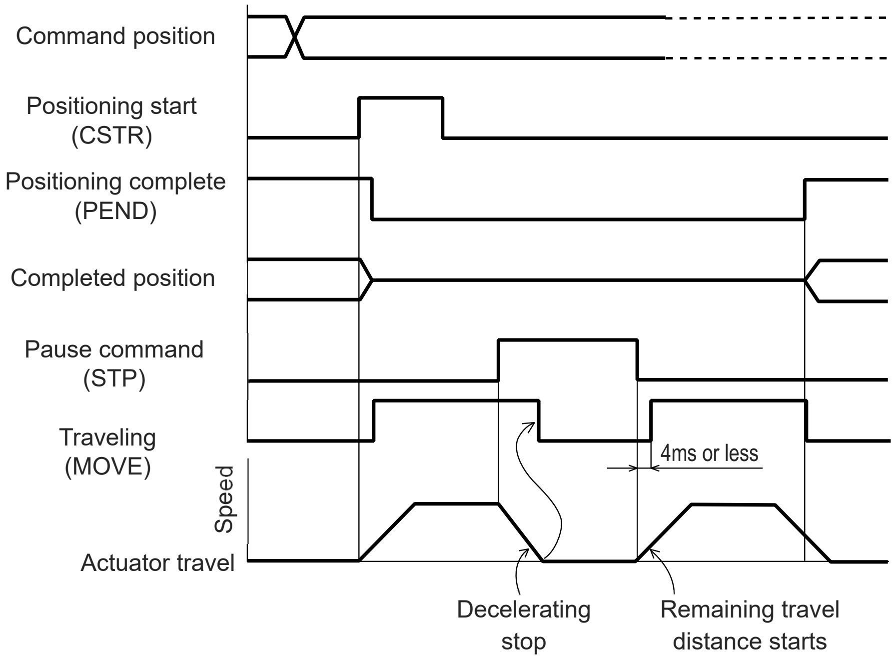
It would not turn off even after the load is removed and current falls. It will turn off at the next movement command or alarm reset.

Note 1: It is to be set in Parameter No. 50 “Load output judgment time”. (Initial value: 255ms)

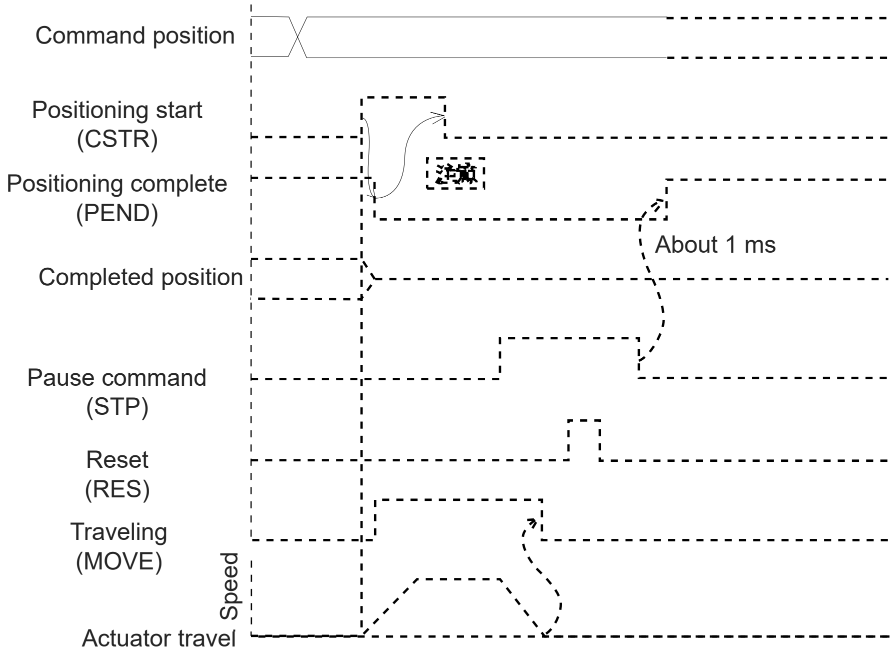


[Pausing]

Deceleration to a stop occurs when the pause command signal STP is set to "1" (ON) during actuator operation and the remaining travel distance is suspended. If the STP signal is set to "0" (OFF) again, movement over the remaining travel distance is resumed.

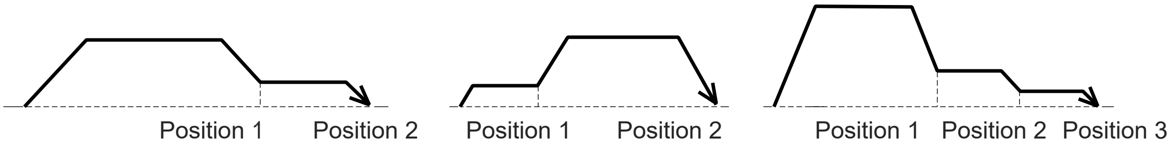


If reset signal RES is set to "1" (ON) while paused, it is possible to cancel the remaining travel distance. After that, the positioning complete signal PEND becomes "1" (ON) in about 1 ms when cancellation of the pause command signal STP is recognized. (Detects the RES signal and cancels it.)



[Speed changes while traveling]

Multiple speed control is possible with one operation. While traveling, you can slow down or speed up from a given point. However, position data is required every time the speed changes.

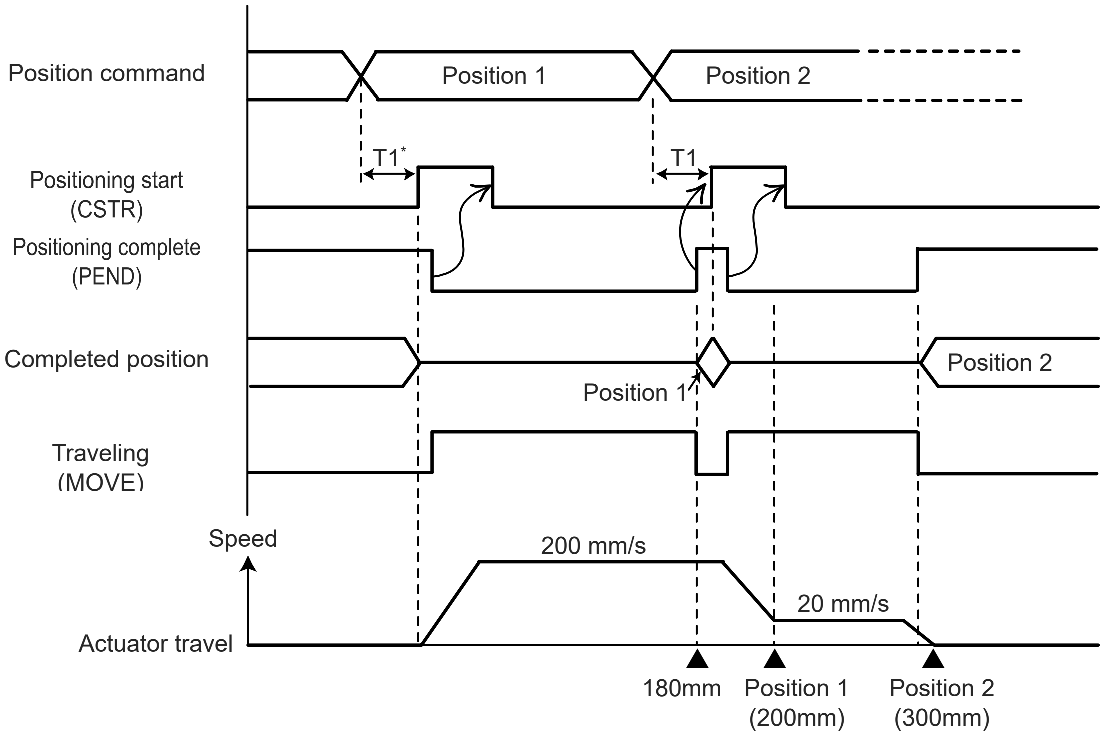


This function is effective for cases where the material to be conveyed is soft, the workpiece may fall due to its shape, such as bottles, and when vibration or shocks while stopping are undesirable.

(Example) When positioning to position 2 (300 mm from home), it moves to an intermediate position 1 (200 mm from home) at 200 mm/s speed, and thereafter at 20 mm/s speed.

Position table example

No.	Position [mm]	Speed [mm/s]	Acceleration [G]	Deceleration [G]	Push [%]		Positioning width [mm]		Comment
0	*	*	*	*	*		*		
1	200.00	200.00	0.30	0.30	0		20.00		
2	300.00	20.00	0.30	0.30	0		0.10		



* Consider the scan time of the host controller, so that T1 ≥ 0 ms.

Caution

- When the positioning start signal CSTR is set to "1" (ON), positioning complete signal PEND changes to "0" (OFF) and the moving signal MOVE changes to "1" (ON).
  Set the start signal CSTR to "1" (ON); after confirming that the PEND signal is "0" (OFF), set the CSTR signal back to "0" (OFF).
- If you increase the positioning width at position 1, speed change can be performed smoothly without having to pause.
- When a pause command is issued during home return, the travel command is suspended if before mechanical end pushing; if after push reverse operation, it starts over from home return.

[Operation at Different Acceleration/Deceleration Speeds]

(1) In positioner 1 to 3 and 5 mode and simple direct mode

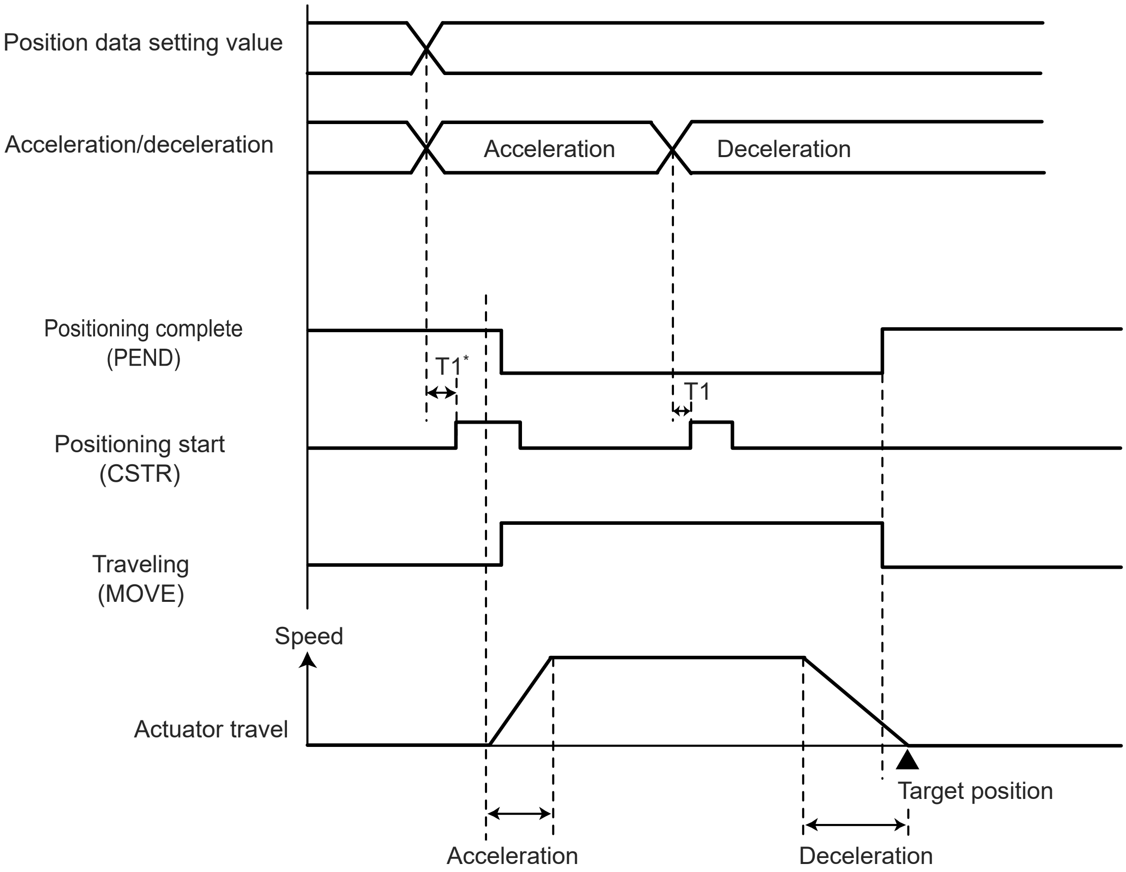
Acceleration and deceleration can be set separately in the position table.

(2) In direct numerical control mode

In this mode, acceleration and deceleration cannot be set separately.

Acceleration/deceleration can be set together.

Acceleration/deceleration data (16-bit data) is valid when data is received by the driver unit (rising edge "0" (OFF) → "1" (ON) of CSTR signal), so to set a different deceleration from acceleration, change the acceleration/deceleration data while traveling.



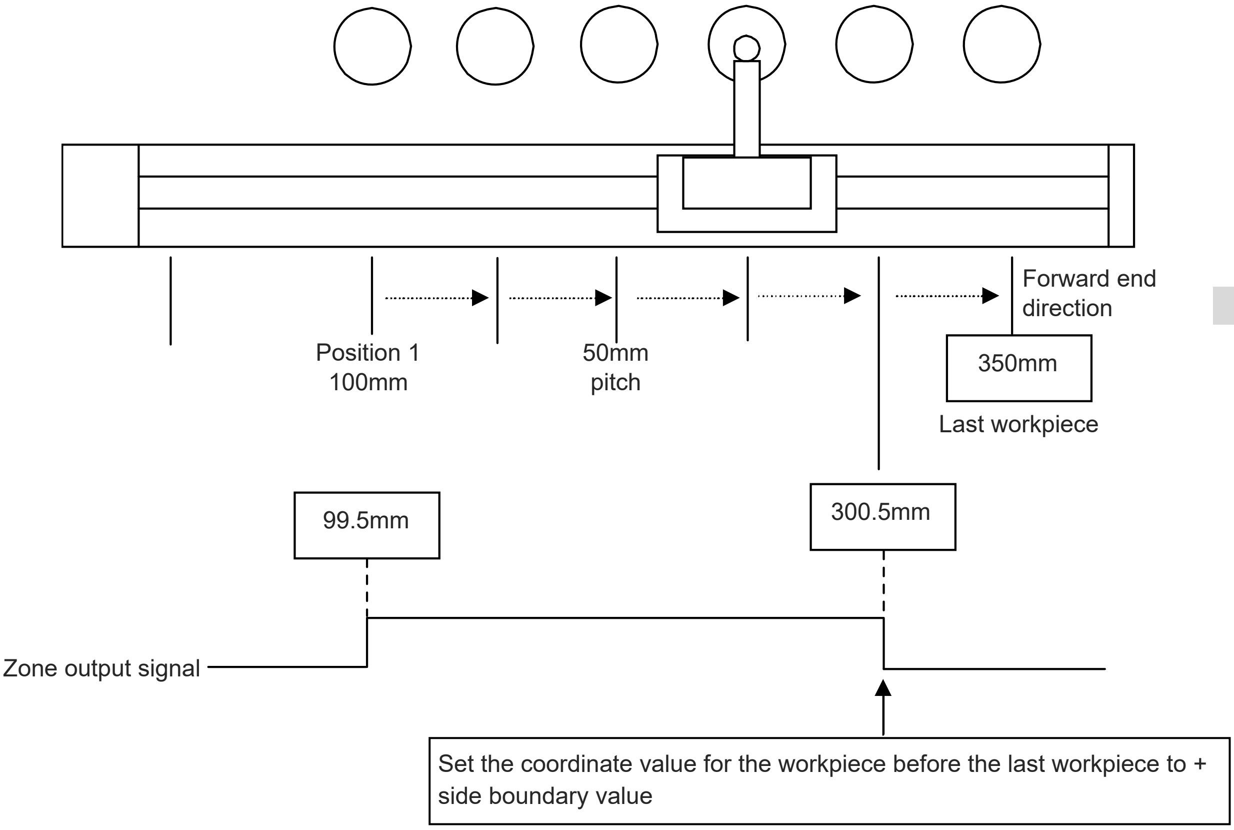
* Consider the scan time of the host controller, so that T1 ≥ 0 ms.

[Operation by Specifying Relative Coordinates]

Relative coordinates for the target position of the position table can also be specified, allowing use for equidistant positioning operations.

(1) Example for operation in positioner 1 to 3 and 5 mode

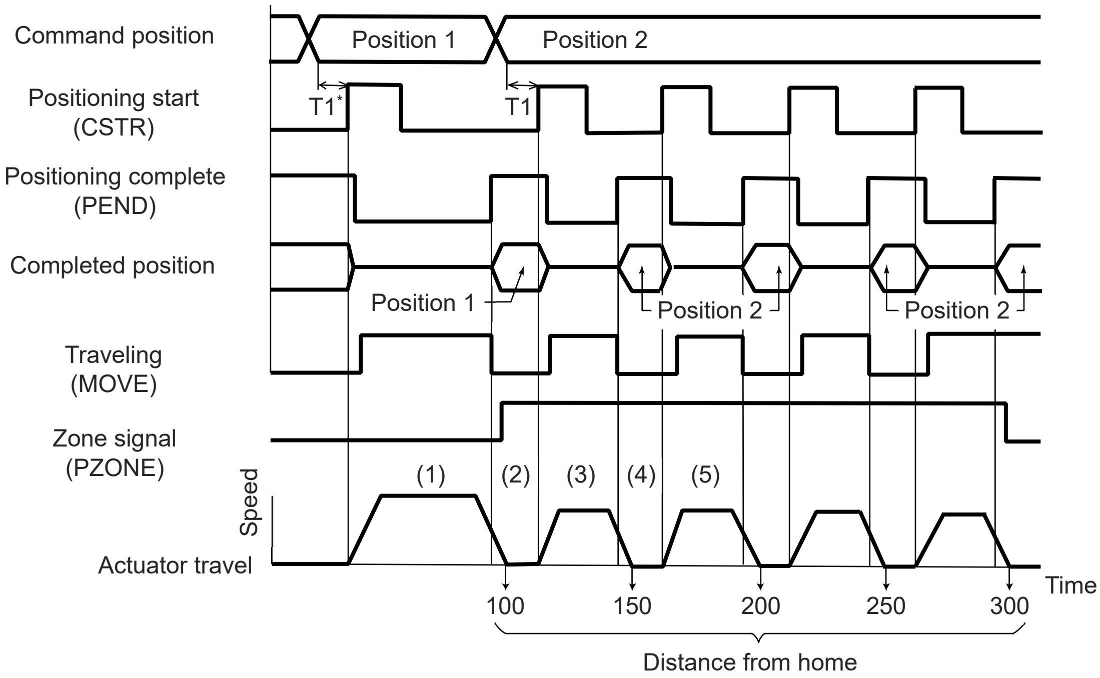
Here is an example for positioning with 50 mm pitch starting from position No. 1. Create a position table like the one below. The end of operation judgment is carried out by performing count management on the PLC side. Double checking is possible if a zone signal is used together.



Position table example

No.	Position [mm]	Zone+ [mm]	Zone- [mm]	Incremental	Comment
0	*	*	*	0	
1	100.00	300.50	99.50	0	
2 ＝	50.00	300.50	99.50	1	

Indicates the relative coordinate specification with the teaching tool.



* Consider the scan time of the host controller, so that T1 ≥ 0 ms.

[Description of Operation]

(1) Positioning to position 1 (100.00 mm) is carried out

(2) When positioning to position 1 is completed, positioning complete signal PEND changes to "1" (ON). The zone signal PZONE also changes to "1" (ON).
Switch position No. 1 → 2 and set the start signal CSTR to "1" (ON).

(3) When travel starts, PEND signal changes from "1" (ON) to "0" (OFF) and the moving signal MOVE changes from "0" (OFF) to "1" (ON). After confirming that the PEND signal is "0" (OFF), set the CSTR signal to "0" (OFF).

(4) After moving by 50 mm again, the PEND signal changes to "1" (ON) and the MOVE signal changes to "0" (OFF). At this time, the travel count is counted as 1 by the PLC. Next, set the CSTR signal for the second 50 mm movement to "1" (ON).

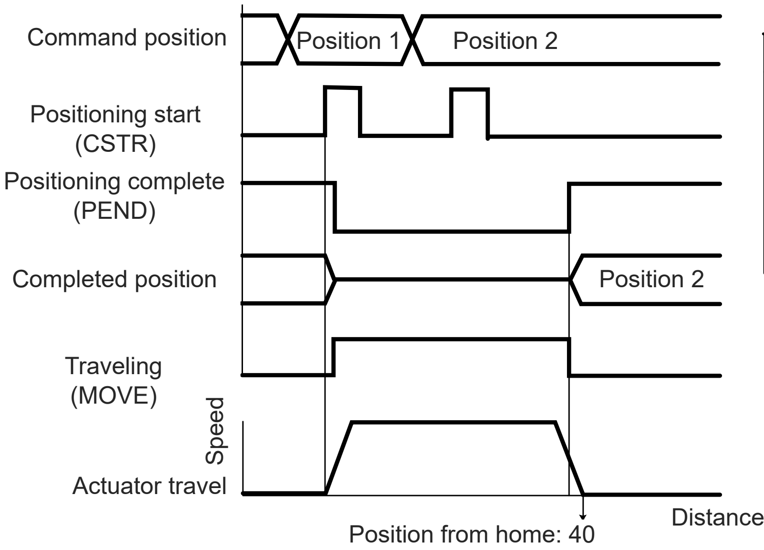
(5) Operations (3) and (4) below are repeated.

The PLC side confirms the state of the PZONE signal after positioning complete, and if it is "0" (OFF), it recognizes it as the last workpiece position.
If the count on the PLC side does not match the state of the zone signal, the signal timing may not have been synchronized.

(2) Precautions for positioning operation

When selecting and inputting position No. of the relative coordinates during positioning operation and performing start input, it travels to the first position plus the amount of relative travel. (If the amount of relative travel is negative, it moves to the position subtracted from the first position.)

Example: If start input of position 2 is performed during travel to position 1, it will go to a position 40mm from home.

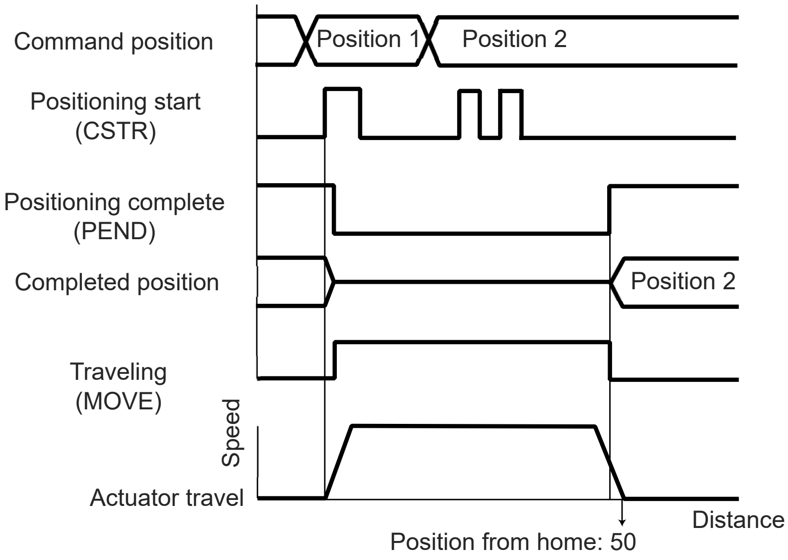


<Position table with teaching tool>

No.	Position	Speed
0	*	*
1	30	100
2	= 10	100
⋮	⋮	⋮

Also, when performing start input to the position No. of the relative coordinates during positioning operation multiple times, it travels to the first position plus the amount of relative travel x the count.

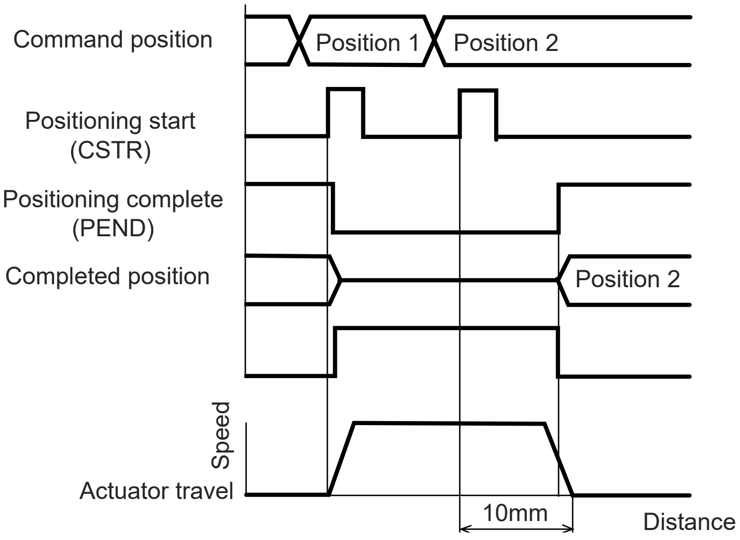
Example: If start input of position 2 is performed twice during travel to position 1, it will go to a position 50mm from home.



(3) Precautions for push-motion operation

When selecting and inputting position No. (pushing designation) of the relative coordinates while traveling in push mode, it travels to the input position plus the relative travel amount. Therefore, the end point position is not fixed.

Example: If start input of position 2 is performed during travel to position 1 in push mode, it will go to a position 10mm from the input position.



<Position table with teaching tool>

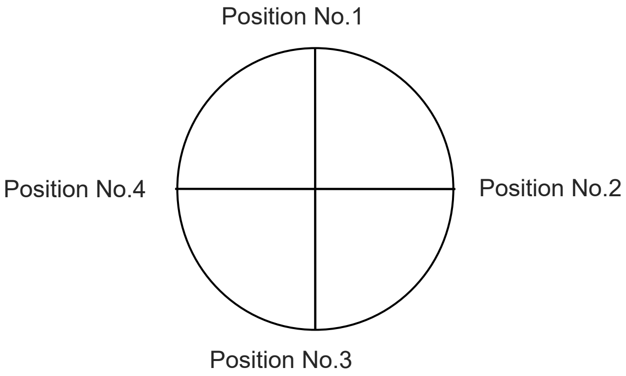
No.	Position	Speed
0	*	*
1	50	100
2	= 10	100
⋮	⋮	⋮

[Shortcut control of multi-rotation specification rotary actuator]

(1) Setting shortcut selection

Shortcut selection can be set to enabled/disabled in parameter No. 80 "Rotary axis shortcut select". When shortcut selection is enabled, it is also possible to operate only in the same direction.

[Operation examples]

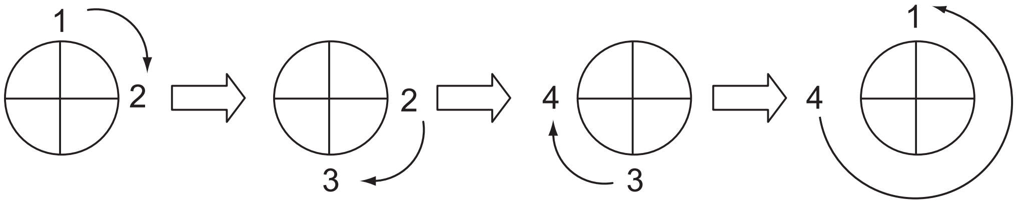


Position No.	Position
1	0.00
2	90.00
3	180.00
4	270.00

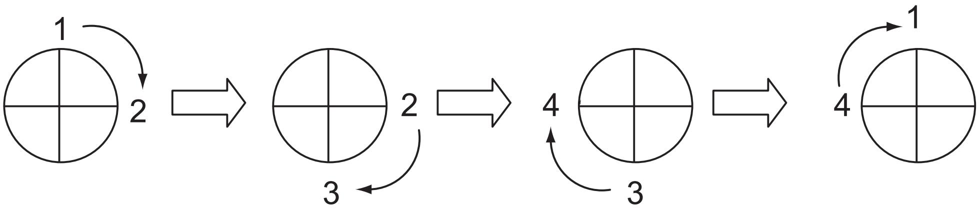
Enter the position data as 1 deg = 1 mm. (Ex) 1.2 is treated as 1.2 deg.

When operating in order of positions 1 → 2 → 3 → 4 → 1, operation differs according to whether shortcut selection is disabled or enabled.

- Disabled



- Enabled

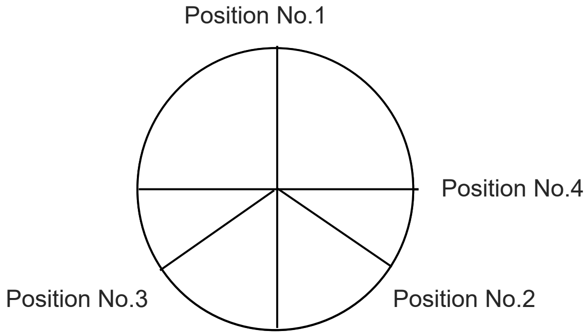


(2) Infinite rotation control

When shortcut selection is enabled for continuous operation in the same direction, it is possible to perform continuous rotation in the same manner as a motor. Proceed as follows to perform continuous operation.

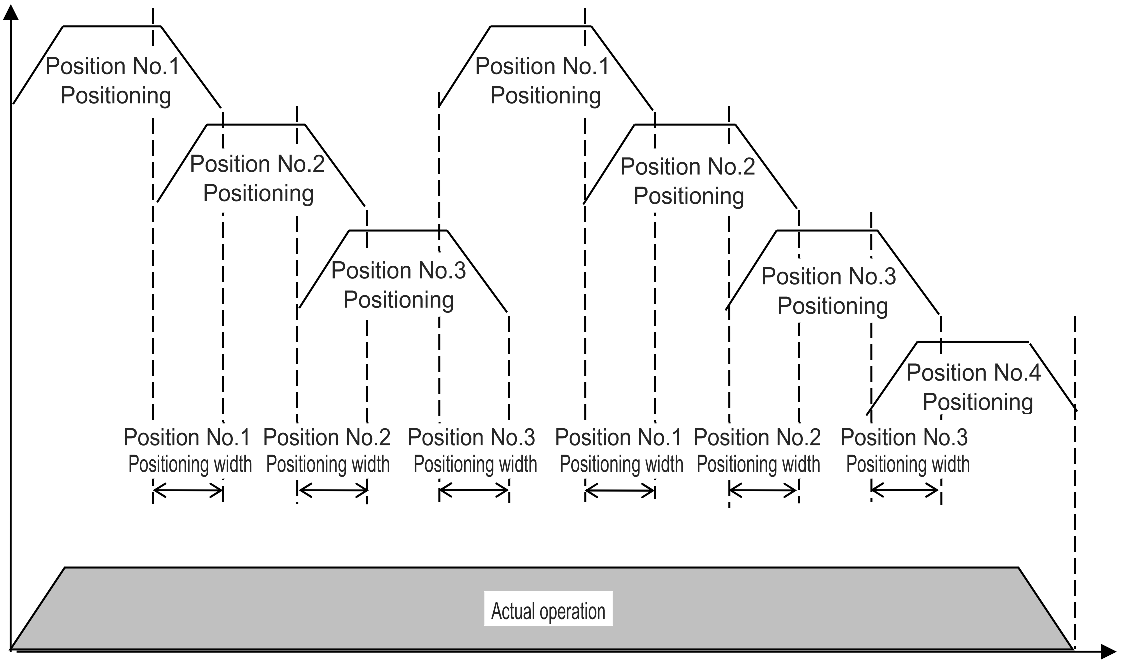
[Operation examples]

This example shows 2 rotations, finally stopping at position No. 4.



Position No.	Position
1	0.00
2	120.00
3	240.00
4	90.00

Enter the position data as 1 deg = 1 mm. (Ex) 1.2 is treated as 1.2 deg.



(1) Expand the positioning width setting of Position No. 1 to 3 to a position forward of the position where deceleration starts.

(2) If positioning is performed at Position No. 1, the positioning complete signal PEND turns ON before deceleration starts.
Position No. 2 positioning is performed by turning ON the PEND signal. Similarly, positioning is performed in the order of position No. 3 → 1 → 2 → 3 → 4. In normal positioning, the position data commanded afterward is always prioritized, which enables continuous rotation.

(3) At this point, if the speed setting is the same for Position No. 1 to 4, it is possible to rotate at the same speed and set the stop position to No. 4. The number of rotations is determined by how many times positions No. 1 to 3 are repeated.

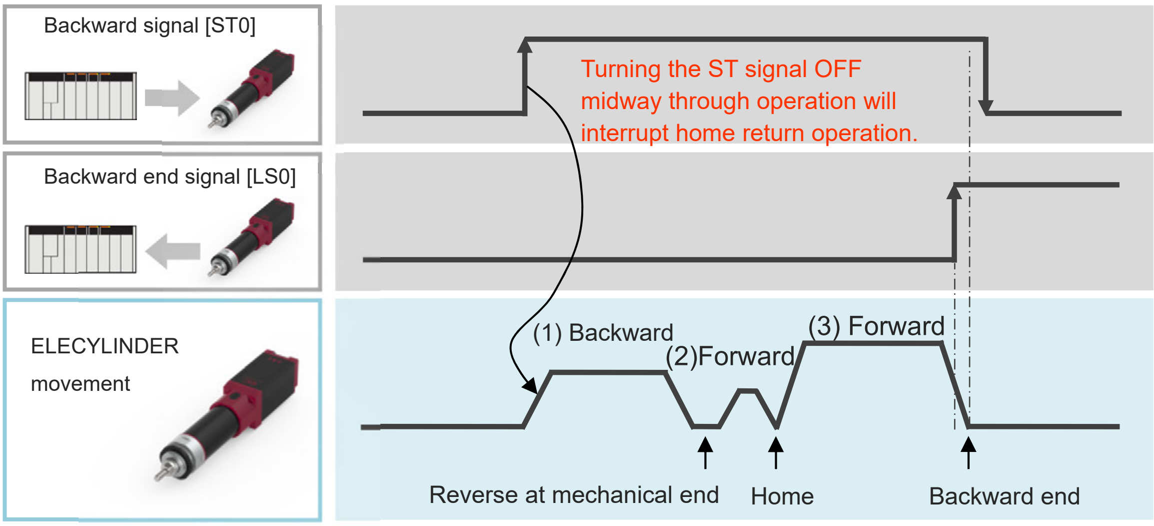
Basic Operations of ELECYLINDER

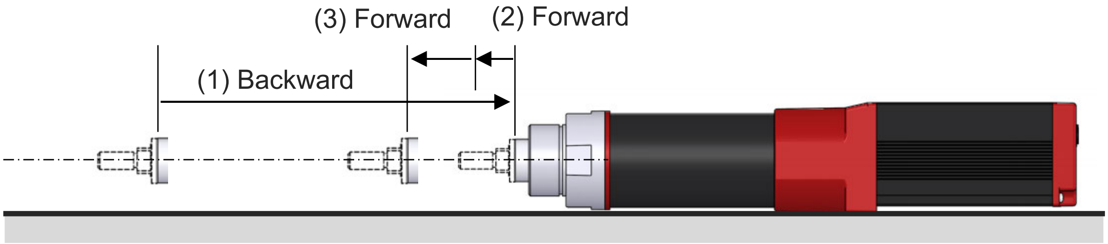
*** ELECYLINDER is not available for operation in the single solenoid system.**

[Home return operation/positioning operation]

Turning the [ST0] signal ON when home return is not complete will first trigger home return operation.

After a momentary stop at the home position, it will then move to the backward end. As well, when the [ST1] signal is turned ON, the unit will move to the forward end after home return operation. However for the battery-less absolute type, positioning operation should be conducted without having the home-return operation.





(1) When the [ST0] signal is turned ON, backward motion begins towards the mechanical end. The movement speed is 20mm/s.

(2) Once the mechanical end is struck, the direction will be reversed and forward motion will begin. The unit will move forward until the home position, then stop.

(3) After that, it will continuously move forward until the backward end, where it stops as operation is complete.

Caution

In the home reverse specification (model: NM), home return operation is in the reverse direction.

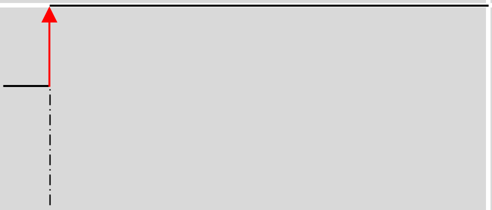
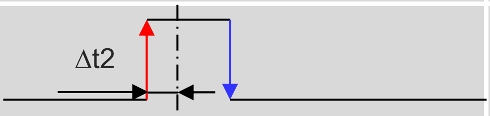
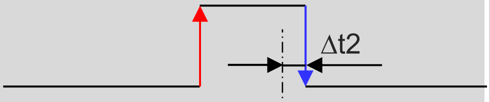
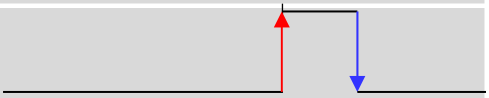
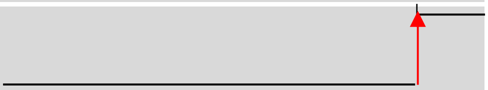
This shows the PLC timing chart for operating the ELECYLINDER.

The basic process is as follows.

Power ON ▶ **Home return** ▶ **Move to forward end** ▶ **Move to backward end**

[Basic timing chart]

Output	ELECYLINDER → output signals to PLC
Input	PLC → input signals to ELECYLINDER

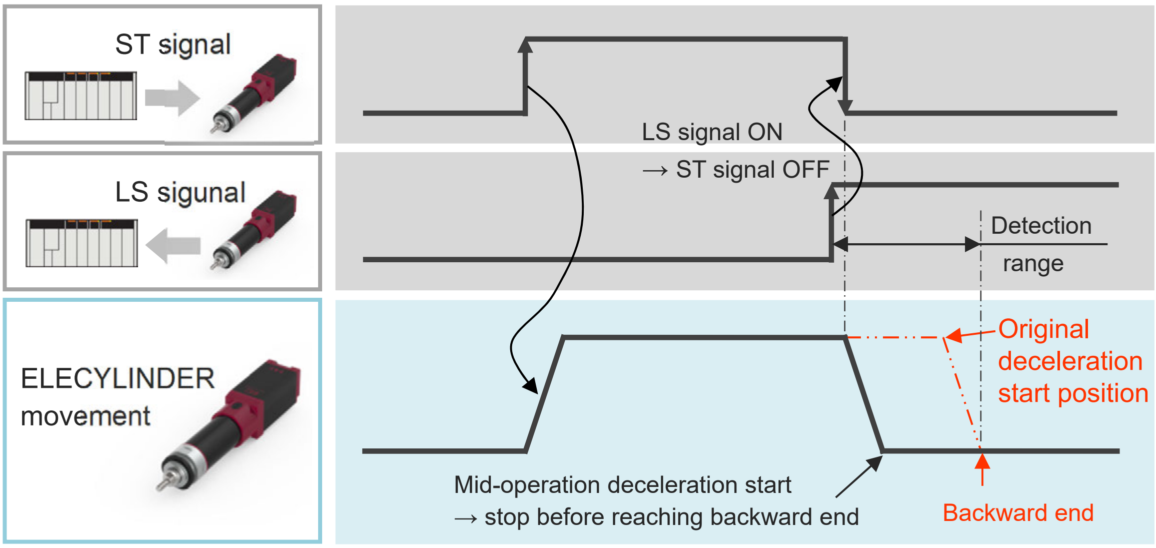
Category		Signal abbreviation	Timing chart	Remarks
1	**Power**	Power ON	 EC Connection Unit SYS LED : On	24VDC power supply is turned ON.
2	Output	*ALM E*RD		*ALM:Turns ON if no alarm has been triggered. E*RD: It turns on when operation ready (servo on)
3	Input	ST0		When the [ST0] signal is turned ON, home return operation begins.
4	Output	LS0	 EC Connection Unit Backward End LED: On	Home return operation is complete and the unit moves to the backward end.
5	Input	ST1		Moves to the forward end.
6	Output	LS1	 EC Connection Unit Forward End LED: On	Moved to the forward end.
7	Input	ST0		Moves to the backward end.
8	Output	LS0		Moved to the backward end.
9	After this, "**5**" to "**8**" repeat.			

Δt1: Wait approximately 0.5 seconds from when the E*RD signal turns ON before inputting the first command.

Δt2: The time taken for the ELECYLINDER actually to reach the forward or backward end after the LS signal turns ON. Consider Δt2 when giving instructions for the next operation from the PLC to the ELECYLINDER.
Also, Δt2 varies depending on the communication time among PLC ⇔ EC connection unit ⇔ ELECYLINDER, size of payload and acceleration/deceleration.

Turning the ST signal OFF midway through operation will cause a gradual stop.
For example, be careful of the following point with a large LS signal detection range.

If the sequence is set to turn the ST signal OFF immediately after the LS signal turns ON, the ELECYLINDER may not have reached the forward/backward end.

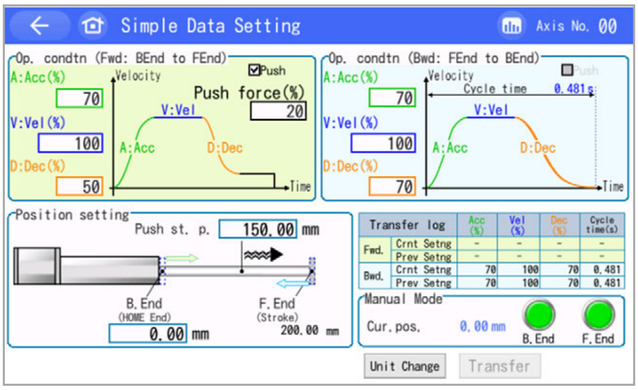


Caution

- Turning the ST signal ON again after the gradual stop causes the ELECYLINDER to begin operation again.
- Within the detection range, the LS signal turns ON even if the ELECYLINDER is mid-operation.
- Make sure that [ST0] and [ST1] do not turn ON simultaneously.
  This may result in unpredictable operation.

[Pressing operation]

Establish the setting for the operating conditions and position setting in the simple data setting window before performing the pressing operation.


Simple Data Setting
Axis No. 00

Op. condtn (Fwd: BEnd to FEnd)
A:Acc(%) 70
V:Vel(%) 100
D:Dec(%) 50
☑Push
Push force(%) 20

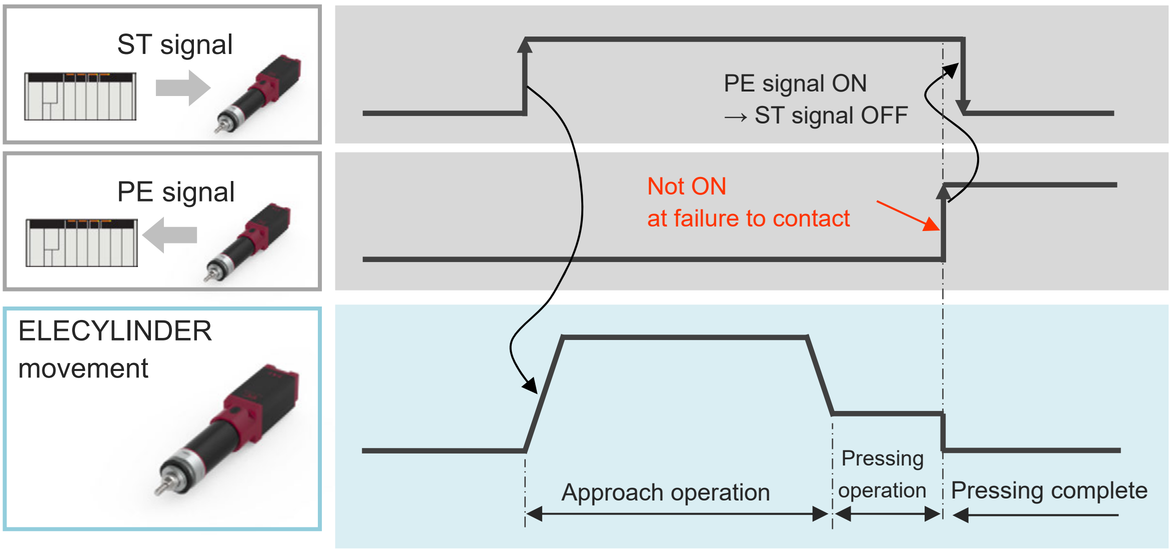
Op. condtn (Bwd: FEnd to BEnd)
A:Acc(%) 70
V:Vel(%) 100
D:Dec(%) 70
☐Push
Cycle time 0.481s

Position setting
Push st. p. 150.00 mm
B.End (HOME End) 0.00 mm
F.End (Stroke) 200.00 mm

Transfer log		Acc (%)	Vel (%)	Dec (%)	Cycle time(s)
Fwd.	Crnt Setng	-	-	-	-
	Prev Setng	-	-	-	-
Bwd.	Crnt Setng	70	100	70	0.481
	Prev Setng	70	100	70	0.481

Manual Mode
Cur. pos. 0.00 mm

The basic time chart is as follows.



Caution

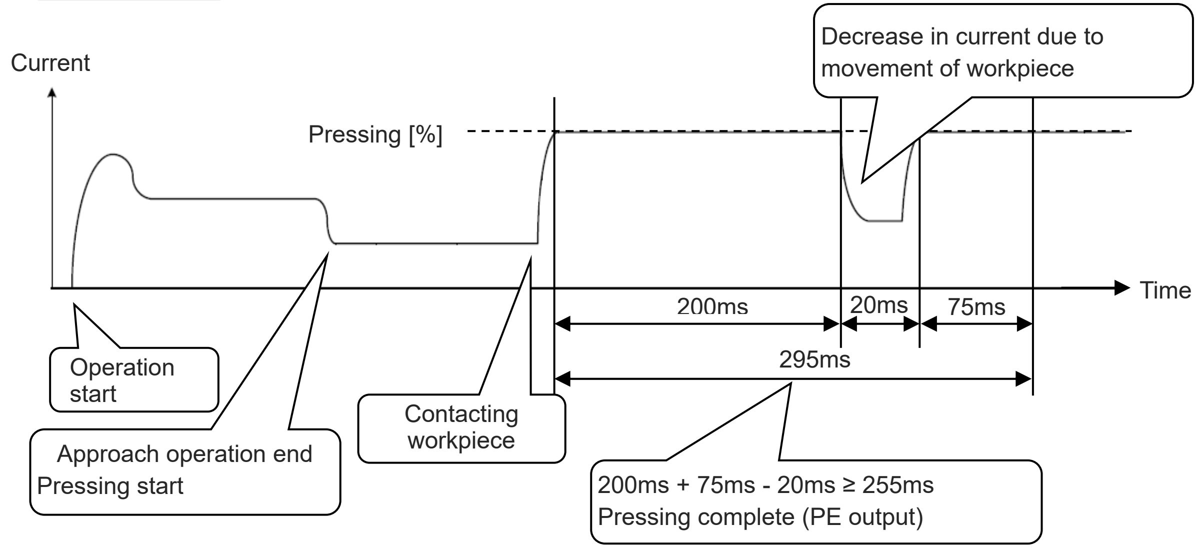
- The pressing operation speed is 20 mm/s.
  Refer to an instruction manual of each ELECYLINDER or a catalog for detail.
- The workpiece remains pressed after the pressing is completed.
  If the workpiece moves or pushes back, it may be pressed even further.
- Hitting a workpiece during the approaching operation will cause "Alarm Group A: Overload Alarm".

The torque (current limit value) configured for [Pressing force] in the Simple Data Setting screen judges completion of pressing operation.

When the ELECYLINDER is performing pressing operation, satisfying the following conditions will produce a judgment of pressing complete, turning ON the PE signal.

(Accumulated time in which current has reached pressing value [%]) -
(Accumulated time in which current is less than pressing value [%]) ≥ 255ms

Reference



Reference

Points of caution for when the workpiece is not struck (no contact) and the movement to forward end or backward end is complete. Consider a master device sequence or detection method based on the content below.

- If no contact is made, the PE signal will not turn ON.
  A timer is required to determine if no contact has been made.
- After a non-contact operation, the unit will stop in the pressing operation status.
- If the workpiece shifts once pressing complete is determined and the PE signal is ON, the ELECYLINDER will start another approach operation with the PE signal still ON. If the workpiece cannot be pressed again, it will remain ON even with no contact.

Precautions for Rotary Type

(1) Homing direction

Home position is the counter-clockwise moving end of the output shaft.

The multi-rotation specification includes a reverse-rotation specification. For reverse-rotation specification, the homing direction is clockwise.

Caution

- If the homing direction is changed by changing the parameter after delivery, the homing direction will be reversed. However, do not change the parameter of homing direction, as the home position will deviate due to structural reasons.

(2) Operation (position setting) range

Position value is the travel angle from home position.

[330-degree Rotation Specification]

Position specification range 0 to 330 degrees

[Multi-rotation Specification]

The multi-rotation specification actuator has two operation modes: normal mode with finite rotation and index mode (Note 1) capable of multiple rotation. The operation mode can be selected in parameter No. 79 "Rotary axis mode select". In addition, shortcut selection can be set to enabled/disabled in parameter No. 80 "Rotary axis shortcut select".

The table below shows the parameter settings and operation specifications in the respective modes.

Rotary axis mode select Parameter No.79	Rotary axis shortcut select Parameter No.80	Present position display (Note 3)	Absolute position command range (Note 3)	Relative position command range (Note 3)	Software limit Enabled/disabled
0 (Normal mode)	0 (Disabled)	-9,999.99 to 9,999.99 (Note 2)	-0.15 to 9,999.15 (Note 2)	-9,999.30 to 9,999.30 (Note 2)	Enabled
1 (Index mode)	0 to 359.99	0 to 359.99	0 to 359.99	-360.00 to 360.00	Disabled

Note 1: Index Mode is not available for the absolute type actuators except for DD Motor.

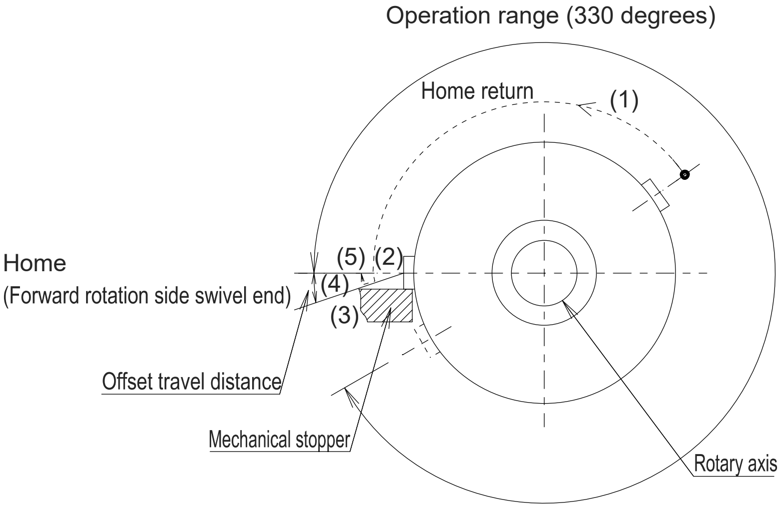
Note 2: Restricted to the range of the software limit.

Note 3: The minimum resolution of the DD motor is 0.001°.

(3) Angular velocity and acceleration/deceleration command
Angular velocity (deg/s) is the command value for rotation angle.
Acceleration/deceleration is specified as "G" in the program.
Rated angular acceleration/deceleration: 0.3G = 2,940 deg/s

(4) Home return motion

[330° rotation specification]

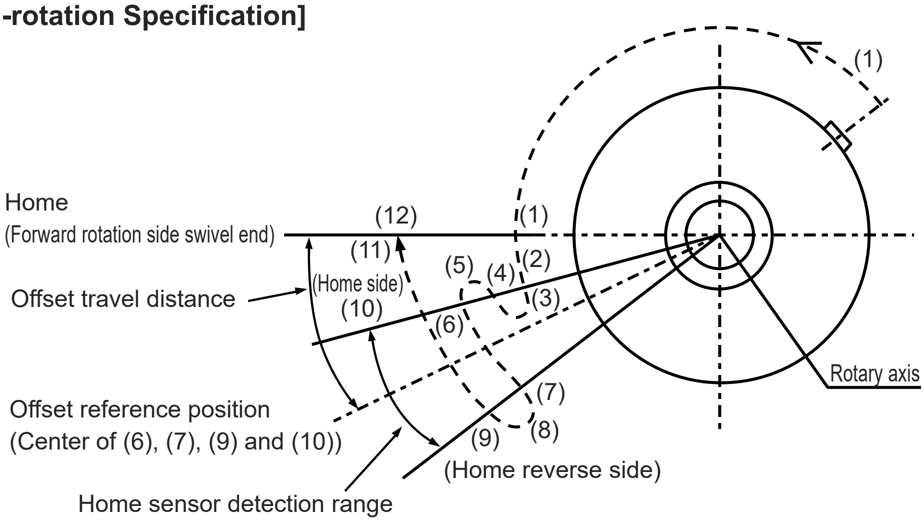


(1) When home return is commanded, the rotary part rotates in the CCW（counterclockwise）direction as seen from the load side.
The speed is 20 deg/s.
(2) Detects mechanical stopper.
(3) It travels in reverse.
(4) Moves from the position of (3) for the amount set in Parameter No. 22 “Homing Offset” and stops.
(5) The position stopped in (4) should be the home position.

Caution

- When changing Parameter No. 22 "Homing offset", be sure to refer to [page B6-16].

[Multi-rotation Specification]



(1) When home return is commanded, the rotary part rotates in the CCW (counterclockwise) direction as seen from the load side.
The speed is 20 deg/s.
(2) The home sensor turns ON.
(3) It travels in reverse.
(4) Confirm that the home sensor turns OFF as it returns to the position beyond the detection range of the home sensor.
(5) It travels in reverse.
(6) Check again that the home sensor is ON.
(7) Confirm that the home sensor turns OFF beyond the detection range on the home reverse side of the home sensor.
(8) It travels in reverse.
(9) Check that the home sensor is ON.
(10) Confirm that the home sensor turns OFF beyond the detection range on the home side of the home sensor.
(11) Calculate the detection range center of the home sensor from the results of (6), (7), (9) and (10).
(12) Moves from the position of (11) for the amount set in Parameter No. 22 “Homing Offset” and stops.
This stopped position should be the home position.

Caution

- When changing Parameter No. 22 "Homing offset", be sure to refer to [page B6-16].

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(5) Relation among Output Torque, Allowable Inertia Moment and Rotary Speed
Refer in the graph shown in [Appendix 2.4 Rotational speed and Output torque / Allowable inertial moment].

Precautions for Gripper Type

(1) Finger part operation

[Definition of position]

Home is the position where the fingers are open. Position command is the travel distance from home position of this single finger to the closed side.

Therefore, the maximum command value is 5mm for RCP2-GRS type, or 7mm for RCP2-GRM type.

As for the stroke of 2-claw type, the total travel distance value of both fingers is shown in the specifications.

Therefore, the travel distance of a single finger is half of the stroke.

[Definition of velocity and acceleration/deceleration]

Command value is per single finger.

Relative velocity and acceleration/deceleration of the 2-claw type are twice as much as the command value.

[Operation mode for gripper applications]

When using as a gripper that involves gripping of workpieces, be sure to use in "push mode".

Caution

- If used in "positioning mode", a servo error may occur while the workpiece is being gripped, or the workpiece may be dropped.

---

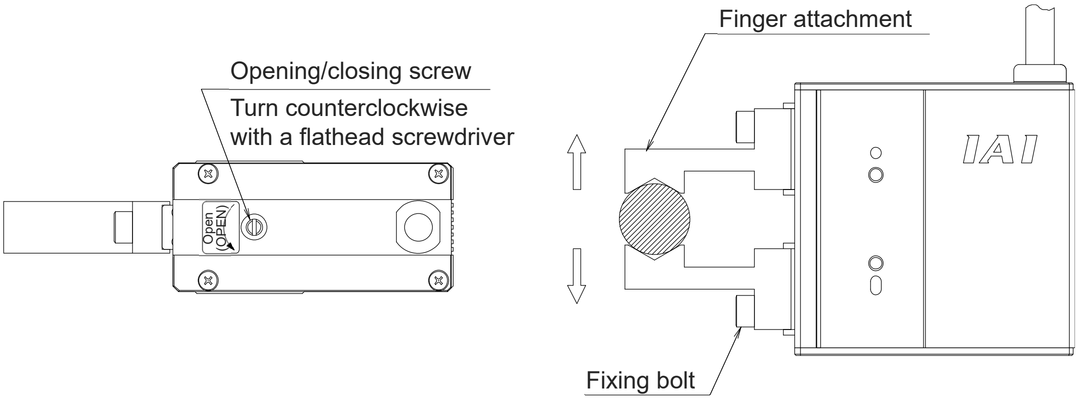
(2) Removing gripped workpieces

This gripper is structured to maintain its gripping force by self-locking the workpiece even during servo OFF or controller power shut-off.

When removal of a gripped workpiece is necessary during power shut-off, turn the opening/closing screw or remove the finger attachment on one side to remove the workpiece.

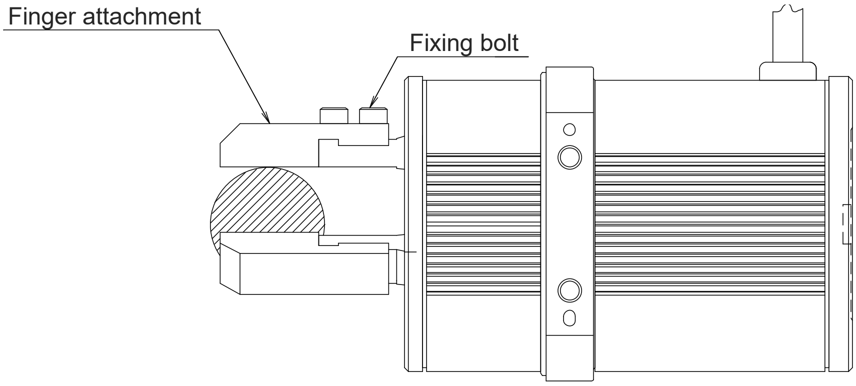
[2-claw Type]

Turn the opening/closing screw or remove the finger attachment on one side.



[3-claw Type]

Remove one of the finger attachments.



(3) Relation between Grip Force and Current Limit Value

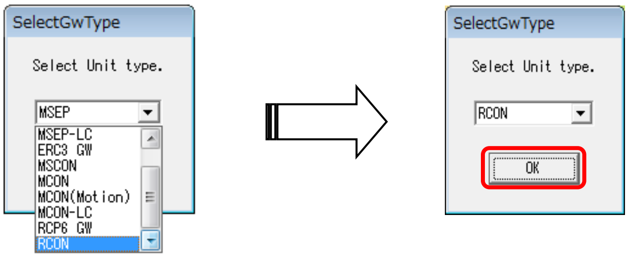
Refer to the graph in [Appendix 2.3 Push Force / Gripping Force and Current Limit Value].

3.9 Gateway Parameter Configuration Tool

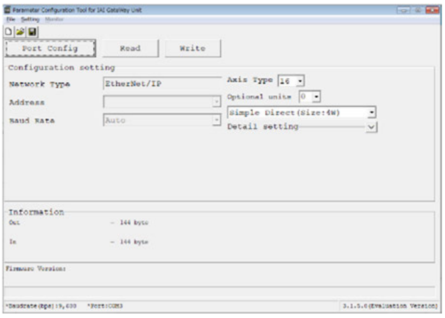
Use the gateway parameter configuration tool to select the operation mode of the RCON system and to set various functions. The screen design differs slightly depending on the OS of the PC.

Tool startup

1 After turning on the RCON system, starting the gateway parameter configuration tool will display the following screen. Select "RCON" and press OK.



2 The main screen will be displayed. Even if the gateway unit cannot be detected, the main screen will be displayed. When you press "Import" on this screen, parameters will be imported from the detected gateway unit.
Press the "Transfer" button to transfer the parameters. However, note that they cannot be transferred if the address or communication speed is not selected.



Configuration setting
Network Type: EtherNet/IP
Address
Baud Rate: Auto
Axis Type: 16
Optional units: 0
Simple Direct(Size:4W)
Detail setting

Information
Out – 144 byte
In – 144 byte
Firmware Version:

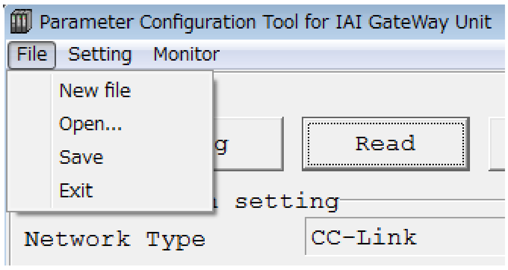
Main screen (initial state)

Caution

- If the actual number of connected axes of the RCON system does not match the number of axes set and transferred in the gateway parameter configuration tool, the PC software cannot be connected.
- Set and transfer the gateway parameters suitably according to the actual unit configuration and the number of connected axes.

Menu descriptions

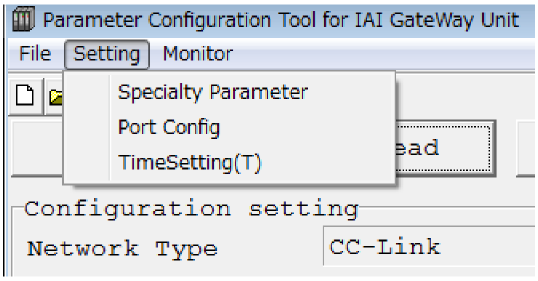
[File menu]



On the main screen, click on the file menu on the upper left to display the menu items as shown above.

- New file : Creates a new network parameter and operation mode parameter.
- Open : Opens the saved parameter file and reflects it to the main screen.
- Save : Saves the parameters held by the tool to a file.
- Exit : Terminates the tool.

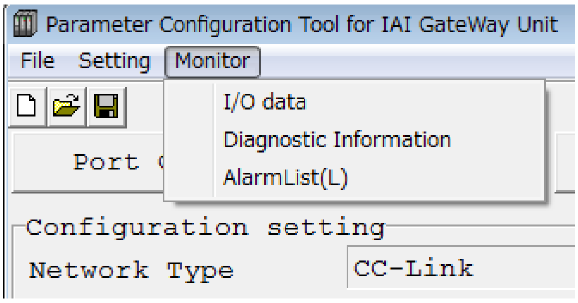
[Settings menu]



Click the "Settings" menu in the upper left of the main screen to display the settings menu items.

- Specialty Parameter : Sets parameters related to gateway unit processing.
  [Refer to "GW parameters /2/3, GW mode selection" on pages A3-157 to A3-161]
- Port Config : Sets the communication speed between the tool and PC and the COM port number.
- TimeSetting (T) : Sets the time to be held in the gateway unit.
  [See "Time setting" on page A3-164]

[Monitor menu]

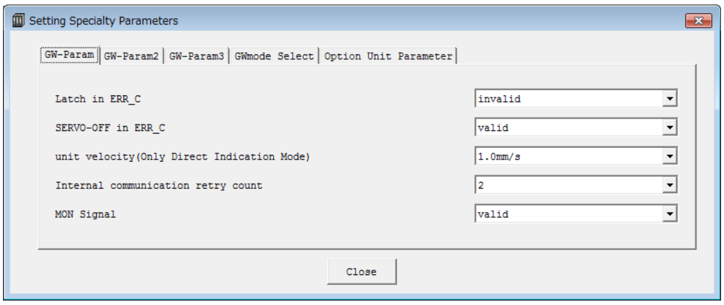


Click the "Monitor" menu in the upper left of the main screen to display the monitor menu items.
(Note) "Monitor" cannot be selected before reading in the parameters.

• I/O data	: Displays the communication contents between the host PLC and gateway unit. [See "I/O Data (register monitor)" on page A3-165]
• Diagnostic Information	: Displays the number of ERRT and ERRC generated, number of stops and scan time. [See "Diagnostic information" on page A3-166]
• AlarmList (L)	: Imports and displays the alarm list held in the gateway unit. [See "Alarm list" on page A3-166]

Special parameter setting function descriptions

[GW parameters]



Latch in ERR_C: invalid

SERVO-OFF in ERR_C: valid

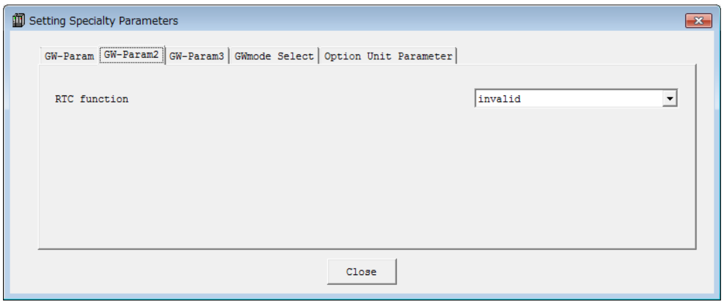
unit velocity(Only Direct Indication Mode): 1.0mm/s

Internal communication retry count: 2

MON Signal: valid

• ERR_T/C occur latch	: Selects whether to continue the error in recoverable state after ERRT and ERRC occur.
• SERVO-OFF in ERR_C	: Selects whether to turn the servo of the connected axis OFF when ERRC is generated.
• Speed unit (in direct numerical control mode)	: Selects the speed unit from 1.0 mm/s or 0.1 mm/s.
• Internal communication retry count	: In AUTO, this is used to set the number of communication retries with the connected axis.
• MON signal	: Select whether to use MON signal to control enable/disable of the PLC → gateway unit commands.

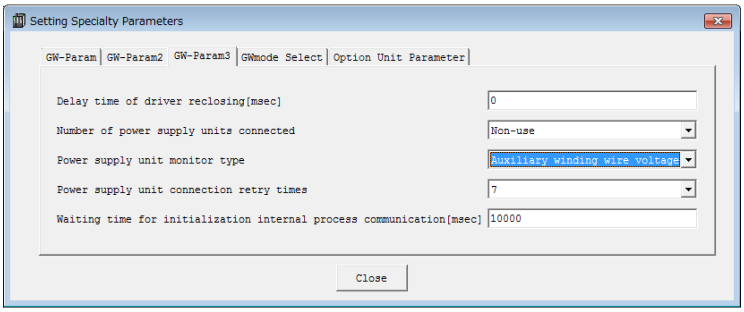
[GW parameters 2]



RTC function: invalid

- Calendar function: Selects whether to set an alarm or not when the time setting disappears.

[GW parameters 3]



Delay time of driver reclosing[msec]: 0

Number of power supply units connected: Non-use

Power supply unit monitor type: Auxiliary winding wire voltage

Power supply unit connection retry times: 7

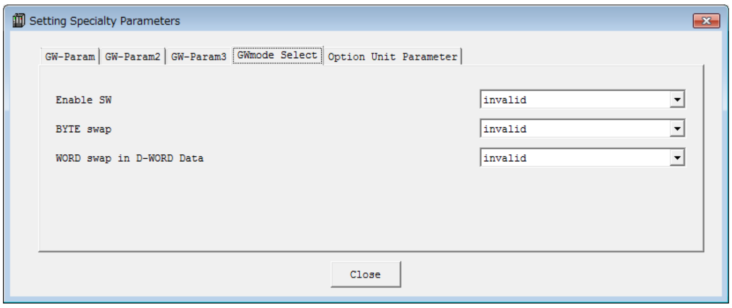
Waiting time for initialization internal process communication[msec]: 10000

- Delay time of driver reclosing : Sets the delay time (interval) when sequentially supplying power to each axis of the driver unit.
  It is used for the purpose of reducing inrush current by shifting the timing of power supplied to each axis.
  The initial value for the latency is 5ms for each axis.
  However, the minimum latency of the 200V driver unit is 50ms. Setting to a value less than 50ms should automatically be pulled up to 50ms.
  Also, for the EC connection unit, the release timing of the drive cutoff circuit for each unit (four axes) should get misaligned.
- Number of power supply units connected : Sets the number of IAI power supply units (Model: PSA-24) that are connected to the gateway unit.
  Up to 5 units can be connected.
- Power supply unit monitor type : Select the monitoring item for the IAI power supply unit (PSA-24).
  One item of those in the following page table can be monitored.

Item	Description
Output voltage	This power supply can vary the output voltage according to the load. The output voltage monitoring value changes, but this is not abnormal.
Voltage of auxiliary winding	Control power supply voltage inside the power supply unit. As with the output voltage, it changes according to the load on the output voltage side.
Output current	Instantaneous value of output current.
Peak hold current	Peak value of output current.
Load factor	Ratio of integral value of output current and rated output current. If this value exceeds 100%, the output voltage is cut off as an overload error.
FAN rotation speed	It is the speed of the fan rotation.
PCB temperature	Internal temperature: Temperature in the vicinity of the output capacitor on the secondary side.

- Power supply unit connection retry times : Sets the number of retries when a communication error occurs.
- Waiting time for initialization internal process communication : Sets additional wait time until the driver unit starts internal communication.

[GW mode selection]

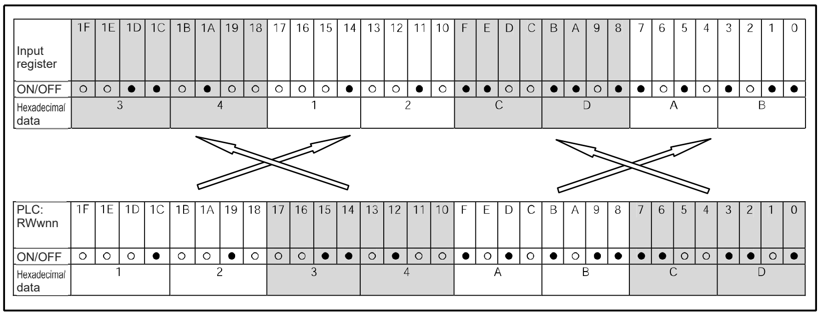


Enable SW: invalid
BYTE swap: invalid
WORD swap in D-WORD Data: invalid

- Enable SW : Selects whether to enable/disable the enable switch of the TP.
- BYTE swap : Set the byte swap. [See "Byte swap" on page A3-160]
- WORD swap in D-WORD Data : Sets whether the W word size data is to be swapped in word size. [See "Word swap in D-WORD Data" on page A3-162]

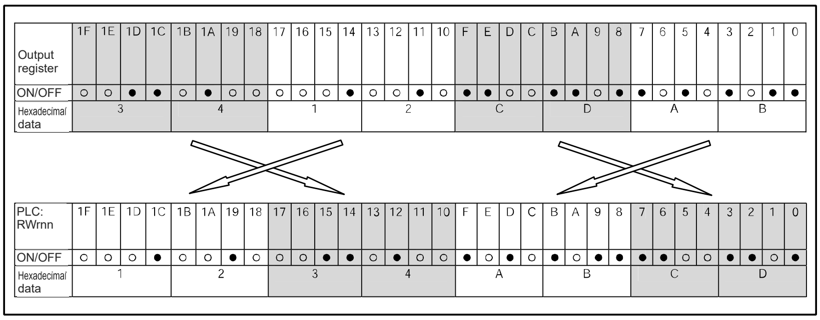
Byte swap : Swaps the master and slave bytes of transmitted/received data.
Set according to the master to be connected as necessary.

●: ON
○: OFF



Input register	1F	1E	1D	1C	1B	1A	19	18	17	16	15	14	13	12	11	10	F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
ON/OFF	○	○	●	●	○	●	○	○	○	○	○	●	○	○	●	○	●	●	○	○	●	●	○	●	●	○	●	○	●	○	●	●
Hexadecimal data	3				4				1				2				C				D				A				B			

PLC: RWwnn	1F	1E	1D	1C	1B	1A	19	18	17	16	15	14	13	12	11	10	F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
ON/OFF	○	○	○	●	○	○	●	○	○	○	●	●	○	●	○	○	●	○	●	○	●	○	●	●	●	●	○	○	●	●	○	●
Hexadecimal data	1				2				3				4				A				B				C				D			

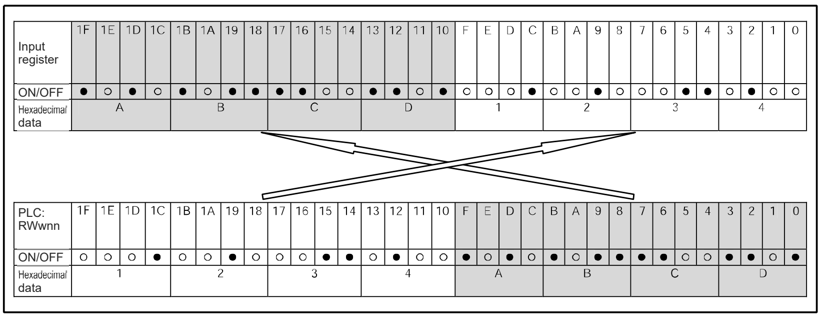


Output register	1F	1E	1D	1C	1B	1A	19	18	17	16	15	14	13	12	11	10	F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
ON/OFF	○	○	●	●	○	●	○	○	○	○	○	●	○	○	●	○	●	●	○	○	●	●	○	●	●	○	●	○	●	○	●	●
Hexadecimal data	3				4				1				2				C				D				A				B			

PLC: RWrnn	1F	1E	1D	1C	1B	1A	19	18	17	16	15	14	13	12	11	10	F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
ON/OFF	○	○	○	●	○	○	●	○	○	○	●	●	○	●	○	○	●	○	●	○	●	○	●	●	●	●	○	○	●	●	○	●
Hexadecimal data	1				2				3				4				A				B				C				D			

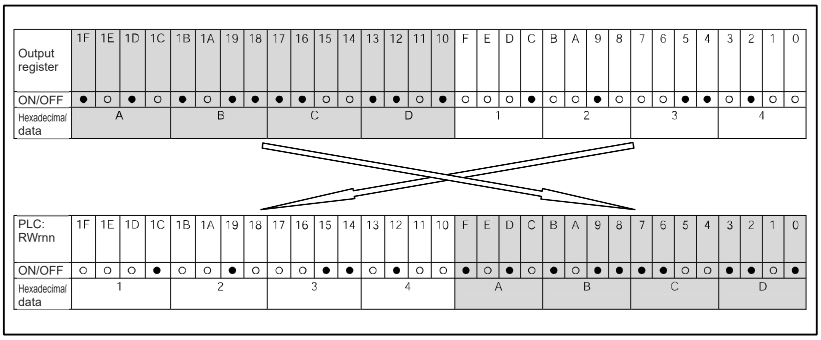
Word swap in D-WORD Data : Swaps the master and slave of transmitted/received data of W word size in word unit.
Set according to the master to be connected as necessary.

●: ON
○: OFF



Input register	1F	1E	1D	1C	1B	1A	19	18	17	16	15	14	13	12	11	10	F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
ON/OFF	●	○	●	○	●	○	●	●	●	●	○	○	●	●	○	●	○	○	○	●	○	○	●	○	○	○	●	●	○	●	○	○
Hexadecimal data	A				B				C				D				1				2				3				4			

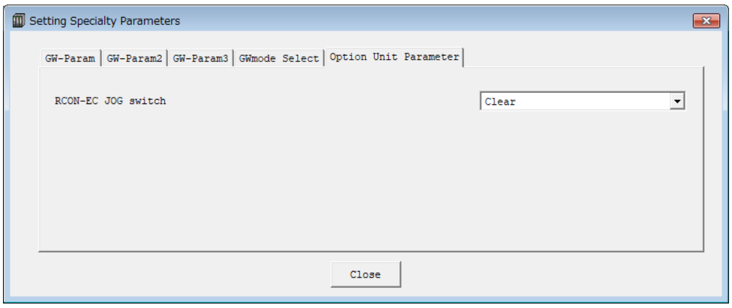
PLC: RWwnn	1F	1E	1D	1C	1B	1A	19	18	17	16	15	14	13	12	11	10	F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
ON/OFF	○	○	○	●	○	○	●	○	○	○	●	●	○	●	○	○	●	○	●	○	●	○	●	●	●	●	○	○	●	●	○	●
Hexadecimal data	1				2				3				4				A				B				C				D			



Output register	1F	1E	1D	1C	1B	1A	19	18	17	16	15	14	13	12	11	10	F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
ON/OFF	●	○	●	○	●	○	●	●	●	●	○	○	●	●	○	●	○	○	○	●	○	○	●	○	○	○	●	●	○	●	○	○
Hexadecimal data	A				B				C				D				1				2				3				4			

PLC: RWrnn	1F	1E	1D	1C	1B	1A	19	18	17	16	15	14	13	12	11	10	F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
ON/OFF	○	○	○	●	○	○	●	○	○	○	●	●	○	●	○	○	●	○	●	○	●	○	●	●	●	●	○	○	●	●	○	●
Hexadecimal data	1				2				3				4				A				B				C				D			

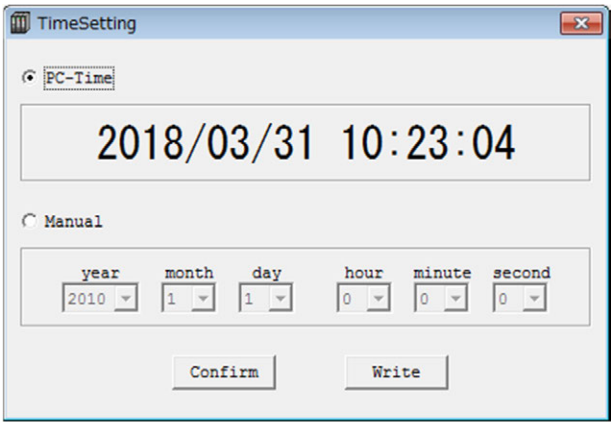
[Option Unit Parameter]



RCON-EC JOG switch: Clear

- RCON-EC JOG switch : Select whether to activate/inactivate the jog switch on the EC connection unit (RCON-EC).
  The setting to activate/inactivate should be reflected to all the units of the EC connection unit that are connected to the gateway unit.
  Whether to activate/inactivate the jog switch is to be set in Parameter No. 194 "Jog Switch".

[Time setting]



TimeSetting

● PC-Time

2018/03/31 10:23:04

○ Manual

year: 2010
month: 1
day: 1
hour: 0
minute: 0
second: 0

When PC-Time is selected, the current time of the PC is acquired and set to the gateway unit. Once manual setting is selected, set any time set in the time editing on the screen to the gateway unit.

By pressing "Write", time is transferred and written to the gateway unit.

When "Confirm" is pressed, the time data currently held in the gateway unit will be read out and displayed.

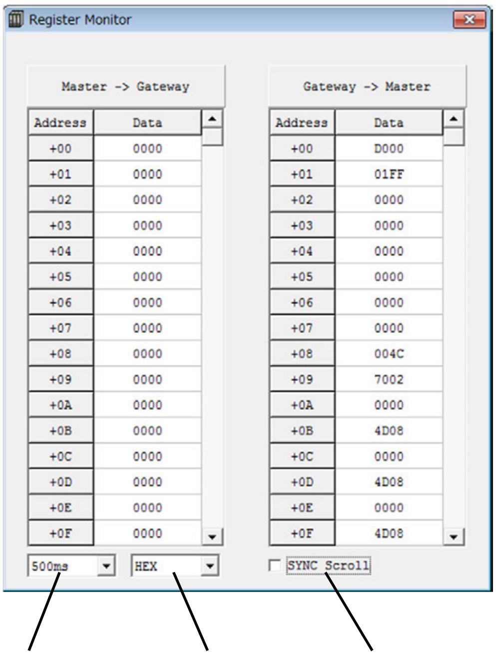
Caution

The clock (calendar) function of the gateway unit is effective for about 10 days from the time gateway unit is turned off, given that the capacitor is sufficiently charged.

When the time data is lost, the current time will be the time elapsed from 2000/1/1 0:00:00 as the time when the power is turned on.

Explanations of Monitoring Menu Features

[I/O data (register monitor)]



Master -> Gateway

Address	Data
+00	0000
+01	0000
+02	0000
+03	0000
+04	0000
+05	0000
+06	0000
+07	0000
+08	0000
+09	0000
+0A	0000
+0B	0000
+0C	0000
+0D	0000
+0E	0000
+0F	0000

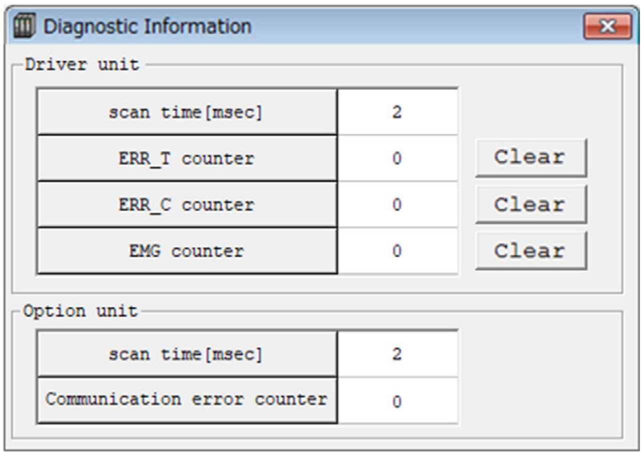
Gateway -> Master

Address	Data
+00	D000
+01	01FF
+02	0000
+03	0000
+04	0000
+05	0000
+06	0000
+07	0000
+08	004C
+09	7002
+0A	0000
+0B	4D08
+0C	0000
+0D	4D08
+0E	0000
+0F	4D08

The data that the gateway received from the master and transmission data returned to the master are displayed on this register monitor screen.

- Data read cycle : Select the update cycle of the display data between 100 and 500 ms
- Display switch : Select either binary or hexadecimal display
- SYNC Scroll : When checked, the transmitted/received data will be scrolled at the same time

[Diagnostic information]



Driver unit

scan time[msec]	2
ERR_T counter	0
ERR_C counter	0
EMG counter	0

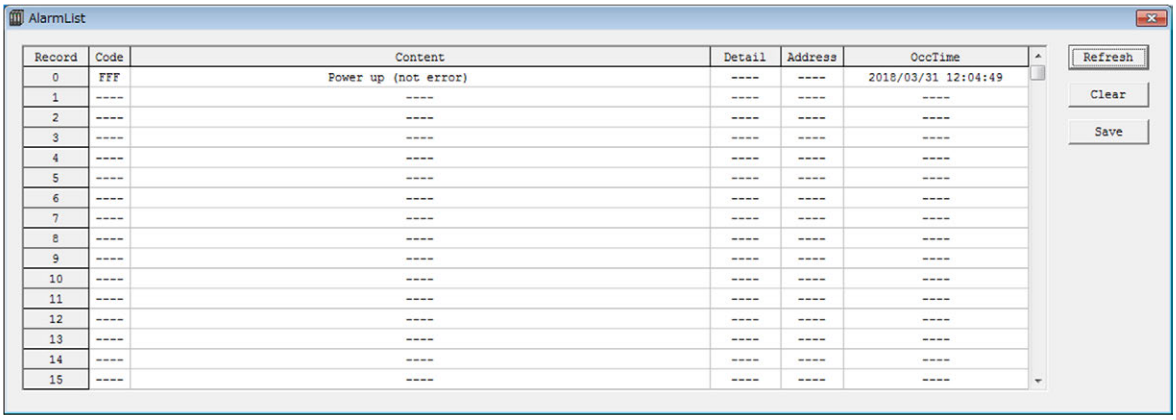
Option unit

scan time[msec]	2
Communication error counter	0

The scan time of the driver unit, the number of communication errors (ERRC, ERRT) and the number of stops (EMG) detected can be counted.

When there is an option unit connected, the scan time and the number of communication errors of the option unit should be displayed.

[Alarm list]



Record	Code	Content	Detail	Address	OccTime
0	FFF	Power up (not error)	----	----	2018/03/31 12:04:49
1	----	----	----	----	----
2	----	----	----	----	----
3	----	----	----	----	----
4	----	----	----	----	----
5	----	----	----	----	----
6	----	----	----	----	----
7	----	----	----	----	----
8	----	----	----	----	----
9	----	----	----	----	----
10	----	----	----	----	----
11	----	----	----	----	----
12	----	----	----	----	----
13	----	----	----	----	----
14	----	----	----	----	----
15	----	----	----	----	----

Press "Refresh" to read out the alarm list again from the gateway unit.

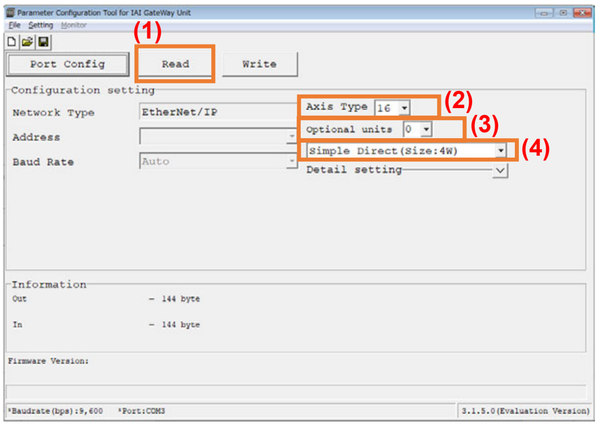
Press "Clear" to delete all alarm lists held by the gateway unit.

Press "Save" to save the alarm list held by the gateway unit in CSV format.

For the alarm details, refer to [Maintenance Section Chapter 2 Troubleshooting].

Operation mode setting

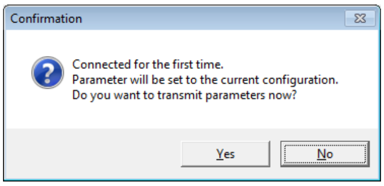
The operation after main screen reading is as follows.



Network Type: EtherNet/IP
Address:
Baud Rate: Auto
Axis Type: 16
Optional units: 0
Simple Direct(Size:4W)
Out – 144 byte
In – 144 byte
*Baudrate(bps):9,600 *Port:COM3
3.1.5.0(Evaluation Version)

(1) Read

For the first connection, the following dialog will be displayed.
Press "Yes" to transfer the parameters that match the current configuration.



Connected for the first time.
Parameter will be set to the current configuration.
Do you want to transmit parameters now?

(2) Axis Type

Sets the number of axes of the actuator to be controlled

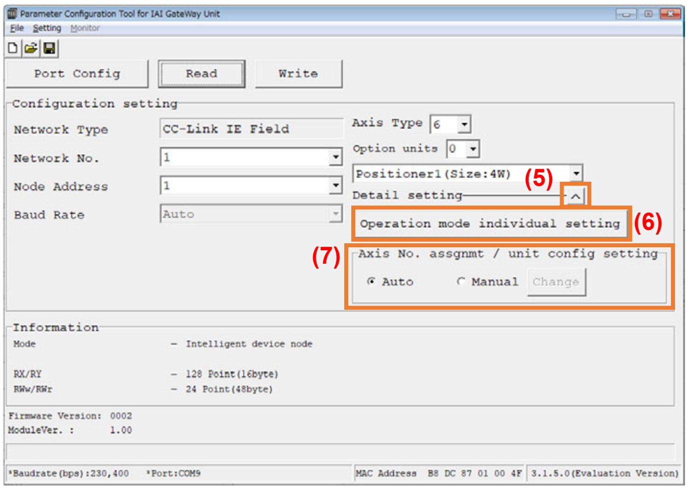
(3) Optional units

Set the number of the units of the EC connection unit to be connected.

(4) Operation mode setting

Sets all operation modes of all driver units connected to this gateway unit at once. The operation mode options are as follows.

No.	Operation mode setting	No.	Operation mode setting
1	Positioner 1 (size: 4 W)	5	Direct numerical control (size: 8 W)
2	Positioner 2 (size: 2 W)	6	Simple direct (size: 4 W)
3	Positioner 3 (size: 1 W)	7	Individual setting [see (5)]
4	Positioner 5 (size: 2 W)		



Network Type CC-Link IE Field

Network No. 1

Node Address 1

Baud Rate Auto

Axis Type 6

Option units 0

Positioner1(Size:4W)

● Auto ○ Manual

Mode – Intelligent device node

RX/RY – 128 Point(16byte)

RWw/RWr – 24 Point(48byte)

Firmware Version: 0002

ModuleVer. : 1.00

*Baudrate(bps):230,400 *Port:COM9

MAC Address B8 DC 87 01 00 4F 3.1.5.0(Evaluation Version)

(5) Detailed setting display

When you press "Detail setting", the following buttons will be displayed.

· [Operation mode individual setting] button ((6))

· "Axis number assignment change" button and automatic/manual axis number assignment switching ((7))

(6) Operation mode individual setting

When you press "Operation mode individual setting", the "Operation mode individual setting screen" will be displayed.

For details on the individual setting screen, see [Operation mode individual setting] on page A3-169.

(7) Axis No. assgnmt change

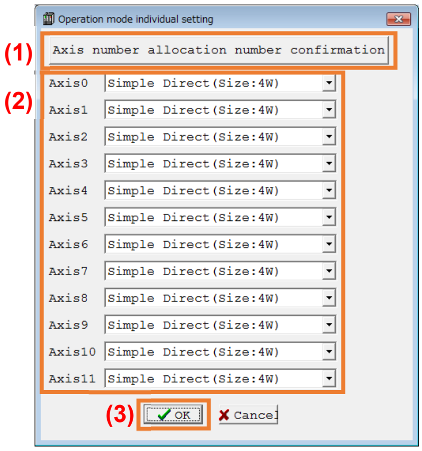
When you press "Change" in axis number assignment, the "Axis number assignment change screen" will be displayed. For the axis number assignment change method, refer to "Axis number assignment change" on page A3-170.

Operation for automatic assignment and manual assignment is as follows.

	"Change" button for axis number assignment	**Axis number**
Automatic assignment	Disabled	Serial numbers
Manual assignment	Enabled	Values set on the axis number assignment change screen

Operation mode individual setting

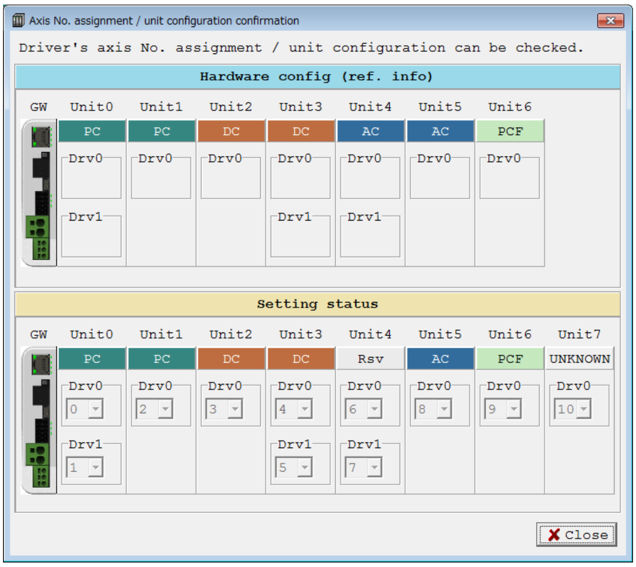
The operation for operation mode individual setting is as follows.



Axis0 Simple Direct(Size:4W)
Axis1 Simple Direct(Size:4W)
Axis2 Simple Direct(Size:4W)
Axis3 Simple Direct(Size:4W)
Axis4 Simple Direct(Size:4W)
Axis5 Simple Direct(Size:4W)
Axis6 Simple Direct(Size:4W)
Axis7 Simple Direct(Size:4W)
Axis8 Simple Direct(Size:4W)
Axis9 Simple Direct(Size:4W)
Axis10 Simple Direct(Size:4W)
Axis11 Simple Direct(Size:4W)

(1) Axis number assignment confirmation

When "Axis number allocation number confirmation" button is pressed, the "Axis number assignment / unit configuration confirmation screen" opens. Note that axis numbers cannot be edited on this screen.



Driver's axis No. assignment / unit configuration can be checked.

Hardware config (ref. info)

GW	Unit0	Unit1	Unit2	Unit3	Unit4	Unit5	Unit6
	PC	PC	DC	DC	AC	AC	PCF
	Drv0	Drv0	Drv0	Drv0	Drv0	Drv0	Drv0
	Drv1			Drv1	Drv1		

Setting status

GW	Unit0	Unit1	Unit2	Unit3	Unit4	Unit5	Unit6	Unit7
	PC	PC	DC	DC	Rsv	AC	PCF	UNKNOWN
	Drv0 0	Drv0 2	Drv0 3	Drv0 4	Drv0 6	Drv0 8	Drv0 9	Drv0 10
	Drv1 1			Drv1 5	Drv1 7			

(2) Operation mode individual setting

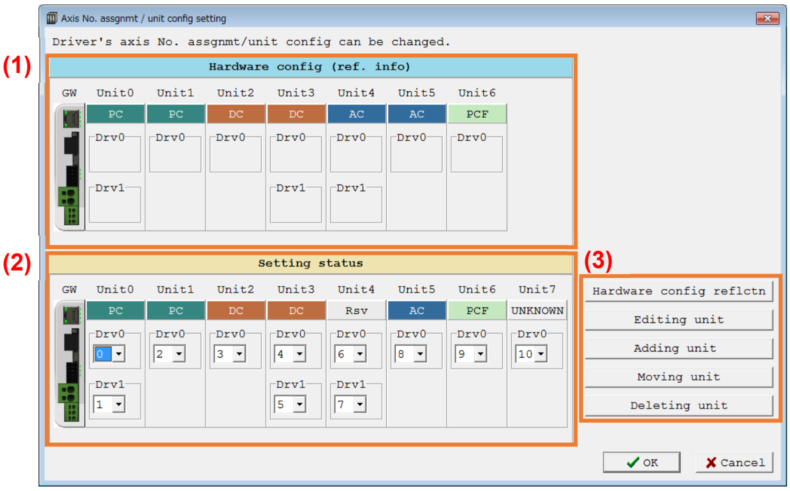
Set in order to set the operation mode for each axis.

(3) OK

It confirms the change and returns to the main screen. If the operation mode of each axis is not the same, the display on the main screen will be individually set.

○ Axis number assignment change

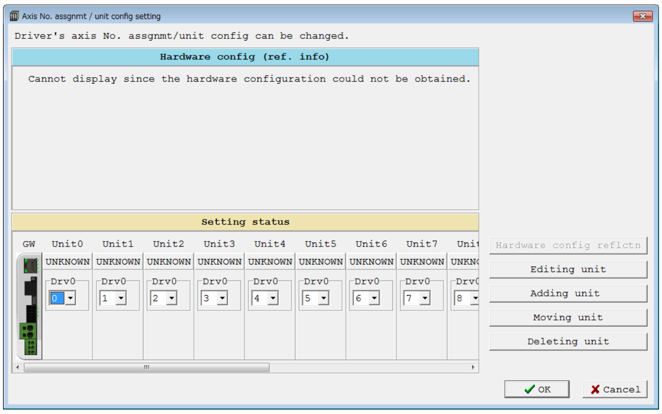
The operation of axis number assignment change is as follows.



Driver's axis No. assgnmt/unit config can be changed.

(1) Hardware configuration (reference information)

Displays the driver unit configuration connected to the gateway unit. When creating or editing, if the configuration cannot be read due to a communication error, the following screen will be displayed.



Driver's axis No. assgnmt/unit config can be changed.

Cannot display since the hardware configuration could not be obtained.

(2) Setting status

The axis number assignment can be changed on this screen.

The unit configuration shows the setting of the previous transfer.

(3) Unit configuration edit button

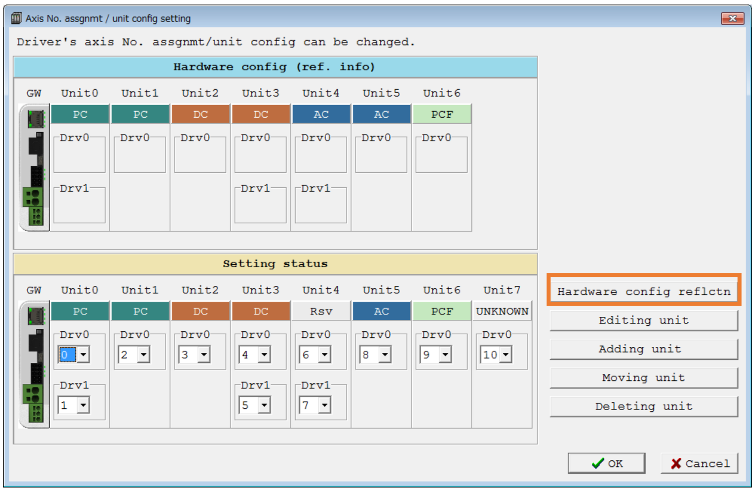
Displays various screens for editing the driver unit configuration displayed in (2). For details on editing the unit configuration, refer to [Editing driver unit configuration] on page A3-169.

Editing driver unit configuration

The driver unit configuration editing method is as follows.

1 Reflect the current driver unit configuration

(1) On the "Axis number assignment / Unit configuration confirmation screen", press "Current configuration reflection".



Axis No. assgnmt / unit config setting

Driver's axis No. assgnmt/unit config can be changed.

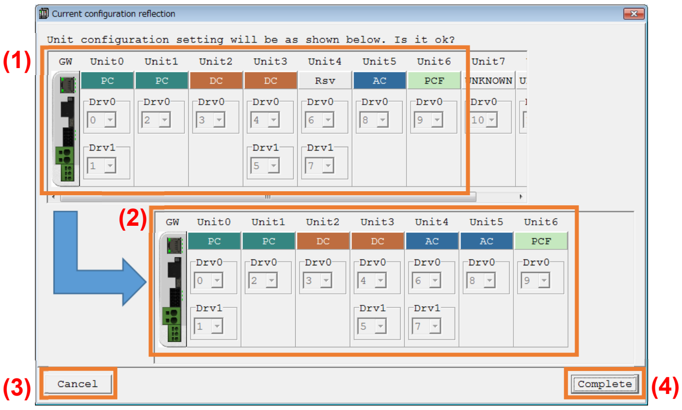
Hardware config (ref. info)

GW	Unit0	Unit1	Unit2	Unit3	Unit4	Unit5	Unit6
	PC	PC	DC	DC	AC	AC	PCF
	Drv0	Drv0	Drv0	Drv0	Drv0	Drv0	Drv0
	Drv1			Drv1	Drv1		

Setting status

GW	Unit0	Unit1	Unit2	Unit3	Unit4	Unit5	Unit6	Unit7
	PC	PC	DC	DC	Rsv	AC	PCF	UNKNOWN
	Drv0 0	Drv0 2	Drv0 3	Drv0 4	Drv0 6	Drv0 8	Drv0 9	Drv0 10
	Drv1 1			Drv1 5	Drv1 7			

(2) The configuration of the actual driver unit will be imported.



Current configuration reflection

Unit configuration setting will be as shown below. Is it ok?

GW	Unit0	Unit1	Unit2	Unit3	Unit4	Unit5	Unit6	Unit7
	PC	PC	DC	DC	Rsv	AC	PCF	NKNOWN
	Drv0 0	Drv0 2	Drv0 3	Drv0 4	Drv0 6	Drv0 8	Drv0 9	Drv0 10
	Drv1 1			Drv1 5	Drv1 7			

GW	Unit0	Unit1	Unit2	Unit3	Unit4	Unit5	Unit6
	PC	PC	DC	DC	AC	AC	PCF
	Drv0 0	Drv0 2	Drv0 3	Drv0 4	Drv0 6	Drv0 8	Drv0 9
	Drv1 1			Drv1 5	Drv1 7		

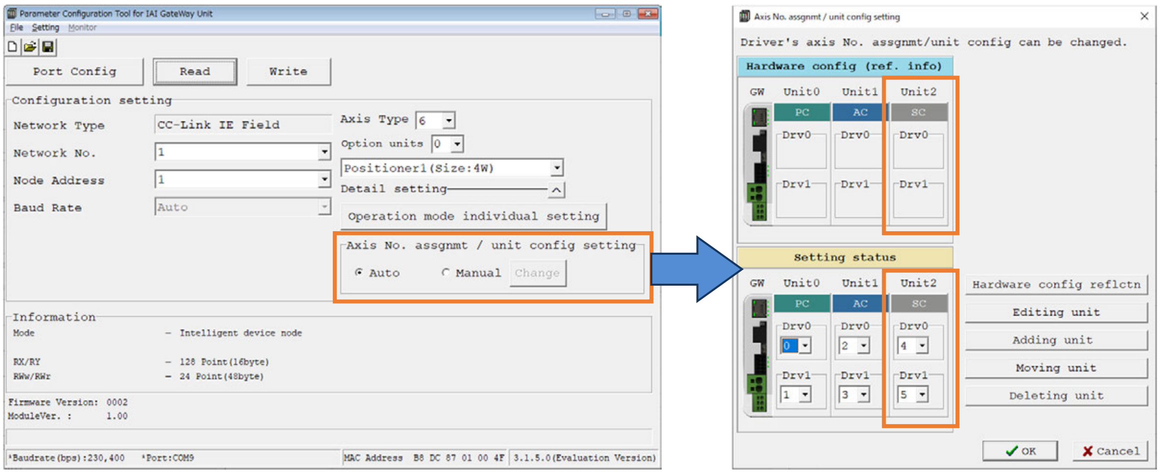
(3) Confirm the unit configuration and press "Complete".
It will be reflected in the "Axis number assignment / Unit configuration confirmation screen".

[When Connecting 200V Driver Unit (RCON-SC)]

When the 200V driver unit is connected, set "Axis Number Assignment / Unit Structure Setting" to "Automatic", and the 200V driver unit should get assigned to the last of the 24V driver units (RCON-PC/PCF/AC/DC).

When SCON-CB is connected using the SCON extension unit (RCON-EXT), the 200V driver unit should be assigned before SCON-CB.

Also, the 24V driver units cannot be moved or added after the 200V driver unit.



Configuration setting

Network Type: CC-Link IE Field

Network No.: 1

Node Address: 1

Baud Rate: Auto

Axis Type: 6

Option units: 0

Positioner1(Size:4W)

Detail setting

Axis No. assgnmt / unit config setting: ● Auto ○ Manual

Information

Mode – Intelligent device node

RX/RY – 128 Point(16byte)

RWw/RWr – 24 Point(48byte)

Firmware Version: 0002

ModuleVer. : 1.00

*Baudrate(bps):230,400 *Port:COM9

MAC Address B8 DC 87 01 00 4F

3.1.5.0(Evaluation Version)

Driver's axis No. assgnmt/unit config can be changed.

Hardware config (ref. info)

GW	Unit0	Unit1	Unit2
	PC	AC	SC
	Drv0	Drv0	Drv0
	Drv1	Drv1	Drv1

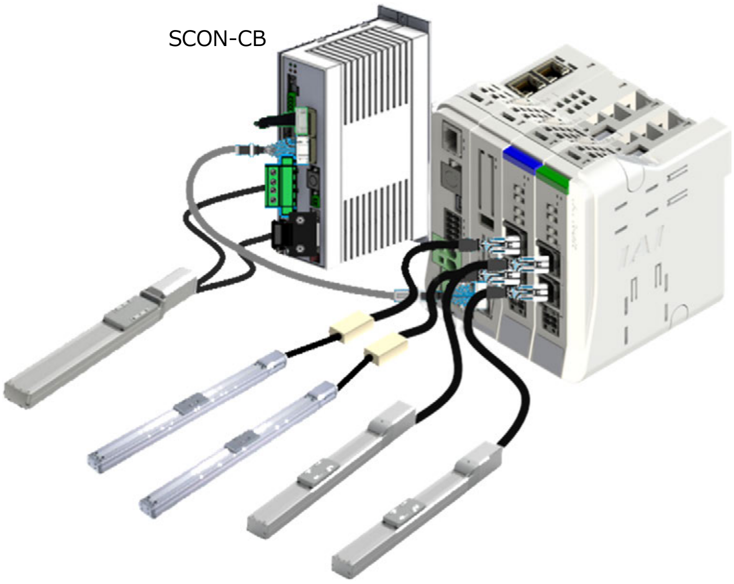
Setting status

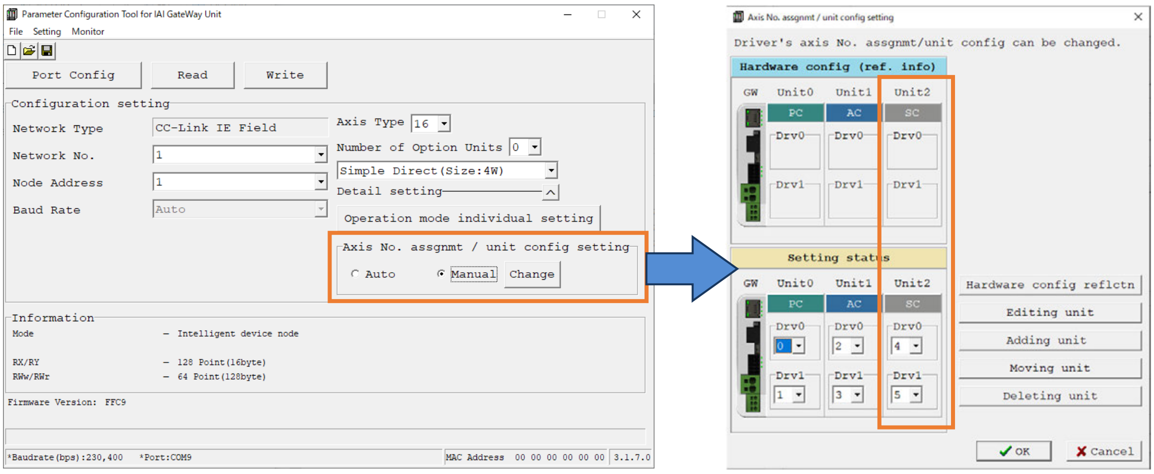
GW	Unit0	Unit1	Unit2
	PC	AC	SC
	Drv0: 0	Drv0: 2	Drv0: 4
	Drv1: 1	Drv1: 3	Drv1: 5

[When connecting SCON-CB]

When SCON-CB is connected using an extension unit (RCON-EXT), set “Axis No. assignment / unit configuration setting” to “Auto”, and SCON-CB should be assigned to the last of all the driver units.

Also, no other driver unit (RCON-PC/PCF/AC/DC/SC) can be moved or added after SCON-CB.





Configuration setting

Network Type: CC-Link IE Field

Network No.: 1

Node Address: 1

Baud Rate: Auto

Axis Type: 16

Number of Option Units: 0

Simple Direct(Size:4W)

Axis No. assgnmt / unit config setting: ○ Auto ● Manual

Information

Mode – Intelligent device node

RX/RY – 128 Point(16byte)

RWw/RWr – 64 Point(128byte)

Firmware Version: FFC9

*Baudrate(bps):230,400 *Port:COM9 MAC Address 00 00 00 00 00 00 3.1.7.0

Axis No. assgnmt / unit config setting

Driver's axis No. assgnmt/unit config can be changed.

Hardware config (ref. info)

GW	Unit0	Unit1	Unit2
	PC	AC	SC
	Drv0	Drv0	Drv0
	Drv1	Drv1	Drv1

Setting status

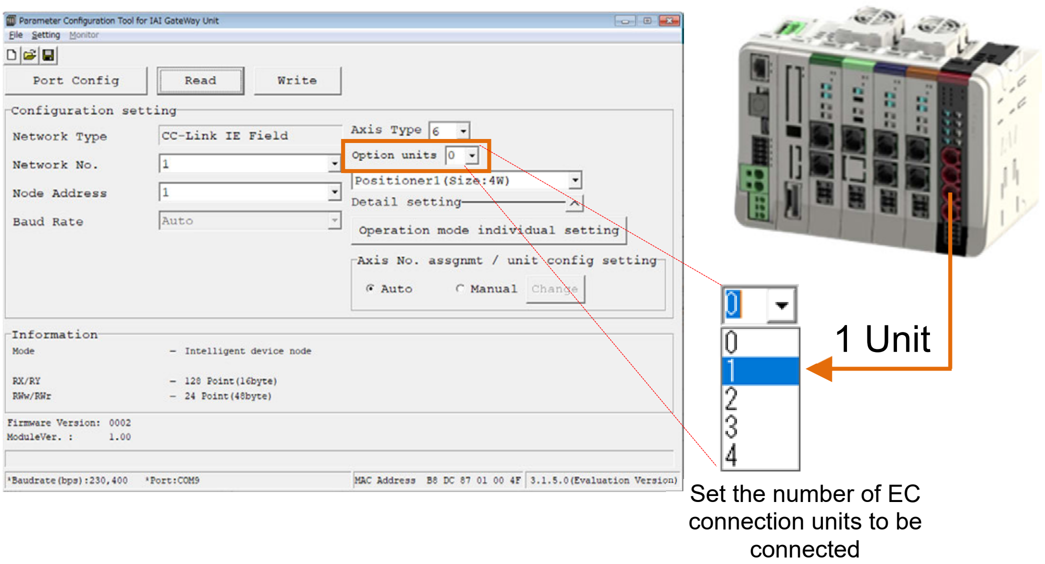
GW	Unit0	Unit1	Unit2
	PC	AC	SC
	Drv0 0	Drv0 2	Drv0 4
	Drv1 1	Drv1 3	Drv1 5

[When Connecting EC Connection Unit]

When the EC connection unit is connected, set the number of EC connection units to be connected in “Option units”.

The axis numbers for the EC connection unit should be assigned after each driver unit (RCON-PC/PCF/AC/DC/SC) and SCON-CB. Also, no other unit can be moved or added after the EC connection unit.

The EC connection unit can be connected for four units at maximum, however, it cannot be connected if the top axis number exceeds 0 to 15.



Parameter Configuration Tool for IAI GateWay Unit

File Setting Monitor

Port Config | Read | Write

Configuration setting

Network Type: CC-Link IE Field

Network No.: 1

Node Address: 1

Baud Rate: Auto

Axis Type: 6

Option units: 0

Positioner1(Size:4W)

Detail setting

Operation mode individual setting

Axis No. assgnmt / unit config setting

● Auto ○ Manual Change

Information

Mode – Intelligent device node

RX/RY – 128 Point(16byte)

RWw/RWr – 24 Point(48byte)

Firmware Version: 0002

ModuleVer. : 1.00

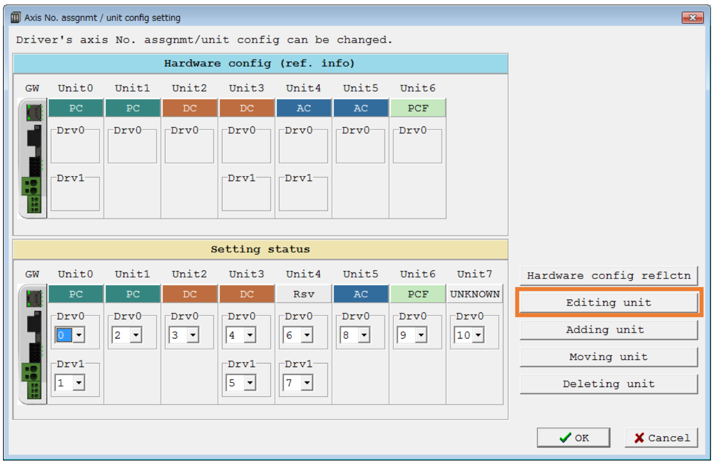
Baudrate(bps):230,400 Port:COM9 MAC Address B8 DC 87 01 00 4F 3.1.5.0(Evaluation Version)

Caution

- If the actual number of connected axes of the RCON system does not match the number of axes set and transferred in the gateway parameter configuration tool, the PC software cannot be connected.
- Set and transfer the gateway parameters suitably according to the actual unit configuration and the number of connected axes.

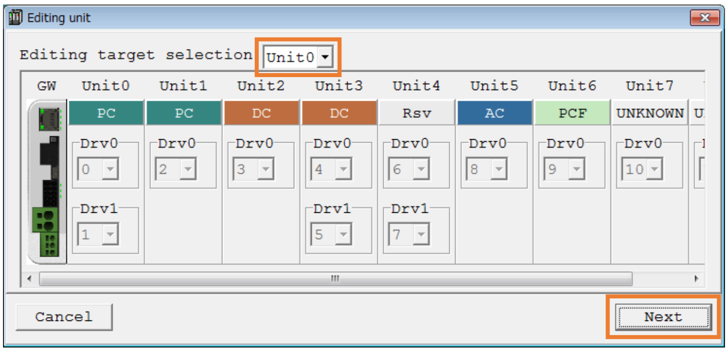
2 Edit the settings of the specific driver unit

(1) On the "Axis number assignment / Unit configuration confirmation screen", press "Editing unit".



Driver's axis No. assgnmt/unit config can be changed.

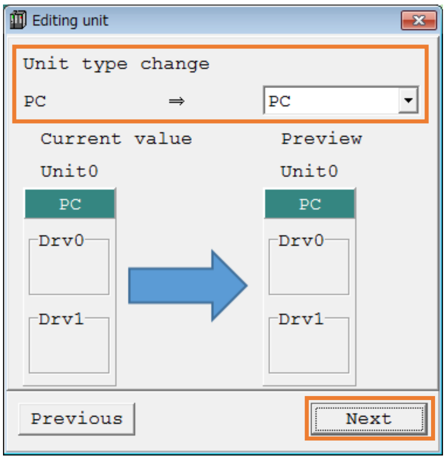
(2) "Editing unit screen" opens.
Select the driver units to be edited and press "Next".



Editing target selection Unit0

(3) "Unit type change screen" opens.

Select the unit type from the following 6 types and press "Next".



Editing unit

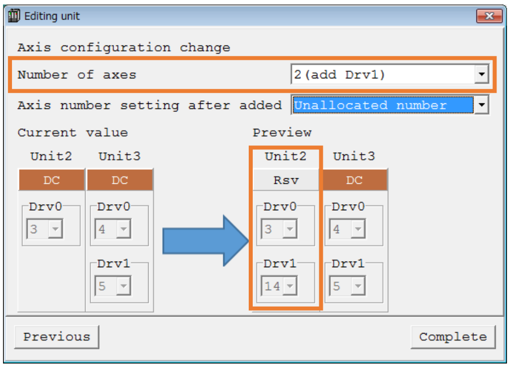
Unit type change

PC ⇒ PC

Unit type
PC, PCF, AC, DC, SC, SCON, reserved

(4) "Axis configuration change screen" opens.

First, select the number of axes to be used in the driver unit.

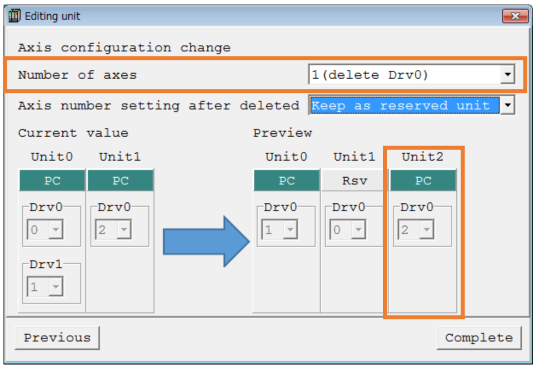


Editing unit

Axis configuration change

Number of axes: 2 (add Drv1)

Axis number setting after added: Unallocated number



Editing unit

Axis configuration change

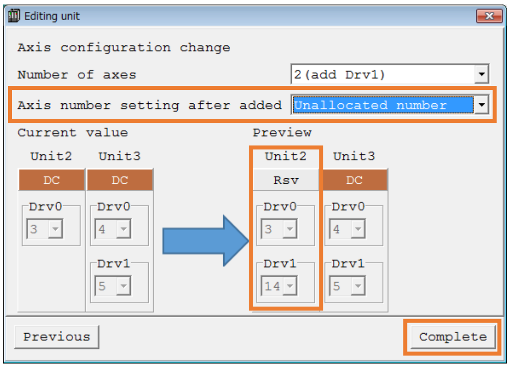
Number of axes: 1 (delete Drv0)

Axis number setting after deleted: Keep as reserved unit

Number of axes of selected driver unit	Selection item
1-axis	1 *1
	2 (add to Drv0)
	2 (add to Drv1)
2-axis	1 (delete Drv0)
	1 (delete Drv1)
	2

*1: Since PCF, SC and SCON are 1 unit 1 axis, the selection item will be only 1.

(5) Next, set the axis number after adding/deleting.
Select from the following selection items and press "Complete".

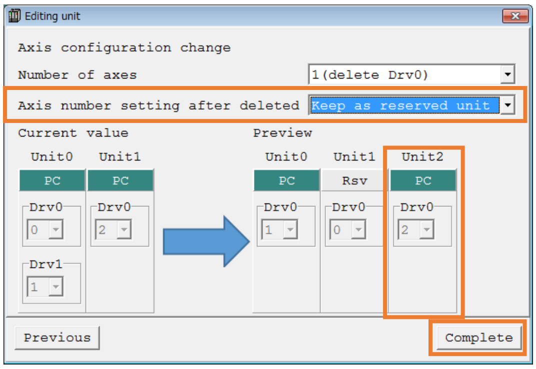


Editing unit

Axis configuration change

Number of axes: 2 (add Drv1)

Axis number setting after added: Unallocated number



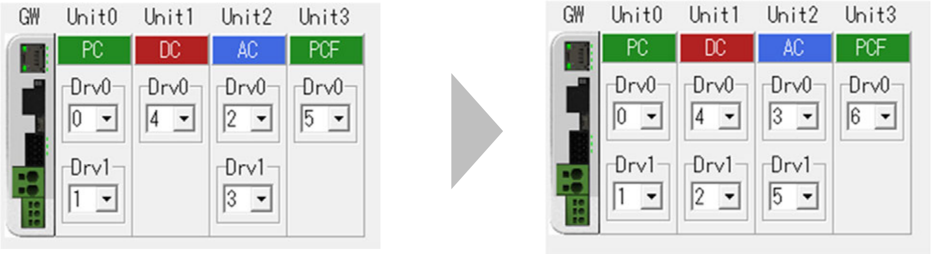
Editing unit

Axis configuration change

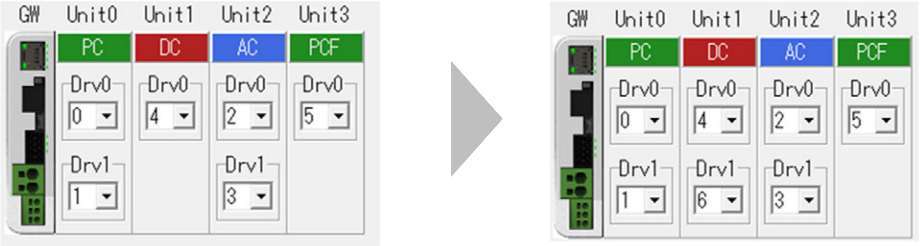
Number of axes: 1 (delete Drv0)

Axis number setting after deleted: Keep as reserved unit

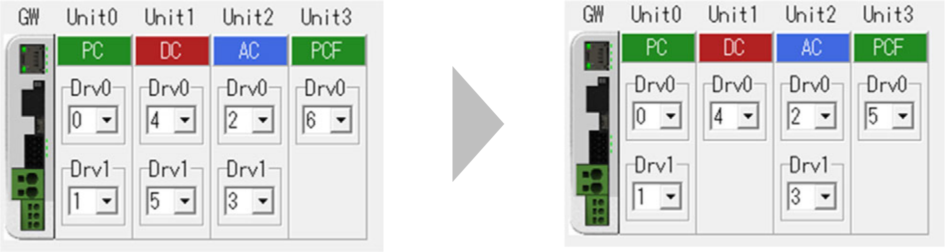
Number of Axes	Selection item	Axis number setting change results
When adding	Shift	Shifts the axis number of the added drivers from before.
	Unallocated number	Sets unassigned number to the added driver.
When deleting	Shift	Shifts the axis number of the deleted driver from before.
	Keep as reserved unit	Adds the reserved unit after the edited unit and leaves the axis number.



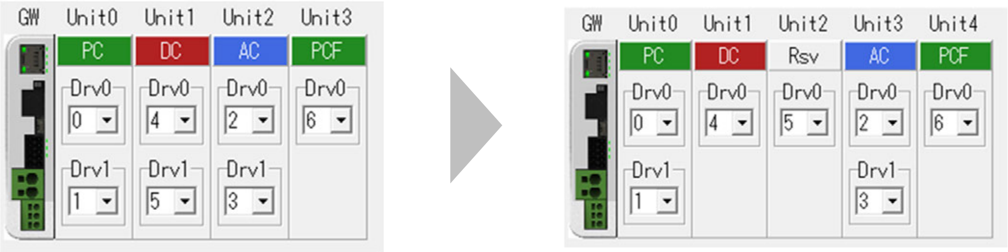
<When Drv1 is added to Unit1 and "Shift" is selected>



<When Drv1 is added to Unit1 and "Unallocated number" is selected>



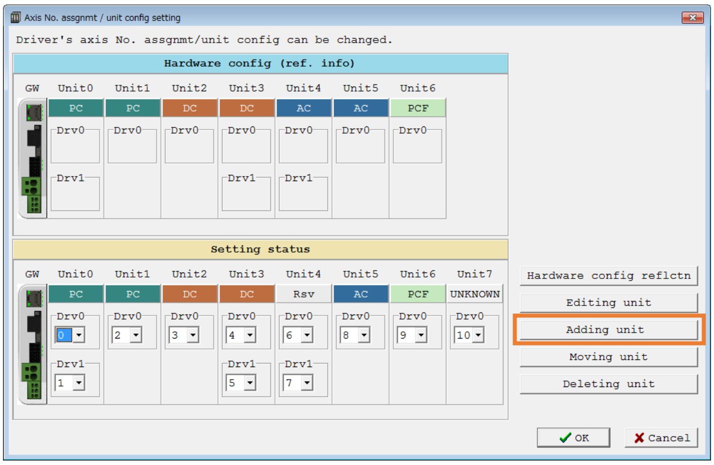
<When Drv1 is deleted from Unit1 and "Shift" is selected>



<When Drv1 is deleted from Unit1 and "Keep as reserved unit" is selected>

3 Add the driver unit

(1) In "Axis number assignment / Unit configuration confirmation screen", press "Adding unit".

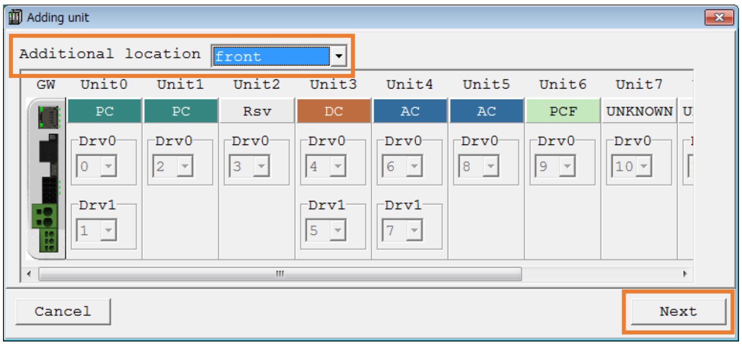


Axis No. assgnmt / unit config setting

Driver's axis No. assgnmt/unit config can be changed.

(2) "Additional location screen" opens.

Select the position to which the driver unit is to be added and press "Next".

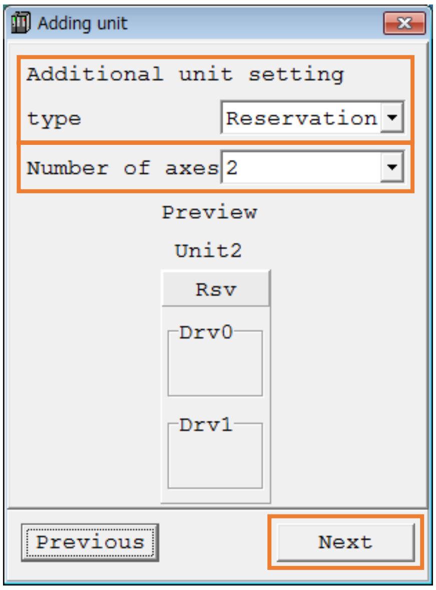


Additional location: front

GW	Unit0	Unit1	Unit2	Unit3	Unit4	Unit5	Unit6	Unit7
	PC	PC	Rsv	DC	AC	AC	PCF	UNKNOWN
	Drv0 0	Drv0 2	Drv0 3	Drv0 4	Drv0 6	Drv0 8	Drv0 9	Drv0 10
	Drv1 1			Drv1 5	Drv1 7			

(3) "Adding unit screen" opens.

Select the unit type from the following 6 types and select the number of axes, then press "Next".



Additional unit setting

type: Reservation

Number of axes: 2

Preview

Unit2

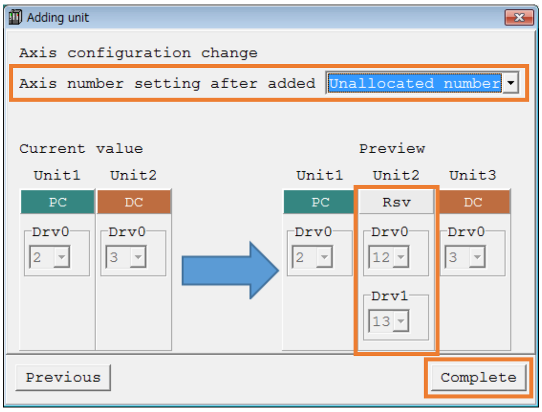
Rsv

Drv0

Drv1

Unit type
PC, PCF, AC, DC, SC, SCON, reserved

(4) "Axis configuration change screen" opens.
First, select the number of axes to be used in the driver unit.

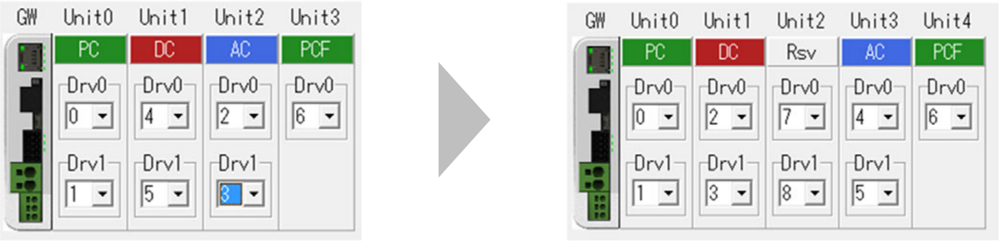


Adding unit

Axis configuration change

Axis number setting after added: Unallocated number

Selection item	Axis number setting change results
Unallocated number	Sets unassigned number.
Shift	Shifts the axis number of the added drivers from before.

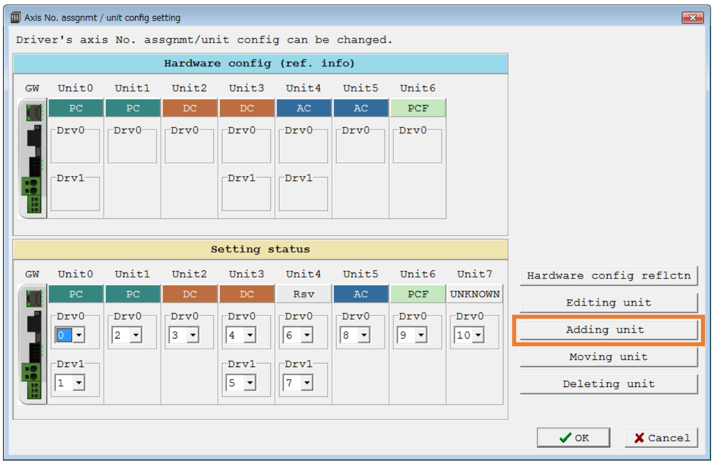


<When the reserved unit is added to Unit1-Unit2 and " Unallocated number" is

<When the reserved unit is added to Unit1-Unit2 and "Shift" is selected>

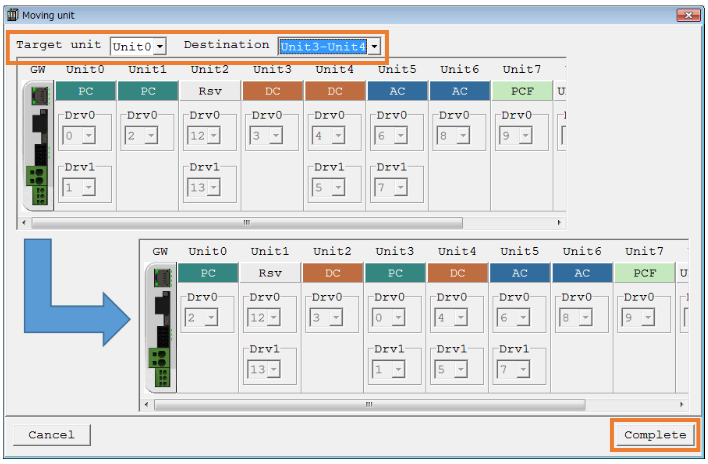
4 Move the driver unit

(1) On the "Axis number assignment / Unit configuration confirmation screen", press "Moving unit".



Driver's axis No. assgnmt/unit config can be changed.

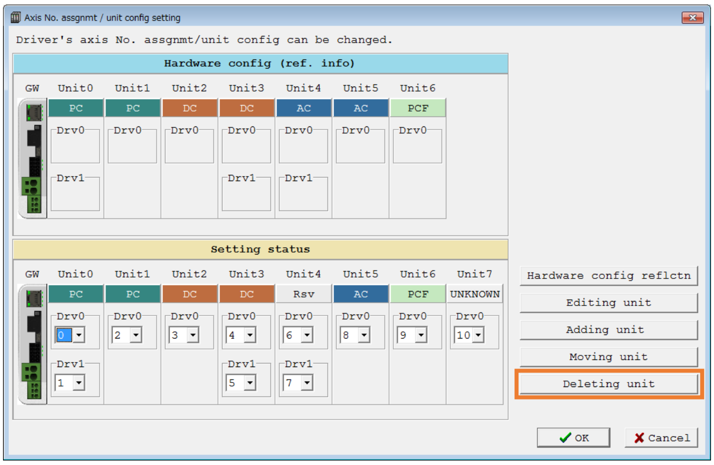
(2) "Moving unit screen" opens.
Select the driver unit to be moved and its position, and press "Complete".



Target unit Unit0
Destination Unit3-Unit4

5 Delete the driver unit

(1) On the "Axis number assignment / Unit configuration confirmation screen", press "Deleting unit".



Driver's axis No. assgnmt/unit config can be changed.

Hardware config (ref. info)

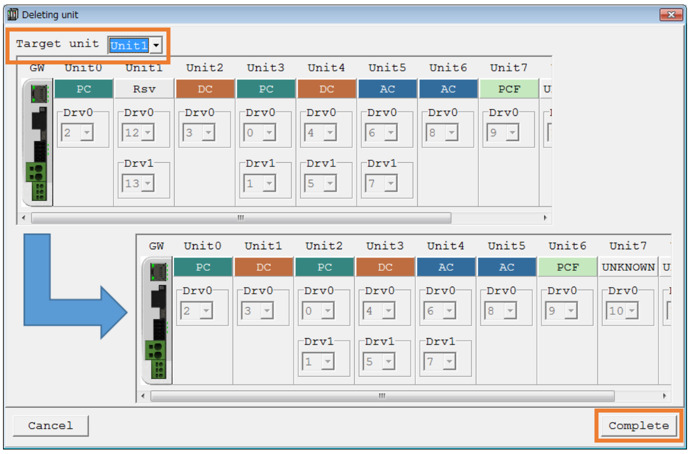
GW	Unit0	Unit1	Unit2	Unit3	Unit4	Unit5	Unit6
	PC	PC	DC	DC	AC	AC	PCF
	Drv0	Drv0	Drv0	Drv0	Drv0	Drv0	Drv0
	Drv1			Drv1	Drv1		

Setting status

GW	Unit0	Unit1	Unit2	Unit3	Unit4	Unit5	Unit6	Unit7
	PC	PC	DC	DC	Rsv	AC	PCF	UNKNOWN
	Drv0 0	Drv0 2	Drv0 3	Drv0 4	Drv0 6	Drv0 8	Drv0 9	Drv0 10
	Drv1 1			Drv1 5	Drv1 7			

(2) "Deleting unit screen" opens.

Select the driver units to be deleted and press "Complete".



Target unit Unit1

GW	Unit0	Unit1	Unit2	Unit3	Unit4	Unit5	Unit6	Unit7
	PC	Rsv	DC	PC	DC	AC	AC	PCF
	Drv0 2	Drv0 12	Drv0 3	Drv0 0	Drv0 4	Drv0 6	Drv0 8	Drv0 9
		Drv1 13		Drv1 1	Drv1 5	Drv1 7		

GW	Unit0	Unit1	Unit2	Unit3	Unit4	Unit5	Unit6	Unit7
	PC	DC	PC	DC	AC	AC	PCF	UNKNOWN
	Drv0 2	Drv0 3	Drv0 0	Drv0 4	Drv0 6	Drv0 8	Drv0 9	Drv0 10
			Drv1 1	Drv1 5	Drv1 7			

Specifications
Section

Chapter 4

24V Driver Unit
EC Connection Unit

4.1 Overview

The 24V driver unit is a dedicated controller for R unit.
There are 5 types of driver unit available to suit the type of actuator motor controllable.
Additionally, up to 2 axes are controllable by a single driver unit.
Basic functions and performance are the same as PCON/ACON/DCON/SCON controllers.
These controllers use field network communication via a gateway unit, as described in Chapter 3, for control.

[Features]

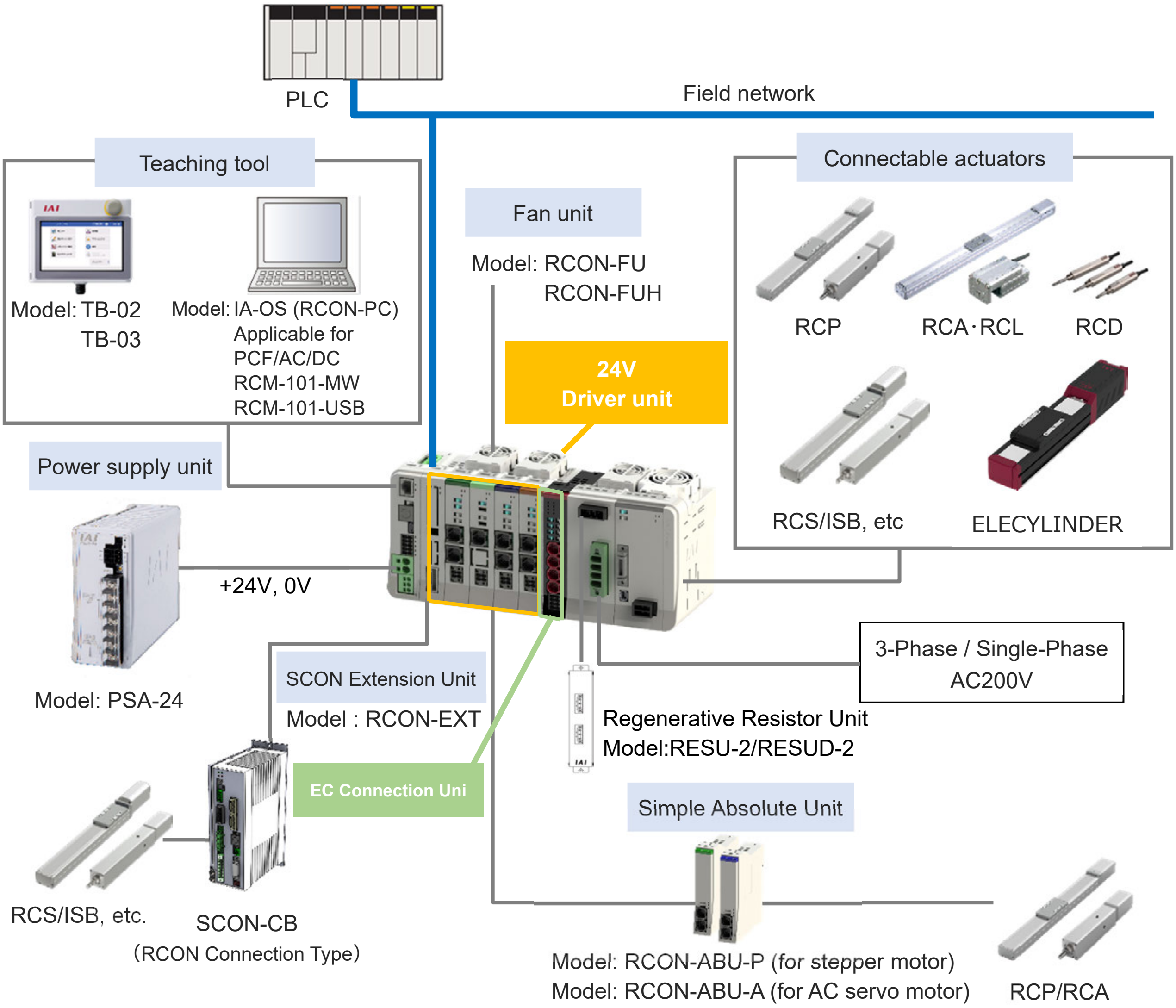
- ■ Compatible with battery-less absolute specification and incremental specification. Additionally, connection of a simple absolute unit allows support for simple absolute specification.
- ■ Compatible with stepper motor PowerCON specification and high thrust specification.
- ■ Driver units are directly connected so that the hassles of wiring can be significantly reduced.
- ■ DIN rail mounting makes it easy to mount onto control boards, etc.

The EC connection is a unit to connect ELECYLINDER dedicated for R Unit.
Connect RCON-EC connection type (option: ACR) ELECYLINDER to RCON and ELECYLINDER can be controlled in the field network communication. 24V and 200V driver units can exist together.
Also, the number of ELECYLINDER available to be connected to one unit of the EC connection unit should be four axes at the maximum.

In this section, explains the 24V driver units (RCON-PC/PCF/AC/DC) and the EC connection unit (RCON-EC).
Refer to Specification Section Chapter 5 for the 200V driver unit (RCON-SC).

Caution

- ● ELECYLINDER is not available for operation in the single solenoid system. ELECYLINDER may not operate as commanded by a host system if the setting is changed to the single solenoid system.


PLC
Field network
Teaching tool
Model: TB-02
TB-03
Model: IA-OS (RCON-PC)
Applicable for
PCF/AC/DC
RCM-101-MW
RCM-101-USB
Fan unit
Model: RCON-FU
RCON-FUH
24V
Driver unit
Connectable actuators
RCP
RCA･RCL
RCD
RCS/ISB, etc
ELECYLINDER
Power supply unit
+24V, 0V
Model: PSA-24
SCON Extension Unit
Model : RCON-EXT
EC Connection Uni
RCS/ISB, etc.
SCON-CB
（RCON Connection Type）
3-Phase / Single-Phase
AC200V
Regenerative Resistor Unit
Model:RESU-2/RESUD-2
Simple Absolute Unit
Model: RCON-ABU-P (for stepper motor)
Model: RCON-ABU-A (for AC servo motor)
RCP/RCA

4.2 How to Read the Model Number

The model codes for the 24V driver unit and EC connection unit are as shown below.
1-axis specification or 2-axis specification can be selected for RCON-PC/AC/DC.
There is only one type, one-axis type for RCON-PCF and one type, four-axis type for the EC connection unit.

24V Driver unit model

RCON – ☐ – ☐

Type　　Number of Axes

Type	
PC	Stepper motor Type
PCF	Stepper motor 56SP/60P/86P Compatible type
AC	AC servo motor type
DC	DC brush-less motor type

Number of Axes	
1	1-axis specification
2	2-axis specification

EC Connection Unit model

RCON – ☐ – ☐

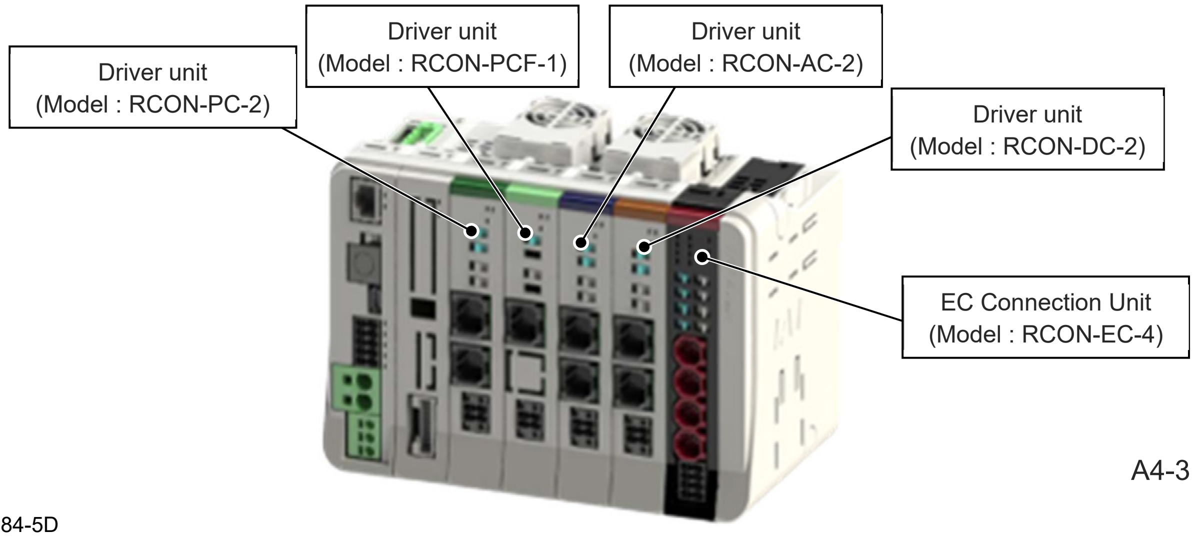
Type　　Number of Axes

Type	
EC	ELECYLINDER

Number of Axes	
4	Four-axis type

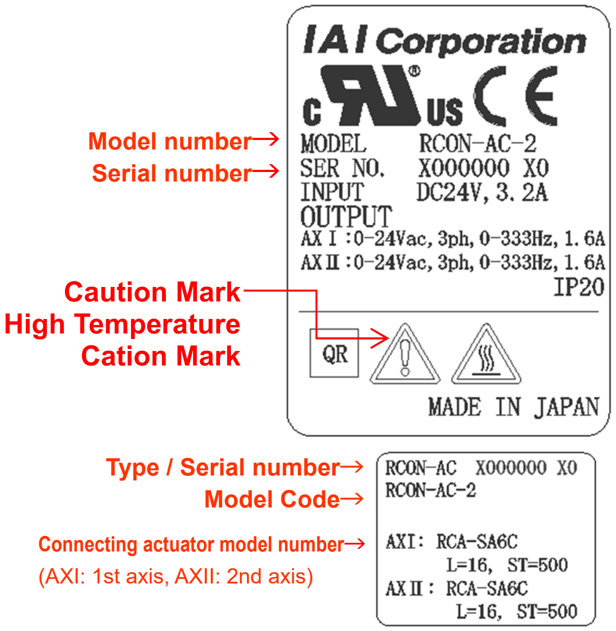
*ELECYLINDER capable to be connected to the EC connection unit is the option: ACR only.

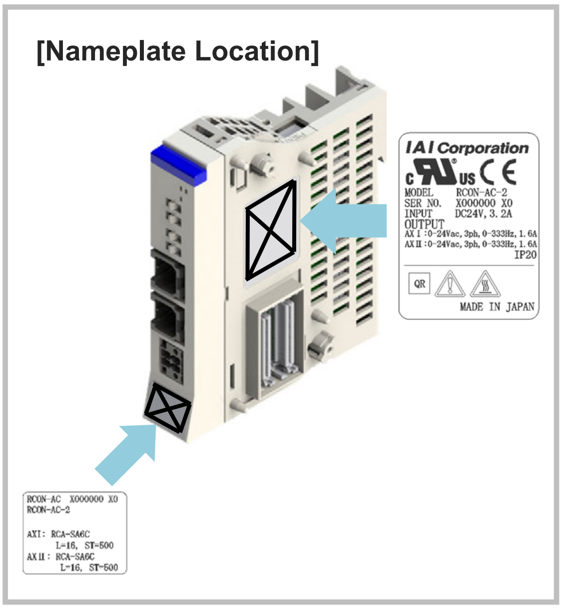
EC -	☐ -	☐ -	(☐) -	☐ -	☐ -	**ACR**
< Series>	<Type>	<Lead>	< Motor Joint Type>	< Stroke>	< Cable Length>	<Option> ACR: RCON-EC connection type (tentative)



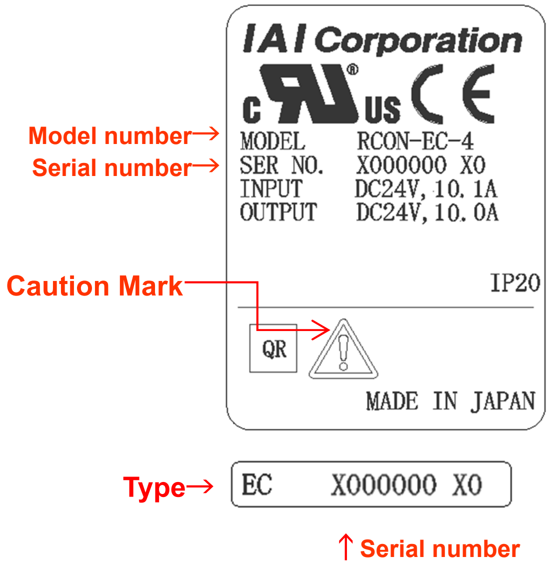
How to read the model nameplate

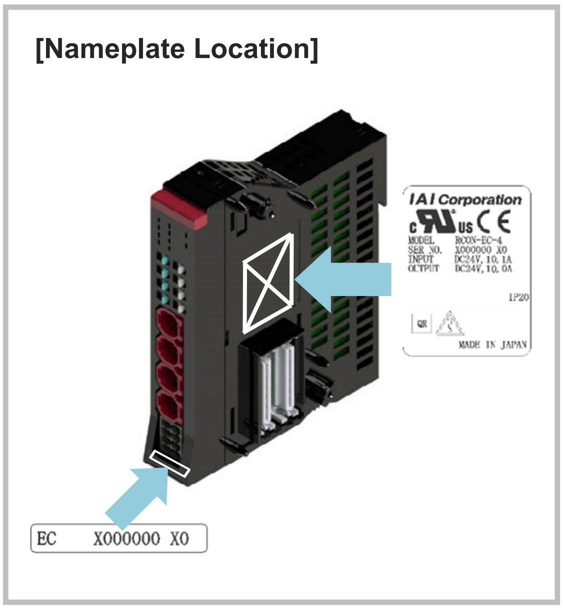
[24V Driver unit]





[EC Connection Unit]



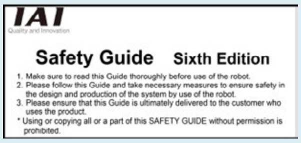


Mark	Explanation of Mark
⚠	Use IAI specified cables only.
♨	Do not touch product when power is ON. Risk of burn.

4.3 Components

The following table shows the product configuration for the standard specification.
See the packing list for the details of the enclosed components. In the unlikely case that any model number errors or missing parts come to light, contact your local IAI distributor.

[24V Driver Unit]

Part name	Shape	Quantity	Remarks
Driver unit		1	Model example: RCON-PC/PCF/AC/DC
Drive source shutoff connector		1	Model: DFMC1.5/2-STF-3.5 * Supplied with driver unit
First Step Guide	 IAI Quality and Innovation RCON-PC/PCF/AC/DC, RCON-FU RCON-ABU-A/P, RCON-EXT Driver Unit, Fan Unit, Simple Absolute Unit, Extension Unit First Step Guide First Edition Thank you for purchasing our product. Make sure to read the Safety Guide and detailed Instruction Manual (DVD) included with the product in addition to this First Step Guide to ensure correct use. This Instruction Manual is original. Warning: Operation of this equipment requires detailed installation and operation instructions which are provided on the DVD Manual included in the box this device was packaged in. It should be retained with this device at all times. A copy of the DVD Manual can be requested by contacting your nearest IAI Sales Office listed at the back cover of the Instruction Manual or on the First Step Guide. • Using or copying all or part of this Instruction Manual without permission is prohibited. • The company names, names of products and trademarks of each company shown in the sentences are registered trademarks.	1	
Safety Guide	 IAI Quality and Innovation Safety Guide Sixth Edition 1. Make sure to read this Guide thoroughly before use of the robot. 2. Please follow this Guide and take necessary measures to ensure safety in the design and production of the system by use of the robot. 3. Please ensure that this Guide is ultimately delivered to the customer who uses the product. * Using or copying all or a part of this SAFETY GUIDE without permission is prohibited.	1	

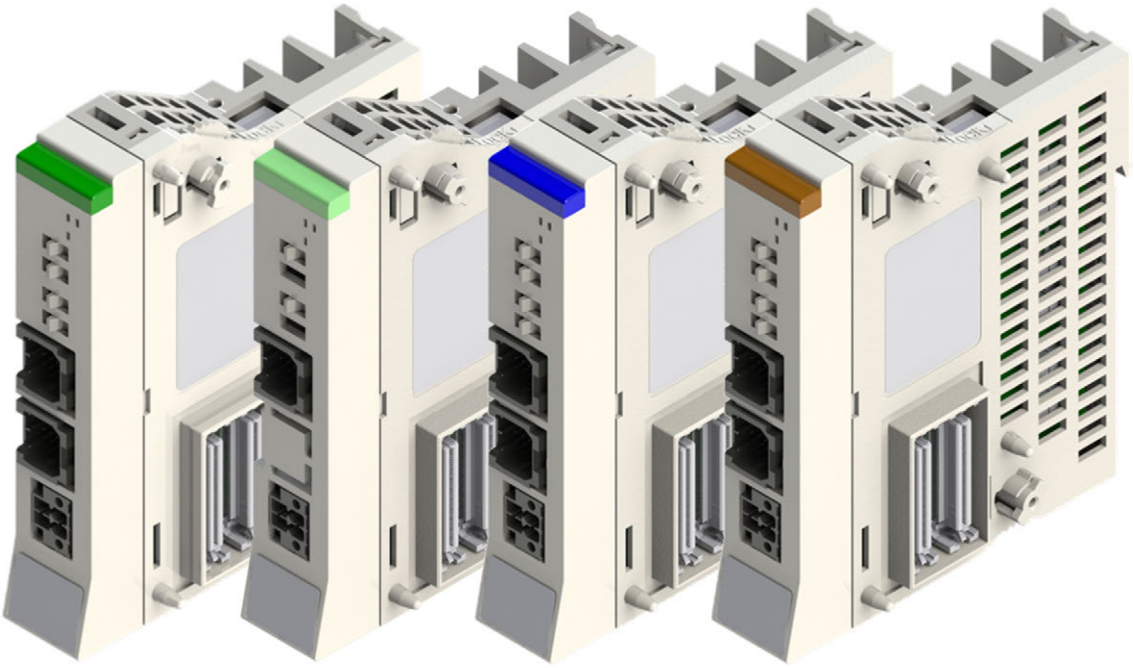
[EC Connection Unit]

Part name	Shape	Quantity	Remarks
Driver unit		1	Model example: RCON-EC
Drive source shutoff connector		1	Model: DFMC1.5/4-ST-3.5 * Supplied with EC Connection Unit
First Step Guide	 IAI REC-GW、RCON-EC、 RCON-GW-TRE EC ゲートウェイユニット、EC 接続ユニット、 REC 用ターミナルユニット ファーストステップガイド　第 1 版	1	
Safety Guide	 IAI 安全ガイド　第 6 版 Safety Guide　Sixth Edition 1. Make sure to read this Guide thoroughly before use of the robot. 2. Please follow this Guide and take necessary measures to ensure safety in the design and production of the system by use of the robot. 3. Please ensure that this Guide is ultimately delivered to the customer who uses the product. * Using or copying all or a part of this SAFETY GUIDE without permission is prohibited.	1	

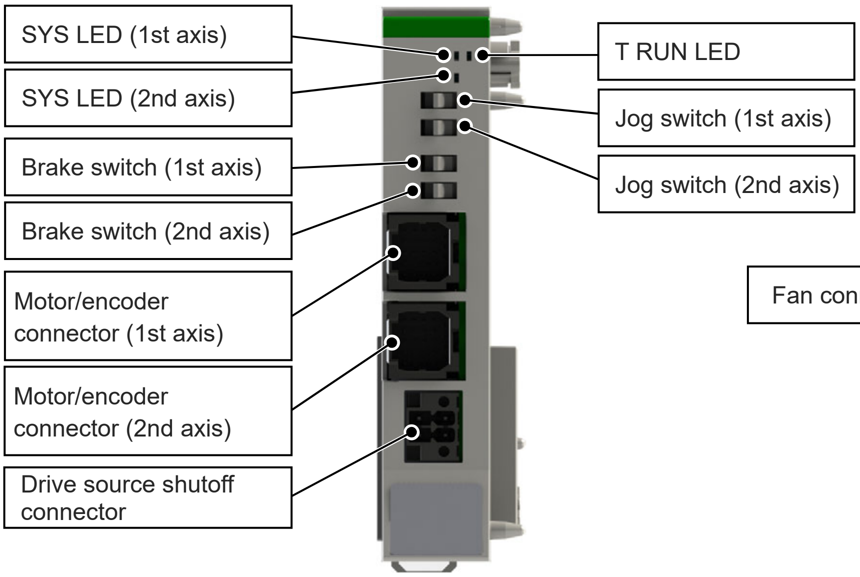
4.4 Part Names/Functions and External Dimensions

[24V Driver Unit]

Part names

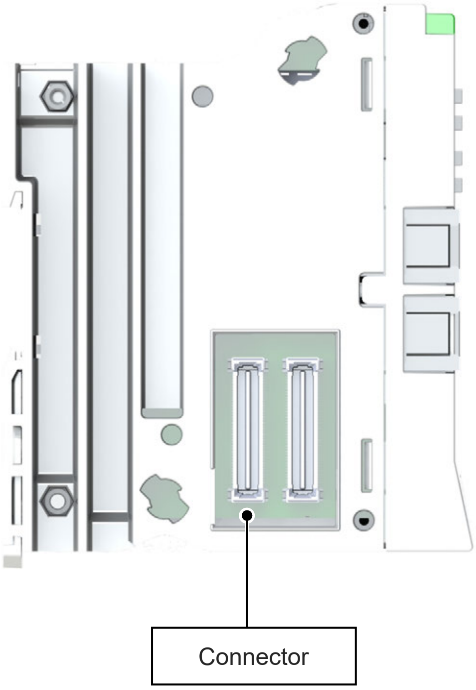


RCON-PC (green) RCON-PCF (light green) RCON-AC (blue) RCON-DC (brown)

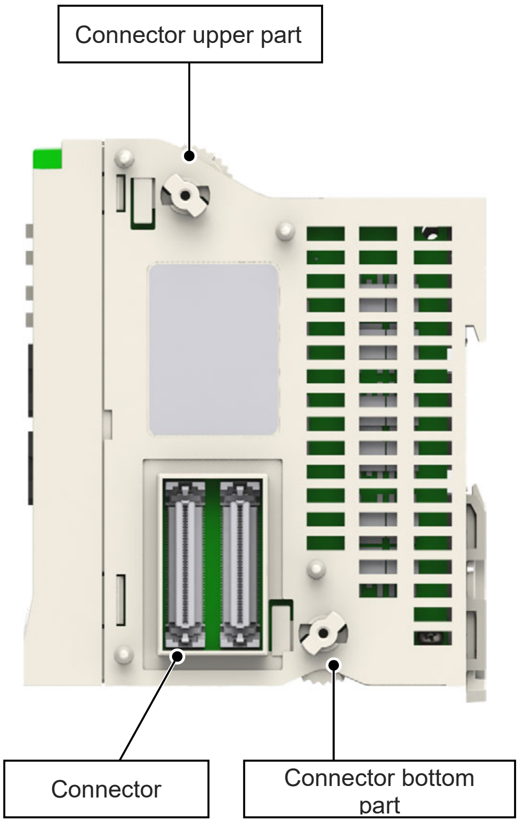


Front

Top



Left side

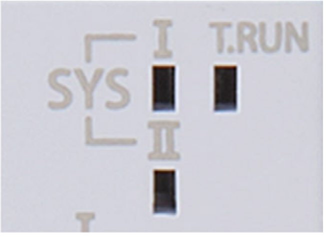


Right side

Rear

LED display

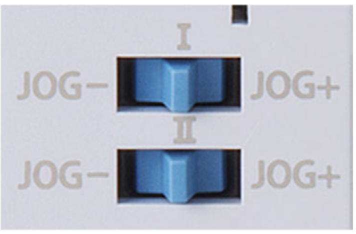
Panel notation	Display color	Status	Description
T RUN	Green	Light ON	Normal internal bus communication
		Blinking	Waiting for initialization signal, initialization communication failed
	Orange	Light ON	Bus communication error generated
	Light OFF		Communication stop
SYS (I: 1st axis II: 2nd axis)	Green	Light ON	Servo ON
		Blinking	Automatic servo OFF (blinks at 0.5 Hz)
	Red	Light ON	Alarm triggered STOP signal input OFF (Drive source cutoff triggered)
		Blinking	Collision detection (blinks at 1 Hz)
	Light OFF		Servo OFF, axis disable setting (gateway parameters)



Jog switch

A switch for jog operation. I indicates the 1st axis, and II indicates the 2nd axis.

Tilt the switch to the JOG+ side to perform jog operation in the + direction, and to the JOG- side for jog operation in the - direction. Tilting the switch further increases the jog speed step by step. However, if home return is not complete, the jog speed will be home return speed.
When performing jog operation with the JOG switch with servo ON, the servo will be ON even after completion; with servo OFF, perform jog operation after servo ON and the servo will be OFF after completion.
Note that the operation of the jog switch is enabled only in MANU teaching mode. It is disabled in MANU monitor mode and AUTO mode.
The jog switch is also disabled when opening the screen in which the actuator can be operated with the teaching tool. When opening the screen in which operation can be done with the jog switch, the actuator will decelerate and stop.
If parameter No. 194 "JOG Switch" is set to "1", this switch will be enabled (Initial setting is “0: Valid”.)



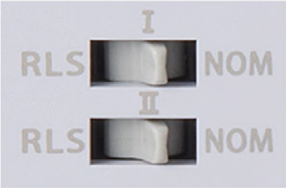
Symbol	Description
JOG+	Jog operation in + direction (home reverse direction)
JOG-	Jog operation in - direction (home direction)

Caution

- The jog switch is disabled when the communication with the teaching tool is disconnected while the screen in which the actuator can be operated with the teaching tool is opened.
- To enable jog switch operation again, turn the RCON system on again or perform software reset.

Brake release switch

A switch for forced brake release. I indicates the 1st axis, and II indicates the 2nd axis. Should be on NOM side during normal operation. On NOM side, the brake will be released by servo ON and locked by servo OFF. On RLS side, there will be forced release regardless of servo ON/OFF (except when control power is OFF).



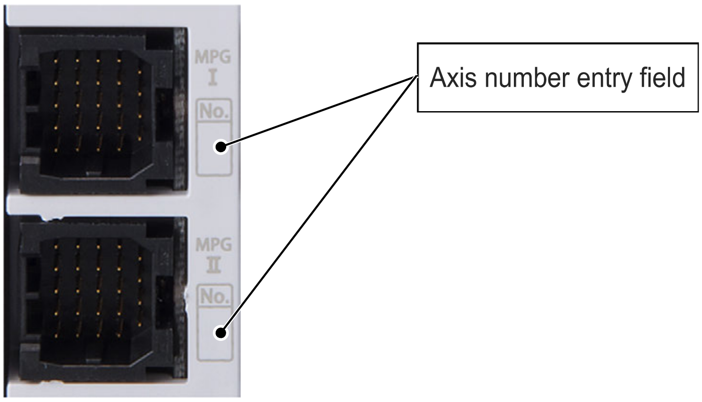
Symbol	Description
RLS	Brake release (Brake Release)
NOM	Brake lock (Normal)

Warning

- Be careful when releasing the brake. Releasing carelessly may cause injury or damage to the actuator body, workpiece or surrounding devices due to the slider or rod falling.
- After releasing the brake, be sure to return the brake to the enabled status. It is very dangerous to operate with the brake released. It may cause injury or damage to the actuator body, workpiece or surrounding devices due to the slider or rod falling.

Motor/encoder connector

A connector to connect to the actuator. I indicates the 1st axis, and II indicates the 2nd axis. In RCON, the axis numbers will be automatically allocated from the unit closest to the gateway unit (except for the axis connecting to the EC Connection Unit and the SCON extension unit). Axis numbers can be changed as needed to any number with the gateway parameter configuration tool.



RCON-PC/PCF Driver Unit

Pin No.	Signal name	Description
1	A+	Encoder phase A+ input
2	BK-	Brake release - side
3	ϕA+	Motor drive line phase A+
4	ϕA-	Motor drive line phase A-
5	VMM	Motor power line
6	A-	Encoder phase A- input
7	GND	0 V
8	LS+	Limit switch + side
9	VMM	Motor power line
10	ϕB+	Motor drive line phase B+
11	B+	Encoder phase B+ input
12	ENC_SD+	Battery-less absolute signal line +
13	LS_GND	Ground for limit switch
14	LS-	Limit switch - side
15	ϕB-	Motor drive line phase B-
16	B-	Encoder phase B- input
17	ENC_SD-	Battery-less absolute signal line -
18	VPS	Encoder line driver enable output
19	NC	Not connected
20	BK+	Brake release + side
21	VCC	Encoder for motor power 5V
22	CF_VCC	Encoder for high-thrust motor power 5V
23	NC	Not connected
24	FG	Frame ground

RCON-AC Driver Unit

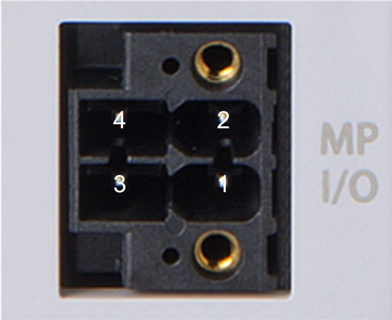
Pin No.	Signal name	Description
1	B+	Encoder phase B+ input
2	LS-	Limit switch - side
3	U	Motor drive line phase U
4	W	Motor drive line phase W
5	V	Motor drive line phase V
6	B-	Encoder phase B- input
7	GND	0 V
8	BK+	Brake release + side
9	NC	Not connected
10	NC	Not connected
11	Z+ / ENC_SD+	Encoder phase Z+ input / Battery-less absolute signal line +
12	A+	Encoder phase A+ input
13	LSGND	Ground for limit switch
14	BK-	Brake release - side
15	NC	Not connected
16	Z- / ENC_SD-	Encoder phase Z- input / Battery-less absolute signal line -
17	A-	Encoder phase A- input
18	VPS	Encoder line driver enable output
19	NC	Not connected
20	LS+	Limit switch + side
21	VCC	Encoder power 5V
22	NC	Not connected
23	NC	Not connected
24	FG	Frame ground

RCON-DC Driver Unit

Pin No.	Signal name	Description
1	B+	Encoder phase B+ input
2	LS-	Limit switch - side
3	U	Motor drive line phase U
4	W	Motor drive line phase W
5	V	Motor drive line phase V
6	B-	Encoder phase B- input
7	GND	0 V
8	BK+	Brake release + side
9	NC	Not connected
10	NC	Not connected
11	HS_U	Hall sensor phase U
12	A+	Encoder phase A+ input
13	HS_W	Hall sensor phase W
14	BK-	Brake release - side
15	NC	Not connected
16	HS_V	Hall sensor phase V
17	A-	Encoder phase A- input
18	VPS	Encoder line driver enable output
19	NC	Not connected
20	LS+	Limit switch + side
21	VCC	Encoder power 5V
22	NC	Not connected
23	NC	Not connected
24	FG	Frame ground

Drive source shutoff connector

Drive-source cutoff input. Drive source can be cut off by individual axes.



Cable connector name: DFMC1.5/2-STF-3.5 (Phoenix Contact)

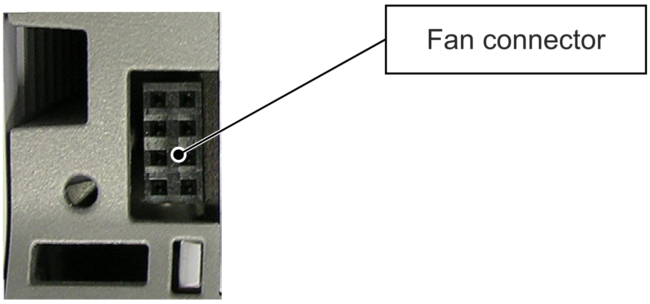
Pin No.	Signal name	Description
1	MPO_2	Motor power output (2nd axis)
2	MPO_1	Motor power output (1st axis)
3	MPI_2	Motor power input (2nd axis)
4	MPI_1	Motor power input (1st axis)

Cable side connector compatible wire

Item	Specifications
Compatible wire	AWG24 ~ 16 (Copper Wire)
Strip length	10.0mm
Rated Temperature on Isolation Coating	60degC or more

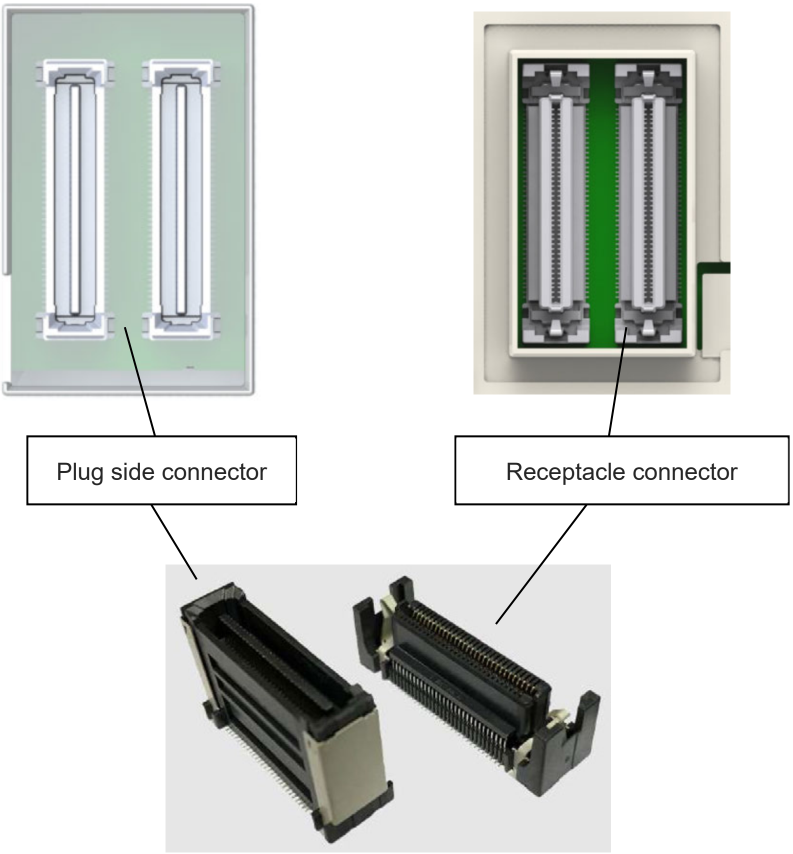
Fan connector

A connector to connect the fan unit. It connects to the fan board connector on the fan unit side.



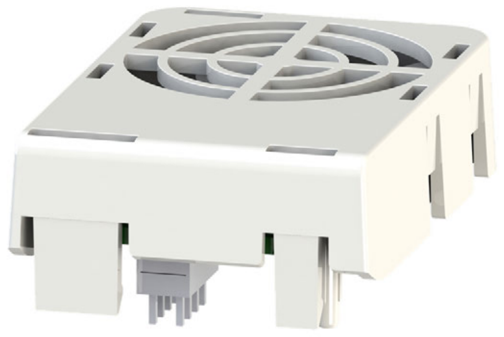
Connectors

A connector for use between units. Two identical connectors are used. The connectors have a floating structure that absorbs connector misalignment due to housing mating or mounting misalignment between connectors.

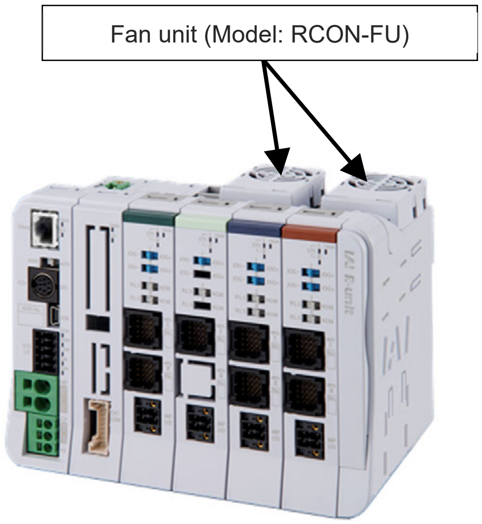


Fan unit

An option for forced air cooling of the driver unit. Use by connecting to the fan connector on the driver unit side. 1 fan unit to be used per 2 driver units.
The fan rotates when the driver unit internal temperature rises and stops when the temperature falls.

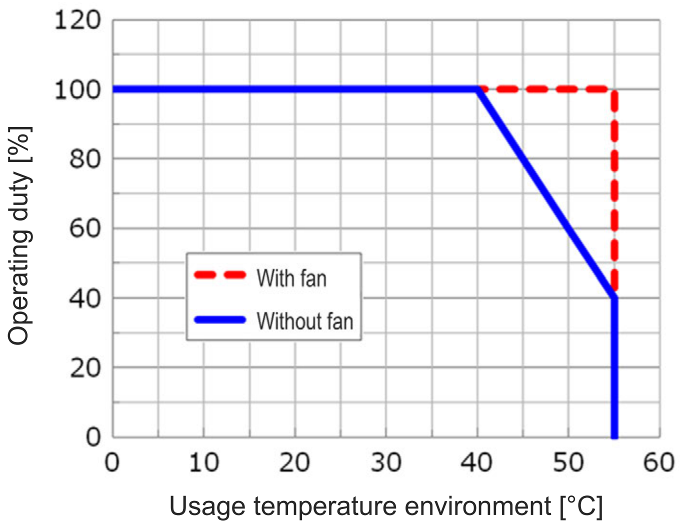


Fan unit



Fan unit (Model: RCON-FU)

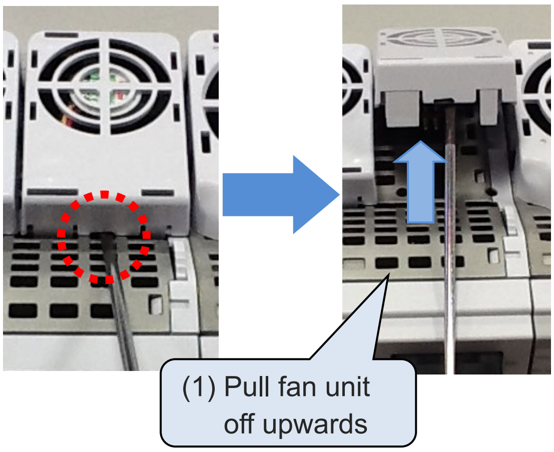
Operation without derating is possible without a fan unit at 0-40°C; however, at 40-55°C, actuator operating duty must be reduced by 20% every 5°C.
(0CA alarm should be generated if operation is performed without decreasing the operation duty.)
With fan unit, operation is possible up to 55°C without derating.



[How to Replace Fan Unit]

<Detaching Fan Unit>

(1) Insert a slotted screwdriver to the cutout (circled in red in figure on the right) on the fan unit and pull up the fan unit upwards to detach it.



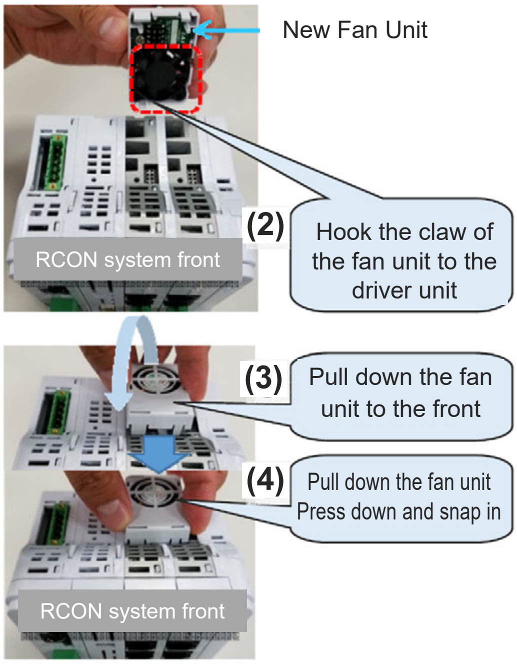
<Attaching Fan Unit>

(2) Adjust the installation orientation of the RCON system and new fan unit.

Hook the claw of the fan unit to the driver unit as shown in the figure on the right.

(3) Pull down the fan unit to the front of the RCON system.

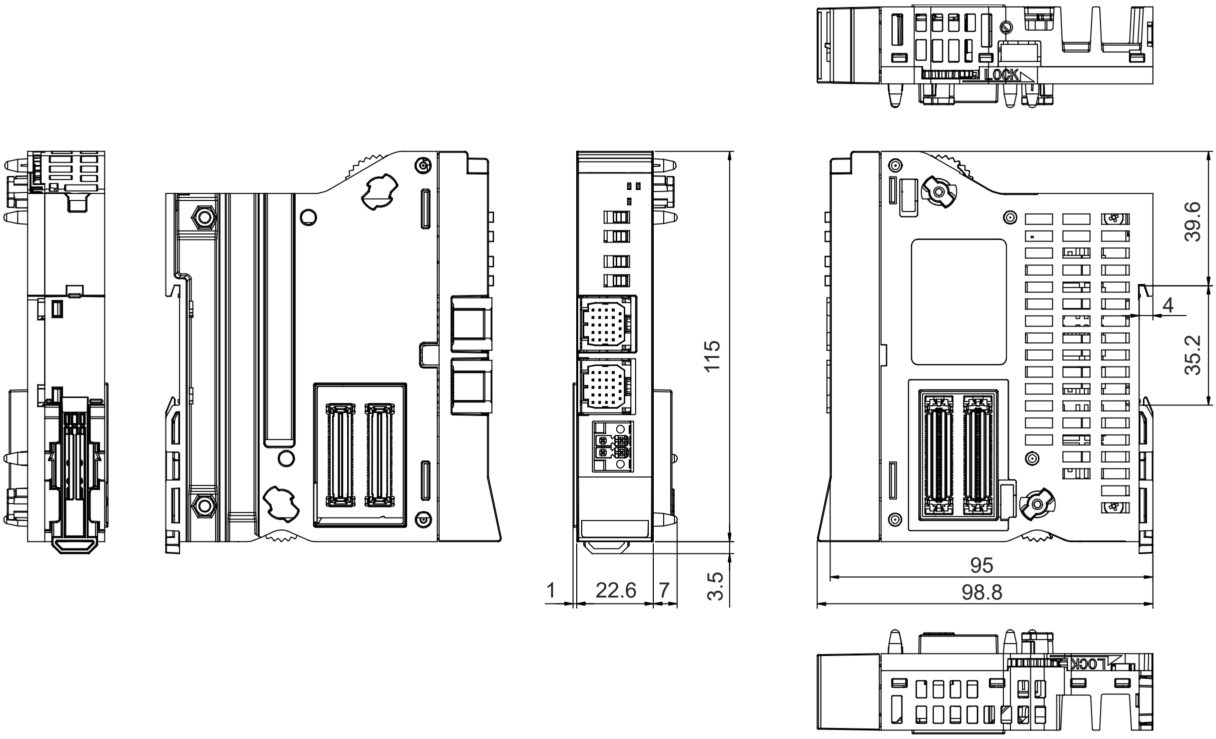
(4) Press the fan unit from the top and snap in.



External dimensions (24V Driver unit, Fun unit)

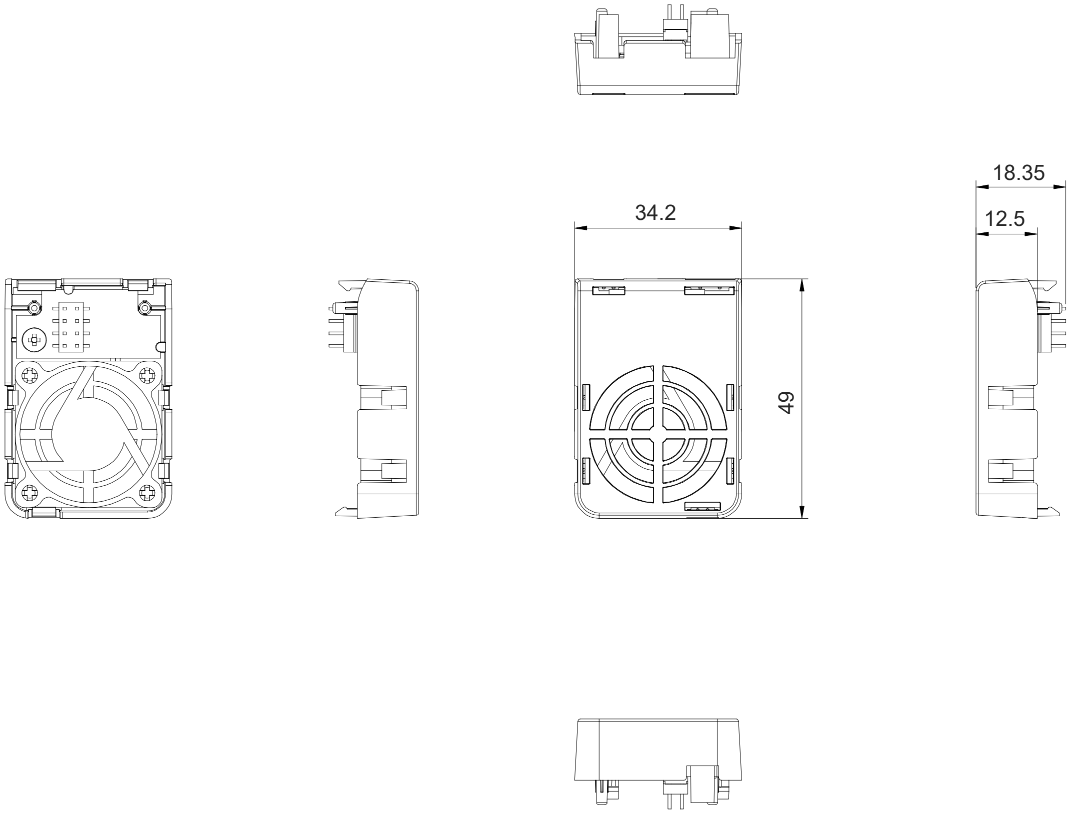
24V Driver unit (common for RCON-PC/PCF/AC/DC types)

Item	Specifications
External dimensions	W22.6 mm × H115 mm × D95 mm
Mass	About 180g
External view	See figure below



Fan unit

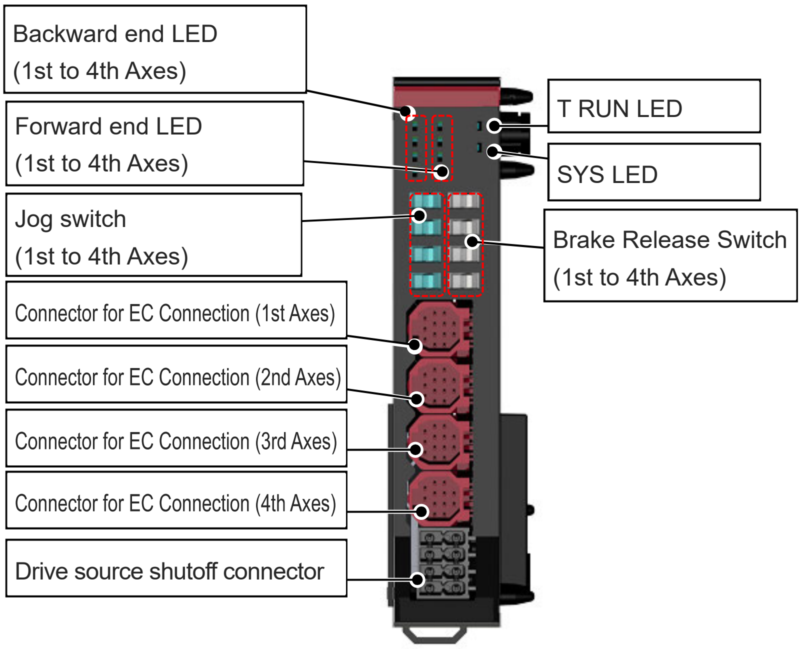
Item	Specifications
External dimensions	W34.2 mm × H49 mm × D12.5 mm
Mass	About 16g
External view	See figure below



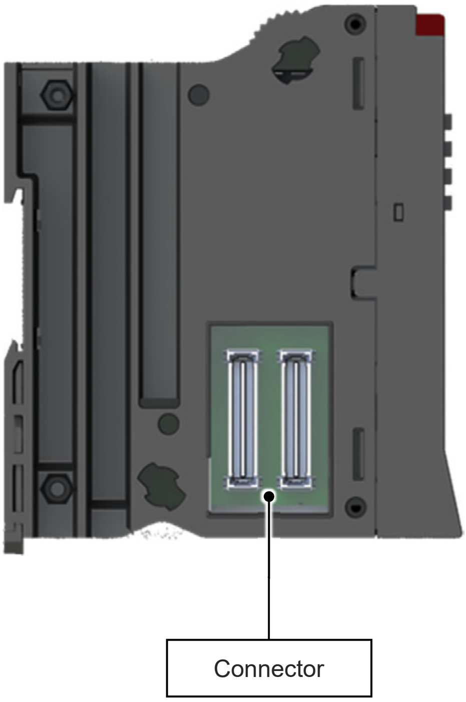
[EC Connection Unit]

Part names

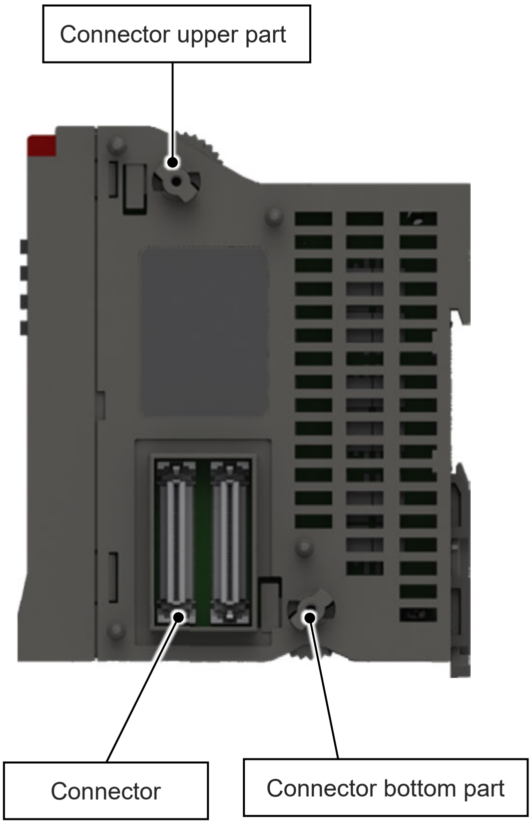
RCON-EC



Front



Left side

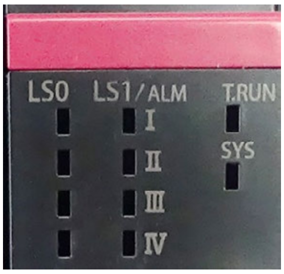


Right side

Rear

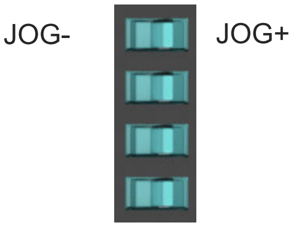
LED display

Panel notation	Display color	Status	Description
T RUN	Green	Light ON	Normal internal bus communication
		Blinking	Waiting for initialization signal, initialization communication failed
	Orange	Light ON	Bus communication error generated
SYS	Green	Light ON	In normal operation
		Light OFF	Control power voltage dropped, motor power voltage dropped, emergency stop, error occurred in steady communication with EC
	Red	Light ON	Control power voltage dropped, motor power voltage dropped, emergency stop, error occurred in steady communication with EC
		Light OFF	In normal operation
LS1/ALM (I = 1st axes, II = 2nd axes, III = 3rd axes, IV = 4th axes)	Green	Light ON	Movement to Forward End Complete
		Light OFF	Stop
	Red	Light ON	Alarm triggered
LS0 (I = 1st axes, II = 2nd axes, III = 3rd axes, IV = 4th axes)	Green	Light ON	Movement to Backward End Complete
		Light OFF	Stop



Jog switch

They are switches for the jog operation. It comes the switches for 1st, 2nd, 3rd and 4th axes from the top.
Set a switch to the JOG+ side and the jog operation to the positive direction (target position registered as the forward end in the position data) should be made and set it to the JOG- side and the jog operation to the negative side (target position registered as the backward end) to be made. The jog speed should be the velocity registered in the position data. If the switch gets released on the way, stop should be performed with the deceleration registered in the position data. However, if the home-return operation is incomplete, it should perform the home-return operation no matter which side the switch is set to. Releasing the switch one the way should cancel the home-return operation.
The operation on on the jog switch is valid only in MANU Mode. It should be invalid in AUTO Mode. Also, when a window to operate actuators is open on a teaching tool, the jog switch should be inactivated. If a window capable to operate actuators gets opened during operation with the jog switch, an actuator should decelerate and stop.
Setting “RCON-EC Jog Switch” in GW Parameter invalid should make the jog switches on all the units of the EC connection unit connected to the gateway inactivated. (It is set to “Valid” in the initial setting.)



Symbol	Description
JOG+	Jog operation to positive direction (target position registered as forward end in position data)
JOG-	Jog operation to negative direction (target position registered as backward end in position data)

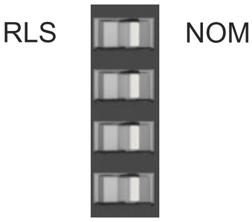
Caution

- The jog switch is disabled when the communication with the teaching tool is disconnected while the screen in which the actuator can be operated with the teaching tool is opened.
- To enable jog switch operation again, turn the RCON system on again or perform software reset.

Brake release switch

They are switches to release the brake compulsorily. It comes the switches for 1st, 2nd, 3rd and 4th axes from the top.

Should be on NOM side during normal operation. On NOM side, the brake will be released by servo ON and locked by servo OFF. On RLS side, there will be forced release regardless of servo ON/OFF (except when control power is OFF).



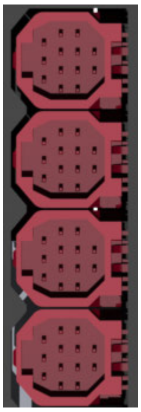
Symbol	Description
RLS	Brake release (Brake Release)
NOM	Brake lock (Normal)

Warning

- Be careful when releasing the brake. Releasing carelessly may cause injury or damage to the actuator body, workpiece or surrounding devices due to the slider or rod falling.
- After releasing the brake, be sure to return the brake to the enabled status. It is very dangerous to operate with the brake released. It may cause injury or damage to the actuator body, workpiece or surrounding devices due to the slider or rod falling.

Connectors for EC Connection

They are connectors to connect ELECYLIDER. It comes the connectors for 1st, 2nd, 3rd and 4th axes from the top.
The axis numbers should be automatically assigned to the numbers after the driver units and SCON extension unit. Axis numbers for four axes should be assigned to the EC connection unit even if ELECYLINDER is not connected to all of four. An axis number that an axis is not connected should not be pulled one number forward.



[RCON-EC]

Pin No.	Signal name	Description
1	24V (MP)	Motor power +24V
2	GND	0V
3	IN0	Input 0
4	IN1	Input 1
5	IN2	Input 2
6	SD+	Communication Line +
7	OUT0	Output 0
8	OUT1	Output 1
9	OUT2	Output 2
10	SD-	Communication Line -
11	BKRLS	Brake Release
12	24V (CP)	Control Power Supply +24V
13	FG	Frame Grounding

Drive source shutoff connector

Drive-source cutoff input. Drive source can be cut off by individual axes.

Cable connector name: DFMC1.5/2-ST-3.5 (Phoenix Contact)

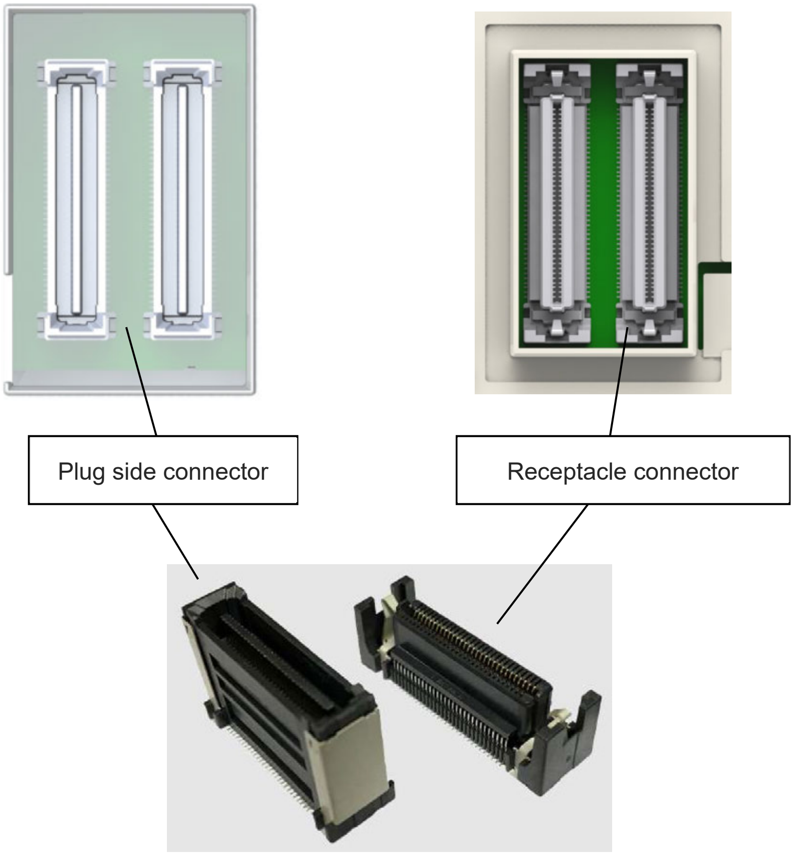
Pin No.	Signal name	Description
1	MPO_4	Motor power output 4th axes
2	MPO_3	Motor power output 3th axes
3	MPO_2	Motor power output 2nd axes
4	MPO_1	Motor power output 1st axes
5	MPI_4	Motor power input 4 th axes
6	MPI_3	Motor power input 3 th axes
7	MPI_2	Motor power input 2nd axes
8	MPI_1	Motor power input 1st axes

Cable side connector compatible wire

Item	Specifications
Compatible wire	AWG24 ~ 16 (Copper Wire)
Strip length	10.0mm
Rated Temperature on Isolation Coating	60degC or more

Connectors

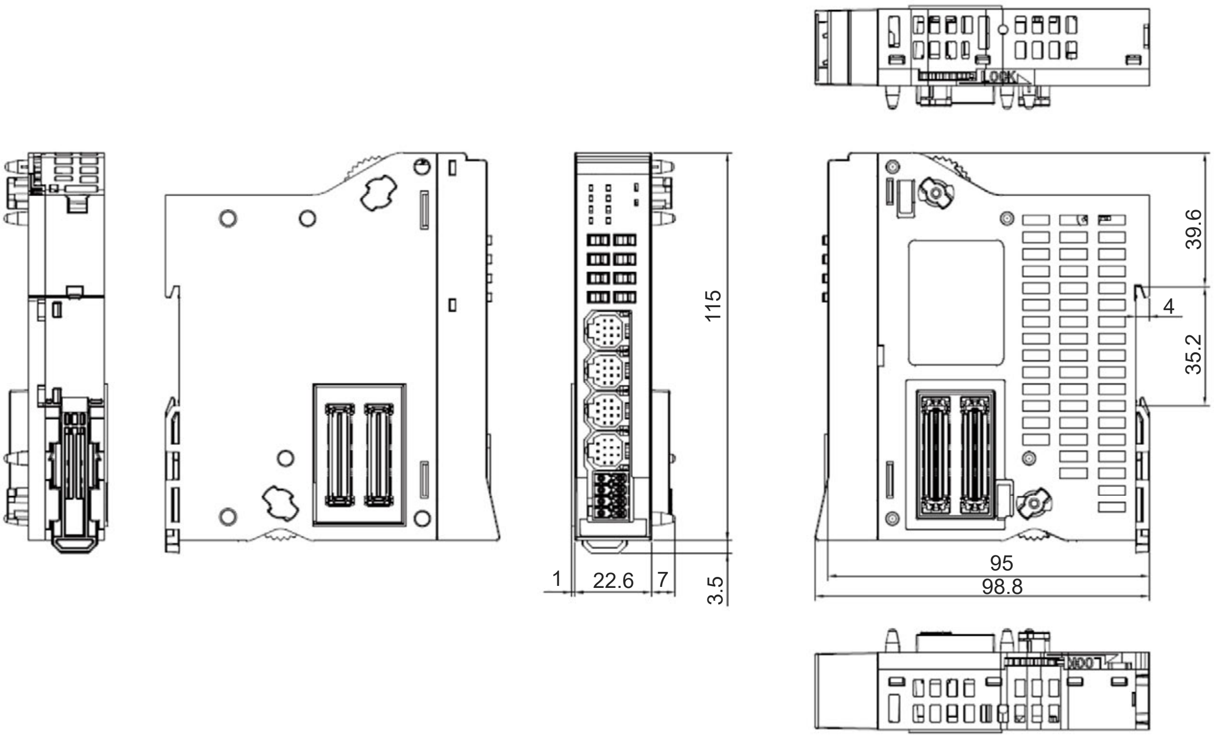
A connector for use between units. Two identical connectors are used. The connectors have a floating structure that absorbs connector misalignment due to housing mating or mounting misalignment between connectors.



External dimensions

[EC Connection Unit]

Item	Specifications
External dimensions	W22.6 mm × H115 mm × D95 mm
Mass	About 114g
External view	See figure below



Specifications Section

Chapter 5

200V Driver Unit
200V Power Supply Unit

[200V Power Supply Unit]

5.1 Overview

[200V Driver Unit]

The 200V driver unit is a controller dedicated for R Unit. The maximum number of axes available to control with one unit of the driver unit is one axis. The basic features and performances are the same as those for SCON controllers.

It is a controller to perform control in the field network communication via the gateway unit explained in Chapter 3.

The unit is to be installed on the right from the front view of the 200V power supply unit. It is available to perform control 16 axes at the maximum in combination with the 24V driver unit and the EC connection unit. (Note)

Also, there is a 200V fan unit enclosed to the 200V driver unit.

Note: There is a limit to the wattage connectable. Refer to [Features] for details.

[200V Power Supply Unit]

The power supply unit is dedicated for 200V AC (single-phase / 3-phase). It is necessary when using the 200V driver unit.

The unit is to be installed on the right from the front view of the 24V driver unit and EC connection unit. If only the 200V driver unit is to be used, allocate it on the right side of the gateway unit.

Also, there is a fan unit and terminal unit for 200V enclosed to the power supply unit.

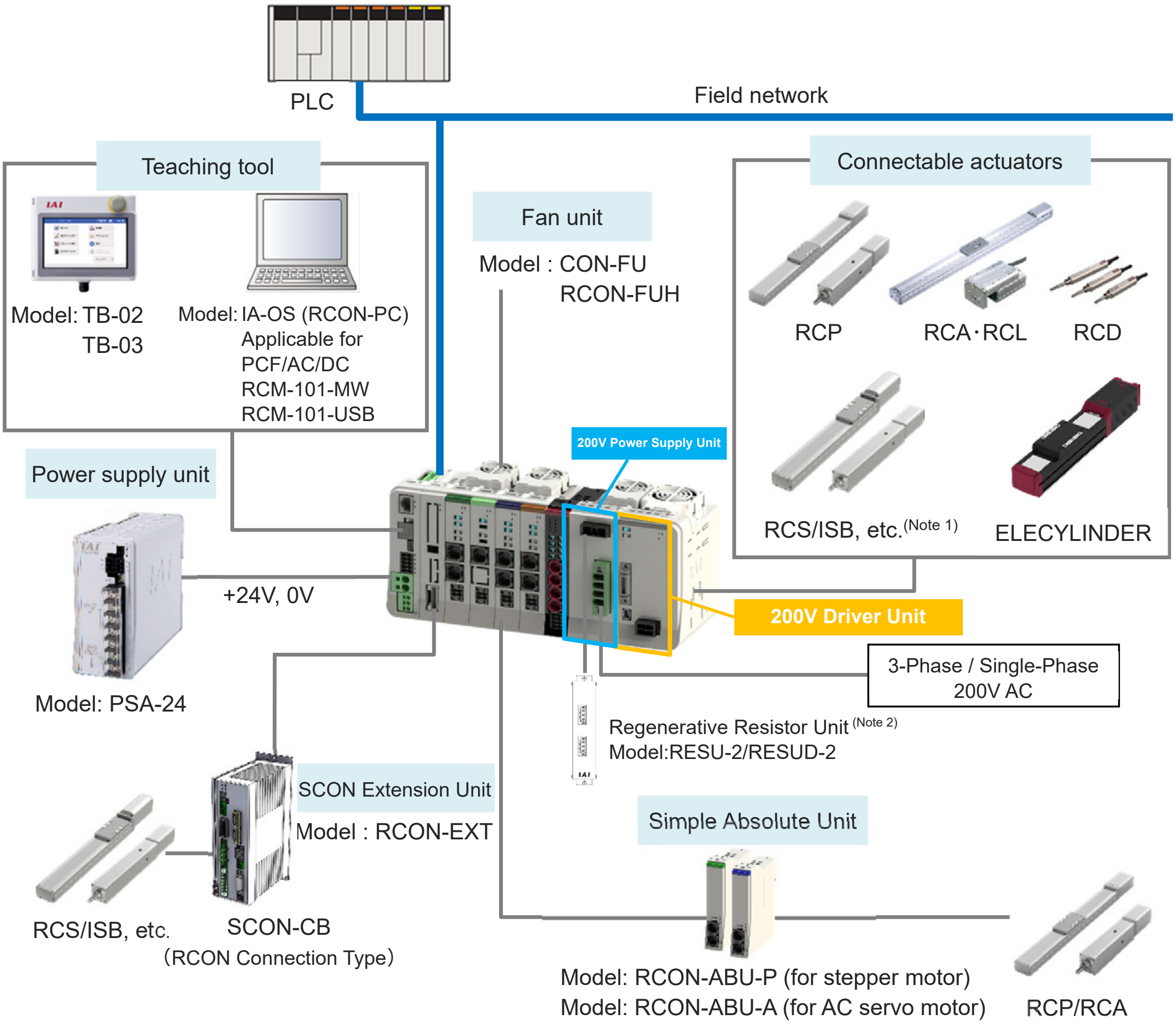
The terminal unit for 200V and the terminal unit for 24V are different.

[Features]

- The unit is applicable for the battery-less absolute type, incremental type, index absolute type and spurious absolute type.
- One unit of the driver unit can be applied to wattages from 60W to 750W.
- As it is equipped with a built-in regenerative resistor, there is basically no need of external regenerative resistor.
- The wattage connectable is as shown below;

  For single-phase 200V·····Total wattage of actuators connected to 200V driver unit should be 1600W max.

  For 3-phase 200V···········Total wattage of actuators connected to 200V driver unit should be 2400W max.
- Direct link among driver units makes drastically simple wiring work.
- Installation on DIN rails makes it easy to install to a control board.



Note1: In case of the following 200V servomotor actuators and the case that the maximum wattage exceeds the following, it is not available to establish connectivity to 200V driver unit.

1) Motor types other than those from 60W to 750W
2) Encoder types other than battery-less absolute, incremental, spurious absolute or index absolute type
3) For 3-Phase 200V ········· Combination that exceeds 2400W for total wattage of actuators connected to 200V driver unit
4) For Single-Phase 200V ··· Combination that exceeds 1600W for total wattage of actuators connected to 200V driver unit
5) Servo Press types
6) SCARA Robot
7) CT4 Series
8) ZR Series

When (1) to (4) above, use SCON extension unit and SCON-CB.

Also, DD/DDA and LSA-W21S are not applicable for the single-phase 200V.

Note 2 There is a built-in regenerative resistor of 60W equipped in 200V driver unit and 200V power supply unit. The regenerative resistor is basically not necessary, but use an external regenerative resistor unit in case of shortage in regenerative resistor.

5.2 How to Read the Model Number

The model codes for 200V driver units, 200V power supply units are as described below.

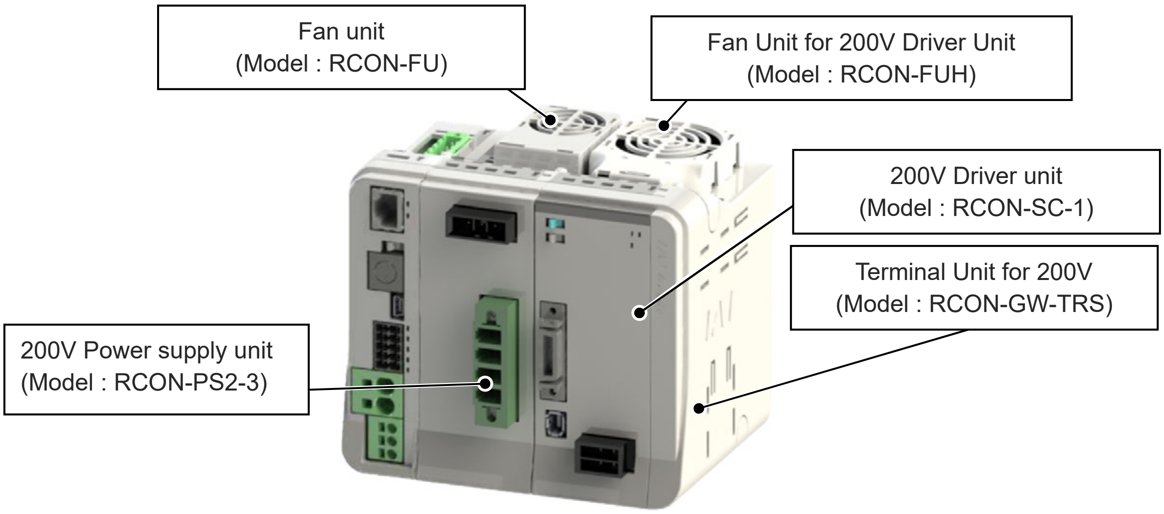
Model Code for 200V Driver Unit

RCON	–	SC	–	1
Series		Type		Number of Axes
		AC : 200V servo motor type		1:1-axis

Type : SC 60-750W motor 1-axis	60	60W servo motor
	100	100W servo motor
	100S	100W servo motor (For LSA)
	150	150W servo motor
	200	200W servo motor
	200S	200W servo motor (For LSA, DD)
	300S	300W servo motor (For LSA)
	400	400W servo motor
	600	600W servo motor
	750	750W servo motor

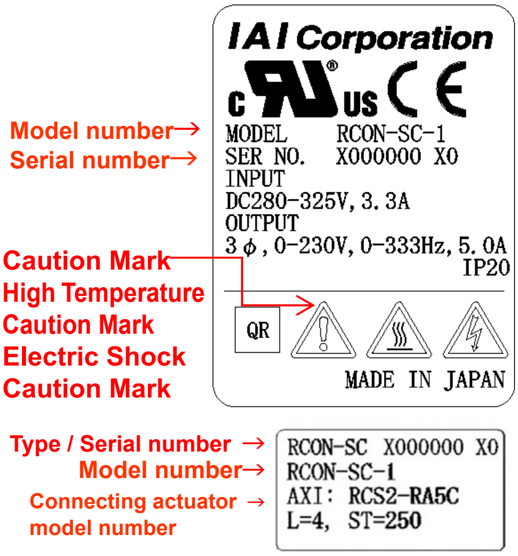
Model Code for 200V Power Supply Unit

RCON	–	PS2	–	3	
Series		Type		Power Supply Voltage	Option
		PS2 : 200 V Power supply unit		3 : 3-Phase / Single-Phase 200V	TPN : Without terminal unit



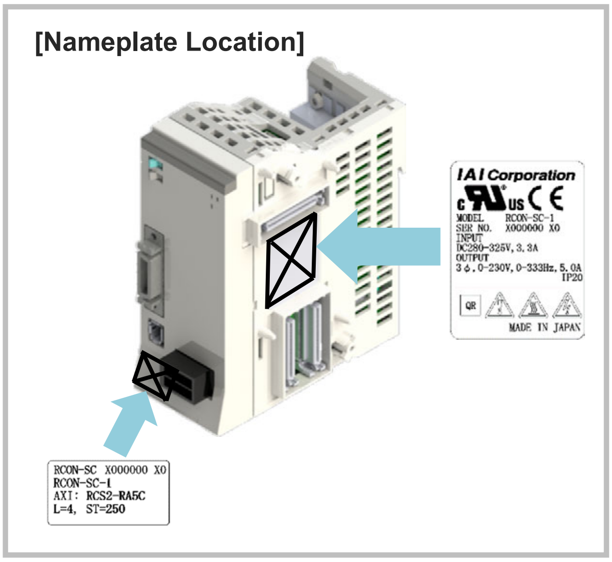
How to read the model nameplate

[200V Driver Unit]

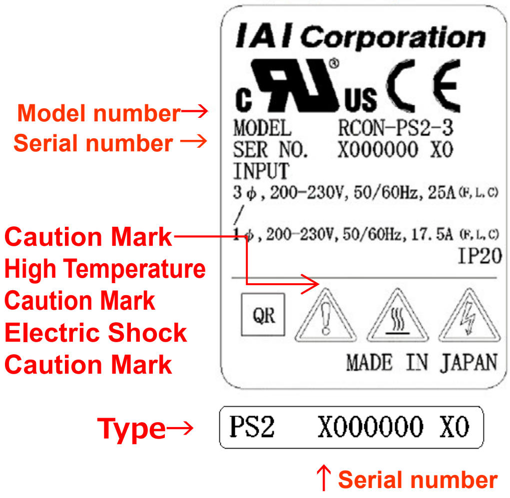


IAI Corporation
c US CE
MODEL RCON-SC-1
SER NO. X000000 X0
INPUT
DC280-325V, 3.3A
OUTPUT
3 φ, 0-230V, 0-333Hz, 5.0A
IP20
QR
MADE IN JAPAN

RCON-SC X000000 X0
RCON-SC-1
AXI: RCS2-RA5C
L=4, ST=250

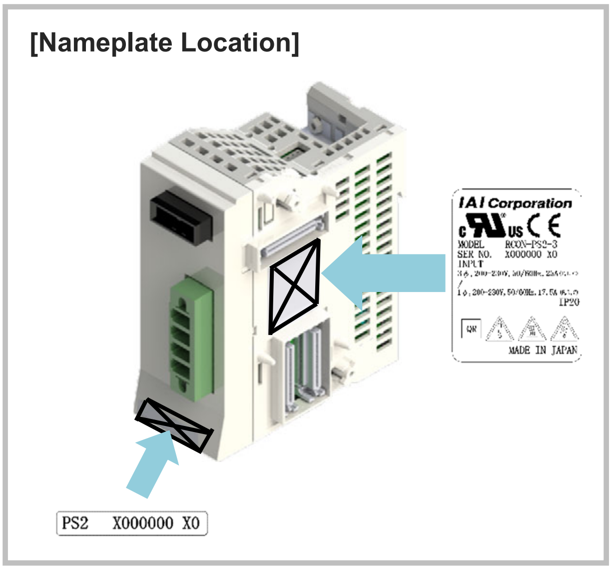


[200V Power Supply Unit]



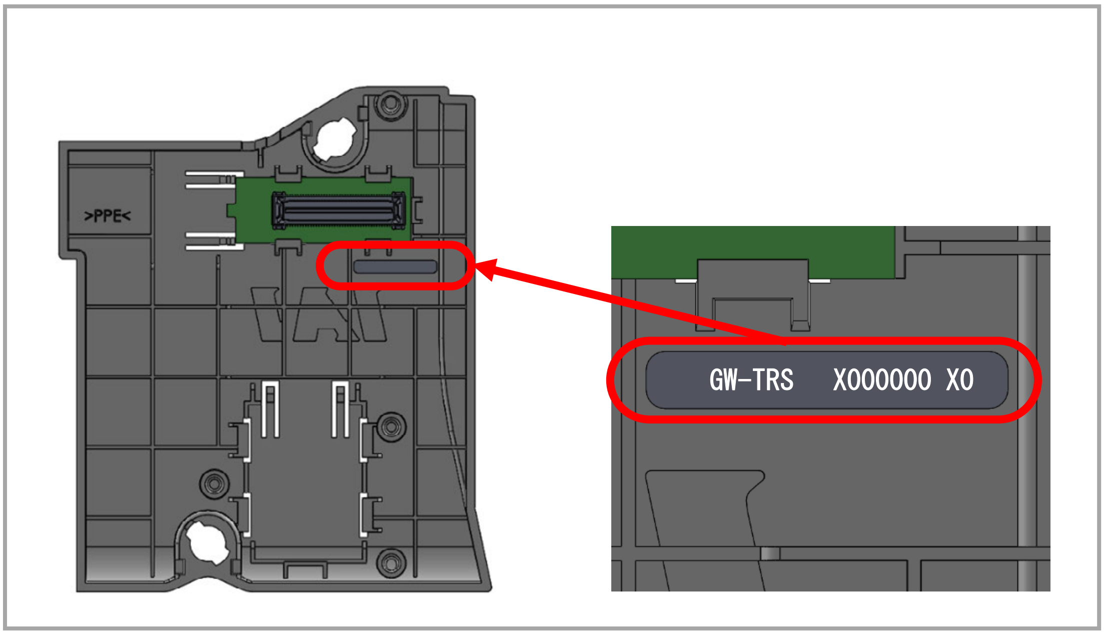
IAI Corporation
c US CE
MODEL RCON-PS2-3
SER NO. X000000 X0
INPUT
3 φ, 200-230V, 50/60Hz, 25A (F, L, C)
/
1 φ, 200-230V, 50/60Hz, 17.5A (F, L, C)
IP20
QR
MADE IN JAPAN

PS2 X000000 X0



Mark	Explanation of Mark
⚠	Where residual-current-operated protective device (RCD) is used for protection in case of direct or indirect contact, only RCD of Type B is allowed on the supply side of this Electrotonic Equipment (EE).
⚡	Do not touch terminals within 10 minutes after disconnect the power. Risk of electric shock.
♨	Do not touch product when power is ON. Risk of burn.

[Terminal Unit for 200V]



5.3 Components

The following table shows the product configuration for the standard specification.
See the packing list for the details of the enclosed components. In the unlikely case that any model number errors or missing parts come to light, contact your local IAI distributor.

[200V Driver unit]

Part name	Shape	Quantity	Remarks
200V Driver unit		1	Model : RCON-SC-1
Fan Unit for 200V Driver Unit		1	Single product model : RCON-FUH
Dummy plug		1	Single product model : DP-6
First Step Guide	 IAI RCON-PC/PCF/AC/DC、RCON-FU RCON-ABU-A/P、RCON-EXT ドライバーユニット、ファンユニット、 簡易アブソユニット、拡張ユニット ファーストステップガイド　第1版	1	
Safety Guide	 IAI 安全ガイド　第6版 Safety Guide　Sixth Edition 1. ﾛﾎﾞｯﾄのご使用前には必ずｶﾞｲﾄﾞを熟読して頂くようお願いします。 2. ﾛﾎﾞｯﾄを用いたｼｽﾃﾑの設計および製作における安全性の確保に関しては、本ｶﾞｲﾄﾞに従い、必要な処置をして頂くようお願いします。 3. 本ｶﾞｲﾄﾞは最終的に製品をお使いになるお客様の元へ確実に届けて頂くようにお願いします。 ※この安全ｶﾞｲﾄﾞの全部または一部を無断で使用・複製することはできません。 1. Make sure to read this Guide thoroughly before use of the robot. 2. Please follow this Guide and take necessary measures to ensure safety in the design and production of the system by use of the robot. 3. Please ensure that this Guide is ultimately delivered to the customer who uses the product. * Using or copying all or a part of this SAFETY GUIDE without permission is prohibited.	1	

[200V Power Supply Unit]

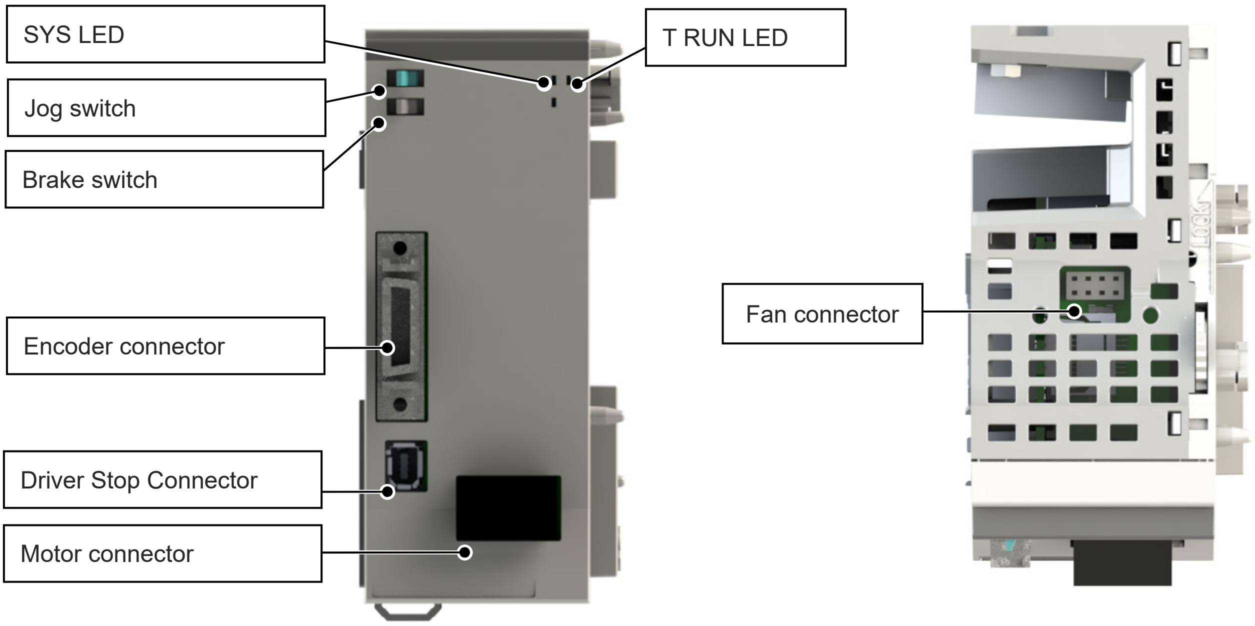
Part name	Shape	Quantity	Remarks
200V Power Supply Unit		1	Model : RCON-PS2-3
Terminal Unit for 200V		1	Single product model : RCON-GW-TRS (Not supplied with TRN specification)
Fun Unit		1	Single product model : RCON-FU
Power Connector		1	Single product model : SPC5/4-STF-7.62 (Phoenix Contact)
First Step Guide	 IAI RCON-PC/PCF/AC/DC、RCON-FU RCON-ABU-A/P、RCON-EXT ドライバーユニット、ファンユニット、 簡易アブソユニット、拡張ユニット ファーストステップガイド　第1版	1	
Safety Guide	 IAI 安全ガイド　第6版 Safety Guide　Sixth Edition 1. Make sure to read this Guide thoroughly before use of the robot. 2. Please follow this Guide and take necessary measures to ensure safety in the design and production of the system by use of the robot. 3. Please ensure that this Guide is ultimately delivered to the customer who uses the product. * Using or copying all or a part of this SAFETY GUIDE without permission is prohibited.	1	

5.4 Part Names/Functions and External Dimensions

[200V Driver Unit]

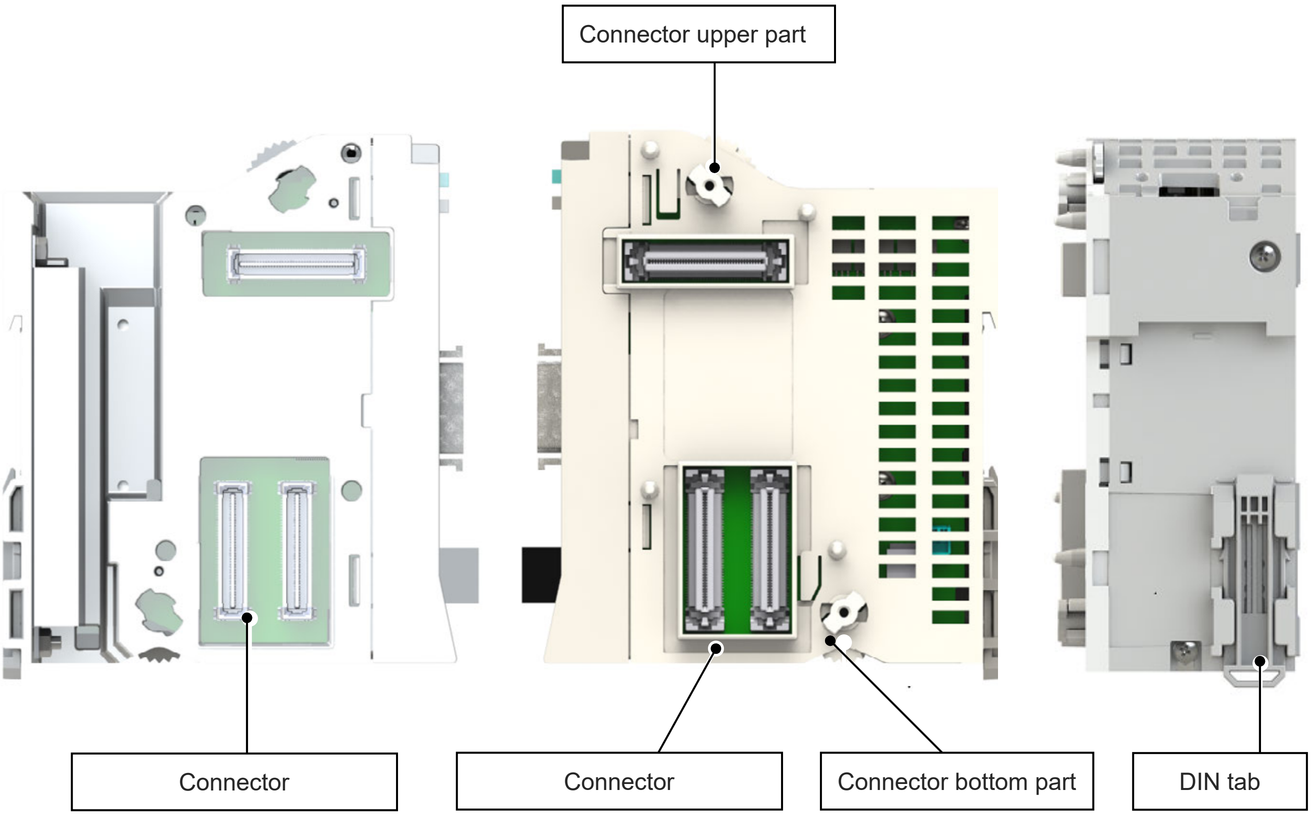
Part names

RCON-SC



Front

Top



Left side Right side Rear

LED display

Panel notation	Display color	Status	Description
T RUN	Green	Light ON	Normal internal bus communication
		Blinking	Waiting for initialization signal, initialization communication failed
	Orange	Light ON	Bus communication error generated
SYS	Green	Light ON	Servo ON
		Light OFF	Servo OFF
	Red	Light ON	Alarm triggered, Stop Signal Input On

Jog switch

A switch for jog operation.
Tilt the switch to the JOG+ side to perform jog operation in the + direction, and to the JOG- side for jog operation in the - direction. Tilting the switch further increases the jog speed step by step. However, if home return is not complete, the jog speed will be home return speed.
When performing jog operation with the JOG switch with servo ON, the servo will be ON even after completion; with servo OFF, perform jog operation after servo ON and the servo will be OFF after completion.
Note that the operation of the jog switch is enabled only in MANU teaching mode. It is disabled in MANU monitor mode and AUTO mode.
The jog switch is also disabled when opening the screen in which the actuator can be operated with the teaching tool. When opening the screen in which operation can be done with the jog switch, the actuator will decelerate and stop.
If parameter No. 194 "JOG Switch" is set to "1", this switch will be enabled. (Initial setting is "0: Valid".)

Symbol	Description
JOG+	Jog operation in + direction (home reverse direction)
JOG-	Jog operation in - direction (home direction)

Caution

- The jog switch is disabled when the communication with the teaching tool is disconnected while the screen in which the actuator can be operated with the teaching tool is opened.
- To enable jog switch operation again, turn the RCON system on again or perform software reset.

Brake release switch

A switch for forced brake release.
Should be on NOM side during normal operation. On NOM side, the brake will be released by servo ON and locked by servo OFF. On RLS side, there will be forced release regardless of servo ON/OFF (except when control power is OFF).

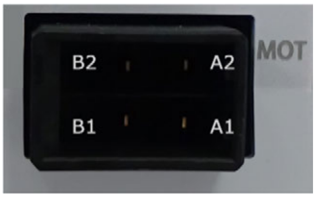
Symbol	Description
RLS	Brake release (Brake Release)
NOM	Brake lock (Normal)

Warning

- Be careful when releasing the brake. Releasing carelessly may cause injury or damage to the actuator body, workpiece or surrounding devices due to the slider or rod falling.
- After releasing the brake, be sure to return the brake to the enabled status. It is very dangerous to operate with the brake released. It may cause injury or damage to the actuator body, workpiece or surrounding devices due to the slider or rod falling.

Motor connector

It is a connector to connect to the motor cable on an actuator.
In RCON, the axis numbers will be automatically allocated from the unit closest to the gateway unit (except for the axis connecting to the EC Connection Unit and the SCON connection unit). Axis numbers can be changed as needed to any number with the gateway parameter configuration tool.



Pin No.	Signal name	Description
A1	W	Motor drive line phase W
A2	⏚	Protection Grounding
B1	U	Motor drive line phase U
B2	V	Motor drive line phase V

Encoder connector

It is a connector to connect to the encoder cable on an actuator.

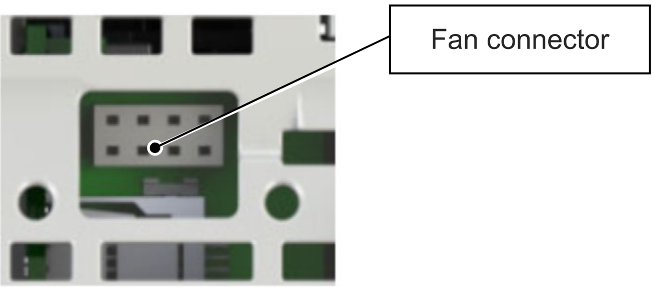
Pin No.	Signal name	Description
1	A+	Encoder phase A+ input
2	A-	Encoder phase A- input
3	B+	Encoder phase B+ input
4	B-	Encoder phase B- input
5	Z+	Encoder phase Z+ input
6	Z-	Encoder phase Z- input
7	SRD+	Send & Receive Data +
8	SRD-	Send & Receive Data -
9	-	
10	-	
11	NC	Not to be connected
12	24VOUT	Sensor Power Supply Output
13	0V	24V Power Supply GND
14	-	
15	-	
16	VCC	Encoder Power Supply
17	GND	GND
18	-	
19	-	
20	BK-	Brake Release Output Signal -
21	BK+	Brake Release Output Signal +
22	NC	Not to be connected
23	RSV	Sensor input (Reserve)
24	OT	Sensor input (Over Travel)
25	CLEEP	Sensor input (Creeping Sensor)
26	LS	Sensor input (Limit Switch)

Driver Stop Connector

It is a connector to use the driver stop feature.
Refer to 2.5 Connection Diagrams / Driver Stop Circuit (Page A2-37) for detail.
Keep the enclosed dummy plug (model code: DP-6) on when this feature is not to be used.

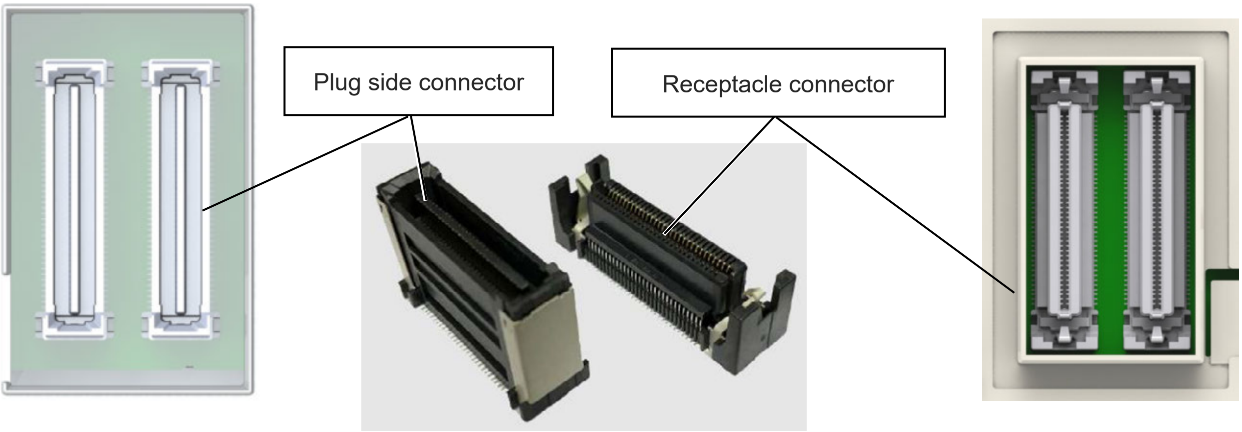
Fan connector

A connector to connect the Fan Unit for 200V Driver Unit. It connects to the fan board connector on the fan unit side.



Connectors

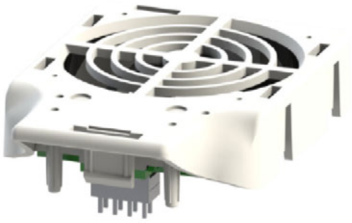
A connector for use between units. Two identical connectors are used. The connectors have a floating structure that absorbs connector misalignment due to housing mating or mounting misalignment between connectors.



Fan Unit for 200V Driver Unit

It is a fan to have forced air cooling on the driver unit. Use by connecting to the fan connector on the driver unit side. One unit of the 200V driver unit requires one unit of the Fan Unit for 200V Driver Unit.

The fan rotates when the driver unit internal temperature rises and stops when the temperature falls.



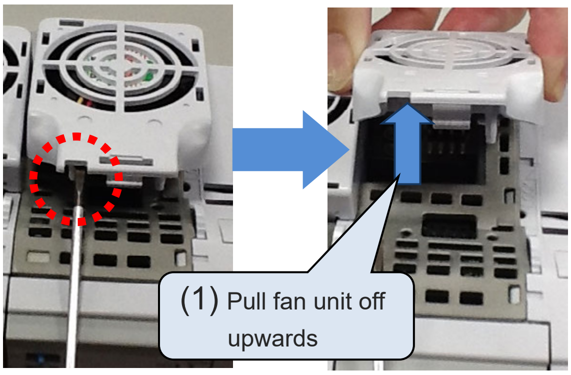
Fan Unit for 200V Driver Unit

Fan Unit for 200V Driver Unit
(Model : RCON-FUH)

[How to Replace Fan Unit for 200V Driver Unit]

<Detaching Fan Unit>

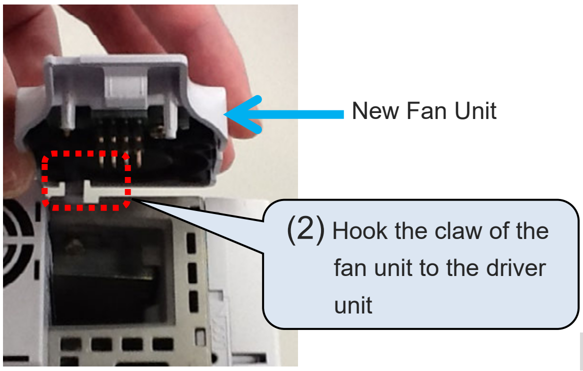
(1) Insert a slotted screwdriver to the cutout (circled in red in figure on the right) on the fan unit and pull up the fan unit upwards to detach it.



<Attaching Fan Unit>

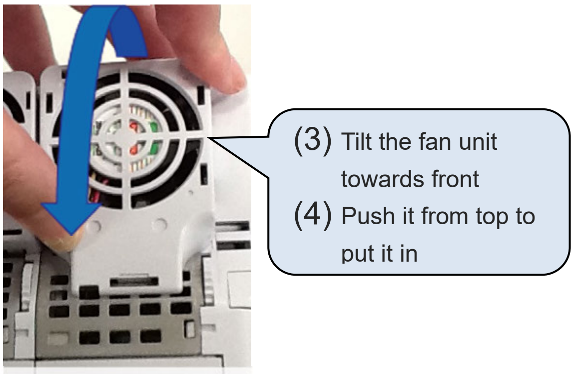
(2) Adjust the installation orientation of the RCON system and new fan unit.

Hook the claw of the fan unit to the driver unit as shown in the figure on the right.



(3) Pull down the fan unit to the front of the RCON system.

(4) Press the fan unit from the top and snap in.

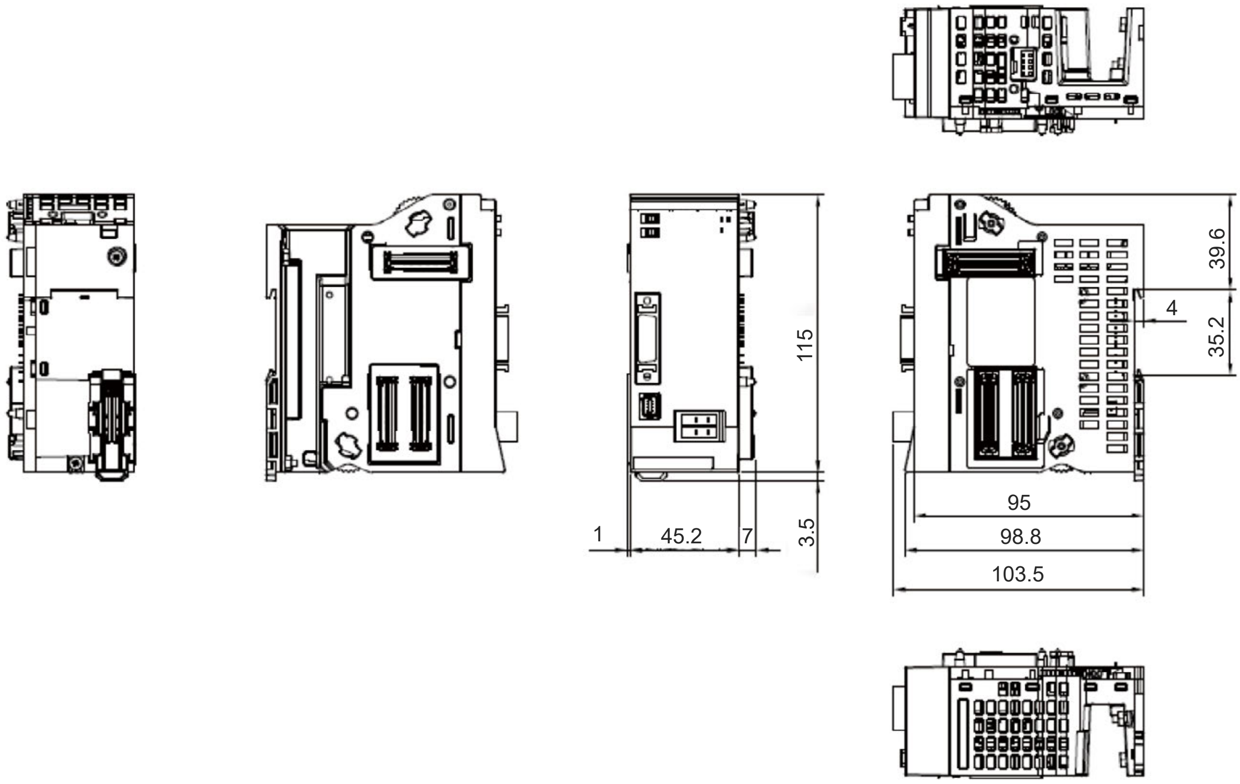


RCON system front

External dimensions (200V Driver Unit, Fan Unit for 200V Driver Unit)

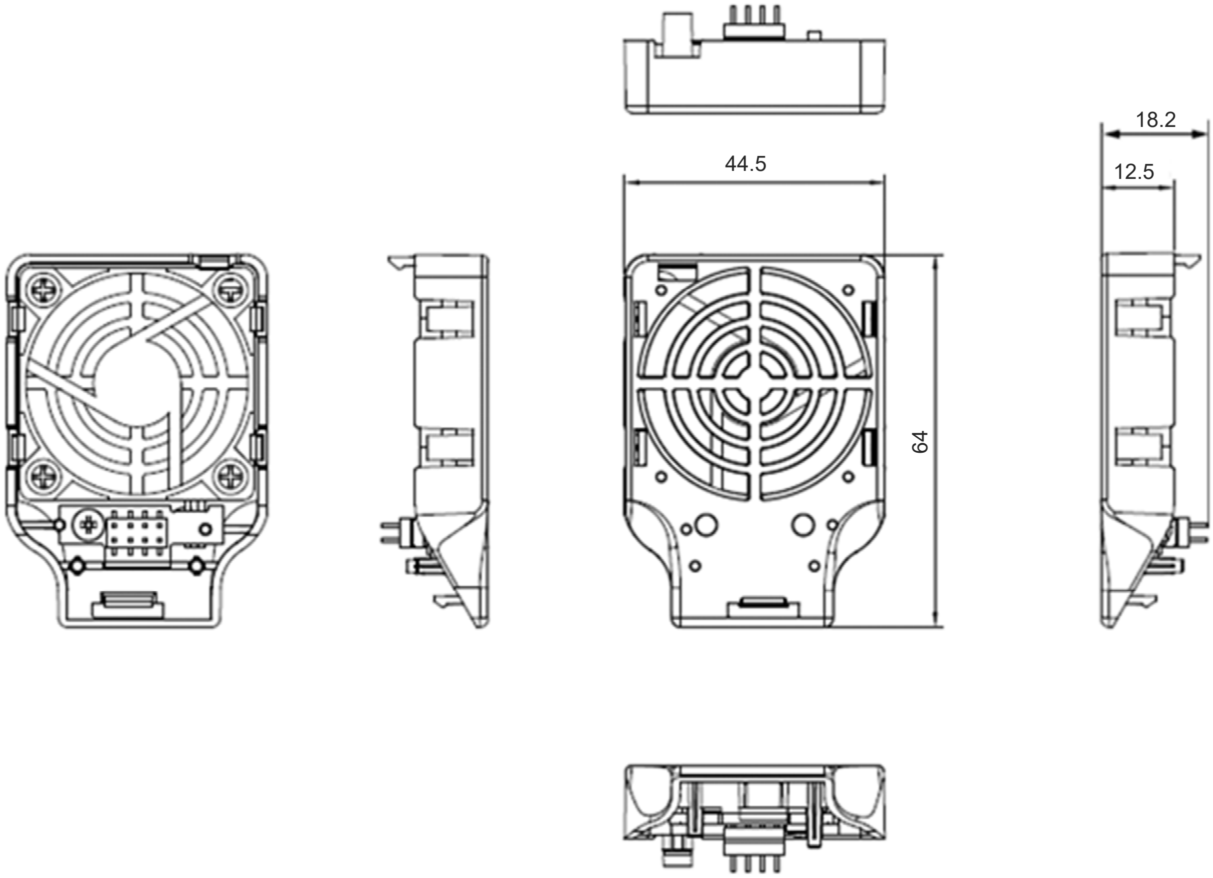
200V Driver Unit (RCON-SC)

Item	Specifications
External dimensions	W45.2mm × H115mm × D95mm
Mass	About 438 g
External view	See figure below



Fan Unit for 200V Driver Unit (ROCN-FUH)

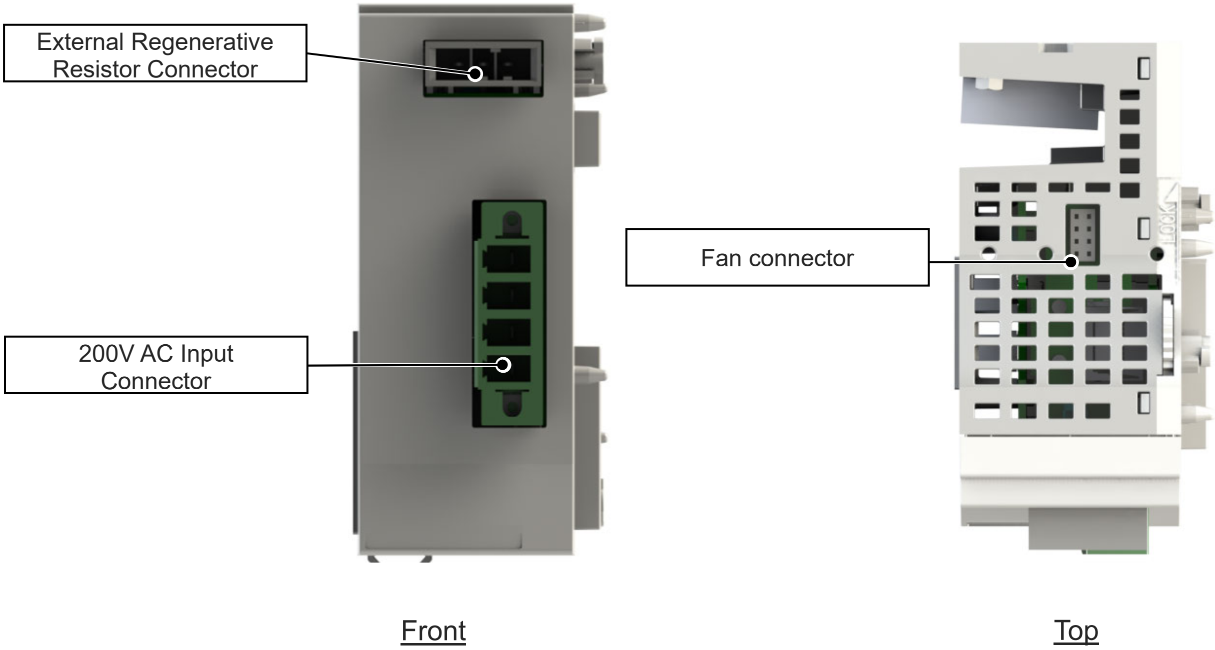
Item	Specifications
External dimensions	W44.5mm × 64mm × D18.2mm
Mass	About 20g
External view	See figure below

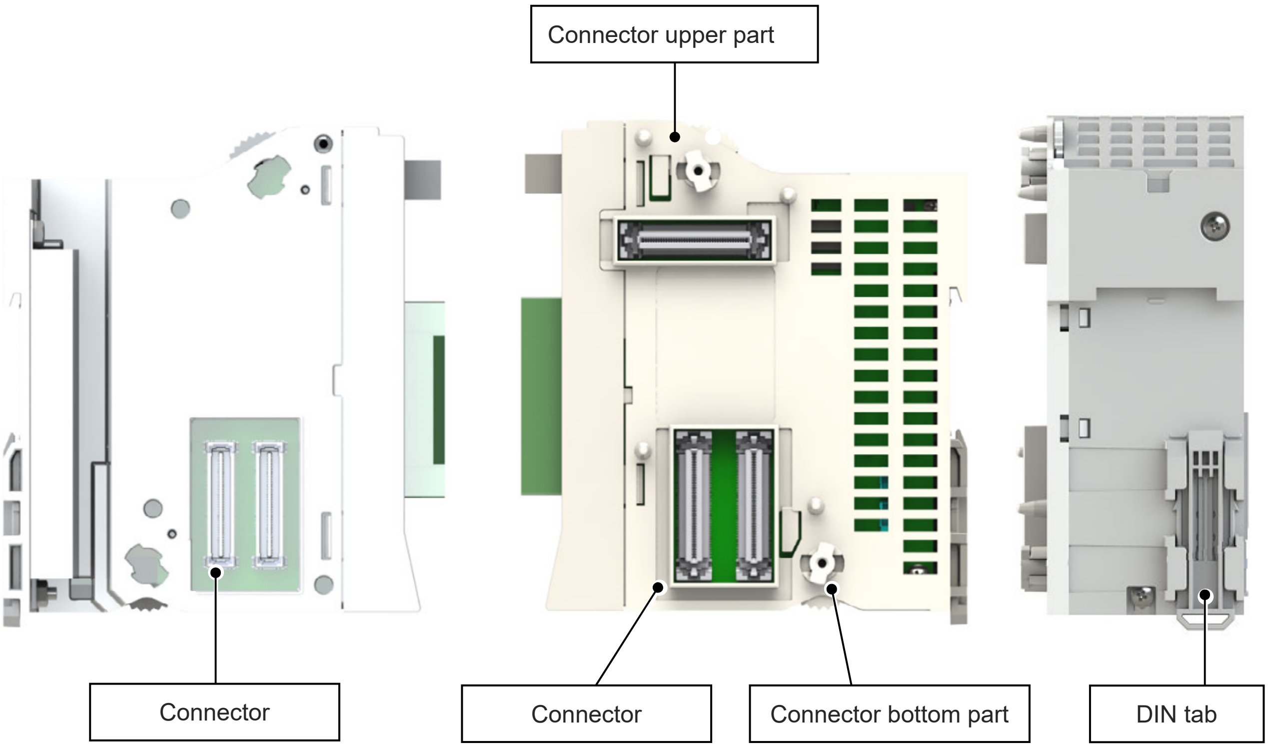


Part names

[200V Power Supply Unit]

RCON-PS2



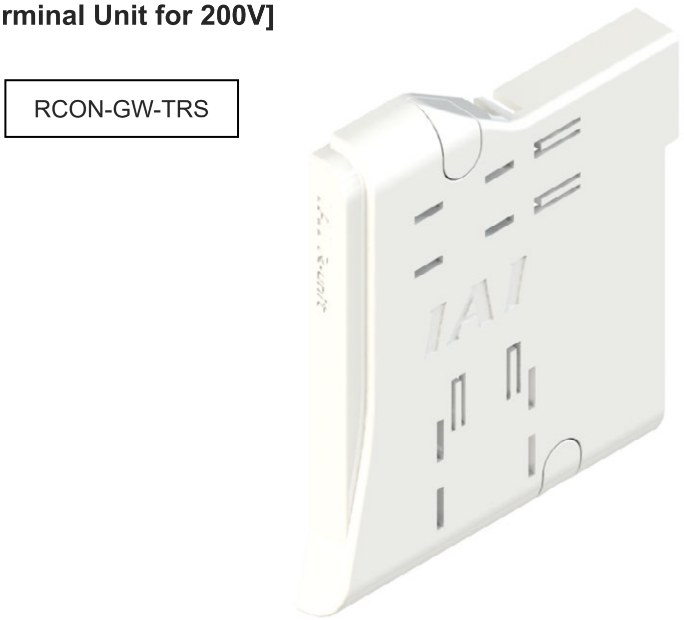


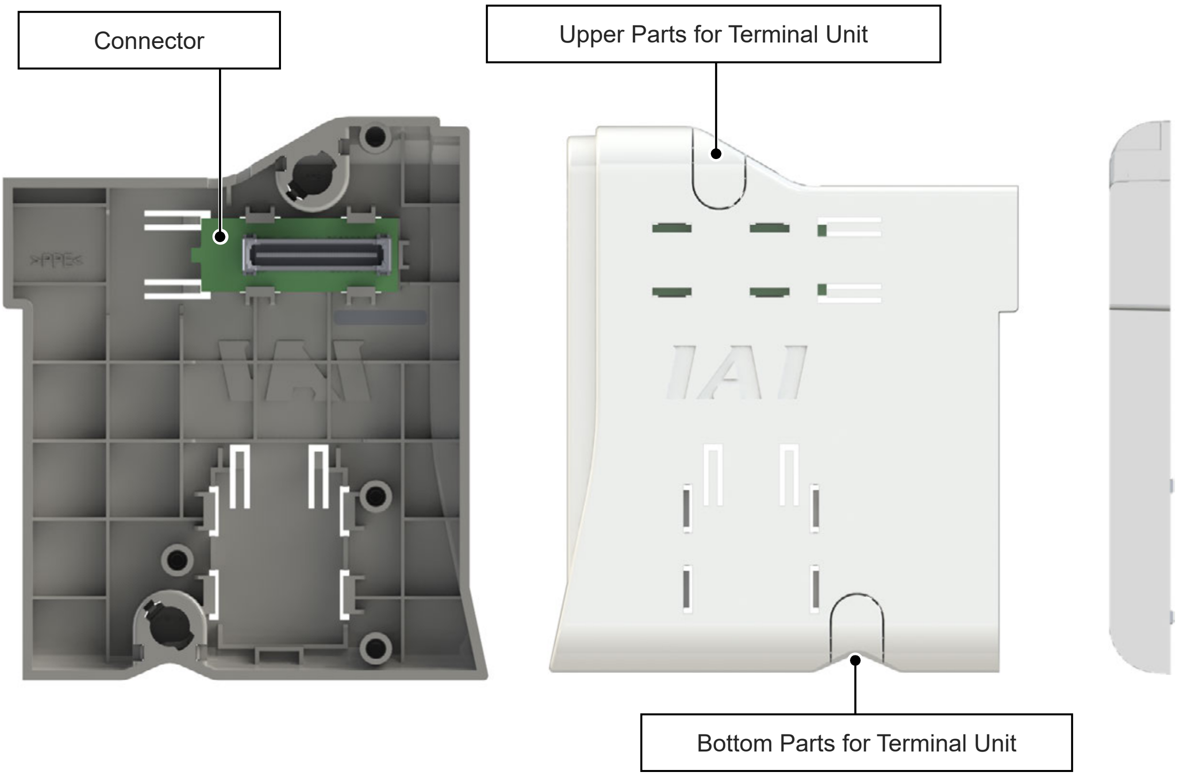
Left side

Right side

Rear

[Terminal Unit for 200V]





Left side Right side Rear

⚠ Danger

- When 200V units are to be connected, make sure to use the terminal unit for 200V (RCON-GW-TRS) enclosed in the 200V power supply unit.
  The terminal unit for 24V has a structure that does not allow itself connected to the 200V driver unit, however, it could be forcefully inserted, which could cause fire on the connector as well as damage on it.

External Regenerative Resistor Connector

200V power supply unit and 200V driver unit are equipped with a built-in 60W regenerative resistor. In addition, they are equipped with a feature to share the regenerative resistance among units. In case the resistance is in lack even with them, connect an external regenerative resistor unit to these connectors.

For the wiring method, refer to "Startup Section 2.2 Wiring / Wiring for External Regenerative Resistor Unit (page B2-17)".

Pin No.	Signal name	Description
1	RB－(RB＋)	Resistor
2	RB＋(RB－)	Resistor
3	⏚	Protection Grounding

200V AC Input Connector

It is a 3-phase/single-phase 200V AC input connector. The total wattage connectable for 3-phase 200AC should be 2,400W while the total wattage should be 1,600W for single-phase 200V AC.

Cable connector name:SPC5/4-GF-7,62 (Phoenix Contact)

3-Phase 200V

Pin No.	Signal name	Description	Remarks
1	L1	1st Phase	
2	L2	2nd Phase	
3	L3	3th Phase	
4	⏚	Protection Grounding	

Single-Phase 200V

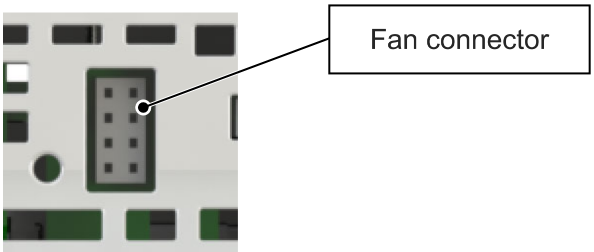
Pin No.	Signal name	Description	Remarks
1	L1	Live	
2	L2	Neutral	
3	L3	No Connect	Not to be connected
4	⏚	Protection Grounding	

Cable side connector compatible wire

Item	Specifications
Compatible wire	AWG14 ~ 8 (Copper Wire)
Strip length	15.0mm
Rated Temperature on Isolation Coating	60degC or more

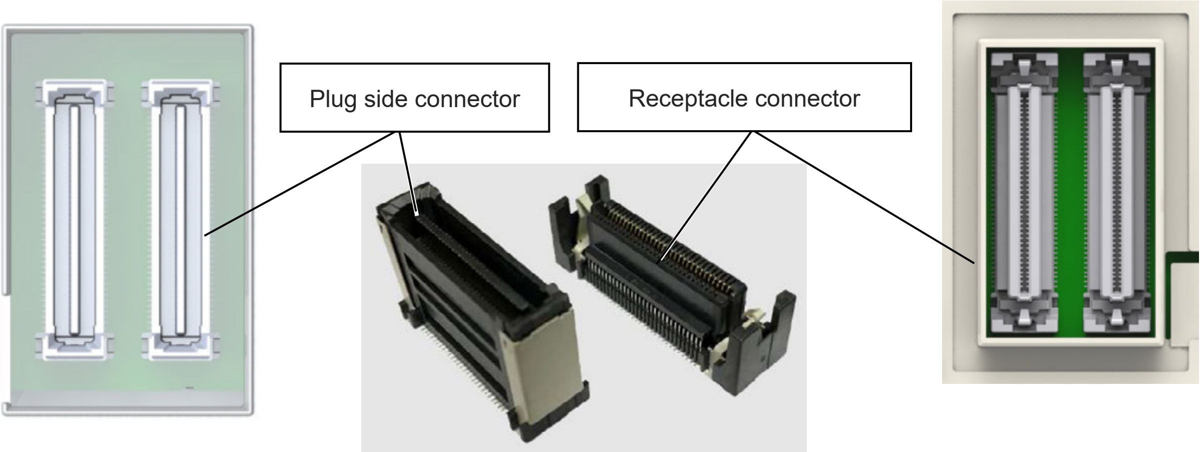
Fan connector

A connector to connect the fan unit. It is the same as the fan unit attached on the 24V driver unit. It connects to the fan board connector on the fan unit side.



Connectors

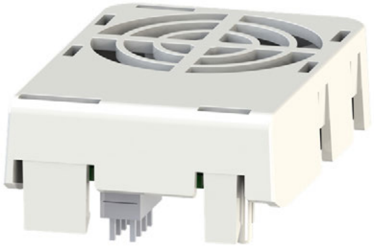
A connector for use between units. Two identical connectors are used. The connectors have a floating structure that absorbs connector misalignment due to housing mating or mounting misalignment between connectors.



Fan unit

It is a fun to have forced air cooling on the power supply unit. It is the same as the fan unit attached on the 24V driver unit. Use the unit by connecting to the fan connector on the 200V Power Supply Unit unit side. One unit of the 200V Power Supply Unit uses one unit of the fan unit.

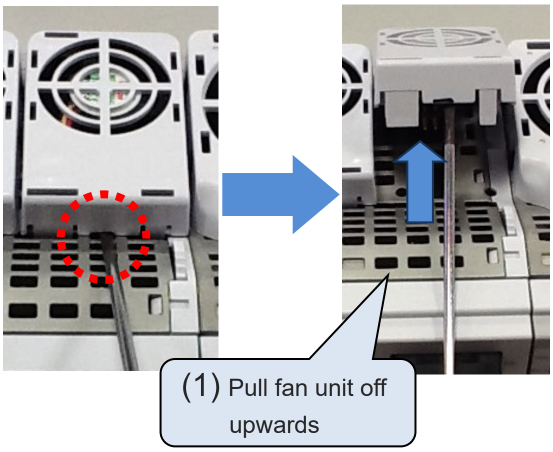
The fan starts turning if the temperature inside of the power supply unit gets high, and stops when the temperature drops.



[How to Replace Fan Unit]

<Detaching Fan Unit>

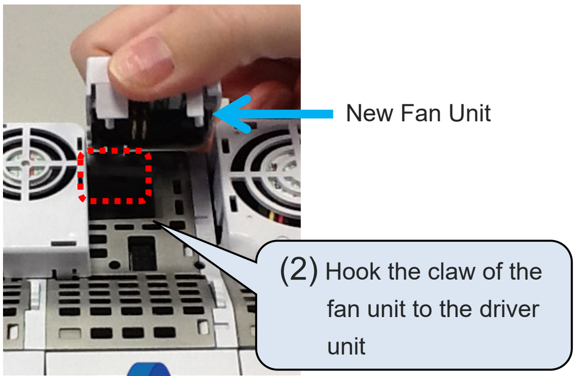
(1) Insert a slotted screwdriver to the cutout (circled in red in figure on the right) on the fan unit and pull up the fan unit upwards to detach it.



<Attaching Fan Unit>

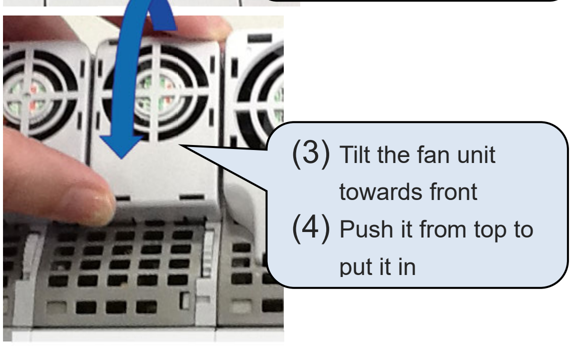
(2) Adjust the installation orientation of the RCON system and new fan unit.

Hook the claw of the fan unit to the driver unit as shown in the figure on the right.



(3) Pull down the fan unit to the front of the RCON system.

(4) Press the fan unit from the top and snap in.

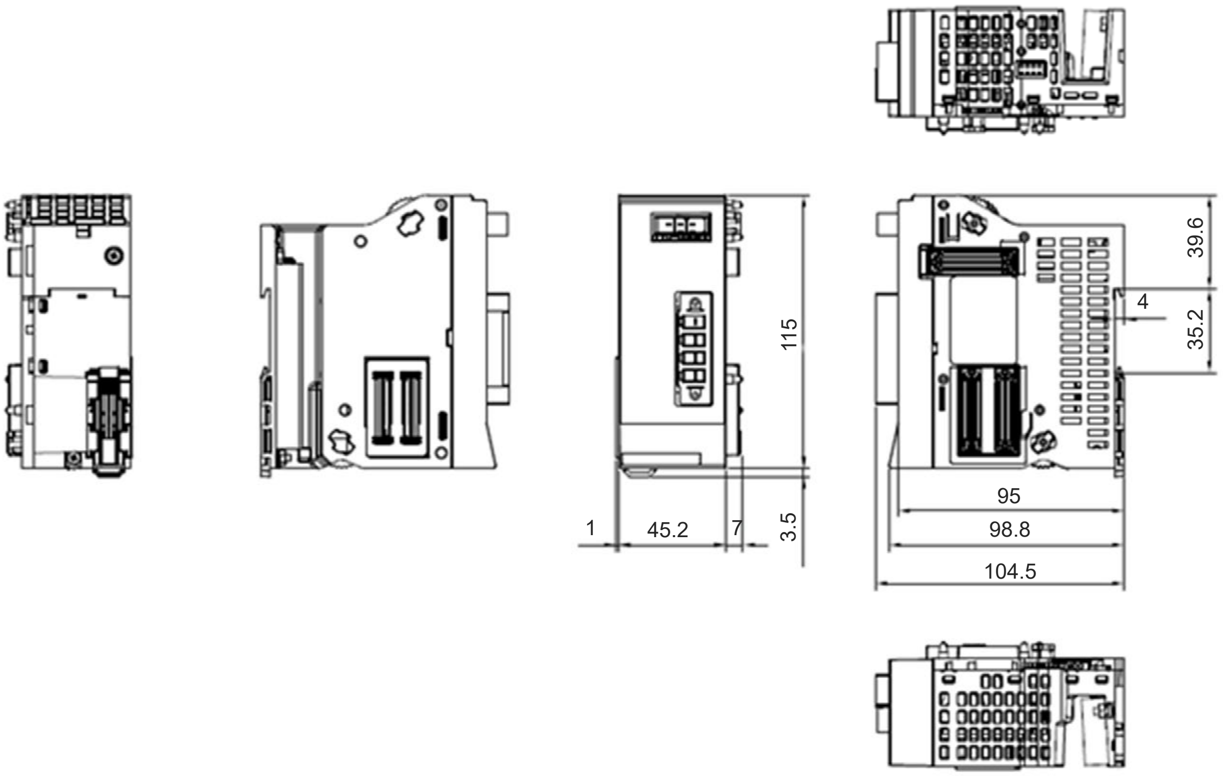


RCON system front

External dimensions (200V Power Supply Unit, Terminal Unit)

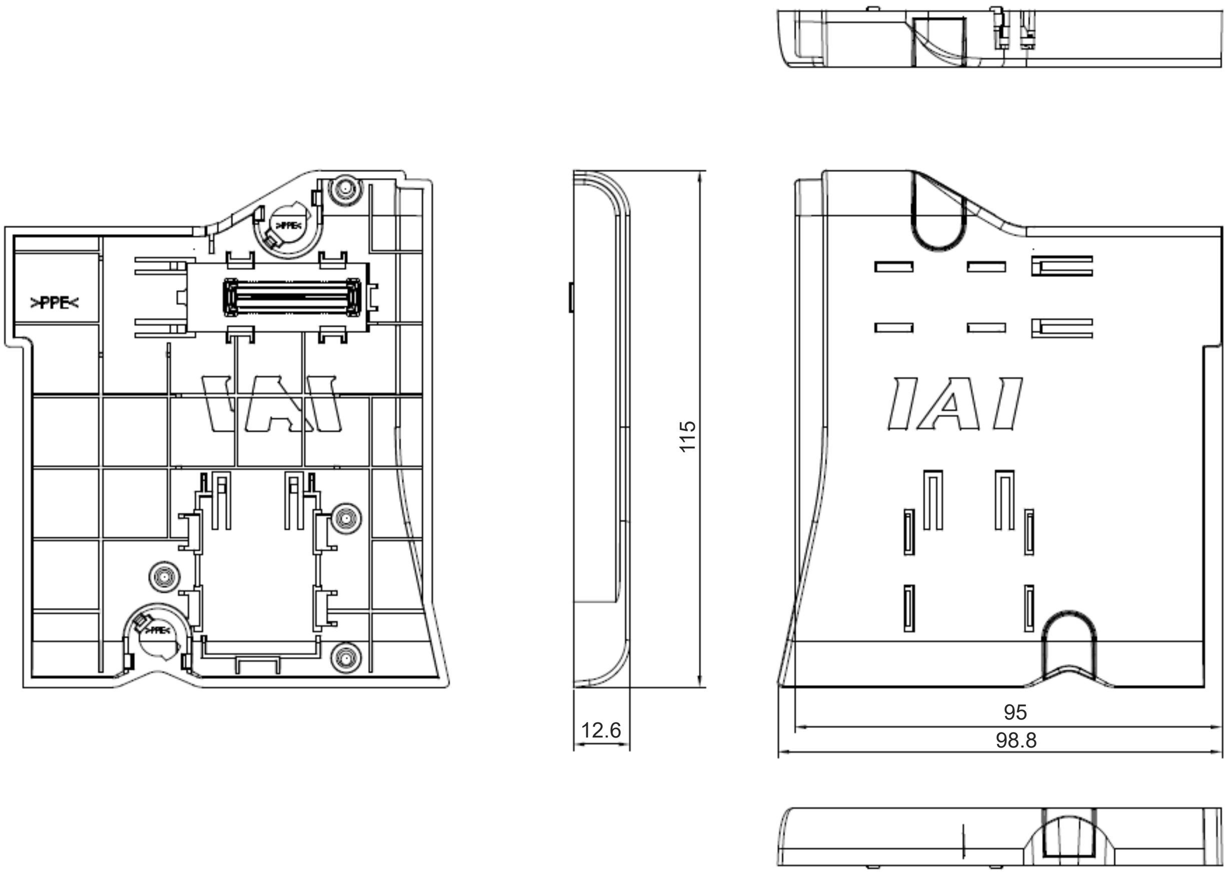
200V Power Supply Unit (RCON-PS2)

Item	Specifications
External dimensions	W45.2mm × H115mm × D95mm
Mass	About 393g
External view	See figure below



Terminal Unit for 200V (RCON-GW-TRS)

Item	Specifications
External dimensions	W12.6mm × H115mm × D95mm
Mass	About 40g
External view	See figure below



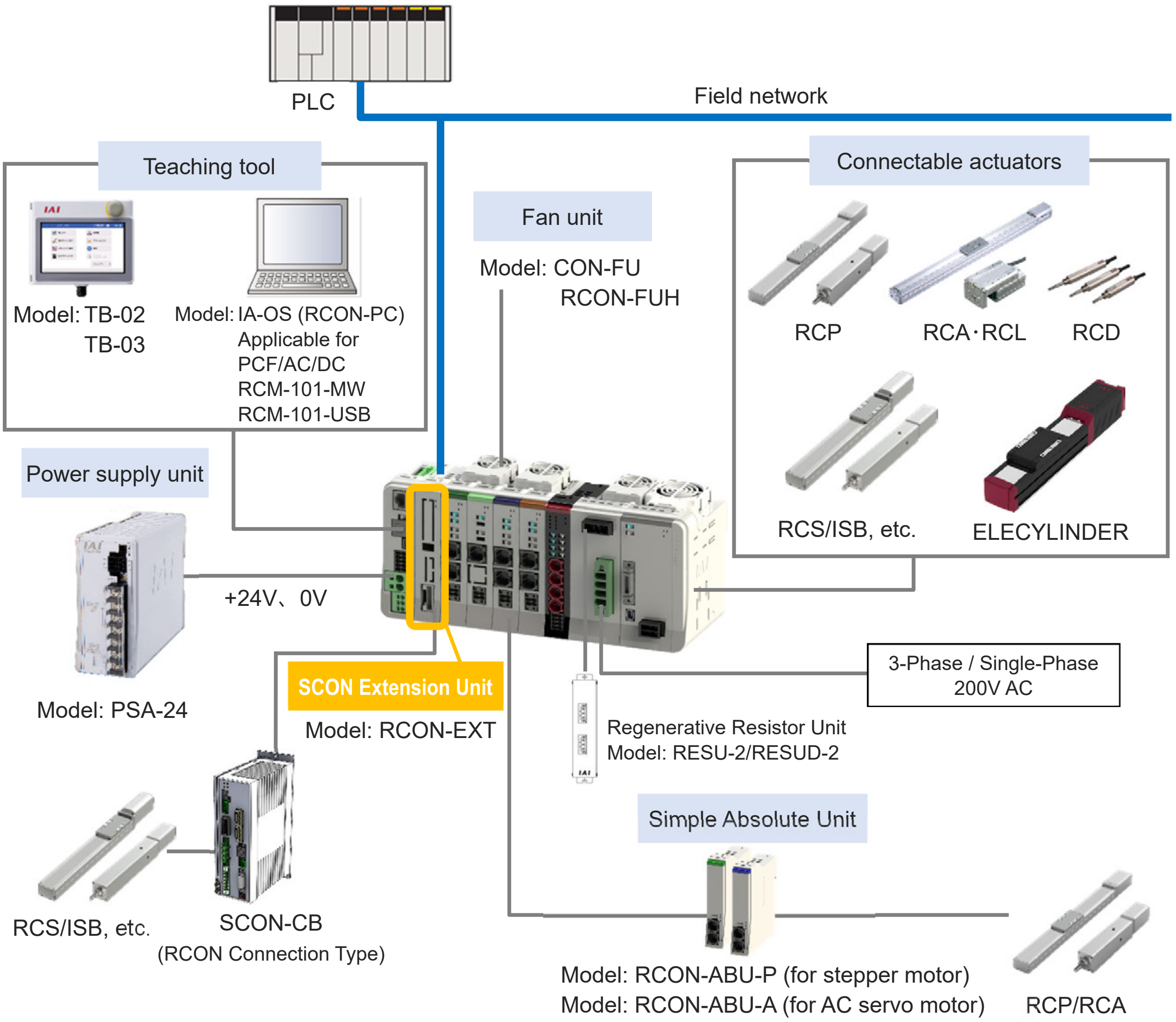
Specifications Section

Chapter 6

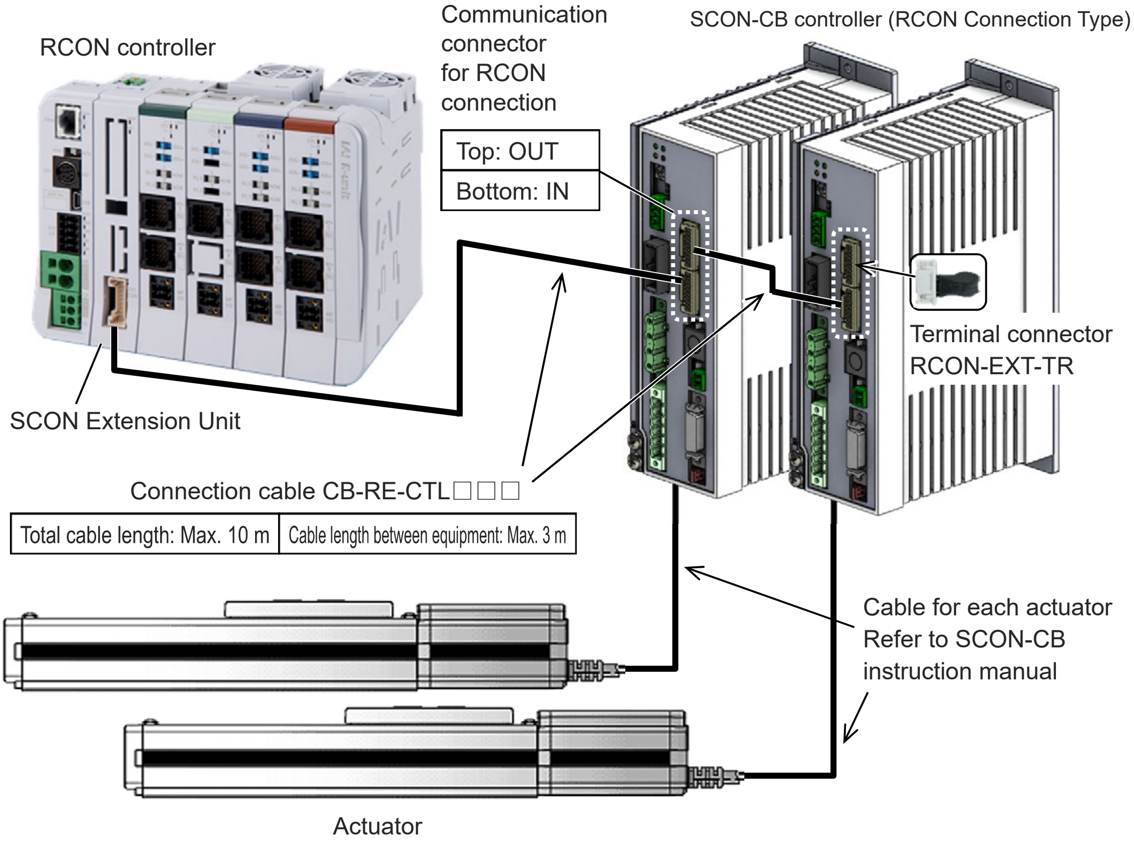
SCON Extension Unit

6.1 Overview

SCON extension unit is a unit to connect SCON-CB Controller (RCON connection type) to R Unit.
Using the SCON extension unit and SCON-CB Controller should enable to connect actuators (*) that are not capable to connect with the 200V driver unit.
*: Refer to Note 1 in the figure below
As seen from the front, the gateway unit is placed to the left end of the RCON system, while the expansion unit is located on the right side of the gateway unit during use.



The SCON extension unit and the SCON-CB controller are connected with a dedicated cable (model: CB-RE-CTL□□□). When connecting two or more SCON-CB controllers, connect the SCON-CB units together with a dedicated cable. Up to 16 axes can be controlled by combining with a driver unit.



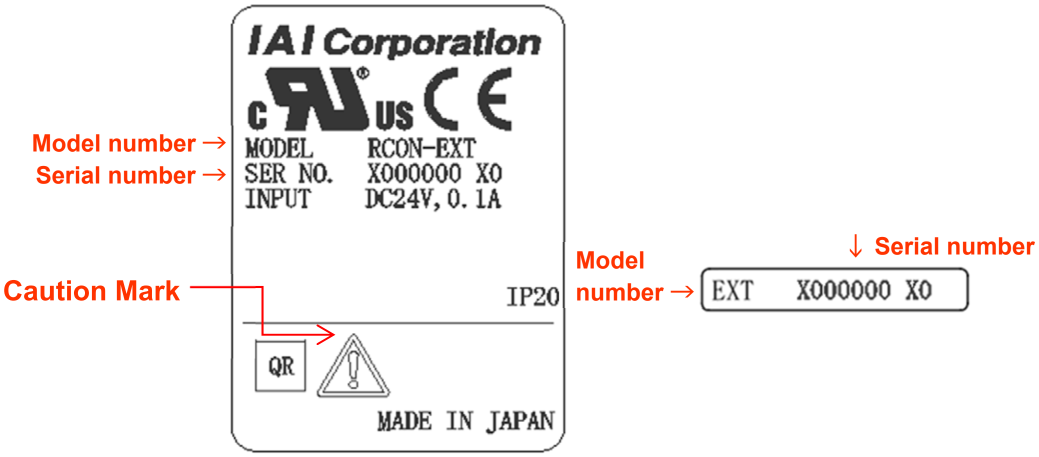
6.2 How to Read the Model Number

The model of the SCON extension unit is as follows.

SCON extension unit model

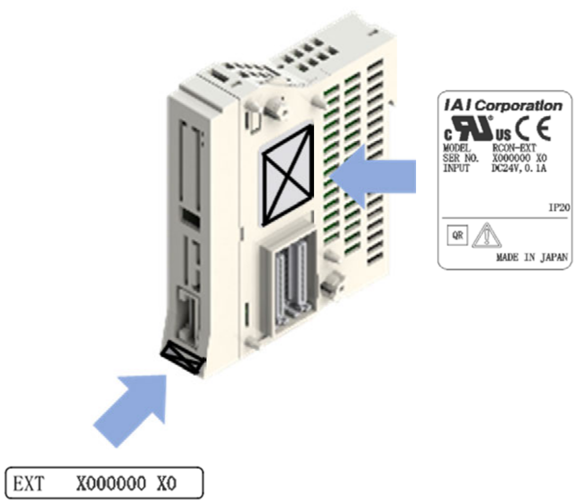
RCON – EXT

How to read the model nameplate



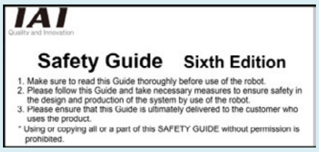
Mark	Explanation of Mark
⚠	Use IAI specified cables only.

[Nameplate Location]



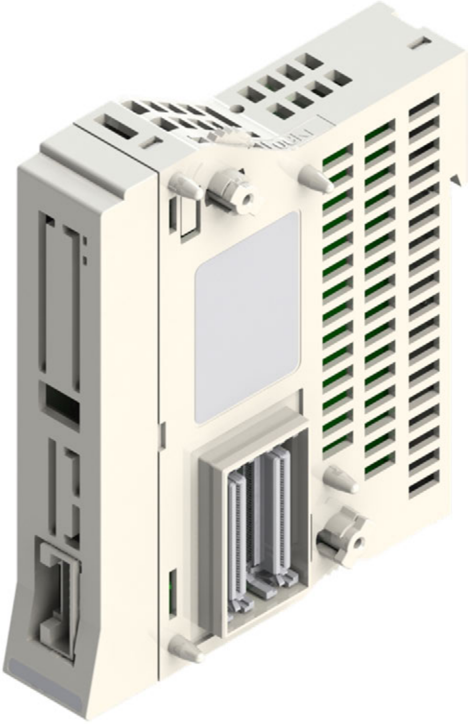
6.3 SCON Extension Unit and Components

The following table shows the product configuration for the standard specification.
See the packing list for the details of the enclosed components. In the unlikely case that any model number errors or missing parts come to light, contact your local IAI distributor.

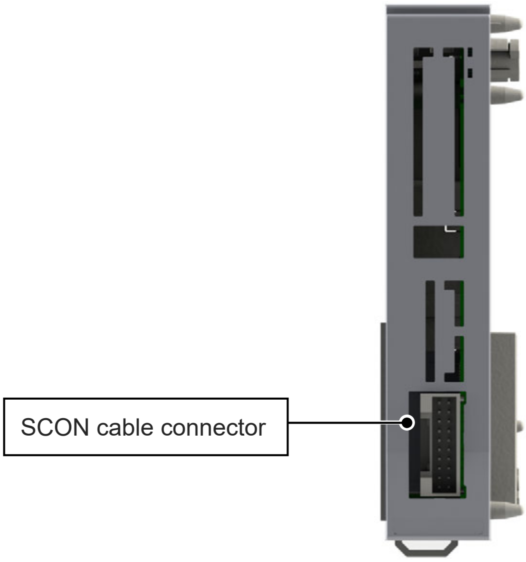
Part name	Shape	Quantity	Remarks
SCON extension unit		1	
Terminal connector		1	Terminal Resistor for SCON-CB Single product model number: RCON-EXT-TR * Enclosed to SCON extension unit
First Step Guide	 IAI Quality and Innovation RCON-PC/PCF/AC/DC, RCON-FU RCON-ABU-A/P, RCON-EXT Driver Unit, Fan Unit, Simple Absolute Unit, Extension Unit First Step Guide First Edition Thank you for purchasing our product. Make sure to read the Safety Guide and detailed Instruction Manual (DVD) included with the product in addition to this First Step Guide to ensure correct use. This Instruction Manual is original. Warning: Operation of this equipment requires detailed installation and operation instructions which are provided on the DVD Manual included in the box this device was packaged in. It should be retained with this device at all times. A copy of the DVD Manual can be requested by contacting your nearest IAI Sales Office listed at the back cover of the Instruction Manual or on the First Step Guide. • Using or copying all or part of this Instruction Manual without permission is prohibited. • The company names, names of products and trademarks of each company shown in the sentences are registered trademarks.	1	
Safety Guide	 IAI Quality and Innovation Safety Guide Sixth Edition 1. Make sure to read this Guide thoroughly before use of the robot. 2. Please follow this Guide and take necessary measures to ensure safety in the design and production of the system by use of the robot. 3. Please ensure that this Guide is ultimately delivered to the customer who uses the product. * Using or copying all or a part of this SAFETY GUIDE without permission is prohibited.	1	

6.4 Part Names/Functions and External Dimensions

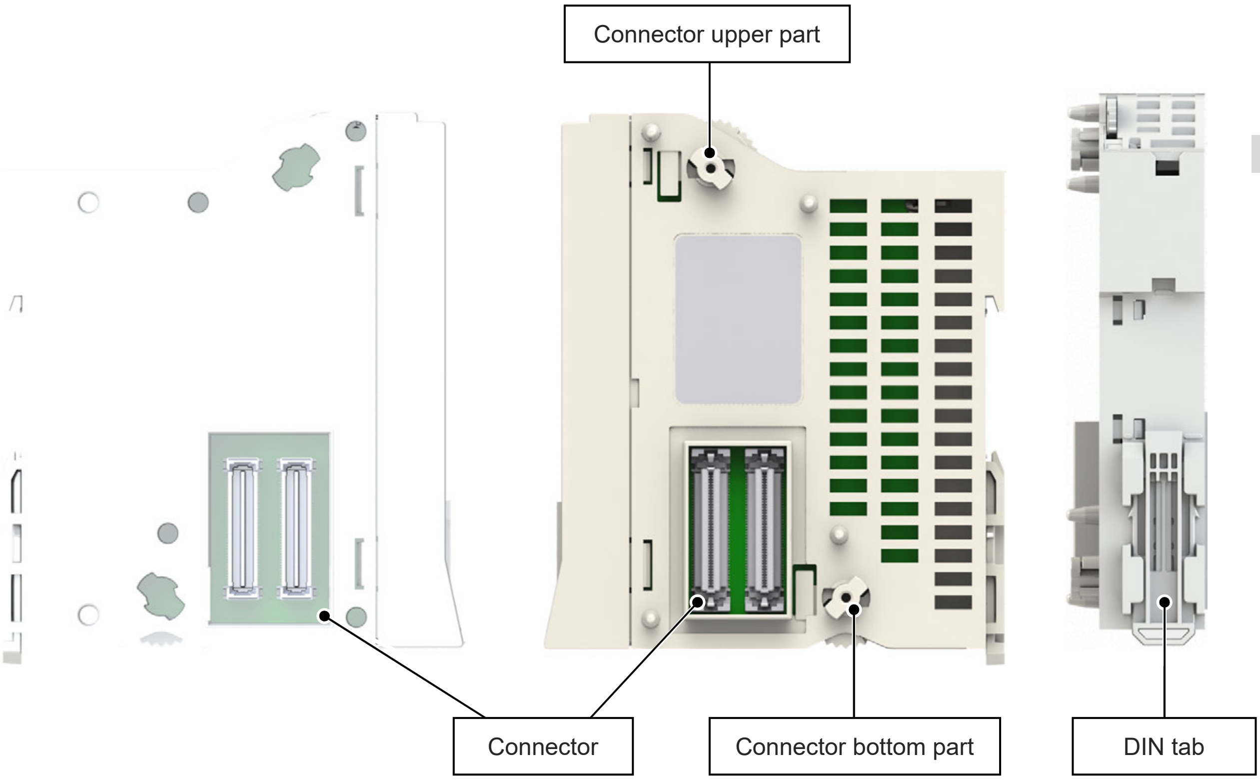
Part names



RCON-EXT



Front



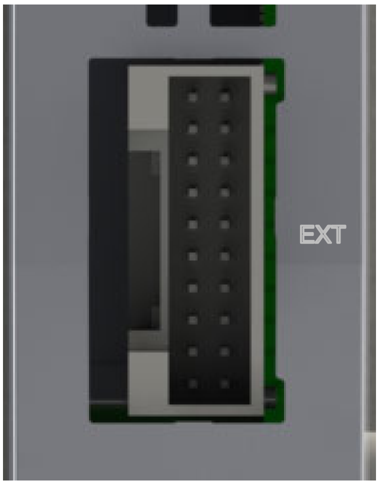
Left side

Right side

Rear

SCON cable connector

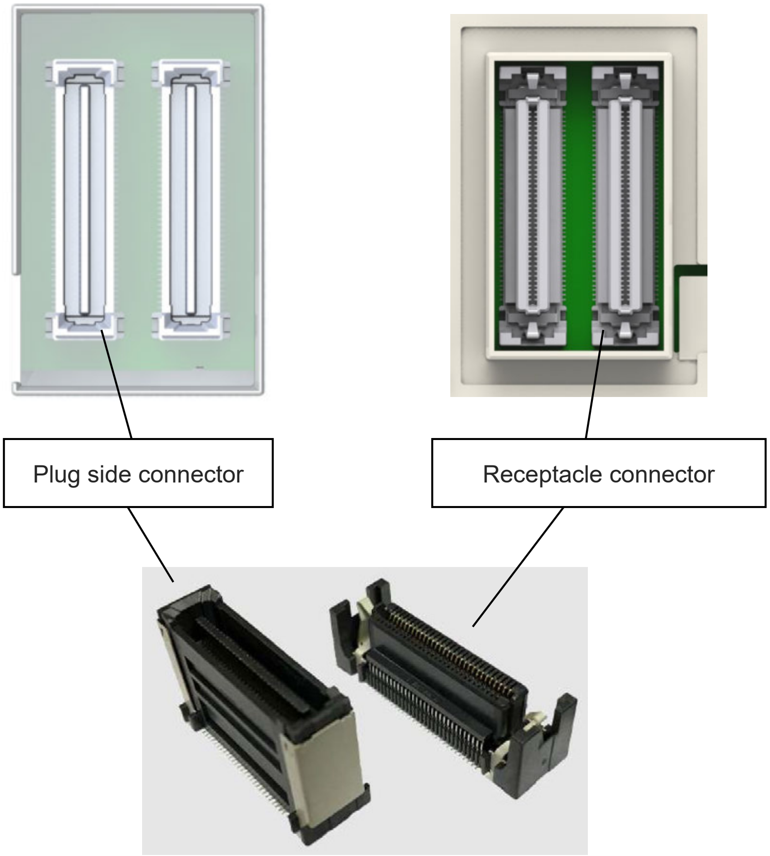
A cable connector for connecting the SCON extension unit and SCON.



Pin No.	Signal name	Description
1	VP24	Expansion module 24 V power
2	GND	0 V
3	DRV_DY	Driver dedicated internal bus signal differential transmit line +
4	DRV_RA	Driver dedicated internal bus signal differential receive line +
5	DRV_DZ	Driver dedicated internal bus signal differential transmit line -
6	DRV_RB	Driver dedicated internal bus signal differential receive line -
7	AM_SD+	MODBUS differential line +
8	AM_SD-	MODBUS differential line -
9	ACT_PULSE+	Driver signal timing notification signal differential line +
10	ACT_PULSE-	Driver signal timing notification signal differential line -
11	SYNC_PULSE+	Driver synchronizing signal differential line +
12	SYNC_PULSE-	Driver synchronizing signal differential line -
13	RTC_1Hz	1 Hz toggle signal
14	CONE_IN	Unit connection check signal
15	STOP	Stop signal
16	ENABLE	Enable signal
17	NC	Not connected
18	GW_RESET	Gateway reset signal
19	FG	Frame ground

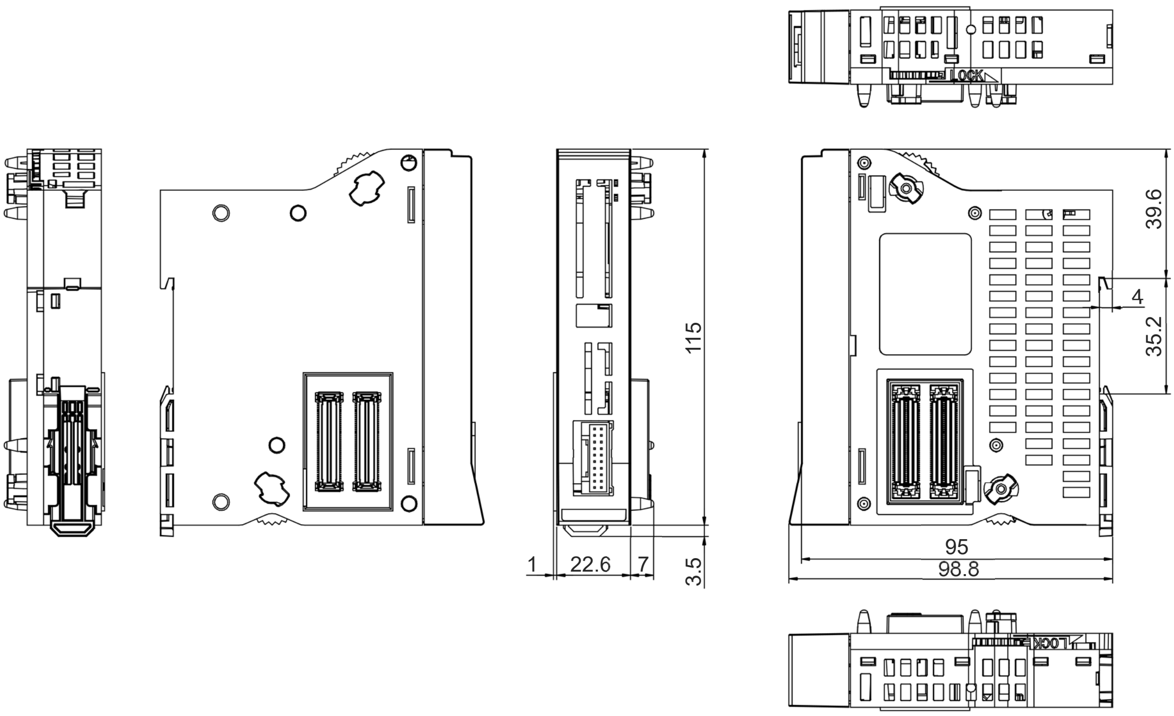
Connectors

A connector for use between units. Two identical connectors are used. The connectors have a floating structure that absorbs connector misalignment due to housing mating or mounting misalignment between connectors.



External dimensions

Item	Specifications
External dimensions	W22.6 mm × H115 mm × D95 mm
Mass	About 96g
External view	See figure below



Specifications Section

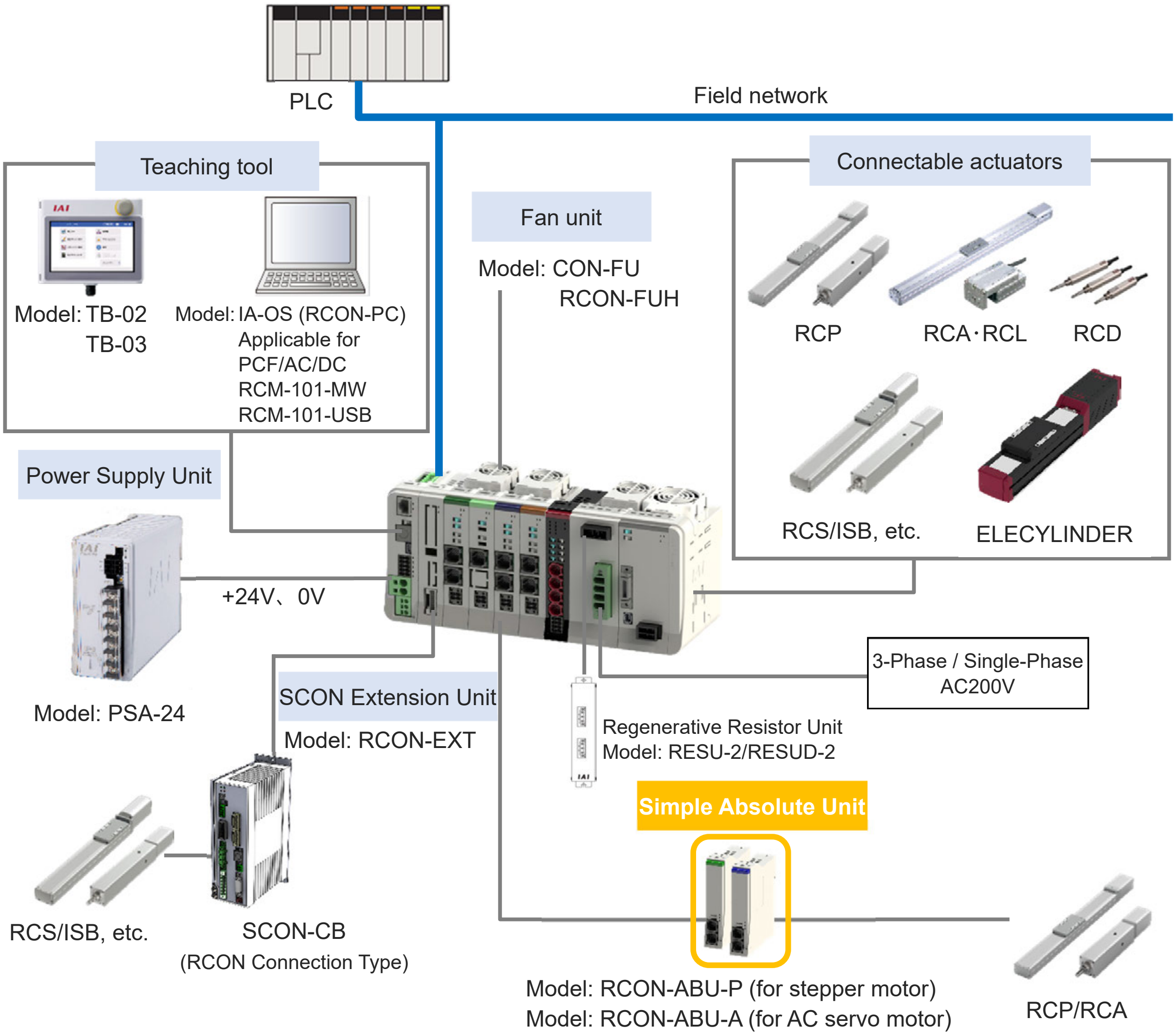
Chapter 7

Simple Absolute Unit

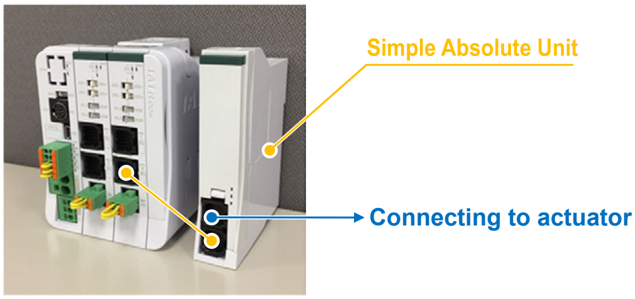
7.1 Overview

Incremental specification actuators can be used as absolute specification models by adding a simple absolute unit to the driver unit.

After absolute reset, home return motion is not required even if turning the control power supply OFF and then ON again.



However, simple absolute units do not have a unit-connectable structure. Connect to the driver unit with a cable after securing to a DIN rail.



7.2 How to Read the Model Number

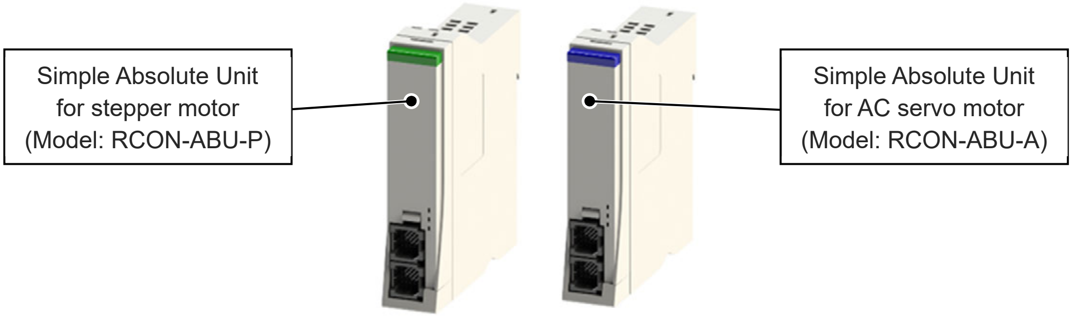
The simple absolute unit models are as follows.

1 simple absolute unit is required for each actuator axis.

Also, the applicable driver units should be the 24 pulse motor type (RCON-PC) and the 24V AC servo-motor type (RCON-AC) only.

Simple absolute unit model

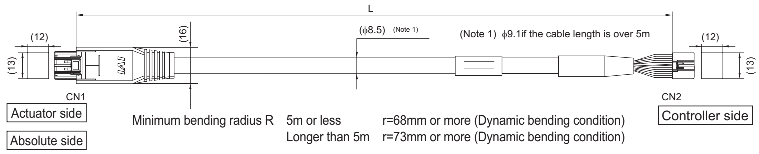
P	Stepper motor type
A	AC servo motor type



A cable (model: CB-ADPC-MPA005, length 50 cm) is included for connection to the driver unit. Cables of lengths other than 50 cm must be prepared separately as needed. The cable length should be selected based on the driver unit and simple absolute unit installation positions.

Model Number CB-ADPC-MPA□□□/CB-ADPC-MPA□□□-RB
Standard cable　Robot cable

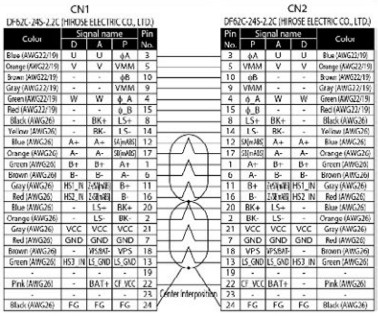
*Please indicate the cable length (L) in □□□, e.g.) 030 = 3m



Minimum bending radius R	5m or less	r=68mm or more (Dynamic bending condition)
	Longer than 5m	r=73mm or more (Dynamic bending condition)

* The robot cable is designed for flex-resistance: Please use the robot cable if the cable needs to be installed through the cable track.

* Please contact IAI if the cable length other than above is needed.



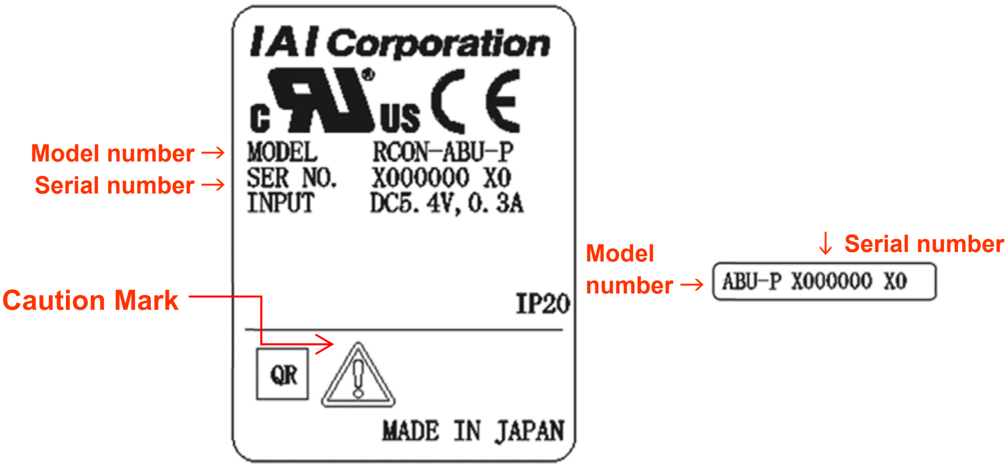
CN1
DF62C-24S-2.2C (HIROSE ELECTRIC CO., LTD.)

Color	Signal name			Pin
	D	A	P	No.
Blue (AWG22/19)	U	U	ϕA	3
Orange (AWG22/19)	V	V	VMM	5
Brown (AWG22/19)	-	-	ϕB	10
Gray (AWG22/19)	-	-	VMM	9
Green (AWG22/19)	W	W	ϕ_A	4
Red (AWG22/19)	-	-	ϕ_B	15
Black (AWG26)	-	BK+	LS+	8
Yellow (AWG26)	-	BK-	LS-	14
Blue (AWG26)	A+	A+	SA[mABS]	12
Orange (AWG26)	A-	A-	SB[mABS]	17
Green (AWG26)	B+	B+	A+	1
Brown (AWG26)	B-	B-	A-	6
Gray (AWG26)	HS1_IN	Z-ϕ/SA[mABS]	B+	11
Red (AWG26)	HS2_IN	Z-ϕ/SB[mABS]	B-	16
Blue (AWG26)	-	LS+	BK+	20
Orange (AWG26)	-	LS-	BK-	2
Gray (AWG26)	VCC	VCC	VCC	21
Red (AWG26)	GND	GND	GND	7
Brown (AWG26)	-	VPS/BAT-	VPS	18
Green (AWG26)	HS3_IN	LS_GND	LS_GND	13
-	-	-	-	19
Pink (AWG26)	-	BAT+	CF_VCC	22
-	-	-	-	23
Black (AWG26)	FG	FG	FG	24

CN2
DF62C-24S-2.2C (HIROSE ELECTRIC CO., LTD.)

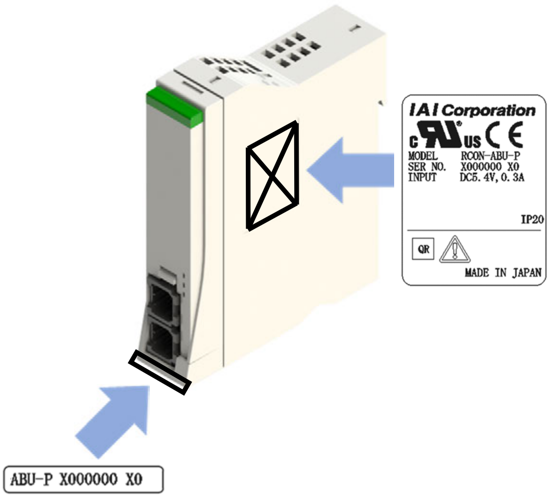
Pin	Signal name			Color
No.	P	A	D	
3	ϕA	U	U	Blue (AWG22/19)
5	VMM	V	V	Orange (AWG22/19)
10	ϕB	-	-	Brown (AWG22/19)
9	VMM	-	-	Gray (AWG22/19)
4	ϕ_A	W	W	Green (AWG22/19)
15	ϕ_B	-	-	Red (AWG22/19)
8	LS+	BK+	-	Black (AWG26)
14	LS-	BK-	-	Yellow (AWG26)
12	SA[mABS]	A+	A+	Blue (AWG26)
17	SB[mABS]	A-	A-	Orange (AWG26)
1	A+	B+	B+	Green (AWG26)
6	A-	B-	B-	Brown (AWG26)
11	B+	Z-ϕ/SA[mABS]	HS1_IN	Gray (AWG26)
16	B-	Z-ϕ/SB[mABS]	HS2_IN	Red (AWG26)
20	BK+	LS+	-	Blue (AWG26)
2	BK-	LS-	-	Orange (AWG26)
21	VCC	VCC	VCC	Gray (AWG26)
7	GND	GND	GND	Red (AWG26)
18	VPS	VPS/BAT-	-	Brown (AWG26)
13	LS_GND	LS_GND	HS3_IN	Green (AWG26)
19	-	-	-	-
22	CF_VCC	BAT+	-	Pink (AWG26)
23	-	-	-	-
24	FG	FG	FG	Black (AWG26)

How to read the model nameplate



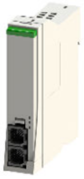
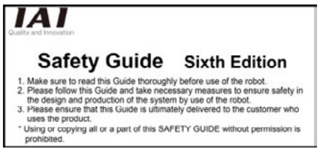
Mark	Explanation of Mark
⚠	Use IAI specified cables only.

[Nameplate Location]



7.3 Simple Absolute Unit and Components

The following table shows the product configuration for the standard specification.
See the packing list for the details of the enclosed components. In the unlikely case that any model number errors or missing parts come to light, contact your local IAI distributor.

Part name	Shape	Quantity	Remarks
Simple Absolute Unit		1	
Absolute battery		1	Model Name: AB-7 * Supplied with Simple Absolute Unit
Motor/encoder cable		1	Model Name: CB-ADPC-MPA005 * Supplied with Simple Absolute Unit
First Step Guide	IAI Quality and Innovation RCON-PC/PCF/AC/DC, RCON-FU RCON-ABU-A/P, RCON-EXT Driver Unit, Fan Unit, Simple Absolute Unit, Extension Unit First Step Guide First Edition Thank you for purchasing our product. Make sure to read the Safety Guide and detailed Instruction Manual (DVD) included with the product in addition to this First Step Guide to ensure correct use. This Instruction Manual is original.	1	
Safety Guide	IAI Quality and Innovation Safety Guide Sixth Edition 1. Make sure to read this Guide thoroughly before use of the robot. 2. Please follow this Guide and take necessary measures to ensure safety in the design and production of the system by use of the robot. 3. Please ensure that this Guide is ultimately delivered to the customer who uses the product. * Using or copying all or a part of this SAFETY GUIDE without permission is prohibited.	1	

7.4 General Specifications

[Absolute Battery Specifications]

Item	Specifications
Type	Cylindrical sealed nickel-metal hydride battery
Manufacturer	FDK Corporation
Model	AB-7
Nominal voltage	3.6 V
Rated capacity	3,100 mAh
Nominal capacity	3,700 mAh
Average life	Approx. 3 years (varies widely with operating conditions)
Weight	190 g
Charging time	Approx. 72 hours

[Absolute Battery Charging]

Charge for at least 72 hours continuously if using for the first time, after replacing the battery, and when power has been turned off for extended periods. The battery is charged while 24 VDC is supplied to RCON.

If RCON power is turned OFF beyond the data retention time, the data will be lost, so charge regularly.

The battery has a limited lifetime that gradually decreases data retention time. Replace the battery when the retention time decreases significantly even if properly charged.

Data retention time (approximate time when battery is new)

Parameter No.155 settings	Upper limit of encoder rotation speed when power is OFF [r/min]		Battery retaining time guideline [days]	Retaining time per 1 hour of charge time (guideline) [h]
	If connected actuator is not RCA2-***NA	If connected actuator is RCA2-***NA		
0	100	75	20	6.6
1	200	150	15	5.0
2	400	300	10	3.3
3	800	600	5	1.6

For details, refer to "Startup Section Chapter 6, 6.1 Parameter (page B6-48)".

(Example) When used under the following conditions: "Monday ~ Friday: 8 hours charging / 16 hours discharging per day, Saturdays and Sundays: discharging"
Connected axis: When not RCA2-***NA

(1) If Parameter No. 155 is set to 3...
Total charge: 8 [h] operation per day x 1.6 [h] retention time per 1 hour charge x 5 [days] weekdays = 64 [h]
Total discharge: Nightly down time 16 [h] x weekdays 5 [days] + weekend down time 48 [h] = 128 [h]
→ If starting on Monday from a fully charged state, the total discharge amount exceeds the total charge amount by 64 [h] in one week, so the full charge amount decreases by 64 [h] each week. Accordingly, a full charge is required every 10 days.

(2) If Parameter No. 155 is set to 2...
Total charge: 8 [h] operation per day x 3.3 [h] retention time per 1 hour charge x 5 [days] weekdays = 132 [h]
Total discharge: Nightly down time 16 [h] x weekdays 5 [days] + weekend down time 48 [h] = 128 [h]
→ If starting on Monday, the total charge amount exceeds the total discharge amount, so there is no need to maintain continuous full charge. Charge increases by 4 [h] each week.

[Absolute Battery Voltage Drop Detection]

If the absolute battery voltage drops, error detection is performed in accordance with the voltage.

Voltage	Output signal status	Alarm code
2.5V ±8% or less	Alarm signal *ALM OFF	0EE "Absolute encoder error detection 2" or 0EF "Absolute encoder error detection 3"

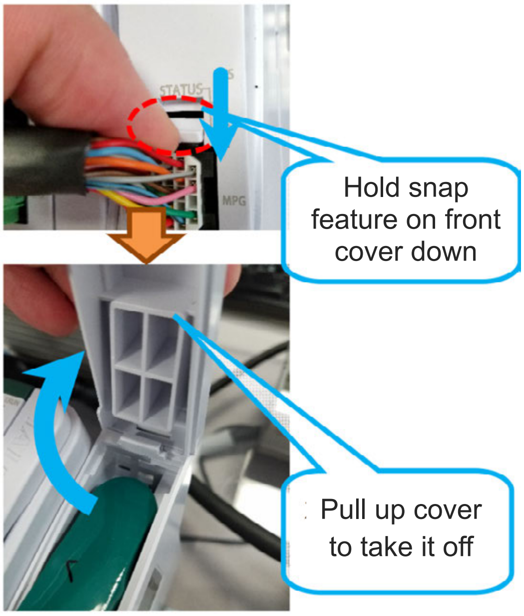
If an alarm occurs, absolute reset must be performed after replacing the battery.
RCON checks the battery voltage at power ON. Detection does not occur even if the battery voltage drops to the alarm level while RCON is energized.

[How to Replace Absolute Battery]

In here, explains how to replace an absolute battery.
When you replace a battery, keep the power to the controller on during replacement work.
If you have the power off during replacement, the encoder position data would not be retained.
Also, the work can be performed with the cables left joined to the connectors on the simple absolute unit.

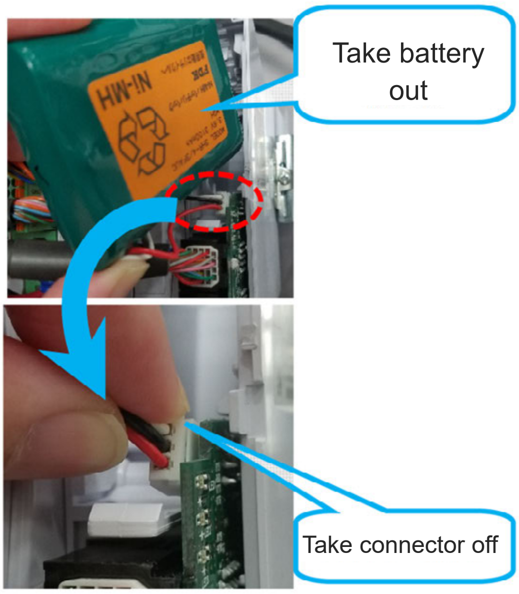
1 Press and hold down the snap feature on the front cover of the simple absolute unit, and pull the cover up towards you to take it off.

[1]



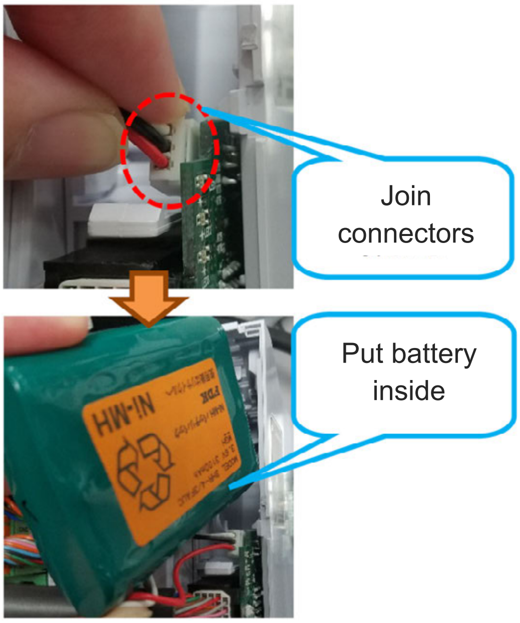
2 Take the battery out of the simple absolute unit, and take off the connector on the battery.

[2]



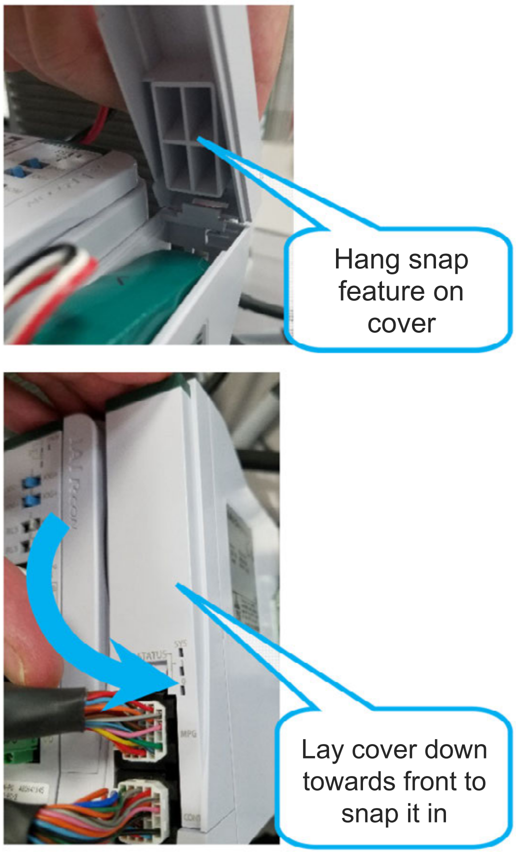
3 Join the connector on a new battery to the PC board and put the battery in the simple absolute unit.

[3]



4 Put the cover on.

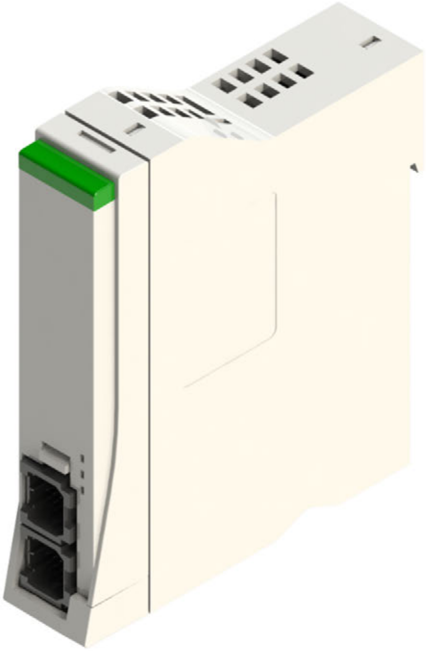
[4]



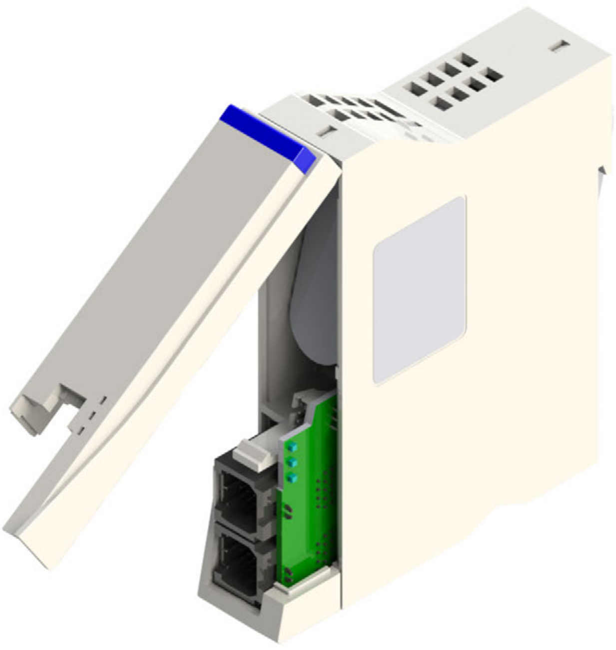
This is the end of the absolute battery replacement work.

7.5 Part Names/Functions and External Dimensions

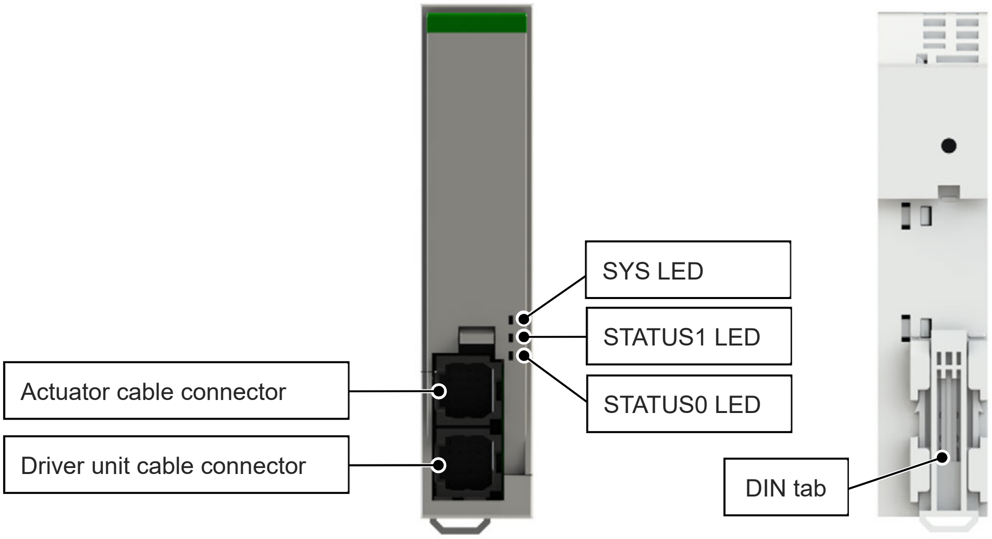
Part names



RCON-ABU-P (green)



RCON-ABU-A (blue)



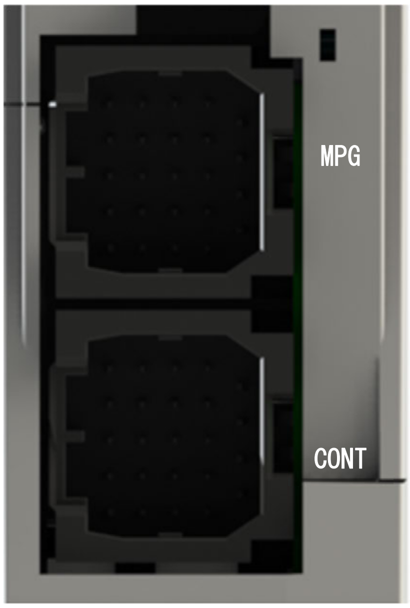
Front Rear

LED display

Panel notation	Display color	Status	Description
SYS	Green	Light ON	Normal operation
	Red	Light ON	Alarm triggered
STATUS1	Green	Light ON	Home return complete
	Red	Light ON	Home return not complete
STATUS0	Green	Light ON	Battery fully charged
	Red	Light ON	Battery not connected
	Orange (green/red)	Light ON	Battery charging

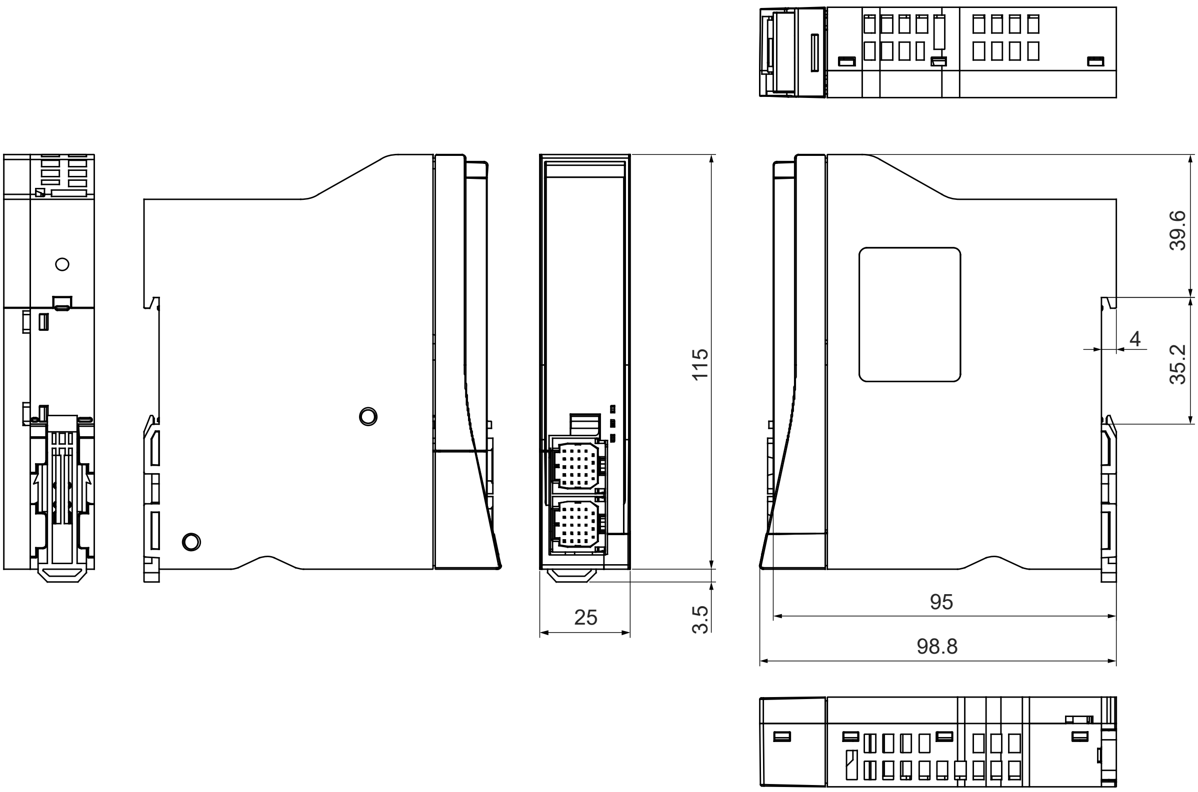
Actuator cable connector/driver unit cable connector

Connect the simple absolute unit to an actuator using an actuator cable connector (MPG), and to a driver unit with the driver unit cable connector (CONT). There are two types, one for stepper motors and one for AC servo motors, as the pin arrangement of the MPG connector differs. A color panel can be used for identification, as with the driver unit.



External dimensions

Item	Specifications
External dimensions	W22.6 mm x H115 mm x D95 mm
Mass	Approx. 271 g (of which 173 g is the battery)
External view	See figure below



7.6 Precautions

[Precautions when Changing Parameters]

If the following parameters are changed, an absolute error will occur. After changing the parameters, absolute reset must be performed once again.

(1) Parameter No.5 "Homing direction"
(2) Parameter No. 22 "Homing offset"
(3) Parameter No. 77 "Ball screw lead length"
(4) Parameter No. 78 "Axis motion type"

[Absolute Battery Handling]

Always observe the following safety precautions.

(1) Do not disassemble under any circumstances. The electrolyte is a strong alkali solution. It is harmful to skin and clothing.
(2) Never short the electrodes out (never directly connect + and - electrodes). Devices may be damaged, or the generated heat may cause burns.
(3) Never place into fire, as it may burst.
Also do not submerge underwater, as the battery will cease to function.
(4) Do not solder directly.
The safety mechanism may explode due to damage to the safety valve in the battery cap.
(5) If the power remains shut OFF for an extended period of time with the connector connected, deep discharge will take place, leakage may occur and the performance/life of the battery may be significantly lowered.
Unplug the connector when shutting OFF the power for extended periods of time due to equipment relocation, remodeling, etc.
(6) When disposing, take measures such as the use of an appropriate collection box installed at a recycling center.

Startup Section

Chapter 1

Overview

1.1 Checking the Product

Prepare the following devices.

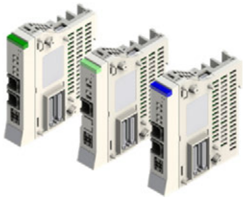
Caution

- The RCON system does not link each unit; individual units are packaged and shipped.
- When unpacking, make sure first that each unit you ordered is present in the correct quantity.
- Below are examples of the products shipped together.

[RCON Gateway Unit]

Part name	Shape	Quantity	Remarks
RCON gateway unit		1	Model example: RCON-GW/GWG
Field network cable connector		1 (Enclosed in connection types described on the right)	Model: MSTB2.5/5-STF-5.08 AU * Enclosed to RCON gateway unit CC-Link connection Type Model: MSTB2.5/5-STF-5.08 AU M * Enclosed to RCON gateway unit DeviceNet connection type
Fan unit (Option)		Depends on gateway unit model	Model: RCON-FU * Supplied with RCON gateway unit
System I/O connector		1	Model: DFMC1.5/5-ST-3.5 * Supplied with RCON gateway unit
Terminal unit		1	Model: RCON-GW-TR * Supplied with RCON gateway unit

[RCON 24V Driver Unit]

Part name	Shape	Quantity	Remarks
RCON Driver Unit		Customer specification dependent	Model example: RCON-PC/PCF/AC/DC
Drive source shutoff connector		1 (per unit)	Model: DFMC1.5/2-STF-3.5 * Supplied with driver unit

[RCON 200V Driver Unit]

Part name	Shape	Quantity	Remarks
200V Driver Unit		Customer specification dependent	Model: RCON-SC-1
Fan Unit for 200V Driver Unit		1 (per unit)	Single product model number: RCON-FUH * Enclosed to 200V driver unit
Dummy plug		1	Single product model number: DP-6 * Enclosed to 200V driver unit

[200V Power Supply Unit]

Part name	Shape	Quantity	Remarks
200V Power Supply Unit		1	Model: RCON-PS2-3
Terminal Unit for 200V		1 Depends on model type of power supply unit	Single product model number: RCON-GW-TRS (Not enclosed to TRN type)
Fan unit		1 (per unit)	Single product model number: RCON-FU * Enclosed to 200V power supply unit
Power connector		1 (per unit)	Single product model number: SPC5/4-STF-7.62 (Phoenix Contact) * Enclosed to 200V power supply unit

[EC Connection Unit]

Part name	Shape	Quantity	Remarks
EC Connection Unit		1	Model example: RCON-EC
Drive source shutoff connector		1 (per unit)	Model: DFMC1.5/4-ST-3.5 (Phoenix Contact) * Enclosed to EC connection unit

[SCON Extension Unit]

Part name	Shape	Quantity	Remarks
SCON extension unit		1	Model: RCON-EXT
SCON Controller (RCON Connection Type)		Customer specification dependent	Model: SCON-CB-***-RC-0-*
Terminal connector (Terminal resistor)		1	Model: RCON-EXT-TR * Included with SCON extension unit
Connection cable		Customer specification dependent	Model: CB-RE-CTL*** * Required for connecting the expansion unit and SCON. 1 piece of CB-RE-CTL002 (0.2m) enclosed to one unit of RCON Connectivity Type RCON-CB

[Other peripheral equipment] (Option)

Part name	Shape	Quantity	Remarks
24VDC power supply		–	Model: PSA-24* * Commercially available 24 VDC power supply can also be used
Teaching pendant		–	Model: TB-02/03-* * Either teaching pendant or PC software is required
PC software		–	Model: RCM-101-USB (applicable for all units) or applicable for IA-OS (RCON-PC/AC/DC/PCF) * Either teaching pendant or PC software is required

1.2 Tools to Use

The tools used for constructing and starting up the RCON system are PC software or a teaching pendant, and the gateway parameter configuration tool.
The applicable versions are as shown below. The versions in < > are the applicable versions when using the 200V driver unit or EC connection unit.

[PC software]

● RCM-101-*-*	Ver.13.00.00.00 or later <Ver. 13.01.00.00 or later>
● IA-OS	Ver.1.00.00.00 or later <Ver. 3.00.00.00 or later>

[Teaching pendant]

● TB-02/TB-02D	Ver.2.10 or later <Ver.2.70 or later>
● TB-03	Ver.2.10 or later <Ver.2.70 or later>

[Gateway parameter configuration tool]

- Ver.3.1.0.0 or later <Ver.3.1.7.0 or later>

The gateway parameter configuration tool is included in the PC software, but you can also download the latest version from our website.
For the operation of PC software and teaching pendant, refer to the following instruction manual.

Also, for how to operate the PC teaching software and the teaching pendant, refer to the instruction manuals stated below.

- PC software operating method
  Refer to [PC software (RCM-101-*-*) manual (ME0155)]
  Refer to [Guiding Features Installed in PC Teaching Software (IA-OS)]
- Teaching pendant operating method
  Refer to [Touch Panel Teaching Pendant manual TB-02/02D (ME0355)]
  Refer to [Touch Panel Teaching Pendant manual TB-03 (MJ0376)]

For an example of using and details the gateway parameter configuration tool, refer to "4.1 How to Use the Gateway Parameter Configuration Tool (page B4-1)" and "Specifications Section Chapter 3, 3.9 Gateway Parameter Configuration Tool (page A3-156)".
Also, "Quick Start Guide" explaining how to set up each network is available to download from IAI homepage. (Quick Start Guide available in Japanese only)

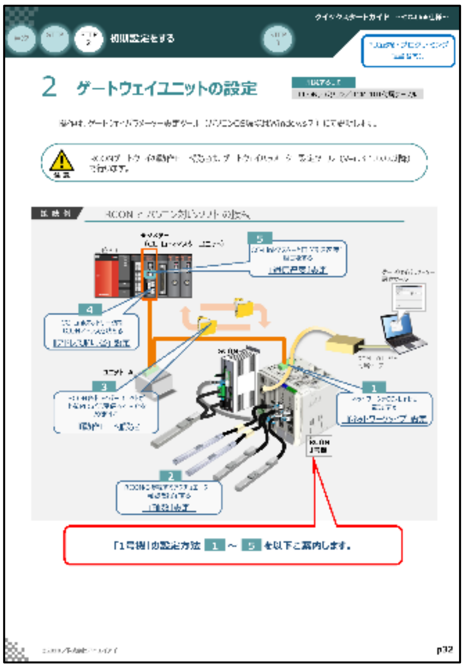
RCON-GW／GWG ゲートウェイユニット
RCON-PC／PCT／AC／DC RCON
RCON拡張仕様 SCON RCON

クイックスタートガイド

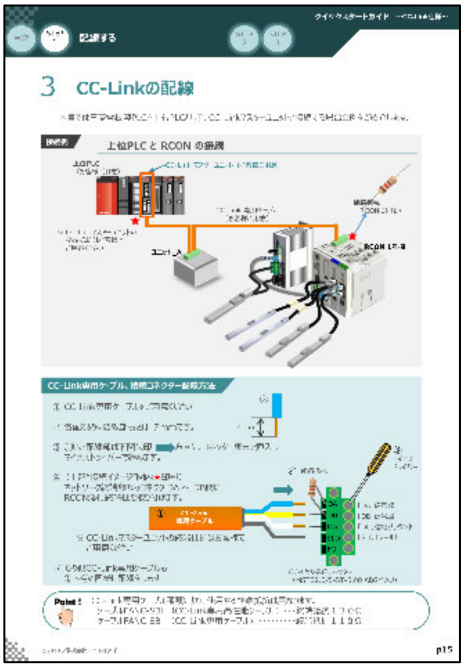
CC-Link 仕様

第1版

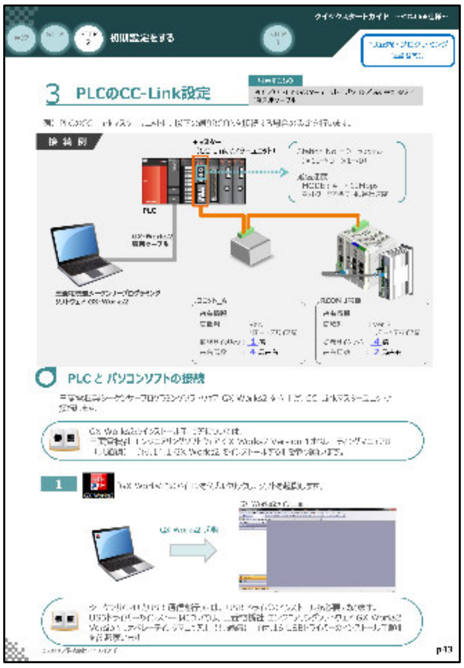
株式会社アイエイアイ



2 ゲートウェイユニットの設定



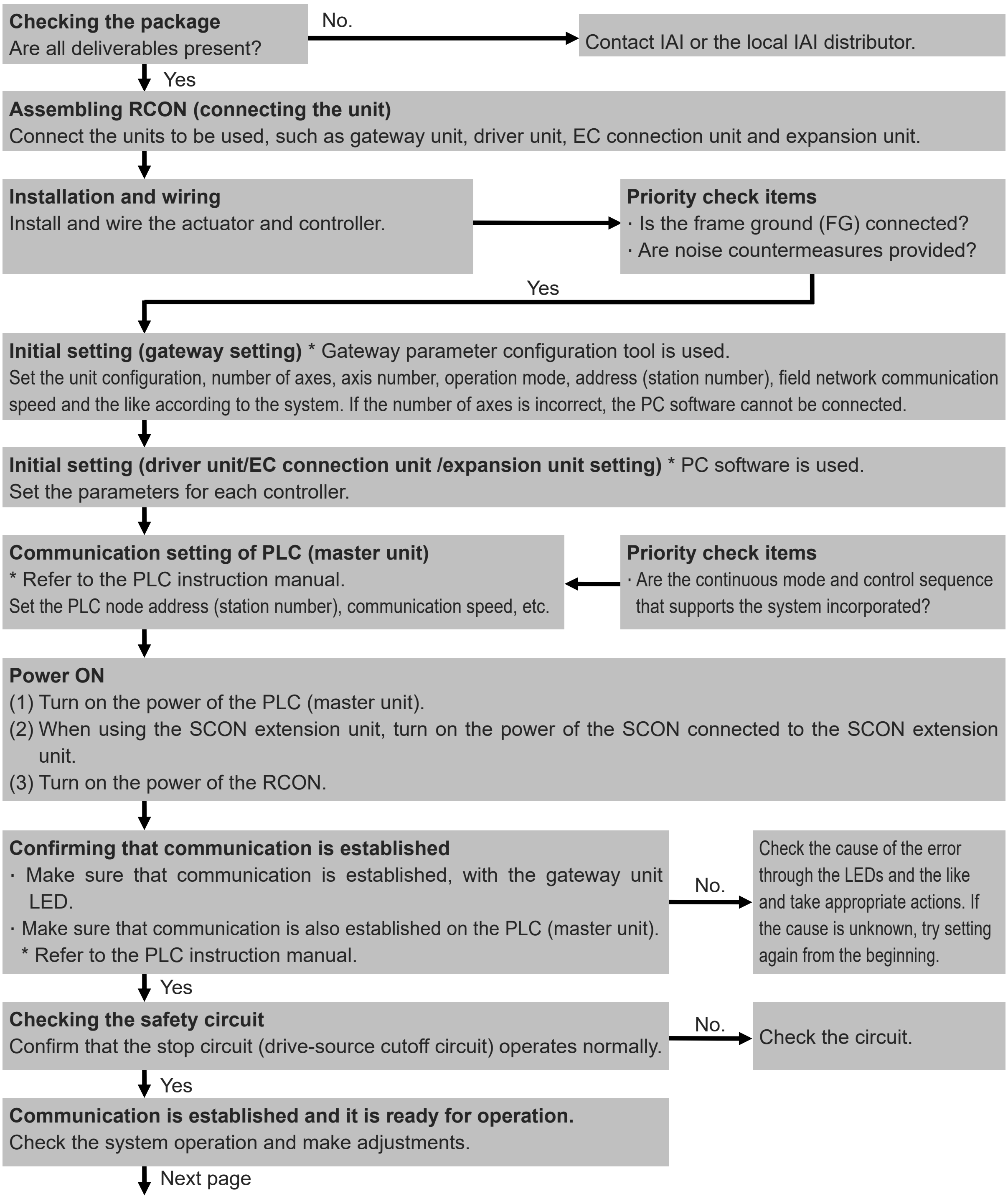
3 CC-Linkの配線



3 PLCのCC-Link設定

1.3 Startup Procedure

When using this product for the first time, refer to the following procedure and pay attention so as to avoid checking or wiring errors.
This section describes the startup procedure of the RCON system. For installation and wiring of miscellaneous devices connected to the network, controllers and actuators, follow the respective instruction manuals (DVDs).



Checking the package
Are all deliverables present?

Contact IAI or the local IAI distributor.

Assembling RCON (connecting the unit)
Connect the units to be used, such as gateway unit, driver unit, EC connection unit and expansion unit.

Installation and wiring
Install and wire the actuator and controller.

Priority check items
- Is the frame ground (FG) connected?
- Are noise countermeasures provided?

Initial setting (gateway setting) * Gateway parameter configuration tool is used.
Set the unit configuration, number of axes, axis number, operation mode, address (station number), field network communication speed and the like according to the system. If the number of axes is incorrect, the PC software cannot be connected.

Initial setting (driver unit/EC connection unit /expansion unit setting) * PC software is used.
Set the parameters for each controller.

Communication setting of PLC (master unit)
* Refer to the PLC instruction manual.
Set the PLC node address (station number), communication speed, etc.

Priority check items
- Are the continuous mode and control sequence that supports the system incorporated?

Power ON
(1) Turn on the power of the PLC (master unit).
(2) When using the SCON extension unit, turn on the power of the SCON connected to the SCON extension unit.
(3) Turn on the power of the RCON.

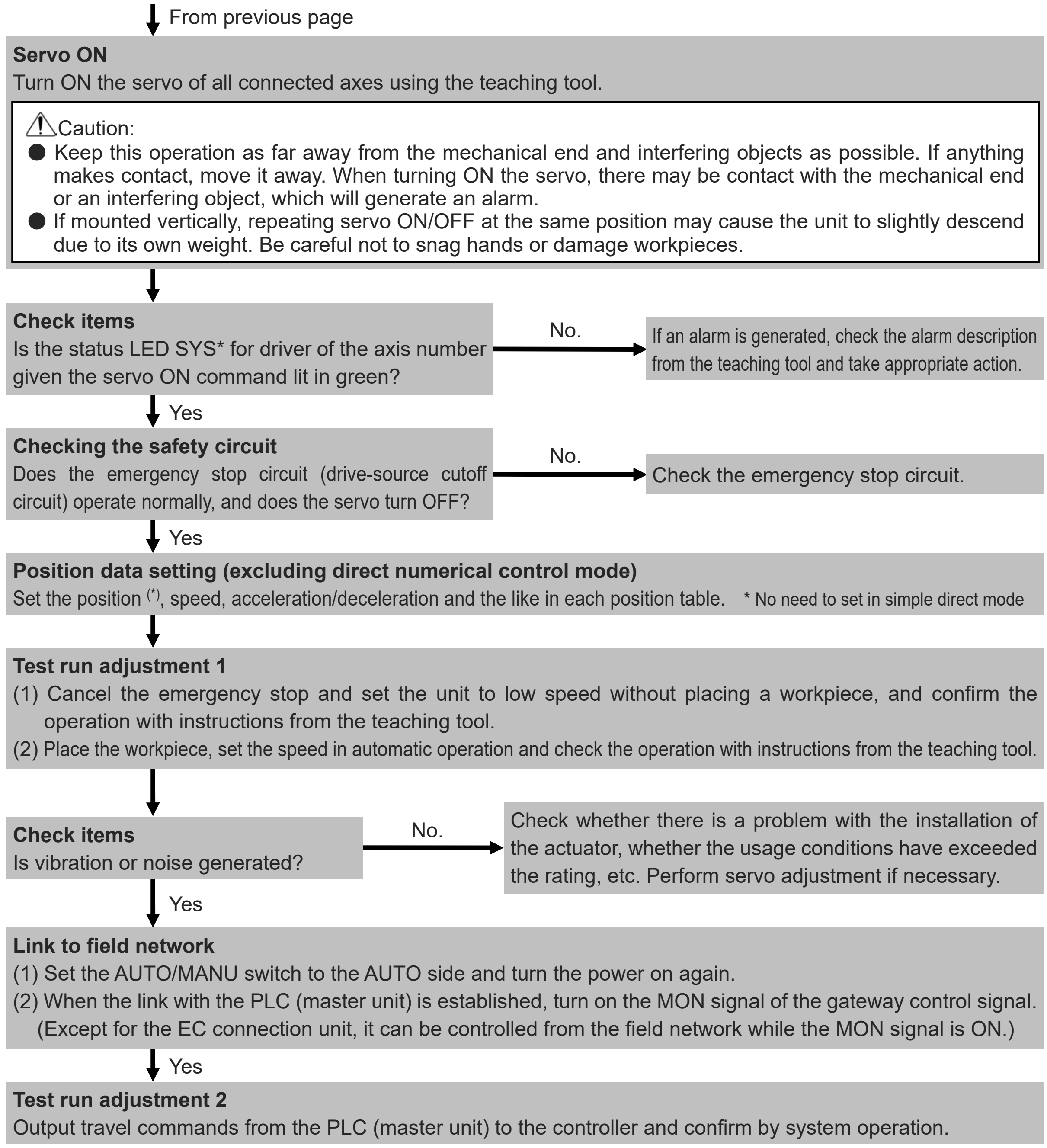
Confirming that communication is established
- Make sure that communication is established, with the gateway unit LED.
- Make sure that communication is also established on the PLC (master unit).
  * Refer to the PLC instruction manual.

Check the cause of the error through the LEDs and the like and take appropriate actions. If the cause is unknown, try setting again from the beginning.

Checking the safety circuit
Confirm that the stop circuit (drive-source cutoff circuit) operates normally.

Check the circuit.

Communication is established and it is ready for operation.
Check the system operation and make adjustments.



From previous page

Servo ON
Turn ON the servo of all connected axes using the teaching tool.

⚠Caution:

- Keep this operation as far away from the mechanical end and interfering objects as possible. If anything makes contact, move it away. When turning ON the servo, there may be contact with the mechanical end or an interfering object, which will generate an alarm.
- If mounted vertically, repeating servo ON/OFF at the same position may cause the unit to slightly descend due to its own weight. Be careful not to snag hands or damage workpieces.

Check items
Is the status LED SYS* for driver of the axis number given the servo ON command lit in green?

No. → If an alarm is generated, check the alarm description from the teaching tool and take appropriate action.

Yes

Checking the safety circuit
Does the emergency stop circuit (drive-source cutoff circuit) operate normally, and does the servo turn OFF?

No. → Check the emergency stop circuit.

Yes

Position data setting (excluding direct numerical control mode)
Set the position (*), speed, acceleration/deceleration and the like in each position table. * No need to set in simple direct mode

Test run adjustment 1
(1) Cancel the emergency stop and set the unit to low speed without placing a workpiece, and confirm the operation with instructions from the teaching tool.
(2) Place the workpiece, set the speed in automatic operation and check the operation with instructions from the teaching tool.

Check items
Is vibration or noise generated?

No. → Check whether there is a problem with the installation of the actuator, whether the usage conditions have exceeded the rating, etc. Perform servo adjustment if necessary.

Yes

Link to field network
(1) Set the AUTO/MANU switch to the AUTO side and turn the power on again.
(2) When the link with the PLC (master unit) is established, turn on the MON signal of the gateway control signal.
(Except for the EC connection unit, it can be controlled from the field network while the MON signal is ON.)

Yes

Test run adjustment 2
Output travel commands from the PLC (master unit) to the controller and confirm by system operation.

Caution

- If the actual number of connected axes of the RCON system does not match the number of axes set and transferred in the gateway parameter configuration tool, the PC software cannot be connected.
- Set and transfer the gateway parameters suitably according to the actual unit configuration and the number of connected axes.

Startup
Section

Chapter 2

Mounting and Wiring

2.1 Installation

Requests/Precautions

In order to enhance the reliability of RCON and to fully utilize its functions, consider the following before installation.

[Installation Environment]

Usage is possible in environments of pollution degree 2[*1] or equivalent.

*1 Pollution degree 2: Environment in which generally only nonconductive pollution occurs, but temporary conductive pollution may occur due to condensation. (IEC60664-1)

Avoid the following locations for installation.

- Where the ambient temperature exceeds the range of 0 to 55°C
  (If there is no fan unit, derating is available.)
  For simple absolute units and SCON, where the ambient temperature exceeds the range of 0 to 40°C
- Where the temperature changes rapidly and condensation occurs
- Where the relative humidity exceeds the range of 5%RH to 85%RH
- Where the unit is exposed to odorous or combustible gases
- Where the unit is exposed to significant amounts of dust, salt or iron powder
- Where the unit is subject to direct vibration or impact
- Where the unit receives direct sunlight
- Where the unit may come in contact with water, oil or chemical spray
- Where vents are blocked [see the section for installation and noise countermeasures]

If the unit is used in any of the following locations, provide sufficient shielding measures:

- Where noise is generated due to static electricity, etc.
- Where there are strong electrical or magnetic fields
- Where mains or power lines pass nearby

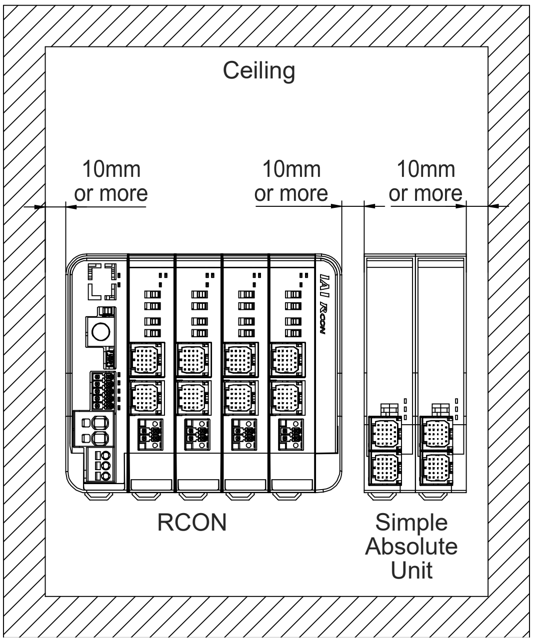
[Installation and mounting]

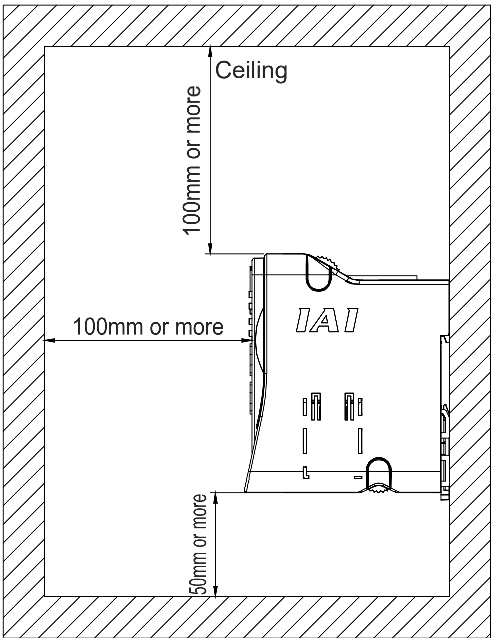
Consider the size of the control panel, placement of the RCON controller, cooling and the like when designing and manufacturing so that the ambient temperature is 0 to 55°C.
(If it has no fan unit, there is derating.)
When installing a simple absolute unit or SCON on the same control panel, design and manufacture so that the ambient temperature is 0 to 40°C.
In particular, the performance may deteriorate when the temperature around the simple absolute unit (battery) is too low or too high. Make sure that the temperature is as close to room temperature as possible. (The recommended temperature is about 20°C.)

Item	Specifications
Installation direction	Vertical mounting (exhaust side on top)
Installation method	DIN rail mounting
Installation conditions	See figure below

Item		Specifications
Ambient operating temperature	With fan unit	0 to 55°C
	Without fan unit	0 to 55°C (Note 1)
Ground		Class D grounding

Note 1: If there is no fan unit, derating is available.



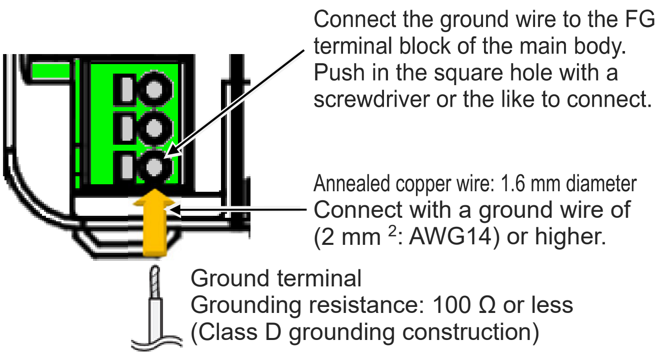


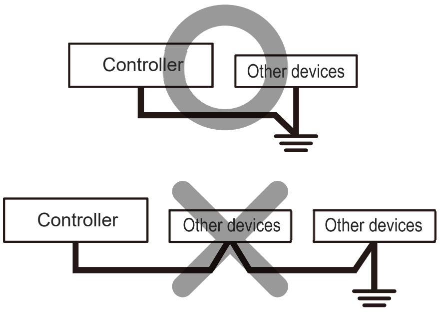
* Simple absolute units can be installed in close contact with each other.

[Noise countermeasures and mounting method]

(1) Grounding for noise countermeasures (frame ground)

[24V DC]

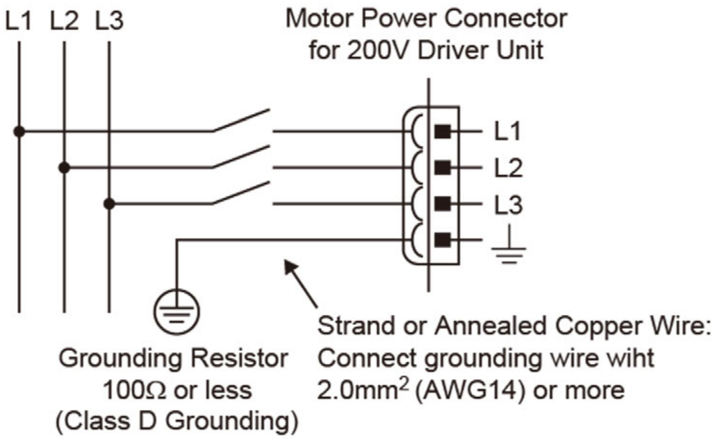




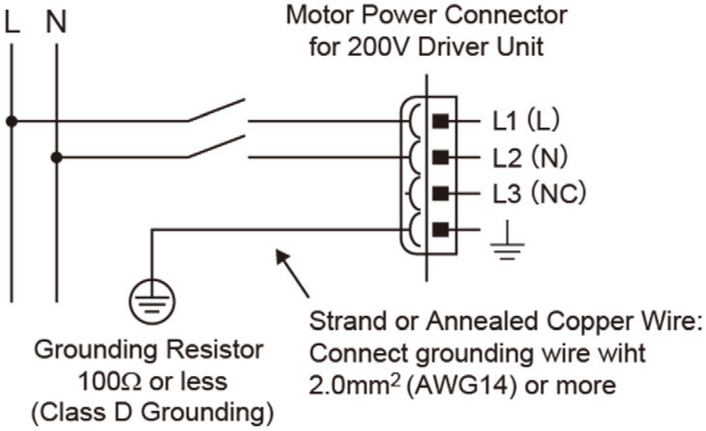
Grounding wires should not be connected in common with other devices and separate controllers should be grounded.

（2）Installation for Safety

[200V 3-Phase Type]



[200V Single-Phase Type]



(3) Notes on wiring method

1) Twist the power wiring.

2) Separate the wiring of signal wires and encoders from power supply lines and power lines.

(4) Noise sources and noise prevention

For the same power supply path and power supply device in the same device, take measures against noise.

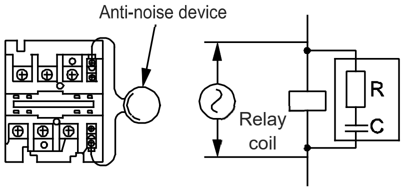
Countermeasure examples for noise sources are shown below.

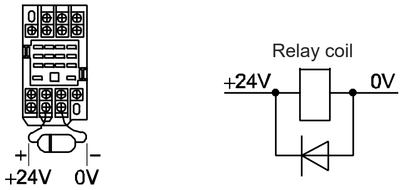
1) AC solenoid valve / magnetic switch / relay

[Measure] Install an anti-noise device in parallel with the coil.

2) DC solenoid valve / magnetic switch / relay

[Measure] Install a diode in parallel with the coil or use the diode built-in type.





Unit connection

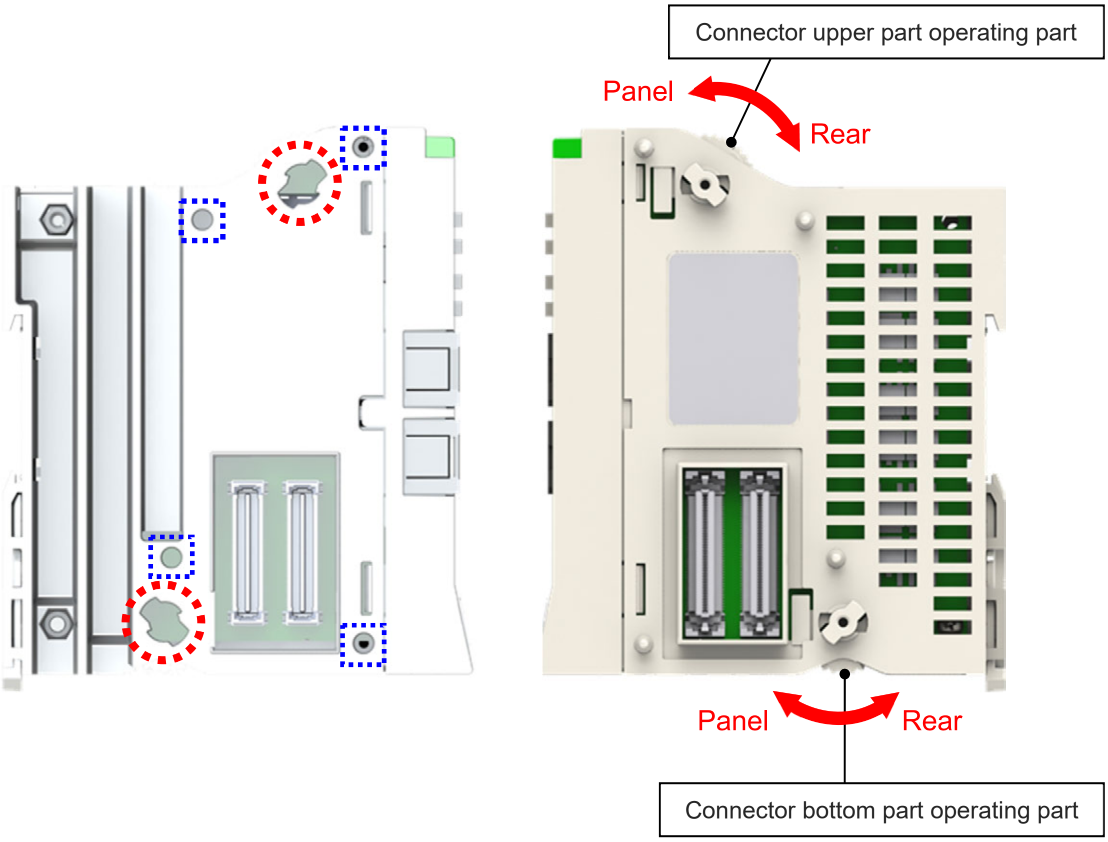
Connect the unit before mounting on a DIN rail.

(1) Turn the operating parts of the connector upper/bottom part towards the panel and position on the panel end.

(2) The 2 sections circled with a dashed line and the 4 positioning bosses within the square dotted lines are used as a total of 6 mating sections for positioning 2 units.

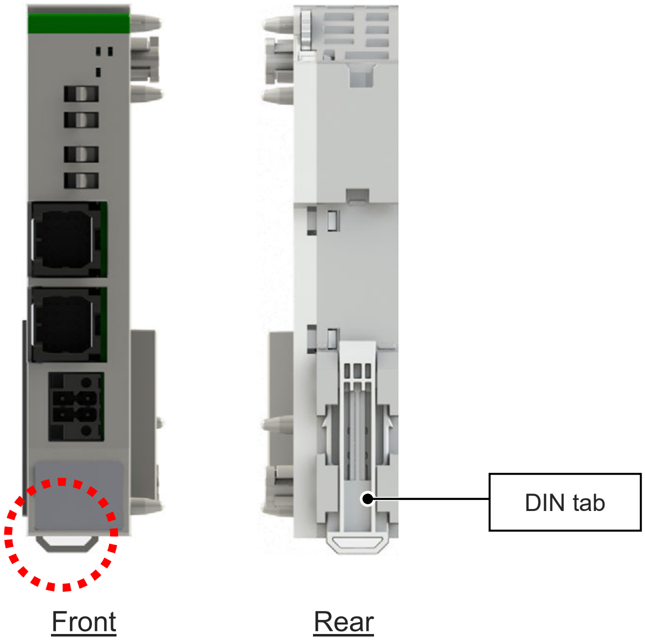
(3) When positioning is completed, insert the cable connectors x 2 so that they are firmly connected.

(4) Turn the operating parts of the connector upper/bottom part towards the rear, rotating firmly until you feel a click.



DIN rail mounting

Pull down the DIN tab visible from the lower part of the housing rear (circled in a dashed line in the figure below), mount on the DIN rail, then push the DIN operating part upward to lock it.



2.2 Wiring

Controller wiring

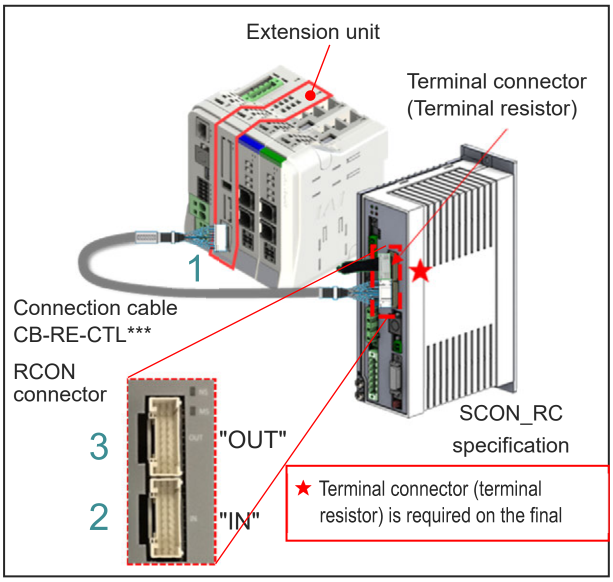
[Connection between SCON and expansion unit]

If including an expansion unit in the RCON system specification, be sure to connect with the following procedure.

1 Connect the cable to the expansion unit.

2 Insert the other end of the cable end connected to the expansion unit to the SCON "IN" side of the RCON cable connector.

3 Insert the terminal connector (terminal resistor) into the RCON connector on the SCON "OUT" side.



For the wiring of the SCON main body, refer to "SCON-CB/CGB controller manual (ME0340)".

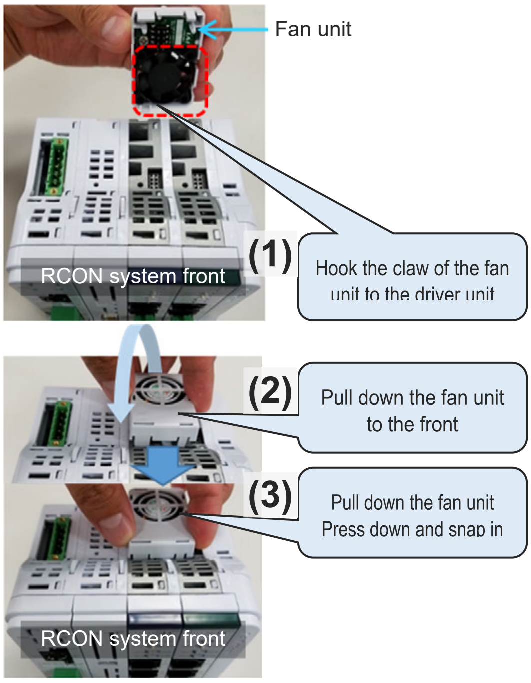
[When installing optional fan unit]

(1) Adjust the installation orientation of the RCON system and fan unit.

Hook the claw of the fan unit to the driver unit as shown in the figure on the right.

(2) Pull down the fan unit to the front of the RCON system.

(3) Press the fan unit from the top and snap in.



Shown below is an example for how to wire the power supply to a controller.
Refer to “Specifications Section Chapter 2.5 Connection Diagrams (Page A2-32)” for examples of wiring for the stop circuit and drive cutoff circuit.

[24V power supply wiring to RCON system]
To supply power to the RCON system, power supply wiring to the RCON gateway unit is required.
The example below shows the wiring of the RCON gateway unit and the IAI 24 VDC power supply unit PSA-24.

Items to prepare
RCON system/wiring

To supply power to the controller, mount the power connector and wire each terminal.
Perform 1 to 4 with reference to the figure and connection diagram below.

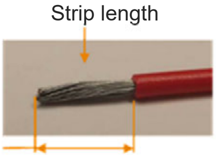
[Wiring method to 24V power connector]

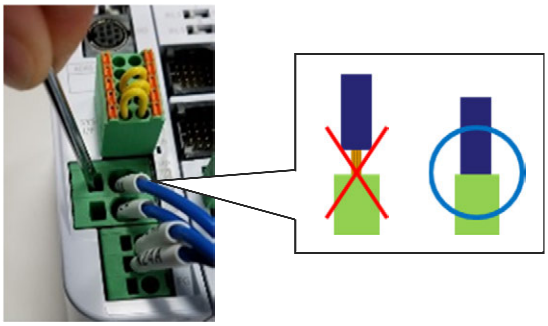
(1) Refer to the next page for each wiring diameter.

(2) The strip length of the wiring is
- MP: 15 mm
- CP: 10 mm

(3) Insert the wire all the way into the terminal port while pushing the flathead screwdriver into the hole next to the wire insertion port.

(4) Remove the screwdriver.



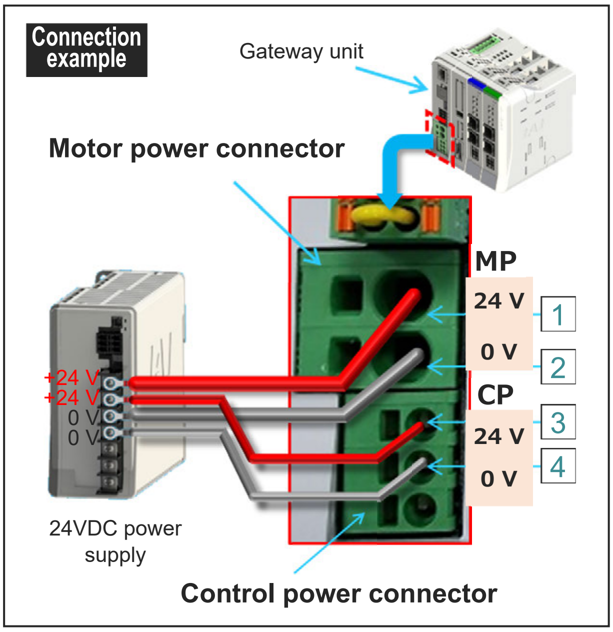


1 Connect the "24 V" of MP (motor power connector) to the +24 V terminal of the 24 VDC power supply.

2 Connect the "0 V" of MP (motor power connector) to the 0 V terminal of the 24 VDC power supply.

3 Connect the "24 V" of CP (control power connector) to the +24 V terminal of the 24 VDC power supply.

4 Connect the "0 V" of CP (control power connector) to the 0 V terminal of the 24 VDC power supply.



[Electric wire diameter used for RCON 24V power supply wiring]

For the wires to be connected to the power connector, use the following applicable wires.

Compatible wire

Signal name		Content	Compatible wire diameter
MP	24 V	Motor drive power supply	AWG20 ~ 8 (Copper wire)
	0 V		
CP	24 V	Control power input	AWG24 ~ 12 (Copper wire)
	0 V		
	FG	Frame ground	AWG14 ~ 12 (Copper wire)

* Use cables with their rated temperature on the isolation sheath at 60°C or higher.

The controller current consumption varies depending on the controller model and the motor type of the actuator to be connected. Refer to "Specifications Section Chapter 2, 2.3 Specifications/ Power supply capacity".

Caution

Using a cable with diameter less than the applicable cable diameter or wiring distance too long may cause an error due to the voltage drop or may drop the actuator performance.
In such a case, have the output voltage of the power supply adjusted to 24V for the controller supply voltage.

[200V Power Supply Wiring to RCON System]

In order to supply motor power to a 200V driver unit (RCON-SC), it is necessary to connect wires to the 200V power supply unit (RCON-PS2).

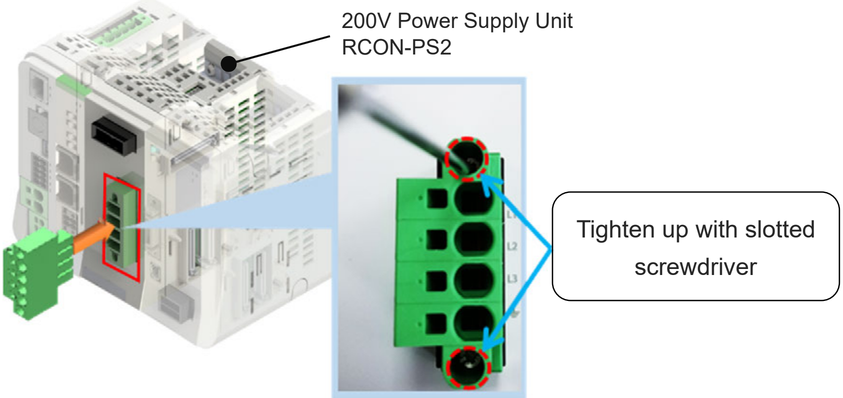
Items to Prepare

RCON System / Wire

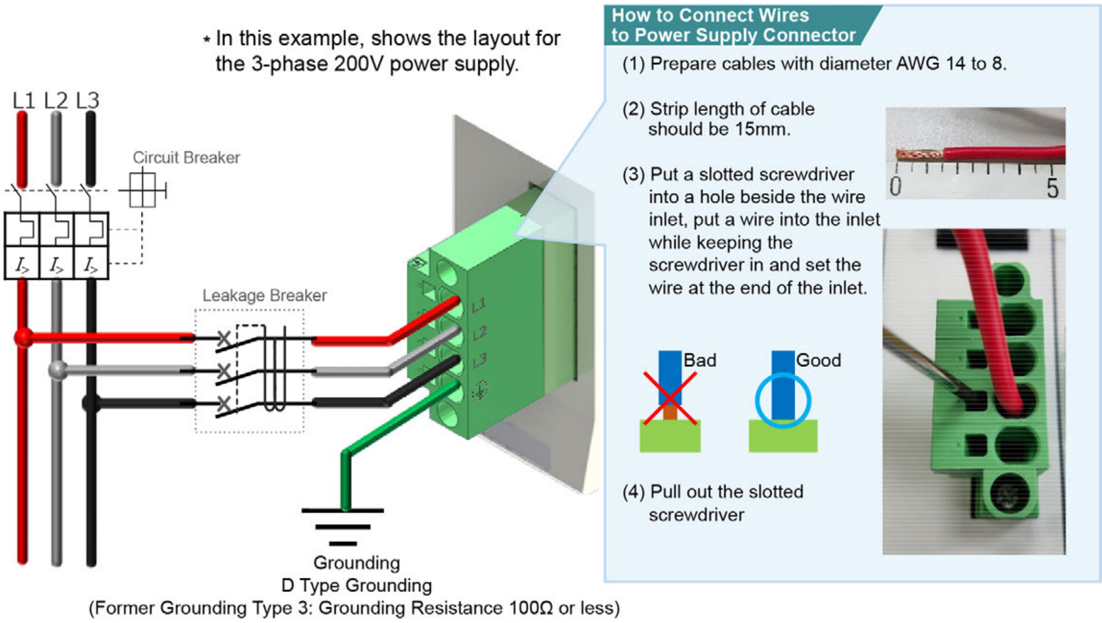
Join the power supply connector and connect wires to each terminal in order to supply motor power to the 200V driver unit. See the figure below and the following wiring diagram and have the processes in 1 to 2.

1 Insert the power supply connector to the 200V power supply unit (RCON-PS2).

Connector Model Code:
SPC5/4-STF-7.62



2 Connect wires to each terminal. See the example of connection below to have the wiring process.



How to Connect Wires to Power Supply Connector

(1) Prepare cables with diameter AWG 14 to 8.

(2) Strip length of cable should be 15mm.

(3) Put a slotted screwdriver into a hole beside the wire inlet, put a wire into the inlet while keeping the screwdriver in and set the wire at the end of the inlet.

(4) Pull out the slotted screwdriver

Refer to "Chapter 2, 2.1 Installation / How to Take Noise Countermeasures and Set up" for wiring of the single-phase 200V.

Caution

- The leakage current may vary depending on the connected motor capacity, cable length and other ambient environment. In case of leakage protection, measure the leakage current at the position to install a leakage breaker.
- A leakage breaker should be selected under a clear purpose such as protection from fire or protection for personnel. Select a leakage breaker applicable for higher harmonics (inverter).

[Electric wire diameter used for RCON 200V power supply wiring]

For the wires to be connected to the power connector, use the following applicable wires.

Compatible wire (3-Phase 200V)

Signal name		Description	Compatible wire diameter
L1	Phase 1	Motor drive power supply	AWG14～8 (Copper wire)
L2	Phase 2		
L3	Phase 3		
⏚	Protection grounding		

Compatible wire (Single-Phase 200V)

Signal name		Description	Compatible wire diameter
L1 (L)	Live	Motor drive power supply	AWG14～8 (Copper wire)
L2 (N)	Neutral		
L3 (NC)	No Connect		
⏚	Protection grounding		

* Use cables with their rated temperature on the isolation sheath at 60°C or higher.

The controller current consumption varies depending on the controller model and the motor type of the actuator to be connected. Refer to "Specifications Section Chapter 2, 2.3 Specifications/ Power supply capacity".

Caution

Use wires with diameter large enough for allowable current higher than the current actually used.

Smaller diameter of the cables than applicable could cause abnormal high heat when flowing current. This could melt the coating on cables and set a fire.

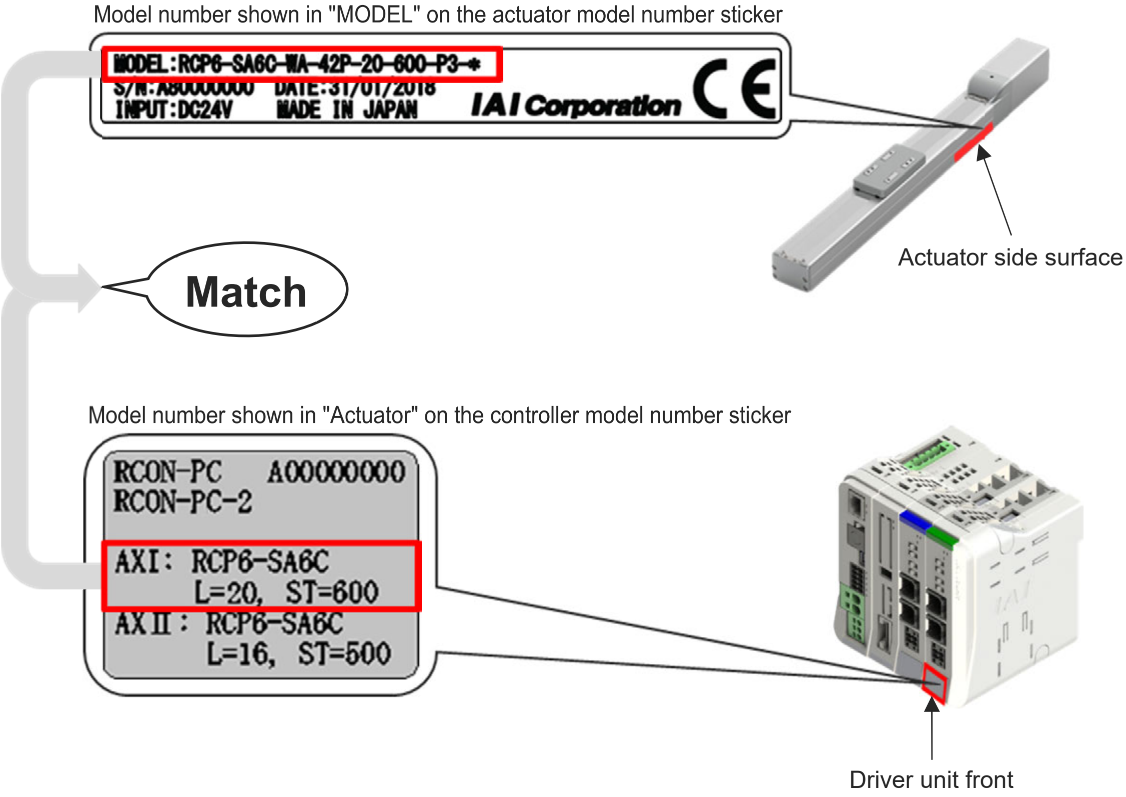
Actuator wiring

[Checking actuator and controller model numbers]

Before connecting the actuator, make sure that the combination with the controller is correct. Connectable actuator models are listed on the model number sticker on the left side of the controller.

Items to prepare

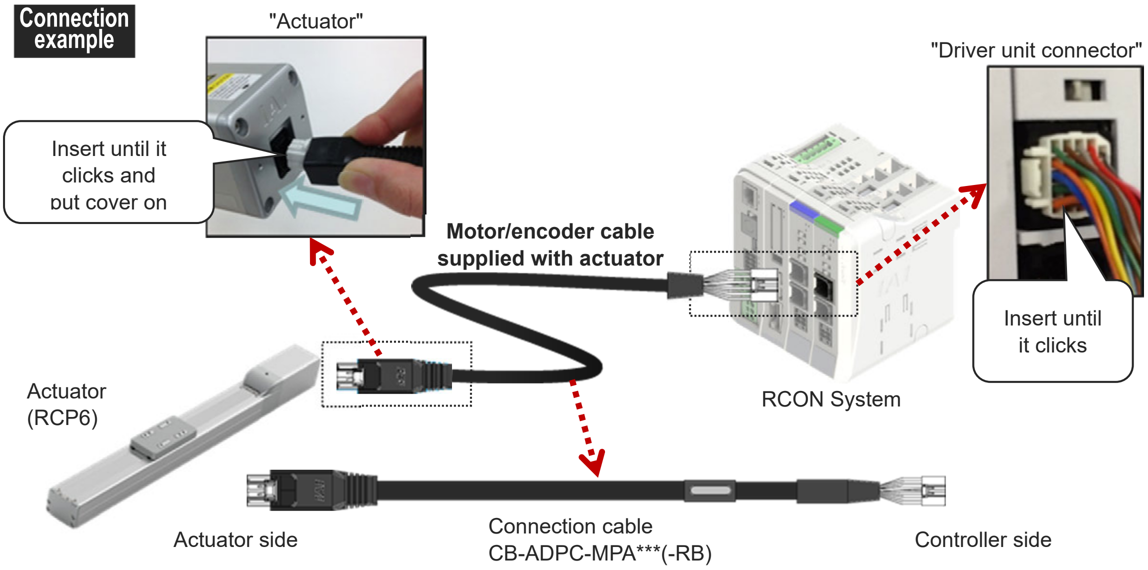
Controller/actuator/motor encoder cable



[Connecting motor/encoder cable]

- Connecting RCP6 (other than high thrust) / RCP5 (other than high thrust) / RCD series to RCON

Connection example

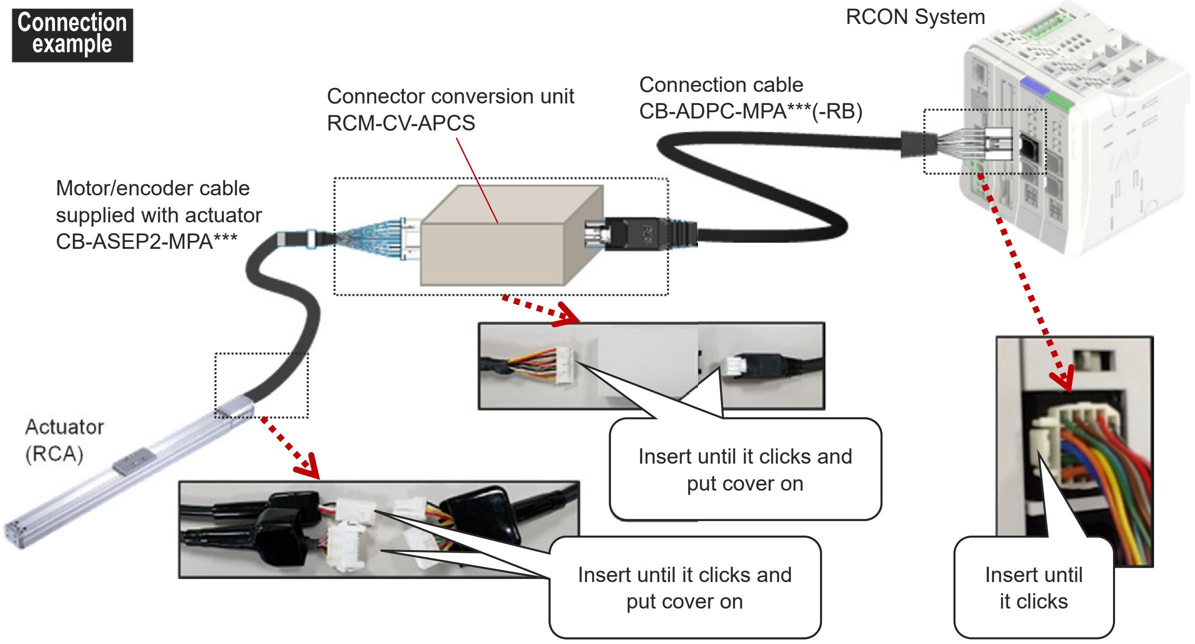


Caution

- Precautions when selecting a motor/encoder cable
  Depending on the actuator model, conversion cable CB-CAN-AJ002 and connector conversion unit RCM-CV-APCS may be required to connect the driver unit and the simple absolute unit.

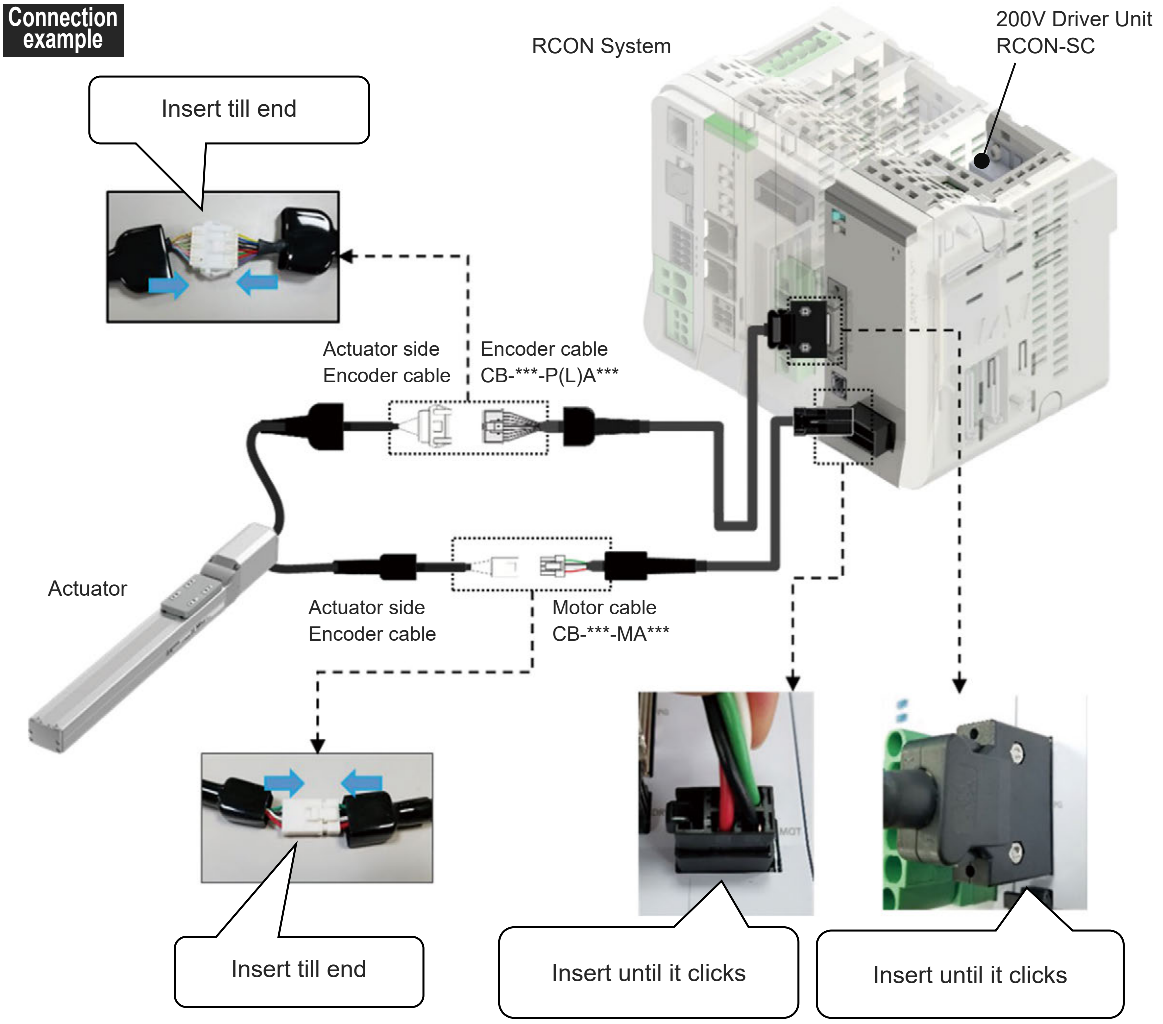
- Connecting RCON and RCP/RCA Series other than the above

Connection example



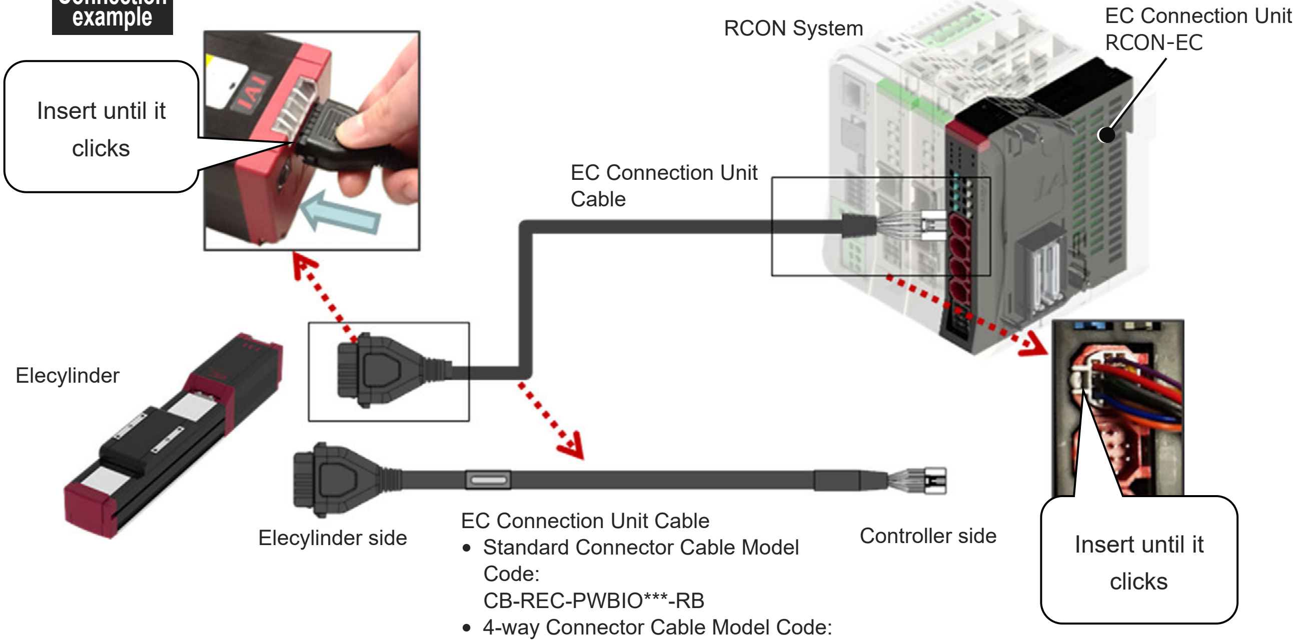
● Connection between 200V AC Servo-motor Actuator and 200V Driver Unit

Connection example



● Connection between ELECYLINDER and EC Connection Unit

Connection example



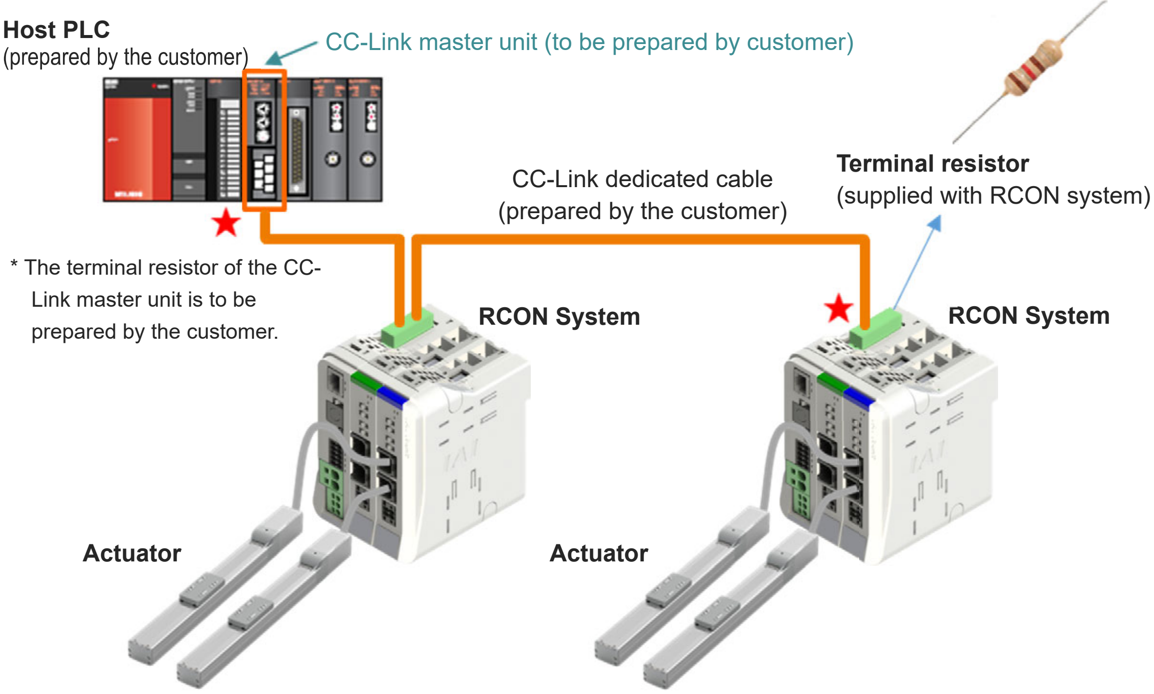
EC Connection Unit Cable
- Standard Connector Cable Model Code: CB-REC-PWBIO***-RB
- 4-way Connector Cable Model Code: CB-REC2-PWBIO***-RB

CC-Link wiring

This manual introduces the example of connecting with a CC-Link master unit with a Mitsubishi Electric PLC as the host PLC.

[Connecting the host PLC and two RCON systems]

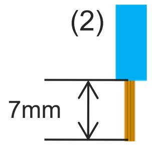
Connection example



* The terminal resistor of the CC-Link master unit is to be prepared by the customer.

[CC-Link dedicated cable and cable connector wiring method]

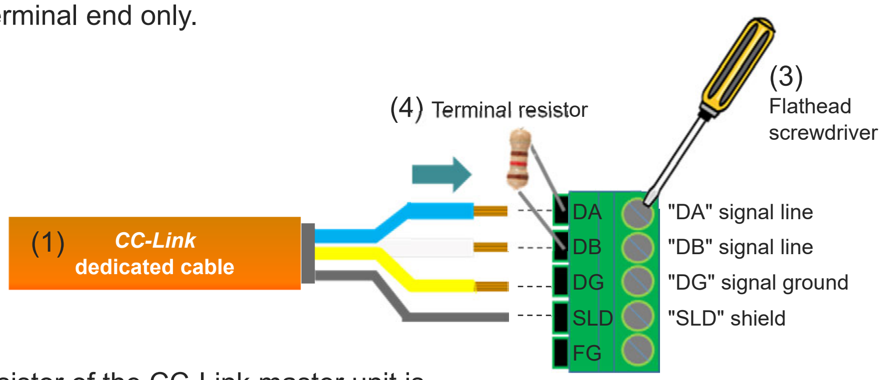
(1) Prepare a CC-Link dedicated cable.



(2) Strip 7mm of insulation from each wire end.

(3) Insert the stripped wiring in the direction of the arrow ➡ in the figure below to the back of the connector and tighten with a flathead screwdriver.

(4) (★ in "Connection image" above)
Attach the controller attached terminal resistor (Note 1) between the connectors DA and DB at the network terminal end only.



* The terminal resistor of the CC-Link master unit is to be prepared by the customer.

(5) Other CC-Link dedicated cables are wired in the same manner as in (1) to (4).

Point!

- The terminal resistor to be used may differ depending on the CC-Link dedicated cable type.
  Cable FANC-SBH (CC-Link dedicated high-performance cable): Terminal resistor: 130 Ω
  Cable FANC-SB (CC-Link dedicated cable): Terminal resistor: 110 Ω

Wiring for External Regenerative Resistor Unit

There is a built-in regenerative resistor of 60W equipped in 200V driver unit and 200V power supply unit.

The regenerative resistor is basically not necessary, but use this external regenerative resistor in case of shortage in regenerative resistor.

[External Regenerative Resistor Unit]

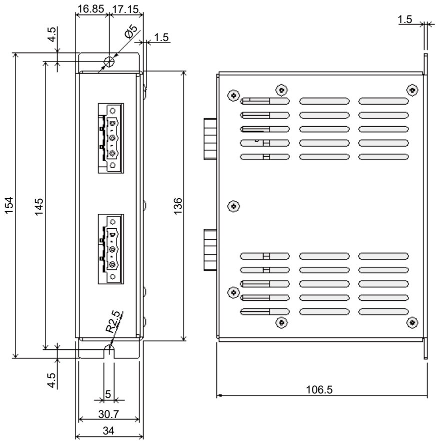
[Model, Accessories]

Item				Enclosed Items
Model	First Unit	Screw attachment small type	RESU-2	200V Driver Unit Connection Cable (Model code: CB-SC-REU010) 1m enclosed
		DIN rail attachment small type	RESUD-2	
	2nd unit or later	Screw attachment small type	RESU-1	Regenerative resistor unit connection cable (Model code: CB-ST-REU010) 1m enclosed
		DIN rail attachment small type	RESUD-1	

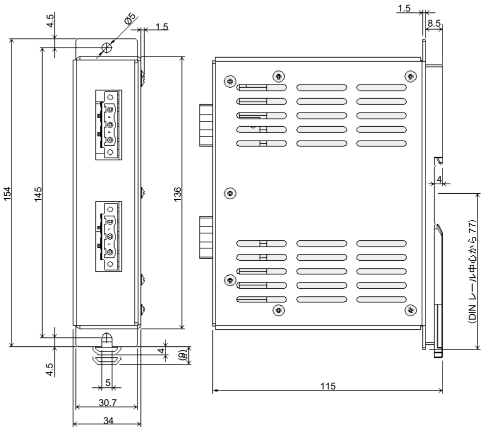
[Specification]

	RESU-1, RESU-2	RESUD-1, RESUD-2
Body Size [mm]	W34 × H154 × D106.5	W34 × H158 × D115
Body Mass	Approx. 0.4kg	
Internal Regenerative Resistor	235Ω 80W	

[Appearance]



RESU-1, RESU-2 (Screw attachment small type)



RESUD-1, RESUD-2 (DIN rail attachment small type)

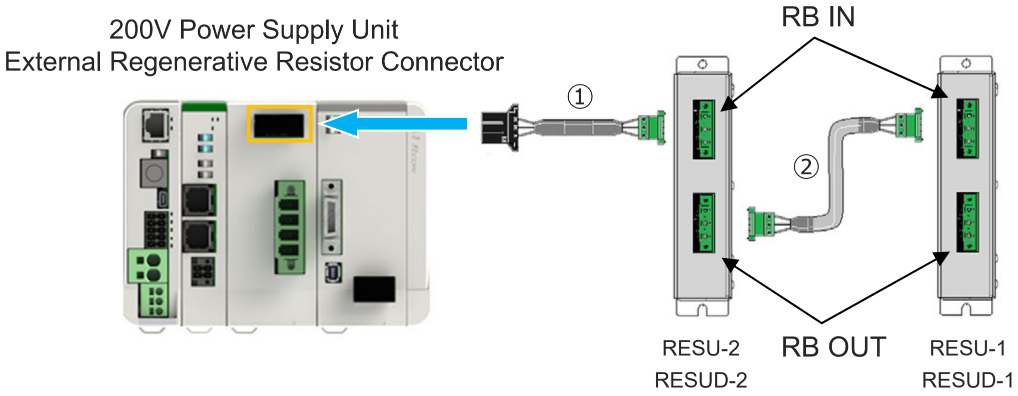
[Wiring for Regenerative Resistor Unit]

Connect the regenerative resistor units as shown in the figure below with using the cables enclosed to the regenerative resistor units.

(1) Connecting 1 Unit: Connect RESU(D)-2 with enclosed cable (CB-SC-REU)

(2) Connecting 2 or More: Connect RESU(D)-1 with enclosed cable (CB-ST-REU)

- Wiring Image



- External Regenerative Resistor Connector Specifications

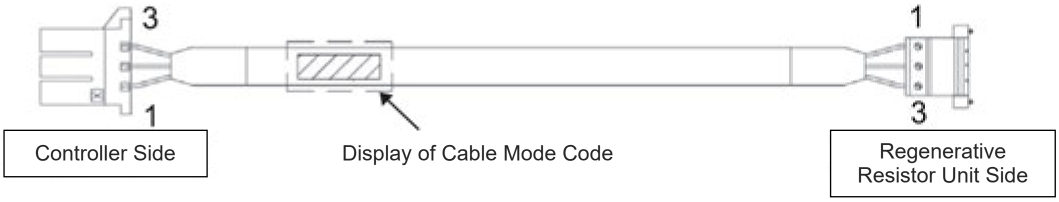
Item	Items and Model	
Connector Name	External Regenerative Resistor Connector (RB)	
Model	Controller side: 1-178138-5	Cable side: 1-178128-3

- Pin Assignment

Pin No.	Signal Name	Items	Applicable cable diameter
1	RB+	Regeneration Resistor + (Motor drive DC voltage)	Dedicated Cable Enclosed to Regenerative Resistor Unit
2	RB-	Regeneration Resistor -	
3	PE	Ground Terminal	

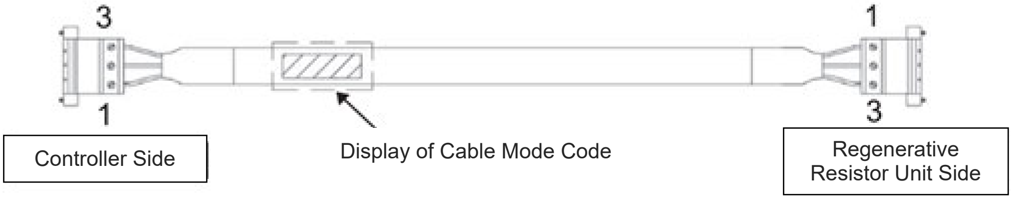
(1) 200V Driver Unit Connection Cable (CB-SC-REU□□□)

□□□ indicates the cable length   (Example) 010 = 1m



(2) Regenerative Resistor Unit Connection Cable (CB-ST-REU□□□)

□□□ indicates the cable length   (Example) 010 = 1m



Wiring	Color	Signal	No.
KIV 1.0mm² (AWG17)	Light Blue	RB+	1
	Brown	RB-	2
	Green/Yellow	PE	3

No.	Signal	Color	Wiring
1	RB+	Light Blue	KIV 1.0mm² (AWG17)
2	RB-	Brown	
3	PE	Green/Yellow	

Startup Section

Chapter 3

Absolute Reset

3.1 Absolute Reset

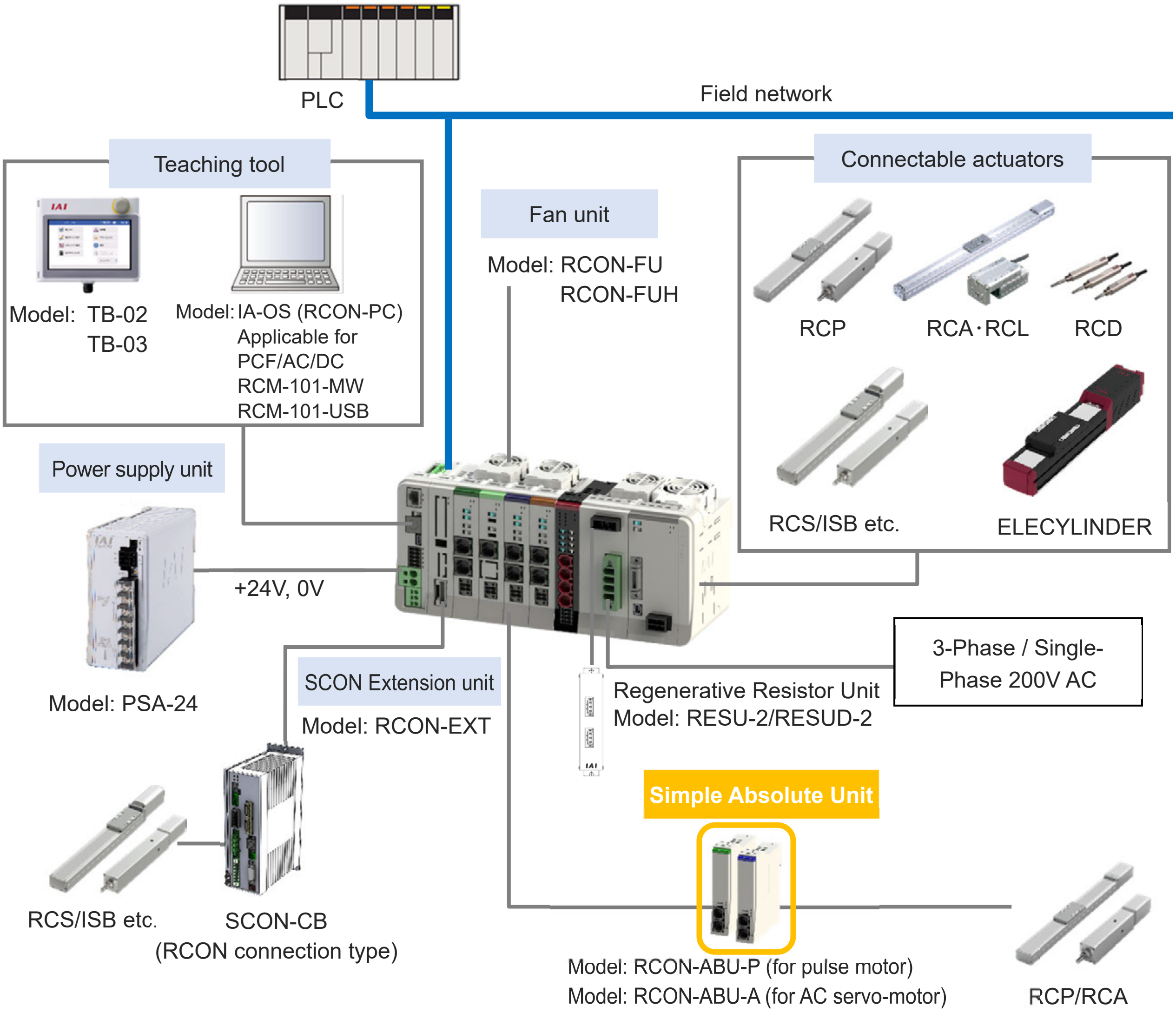
Overview

Incremental specification actuators can be used as absolute specification models by adding a simple absolute unit to the driver unit. (Note)

After absolute reset, home return motion is not required even if turning the control power supply OFF and then ON again.

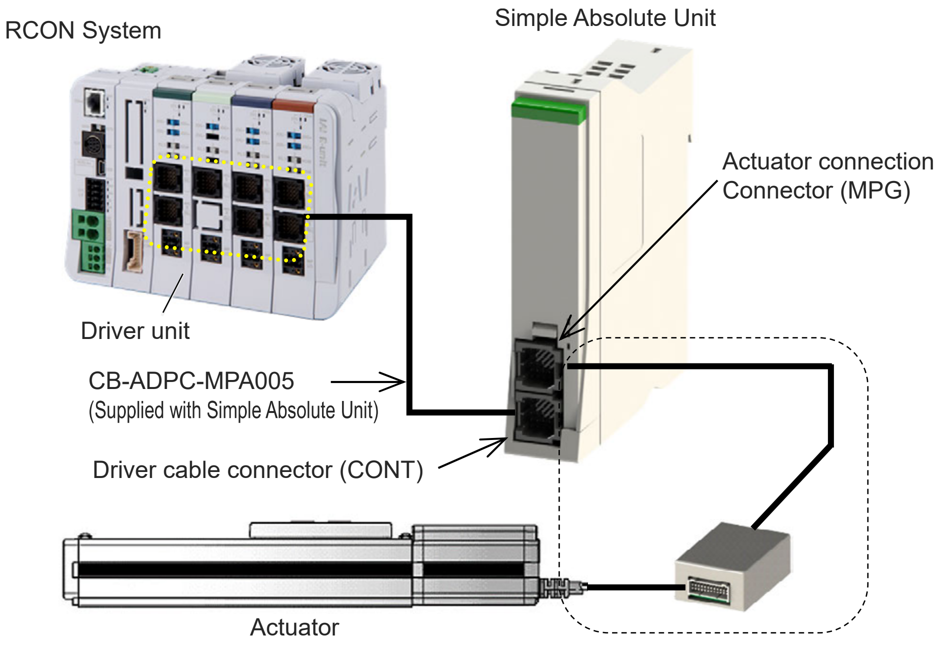
Note: The driver units applicable for the simple absolute unit are as follows:

- Stepper motor specification (RCON-PC)
- 24V AC servo motor specification (RCON-AC)



3.2 Simple Absolute Unit Wiring

When using a simple absolute unit, perform wiring as shown below.
1 simple absolute unit is required for each actuator.



For the wiring of this section, refer to the RCON connection cable list on the next page.

RCON Connection Cable List (RCP/RCA series)

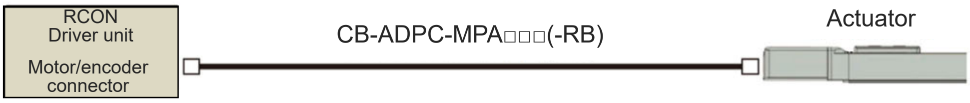
No.	Actuator		Applicable controller code	RCON connection cable (Note 2) (-RB: Robot cable) [Each actuator connection cable]	Conversion unit	Wiring diagram
	Series	Target type				
(3)	RCP4 RCP4CR RCP4W	Gripper (GR*), ST4525E, SA3/RA3	P5	CB-ADPC-MPA□□□(-RB)	-	**A**
(4)		High thrust type (Note 1)	P6	CB-ADPC-MPA□□□(-RB) CB-CAN-AJ002 (conversion cable)	-	**B**
(5)		Other than (3), (4)	P5	CB-ADPC-MPA□□□(-RB) CB-CAN-AJ002 (conversion cable)	-	**B**
(6)	RCP3		P5	CB-RCAPC-MPA□□□(-RB)	-	**C**
(7)	RCP2 RCP2CR RCP2W	RCP2 (standard type) Rotary compact type RCP2-RTBS/RTBSL/RTCS/RTCSL	P5	CB-ADPC-MPA□□□(-RB) [CB-RPSEP-MPA□□□]	Required	**D**
(8)		RCP2CR (clean room type), RCP2W (dust-proof/splash-proof type) Rotary (RT*) of above types GRS/GRM/GR3SS/GR3SM of above types	P5	CB-ADPC-MPA□□□-RB	-	**A**
(9)		All (standard / clean room / dust-proof/splash-proof) types of GRSS/GRLS/GRST/GRHM/GRHB Short type (RCP2 only) RCP2-SRA4R/SRGS4R/SRGD4R	P5	CB-RCAPC-MPA□□□(-RB)	-	**C**
(10)		High thrust type (Note 1)	P6	CB-ADPC-MPA□□□(-RB) [CB-CFA-MPA□□□(-RB)]	Required	**D**
(11)		Other than (7) to (10)	P5	CB-ADPC-MPA□□□(-RB) [CB-PSEP-MPA□□□]	Required	**D**
(12)	RCA2/RCA2CR/RCA2W, RCL		A6	CB-RCAPC-MPA□□□(-RB)	-	**C**
(13)	RCA2/RCA2CR/RCA2W (CNS option)		A6	CB-ADPC-MPA□□□(-RB)	-	**A**
(14)	RCA RCACR RCAW	Short type (RCA only) RCA-SRA4R/SRGS4R/SRGD4R	A6	CB-RCAPC-MPA□□□(-RB)	-	**C**
(15)		Other than (14)	A6	CB-ADPC-MPA□□□(-RB) [CB-ASEP2-MPA□□□]	Required	**D**

Note 1: Actuators using high-thrust pulse motor (56SP, 60P and 86P)

Note 2: Up to 20 m from each driver unit to the actuator, with or without the conversion unit.

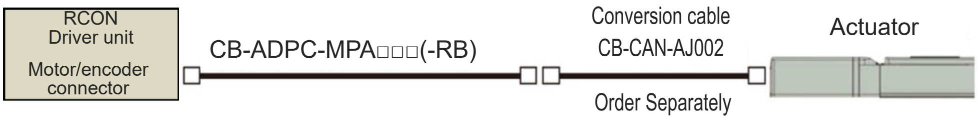
Wiring diagram A

(3) RCP4 Gripper (GR*), ST4525E, SA3/RA3
(8) RCP2CR/RCP2W rotary (RT*) and GRS/GRM/GR3SS/GR3SM
(13) RCA2/RCA2CR/RCA2W (CNS option)



Wiring diagram B

(2) RCP6/RCP6CR/RCP6W/RCP5/RCP5W high thrust type (Note 1)
(4) RCP4/RCP4W high thrust type (Note 1)
(5) RCP4/RCP4CR/RCP4W (gripper, ST4525E, SA3/RA3, other than high thrust type (Note 1))

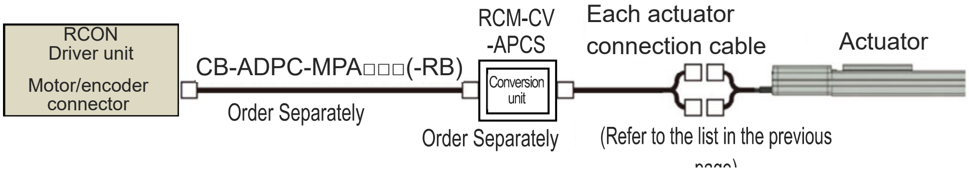


Wiring diagram C

(6) RCP3
(9) RCP2/RCP2CR/RCP2W-GRSS/GRLS/GRST/GRHM/GRHB,
RCP2-SRA4R/SRGS4R/SRGD4R
(12) RCA2/RCA2CR/RCA2W, RCL
(14) RCA short type (RCA-SRA4R/SRGS4R/SRGD4R)

Wiring diagram D

(7) RCP2-RTBS/RTBSL/RTCS/RTCSL
(10) RCP2/RCP2CR/RCP2W high thrust type (Note 1)
(11) RCP2/RCP2CR/RCP2W, excluding some (Refer to the list in the previous page for details)
(15) RCA/RCACR/RCAW (other than RCA-SRA4R/SRGS4R/SRGD4R)



Note 1: Actuators using high-thrust pulse motor (56SP, 60P and 86P)

3.3 Parameter Setting

In the RCON system, the factory default setting of the parameter No. 83 "Absolute unit" is "0". For an axis connected with the simple absolute unit and used in the simple absolute type, change the parameter to "1" in the teaching tool.

24V AC servo motor specification and stepper motor specification only

[Absolute Unit (Parameter No.83)]

No.	Name	Unit	Input range	Default initial value setting
83	Absolute Unit	–	0: Not in use 1: In use	0

For stepper motor specification

Set 1 for simple absolute specification.
For the battery-less absolute specification, the factory default value is 1. Change the setting to 0 when using in incremental specification.

For 24V AC servo motor specification

Set 1 for simple absolute specification.
Battery-less absolute specification cannot be used in incremental specification.

For the PC software, the parameter changes automatically when connected to RCON.

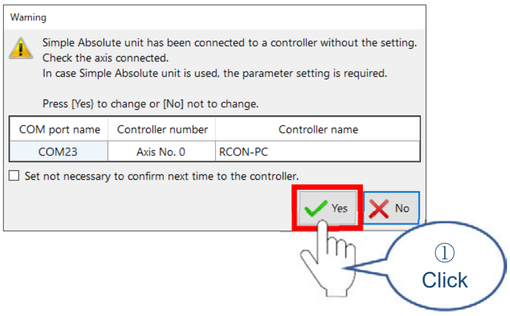
Stated in the following page is how to change settings for IA-OS.

[How to Change to Simple Absolute Type in IA-OS (Parameter Setting)]

[Refer to Fast Step Guide (ME0391) for how to install the PC teaching software IA-OS]

1 In case the change to the single absolute type is not conducted, the following Warning screen should appear after starting up IA-OS and connecting to RCON. Click ✓ Yes .

Warning screen



Warning

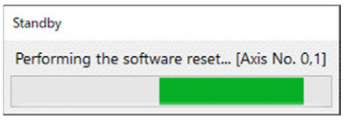
Simple Absolute unit has been connected to a controller without the setting.
Check the axis connected.
In case Simple Absolute unit is used, the parameter setting is required.

Press [Yes} to change or [No] not to change.

COM port name	Controller number	Controller name
COM23	Axis No. 0	RCON-PC

☐ Set not necessary to confirm next time to the controller.

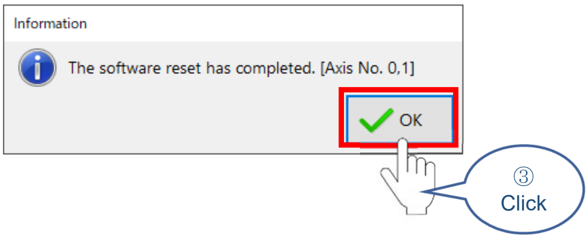
2 Wait till the software reset finishes.



Standby

Performing the software reset... [Axis No. 0,1]

3 Click ✓ OK .

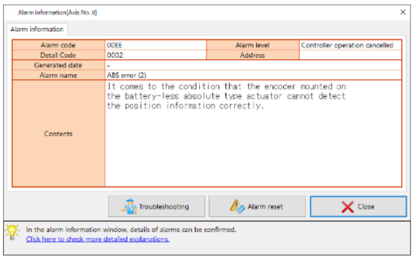


Information

The software reset has completed. [Axis No. 0,1]

4 Alarm Information screen should show up. Click ✕ Close here.

Alarm Information screen



Alarm information[Axis No. 0]

Alarm information

Alarm code	00EE	Alarm level	Controller operation cancelled
Detail Code	0002	Address	
Generated date	-		
Alarm name	ABS error (2)		
Contents	It comes to the condition that the encoder mounted on the battery-less absolute type actuator cannot detect the position information correctly.		

In the alarm information window, details of alarms can be confirmed.
Click here to check more detailed explanations.

Now, it is the end of the parameter setting.

Next, follow the procBedures described in [3.4 Absolute Reset Procedure] to conduct the absolute reset.

3.4 Absolute Reset Procedure

The simple absolute specification and battery-less absolute specification retain the encoder position information even when the power is turned off. With these specifications, there is no need to perform home return every time at startup.

For simple absolute specification, home must be registered (absolute reset) in the following cases (1) to (3).

(1) Initial startup

(2) When the power of RCON system is turned off and the battery of the simple absolute unit is replaced

(3) When the motor/encoder cable is removed from the simple absolute unit

For battery-less absolute specification, home must be registered in the following cases (1) and (2).

(1) When replacing motor

(2) When absolute error occurs

Absolute reset is performed by operating a teaching tool such as PC software or issuing a command from the host PLC. Each procedure is shown below.

[Absolute reset procedure from teaching tool]

(1) Connect the driver unit and actuator.

(2) For the simple absolute specification, connect the simple absolute unit between the driver unit and actuator.

(3) Connect the teaching tool and turn on the RCON system power.

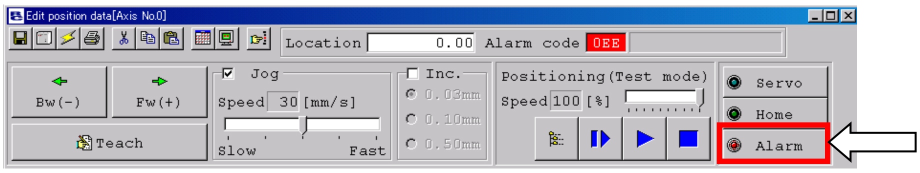
(4) When absolute encoder error is displayed on the teaching tool, reset the alarm.

(5) Perform home return. When home return is completed, the home position is memorized at the same time as it is established.

Each procedure by teaching tool is shown below

[For PC software (RCM-101-*-*)]

1 Select the position data from the main screen and press the Alarm button.

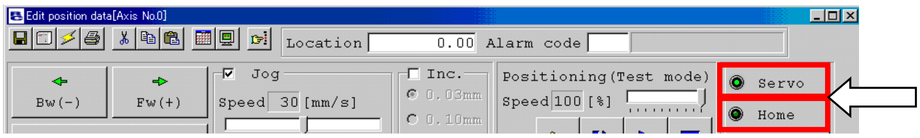


Location 0.00 Alarm code 0EE

Speed 30 [mm/s]

Speed 100 [%]

2 After turning the servo ON with the Servo button, press the Home button.



Location 0.00 Alarm code

Speed 30 [mm/s]

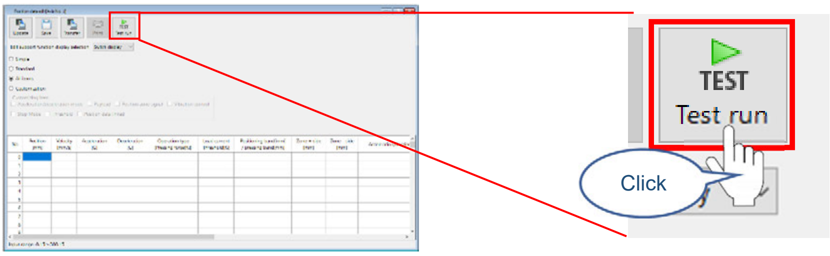
Speed 100 [%]

[For PC Teaching Software (IA-OS)]

[Refer to Fast Step Guide (ME0391) for how to install the PC teaching software IA-OS]

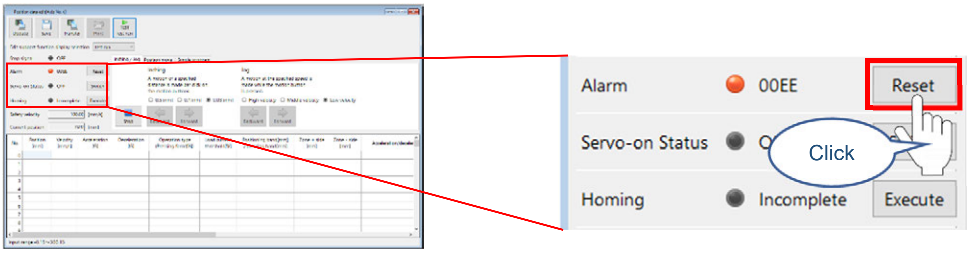
1 Open Position data edit screen and click TEST Test run.

Position data edit screen



2 Click Reset located on the right of "Alarm" in Position data edit screen.

Position data edit screen

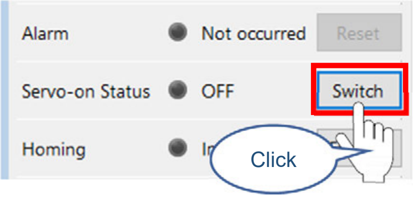

Alarm ● 00EE Reset

Servo-on Status ● O

Homing ● Incomplete Execute

3 The alarm should be reset.

Click Switch located on the right of "Servo-on Status".


Alarm ● Not occurred Reset

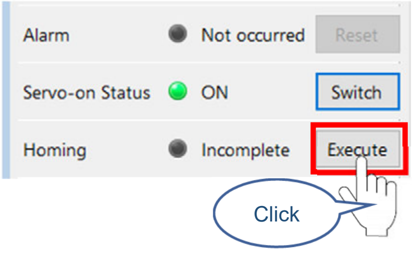
Servo-on Status ● OFF Switch

Homing ● In

4 The servo on the actuator should turn on.

(The lamp at Servo-on Status should turn on in "green".)

Click Execute located on the right of "Homing".


Alarm ● Not occurred Reset

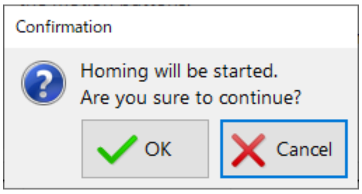
Servo-on Status ● ON Switch

Homing ● Incomplete Execute

5 The confirmation screen for the home-return operation should be displayed.

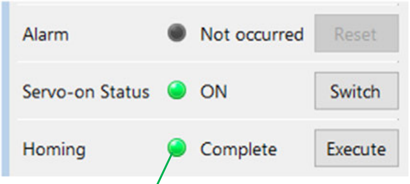
Click ✓ OK.

The actuator should start the home-return operation.


Confirmation

Homing will be started.
Are you sure to continue?

6 The lamp at Homing Complete should turn on in "green" once the actuator completes the home-return operation in the normal condition.


Alarm ● Not occurred Reset

Servo-on Status ● ON Switch

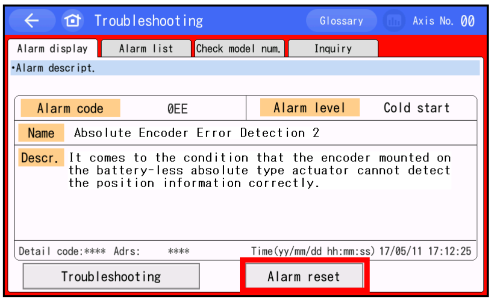
Homing ● Complete Execute

Turns on in green

Home-return operation completed

[For teaching pendant (TB-02/TB-03)]

1 Touch [Alarm reset] .



Alarm code 0EE

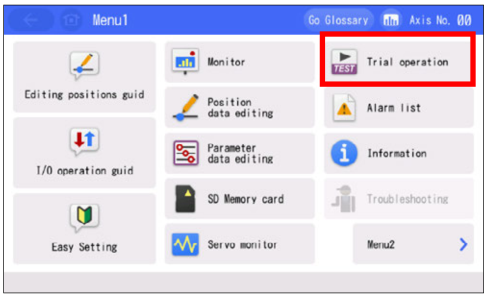
Alarm level Cold start

Name Absolute Encoder Error Detection 2

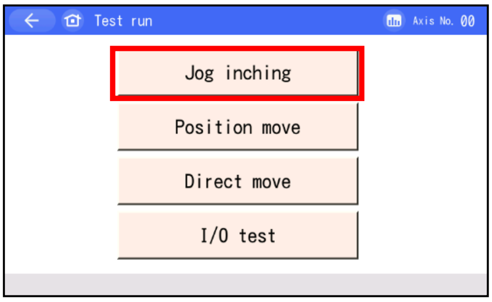
Descr. It comes to the condition that the encoder mounted on the battery-less absolute type actuator cannot detect the position information correctly.

Detail code:**** Adrs: **** Time(yy/mm/dd hh:mm:ss) 17/05/11 17:12:25

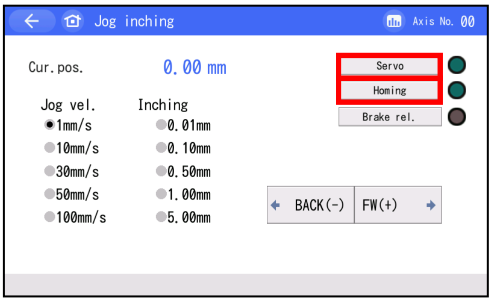
2 Touch [Trial operation] on the Menu 1 screen.



3 On the test run screen, touch [Jog inching] .



4 On the jog/inching screen, turn the servo on by touching [Servo] , then touch [Homing] .



Cur. pos. 0.00 mm

[When performing absolute reset from host]

Perform the following procedure.

(1) Supply the control power and motor power (24V DC).

(2) Turn on the STOP signal input to cancel the drive shutoff status and set to conductive status.

(3) Confirm that the absolute encoder error alarm is output.
(Confirm that the alarm signal “ALM” is ON.)

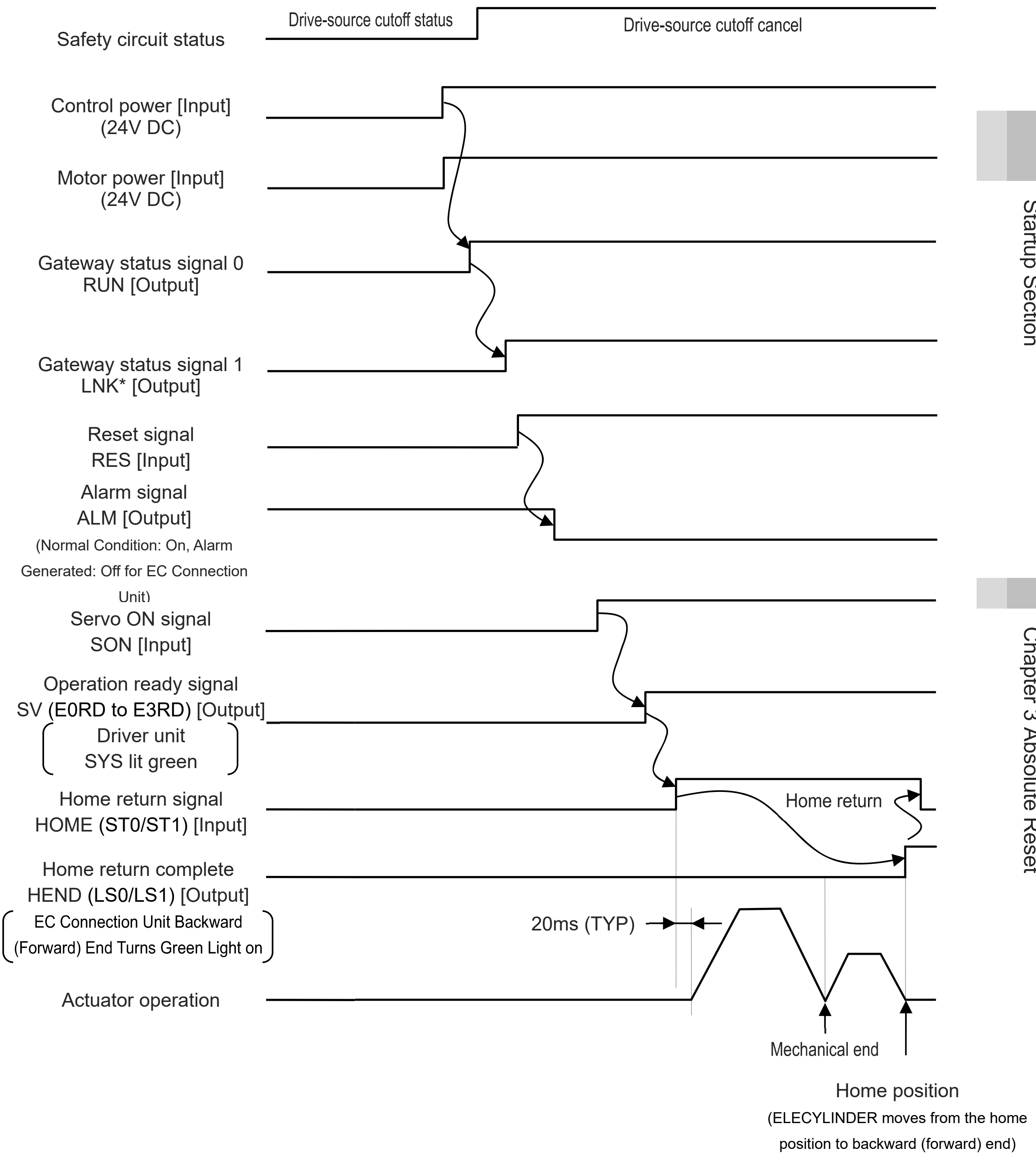
(4) Input the reset signal “RES” and reset the alarm.
The RES signal is processed with ON edge, but if the cause of the other alarm is not removed, the alarm (ALM signal ON) will recur. Check the causes of the other alarms and take appropriate actions.

(5) After confirming that the ALM signal is OFF, input the servo ON signal “SON”.

(6) After confirming that the operation ready signal “SV” is ON, input the home return signal “HOME”. Home return motion begins. When home return is completed, the home return complete signal HEND is output.
For the EC connection unit, confirm that the gateway status signal 0 "RUN" and operation standby complete signals "E0RD" to "E3RD" are turned on, and then input either forward or backward signal "ST0/ST1". The home-return operation starts. Once the home-return operation ends and moved to the backward (or forward) end, the forward/backward signal "LS0/LS1" should be output.

Note: For the EC connection unit, the alarm signal "*ALM" turns on in normal condition and turns off when an alarm is generated.
Also, there is no "LNK*" or "SON" signal for the EC connection unit.

Once the power is supplied, the servo on ELECYLINDER automatically turns on.


Drive-source cutoff status
Drive-source cutoff cancel
Safety circuit status
Control power [Input]
(24V DC)
Motor power [Input]
(24V DC)
Gateway status signal 0
RUN [Output]
Gateway status signal 1
LNK* [Output]
Reset signal
RES [Input]
Alarm signal
ALM [Output]
(Normal Condition: On, Alarm Generated: Off for EC Connection Unit)
Servo ON signal
SON [Input]
Operation ready signal
SV (E0RD to E3RD) [Output]
Driver unit
SYS lit green
Home return signal
HOME (ST0/ST1) [Input]
Home return
Home return complete
HEND (LS0/LS1) [Output]
EC Connection Unit Backward
(Forward) End Turns Green Light on
20ms (TYP)
Actuator operation
Mechanical end
Home position
(ELECYLINDER moves from the home position to backward (forward) end)

3.5 Absolute Battery

[Absolute Battery Specifications]

Item	Specifications
Type	Cylindrical sealed nickel-metal hydride battery
Manufacturer	FDK Corporation
Model	AB-7
Nominal voltage	3.6 V
Rated capacity	3,100 mAh
Nominal capacity	3,700 mAh
Average life	Approx. 3 years (varies widely with operating conditions)
Weight	190 g
Charging time	Approx. 72 hours

[Absolute Battery Charging]

Charge for at least 72 hours continuously if using for the first time, after replacing the battery, and when power has been turned off for extended periods. The battery is charged while 24 VDC is supplied to RCON.

If RCON power is turned OFF beyond the data retention time, the data will be lost, so charge regularly.
The battery has a limited lifetime that gradually decreases data retention time. Replace the battery when the retention time decreases significantly even if properly charged.

Refer to “Specifications Section Chapter 7, 7.4 General Specifications [How to Replace Absolute Battery] (page A7-8)” for how to replace the absolute battery.

Data retention time (approximate time when battery is new)

Parameter No.155 settings	Upper limit of encoder rotation speed when power is OFF [r/min]		Battery retaining time guideline [days]	Retaining time per 1 hour of charge time (guideline) [h]
	If connected actuator is not RCA2-***NA	If connected actuator is RCA2-***NA		
0	100	75	20	6.6
1	200	150	15	5.0
2	400	300	10	3.3
3	800	600	5	1.6

For details, refer to [Startup Section Chapter 6, 6.1 Parameter (page B6-48)].

(Example) When used under the following conditions: "Monday ~ Friday: 8 hours charging / 16 hours discharging per day, Saturdays and Sundays: discharging"
Connected axis: When not RCA2-***NA

(1) If Parameter No. 155 is set to 3...

Total charge: 8 [h] operation per day x 1.6 [h] retention time per 1 hour charge x 5 [days] weekdays = 64 [h]

Total discharge: Nightly down time 16 [h] x weekdays 5 [days] + weekend down time 48 [h] = 128 [h]

→ If starting on Monday from a fully charged state, the total discharge amount exceeds the total charge amount by 64 [h] in one week, so the full charge amount decreases by 64 [h] each week. Accordingly, a full charge is required every 10 days.

(2) If Parameter No. 155 is set to 2...

Total charge: 8 [h] operation per day x 3.3 [h] retention time per 1 hour charge x 5 [days] weekdays = 132 [h]

Total discharge: Nightly down time 16 [h] x weekdays 5 [days] + weekend down time 48 [h] = 128 [h]

→ If starting on Monday, the total charge amount exceeds the total discharge amount, so there is no need to maintain continuous full charge. Charge increases by 4 [h] each week.

[Absolute Battery Voltage Drop Detection]

If the absolute battery voltage drops, error detection is performed in accordance with the voltage.

Voltage	Output signal status	Alarm code
2.5V ±8% or less	Alarm signal *ALM OFF	0EE "Absolute encoder error detection 2" or 0EF "Absolute encoder error detection 3"

If an alarm occurs, absolute reset must be performed after replacing the battery.
RCON checks the battery voltage at power ON. Detection does not occur even if the battery voltage drops to the alarm level while RCON is energized.

3.6 Precautions

[Precautions when changing parameters]

If the following parameters are changed, an absolute error will occur. After changing the parameters, absolute reset must be performed once again.

(1) Parameter No.5 "Homing direction"
(2) Parameter No. 22 "Homing offset"
(3) Parameter No. 77 "Ball screw lead length"
(4) Parameter No. 78 "Axis motion type"

[Absolute Battery handling]

Always observe the following safety precautions.

(1) Do not disassemble under any circumstances. The electrolyte is a strong alkali solution. It is harmful to skin and clothing.
(2) Never short the electrodes out (never directly connect + and - electrodes). Devices may be damaged, or the generated heat may cause burns.
(3) Never place into fire, as it may burst.
Also do not submerge underwater, as the battery will cease to function.
(4) Do not solder directly.
The safety mechanism may explode due to damage to the safety valve in the battery cap.
(5) If the power remains shut OFF for an extended period of time with the connector connected, deep discharge will take place, leakage may occur and the performance/life of the battery may be significantly lowered.
Unplug the connector when shutting OFF the power for extended periods of time due to equipment relocation, remodeling, etc.
(6) When disposing, take measures such as the use of an appropriate collection box installed at a recycling center.

Startup Section

Chapter 4

Network Configuration

4.1 How to Use the Gateway Parameter Configuration Tool

Installing

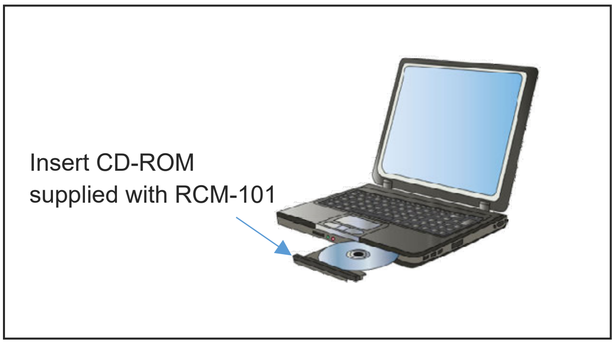
[Installing gateway parameter configuration tool]

Items to prepare

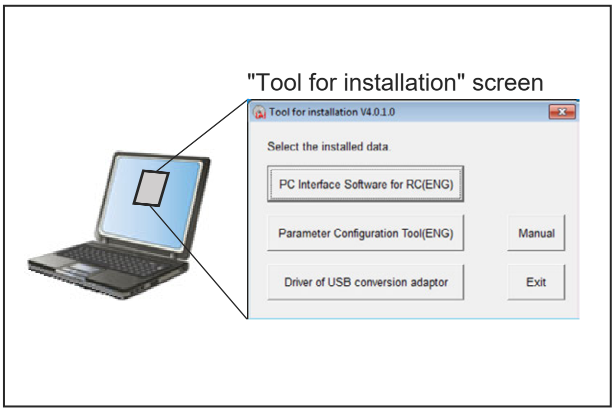
RCON system / PC / RCM-101 supplied CD-ROM / cable

This section describes the operating environment on a PC with Windows 7.

1 (1) Insert the CD-ROM supplied with RCM-101-USB into the CD drive of the PC.

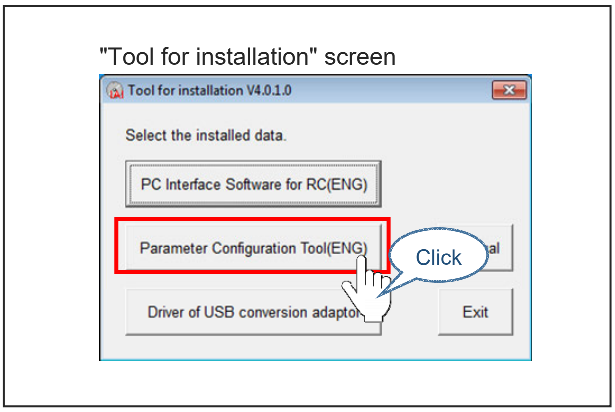


(2) The "Tool for installation" screen will be displayed.



Select the installed data.

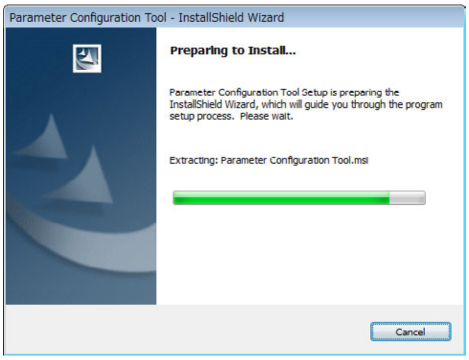
2 Click the "Tool for installation" screen Parameter Configuration Tool(ENG) .



Select the installed data.

3 (1) When installation preparation of the gateway parameter configuration tool is started, the "Parameter configuration tool InstallShield Wizard" screen will be displayed.

"Parameter configuration tool - InstallShield Wizard" screen


Parameter Configuration Tool - InstallShield Wizard

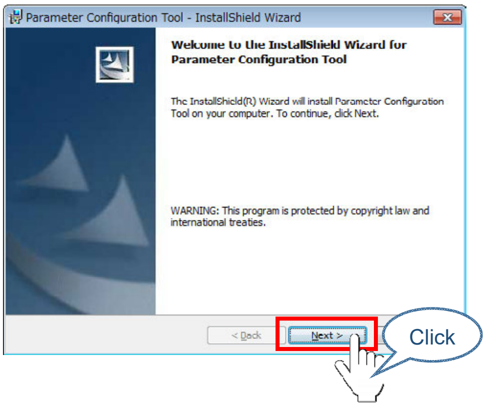
Preparing to Install...

Parameter Configuration Tool Setup is preparing the InstallShield Wizard, which will guide you through the program setup process. Please wait.

Extracting: Parameter Configuration Tool.msi

(2) After the screen switches to the one at right, click Next > .

"Parameter configuration tool - InstallShield Wizard" screen


Parameter Configuration Tool - InstallShield Wizard

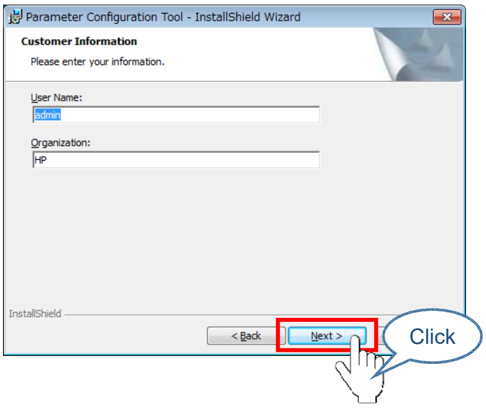
Welcome to the InstallShield Wizard for Parameter Configuration Tool

The InstallShield(R) Wizard will install Parameter Configuration Tool on your computer. To continue, click Next.

WARNING: This program is protected by copyright law and international treaties.

(3) Click Next > .

"Parameter configuration tool - InstallShield Wizard" screen


Parameter Configuration Tool - InstallShield Wizard

Customer Information

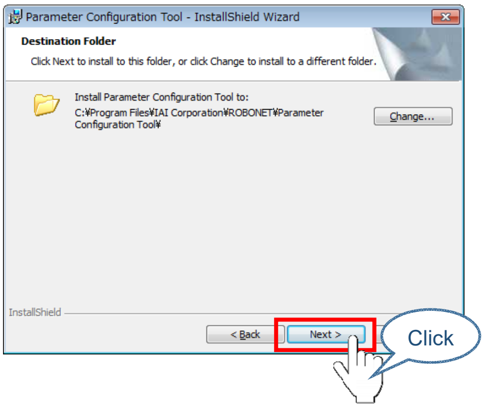
Please enter your information.

User Name: admin

Organization: HP

(4) Click Next > .

"Parameter configuration tool - InstallShield Wizard" screen



Parameter Configuration Tool - InstallShield Wizard

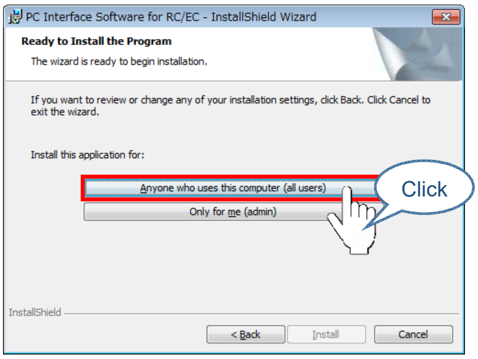
Destination Folder

Click Next to install to this folder, or click Change to install to a different folder.

Install Parameter Configuration Tool to:
C:¥Program Files¥IAI Corporation¥ROBONET¥Parameter Configuration Tool¥

(5) Click Anyone who uses this computer (all users) .

"Parameter configuration tool - InstallShield Wizard" screen



PC Interface Software for RC/EC - InstallShield Wizard

Ready to Install the Program

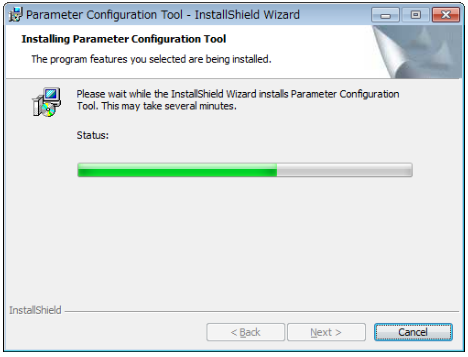
The wizard is ready to begin installation.

If you want to review or change any of your installation settings, click Back. Click Cancel to exit the wizard.

Install this application for:

(6) The screen on the bottom right appears and the installation of the gateway parameter configuration tool starts.

"Parameter configuration tool - InstallShield Wizard" screen



Parameter Configuration Tool - InstallShield Wizard

Installing Parameter Configuration Tool

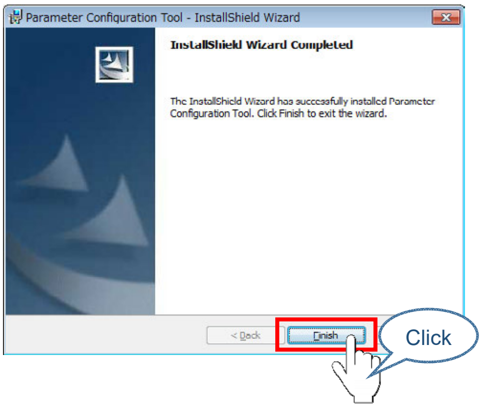
The program features you selected are being installed.

Please wait while the InstallShield Wizard installs Parameter Configuration Tool. This may take several minutes.

Status:

(7) When the screen on the bottom right appears, the installation of the gateway parameter configuration tool is completed.
Click Finish .

"Parameter configuration tool - InstallShield Wizard" screen

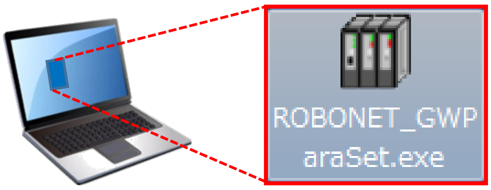


Parameter Configuration Tool - InstallShield Wizard

InstallShield Wizard Completed

The InstallShield Wizard has successfully installed Parameter Configuration Tool. Click Finish to exit the wizard.

Make sure the shortcut for "Gateway parameter configuration tool" is displayed.

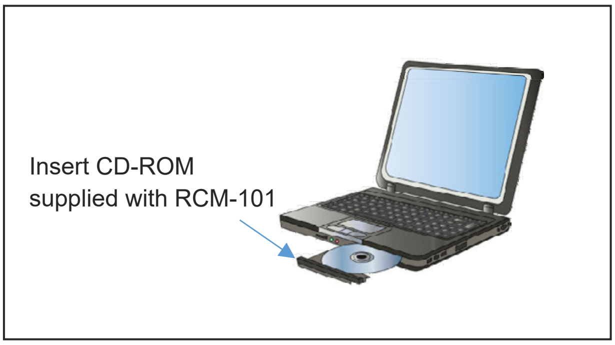


This concludes the installation of the gateway parameter configuration tool.

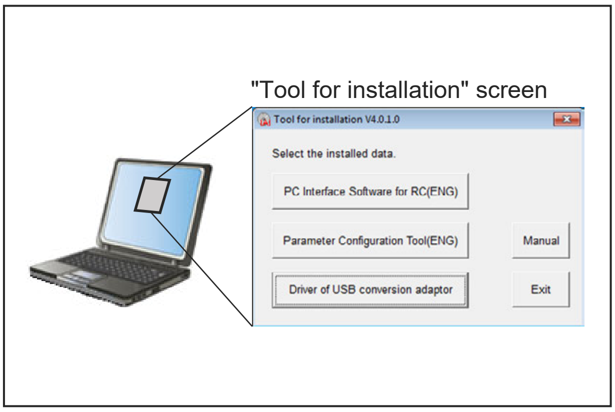
[Installing USB driver and connecting with controller communication]

The operation is explained in the IAI PC software (PC OS environment is Windows 7).

1 (1) Insert the CD-ROM supplied with RCM-101-USB into the CD drive of the PC.

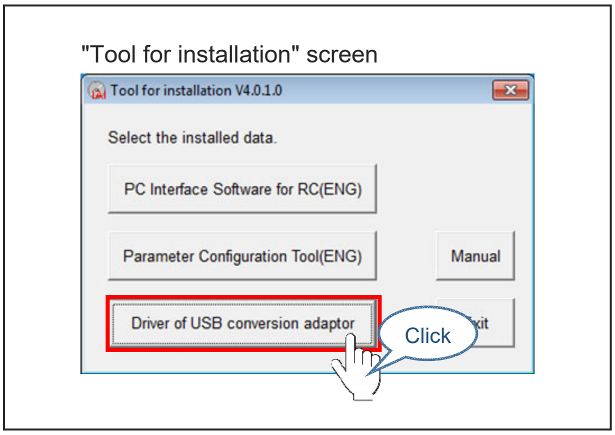


(2) The "Tool for installation" screen will be displayed.



Select the installed data.

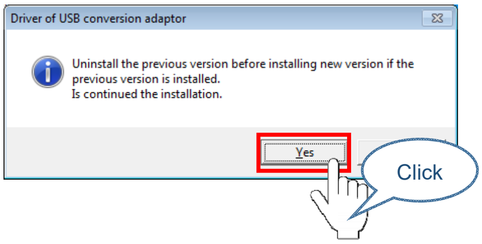
2 Click the "Tool for installation" screen Driver of USB conversion adaptor .



Select the installed data.

3 When the "Driver of USB conversion adaptor" screen is displayed, click Yes .

"Driver of USB conversion adaptor" screen

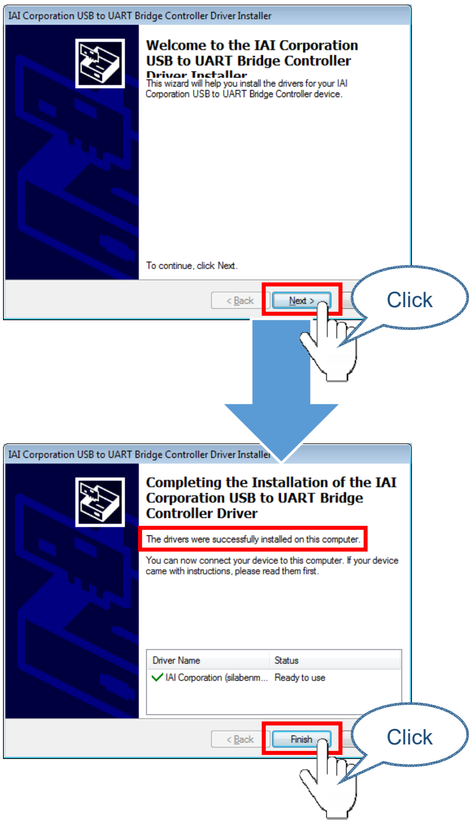

Driver of USB conversion adaptor

Uninstall the previous version before installing new version if the previous version is installed.
Is continued the installation.

4 "IAI Corporation USB to UART Bridge Controller Driver Installer"
When the screen is displayed, click Next > .

When the message "The driver was successfully installed on this computer" is displayed on the same screen, click Finish .

"IAI Corporation USB to UART Bridge Controller Driver Installer" screen


IAI Corporation USB to UART Bridge Controller Driver Installer

Welcome to the IAI Corporation USB to UART Bridge Controller Driver Installer

This wizard will help you install the drivers for your IAI Corporation USB to UART Bridge Controller device.

To continue, click Next.

IAI Corporation USB to UART Bridge Controller Driver Installer

Completing the Installation of the IAI Corporation USB to UART Bridge Controller Driver

The drivers were successfully installed on this computer.

You can now connect your device to this computer. If your device came with instructions, please read them first.

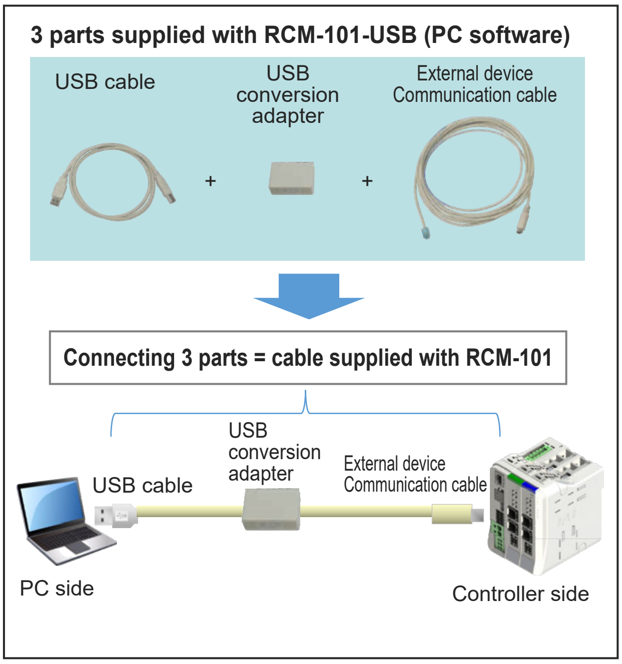
Driver Name	Status
✓ IAI Corporation (silabenm...	Ready to use

5

Connect the RCM-101 supplied cable.

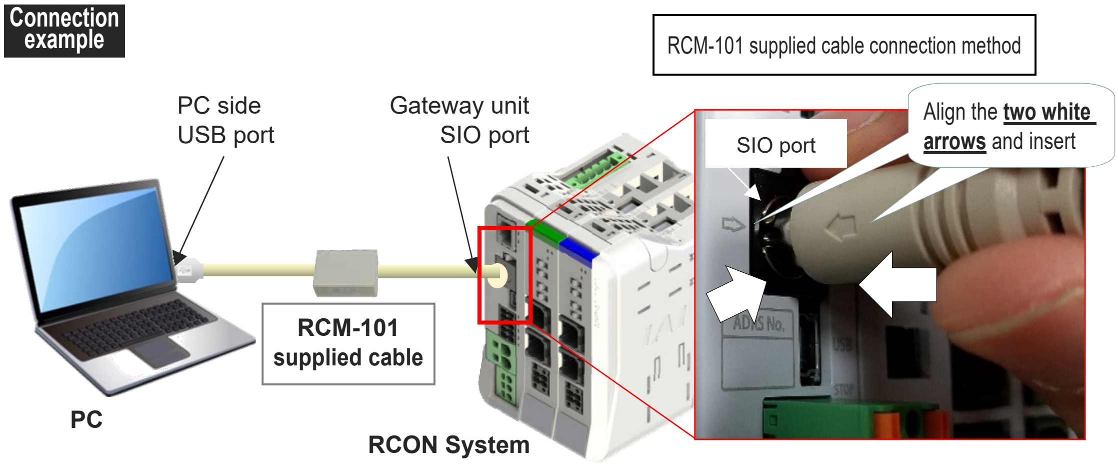
(1) As shown in the figure on the right, connect the 3 parts supplied with RCM-101-USB.

This cable is hereafter referred to as "RCM-101 supplied cable".



(2) Connect the RCM-101 supplied cable as shown below.

Connection example

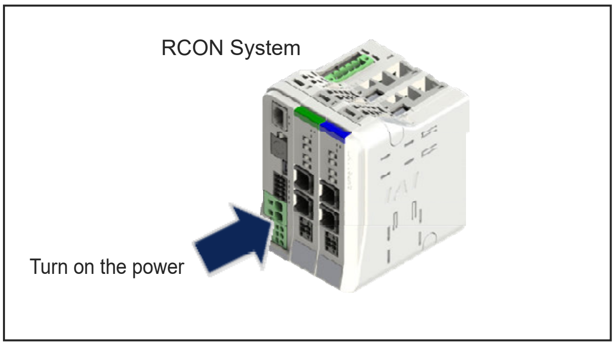


Caution

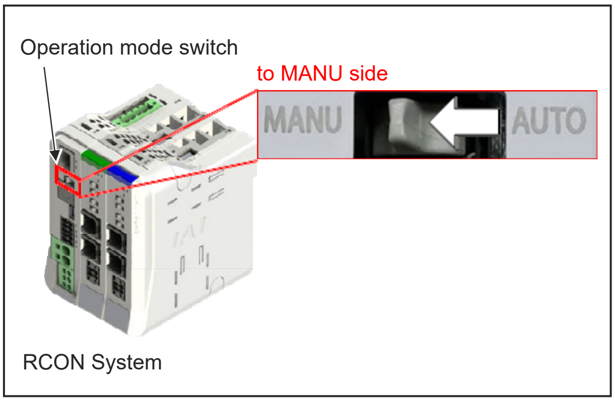
- When connecting the RCM-101 supplied cable to the gateway unit "SIO" port, insert matching the two white arrows as shown in the red frame above. Failure to do so may cause damage to the connector.

6 Turn on the RCON system.

After connecting the RCM-101 cable, turn on the 24 VDC power.



7 Tilt the operation mode switch on the front of the gateway unit to the **"MANU"** side.

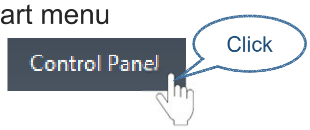


8 Check whether the USB driver installed in 1 to 4 is installed correctly on the PC on the Windows "Device Manager" screen.

<How to open Device Manager>

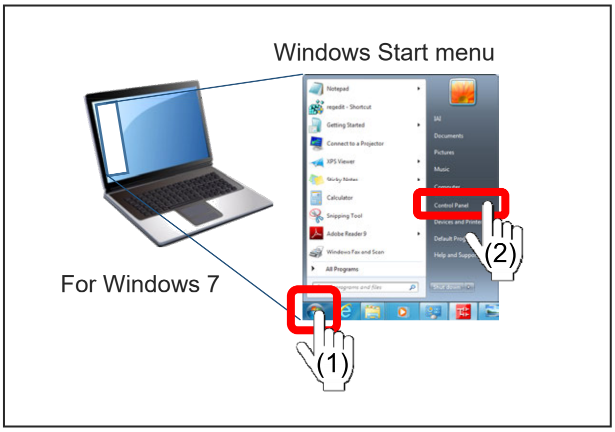
(1) Windows start menu
Bottom left

(2) Windows start menu
Upper right

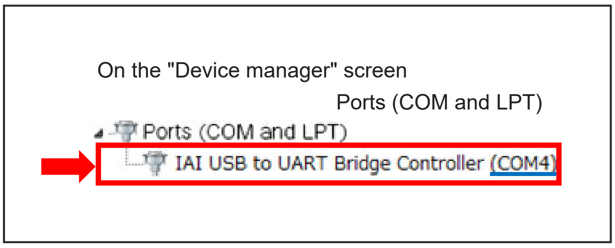


(3) On the next displayed screen

(4) On the next displayed screen



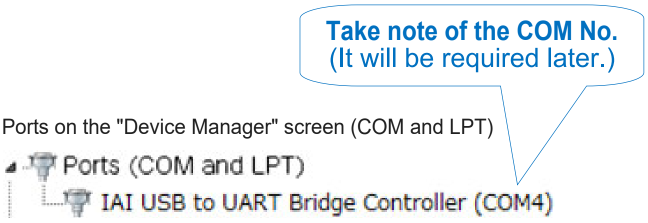
(5) If the "Device Manager" screen is displayed and "IAI USB to UART Bridge Controller (COM*)" is displayed in the "Ports (COM and LPT)" item, the USB driver installation is completed normally.



Ports (COM and LPT)
IAI USB to UART Bridge Controller (COM4)

Point!

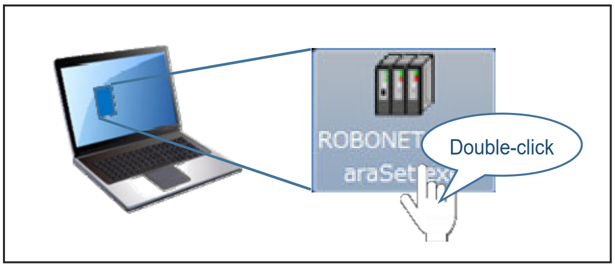
- Communicates with the RCON system using the COM port of the displayed PC.
- Take note of the COM No. as it may be required later.



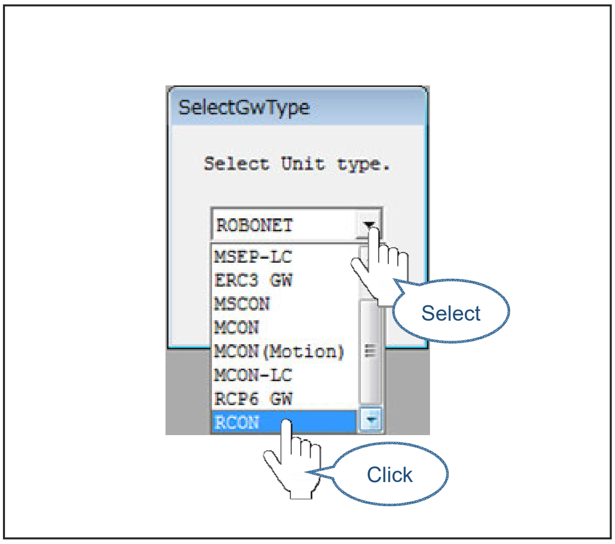
Ports (COM and LPT)
IAI USB to UART Bridge Controller (COM4)

9 Start up the gateway parameter configuration tool.

(1) Double click the "Gateway parameter configuration tool" icon.



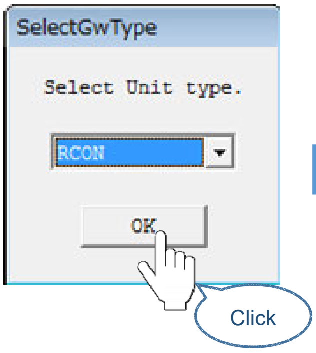
(2) Select and click "RCON" from "SelectGwType" screen.


SelectGwType

Select Unit type.

(3) Clicking OK will open the "Parameter configuration tool" main screen.

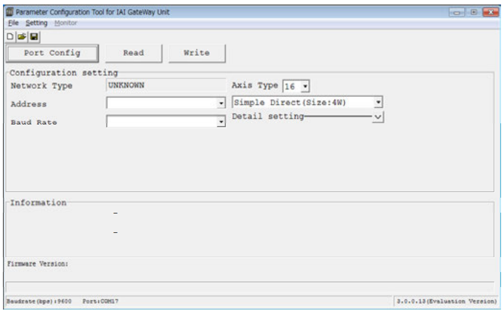
"SelectGwType" screen


SelectGwType

Select Unit type.

RCON

"Parameter configuration tool" main screen


Parameter Configuration Tool for IAI GateWay Unit

Configuration setting

Network Type UNKNOWN

Axis Type 16

Address

Simple Direct(Size:4W)

Baud Rate

Detail setting

Information

-

-

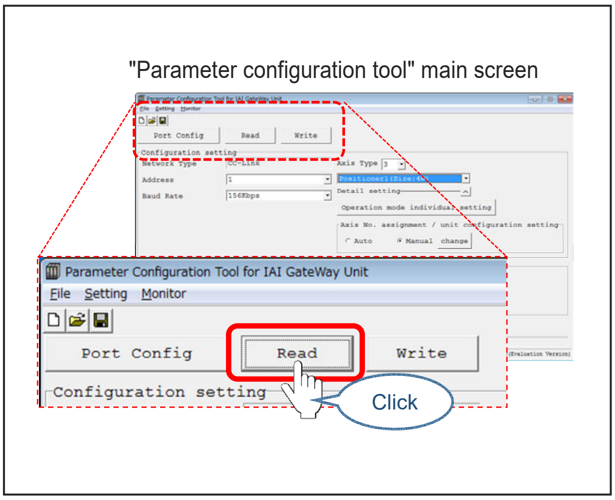
Firmware Version:

Baudrate(bps):9600 Port:COM17

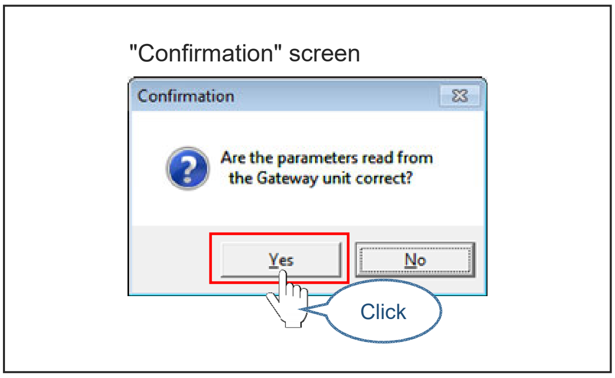
3.0.0.13(Evaluation Version)

10 Import the parameters.

(1) Click Read on the "Parameter configuration tool" main screen .

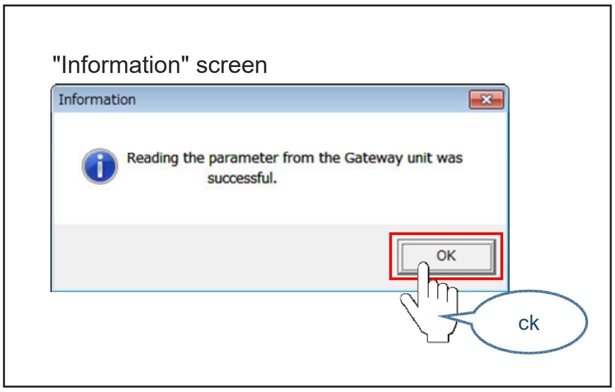

"Parameter configuration tool" main screen

(2) When the "Confirmation" screen appears, click Yes .


"Confirmation" screen

Are the parameters read from the Gateway unit correct?

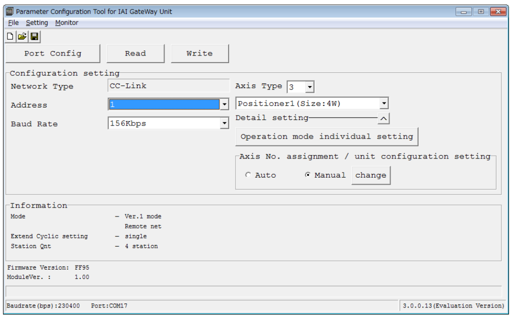
(3) When the "Information" screen appears, click OK .


"Information" screen

Reading the parameter from the Gateway unit was successful.

(4) As shown in the figure on the right, if the parameters in the gateway unit are displayed on the "Parameter configuration tool" main screen, communication has been established.

"Parameter configuration tool" main screen



Network Type CC-Link

Address 1

Baud Rate 156Kbps

Axis Type 3

Positioner1(Size:4W)

Detail setting

○ Auto ● Manual

Mode – Ver.1 mode
Remote net

Extend Cyclic setting – single

Station Qnt – 4 station

Firmware Version: FF95

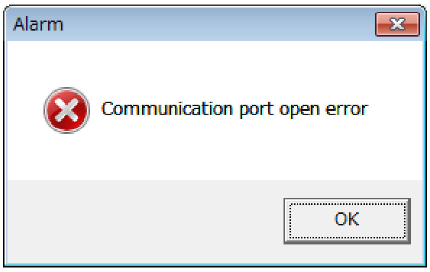
ModuleVer. : 1.00

Baudrate(bps):230400 Port:COM17

3.0.0.13(Evaluation Version)

(5) If "Communication port open error" screen is displayed when importing parameters, communication connection has failed.

"Communication port open error" screen



Communication port open error

[Causes of communication connection failure]

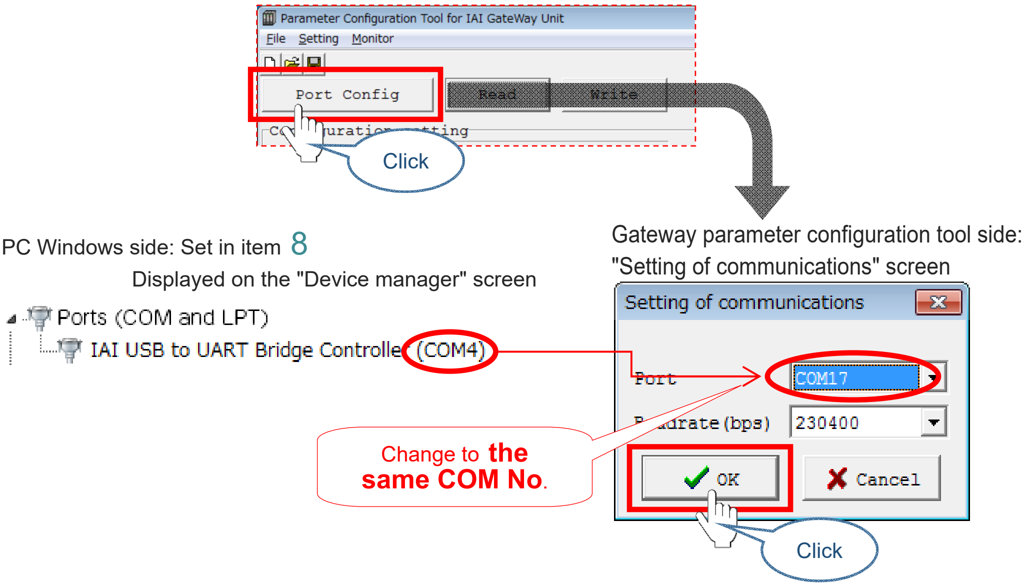
- Mismatched communication port
- Disconnected communication cable
- Connection problem of communication cable connector
- Gateway unit side, PC side malfunction
- PC software double startup

may be possible causes.

[If connection is not possible due to a communication port open error]

(1) Change the port number on the "Setting" → "Setting of communications" screen on the "Parameter configuration tool " main screen so that it is the same as the COM No. on the Device Manager screen on Windows.

"Parameter configuration tool" main screen



PC Windows side: Set in item 8

Displayed on the "Device manager" screen

Ports (COM and LPT)
IAI USB to UART Bridge Controller (COM4)

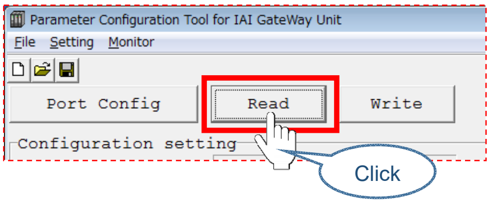
Gateway parameter configuration tool side:
"Setting of communications" screen

Port: COM17
Baudrate (bps): 230400

Change to **the same COM No.**

(2) Click Read on the "Parameter configuration tool" main screen to reconnect with the RCON gateway unit.

"Parameter configuration tool " main screen



This concludes the installation of the USB driver.

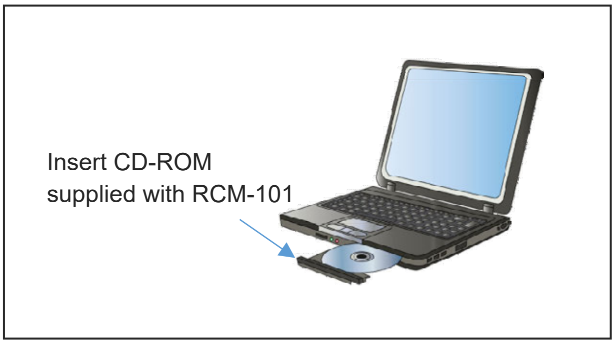
[Installing USB Connection Driver for RCON]

It is necessary to install the driver when connecting the PC software or gateway parameter configuration tool to the USB connector on RCON.

Installation process is explained as shown in the following steps from 1 to 5.

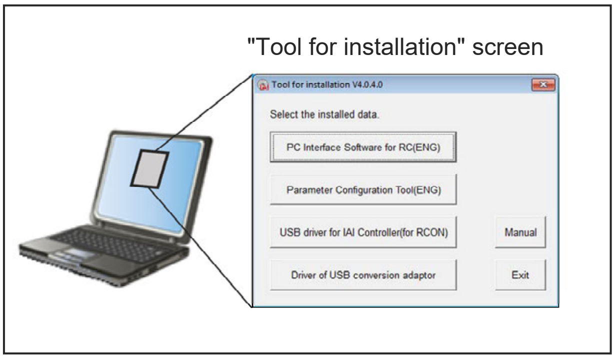
It is not necessary to have the installation work described in this section for Windows 10.

1 (1) Insert the CD-ROM supplied with RCM-101-USB into the CD drive of the PC.



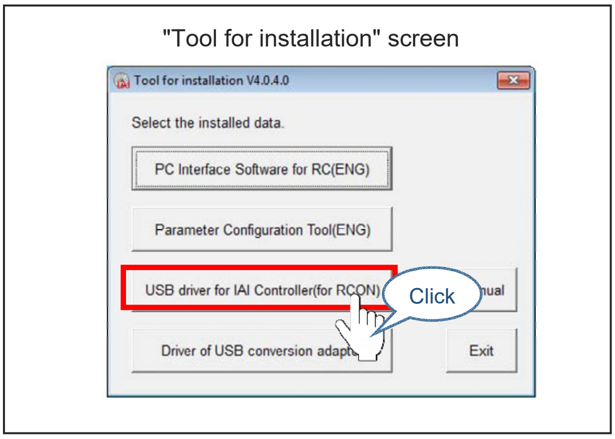
(2) The "Tool for installation" screen will be displayed.

"Tool for installation" screen



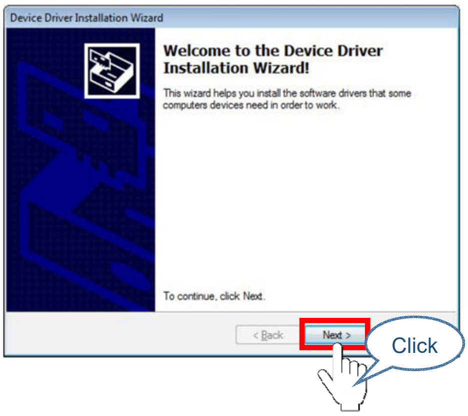
2 Click the "Tool for installation" screen  .

"Tool for installation" screen



3 Click the "Device Driver Install Wizard " screen Next > .

"Device Driver Install Wizard" screen



Device Driver Installation Wizard

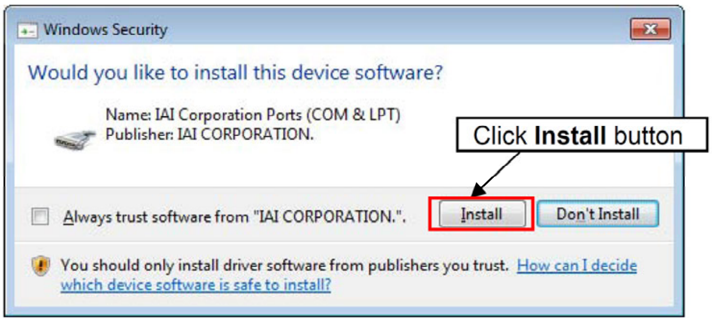
Welcome to the Device Driver Installation Wizard!

This wizard helps you install the software drivers that some computers devices need in order to work.

To continue, click Next.

4 After installation starts, “Windows Security” screen appears in the progress.
Click Install .

"Windows Security" screen



Windows Security

Would you like to install this device software?

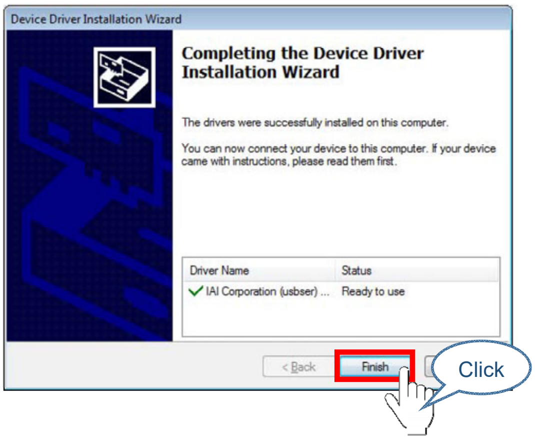
Name: IAI Corporation Ports (COM & LPT)
Publisher: IAI CORPORATION.

☐ Always trust software from "IAI CORPORATION.".

You should only install driver software from publishers you trust. How can I decide which device software is safe to install?

5 After the install, the following window will open.
Click Finish .

"Device Driver Install Wizard" screen



Device Driver Installation Wizard

Completing the Device Driver Installation Wizard

The drivers were successfully installed on this computer.

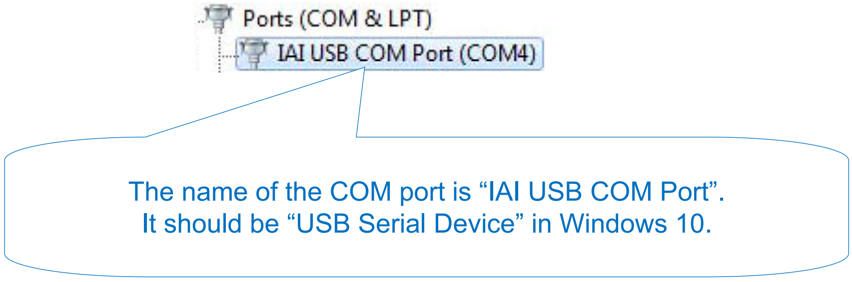
You can now connect your device to this computer. If your device came with instructions, please read them first.

Driver Name	Status
✓ IAI Corporation (usbser) ...	Ready to use

This concludes the installation of the USB driver for RCON.

Once the installation of the USB driver is complete, COM port gets automatically added.
For how to change the COM port, refer to “Chapter 4, 4.1 [If connection is not possible due to a communication port open error] (pages B4-13)”.
The name of the COM port is different from the one on the USB driver for connection to SIO port.

Ports in “Device Manager” screen (COM & LPT)



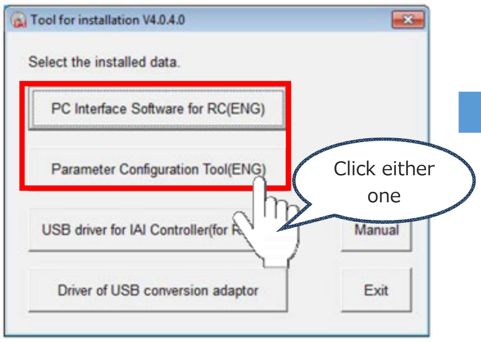
The name of the COM port is “IAI USB COM Port”.
It should be “USB Serial Device” in Windows 10.

[Reference]

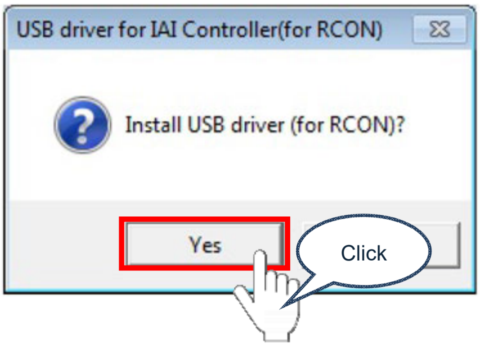
In the conditions below, click Install button in "PC Software for RC/EC (in each language)" or Install button in "Gateway Parameter Setting Tool (in each language)", and confirmation window for installation of RCON USB Driver will appear.

(1) The installation tool PC software was opened in an OS earlier than Windows 10.
(2) RCON USB driver is not installed.

"Tool for installation" screen



“Confirmation of Installing USB Driver fro IAI Controller (for RCON)” screen



Install USB driver (for RCON)?

Click "Yes" and the installation wizard for device driver in Procedure [3] should appear.
Excecute Procedure [3] and after, and the USB connection driver for RCON should get available to install.

RCON setting: CC-Link (for PiC of PLC wiring / programming)

[Setting RCON gateway parameters]

Items to prepare

RCON system / PC / RCM-101 supplied cable

The operation is explained in the gateway parameter configuration tool (PC OS environment is Windows 7).

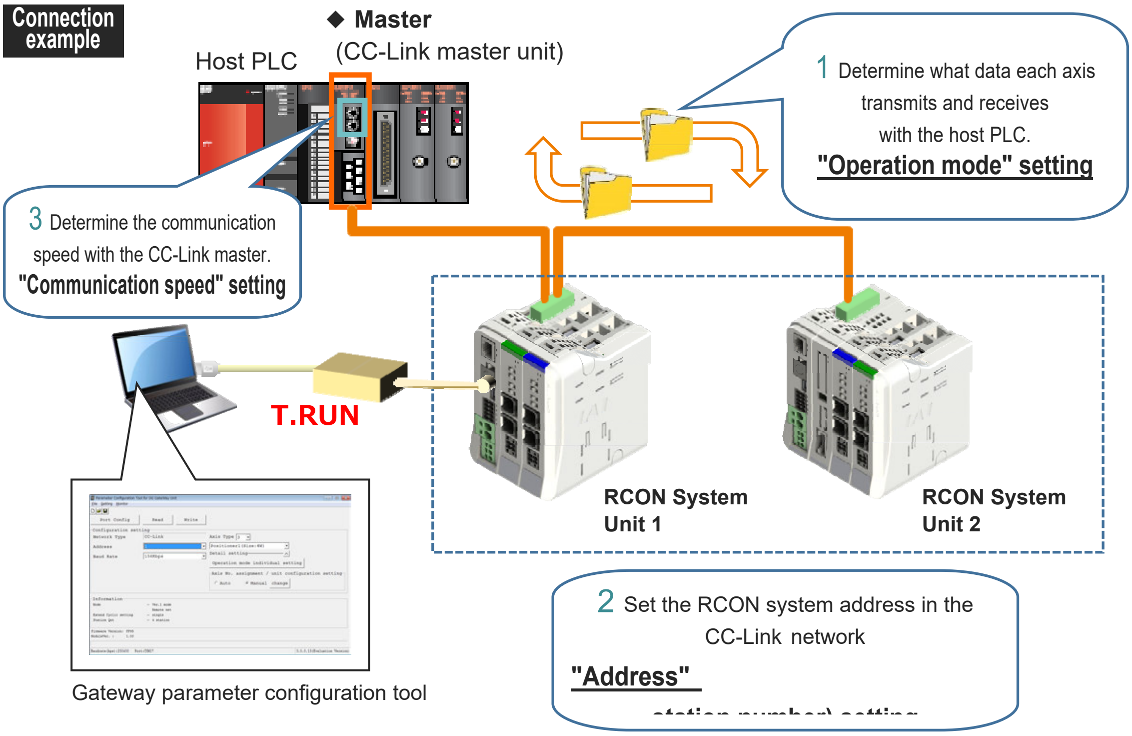
Caution

- The operation mode of the RCON gateway is set up using the gateway parameter configuration tool (Ver.3.1.7.0 or later).

The gateway parameter configuration tool is used to set up the RCON system (indicated as Unit 1 and 2).

Items to be set on the controller side are 1 to 3 below.

[Connecting RCON and gateway parameter configuration tool]



1 Set the "operation mode".

(1) Determine the control method from the host PLC. Select from the following 6 types.

	1	2	3	4	5	6
	Direct numerical control mode	**Simple direct mode**	**Positioner 1 mode**	**Positioner 2 mode**	**Positioner 3 mode**	**Positioner 5 mode**
Number of positioning points	Unlimited	Unlimited	128 points	128 points	128 points	16 points
Home return motion	○	○	○	○	○	○
Positioning operation	○	○	△	△	△	△
Speed, acceleration/deceleration settings	○	△	△	△	△	△
Different acceleration and deceleration settings	×	△	△	△	△	△
Pitch feed (Incremental)	○	△	△	△	×	△
JOG operation	△	△	△	△	×	△
Position data reading signal	×	×	○	○	×	×
Push-motion operation	○	△	△	△	△	△
Speed changes while traveling	○	△	△	△	△	△
Pausing	○	○	○	○	○	○
Zone signal output	△ (2 points)	△ (2 points)	△ (2 points)	△ (2 points)	△ (1 point)	△ (2 points)
Position zone signal output	×	△	△	△	×	×
Overload warning output	○	○	○	○	×	○
Vibration control	×	△	△	△	△	△
Collision detection function	×	△	△	△	△	△
Present position reading (Resolution)	○ (0.01mm)	○ (0.01mm)	○ (0.01mm)	×	×	○ (0.1mm)

(2) When the mode selection is completed in (1), it is input to the gateway unit using the gateway parameter configuration tool. In this manual, the RCON system (Units 1 and 2) is set as shown at right (example).

RCON System Unit 1

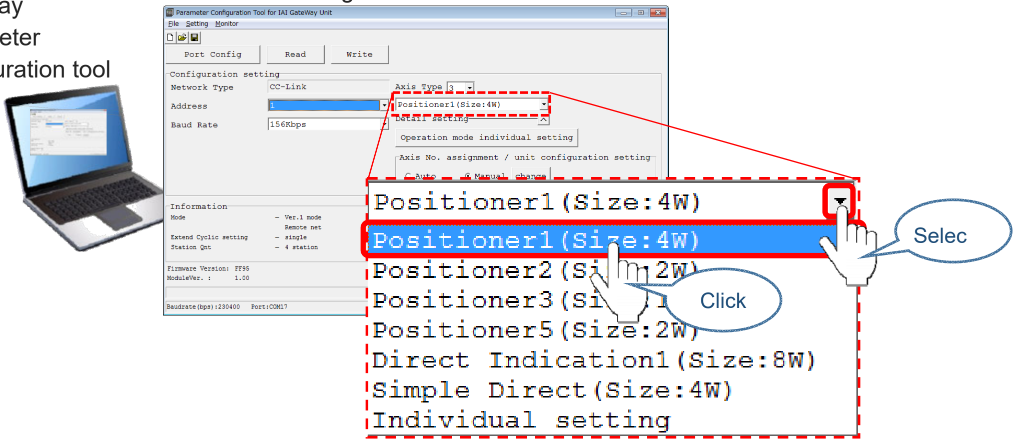
RCON System Unit 2

* ○ shows that direct setting is available, △ shows input is required to the position data or parameters and × shows operation is not available.

(3) Select and click the operation mode confirmed in (1).

Gateway Parameter configuration tool

"Parameter configuration tool" main screen



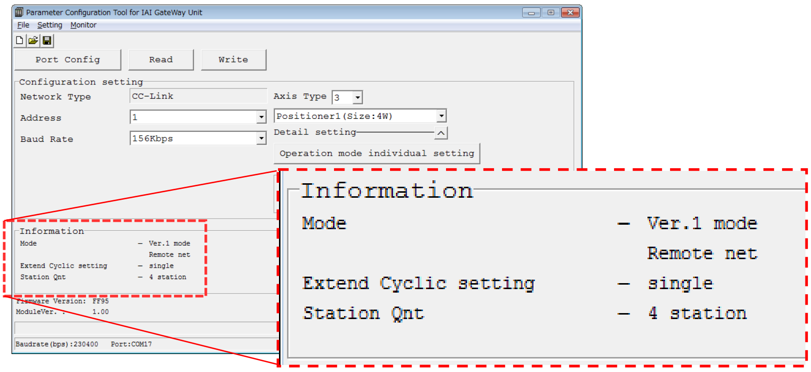
Point!

- Here is how to set all the axes connected to the gateway unit to the same "operation mode" collectively.

To individually set the "operation mode" of the connected axes, refer to "Specifications Section 3.9 Gateway Parameter Configuration Tool/Operation mode setting (page A3-167)".

(4) Take notes of the occupancy information on the "Parameter configuration tool" main screen. This is the information required for setting the 2 "Address" (CC-Link station number) and PLC shown on the next page.

"Parameter configuration tool" main screen



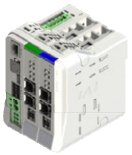
Configuration setting
Network Type: CC-Link
Address: 1
Baud Rate: 156Kbps
Axis Type: 3
Positioner1(Size:4W)

Information
Mode – Ver.1 mode
Remote net
Extend Cyclic setting – single
Station Qnt – 4 station

Firmware Version: FF95
ModuleVer. : 1.00

Baudrate(bps):230400 Port:COM17

The example displays the following occupancy information.



RCON System Unit 1

Occupancy information

By station type : Ver.1
Remote device station
Extended cyclic : 1x
Number of occupied stations : 4 stations occupied

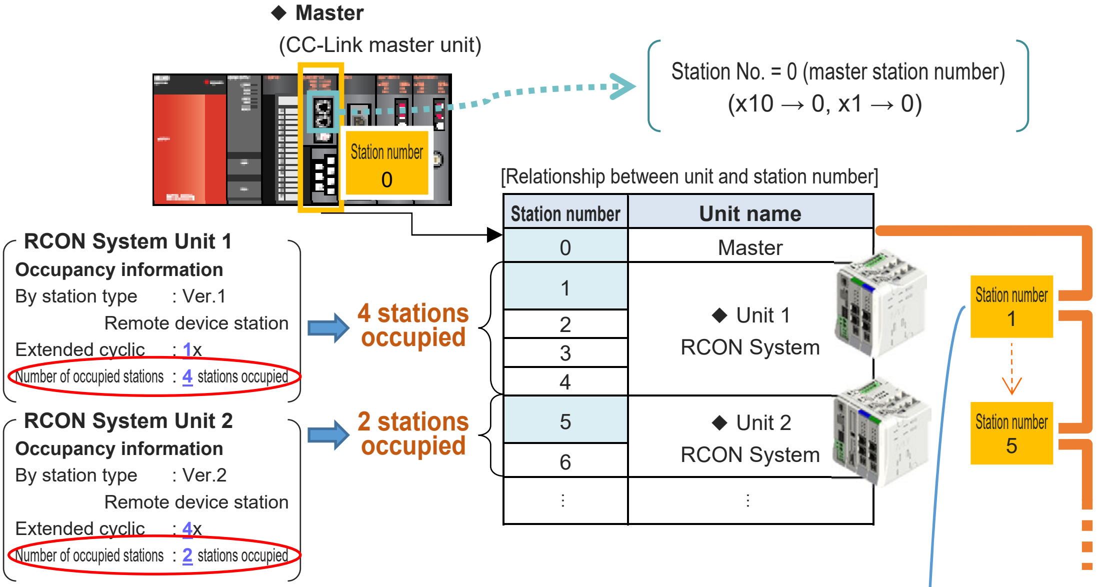
RCON System Unit 2

Occupancy information

By station type : Ver.2
Remote device station
Extended cyclic : 4x
Number of occupied stations : 2 stations occupied

2 Set the "address" (CC-Link station number).

(1) Check the address (station number) set value with reference to the following figure.



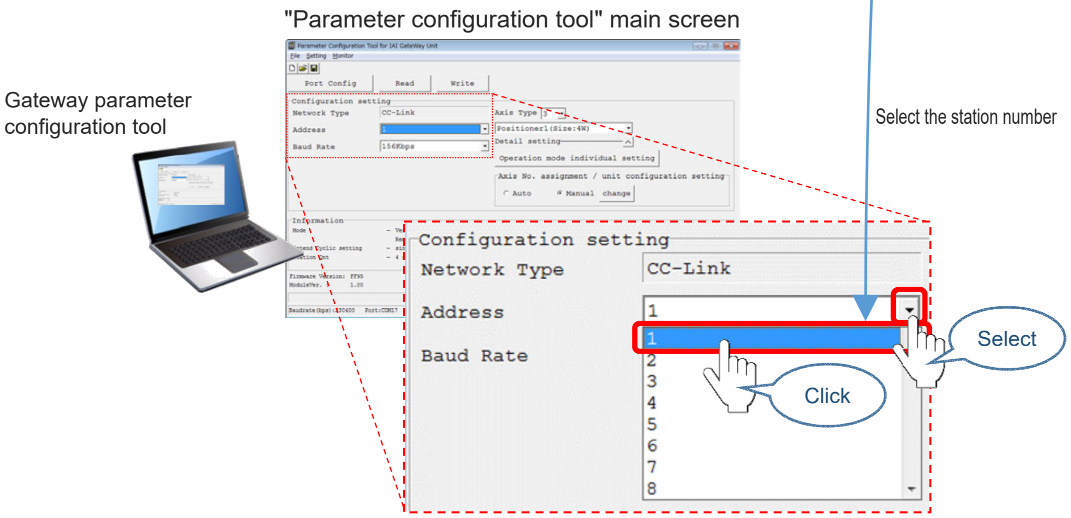
RCON System Unit 1
Occupancy information
By station type : Ver.1
Remote device station
Extended cyclic : 1x
Number of occupied stations : 4 stations occupied

RCON System Unit 2
Occupancy information
By station type : Ver.2
Remote device station
Extended cyclic : 4x
Number of occupied stations : 2 stations occupied

[Relationship between unit and station number]

Station number	Unit name
0	Master
1	◆ Unit 1 RCON System
2	
3	
4	
5	◆ Unit 2 RCON System
6	
⋮	⋮

(2) Select and click the address (station number) set value confirmed in (1).



"Parameter configuration tool" main screen

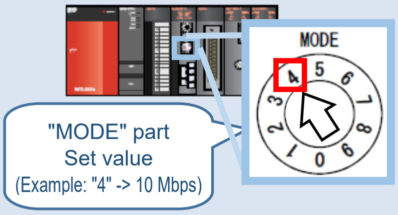
Configuration setting
Network Type CC-Link
Address 1
Baud Rate

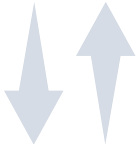
Point!

- When connecting multiple units to the master unit, it is necessary to ensure that there will be no duplicate RCON system station numbers in the same CC-Link network. Also, make sure that the respective number of occupied stations will not be the same.

3 Set the "Communication speed".

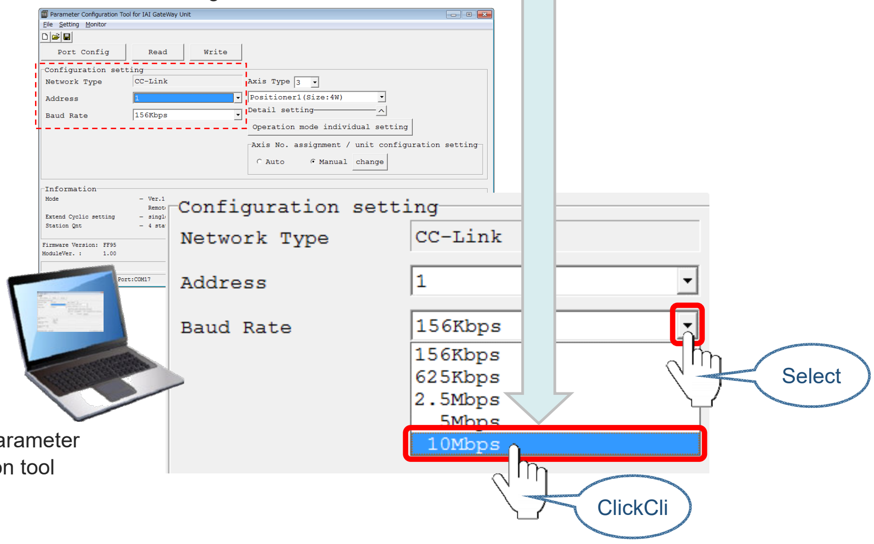
(1) Check the address (station number) set value with reference to the following figure.

CC-Link master unit "MODE" set value  	PLC side Communication speed
0 (Initial value)	156 kbps
1	625 kbps
2	2.5 Mbps
3	5 Mbps
4	10 Mbps



(2) Select and click the same numerical value as the CC-Link master unit "MODE" set value confirmed in (1).

"Parameter configuration tool" main screen



Configuration setting
Network Type CC-Link
Address 1
Baud Rate 156Kbps

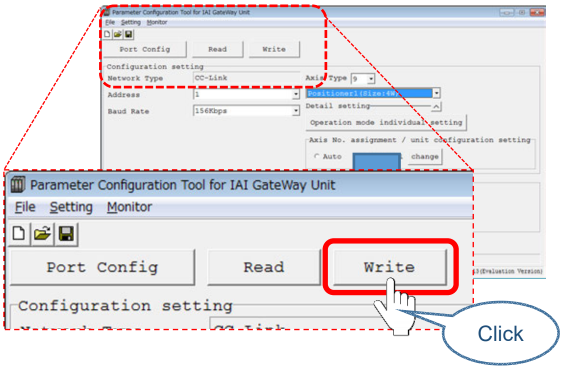
156Kbps
625Kbps
2.5Mbps
5Mbps
10Mbps

Gateway parameter configuration tool

[Transferring and writing parameters]

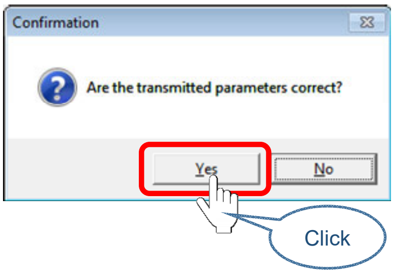
4 (1) Click Write on the "Parameter configuration tool" main screen.

"Parameter configuration tool" main screen



(2) When the "Confirmation" screen appears, click Yes .

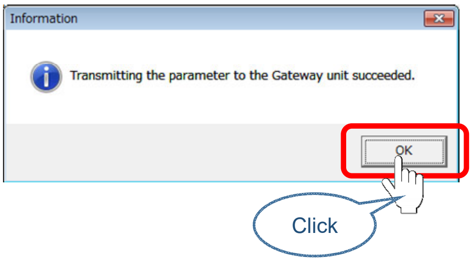
"Confirmation" screen



Are the transmitted parameters correct?

(3) When the parameter writing is completed and the "Information" screen appears, click OK .

"Information" screen

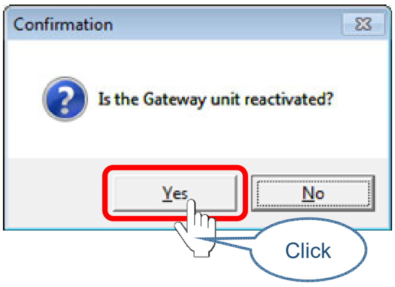


Transmitting the parameter to the Gateway unit succeeded.

(4) When the "Confirmation" screen appears, click Yes .

The gateway unit restarts.

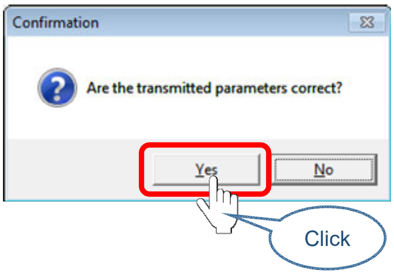
"Confirmation" screen



Is the Gateway unit reactivated?

(5) When the " Confirmation " screen appears, click Yes .

"Confirmation" screen

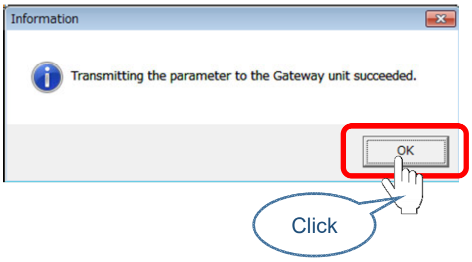


Confirmation

Are the transmitted parameters correct?

(6) When the "Information" screen appears, click OK .

"Information" screen

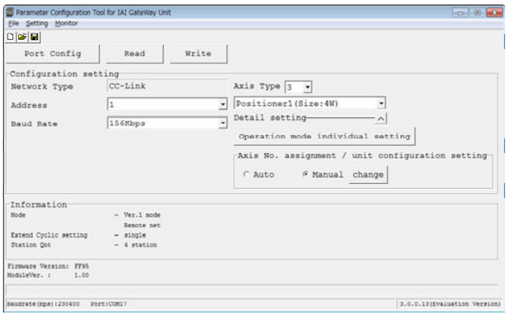


Information

Transmitting the parameter to the Gateway unit succeeded.

(7) When the " Parameter configuration tool" main screen is loaded, check whether the changed contents are reflected.

"Parameter configuration tool" main screen



Parameter Configuration Tool for IAI GateWay Unit

Configuration setting

Network Type CC-Link

Address 1

Baud Rate 156Kbps

Axis Type 3

Positioner1(Size:4W)

Detail setting

Operation mode individual setting

Axis No. assignment / unit configuration setting

○ Auto ● Manual change

Information

Mode – Ver.1 mode
Remote net
Extend Cyclic setting – single
Station Qnt – 4 station

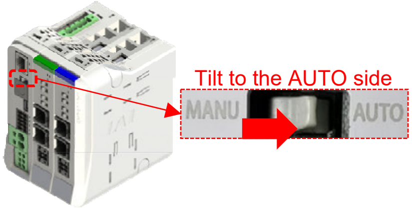
Firmware Version: FF95
ModuleVer. : 1.00

Baudrate(bps):230400 Port:COM17 3.0.0.13(Evaluation Version)

This completes the CC-Link network setting of the RCON system.
Check the communication status between each unit.

Caution

- For subsequent adjustment, when operating from the PLC, return the AUTO/MANU switch on the front of the gateway unit to AUTO.
- If left on the MANU side, operation from the PLC will not be possible.



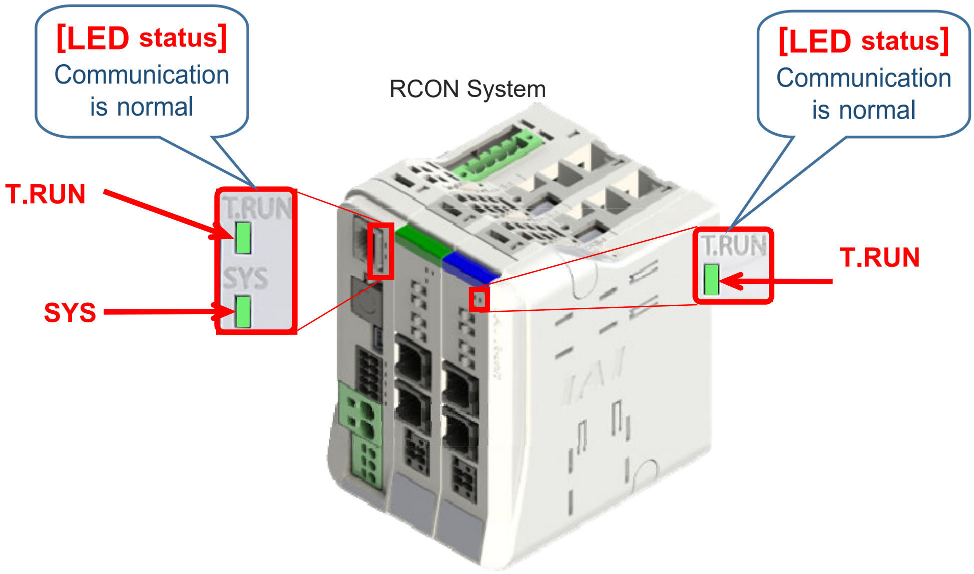
Caution

- If the actual number of connected axes of the RCON system does not match the number of axes set and transferred in the gateway parameter configuration tool, the PC software cannot be connected.
- Confirm the actual number of connected axes and change the gateway parameters, or read the present driver unit configuration with the gateway parameter configuration tool for transfer. For details, refer to Specifications Section Chapter 3 Gateway Parameter Configuration Tool (page A3-156).

[Checking inter-unit communication status of the RCON system]

5 Check the communication status in the RCON system.

Look at the LEDs on the front of the RCON system gateway unit and driver unit (T.RUN and SYS) and check if they are in the same status (normal communication) as ▭ in the table below.



Gateway unit side LED display

Panel notation	Display status	Definition of display
T RUN	🟩 Lit	Normal internal bus communication
	★ Blinking	Waiting for initialization signal
	🟧 Lit	Bus communication error generated
SYS	🟩 Lit	Normal operation
	🟧 Lit	Gateway alarm triggered

Driver unit side LED display

Panel notation	Display status	Definition of display
T RUN	🟩 Lit	Normal internal bus communication
	★ Blinking	Waiting for initialization signal
	🟧 Lit	Bus communication error generated

How to Connect Ethernet

For those equipped with an Ethernet port (Option: ET), here explains how to Ethernet in the gateway parameter setting tool.

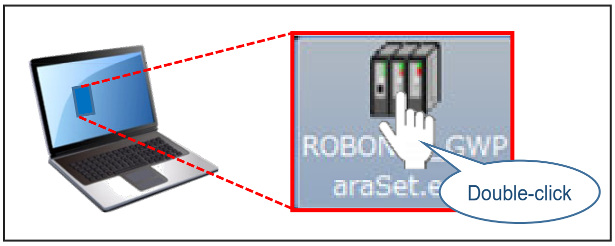
[Setting RCON gateway parameters]

Items to prepare

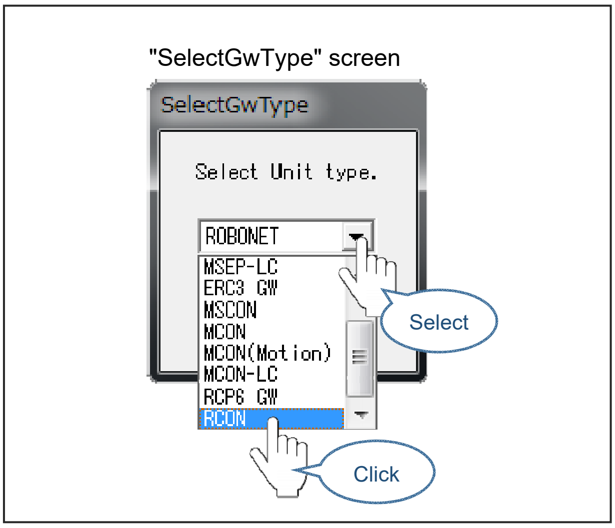
RCON system / PC / RCM-101 supplied cable

1 Start up the gateway parameter configuration tool.

(1) Double click the "Gateway parameter configuration tool" icon.

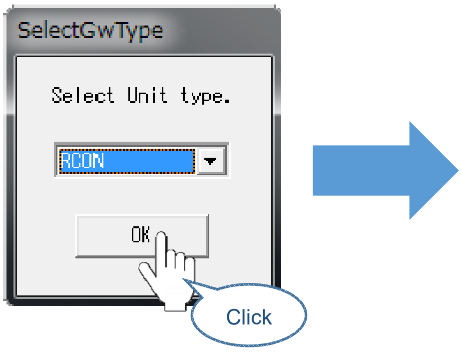


(2) Select and click "RCON" from "SelectGwType" screen.

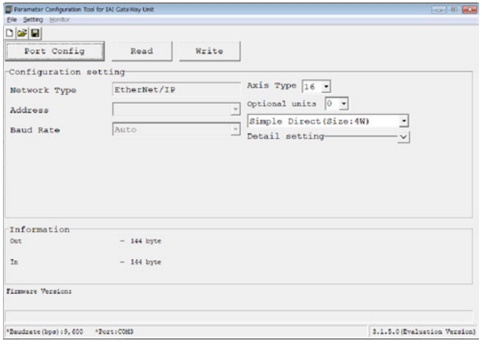

"SelectGwType" screen

(3) Clicking OK will open the " Parameter Configuration Tool for IAI GateWay Unit " main screen.

"SelectGwType" screen



"Parameter Configuration Tool for IAI GateWay Unit" main screen



Configuration setting

Network Type EtherNet/IP

Address

Baud Rate Auto

Axis Type 16

Optional units 0

Simple Direct(Size:4W)

Detail setting

Information

Out - 144 byte

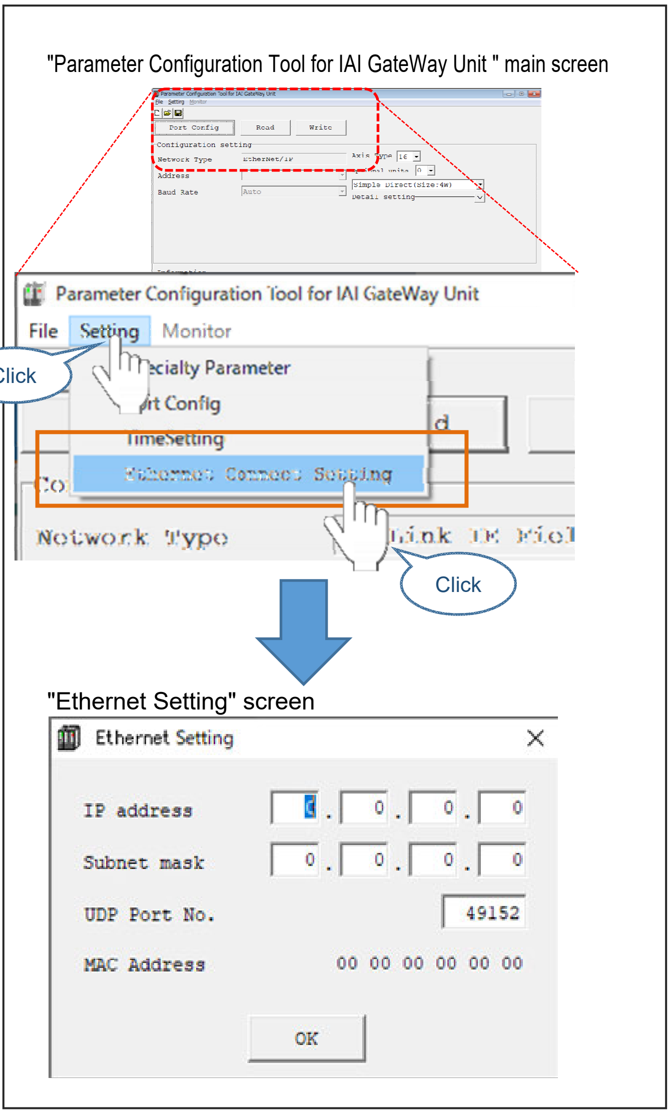
In - 144 byte

Firmware Version:

*Baudrate(bps):9,600 *Port:COM3

3.1.5.0(Evaluation Version)

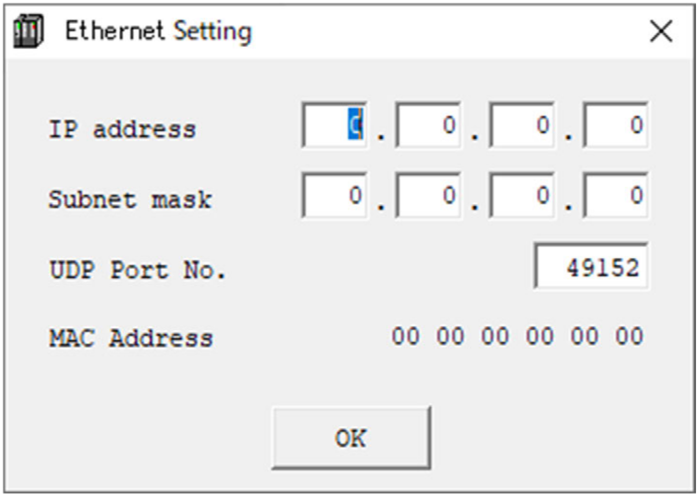
(3) Click [Setting (S)], and then [Ethernet Setting] to open “Ethernet Connection Setup”.



IP address 0 . 0 . 0 . 0
Subnet mask 0 . 0 . 0 . 0
UDP Port No. 49152
MAC Address 00 00 00 00 00 00

2 In “Ethernet Setting” the following parameter settings should be shown. Straight after the window opens, it should be shown the current setting values input.

"Ethernet Setting" screen



IP address 0 . 0 . 0 . 0
Subnet mask 0 . 0 . 0 . 0
UDP Port No. 49152
MAC Address 00 00 00 00 00 00

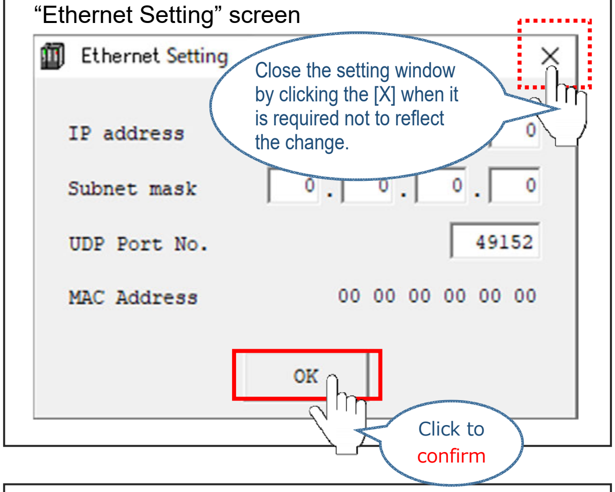
“Ethernet Connection Setting Parameters”

No.	Parameter Name	Explanation of Parameter
1	IP Address	Ethernet Communication Port IP Address
2	Subnet Mask	Ethernet Communication Port Subnet Mask
3	UDP Port Number	Port Number for IP Address Search with IA-OS
4	MAC Address	MAC Address for Ethernet Communication Port (Not available for change) When it is not available to acquire such as in file edit, each item should get hidden.

3 Click [OK] to confirm the change when a change is made to the settings.

* Close the setting screen by clicking the [X] button when it is required not to reflect the change.

“Ethernet Setting” screen



Ethernet Setting

IP address . . . 0

Subnet mask 0 . 0 . 0 . 0

UDP Port No. 49152

MAC Address 00 00 00 00 00 00

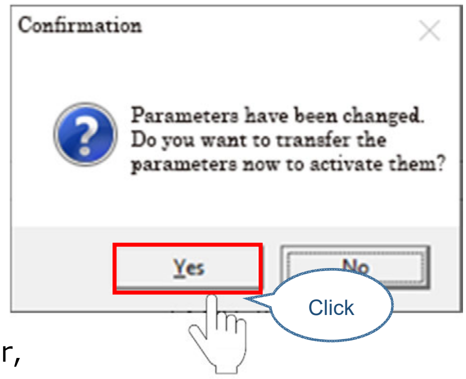
Close the setting window by clicking the [X] when it is required not to reflect the change.

Click to confirm

4 When there is a change made to the setting, “Confirmation” screen should open after “Ethernet Setting” screen is finished. Click [Yes] to transfer the changed contents to the gateway unit.

* The change can also be transferred by clicking the [Transfer] button in the main screen of “Parameter Configuration Tool for IAI Gateway Unit”.

"Confirmation" screen



Confirmation

Parameters have been changed. Do you want to transfer the parameters now to activate them?

Click

Or,

"Parameter Configuration Tool for IAI GateWay Unit" main screen

Click

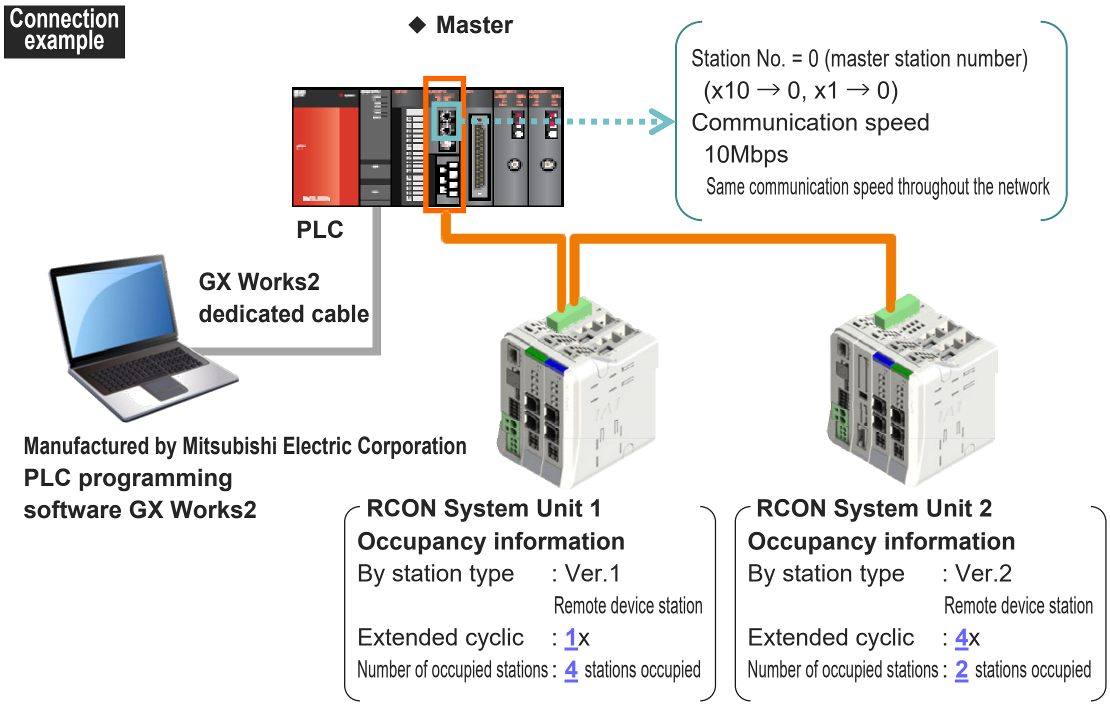
4.2 Master Side Setting

PLC setting: CC-Link (for PiC of PLC wiring / programming)

Items to prepare

PLC / CC-Link master unit / PC / GX Works2 / communication cable

Ex) Two RCON units are connected to the CC-Link master unit of PLC.



Station No. = 0 (master station number)
(x10 → 0, x1 → 0)
Communication speed
10Mbps
Same communication speed throughout the network

RCON System Unit 1
Occupancy information
By station type : Ver.1
Remote device station
Extended cyclic : 1x
Number of occupied stations : 4 stations occupied

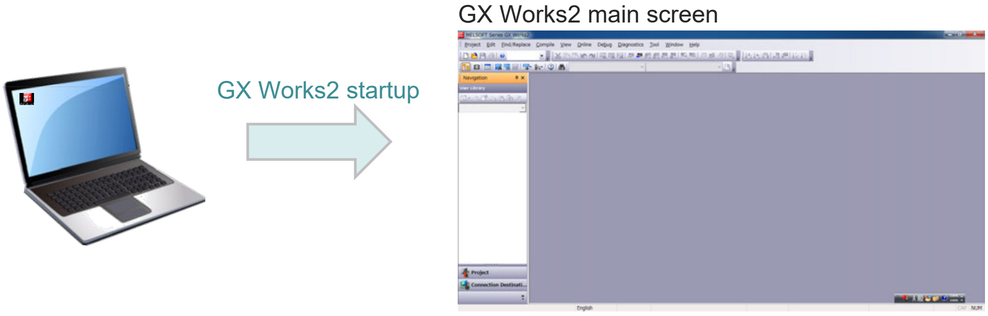
RCON System Unit 2
Occupancy information
By station type : Ver.2
Remote device station
Extended cyclic : 4x
Number of occupied stations : 2 stations occupied

[Connection between PLC and PC software]

Start up the Mitsubishi Electric Co., Ltd. PLC programming software GX Works2 and connect the CC-Link master unit.

For installation procedure and the like of GX Works2,
refer to "Appendix 14.1 Installing GX Works2" in Mitsubishi Electric Co., Ltd. Engineering Software GX Works2 Version 1 Operating Manual (Common Edition).

1 Double-click the "GX Works2" icon to start the software.



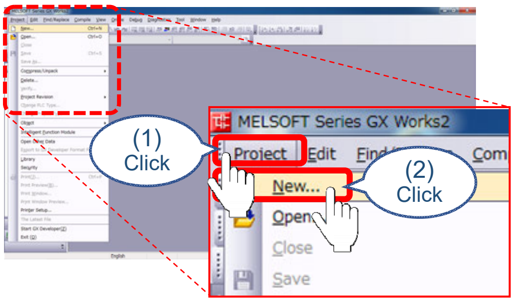
GX Works2 main screen

To perform USB communication with the PLC CPU, it is necessary to install the USB driver. For USB driver installation, refer to "Appendix 16 Installation Procedure of USB Driver" in Mitsubishi Electric Co., Ltd. Engineering Software GX Works2 Version 1 Operating Manual (Common Edition).

2 At the top left of the GX Works2 main screen, click in the order of

(1) "Project (P)"
(2) "New (N)"
in order.

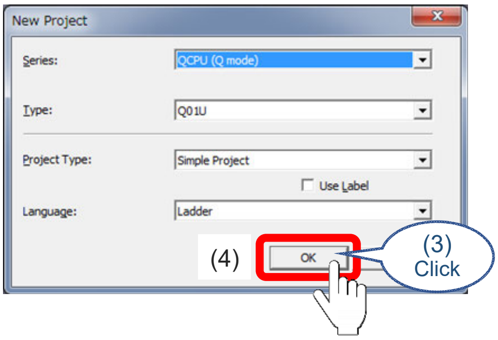
"Main screen New project creation process"



(3) The "New Project" screen opens.

(4) After setting the prerequisites on the "New Project" screen (in this manual, set in the "New Project" screen as shown at right), click OK.

(3) "New Project" screen


New Project

Series: QCPU (Q mode)

Type: Q01U

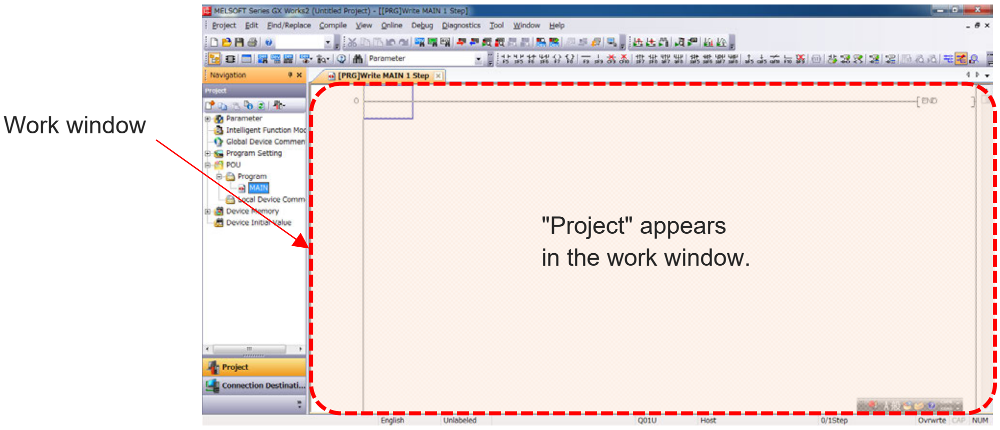
Project Type: Simple Project

☐ Use Label

Language: Ladder

(5) "Project" will be displayed in the work window of the main screen.

Main screen

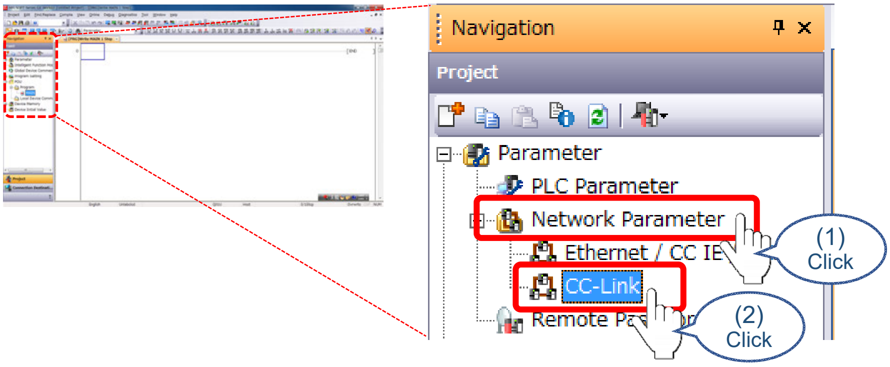


"Project" appears in the work window.

[Setting network parameters]

3 Open the "Network parameters" screen.

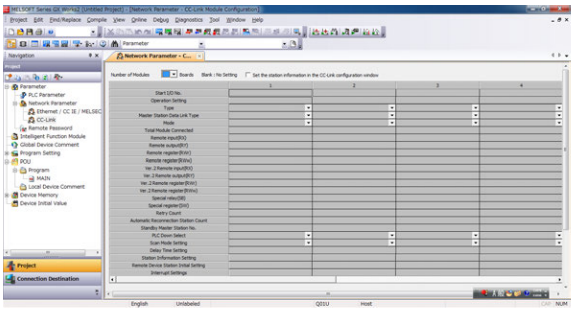
From the "Navigation" screen in the tree view on the left side of the main screen, click and select (1) "Network parameters" then (2) "CC-Link".


"Main" screen

"Navigation" screen

Open the "Network parameters" screen in CC-Link.

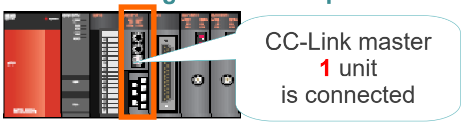
"Network parameters" screen



4 Enter the "number of modules" in CC-Link network.

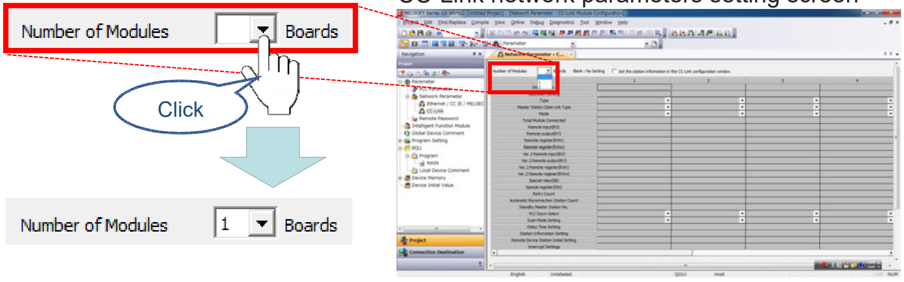
For "PLC unit configuration example" as shown below, one CC-Link network unit is connected.

PLC unit configuration example



Set the number of modules to 1.

CC-Link network parameters setting screen

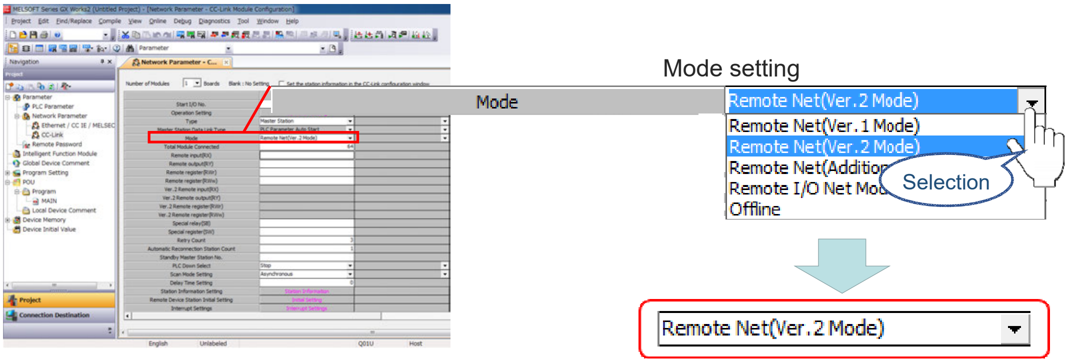


Number of Modules 1 Boards

5 Set the CC-Link network mode.

Make sure that **"Mode setting"** in the CC-Link network parameter setting screen is selected in [Remote Network - Ver.2 mode].

"Network parameters" screen



Mode: Remote Net(Ver.2 Mode)

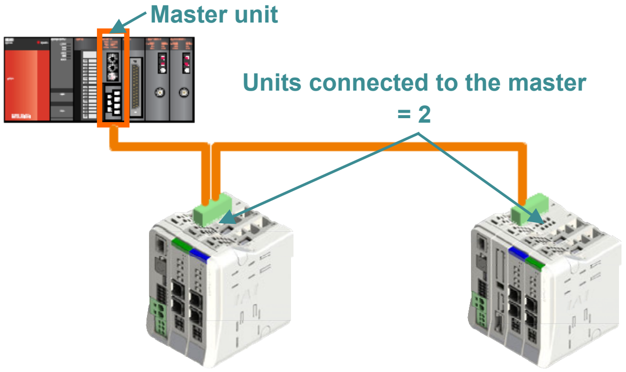
Point!

- RCON's CC-Link unit operates in Remote network - Ver.2 mode.

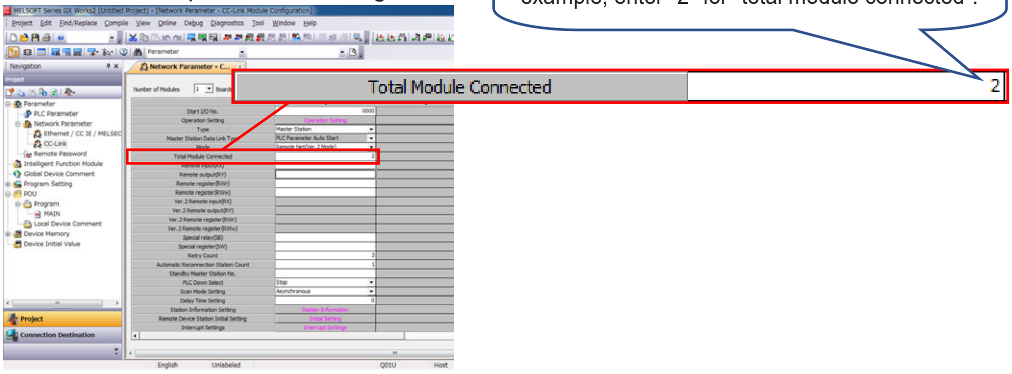
6

Enter the "total module connected" to the CC-Link master.

Connection example



CC-Link network parameters setting screen



Since there are two units connected to the CC-Link master in the above connection example, enter "2" for "total module connected".

Total Module Connected	2

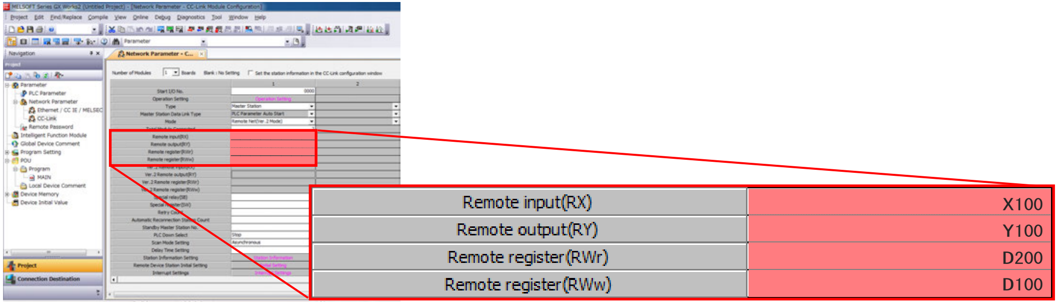
7

Set the "leading I/O number".

Next, we set the "I/O leading No." to be assigned to each unit connected to the master unit.

Set according to your context. In this case, we will set it as 🟥 below.

"Network parameters" screen

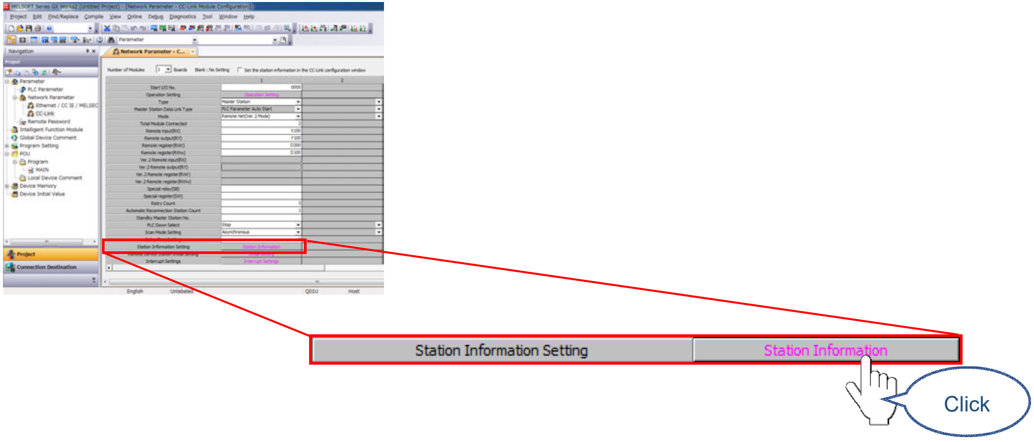


Remote input(RX)	X100
Remote output(RY)	Y100
Remote register(RWr)	D200
Remote register(RWw)	D100

8 Open the "CC-Link station information" screen.

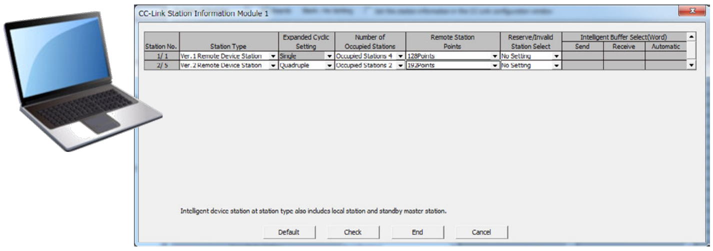
(1) Click **Station Information** in the CC-Link "Network parameters" screen.

"Network parameters" screen CC-Link network parameters setting screen



(2) "CC-Link station information" screen will be displayed.

"CC-Link station information" screen



CC-Link Station Information Module 1

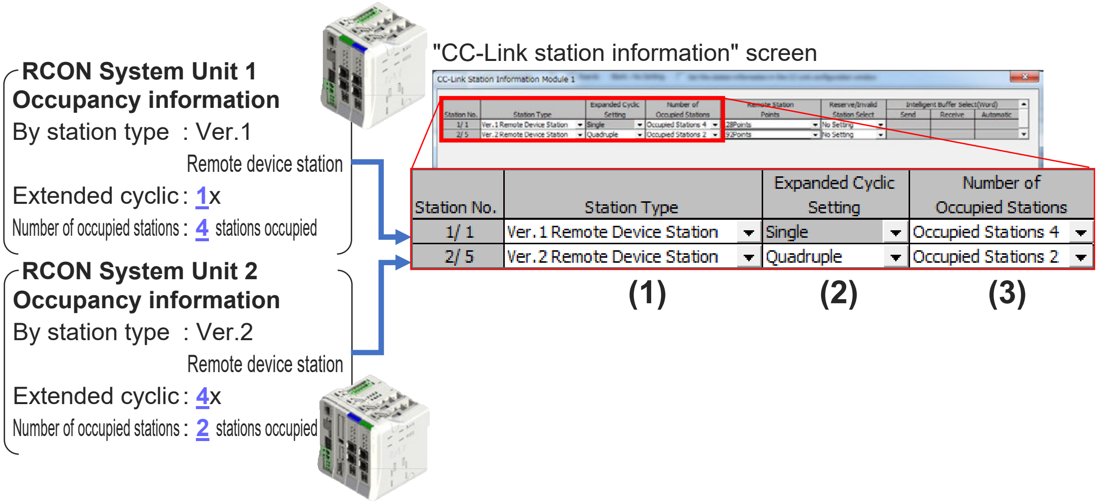
Station No.	Station Type	Expanded Cyclic Setting	Number of Occupied Stations	Remote Station Points	Reserve/Invalid Station Select	Intelligent Buffer Select(Word)		
						Send	Receive	Automatic
1/ 1	Ver.1 Remote Device Station	Single	Occupied Stations 4	128Points	No Setting			
2/ 5	Ver.2 Remote Device Station	Quadruple	Occupied Stations 2	192Points	No Setting			

Intelligent device station at station type also includes local station and standby master station.

9 Set the "CC-Link station information".

Set the occupancy information obtained based on the example.

The RCON system Unit 1 is set to "number of units / station number: 1/1" and the RCON system Unit 2 to "number of units / station number → 2/5".



RCON System Unit 1
Occupancy information
By station type : Ver.1
Remote device station
Extended cyclic : 1x
Number of occupied stations : 4 stations occupied

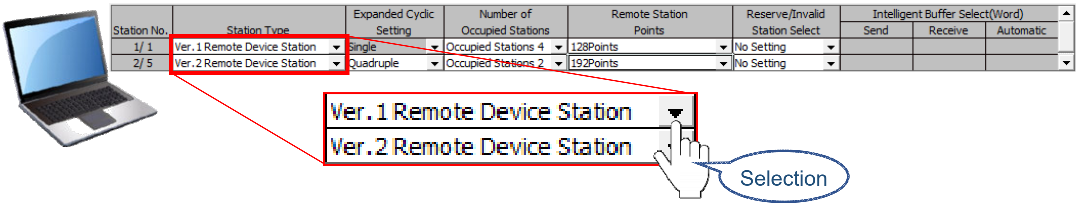
RCON System Unit 2
Occupancy information
By station type : Ver.2
Remote device station
Extended cyclic : 4x
Number of occupied stations : 2 stations occupied

"CC-Link station information" screen

Station No.	Station Type	Expanded Cyclic Setting	Number of Occupied Stations
1/ 1	Ver.1 Remote Device Station	Single	Occupied Stations 4
2/ 5	Ver.2 Remote Device Station	Quadruple	Occupied Stations 2

(1) Select the "station type".
Select "Ver.1 remote device station" for "number of units / station number: 1/1" and "Ver.2 remote device station" for "number of units / station number: 2/5".

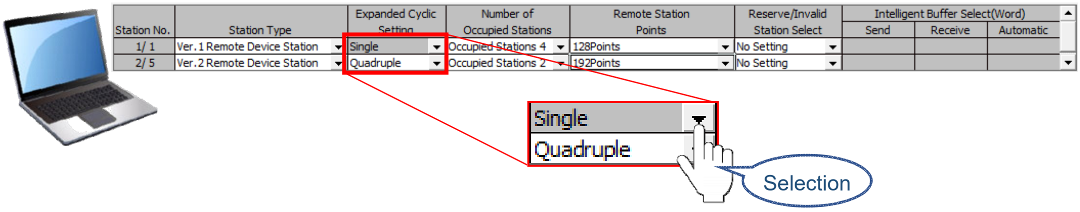
"CC-Link station information" screen



Station No.	Station Type	Expanded Cyclic Setting	Number of Occupied Stations	Remote Station Points	Reserve/Invalid Station Select	Intelligent Buffer Select(Word) Send	Receive	Automatic
1/ 1	Ver.1 Remote Device Station	Single	Occupied Stations 4	128Points	No Setting			
2/ 5	Ver.2 Remote Device Station	Quadruple	Occupied Stations 2	192Points	No Setting			

(2) Perform the "extended cyclic setting".
"Number of units / station number: 1/1" is fixed at "Single". Select "Quadruple" for the "number of units / station number: 2/5".

"CC-Link station information" screen

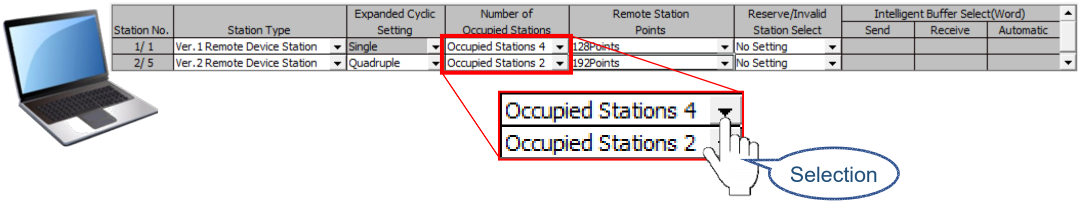


Station No.	Station Type	Expanded Cyclic Setting	Number of Occupied Stations	Remote Station Points	Reserve/Invalid Station Select	Intelligent Buffer Select(Word) Send	Receive	Automatic
1/ 1	Ver.1 Remote Device Station	Single	Occupied Stations 4	128Points	No Setting			
2/ 5	Ver.2 Remote Device Station	Quadruple	Occupied Stations 2	192Points	No Setting			

(3) Set the "number of occupied stations".

Select "4 stations occupied" for "Number of units/Station number: 1/1". Select "2 stations occupied" for the "number of units / station number: 2/5".

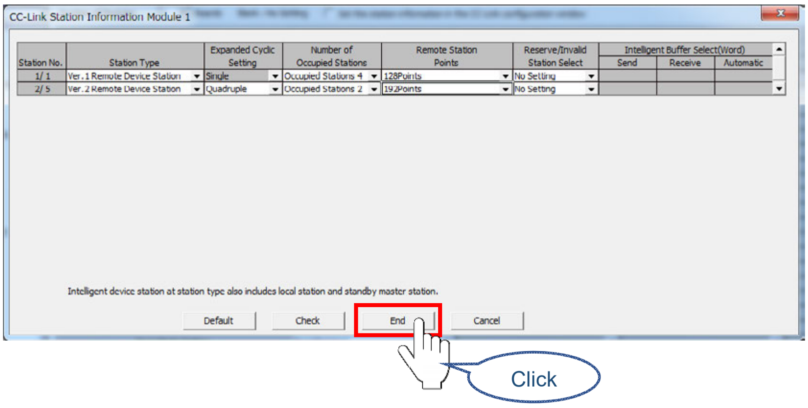
"CC-Link station information" screen



Station No.	Station Type	Expanded Cyclic Setting	Number of Occupied Stations	Remote Station Points	Reserve/Invalid Station Select	Intelligent Buffer Select(Word)		
						Send	Receive	Automatic
1/ 1	Ver. 1 Remote Device Station	Single	Occupied Stations 4	128Points	No Setting			
2/ 5	Ver. 2 Remote Device Station	Quadruple	Occupied Stations 2	192Points	No Setting			

(4) When "CC-Link station information" is set, click End on the same screen.

"CC-Link station information" screen

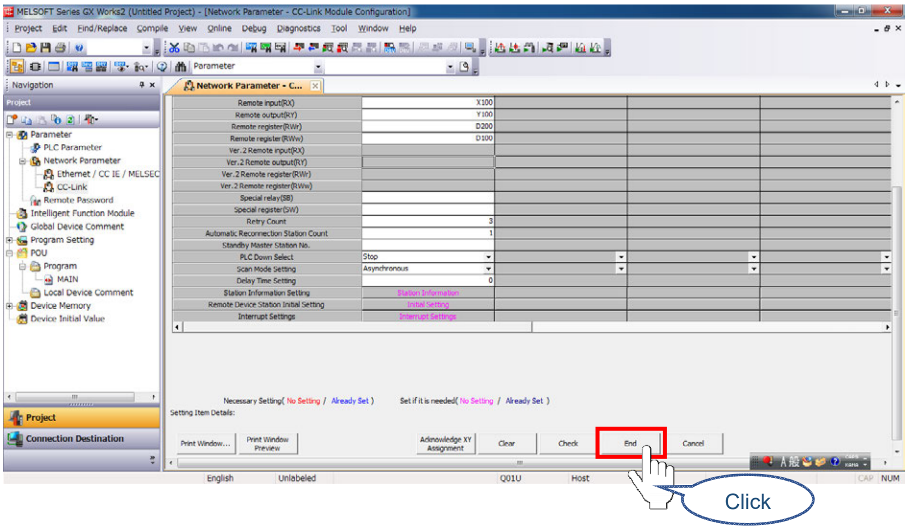


Station No.	Station Type	Expanded Cyclic Setting	Number of Occupied Stations	Remote Station Points	Reserve/Invalid Station Select	Intelligent Buffer Select(Word)		
						Send	Receive	Automatic
1/ 1	Ver. 1 Remote Device Station	Single	Occupied Stations 4	128Points	No Setting			
2/ 5	Ver. 2 Remote Device Station	Quadruple	Occupied Stations 2	192Points	No Setting			

Intelligent device station at station type also includes local station and standby master station.

(5) When it returns to the "Network parameters" screen, click End.

"Network parameters" screen



Remote input(RX)	X100			
Remote output(RY)	Y100			
Remote register(RWr)	D200			
Remote register(RWw)	D100			
Ver. 2 Remote input(RX)				
Ver. 2 Remote output(RY)				
Ver. 2 Remote register(RWr)				
Ver. 2 Remote register(RWw)				
Special relay(SB)				
Special register(SW)				
Retry Count	3			
Automatic Reconnection Station Count	1			
Standby Master Station No.				
PLC Down Select	Stop			
Scan Mode Setting	Asynchronous			
Delay Time Setting	0			
Station Information Setting	Station Information			
Remote Device Station Initial Setting	Initial Setting			
Interrupt Settings	Interrupt Settings			

Necessary Setting(No Setting / Already Set) Set if it is needed(No Setting / Already Set)

Setting Item Details:

Writes the last set network parameters to PLC.

[Saving network parameters]

10 Write the network parameters to PLC.

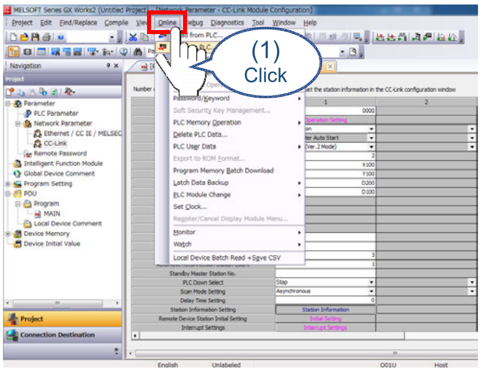
Caution

- The following description is based on one example. Be careful not to accidentally delete your valuable data.

(1) Click **Online** on the menu bar.

Mitsubishi Electric PLC programming software GX Works2

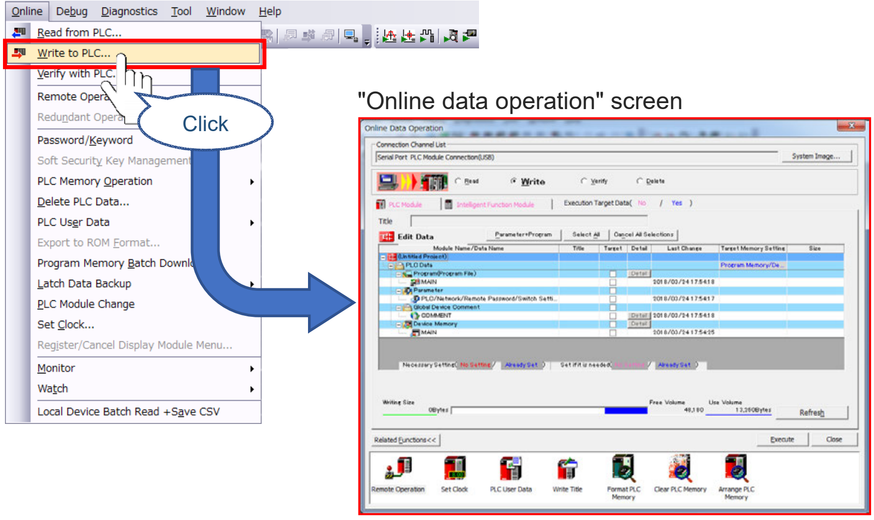
"Main" screen



(2) Clicking on **Write to PLC...** will display the "PC write" screen.

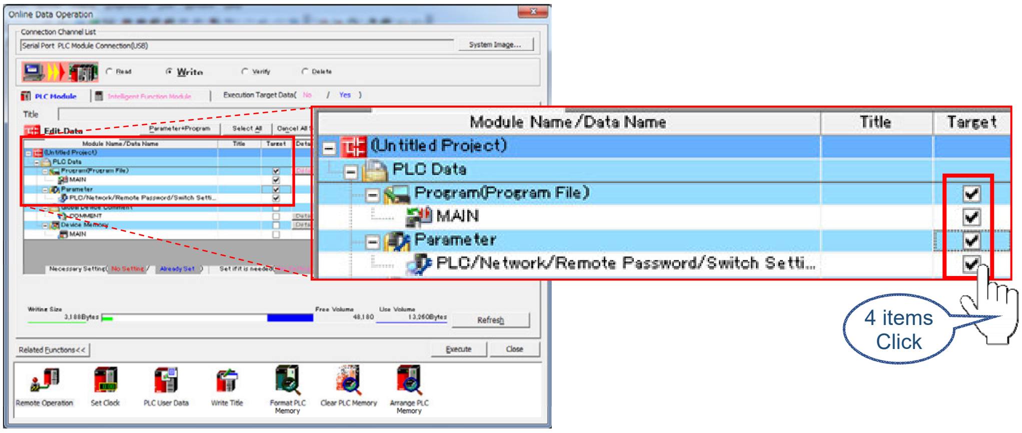
"Main" screen online part

"Online data operation" screen



(3) On the "Online data operation" screen, click the checkboxes ☐ for "Program (program file)", "MAIN", "Parameter" and "PC / network / remote password" to change to ☑ .

"Online data operation" screen

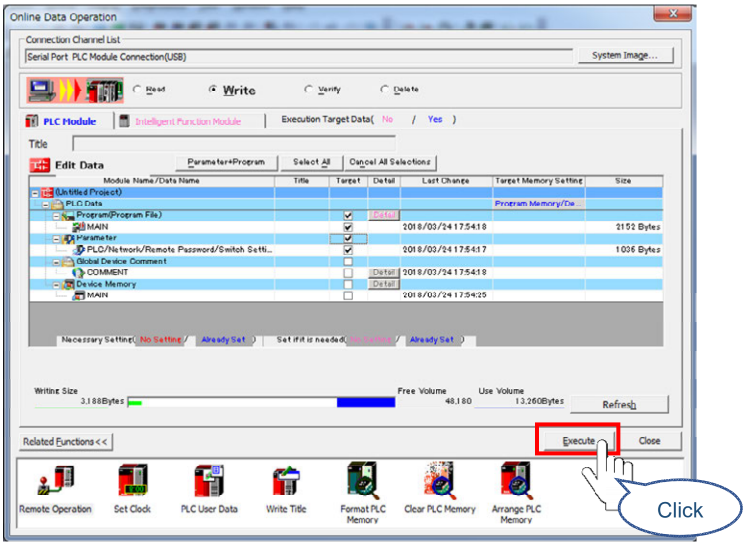


Module Name/Data Name	Title	Target
(Untitled Project)		
PLC Data		
Program(Program File)		☑
MAIN		☑
Parameter		☑
PLC/Network/Remote Password/Switch Setti...		☑

4 items
Click

(4) Click Execute .

"Online data operation" screen



Connection Channel List: Serial Port PLC Module Connection(USB)

● Write

Execution Target Data(No / Yes)

Module Name/Data Name	Title	Target	Detail	Last Change	Target Memory Setting	Size
(Untitled Project)						
PLC Data					Program Memory/De...	
Program(Program File)		☑	Detail			
MAIN		☑		2018/03/24 17:54:18		2152 Bytes
Parameter		☑				
PLC/Network/Remote Password/Switch Setti...		☑		2018/03/24 17:54:17		1036 Bytes
Global Device Comment		☐				
COMMENT		☐	Detail	2018/03/24 17:54:18		
Device Memory		☐	Detail			
MAIN		☐		2018/03/24 17:54:25		

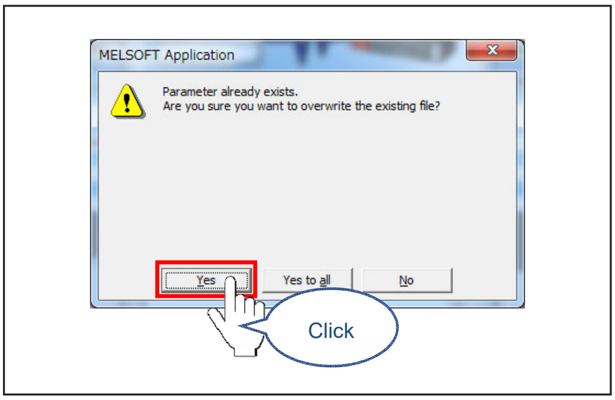
Writing Size 3,188Bytes
Free Volume 48,180
Use Volume 13,260Bytes

Click

Caution

- The following description is based on one example. Be careful not to accidentally delete your valuable data.

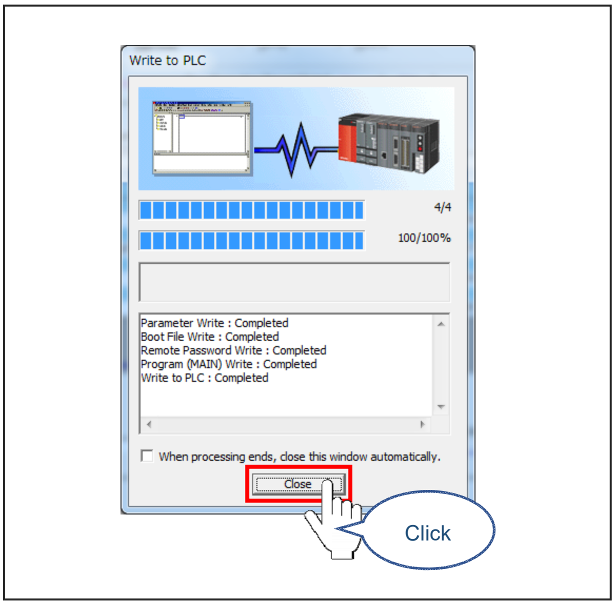
(5) When the following message is displayed, click Yes .



MELSOFT Application

Parameter already exists.
Are you sure you want to overwrite the existing file?

(6) When the parameter is written and the condition shown in the following figure is achieved, click Close .
This concludes the PLC network configuration.



Write to PLC

4/4

100/100%

```
Parameter Write : Completed
Boot File Write : Completed
Remote Password Write : Completed
Program (MAIN) Write : Completed
Write to PLC : Completed
```

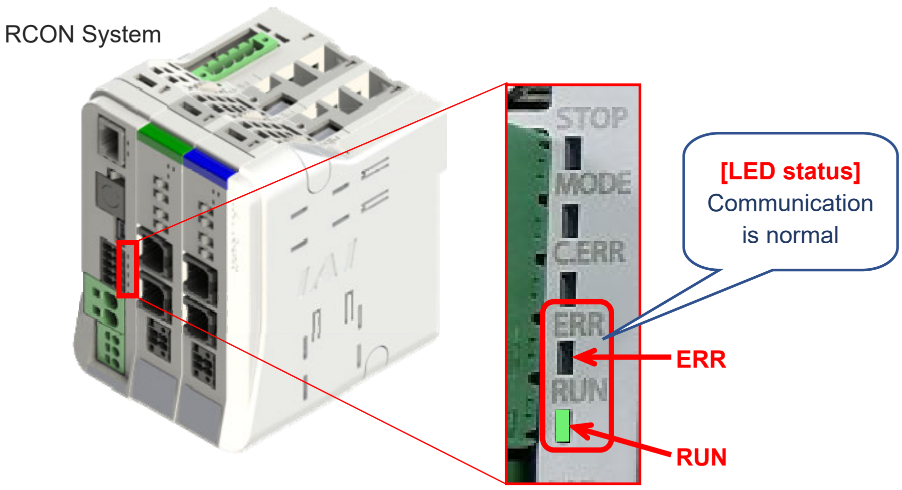
☐ When processing ends, close this window automatically.

[Confirming CC-Link communication status]

Confirm the communication between the CC-Link master unit and the RCON system.

1 Check the communication status in the RCON system.

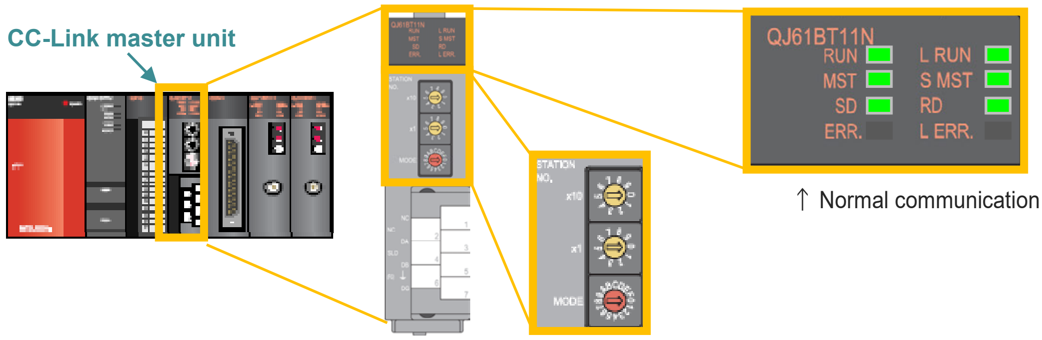
Check the LED (ERR and RUN) status (color) on the front of the gateway unit to confirm the status (normal communication) of the ▭ part.



Status LED	Display status	Definition of display
ERR	🟧 Lit	・Error status ・Time between power-on or software reset to the end of CC-Link initialization
	■ Light off	・Normal communication
	★ (0.4 s)	・The station number or communication speed setting changed during communication
RUN	🟩 Lit	・In communication
	■ Light off	・When not in communication

★ indicates blinking. The value in ( ) is the blinking cycle.

2 Look at the LED status on the front of the CC-Link master and judge whether it is communicating normally.



↑ Normal communication status

No.	LED name	Applications
1	RUN	The operation status will be displayed.
	Light ON 🟩	Normal operation
	Light OFF ⬛	Hardware error or watchdog timer error generated
2	L RUN	The status of the data link will be displayed.
	Light ON 🟩	Data link in process
	Light OFF ⬛	Data link not executed
3	SD	The data transmission status will be displayed.
	Light ON 🟩	Transmitting data
	Light OFF ⬛	Data not transmitted
4	RD	The data receipt status will be displayed.
	Light ON 🟩	Receiving data
	Light OFF ⬛	Data not transmitted
5	ERR.	The error status of the master/local unit will be displayed. Refer to Mitsubishi Electric Co., Ltd. Instruction Manual for error details.
	Light ON 🟥	One of the following errors has occurred. · Error was detected in all stations. · The setting of "station number setting switch" or "transmission speed / mode setting switch" of the master/local main unit is out of the range. · The master stations are duplicated on the same network. · There is an error in the network setting. · CC-Link cable is disconnected. Or there is influence of noise, etc.
	Light OFF ⬛	Normal operation.
6	L ERR.	The status of the data link error will be displayed
	Light ON 🟥	Data link error has occurred in the local station.
	Flashing at regular intervals ★	The setting of the master unit full-surface panel switch on the right has been changed while the power was turned on.
	Flashing at regular intervals ★	Communication is unstable due to the following causes. · Terminal resistor is not connected. Impacted by noise
	Light OFF ⬛	Normal operation.

★ indicates blinking. MST S MST indicate whether or not the master station and standby master station are in operation as master stations.

4.3 Installing PC software

Installing

Items to prepare

RCON system / PC / RCM-101 supplied CD-ROM / cable

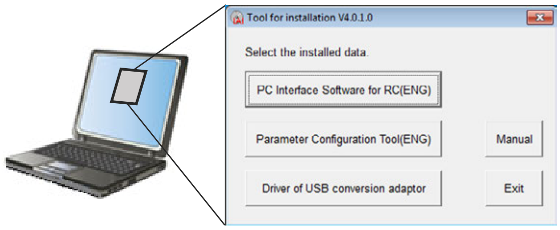
The operation is explained in the IAI PC software (Model Code: RCM-101-USB, PC OS environment Windows 7).
Refer to Fast Step Guide (ME0391) for how to install Model Code: IA-OS.

1

(1) Insert the CD-ROM supplied with RCM- 101-USB into the CD drive of the PC.

Insert CD-ROM supplied with RCM-101

(2) The "Tool for installation" screen will be displayed.



"Tool for installation" screen

Select the installed data.

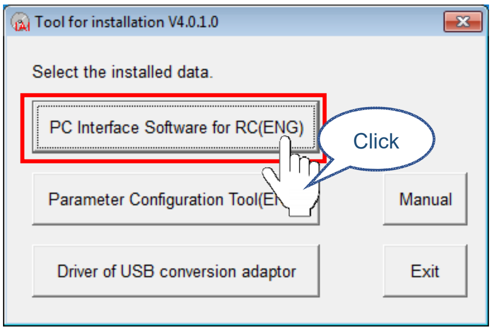
Point!

- When the startup method window is displayed when CD-ROM is inserted, select "Autoplay". If the contents of the folder are displayed, double-click and execute "IAI_Install".

2

(1) Click PC Interface Software for RC(ENG) .

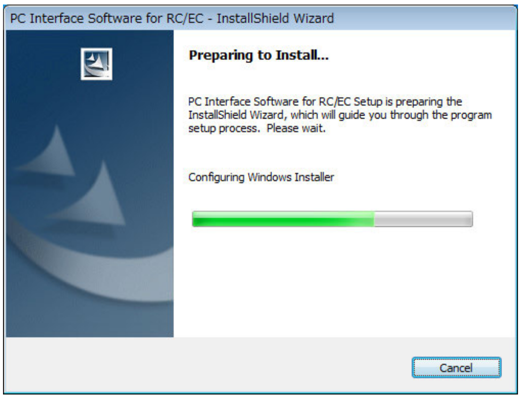
"Tool for installation" screen



Select the installed data.

(2) When the installation preparation of PC software starts, "PC software InstallShield Wizard" screen will be displayed.

"PC software - InstallShield Wizard" screen



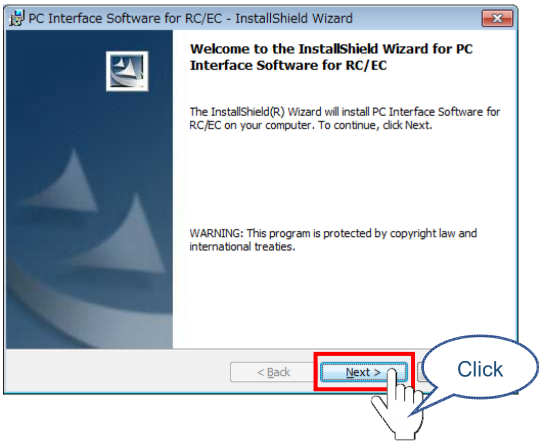
Preparing to Install...

PC Interface Software for RC/EC Setup is preparing the InstallShield Wizard, which will guide you through the program setup process. Please wait.

Configuring Windows Installer

(3) After the screen switches to the one at right, click Next > .

"PC software - InstallShield Wizard" screen



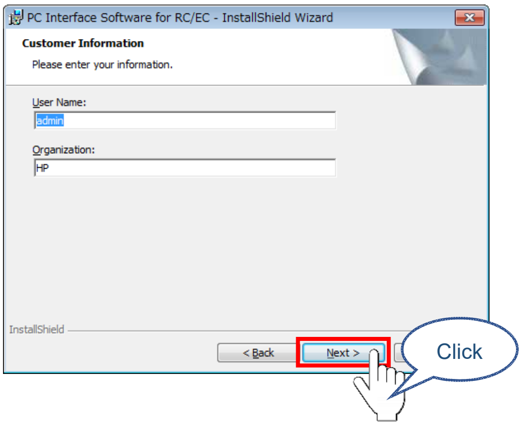
Welcome to the InstallShield Wizard for PC Interface Software for RC/EC

The InstallShield(R) Wizard will install PC Interface Software for RC/EC on your computer. To continue, click Next.

WARNING: This program is protected by copyright law and international treaties.

(4) Click Next > .

"PC Interface Software - InstallShield Wizard"


PC Interface Software for RC/EC - InstallShield Wizard

Customer Information

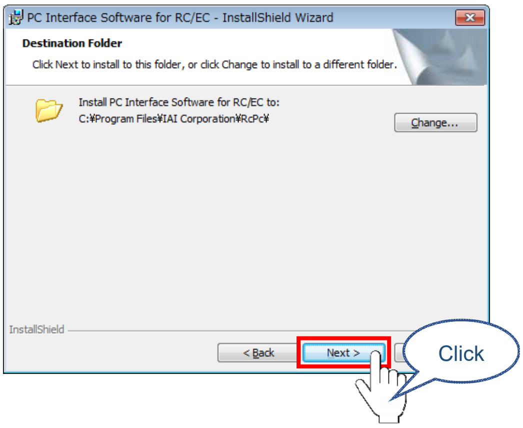
Please enter your information.

User Name: admin

Organization: HP

(5) Click Next > .

"PC Interface Software - InstallShield Wizard"


PC Interface Software for RC/EC - InstallShield Wizard

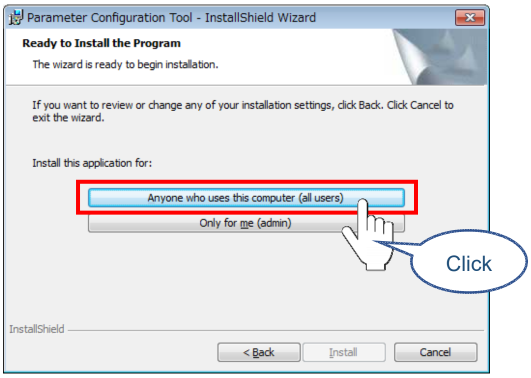
Destination Folder

Click Next to install to this folder, or click Change to install to a different folder.

Install PC Interface Software for RC/EC to:
C:¥Program Files¥IAI Corporation¥RcPc¥

(6) Click Anyone who uses this computer (all users) .

"PC Interface Software - InstallShield Wizard"


Parameter Configuration Tool - InstallShield Wizard

Ready to Install the Program

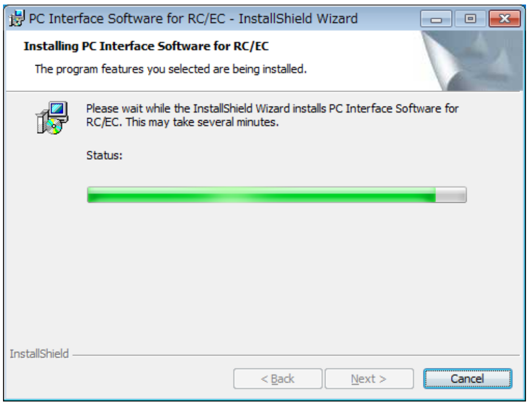
The wizard is ready to begin installation.

If you want to review or change any of your installation settings, click Back. Click Cancel to exit the wizard.

Install this application for:

(7) The screen on the bottom right will be displayed and the installation of the PC software will start.

"PC Interface Software - InstallShield Wizard"



PC Interface Software for RC/EC - InstallShield Wizard

Installing PC Interface Software for RC/EC

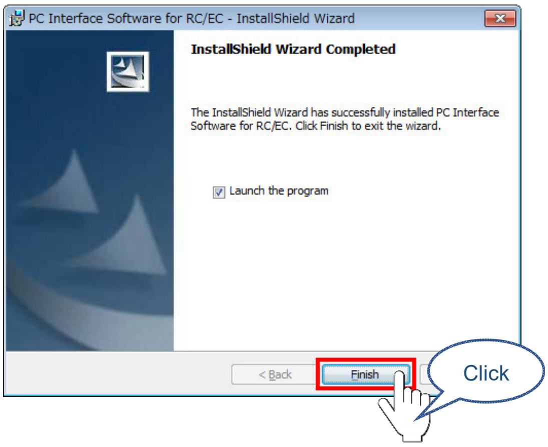
The program features you selected are being installed.

Please wait while the InstallShield Wizard installs PC Interface Software for RC/EC. This may take several minutes.

Status:

(8) When the screen on the bottom right is displayed, the installation of the PC software is finished.
Click Finish .

"PC Interface Software - InstallShield Wizard"



PC Interface Software for RC/EC - InstallShield Wizard

InstallShield Wizard Completed

The InstallShield Wizard has successfully installed PC Interface Software for RC/EC. Click Finish to exit the wizard.

☑ Launch the program

(9) Confirm that the "PC Interface Software for RC/EC" shortcut is displayed on your PC.

This concludes the installation of PC software.

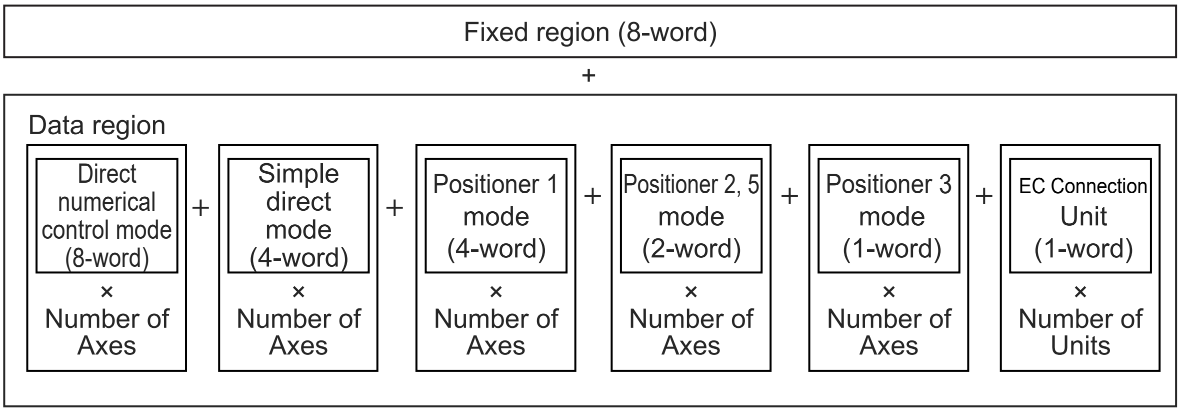
[Items for Reference] Installing USB driver
Refer to “Chapter 4, 4.1 How to Use the Gateway Parameter Configuration Tool (page B4-5 to B4-16)”.

4.4 Address Configuration

The RCON address configuration is the same for all driver units regardless of field network type. The addresses occupied by the network consist of the fixed domains of 8 words, data domains flexible to the operation mode and number of axes and data domains for the EC connection unit. Each operation mode and occupied data region is as follows.

Direct numerical control mode, simple direct mode and positioner 1~3 and 5 modes can be mixed for use and the model for each axis can be selected arbitrarily.

Selection of the operation mode is not available in the EC connection unit.



Fixed region configuration

	PLC output ⇒ RCON			RCON ⇒ PLC input		
	High byte	Low byte	Word count	High byte	Low byte	Word count
Gateway control region	Gateway control signal 0		2	Gateway status signal 0		2
	Gateway control signal 1			Gateway status signal 1		
Power supply unit region *	Not available.		6	Power supply unit status signal 0		6
	Not available.			Power supply unit status signal 1		
	Not available.			Power supply unit status signal 2		
	Not available.			Power supply unit status signal 3		
	Not available.			Power supply unit status signal 4/ Light malfunction maintenance signal (Note1)		
	Not available.			Not available.		

* Occupied as a data region even if a power supply unit is not connected.

Note 1: This signal can change the feature by switchover in the gateway parameter.

(1) Gateway control/status signals

The first 2 words in each of input and output in the address configuration in the gateway unit are the signals to control the gateway unit and to monitor the status.

PLC output

									Address *			
									CC-Link, CC-Link IE Field	DeviceNet	PROFIBUS-DP, EtherNet/IP, EtherCAT	PROFINET-IO
									—	Relative CH	Relative byte	Relative module
Gateway Control signal 0	b15	b14	b13	b12	b11	b10	b9	b8	RY 0*	+0	+0	+0
	MON	—	RTE	—	—	—	—	—				
	b7	b6	b5	b4	b3	b2	b1	b0			+1	
	—	—	—	—	—	—	—	—				
Gateway Control signal 1	b15	b14	b13	b12	b11	b10	b9	b8	RY 1*	+1	+2	
	—	—	—	—	—	—	—	—				
	b7	b6	b5	b4	b3	b2	b1	b0			+3	
	—	—	—	—	—	—	—	—				

PLC input

Gateway Status signal 0	b15	b14	b13	b12	b11	b10	b9	b8
	RUN	LERC	ERRT	MOD	ALMH	ALML	—	SEMG
	b7	b6	b5	b4	b3	b2	b1	b0
	ALMC128	ALMC64	ALMC32	ALMC16	ALMC8	ALMC4	ALMC2	ALMC1
Gateway Status signal 1	b15	b14	b13	b12	b11	b10	b9	b8
	LNK15	LNK14	LNK13	LNK12	LNK11	LNK10	LNK9	LNK8
	b7	b6	b5	b4	b3	b2	b1	b0
	LNK7	LNK6	LNK5	LNK4	LNK3	LNK2	LNK1	LNK0

Address *			
CC-Link, CC-Link IE Field	DeviceNet	PROFIBUS-DP, EtherNet/IP, EtherCAT	PROFINET-IO
—	Relative CH	Relative byte	Relative module
RX 0*	+0	+0	+0
		+1	
RX 1*	+1	+2	
		+3	

*Address is the address relative to the gateway head.
CC-Link, CC-Link IE Field, and DeviceNet have word addresses while PROFIBUS-DP, EtherNet/IP, and EtherCAT use byte addresses. PROFINET-IO uses 4-word module addresses.
The * in CC-Link and CC-Link IE Field bit register addresses is 0 to F.
For CC-Link and CC-Link IE Field, b10 to b15 are bA to bF. (Hexadecimal notation)
For PROFIBUS-DP, EtherNet/IP, and EtherCAT, b8 to b15 are b0 to b7. (Byte addresses)

I/O signal list

Signal type		Bit	Symbol name	Content
PLC output	Control signal 0	15	MON	PLC control output is enabled when ON ("1") (PLC output is reflected on controller unit) and disabled when OFF ("0"). * It should be used only for control of driver units
		14	–	Not available. Keep this OFF ("0") normally.
		13	RTE	Turn it on and the hold status of ERR-T or ERR-C during operation gets released: Release signal when ERR-T or ERR-C was set to latch in the gateway parameter setting seal
		12-0	–	Not available. Keep this OFF ("0") normally.
	Control signal 1	15-0	–	Not available.
PLC input	Status signal 0	b15	RUN	Turns ON when gateway is in normal operation.
		b14	LERC	Turns ON and stays ON when an ERR-C error is generated while operating. Enabled when ERR-C generation is configured with the gateway parameter configuration tool.
		b13	ERRT	Turns ON if a gateway or axis communication error is detected.
		b12	MOD	Turns ON if MANU is selected with the unit front operation mode setting switch, and turns OFF when AUTO is selected.
		b11	ALMH	Turns ON if an error occurs that requires the gateway to be restarted. (Likely due to a mistaken parameter setting. Confirm as needed.)
		b10	ALML	Turns ON if a minor error caused by the gateway occurs. (Likely that calendar data has been deleted. Confirm as needed.)
		b9	–	Not available
		b8	SEMG	Turns ON when the system I/O connector STOP signal input is OFF (stop). All connected axes will go to stop status if this bit turns ON.
		b7	ALMC 1 to 128	Outputs alarm codes caused by the gateway. [For details, refer to "Maintenance Section Chapter 2, 2.3 Gateway Unit Alarm Causes and Countermeasures"]
		b6		
		b5		
		b4		
		b3		
		b2		
		b1		
		b0		
	Status signal 1	b15	LNK15	When communication between the gateway unit and the driver unit is solidly established, the bit No. that the gateway recognizes as enabled turns ON. Axis No. 0 = LNK0 to Axis No. 15 = LNK15 * It is not available in EC connection unit
		b14	LNK14	
		b13	LNK13	
		b12	LNK12	
		b11	LNK11	
		b10	LNK10	
		b9	LNK9	
		b8	LNK8	
		b7	LNK7	
		b6	LNK6	
		b5	LNK5	
		b4	LNK4	
		b3	LNK3	
		b2	LNK2	
		b1	LNK1	
		b0	LNK0	

(2) Power supply unit (PSA-24) status signal

Eight words of input and output from the top address of the gateway unit are the fixed domains. Six words in these domains should be assigned as the power supply unit status signal domains and the condition of the IAI 24V DC power supply unit PSA-24 can be checked.

■ Address configuration

Request command region and response command region comprise 6 words for each I/O. Address is the address relative to the gateway head.

(1) For CC-Link and CC-Link IE Field

Bit Address	PLC output ⇒ gateway ⇒ each axis input b15 High byte b8 / b7 Low byte b0	Each axis output ⇒ gateway ⇒ PLC input b15 High byte b8 / b7 Low byte b0	Bit Address
RY 2F~20	Not available	Power supply unit status signal 0	RX 2F~20
RY 3F~30	Not available	Power supply unit status signal 1	RX 3F~30
RY 4F~40	Not available	Power supply unit status signal 2	RX 4F~40
RY 5F~50	Not available	Power supply unit status signal 3	RX 5F~50
RY 6F~60	Not available	Power supply unit status signal 4/ Light malfunction maintenance signal	RX 6F~60
RY 7F~70	Not available	Not available	RX 7F~70

(2) For DeviceNet

Word Address	PLC output ⇒ gateway ⇒ each axis input b15 High byte b8 / b7 Low byte b0	Each axis output ⇒ gateway ⇒ PLC input b15 High byte b8 / b7 Low byte b0
+2	Not available	Power supply unit status signal 0
+3	Not available	Power supply unit status signal 1
+4	Not available	Power supply unit status signal 2
+5	Not available	Power supply unit status signal 3
+6	Not available	Power supply unit status signal 4/ Light malfunction maintenance signal
+7	Not available	Not available

(3) For PROFIBUS-DP, EtherNet/IP, and EtherCAT

*1 Byte Address	PLC output ⇒ gateway ⇒ each axis input		Each axis output ⇒ gateway ⇒ PLC input	
	b15 High byte b8	b7 Low byte b0	b15 High byte b8	b7 Low byte b0
+4/+5	Not available		Power supply unit status signal 0	
+6/+7	Not available		Power supply unit status signal 1	
+8/+9	Not available		Power supply unit status signal 2	
+10/+11	Not available		Power supply unit status signal 3	
+12/+13	Not available		Power supply unit status signal 4/ Light malfunction maintenance signal	
+13/+14	Not available		Not available	

*1 b8 to b15 of the high byte are b0 to b7.

(4) For PROFINET-IO

*2 Module Address	PLC output ⇒ gateway ⇒ each axis input		Each axis output ⇒ gateway ⇒ PLC input	
	b15 High byte b8	b7 Low byte b0	b15 High byte b8	b7 Low byte b0
+0	Not available		Power supply unit status signal 0	
	Not available		Power supply unit status signal 1	
	Not available		Power supply unit status signal 2	
	Not available		Power supply unit status signal 3	
+1	Not available		Power supply unit status signal 4/ Light malfunction maintenance signal	
	Not available		Not available	

*2 PROFINET-IO uses 4-word unit module addresses.

■ I/O signal

The details of the power supply unit status signal address configuration are as follows.

PLC input

Power supply unit Status signal 0~4	b15	b14	b13	b12	b11	b10	b9	b8
	LNK	–	–	–	–	OPMV	FANW	FANA
	b7	b6	b5	b4	b3	b2	b1	b0
	PSMV							

I/O signal list

Signal type		Bit	Symbol name	Content
PLC input	Power unit Status signal 0 ~ 4	b15	LNK	When communication between the gateway unit and the power supply unit is solidly established, it turns ON when the gateway unit recognizes it as enabled.
		b14 ~ 11	–	Not available
		b10	OPMV	ON when a reading error occurs in monitored data.
		b9	FANW	Generates a message level alarm (alarm code 04C "Fan rotation speed drop") when the fan rotation speed decreases 30%. ON when an alarm occurs and OFF when the alarm is canceled.
		b8	FANA	If the fan rotation speed drops 50%, an operation cancel level alarm (alarm code 0D6 "Fan error detection") is generated, and the actuator stops. ON when an alarm occurs and OFF when the alarm is canceled.
		b7 b6 b5 b4 b3 b2 b1 b0	PSMV	Monitors the item selected using the gateway parameter configuration tool. One of the following seven items can be monitored. (1) Output voltage: 0~255 V (2) Voltage of auxiliary winding: 0~255 V (3) Output current: 0~25.5 A (0.1 A increments) (4) Peak hold current: 0~25.5 A (0.1 A increments) (5) Load factor: 0~255% (6) FAN rotation speed: 0~25,500 r/min (100 r/min increments) (7) PCB temperature: 0~255°C

Monitored items

Item	Content
(1) Output voltage	This power supply can vary the output voltage according to the load. The output voltage monitoring value changes, but this is not abnormal.
(2) Voltage of auxiliary winding	Control power supply voltage inside the power supply unit. As with the output voltage, it changes according to the load on the output voltage side.
(3) Output current	Instantaneous value of output current.
(4) Peak hold current	Peak value of output current.
(5) Load factor	Ratio of integral value of output current and rated output current. If this value exceeds 100%, the output voltage is cut off as an overload error.
(6) FAN rotation speed	It is the speed of the fan rotation.
(7) PCB temperature	Internal temperature: Temperature in the vicinity of the output capacitor on the secondary side.

The items to be monitored should be selected in the gateway setup tool.
For details of the selection method, refer to [3.9 Gateway Parameter Configuration Tool (page A3-156)]

(3) Light Malfunction Maintenance Output Feature (Light Malfunction Maintenance Signal)

The light malfunction maintenance output feature is a feature that outputs light malfunction alarms output from each driver unit and maintenance warnings output from ELECYLINDER connected to the EC connection unit (RCON-EC) to the host PLC. (Note1)

Power Supply Unit Status Signal 4 in the power supply unit status signal domain should be assigned as the domain of the maintenance signals.

This feature gets enabled by having the number of the connected power supply units assigned to the gateway to four units or less. Refer to [3.9 Gateway Parameter Configuration Tool].

This signal can be utilized as a predictive maintenance feature.

■I/O signal

The details of light malfunction maintenance signal address configuration are as follows.

PLC input

Light Malfunction Maintenance Signal	b15	b14	b13	b12	b11	b10	b9	b8
	MNT15	MNT14	MNT13	MNT12	MNT11	MNT10	MNT9	MNT8
	b7	b6	b5	b4	b3	b2	b1	b0
	MNT7	MNT6	MNT5	MNT4	MNT3	MNT2	MNT1	MNT0

I/O signal list

Signal type		Bit	Symbol name	Content
PLC input	Light Malfunction Maintenance Signal	b15	MNT15	ALML bit of ELECYLINDER connected via a driver and EC connection unit should be assigned in order of axis numbers. Axis No.0 = MNT0 ~ Axis No.15 = MNT15
		b14	MNT14	
		b13	MNT13	
		b12	MNT12	
		b11	MNT11	
		b10	MNT10	
		b9	MNT9	
		b8	MNT8	
		b7	MNT7	
		b6	MNT6	
		b5	MNT5	
		b4	MNT4	
		b3	MNT3	
		b2	MNT2	
		b1	MNT1	
		b0	MNT0	

Note1 Gateway version should be V0009 or later

Data region configuration

(1) Direct numerical control mode data region configuration

	PLC output ⇒ each axis input			Each axis output ⇒ PLC input		
	High byte	Low byte	Word count	High byte	Low byte	Word count
Direct specified region	Specified position data (L) *		2	Present position data (L)) *		2
	Specified position data (H)) *			Present position data (H)) *		
	Specified positioning width (L)) *		2	Present current value (L)) * (Note 1)		2
	Specified positioning width (H)) *			Present current value (H)) * (Note 1)		
	Specified speed		1	Present speed data		1
	Specified acceleration/deceleration		1	Not available.		1
	Pushing current limit value		1	Alarm code		1
Control signal region	Control signal		1	Status signal		1

*(L) is the low word of a 2-word datum while (H) is the high word of a 2-word datum.

Note 1: The present current value should be the command current value for the stepper motor and be the feedback current value for the AC servomotor (including AC servomotor connected to SCON-CB).

(2) Simple direct mode and positioner 1 mode data region configuration

	PLC output ⇒ each axis input					Each axis output ⇒ PLC input				
	High byte	Low byte	Word count	Simple direct mode	Positioner 1 mode	High byte	Low byte	Word count	Simple direct mode	Positioner 1 mode
Position data specified region	Specified position data (L)		2	○	x*	Present position data (L)		2	○	○
	Specified position data (H)					Present position data (H)				
Position specified region	Command position No.		1	○	○	Completed position No.		1	○	○
Control signal region	Control signal		1	○	○	Status signal		1	○	○

* Positioner 1 mode does not use the position data specified region (PLC ⇒ each axis input), but it is occupied as a data region.

(3) Positioner 2 mode data region configuration

	High byte	Low byte	Word count	High byte	Low byte	Word count
Position specified region	Command position No.		1	Completed position No.		1
Control signal region	Control signal		1	Status signal		1

(4) Positioner 3 mode data region configuration

	High byte	Low byte	Word count	High byte	Low byte	Word count
Control signal region	Control signal	Command position No.	1	Status signal	Completed position No.	1

(5) Positioner 5 mode data region configuration

	High byte	Low byte	Word count	High byte	Low byte	Word count
Position specified region	Command position No.		1	Present position data (0.1 mm increments)		1
Control signal region	Control signal		1	Status signal		1

(6) EC connection unit data region configuration

	High byte	Low byte	Word count	High byte	Low byte	Word count
Control signal region	Control signal (for four axes).		1	Status signal (for four axes)		1

Overall address configuration example

Here shows an example for the overall address configuration when four-word mode axes (Simple Direct / Positioner 1) are connected for 12 axes, eight-word mode axes (Direct Indication) for two axes are connected, and also the overall address configuration when two-word mode axes (Positioner 2 / Positioner 5) for 12 axes and one unit of the EC connection unit are connected.
Note that CC-Link and DeviceNet are assigned with word addresses while PROFIBUS uses byte addresses.

[For CC-Link]
The following page shows a CC-Link configuration example.
Fixed 8-word region is assigned to the bit register (RX/RY), while the region for each axis is assigned to the word register (RWr/RWw).

- CC-Link overall address configuration example (direct numerical control mode + simple direct mode/positioner 1 mode) shows direct numerical control mode connection for 2 axes and simple direct or positioner 1 mode connection for 12 axes.

PLC output ⇒ RCON | RCON ⇒ PLC input

Output register	High byte Low byte	Input register	High byte Low byte	
RY0F to 00	Gateway control signal 0	RX0F to 00	Gateway status signal 0	8 words each Fixed region
RY1F to 10	Gateway control signal 1	RX1F to 10	Gateway status signal 1	
RY2F to 20	(Not available)	RX2F to 20	Power supply unit status signal 0	
RY3F to 30	(Not available)	RX3F to 30	Power supply unit status signal 1	
RY4F to 40	(Not available)	RX4F to 40	Power supply unit status signal 2	
RY5F to 50	(Not available)	RX5F to 50	Power supply unit status signal 3	
RY6F to 60	(Not available)	RX6F to 60	Power supply unit status signal 4/ Light malfunction maintenance signal	
RY7F to 70	(Not available)	RX7F to 70	(Not available)	

*1 PLC master extended cyclic settings	Output register		Input register		
	RWw 00H	(Axis 0) Specified position data (L)	RWr 00H	(Axis 0) Present position data (L)	4 words each Positioner 1 /simple direct
16-word 1x multiplier *2	RWw 01H	(Axis 0) Specified position data (H)	RWr 01H	(Axis 0) Present position data (H)	
	RWw 02H	(Axis 0) Command position No.	RWr 02H	(Axis 0) Completed position No.	
	RWw 03H	(Axis 0) Control signal	RWr 03H	(Axis 0) Status signal	
	RWw 04H	(Axis 1) Specified position data (L)	RWr 04H	(Axis 1) Present position data (L)	4 words each
	RWw 05H	(Axis 1) Specified position data (H)	RWr 05H	(Axis 1) Present position data (H)	
	RWw 06H	(Axis 1) Command position No.	RWr 06H	(Axis 1) Completed position No.	
	RWw 07H	(Axis 1) Control signal	RWr 07H	(Axis 1) Status signal	
	RWw 08H	(Axis 2) Specified position data (L)	RWr 08H	(Axis 2) Present position data (L)	4 words each
	RWw 09H	(Axis 2) Specified position data (H)	RWr 09H	(Axis 2) Present position data (H)	
	RWw 0AH	(Axis 2) Command position No.	RWr 0AH	(Axis 2) Completed position No.	
	RWw 0BH	(Axis 2) Control signal	RWr 0BH	(Axis 2) Status signal	
	RWw 0CH	(Axis 3) Specified position data (L)	RWr 0CH	(Axis 3) Present position data (L)	4 words each
	RWw 0DH	(Axis 3) Specified position data (H)	RWr 0DH	(Axis 3) Present position data (H)	
	RWw 0EH	(Axis 3) Command position No.	RWr 0EH	(Axis 3) Completed position No.	
	RWw 0FH	(Axis 3) Control signal	RWr 0FH	(Axis 3) Status signal	
32-word 4x multiplier setting 2 stations	⋮	⋮		⋮	4 words each
	RWw 1FH	(Axis 7) Control signal	RWr 1FH	(Axis 7) Status signal	
64-word 8x multiplier	⋮	⋮	⋮	⋮	
	RWw 2FH	(Axis 11) Control signal	RWr 2FH	(Axis 11) Status signal	
	RWw 30H	(Axis 12) Specified position data (L)	RWr 30H	(Axis 12) Present position data (L)	8 words each Direct numerical control mode
	RWw 31H	(Axis 12) Specified position data (H)	RWr 31H	(Axis 12) Present position data (H)	
	RWw 32H	(Axis 12) Specified positioning width (L)	RWr 32H	(Axis 12) Present current value (L) *3	
	RWw 33H	(Axis 12) Specified positioning width (H)	RWr 33H	(Axis 12) Present current value (H) *3	
	RWw 34H	(Axis 12) Specified speed	RWr 34H	(Axis 12) Present speed data	
	RWw 35H	(Axis 12) Specified acceleration/deceleration	RWr 35H	(Not available)	
	RWw 36H	(Axis 12) Pushing current limit value	RWr 36H	(Axis 12) Alarm code	
	RWw 37H	(Axis 12) Control signal	RWr 37H	(Axis 12) Status signal	
	RWw 38H	(Axis 13) Specified position data (L)	RWr 38H	(Axis 13) Present position data (L)	8 words each
	RWw 39H	(Axis 13) Specified position data (H)	RWr 39H	(Axis 13) Present position data (H)	
	RWw 3AH	(Axis 13) Specified positioning width (L)	RWr 3AH	(Axis 13) Present current value (L) *3	
	RWw 3BH	(Axis 13) Specified positioning width (H)	RWr 3BH	(Axis 13) Present current value (H) *3	
	RWw 3CH	(Axis 13) Specified speed	RWr 3CH	(Axis 13) Present speed data	
	RWw 3DH	(Axis 13) Specified acceleration/deceleration	RWr 3DH	(Not available)	
	RWw 3EH	(Axis 13) Pushing current limit value	RWr 3EH	(Axis 13) Alarm code	
	RWw 3FH	(Axis 13) Control signal	RWr 3FH	(Axis 13) Status signal	

*1 Extended cyclic settings are performed based on the occupancy information displayed with the gateway parameter configuration tool.

*2 Operation is also possible with CC-Link Ver.1.10 if extended cyclic 1x multiplier settings (4 stations occupied) are within the usable range.

*3 The present current value should be the command current value for the stepper motor and be the feedback current value for the AC servomotor (including AC servomotor connected to SCON-CB).

- CC-Link overall address configuration example (positioner 2 mode + EC connection unit)
  It is an example of having 12 axes in Positioner 2 Mode and one unit of the EC connection unit getting connected.

PLC output ⇒ RCON | RCON ⇒ PLC input

Output register	High byte Low byte	Input register	High byte Low byte	
RY0F ~ 00	Gateway control signal 0	RX0F ~ 00	Gateway status signal 0	8 words each Fixed region
RY1F ~ 10	Gateway control signal 1	RX1F ~ 10	Gateway status signal 1	
RY2F ~ 20	(Not available)	RX2F ~ 20	Power supply unit status signal 0	
RY3F ~ 30	(Not available)	RX3F ~ 30	Power supply unit status signal 1	
RY4F ~ 40	(Not available)	RX4F ~ 40	Power supply unit status signal 2	
RY5F ~ 50	(Not available)	RX5F ~ 50	Power supply unit status signal 3	
RY6F ~ 60	(Not available)	RX6F ~ 60	Power supply unit status signal 4/ Light malfunction maintenance signal	
RY7F ~ 70	(Not available)	RX7F ~ 70	(Not available)	

*1 PLC master extended cyclic settings	Output register		Input register		
16-word 1x multiplier setting 4 *2	RWw 00H	(Axis 0) Command position No.	RWr 00H	(Axis 0) Completed position No.	2 words each
	RWw 01H	(Axis 0) Control signal	RWr 01H	(Axis 0) Status signal	
	RWw 02H	(Axis 1) Command position No.	RWr 02H	(Axis 1) Completed position No.	
	RWw 03H	(Axis 1) Control signal	RWr 03H	(Axis 1) Status signal	
	RWw 04H	(Axis 2) Command position No.	RWr 04H	(Axis 2) Completed position No.	
	RWw 05H	(Axis 2) Control signal	RWr 05H	(Axis 2) Status signal	
	RWw 06H	(Axis 3) Command position No.	RWr 06H	(Axis 3) Completed position No.	
	RWw 07H	(Axis 3) Control signal	RWr 07H	(Axis 3) Status signal	
	RWw 08H	(Axis 4) Command position No.	RWr 08H	(Axis 4) Completed position No.	
	RWw 09H	(Axis 4) Control signal	RWr 09H	(Axis 4) Status signal	
	RWw 0AH	(Axis 5) Command position No.	RWr 0AH	(Axis 5) Completed position No.	
	RWw 0BH	(Axis 5) Control signal	RWr 0BH	(Axis 5) Status signal	
	RWw 0CH	(Axis 6) Command position No.	RWr 0CH	(Axis 6) Completed position No.	
	RWw 0DH	(Axis 6) Control signal	RWr 0DH	(Axis 6) Status signal	
	RWw 0EH	(Axis 7) Command position No.	RWr 0EH	(Axis 7) Completed position No.	
	RWw 0FH	(Axis 7) Control signal	RWr 0FH	(Axis 7) Status signal	
32-word 4x multiplier setting 2	RWw 10H	(Axis 8) Command position No.	RWr 10H	(Axis 8) Completed position No.	
	RWw 11H	(Axis 8) Control signal	RWr 11H	(Axis 8) Status signal	
	RWw 12H	(Axis 9) Command position No.	RWr 12H	(Axis 9) Completed position No.	
	RWw 13H	(Axis 9) Control signal	RWr 13H	(Axis 9) Status signal	
	RWw 14H	(Axis 10) Command position No.	RWr 14H	(Axis 10) Completed position No.	
	RWw 15H	(Axis 10) Control signal	RWr 15H	(Axis 10) Status signal	
	RWw 16H	(Axis 11) Command position No.	RWr 16H	(Axis 11) Completed position No.	
	RWw 17H	(Axis 11) Control signal	RWr 17H	(Axis 11) Status signal	
	RWw 18H	(Axis 12 ~ Axis 15) Control signal	RWr 18H	(Axis 12 ~ Axis 15) Status signal	1 word *3

*1 Extended cyclic settings are performed based on the occupancy information displayed with the gateway parameter configuration tool.

*2 Operation is also possible with CC-Link Ver.1.10 if extended cyclic 1x multiplier settings (4 stations occupied) are within the usable range.

*3 The EC connection unit occupies domains and axis numbers for four axes (one word) even if not all of four axes are connected.
The axes numbers for the EC connection unit should be assigned from the back of those in the driver unit (RCON-PC/AC/DC/PCF/SC) and the SCON extension unit.

[For CC-Link IE Field]

Fixed 8-word region is assigned to the bit register (RX/RY), while the region for each axis is assigned to the word register (RWr/RWw).

■ CC-Link IE Field overall address configuration example (direct numerical control mode + simple direct mode/positioner 1 mode) shows direct numerical control mode connection for 2 axes and simple direct or positioner 1 mode connection for 12 axes.

PLC output ⇒ RCON

RCON ⇒ PLC input

Output register	High byte Low byte	Input register	High byte Low byte	
RY0F to 00	Gateway control signal 0	RX0F to 00	Gateway status signal 0	8 words each Fixed region
RY1F to 10	Gateway control signal 1	RX1F to 10	Gateway status signal 1	
RY2F to 20	(Not available)	RX2F to 20	Power supply unit status signal 0	
RY3F to 30	(Not available)	RX3F to 30	Power supply unit status signal 1	
RY4F to 40	(Not available)	RX4F to 40	Power supply unit status signal 2	
RY5F to 50	(Not available)	RX5F to 50	Power supply unit status signal 3	
RY6F to 60	(Not available)	RX6F to 60	Power supply unit status signal 4/ Light malfunction maintenance signal	
RY7F to 70	(Not available)	RX7F to 70	(Not available)	

Output register		Input register		
RWw 00H	(Axis 0) Specified position data (L)	RWr 00H	(Axis 0) Present position data (L)	4 words each Positioner 1 /simple direct
RWw 01H	(Axis 0) Specified position data (H)	RWr 01H	(Axis 0) Present position data (H)	
RWw 02H	(Axis 0) Command position No.	RWr 02H	(Axis 0) Completed position No.	
RWw 03H	(Axis 0) Control signal	RWr 03H	(Axis 0) Status signal	
RWw 04H	(Axis 1) Specified position data (L)	RWr 04H	(Axis 1) Present position data (L)	4 words each
RWw 05H	(Axis 1) Specified position data (H)	RWr 05H	(Axis 1) Present position data (H)	
RWw 06H	(Axis 1) Command position No.	RWr 06H	(Axis 1) Completed position No.	
RWw 07H	(Axis 1) Control signal	RWr 07H	(Axis 1) Status signal	
RWw 08H	(Axis 2) Specified position data (L)	RWr 08H	(Axis 2) Present position data (L)	4 words each
RWw 09H	(Axis 2) Specified position data (H)	RWr 09H	(Axis 2) Present position data (H)	
RWw 0AH	(Axis 2) Command position No.	RWr 0AH	(Axis 2) Completed position No.	
RWw 0BH	(Axis 2) Control signal	RWr 0BH	(Axis 2) Status signal	
RWw 0CH	(Axis 3) Specified position data (L)	RWr 0CH	(Axis 3) Present position data (L)	4 words each
RWw 0DH	(Axis 3) Specified position data (H)	RWr 0DH	(Axis 3) Present position data (H)	
RWw 0EH	(Axis 3) Command position No.	RWr 0EH	(Axis 3) Completed position No.	
RWw 0FH	(Axis 3) Control signal	RWr 0FH	(Axis 3) Status signal	
⋮	⋮		⋮	4 words each
RWw 1FH	(Axis 7) Control signal	RWr 1FH	(Axis 7) Status signal	
⋮	⋮		⋮	
RWw 2FH	(Axis 11) Control signal	RWr 2FH	(Axis 11) Status signal	
RWw 30H	(Axis 12) Specified position data (L)	RWr 30H	(Axis 12) Present position data (L)	8 words each Direct numerical control mode
RWw 31H	(Axis 12) Specified position data (H)	RWr 31H	(Axis 12) Present position data (H)	
RWw 32H	(Axis 12) Specified positioning width (L)	RWr 32H	(Axis 12) Present current value (L) *1	
RWw 33H	(Axis 12) Specified positioning width (H)	RWr 33H	(Axis 12) Present current value (H) *1	
RWw 34H	(Axis 12) Specified speed	RWr 34H	(Axis 12) Present speed data	
RWw 35H	(Axis 12) Specified acceleration/deceleration	RWr 35H	(Not available)	
RWw 36H	(Axis 12) Pushing current limit value	RWr 36H	(Axis 12) Alarm code	
RWw 37H	(Axis 12) Control signal	RWr 37H	(Axis 12) Status signal	
RWw 38H	(Axis 13) Specified position data (L)	RWr 38H	(Axis 13) Present position data (L)	8 words each
RWw 39H	(Axis 13) Specified position data (H)	RWr 39H	(Axis 13) Present position data (H)	
RWw 3AH	(Axis 13) Specified positioning width (L)	RWr 3AH	(Axis 13) Present current value (L) *1	
RWw 3BH	(Axis 13) Specified positioning width (H)	RWr 3BH	(Axis 13) Present current value (H) *1	
RWw 3CH	(Axis 13) Specified speed	RWr 3CH	(Axis 13) Present speed data	
RWw 3DH	(Axis 13) Specified acceleration/deceleration	RWr 3DH	(Not available)	
RWw 3EH	(Axis 13) Pushing current limit value	RWr 3EH	(Axis 13) Alarm code	
RWw 3FH	(Axis 13) Control signal	RWr 3FH	(Axis 13) Status signal	

*1 The present current value should be the command current value for the stepper motor and be the feedback current value for the AC servomotor (including AC servomotor connected to SCON-CB).

- CC-Link IE Field overall address configuration example (positioner 2 mode + EC connection unit) It is an example of having 12 axes in Positioner 2 Mode and one unit of the EC connection unit getting connected.

PLC output ⇒ RCON / RCON ⇒ PLC input

Output register	High byte Low byte	Input register	High byte Low byte	
RY0F ~ 00	Gateway control signal 0	RX0F ~ 00	Gateway status signal 0	8 words each Fixed region
RY1F ~ 10	Gateway control signal 1	RX1F ~ 10	Gateway status signal 1	
RY2F ~ 20	(Not available)	RX2F ~ 20	Power supply unit status signal 0	
RY3F ~ 30	(Not available)	RX3F ~ 30	Power supply unit status signal 1	
RY4F ~ 40	(Not available)	RX4F ~ 40	Power supply unit status signal 2	
RY5F ~ 50	(Not available)	RX5F ~ 50	Power supply unit status signal 3	
RY6F ~ 60	(Not available)	RX6F ~ 60	Power supply unit status signal 4/ Light malfunction maintenance signal	
RY7F ~ 70	(Not available)	RX7F ~ 70	(Not available)	

Output register		Input register		
RWw 00H	(Axis 0) Command position No.	RWr 00H	(Axis 0) Completed position No.	2 words each
RWw 01H	(Axis 0) Control signal	RWr 01H	(Axis 0) Status signal	
RWw 02H	(Axis 1) Command position No.	RWr 02H	(Axis 1) Completed position No.	
RWw 03H	(Axis 1) Control signal	RWr 03H	(Axis 1) Status signal	
RWw 04H	(Axis 2) Command position No.	RWr 04H	(Axis 2) Completed position No.	
RWw 05H	(Axis 2) Control signal	RWr 05H	(Axis 2) Status signal	
RWw 06H	(Axis 3) Command position No.	RWr 06H	(Axis 3) Completed position No.	
RWw 07H	(Axis 3) Control signal	RWr 07H	(Axis 3) Status signal	
RWw 08H	(Axis 4) Command position No.	RWr 08H	(Axis 4) Completed position No.	
RWw 09H	(Axis 4) Control signal	RWr 09H	(Axis 4) Status signal	
RWw 0AH	(Axis 5) Command position No.	RWr 0AH	(Axis 5) Completed position No.	
RWw 0BH	(Axis 5) Control signal	RWr 0BH	(Axis 5) Status signal	
RWw 0CH	(Axis 6) Command position No.	RWr 0CH	(Axis 6) Completed position No.	
RWw 0DH	(Axis 6) Control signal	RWr 0DH	(Axis 6) Status signal	
RWw 0EH	(Axis 7) Command position No.	RWr 0EH	(Axis 7) Completed position No.	
RWw 0FH	(Axis 7) Control signal	RWr 0FH	(Axis 7) Status signal	
RWw 10H	(Axis 8) Command position No.	RWr 10H	(Axis 8) Completed position No.	
RWw 11H	(Axis 8) Control signal	RWr 11H	(Axis 8) Status signal	
RWw 12H	(Axis 9) Command position No.	RWr 12H	(Axis 9) Completed position No.	
RWw 13H	(Axis 9) Control signal	RWr 13H	(Axis 9) Status signal	
RWw 14H	(Axis 10) Command position No.	RWr 14H	(Axis 10) Completed position No.	
RWw 15H	(Axis 10) Control signal	RWr 15H	(Axis 10) Status signal	
RWw 16H	(Axis 11) Command position No.	RWr 16H	(Axis 11) Completed position No.	
RWw 17H	(Axis 11) Control signal	RWr 17H	(Axis 11) Status signal	
RWw 18H	(Axis 12 ~ Axis 15) Control signal	RWr 18H	(Axis 12 ~ Axis 15) Status signal	1 word *1

*1 The EC connection unit occupies domains and axis numbers for four axes (one word) even if not all of four axes are connected.
The axes numbers for the EC connection unit should be assigned from the back of those in the driver unit (RCON-PC/AC/DC/PCF/SC) and the SCON extension unit.

[For DeviceNet]

■ DeviceNet overall address configuration example (direct numerical control mode + simple direct mode/positioner 1 mode)
Shows direct numerical control mode connection for 2 axes and simple direct or positioner 1 mode connection for 12 axes.

	PLC output ⇒ RCON	RCON ⇒ PLC input	
Relative CH *	High byte Low byte	High byte Low byte	
0	Gateway control signal 0	Gateway status signal 0	8 words each Fixed region
1	Gateway control signal 1	Gateway status signal 1	
2	(Not available)	Power supply unit status signal 0	
3	(Not available)	Power supply unit status signal 1	
4	(Not available)	Power supply unit status signal 2	
5	(Not available)	Power supply unit status signal 3	
6	(Not available)	Power supply unit status signal 4/ Light malfunction maintenance signal	
7	(Not available)	(Not available)	
8	(Axis 0) Specified position data (L)	(Axis 0) Present position data (L)	4 words each Positioner 1 /simple direct mode
9	(Axis 0) Specified position data (H)	(Axis 0) Present position data (H)	
10	(Axis 0) Command position No.	(Axis 0) Completed position No.	
11	(Axis 0) Control signal	(Axis 0) Status signal	
12	(Axis 1) Specified position data (L)	(Axis 1) Present position data (L)	4 words each
13	(Axis 1) Specified position data (H)	(Axis 1) Present position data (H)	
14	(Axis 1) Command position No.	(Axis 1) Completed position No.	
15	(Axis 1) Control signal	(Axis 1) Status signal	
16	(Axis 2) Specified position data (L)	(Axis 2) Present position data (L)	4 words each
17	(Axis 2) Specified position data (H)	(Axis 2) Present position data (H)	
18	(Axis 2) Command position No.	(Axis 2) Completed position No.	
19	(Axis 2) Control signal	(Axis 2) Status signal	
20	(Axis 3) Specified position data (L)	(Axis 3) Present position data (L)	4 words each
21	(Axis 3) Specified position data (H)	(Axis 3) Present position data (H)	
22	(Axis 3) Command position No.	(Axis 3) Completed position No.	
23	(Axis 3) Control signal	(Axis 3) Status signal	
⋮	⋮	⋮	4 words each
39	(Axis 7) Control signal	(Axis 7) Status signal	
⋮	⋮	⋮	
55	(Axis 11) Control signal	(Axis 11) Status signal	
56	(Axis 12) Specified position data (L)	(Axis 12) Present position data (L)	8 words each Direct numerical control mode
57	(Axis 12) Specified position data (H)	(Axis 12) Present position data (H)	
58	(Axis 12) Specified positioning width (L)	(Axis 12) Present current value (L) *1	
59	(Axis 12) Specified positioning width (H)	(Axis 12) Present current value (H) *1	
60	(Axis 12) Specified speed	(Axis 12) Present speed data	
61	(Axis 12) Specified acceleration/deceleration	(Not available)	
62	(Axis 12) Pushing current limit value	(Axis 12) Alarm code	
63	(Axis 12) Control signal	(Axis 12) Status signal	
64	(Axis 13) Specified position data (L)	(Axis 13) Present position data (L)	8 words each
65	(Axis 13) Specified position data (H)	(Axis 13) Present position data (H)	
66	(Axis 13) Specified positioning width (L)	(Axis 13) Present current value (L) *1	
67	(Axis 13) Specified positioning width (H)	(Axis 13) Present current value (H) *1	
68	(Axis 13) Specified speed	(Axis 13) Present speed data	
69	(Axis 13) Specified acceleration/deceleration	(Not available)	
70	(Axis 13) Pushing current limit value	(Axis 13) Alarm code	
71	(Axis 13) Control signal	(Axis 13) Status signal	

* Relative CH is the CH number relative to the gateway head CH

*1 The present current value should be the command current value for the stepper motor and be the feedback current value for the AC servomotor (including AC servomotor connected to SCON-CB).

- DeviceNet overall address configuration example (positioner 2 mode + EC connection unit)
  It is an example of having 12 axes in Positioner 2 Mode and one unit of the EC connection unit getting connected.

	PLC output ⇒ RCON		RCON ⇒ PLC input		
Relative CH *	High byte	Low byte	High byte	Low byte	
0	Gateway control signal 0		Gateway status signal 0		8 words each Fixed region
1	Gateway control signal 1		Gateway status signal 1		
2	(Not available)		Power supply unit status signal 0		
3	(Not available)		Power supply unit status signal 1		
4	(Not available)		Power supply unit status signal 2		
5	(Not available)		Power supply unit status signal 3		
6	(Not available)		Power supply unit status signal 4/ Light malfunction maintenance signal		
7	(Not available)		(Not available)		
8	(Axis 0) Command position No.		(Axis 0) Completed position No.		2 words each
9	(Axis 0) Control signal		(Axis 0) Status signal		
10	(Axis 1) Command position No.		(Axis 1) Completed position No.		
11	(Axis 1) Control signal		(Axis 1) Status signal		
12	(Axis 2) Command position No.		(Axis 2) Completed position No.		
13	(Axis 2) Control signal		(Axis 2) Status signal		
14	(Axis 3) Command position No.		(Axis 3) Completed position No.		
15	(Axis 3) Control signal		(Axis 3) Status signal		
16	(Axis 4) Command position No.		(Axis 4) Completed position No.		
17	(Axis 4) Control signal		(Axis 4) Status signal		
18	(Axis 5) Command position No.		(Axis 5) Completed position No.		
19	(Axis 5) Control signal		(Axis 5) Status signal		
20	(Axis 6) Command position No.		(Axis 6) Completed position No.		
21	(Axis 6) Control signal		(Axis 6) Status signal		
22	(Axis 7) Command position No.		(Axis 7) Completed position No.		
23	(Axis 7) Control signal		(Axis 7) Status signal		
24	(Axis 8) Command position No.		(Axis 8) Completed position No.		
25	(Axis 8) Control signal		(Axis 8) Status signal		
26	(Axis 9) Command position No.		(Axis 9) Completed position No.		
27	(Axis 9) Control signal		(Axis 9) Status signal		
28	(Axis 10) Command position No.		(Axis 10) Completed position No.		
29	(Axis 10) Control signal		(Axis 10) Status signal		
30	(Axis 11) Command position No.		(Axis 11) Completed position No.		
31	(Axis 11) Control signal		(Axis 11) Status signal		
32	(Axis 12 ~ Axis 15) Control signal		(Axis 12 ~ Axis 15) Status signal		1 word *1

* Relative CH is the CH number relative to the gateway head CH

*1 The EC connection unit occupies domains and axis numbers for four axes (one word) even if not all of four axes are connected.
The axes numbers for the EC connection unit should be assigned from the back of those in the driver unit (RCON-PC/AC/DC/PCF/SC) and the SCON extension unit.

[For PROFIBUS-DP, EtherNet/IP, EtherCAT]

■ Overall address configuration example (direct numerical control mode + simple direct mode/positioner 1 mode)
Shows direct numerical control mode connection for 2 axes and simple direct or positioner 1 mode connection for 12 axes.

Relative byte *	PLC output ⇒ RCON High byte Low byte	RCON ⇒ PLC input High byte Low byte	
0	Gateway control signal 0	Gateway status signal 0	8 words each Fixed region
2	Gateway control signal 1	Gateway status signal 1	
4	(Not available)	Power supply unit status signal 0	
6	(Not available)	Power supply unit status signal 1	
8	(Not available)	Power supply unit status signal 2	
10	(Not available)	Power supply unit status signal 3	
12	(Not available)	Power supply unit status signal 4/ Light malfunction maintenance signal	
14	(Not available)	(Not available)	
16	(Axis 0) Specified position data (L)	(Axis 0) Present position data (L)	4 words each Positioner 1 /simple direct mode
18	(Axis 0) Specified position data (H)	(Axis 0) Present position data (H)	
20	(Axis 0) Command position No.	(Axis 0) Completed position No.	
22	(Axis 0) Control signal	(Axis 0) Status signal	
24	(Axis 1) Specified position data (L)	(Axis 1) Present position data (L)	4 words each
26	(Axis 1) Specified position data (H)	(Axis 1) Present position data (H)	
28	(Axis 1) Command position No.	(Axis 1) Completed position No.	
30	(Axis 1) Control signal	(Axis 1) Status signal	
32	(Axis 2) Specified position data (L)	(Axis 2) Present position data (L)	4 words each
34	(Axis 2) Specified position data (H)	(Axis 2) Present position data (H)	
36	(Axis 2) Command position No.	(Axis 2) Completed position No.	
38	(Axis 2) Control signal	(Axis 2) Status signal	
40	(Axis 3) Specified position data (L)	(Axis 3) Present position data (L)	4 words each
42	(Axis 3) Specified position data (H)	(Axis 3) Present position data (H)	
44	(Axis 3) Command position No.	(Axis 3) Completed position No.	
46	(Axis 3) Control signal	(Axis 3) Status signal	
⋮	⋮	⋮	4 words each
78	(Axis 7) Control signal	(Axis 7) Status signal	
⋮	⋮	⋮	
110	(Axis 11) Control signal	(Axis 11) Status signal	
112	(Axis 12) Specified position data (L)	(Axis 12) Present position data (L)	8 words each Direct numerical mode
114	(Axis 12) Specified position data (H)	(Axis 12) Present position data (H)	
116	(Axis 12) Specified positioning width (L)	(Axis 12) Present current value (L) *1	
118	(Axis 12) Specified positioning width (H)	(Axis 12) Present current value (H) *1	
120	(Axis 12) Specified speed	(Axis 12) Present speed data	
122	(Axis 12) Specified acceleration/deceleration	(Not available)	
124	(Axis 12) Pushing current limit value	(Axis 12) Alarm code	
126	(Axis 12) Control signal	(Axis 12) Status signal	
128	(Axis 13) Specified position data (L)	(Axis 13) Present position data (L)	8 words each
130	(Axis 13) Specified position data (H)	(Axis 13) Present position data (H)	
132	(Axis 13) Specified positioning width (L)	(Axis 13) Present current value (L) *1	
134	(Axis 13) Specified positioning width (H)	(Axis 13) Present current value (H) *1	
136	(Axis 13) Specified speed	(Axis 13) Present speed data	
138	(Axis 13) Specified acceleration/deceleration	(Not available)	
140	(Axis 13) Pushing current limit value	(Axis 13) Alarm code	
142	(Axis 13) Control signal	(Axis 13) Status signal	

* Relative byte is the byte address relative to the gateway head

*1 The present current value should be the command current value for the stepper motor and be the feedback current value for the AC servomotor (including AC servomotor connected to SCON-CB).

- Overall address configuration example (positioner 2 mode + EC connection unit)
  It is an example of having 12 axes in Positioner 2 Mode and one unit of the EC connection unit getting connected.

Relative byte *	PLC output ⇒ RCON High byte Low byte	RCON ⇒ PLC input High byte Low byte	
0	Gateway control signal 0	Gateway status signal 0	8 words each Fixed region
2	Gateway control signal 1	Gateway status signal 1	
4	(Not available)	Power supply unit status signal 0	
6	(Not available)	Power supply unit status signal 1	
8	(Not available)	Power supply unit status signal 2	
10	(Not available)	Power supply unit status signal 3	
12	(Not available)	Power supply unit status signal 4/ Light malfunction maintenance signal	
14	(Not available)	(Not available)	
16	(Axis 0) Command position No.	(Axis 0) Completed position No.	2 words each
18	(Axis 0) Control signal	(Axis 0) Status signal	
20	(Axis 1) Command position No.	(Axis 1) Completed position No.	
22	(Axis 1) Control signal	(Axis 1) Status signal	
24	(Axis 2) Command position No.	(Axis 2) Completed position No.	
26	(Axis 2) Control signal	(Axis 2) Status signal	
28	(Axis 3) Command position No.	(Axis 3) Completed position No.	
30	(Axis 3) Control signal	(Axis 3) Status signal	
32	(Axis 4) Command position No.	(Axis 4) Completed position No.	
34	(Axis 4) Control signal	(Axis 4) Status signal	
36	(Axis 5) Command position No.	(Axis 5) Completed position No.	
38	(Axis 5) Control signal	(Axis 5) Status signal	
40	(Axis 6) Command position No.	(Axis 6) Completed position No.	
42	(Axis 6) Control signal	(Axis 6) Status signal	
44	(Axis 7) Command position No.	(Axis 7) Completed position No.	
46	(Axis 7) Control signal	(Axis 7) Status signal	
48	(Axis 8) Command position No.	(Axis 8) Completed position No.	
50	(Axis 8) Control signal	(Axis 8) Status signal	
52	(Axis 9) Command position No.	(Axis 9) Completed position No.	
54	(Axis 9) Control signal	(Axis 9) Status signal	
56	(Axis 10) Command position No.	(Axis 10) Completed position No.	
58	(Axis 10) Control signal	(Axis 10) Status signal	
60	(Axis 11) Command position No.	(Axis 11) Completed position No.	
62	(Axis 11) Control signal	(Axis 11) Status signal	
64	(Axis 12 ~ Axis 15) Control signal	(Axis 12 ~ Axis 15) Status signal	1 word *1

* Relative byte is the byte address relative to the gateway head

*1 The EC connection unit occupies domains and axis numbers for four axes (one word) even if not all of four axes are connected.
The axes numbers for the EC connection unit should be assigned from the back of those in the driver unit (RCON-PC/AC/DC/PCF/SC) and the SCON extension unit.

[For PROFINET-IO]

■ PROFINET-IO overall address configuration example (direct numerical control mode + simple direct mode/positioner 1 mode)
Shows direct numerical control mode connection for 2 axes and simple direct or positioner 1 mode connection for 12 axes.

4-word Module count	PLC output ⇒ RCON		RCON ⇒ PLC input		
	High byte	Low byte	High byte	Low byte	
1	Gateway control signal 0		Gateway status signal 0		8 words each Fixed region
	Gateway control signal 1		Gateway status signal 1		
	(Not available)		Power supply unit status signal 0		
	(Not available)		Power supply unit status signal 1		
2	(Not available)		Power supply unit status signal 2		
	(Not available)		Power supply unit status signal 3		
	(Not available)		Power supply unit status signal 4/ Light malfunction maintenance signal		
	(Not available)		(Not available)		
3	(Axis 0) Specified position data (L)		(Axis 0) Present position data (L)		4 words each Positioner 1 /simple direct mode
	(Axis 0) Specified position data (H)		(Axis 0) Present position data (H)		
	(Axis 0) Command position No.		(Axis 0) Completed position No.		
	(Axis 0) Control signal		(Axis 0) Status signal		
4	(Axis 1) Specified position data (L)		(Axis 1) Present position data (L)		4 words each
	(Axis 1) Specified position data (H)		(Axis 1) Present position data (H)		
	(Axis 1) Command position No.		(Axis 1) Completed position No.		
	(Axis 1) Control signal		(Axis 1) Status signal		
5	(Axis 2) Specified position data (L)		(Axis 2) Present position data (L)		4 words each
	(Axis 2) Specified position data (H)		(Axis 2) Present position data (H)		
	(Axis 2) Command position No.		(Axis 2) Completed position No.		
	(Axis 2) Control signal		(Axis 2) Status signal		
6	(Axis 3) Specified position data (L)		(Axis 3) Present position data (L)		4 words each
	(Axis 3) Specified position data (H)		(Axis 3) Present position data (H)		
	(Axis 3) Command position No.		(Axis 3) Completed position No.		
	(Axis 3) Control signal		(Axis 3) Status signal		
⋮	⋮		⋮		4 words each
14	(Axis 11) Specified position data (L)		(Axis 11) Present position data (L)		4 words each
	(Axis 11) Specified position data (H)		(Axis 11) Present position data (H)		
	(Axis 11) Command position No.		(Axis 11) Completed position No.		
	(Axis 11) Control signal		(Axis 11) Status signal		
15	(Axis 12) Specified position data (L)		(Axis 12) Present position data (L)		8 words each Direct numerical mode
	(Axis 12) Specified position data (H)		(Axis 12) Present position data (H)		
	(Axis 12) Specified positioning width (L)		(Axis 12) Present current value (L) *1		
	(Axis 12) Specified positioning width (H)		(Axis 12) Present current value (H) *1		
16	(Axis 12) Specified speed		(Axis 12) Present speed data		
	(Axis 12) Specified acceleration/deceleration		(Not available)		
	(Axis 12) Pushing current limit value		(Axis 12) Alarm code		
	(Axis 12) Control signal		(Axis 12) Status signal		
17	(Axis 13) Specified position data (L)		(Axis 13) Present position data (L)		8 words each
	(Axis 13) Specified position data (H)		(Axis 13) Present position data (H)		
	(Axis 13) Specified positioning width (L)		(Axis 13) Present current value (L) *1		
	(Axis 13) Specified positioning width (H)		(Axis 13) Present current value (H) *1		
18	(Axis 13) Specified speed		(Axis 13) Present speed data		
	(Axis 13) Specified acceleration/deceleration		(Not available)		
	(Axis 13) Pushing current limit value		(Axis 13) Alarm code		
	(Axis 13) Control signal		(Axis 13) Status signal		

*1 The present current value should be the command current value for the stepper motor and be the feedback current value for the AC servomotor (including AC servomotor connected to SCON-CB).

- PROFINET-IO overall address configuration example (positioner 2 mode + EC connection unit)
It is an example of having 12 axes in Positioner 2 Mode and one unit of the EC connection unit getting connected.

	PLC output ⇒ RCON	RCON ⇒ PLC input	
4-word Module count	High byte Low byte	High byte Low byte	
1	Gateway control signal 0	Gateway status signal 0	8 words each Fixed region
	Gateway control signal 1	Gateway status signal 1	
	(Not available)	Power supply unit status signal 0	
	(Not available)	Power supply unit status signal 1	
2	(Not available)	Power supply unit status signal 2	
	(Not available)	Power supply unit status signal 3	
	(Not available)	Power supply unit status signal 4/ Light malfunction maintenance signal	
	(Not available)	(Not available)	
3	(Axis 0) Command position No.	(Axis 0) Completed position No.	2 words each
	(Axis 0) Control signal	(Axis 0) Status signal	
	(Axis 1) Command position No.	(Axis 1) Completed position No.	
	(Axis 1) Control signal	(Axis 1) Status signal	
4	(Axis 2) Command position No.	(Axis 2) Completed position No.	
	(Axis 2) Control signal	(Axis 2) Status signal	
	(Axis 3) Command position No.	(Axis 3) Completed position No.	
	(Axis 3) Control signal	(Axis 3) Status signal	
5	(Axis 4) Command position No.	(Axis 4) Completed position No.	
	(Axis 4) Control signal	(Axis 4) Status signal	
	(Axis 5) Command position No.	(Axis 5) Completed position No.	
	(Axis 5) Control signal	(Axis 5) Status signal	
6	(Axis 6) Command position No.	(Axis 6) Completed position No.	
	(Axis 6) Control signal	(Axis 6) Status signal	
	(Axis 7) Command position No.	(Axis 7) Completed position No.	
	(Axis 7) Control signal	(Axis 7) Status signal	
7	(Axis 8) Command position No.	(Axis 8) Completed position No.	
	(Axis 8) Control signal	(Axis 8) Status signal	
	(Axis 9) Command position No.	(Axis 9) Completed position No.	
	(Axis 9) Control signal	(Axis 9) Status signal	
8	(Axis 10) Command position No.	(Axis 10) Completed position No.	
	(Axis 10) Control signal	(Axis 10) Status signal	
	(Axis 11) Command position No.	(Axis 11) Completed position No.	
	(Axis 11) Control signal	(Axis 11) Status signal	
9	(Axis 12 ~ Axis 15) Control signal	(Axis 12 ~ Axis 15) Status signal	1 word *1

*1 The EC connection unit occupies domains and axis numbers for four axes (one word) even if not all of four axes are connected.
The axes numbers for the EC connection unit should be assigned from the back of those in the driver unit (RCON-PC/AC/DC/PCF/SC) and the SCON extension unit.

Startup Section

Chapter 5

Basic Operation Confirmation and Adjustment

5.1 Operation Confirmation with PC Software

Described below, shows how to check operation in PC software (RCON-101*-*).
For how to check operations in IA-OS, refer to the guiding features installed in IA-OS or in the quick starter guide available to download from IAI homepage.

Items to prepare
RCON system / actuator / PC / communication cable / motor/encoder cable

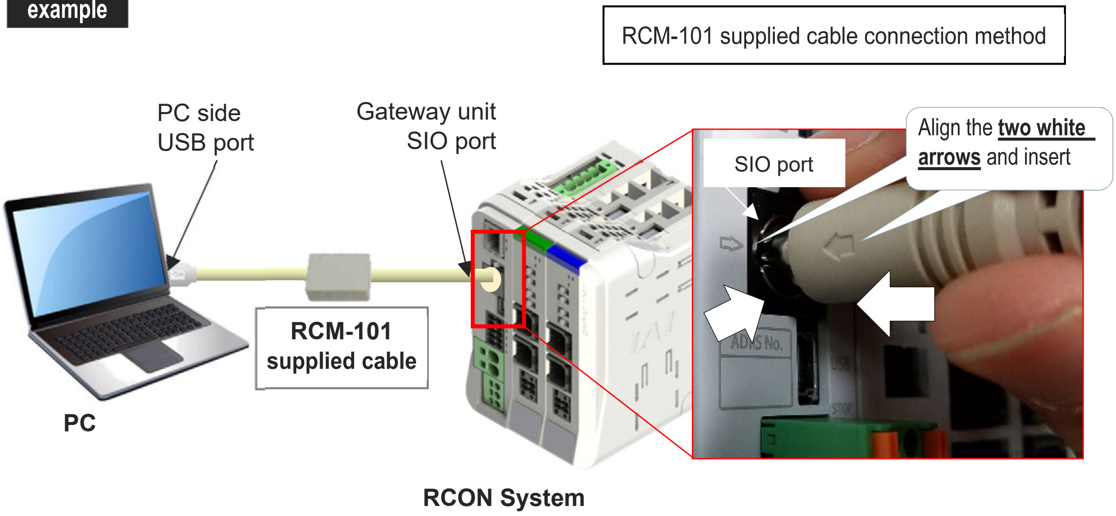
1 Connect the PC software.

Caution

- Operate the actuator through the following procedure. Before starting operation, make sure that there is no interfering object within the movable range of the actuator.

(1) Connect the RCM-101 supplied cable as shown below.

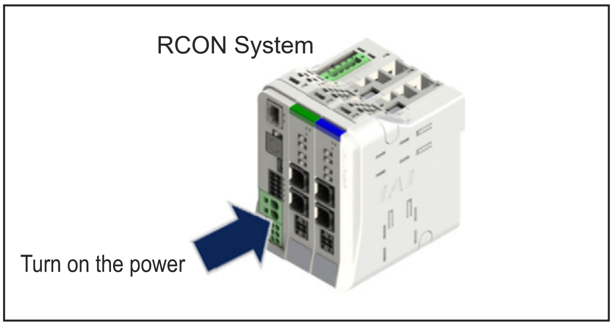
Connection example



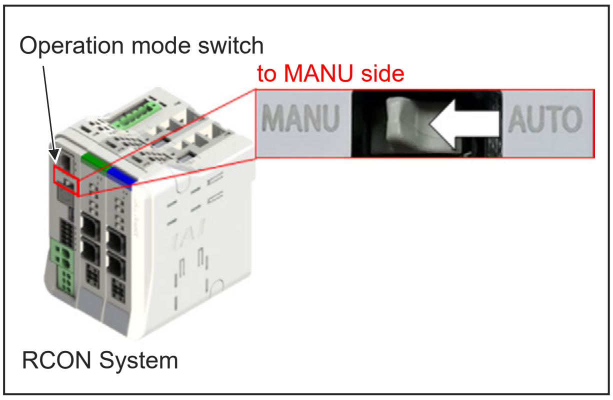
Caution

- When connecting the RCM-101 supplied cable to the gateway unit "SIO" port, insert matching the two white arrows as shown in the red frame above. Failure to do so may cause damage to the connector.

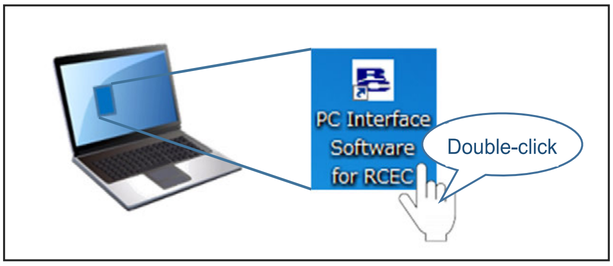
(2) After connecting the RCM-101 cable, turn on 24 VDC power to RCON.



(3) Tilt the operation mode switch on the front of the gateway unit to the **"MANU"** side.



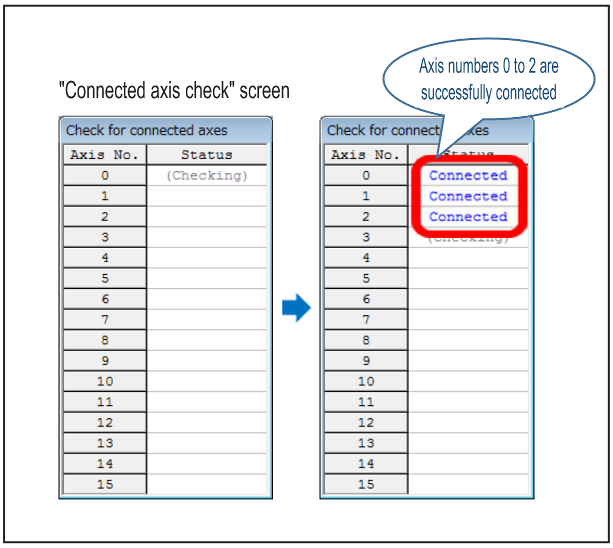
(4) Double-click the "PC software for RC/EC" icon to start up the software.



(5) The "Connected axis check" screen will be displayed.

If it shows "connected" in blue, it means that the corresponding axis is successfully connected.

(The display on the right shows an example of successful connection when axes are set to No. 0 to No. 2.)



Check for connected axes

Axis No.	Status
0	(Checking)
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	

Check for connected axes

Axis No.	Status
0	Connected
1	Connected
2	Connected
3	(Checking)
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	

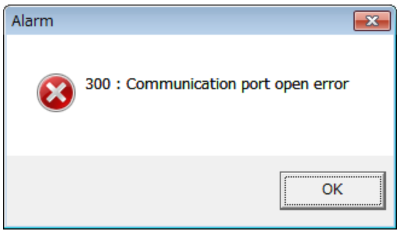
Startup Section

Chapter 5 Basic Operation Confirmation and Adjustment

(6) If "300: Communication port open error" screen is displayed, communication connection has failed.

The following causes may be possible, so review the procedure from item 1.

"Alarm" screen



300 : Communication port open error

[Causes of communication connection failure]

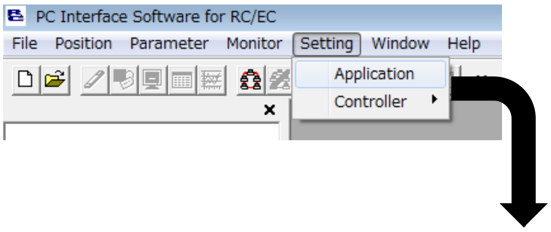
- Mismatched communication port (COM port)
- Disconnected communication cable
- Connection problem of communication cable connector
- Gateway unit side, PC side malfunction
- PC software double startup

may be possible causes.

[If connection failed, check here first.]

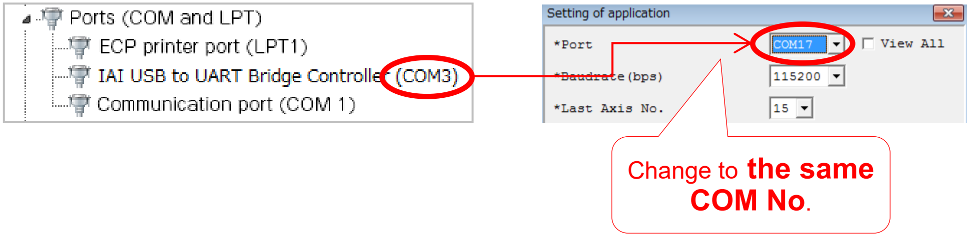
(1) "Setting (S)" → "Setting of application (A)" on the upper left corner on the screen of the PC software → Change the port number on the "Setting of application" screen to the COM number on the Windows Device Manager screen.

"PC Software " main screen



PC Windows:
Displayed on the "Device manager" screen

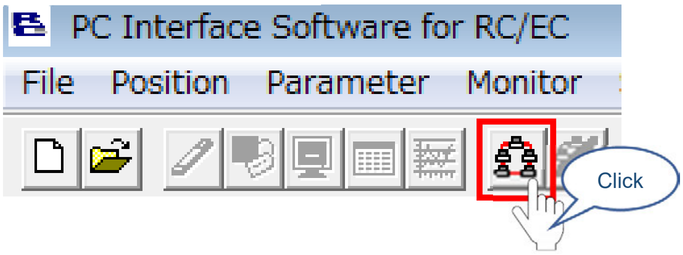
PC software:
Displayed on the "Setting of application" screen


Ports (COM and LPT)
ECP printer port (LPT1)
IAI USB to UART Bridge Controller (COM3)
Communication port (COM 1)

Setting of application
*Port COM17
*Baudrate (bps) 115200
*Last Axis No. 15

(2) Click the "Check Connected Axes" icon in the upper left corner of the PC software to connect with the RCON system.

"PC Software " main screen



If connection is not possible, check from step 1 again.

Caution

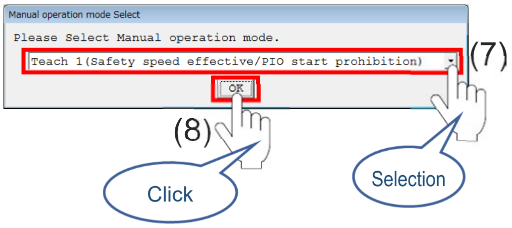
- If the actual number of connected axes of the RCON system does not match the number of axes set and transferred in the gateway parameter configuration tool, the PC software cannot be connected.
- Confirm the actual number of connected axes and change the gateway parameters, or read the present driver unit configuration with the gateway parameter configuration tool for transfer. For details, refer to Specifications Section Chapter 3, 3.9 Gateway Parameter Configuration Tool (page A3-156).

When "Manual operation mode Select" screen appears,

(7) Select "Teach mode 1 (Safety speed effective/PIO start prohibition)",

(8) and click OK.

"Manual operation mode Select" screen

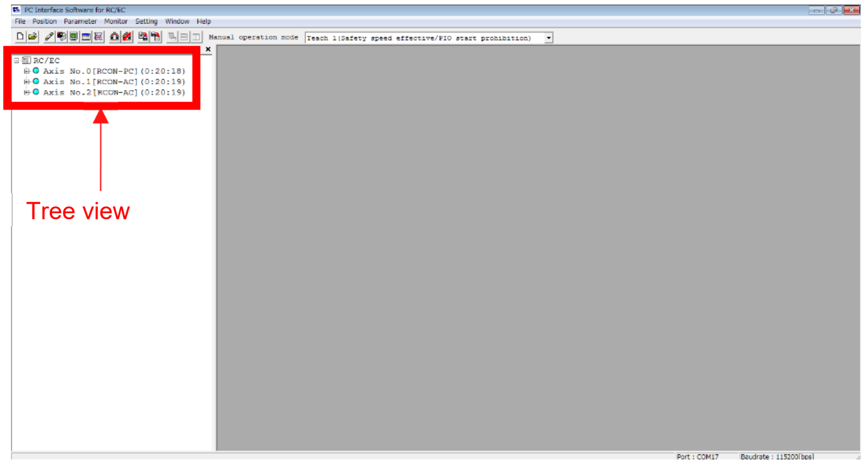


Please Select Manual operation mode.

Teach 1(Safety speed effective/PIO start prohibition)

(9) The main screen of PC software starts up.

"PC Software " main screen



Manual operation mode: Teach 1(Safety speed effective/PIO start prohibition)

RC/EC
Axis No.0[RCON-PC](0:20:18)
Axis No.1[RCON-AC](0:20:19)
Axis No.2[RCON-AC](0:20:19)

Port : COM17
Baudrate : 115200[bps]

Point!

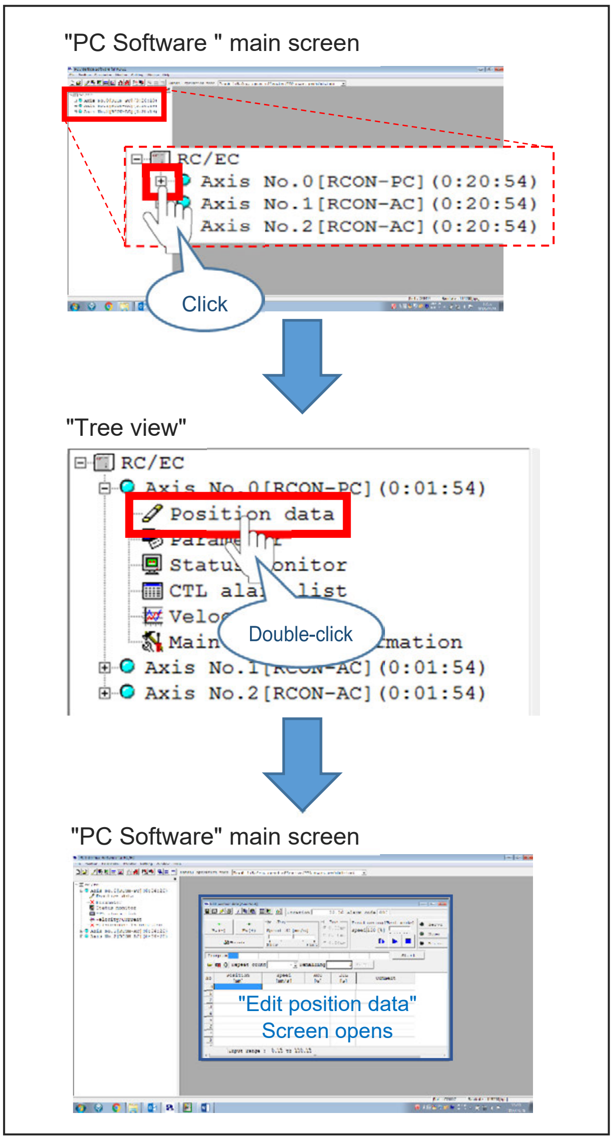
- If the icon is not displayed on the tree view, the controller and PC software are not connected.

2 Open the position data editing screen.

(1) Click ⊞ on the left of axis No. 0 in the tree view on the left end of the main screen to expand each item.

(2) Double click on "Position data".

(3) The "Edit position data" screen is displayed.



"PC Software " main screen

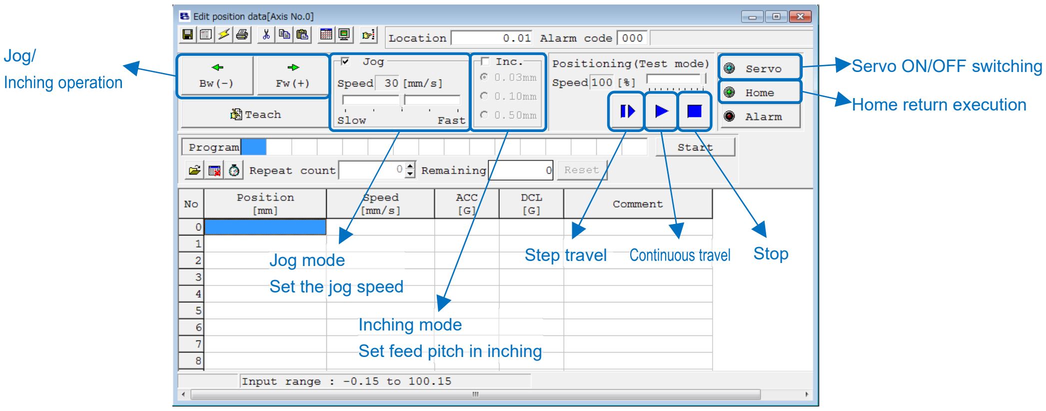
```
⊟ RC/EC
  ⊞ Axis No.0[RCON-PC](0:20:54)
    Axis No.1[RCON-AC](0:20:54)
    Axis No.2[RCON-AC](0:20:54)
```

"Tree view"

```
⊟ RC/EC
  ⊟ Axis No.0[RCON-PC](0:01:54)
      Position data
      Parameter
      Status monitor
      CTL alarm list
      Velocity
      Maintenance information
  ⊞ Axis No.1[RCON-AC](0:01:54)
  ⊞ Axis No.2[RCON-AC](0:01:54)
```

"PC Software" main screen

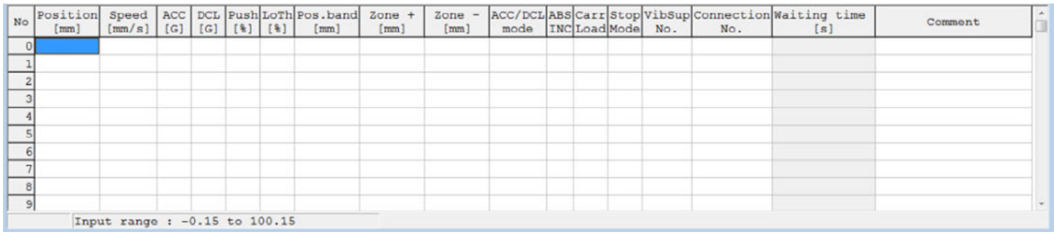
"Edit position data" screen



[Switching edit position data screen]

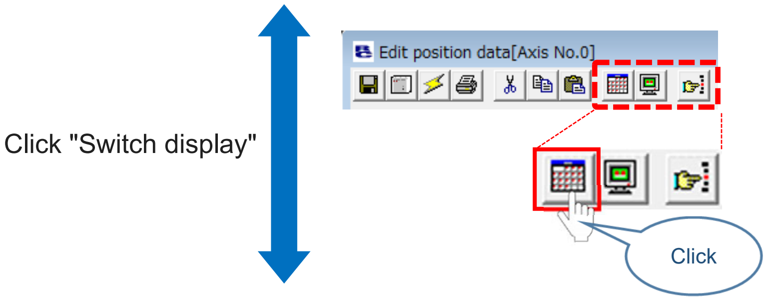
The "Edit position data (detailed)" screen can be switched to "Edit position data (detailed)" and "Edit position data (simple)".

"Edit position data (detailed)" screen

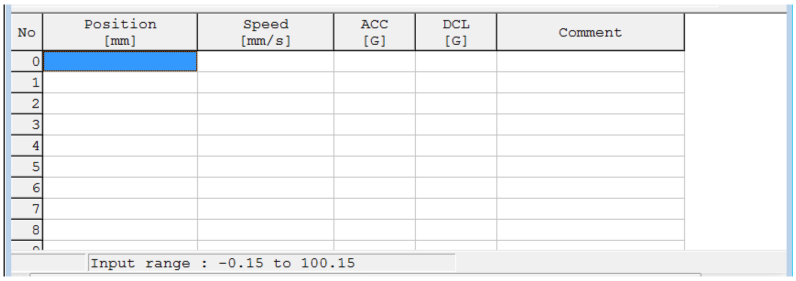


No	Position [mm]	Speed [mm/s]	ACC [G]	DCL [G]	Push [%]	LoTh [%]	Pos.band [mm]	Zone + [mm]	Zone - [mm]	ACC/DCL mode	ABS INC	Carr Load	Stop Mode	VibSup No.	Connection No.	Waiting time [s]	Comment
0																	
1																	
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	

Input range : -0.15 to 100.15



"Edit position data (simple)" screen



No	Position [mm]	Speed [mm/s]	ACC [G]	DCL [G]	Comment
0					
1					
2					
3					
4					
5					
6					
7					
8					

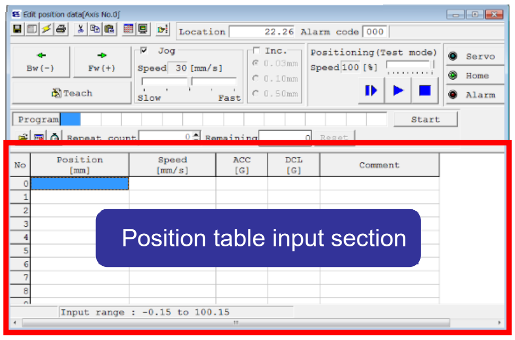
Input range : -0.15 to 100.15

3 Moves to the registered position.

[Registering target position]

(1) In the position table input section, enter the "position [mm]" to which the movable part of the actuator is to travel.

"Edit position data" screen



Location 22.26 Alarm code 000

☑ Jog Speed 30 [mm/s]

Speed 100 [%]

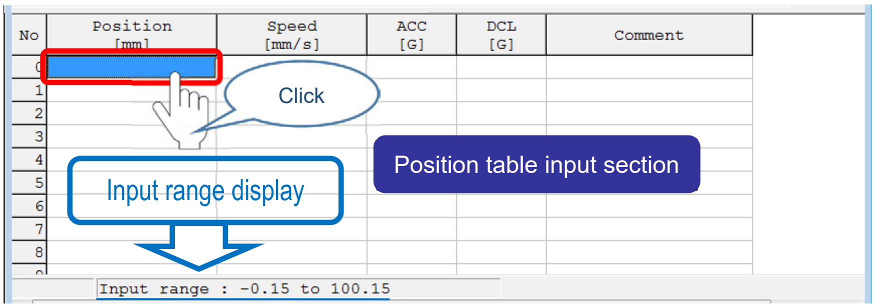
Repeat count 0 Remaining 0

No	Position [mm]	Speed [mm/s]	ACC [G]	DCL [G]	Comment
0					
1					
2					
3					
4					
5					
6					
7					
8					

Input range : -0.15 to 100.15

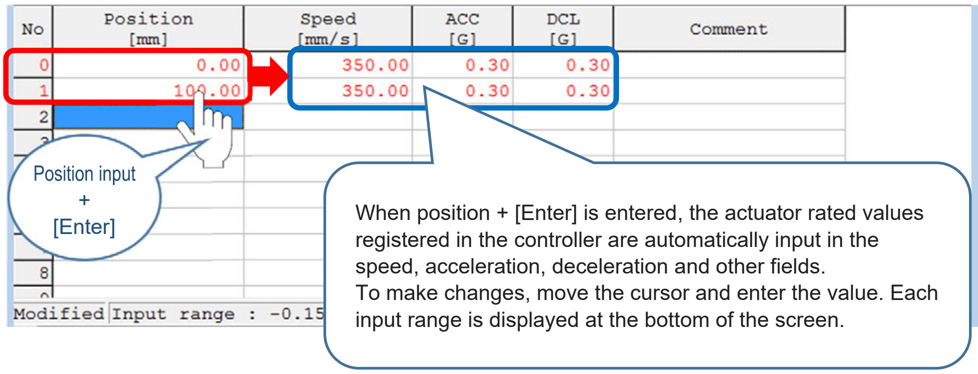
(2) Move the cursor to the position No. "Position [mm]" to be entered in the "position table input section". The range of values that can be entered is displayed at the bottom of the "position table input section".

"Position data input section" screen



Input range : -0.15 to 100.15

(3) Enter any coordinate value within the range of the values displayed in the "input range" and press [Enter] on your PC. (In the following example, 0 mm is entered in position No. 0 and 100 mm in position No. 1.)

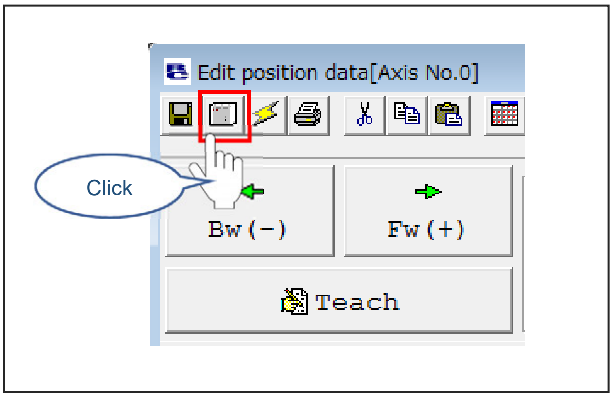


No	Position [mm]	Speed [mm/s]	ACC [G]	DCL [G]	Comment
0	0.00	350.00	0.30	0.30	
1	100.00	350.00	0.30	0.30	
2					

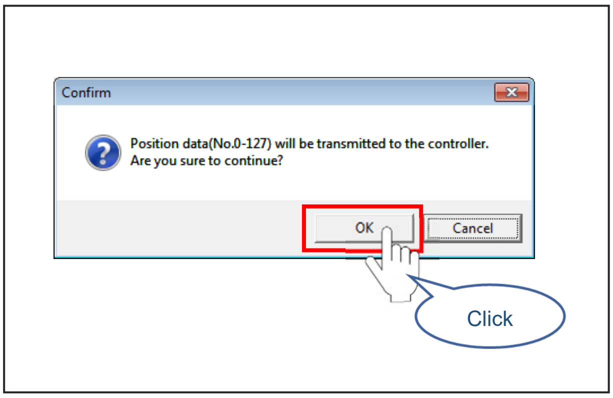
Modified Input range : -0.15

When position + [Enter] is entered, the actuator rated values registered in the controller are automatically input in the speed, acceleration, deceleration and other fields.
To make changes, move the cursor and enter the value. Each input range is displayed at the bottom of the screen.

(4) Click (Transfer to controller) in the upper left corner of the edit position data screen.

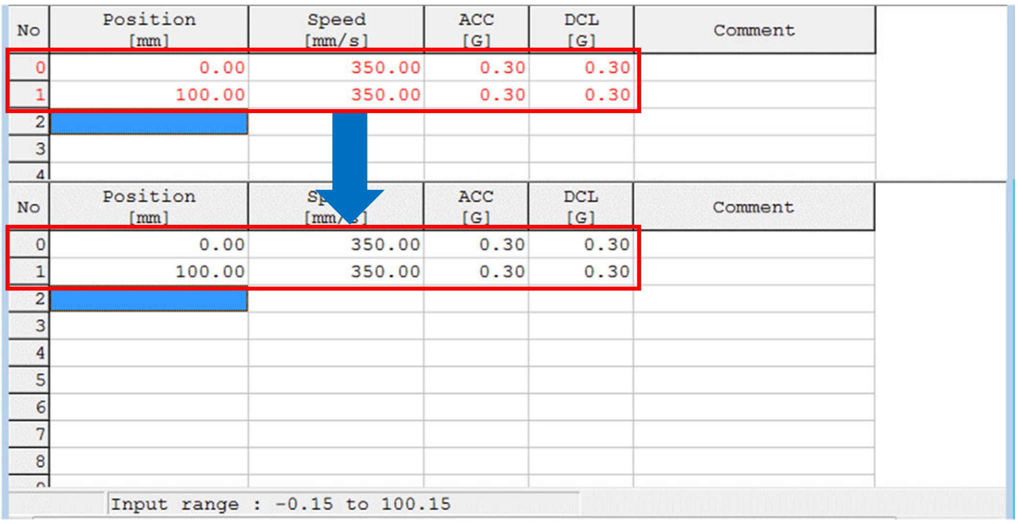


(5) Click OK when the "Confirm" screen is displayed .



Position data(No.0-127) will be transmitted to the controller.
Are you sure to continue?

When the controller transfer of position table data is completed, the number entered changes from red to black.



No	Position [mm]	Speed [mm/s]	ACC [G]	DCL [G]	Comment
0	0.00	350.00	0.30	0.30	
1	100.00	350.00	0.30	0.30	
2					
3					
4					

No	Position [mm]	Speed [mm/s]	ACC [G]	DCL [G]	Comment
0	0.00	350.00	0.30	0.30	
1	100.00	350.00	0.30	0.30	
2					
3					
4					
5					
6					
7					
8					

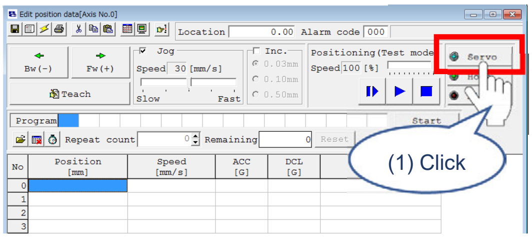
Input range : -0.15 to 100.15

Home return

1 Turn on the actuator motor. (Servo ON)

(1) Click ● Servo .

"Edit position data" screen



(2) When the servo of the actuator motor normally turns on (motor power on) ● Servo changes to ● Servo . (The lamp lights up in light blue.)

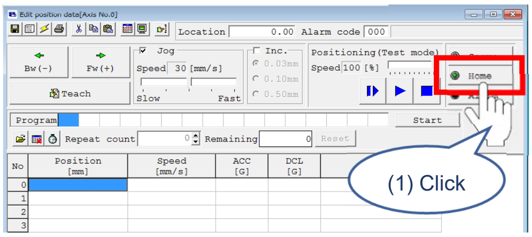
Caution

- When operating the actuator, the motor needs to be turned to servo ON. If an operation command is sent while the servo is off, "Warning: Movement command during servo off" is displayed and the actuator does not start operation.

2 Perform home return for the actuator.

(1) Click ● Home .

"Edit position data" screen



(2) When the actuator starts home return motion and the home return completes normally ● Home changes to ● Home . (The lamp lights up in green.)

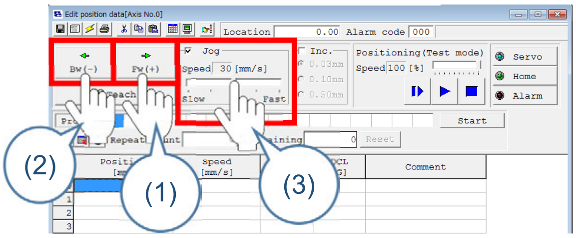
Caution

- <u>The home return speed cannot be changed.</u> Increasing this speed may increase the impact when the actuator operating part hits the mechanical end, which may adversely affect the actuator mechanism in the long run or increase the error of the home position.

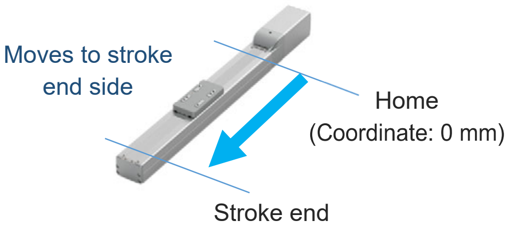
Jog travel

1 Activates the JOG operation of the actuator.

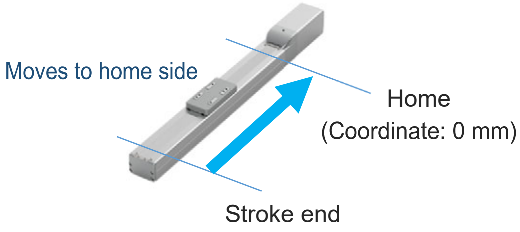
"Edit position data" screen



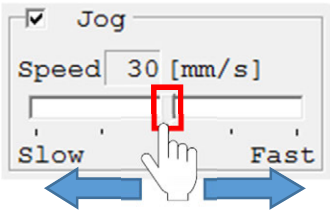
(1) Clicking Fw(+) will move the actuator to the stroke end side.



(2) Clicking Bw(−) will move the actuator to the home direction.



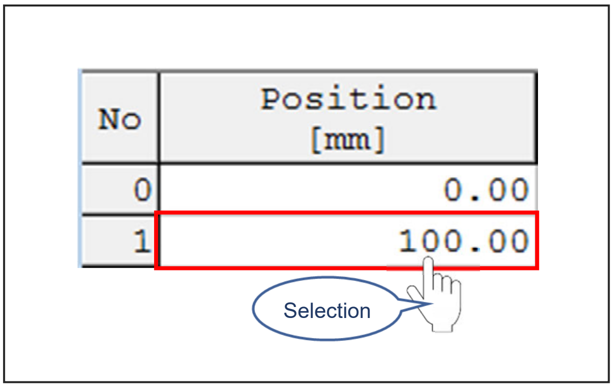
(3) The speed can be adjusted by moving the red frame section below to the left (slow) or right (fast).



Position travel

1 Moves the actuator to the registered position (target position).

(1) Click and select the position No. column to be moved.

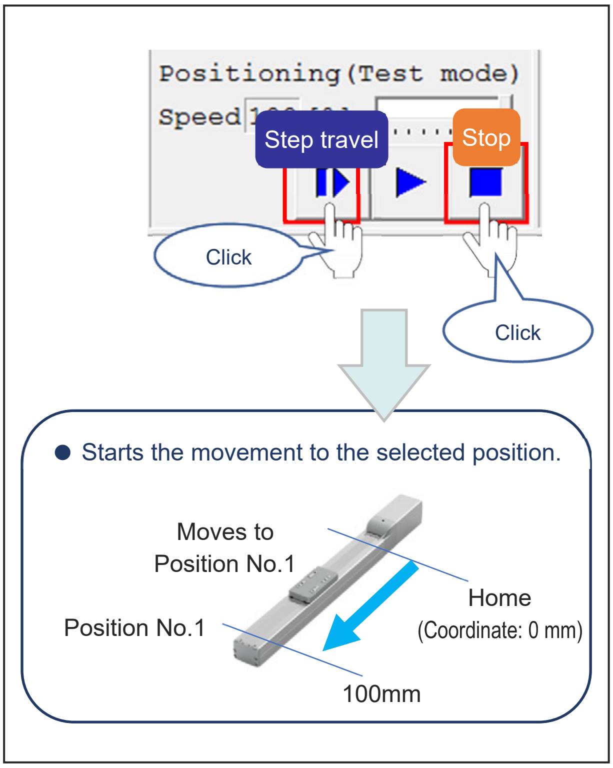


No	Position [mm]
0	0.00
1	100.00

(2) Click ▮▶ in the "Position travel" column.

Stop

To stop, click ■ .

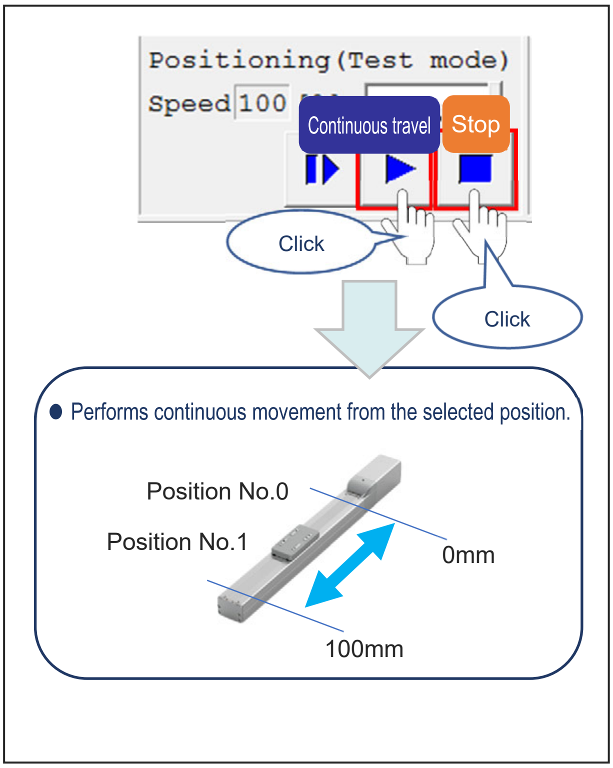


● Starts the movement to the selected position.

(3) Click ▶ in the "Position travel" column.

Stop

To stop, click ■ .

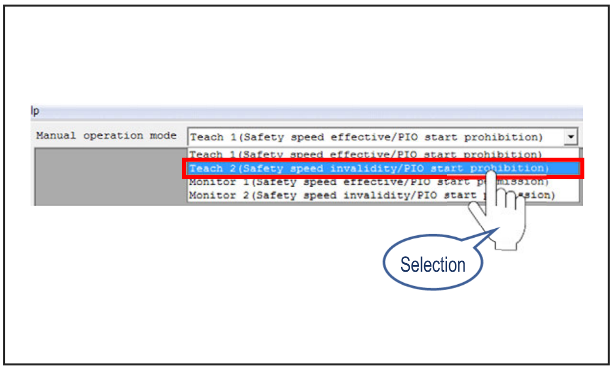


● Performs continuous movement from the selected position.

[Test run speed]

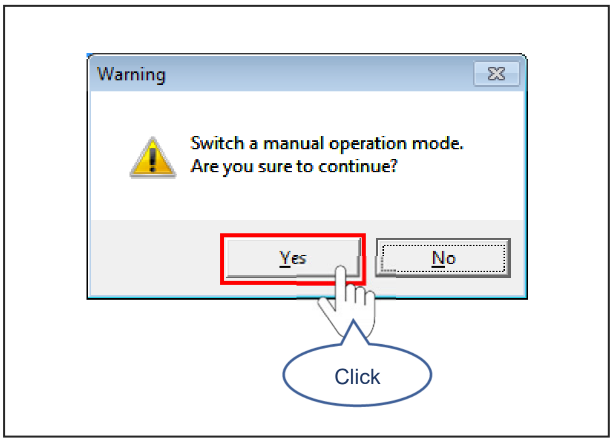
When performing a test run, check whether the "safety speed" function is enabled/disabled in [MANU operation mode] in the tool bar. If the safety speed function is enabled, the operation will be restricted by the speed set in parameter No. 35 "Safety velocity", which may prevent operation according to the speed set in the position data. To perform trial run at the speed set in the position data, disable the safety speed function using the following procedure.

(1) Select "Teach mode 2" in [MANU operation mode] in the tool bar.



Manual operation mode Teach 1(Safety speed effective/PIO start prohibition)

(2) Click "Yes" on the warning screen.



Warning

Switch a manual operation mode.
Are you sure to continue?

(3) The safety speed function has been switched.

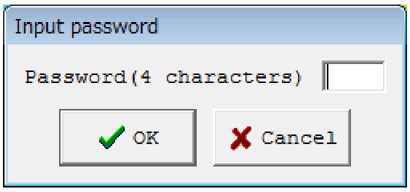
Operation Check of ELECYLINDER

Shown below, explains how to operate in PC software (Model Code: RCM-101-*-*) when ELECYLINDER is connected via the EC connection unit.
For how to check operation in the teaching pendant (TB-02/03), refer to an instruction manual of each ELECYLINDER or teaching pendant.

[Caution when Connecting ELECYLINDER]

- ELECYLINDER is not available for operation in the single solenoid system. ELECYLINDER may not operate as commanded by a host system if the setting is changed to the single solenoid system.
- SIO connectors on ELECYLINDER side cannot be used during being connected to the EC connection unit.
- ELECYLINDER will be in motor voltage drop condition (alarm in teaching pendant: 203) if the teaching pendant gets into disable status by the deadman's switch.
- When the mode switch on the gateway unit is set to AUTO, it should not be available to go to the try run window of the digital speed controller for ELECYLINDER.
- If the mode switch on the gateway unit gets switched from MANU to AUTO during the try run window for the ELECYLINDER digital speed controller is displayed, the try run window should close.

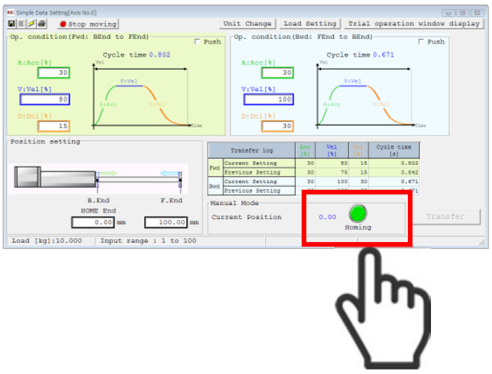
1 Select [Position] → Edit/Teach from the main menu or click 🖉 button, and the screen switches to the simple data setting window.
Except when the position edit password is set to "0000", the password input window should show up. Input the password.



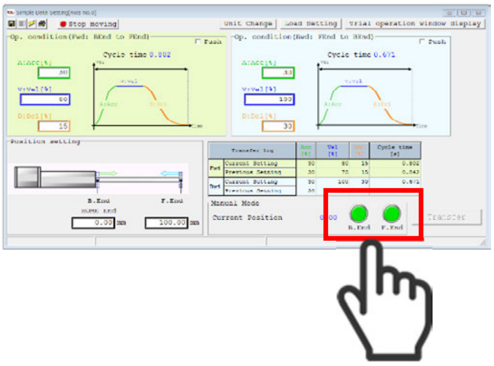
Reference

The position edit password at delivery is set to "0000".
For how to change the password, refer to PA Software (RCM-101-*-*) Instruction Manual (ME0355).

2 Click “Home-Return” button.
ELECYLINDER starts performing the home-return operation.
Once the home-return operation is complete, [Backward End] and [Forward End] buttons should appear.
(Note) There is no need of having the home-return operation for the battery-less absolute encoder type (WA).



3 Click either [Forward End] button or [Backward End] button.
ELECYLINDER starts moving forward or backward.
Stop the click during operation and the ELECYLINDER starts to decelerate and stop from that timing.



[Stop Position / Operating Condition Setting / Adjustment]

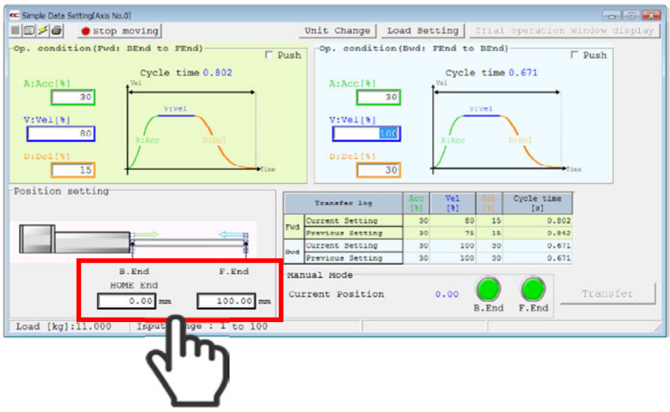
ELECYLINDER is ready with the stop position and operating conditions set before delivery. Adjustment can be made to the stop position and operating conditions in the simple data setting window.

Caution

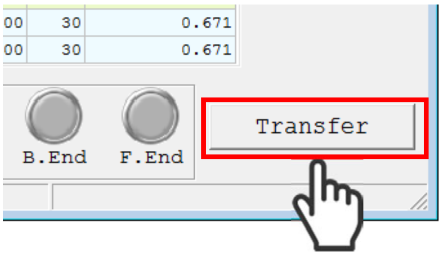
- Make sure to touch [Transfer] after setting or adjusting the data.
- Switching the window without transferring should allow to get the data back.
  Also, without transferring, operation with “Manual Run” would not work.

[Stop Position Setting and Adjustment]

1 Click at the position that you would like to set or adjust.



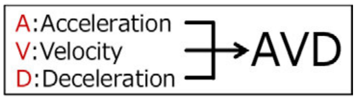
2 Input a number and press [Enter] key on your PC keyboard, and click [Transfer].



3 Perform operation by clicking “Forward End” button and “Backward End” button.

Check the result of the setting or adjustment.

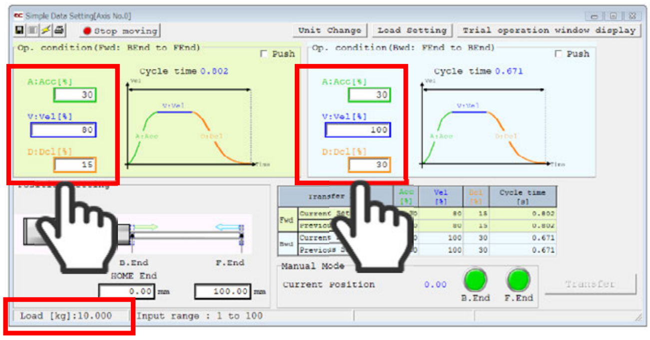
Also, stop the click during operation and the ELECYLINDER starts to decelerate and stop at that point.



[Operating Condition Setting and Adjustment]

The operating conditions (AVD) can be set or adjusted with the procedures shown below.
Also, there is a feature to calculate automatically the “optimum velocity and optimum acceleration / deceleration” in ELECYLINDER.
Set the “Installation Posture” and “Transferred Payload” before setting or adjusting the operating conditions.

1 Click either acceleration, velocity or deceleration, and the current payload setting should appear at the bottom of the screen.



Op. condition(Fwd: BEnd to FEnd) ☐ Push
Cycle time 0.802
A:Acc[%] 30
V:Vel[%] 80
D:Dcl[%] 15

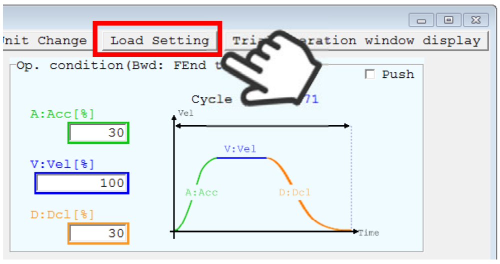
Op. condition(Bwd: FEnd to BEnd) ☐ Push
Cycle time 0.671
A:Acc[%] 30
V:Vel[%] 100
D:Dcl[%] 30

0.00 mm
100.00 mm

Current Position 0.00

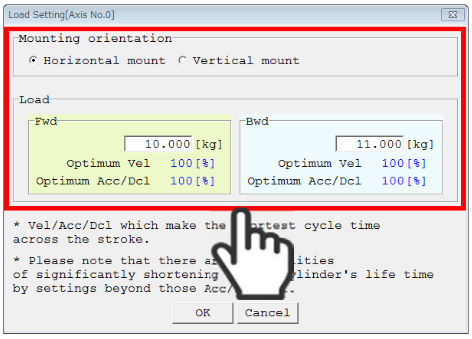
Load [kg]:10.000
Input range : 1 to 100

2 To set or adjust the payload setting, click [Payload Setting]. [Payload Setting] window should open.



Op. condition(Bwd: FEnd t ☐ Push
Cycle
71
A:Acc[%] 30
V:Vel[%] 100
D:Dcl[%] 30

3 Select “Installation Posture”, input “Payload” and click [OK].
With the set conditions, the “optimum velocity” and “optimum acceleration / deceleration” that gives the fastest cycle time should be displayed.



Mounting orientation
● Horizontal mount ○ Vertical mount

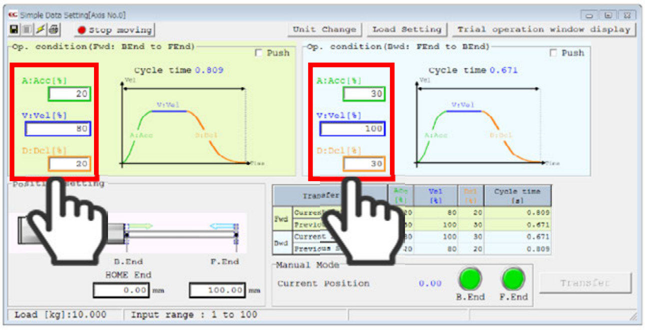
Load
Fwd
10.000 [kg]
Optimum Vel 100 [%]
Optimum Acc/Dcl 100 [%]

Bwd
11.000 [kg]
Optimum Vel 100 [%]
Optimum Acc/Dcl 100 [%]

* Vel/Acc/Dcl which make the ortest cycle time across the stroke.

* Please note that there a ities of significantly shortening linder's life time by settings beyond those Acc/ .

4 Click on a operating condition that you would like to set or adjust.



Simple Data Setting[Axis No.0]

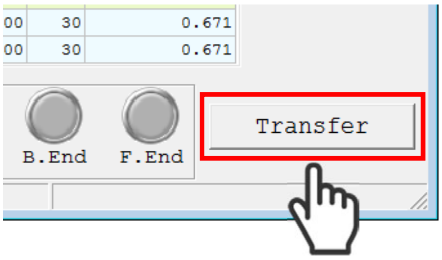
Op. condition(Fwd: BEnd to FEnd) — cycle time 0.809 — A:Acc[%] 20, V:Vel[%] 80, D:Dcl[%] 20

Op. condition(Bwd: FEnd to BEnd) — cycle time 0.671 — A:Acc[%] 30, V:Vel[%] 100, D:Dcl[%] 30

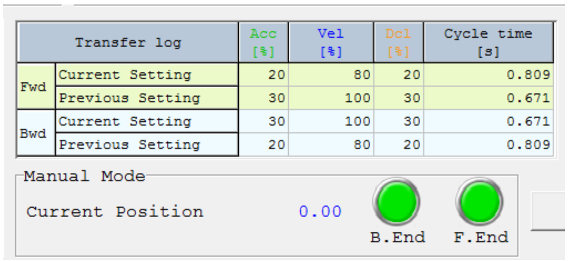
Current Position 0.00

Load [kg]:10.000 Input range : 1 to 100

5 Input a number, press [Enter] key on your PC keyboard and click [Transfer].
The number should be written to the controller and “Backward End” and “Forward End” buttons turns into green.
Also, “Transfer History” should be updated.



6 Calculation result of the cycle time in “Current Setting” and “Previous Setting” in “Transfer History” should be updated.
Perform operation by clicking “Forward End” button and “Backward End” button.
Check the result of the setting or adjustment.



Transfer log		Acc [%]	Vel [%]	Dcl [%]	Cycle time [s]
Fwd	Current Setting	20	80	20	0.809
	Previous Setting	30	100	30	0.671
Bwd	Current Setting	30	100	30	0.671
	Previous Setting	20	80	20	0.809

Manual Mode

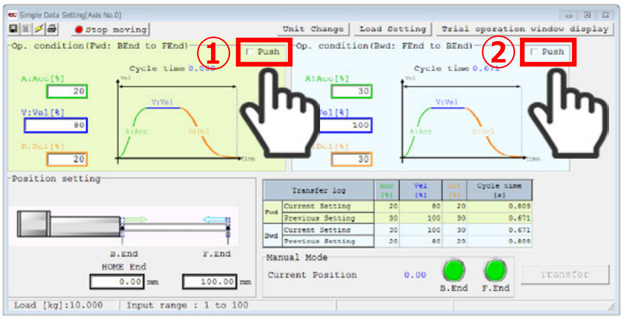
Current Position 0.00

Caution

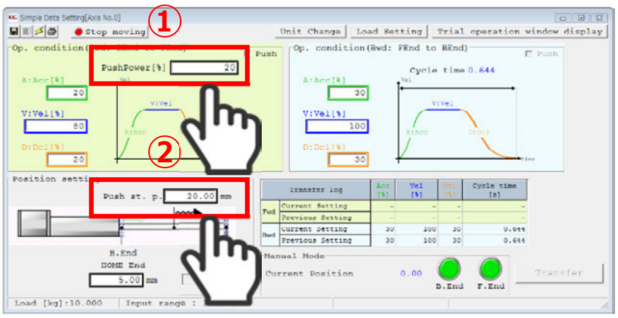
In case there is some abnormal noise, vibration or impact when operating ELECYLINDER, attempt to reduce the acceleration or deceleration.
Keep Using without reducing could cause malfunction.

[Pressing Operation Setting]

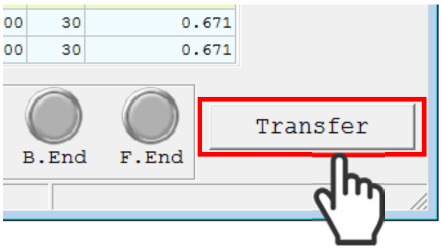
1 Click in the checkbox on “Pressing” to switch to the pressing operation window.
“Pressing” can be set to the (1) way forward and (2) way back.
Adjust the setting considering the operating conditions.



2 Click (1) “Pressing Force” and (2) “Pressing Start Point” and input a number.



3 Input a number, press [Enter] key on your PC keyboard and click [Transfer].
The number should be written to the controller and “Backward End” and “Forward End” buttons turns into green.



4 Perform operation by clicking “Forward End” button and “Backward End” button.
Check the result of the setting or adjustment.

Caution

- Pressing force displayed in N units are reference.
  Refer to the instruction manual or catalog for each ELECYLINDER for detail.
- When the pressing velocity is low, the pressing force may get unstable and the operation may get inappropriate. The pressing velocity may vary depending on models.
  Refer to the instruction manual or catalog for each ELECYLINDER for detail

Startup
Section

Chapter 6

Parameter

6.1 Parameter

Parameter list

The following parameters are available for each actuator.
Parameters should be set and confirmed for each axis number.
Also, the unused parameters are not mentioned in the list.

Parameter list (1/5)

No.	Name	Unit (Note 1)	Input range	Default initial value setting	Compatible motor Type (Note 3)				Relevant sections
					P	A	D	S	
1	Zone boundary 1 + side	mm (deg)	-9,999.99 to 9,999.99	Actual stroke on + side (Note 2)	○	○	○	○	B6-6
2	Zone boundary 1 - side	mm (deg)	-9,999.99 to 9,999.99	Actual stroke on - side (Note 2)	○	○	○	○	B6-6
3	Soft limit - side	mm (deg)	-9,999.99 to 9,999.99	Actual stroke on + side (Note 2)	○	○	○	○	B6-8
4	Soft limit - side	mm (deg)	-9,999.99 to 9,999.99	Actual stroke on - side (Note 2)	○	○	○	○	B6-8
5	Homing direction	–	0: Reverse, 1: Forward	In accordance with actuator (Note 2)	○	○	○	○	B6-9
6	Pushing stop recognition time	ms	0 to 9,999	In accordance with actuator (Note 2)	○	○	○	○	B6-10
7	Servo gain number	–	0 to 31	In accordance with actuator (Note 2)	○	○	○	○	B6-11
8	Velocity initial value	mm/s (deg/s)	1 ~ Actuator maximum speed	Actuator rated speed (Note 2)	○	○	○	○	B6-11
9	Acc/Dec initial value	G	0.01 ~ Actuator max. acceleration/deceleration	Actuator rated acceleration/deceleration (Note 2)	○	○	○	○	B6-12
10	Positioning band initial value	mm (deg)	0.01 ~ 999.99	In accordance with actuator (Note 2)	○	○	○	○	B6-12
12	Current limit during positioning stop	%	0 to 70	In accordance with actuator (Note 2)	○	–	–	–	B6-13
13	Current limit during homing	%	0 to 100	In accordance with actuator (Note 2)	○	–	–	–	B6-13
			0 to 300		–	○	○	○	
14	Dynamic brake	–	0: Disabled, 1: Enabled	1	–	–	–	○	B6-13
18	Home sensor polarity	–	0 to 2	In accordance with actuator (Note 2)	○	○	–	○	B6-14
19	Overrun sensor input polarity	–	0 to 2	In accordance with actuator (Note 2)	–	–	–	○	B6-14
20	Creep sensor input polarity	–	0 to 2	In accordance with actuator (Note 2)	–	–	–	○	B6-15
22	Homing offset	mm (deg)	0.00 to 9,999.99	In accordance with actuator (Note 2)	○	○	○	○	B6-16
23	Zone boundary 2 + side	mm (deg)	-9,999.99 to 9,999.99	Actual stroke on + side (Note 2)	○	○	○	○	B6-6
24	Zone boundary 2 - side	mm (deg)	-9,999.99 to 9,999.99	Actual stroke on - side (Note 2)	○	○	○	○	B6-6

Note 1 The unit (deg) is applicable to the rotary actuator or lever-type gripper. It will be displayed as (mm) on the teaching tool.

Note 2 The setting values vary in accordance with the specification of the actuator. At shipping, the parameters are set in accordance with the specification.

Note 3 P: Stepper motor specification, A: AC servo motor specification, D: DC brush-less motor specification, S: 200V AC servo motor specification

Parameter list (2/5)

No.	Name	Unit (Note 1)	Input range	Default initial value setting	Compatible motor Type (Note 3)				Relevant sections
					P	A	D	S	
26	PIO Jog velocity	mm/s (deg/s)	1 ~ Actuator maximum speed	In accordance with actuator (Note 2)	○	○	○	○	B6-17
28	Excitation signal detection operation Initial travel direction	–	0: Reverse, 1: Forward	In accordance with actuator (Note 2)	○	○	–	–	B6-17
29	Excitation signal detection time	ms	1 to 999	10	○	–	–	–	B6-17
			50 to 999	128	–	○	–	–	
30	Excitation detection type	–	0: Conventional mode 1: New mode 1 2: New mode 2	1	○	–	–	–	B6-18
	Pole sense type	–	0: Current control 1: Distance control 1 2: Distance control 2	1	–	○	–	–	B6-18
31	Velocity loop proportional gain	–	1 to 99,999,999	In accordance with actuator (Note 2)	○	○	○	○	B6-19
32	Velocity loop integral gain	–	1 to 99,999,999	In accordance with actuator (Note 2)	○	○	○	○	B6-20
33	Torque filter constant	–	0 to 2,500	In accordance with actuator (Note 2)	○	○	○	○	B6-21
34	Push speed	mm/s (deg/s)	1 ~ Actuator Maximum push speed	In accordance with actuator (Note 2)	○	○	○	○	B6-21
35	Safety velocity	mm/s (deg/s)	1 to 250 (Maximum speed should be the upper limit for actuators with maximum speed less than 250)	100	○	○	○	○	B6-22
36	Automatic servo OFF delay time 1	s	0 to 9,999	0	○	○	○	○	B6-22
37	Automatic servo OFF delay time 2	s	0 to 9,999	0	○	○	○	○	B6-22
38	Automatic servo OFF delay time 3	s	0 to 9,999	0	○	○	○	○	B6-22
39	Positioning complete signal output method	–	0: PEND 1: INP	0	○	○	○	○	B6-22
43	Home confirmation sensor input polarity	–	0: Sensor not in use 1: a-contact 2: b-contact	In accordance with actuator (Note 2)	○	○	–	–	B6-23
46	Velocity override	%	1 to 100	100	○	○	○	○	B6-23
47	PIO Jog velocity 2	mm/s (deg/s)	1 ~ Actuator maximum speed	In accordance with actuator (Note 2)	○	○	○	○	B6-24
48	PIO inching distance	mm (deg/s)	0.01 to 1.00	1.00	○	○	○	–	B6-24
				0.10	–	–	–	○	
49	PIO inching distance 2	mm (deg/s)	0.01 to 1.00	0.10	○	○	○	○	B6-24
50	Load output judgment time	ms	0 to 9,999	255	○	–	–	○	B6-24
52	Acc/Dec mode initial value	–	0: Trapezoid pattern 1: S-motion 2: First-order delay filter	0	○	○	○	○	B6-25
53	Stop mode initial value	–	0 to 3	0 (not in use)	–	○	○	○	B6-25
			0 to 7		○	–	–	–	

Note 1 The unit (deg) is applicable to the rotary actuator or lever-type gripper. It will be displayed as (mm) on the teaching tool.

Note 2 The setting values vary in accordance with the specification of the actuator. At shipping, the parameters are set in accordance with the specification.

Note 3 P: Stepper motor specification, A: AC servo motor specification, D: DC brush-less motor specification, S: 200V AC servo motor specification

Parameter list (3/5)

No.	Name		Unit (Note 1)	Input range	Default initial value setting	Compatible motor type (Note 3)				Relevant sections
						P	A	D	S	
54	Current control width number		–	0 to 15	In accordance with actuator (Note 2)	–	○	○	○	B6-25
55	Position command primary filter time constant		ms	0.0 to 100.0	0.0	○	○	○	○	B6-26
56	S-motion ratio setting		%	0 to 100	0	○	○	○	○	B6-27
71	Position feed forward gain		–	0 to 100	0	○	○	–	○	B6-29
					50	–	–	○	–	
73	Encoder voltage level		–	0 to 3	Depending on encoder cable length	–	–	–	○	B6-30
75	Electromagnetic Brake Power Supply Monitoring		–	0: Disabled, 1: Enabled	In accordance with actuator (Note 2)	–	–	–	○	B6-30
76	Belt breaking sensor input polarity		–	0 to 2	In accordance with actuator (Note 2)	–	–	–	○	B6-31
77	Lead size of ball screw		mm (deg)	0.01 to 999.99	In accordance with actuator (Note 2)	○	○	○	○	B6-32
78	Axis motion type		–	0: Linear axis 1: Rotary axis	In accordance with actuator (Note 2)	○	○	○	○	B6-32
79	Rotary axis mode select		–	0: Normal mode 1: Index mode	In accordance with actuator (Note 2)	○	○	○	○	B6-33
80	Rotary axis shortcut select		–	0: Disabled, 1: Enabled	In accordance with actuator (Note 2)	○	○	○	○	B6-34
83	Absolute Unit		–	0: Not in use, 1: Used	0 (Note 4)	○	○	–	–	B6-34
88	Software limit margin		mm	0 to 9,999.99	0	○	○	○	○	B6-35
89	Allowable time of exceeding torque allowing continuous pressing		sec	0 to 300	In accordance with actuator (Note 2)	–	–	–	○	B6-35
91	Current limit value during contactless push stop		–	0: Current limit value during stop 1: Current limit value during push	0	○	○	○	○	B6-36
97	Set 1 Vibration damping parameters	Damping characteristics coefficient 1	–	0 to 1,000	10	–	○	–	○	B6-36
98		Damping characteristics coefficient 2	–	0 to 1,000	1,000	–	○	–	○	
99		Natural frequency	1/1,000Hz	500 to 30,000	10,000	–	○	–	○	
100		Notch filter gain	–	1 to 20,000	9,990	–	○	–	○	
101	Set 2 Vibration damping parameters	Damping characteristics coefficient 1	–	0 to 1,000	10	–	○	–	○	
102		Damping characteristics coefficient 2	–	0 to 1,000	1,000	–	○	–	○	
103		Natural frequency	1/1,000Hz	500 to 30,000	10,000	–	○	–	○	
104		Notch filter gain	–	1 to 20,000	9,990	–	○	–	○	
105	Set 3 Vibration damping parameters	Damping characteristics coefficient 1	–	0 to 1,000	10	–	○	–	○	
106		Damping characteristics coefficient 2	–	0 to 1,000	1,000	–	○	–	○	
107		Natural frequency	1/1,000Hz	500 to 30,000	10,000	–	○	–	○	
108		Notch filter gain	–	1 to 20,000	9,990	–	○	–	○	

Note 1 The unit (deg) is applicable to the rotary actuator or lever-type gripper. It will be displayed as (mm) on the teaching tool.

Note 2 The setting values vary in accordance with the specification of the actuator. At shipping, the parameters are set in accordance with the specification.

Note 3 P: Stepper motor specification, A: AC servo motor specification, D: DC brush-less motor specification, S: 200V AC servo motor specification

Note 4 When using the simple absolute unit, change the parameter No. 83 to "1" and perform absolute reset before use.

Parameter list (4/5)

No.	Name	Unit (Note 1)	Input range	Default initial value setting	Compatible motor Type (Note 3)				Relevant sections
					P	A	D	S	
109	Vibration damping No. initial value	–	0 to 3	0	–	○	–	○	B6-37
110	Stop method during SrvOFF	–	0: Sudden stop 1: Decelerating stop	0	○	○	○	○	B6-37
112	Monitoring mode select	–	0: Not in use 1: Monitor function 1 2: Monitor function 2 3: Monitor function 3	1	○	○	○	○	B6-38
113	Monitoring cycle	ms	1 to 60,000	1	○	○	○	–	B6-38
			1 to 1,000		–	–	–	○	
120	Servo gain number 1	–	0 to 31	In accordance with actuator (Note 2)	–	○	–	○	B6-39
121	Position feed forward gain 1	–	0 to 100	0	–	○	–	○	
122	Velocity loop proportional gain 1	–	1 to 27,661	In accordance with actuator (Note 2)	–	○	–	–	
			1 to 99,999,999		–	–	–	○	
123	Velocity loop integral gain 1	–	1 to 217,270	In accordance with actuator (Note 2)	–	○	–	–	
			1 to 99,999,999		–	–	–	○	
124	Torque filter constant 1	–	0 to 2,500	In accordance with actuator (Note 2)	–	○	–	○	
125	Current control width number 1	–	0 to 15	In accordance with actuator (Note 2)	–	○	–	○	
126	Servo gain number 2	–	0 to 31	In accordance with actuator (Note 2)	–	○	–	○	
127	Position feed forward gain 2	–	0 to 100	0	–	○	–	○	
128	Velocity loop proportional gain 2	–	1 to 27,661	In accordance with actuator (Note 2)	–	○	–	–	
			1 to 99,999,999		–	–	–	○	
129	Velocity loop integral gain 2	–	1 to 217,270	In accordance with actuator (Note 2)	–	○	–	–	
			1 to 99,999,999		–	–	–	○	
130	Torque filter constant 2	–	0 to 2,500	In accordance with actuator (Note 2)	–	○	–	○	
131	Current control width number 2	–	0 to 15	In accordance with actuator (Note 2)	–	○	–	○	
132	Servo gain number 3	–	0 to 31	In accordance with actuator (Note 2)	–	○	–	○	
133	Position feed forward gain 3	–	0 to 100	0	–	○	–	○	
134	Velocity loop proportional gain 3	–	1 to 27,661	In accordance with actuator (Note 2)	–	○	–	–	
			1 to 99,999,999		–	–	–	○	
135	Velocity loop integral gain 3	–	1 to 217,270	In accordance with actuator (Note 2)	–	○	–	–	
			1 to 99,999,999		–	–	–	○	
136	Torque filter constant 3	–	0 to 2,500	In accordance with actuator (Note 2)	–	○	–	○	
137	Current control width number 3	–	0 to 15	In accordance with actuator (Note 2)	–	○	–	○	

Note 1 The unit (deg) is applicable to the rotary actuator or lever-type gripper. It will be displayed as (mm) on the teaching tool.

Note 2 The setting values vary in accordance with the specification of the actuator. At shipping, the parameters are set in accordance with the specification.

Note 3 P: Stepper motor specification, A: AC servo motor specification, D: DC brush-less motor specification, S: 200V AC servo motor specification

Parameter list (5/5)

No.	Name	Unit (Note 1)	Input range	Default initial value setting	Compatible motor Type (Note 3)				Relevant sections
					P	A	D	S	
138	Servo gain switch time constant	ms	10 to 2,000	10	–	○	–	○	B6-40
139	Home preset value	mm	-9,999.99 to 9,999.99	In accordance with actuator (Note 2)	–	○	–	○	B6-41
143	Overload load level ratio	%	50 to 100	100	○	○	○	○	B6-42
144	GS magnification upper limit	%	0 to 1,023	0 (Disabled)	○	–	–	–	B6-43
145	GS velocity loop proportional gain	–	1 to 99,999,999	In accordance with actuator (Note 2)	○	–	–	–	B6-43
146	GS velocity loop integral gain	–	1 to 99,999,999	In accordance with actuator (Note 2)	○	–	–	–	B6-44
147	Total travel count threshold	times	0 to 999,999,999	0 (Disabled)	○	○	○	○	B6-44
148	Total travel distance threshold	m	0 to 999,999,999	0 (Disabled)	○	○	○	○	B6-44
150	Linear Absolute Home Preset Value	mm	-9,999.99 to 999,999,999	In accordance with actuator (Note 2)	–	–	–	○	B6-45
151	Minor malfunction alarm output select	–	0: Output during overload warning 1: Message level Alarm output	1	○	○	○	–	B6-46
152	High output setting	–	0: Disabled, 1: Enabled	In accordance with actuator (Note 2)	○	–	–	–	B6-46
153	BU velocity loop proportional gain	–	1 to 99999999	In accordance with actuator (Note 2)	○	–	–	–	B6-46
154	BU velocity loop integral gain	–	1 to 99999999	In accordance with actuator (Note 2)	○	–	–	–	B6-47
155	Absolute battery retention time	–	0: 20 days 1: 15 days 2: 10 days 3: 5 days	0	○	○	–	–	B6-48
158	Enabled/disabled axis select	–	0: Enabled, 1: Disabled	0	○	○	○	–	B6-49
166	Startup current limit expansion Function	–	0: Disabled, 1: Enabled	0	○	–	–	–	B6-49
168	Collision detection function	–	0 to 7	0	○	–	–	–	B6-50
181	Push mode	–	0: CON mode 1: SEP mode	0	○	○	○	–	B6-51
182	Auto current adj. select	–	0: Disabled, 1: Enabled	0	○	–	–	–	B6-52
190	Servo ON delay time adjustment	ms	0 to 9,999	0	○	–	–	–	B6-52
191	Position data expansion function setting	–	0: Not displayed 1: Drive torque limit 2: Push speed	0	○	○	○	○	B6-52
194	JOG switch	–	0: Enabled, 1: Disabled	0	○	○	○	○	B6-53
195	Virtual axis	mm	0 to 1	0	○	○	○	○	B6-54
196	Virtual axis absolute initial position	mm	-9,999.99 to 9,999.99	0	○	○	–	○	B6-54

Note 1 The unit (deg) is applicable to the rotary actuator or lever-type gripper. It will be displayed as (mm) on the teaching tool.

Note 2 The setting values vary in accordance with the specification of the actuator. At shipping, the parameters are set in accordance with the specification.

Note 3 P: Stepper motor specification, A: AC servo motor specification, D: DC brush-less motor specification, S: 200V AC servo motor specification

Parameter details

Caution

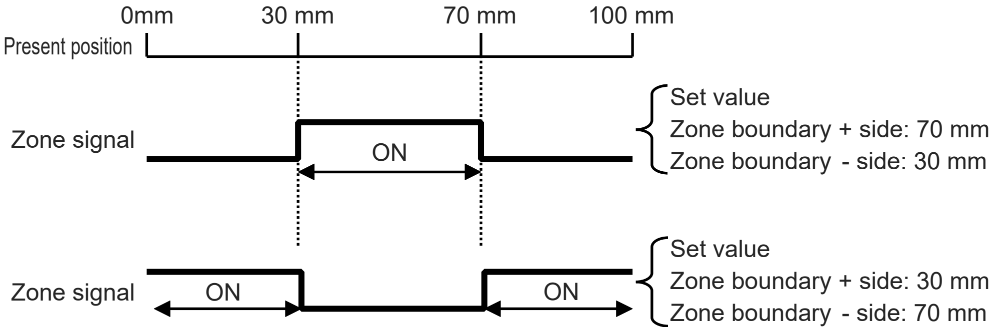
- After changing (writing) parameters, perform a software reset or power reboot so that the set values can be reflected.
- The unit (deg) is applicable to the rotary actuator or lever-type gripper. Note that it will be displayed as mm on the teaching tool.

[Zone Boundary 1 + Side, Zone Boundary 1 - Side (Parameter No. 1, No. 2)]
[Zone Boundary 2 + Side, Zone Boundary 2 - Side (Parameter No. 23, No. 24)]

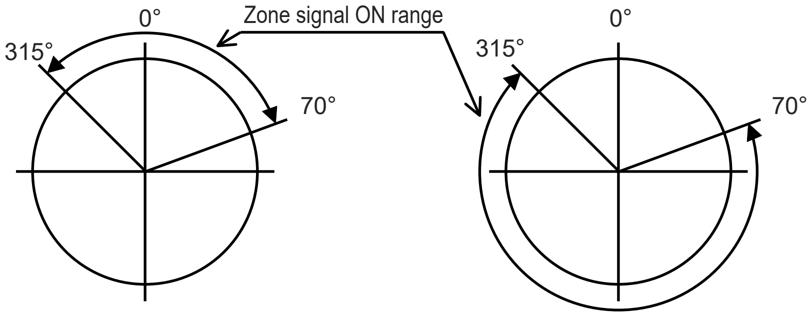
No.	Name	Unit	Input range	Default initial value setting
1	Zone boundary 1 + side	mm (deg)	-9,999.99 to 9,999.99	Actual stroke on + side
2	Zone boundary 1 - side	mm (deg)	-9,999.99 to 9,999.99	Actual stroke on - side
23	Zone boundary 2 + side	mm (deg)	-9,999.99 to 9,999.99	Actual stroke on + side
24	Zone boundary 2 - side	mm (deg)	-9,999.99 to 9,999.99	Actual stroke on - side

Set the range to turn zone signals (ZONE1, ZONE2) ON.
The minimum setting unit is 0.01 mm (deg).
If the same value is set for zone boundary + side and zone boundary - side, a zone signal will not be output.
Setting examples are shown below.

[For linear axis]



[For rotary actuator in index mode]



Caution

- Unless the zone signal detection range is set at a value above minimum resolution, a signal will not be output.
- The minimum resolution can be calculated with the equation below.
  Minimum resolution [mm/pulse] = Actuator lead [mm/r] / Encoder resolution [pulse/r]

[Soft Limit + Side, Soft Limit - Side (Parameter No. 3, No. 4)]

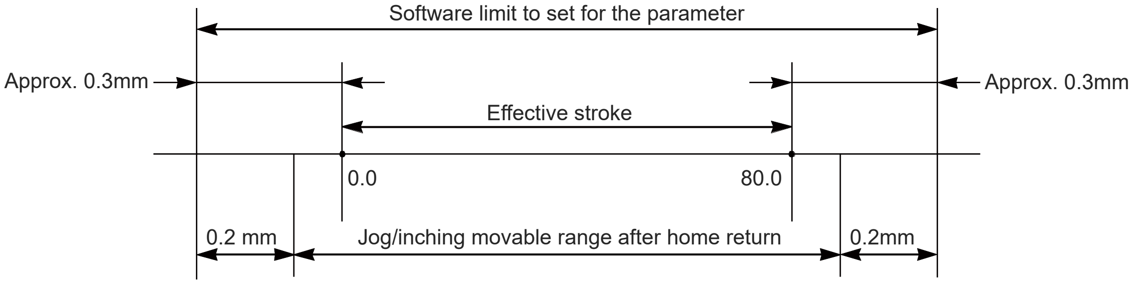
No.	Name	Unit	Input range	Default initial value setting
3	Soft limit + side	mm (deg)	-9,999.99 to 9,999.99	Actual stroke on + side
4	Soft limit - side	mm (deg)	-9,999.99 to 9,999.99	Actual stroke on - side

0.3 mm (deg) is added to the outside of the effective actuator stroke for the default setting. Change as required to prevent collision when there are obstacles, or when used slightly above effective stroke within the movable range.
The minimum setting unit is 0.01mm.

Caution

- At this time, take extra care not to set incorrect values as this will lead to a collision with the mechanical end.
- If changing, set a value extended by 0.3 mm to the outside of the effective stroke.

Example) To set the effective stroke between 0.0 mm and 80.0 mm
Parameter No.3 (+ side) 80.3
Parameter No.4 (- side) -0.3



The movable range of jog or inching after home return will be 0.2 mm inside the set value. Alarm code 0D9 "Software limit over error" occurs when the set value exceeds the value set in parameter No. 88 "Soft limit margin" (default setting = 0). If parameter No. 88 is not set, the value set for this parameter will become a detection value of the alarm code 09D "Software limit over error."

[Homing Direction (Parameter No.5)]

No.	Name	Unit	Input range	Default initial value setting
5	Homing direction	–	0: Reverse, 1: Forward	In accordance with actuator

Unless indicated as home reverse specification (option), the direction of home return for the linear axis is on the motor side, the rotary axis is on the counterclockwise side, and the gripper is on the outside (open side).
For details, refer to "Actuator coordinate system (page Intro-18)".

Caution

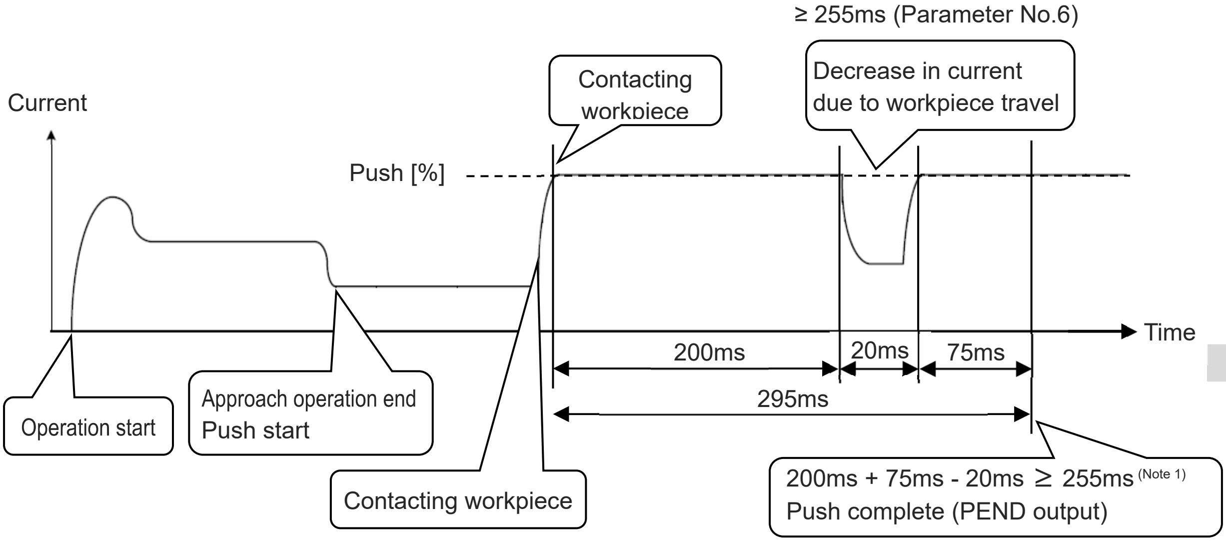
- Homing direction cannot be changed with some models.
- If it becomes necessary to reverse the homing direction after assembly to equipment, check the model of the applicable actuator to ensure that the homing direction is changeable.
- For models with which change is not possible, the actuator must be replaced.
  Contact IAI if anything is unclear.

[Pushing Stop Recognition Time (Parameter No. 6)]

No.	Name	Unit	Input range	Default initial value setting
6	Pushing stop recognition time	ms	0 to 9,999	In accordance with actuator

A parameter to set completion judgment time of push-motion operation.
The torque (current limit value) set in % in "Pushing" in the position table is monitored, and the pushing complete signal PEND turns ON when the load current reaches the following conditions during push-motion operation. PEND signal turns ON when the conditions are satisfied even if the workpiece is not stopped.

(Accumulated time in which current has reached push value [%]) - (accumulated time in which current is less than push value [%])



Note 1 : The default is set to 70ms for some models of the gripper type.

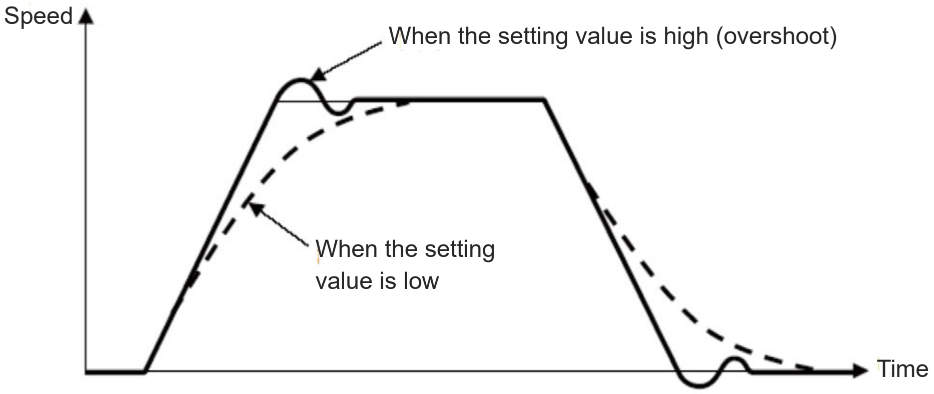
[Servo Gain Number (Parameter No. 7)]

No.	Name	Unit	Input range	Default initial value setting
7	Servo gain number	–	0 to 31	In accordance with actuator

Called position loop gain, position control system proportional gain, etc., this is the parameter that sets the response of the position control loop. The increased set value improves tracking of position command. If it is too high, overshoot may occur.

If the setting value is low, tracking performance with respect to the position command becomes worse, and positioning takes time.

In systems with low mechanical rigidity and systems with low natural frequency, mechanical resonance occurs when the setting value is increased, and this may cause not only vibration and noise, but also overload malfunctions.



[Velocity Initial Value (Parameter No. 8)]

No.	Name	Unit	Input range	Default initial value setting
8	Velocity initial value	mm/s (deg/s)	1 ~ Actuator maximum speed	Actuator rated speed

The actuator rated speed is set at shipment.

This value will be written automatically in the speed field of the applicable position No. when target position is written in an unregistered position table.

Enter frequently used values for convenience.

[Acc/Dec Initial Value (Parameter No. 9)]

No.	Name	Unit	Input range	Default initial value setting
9	Acc/Dec initial value	G	0.01 ~ Actuator max. acceleration/deceleration	Actuator rated acceleration/deceleration

The actuator rated acceleration/deceleration is set at shipment.
This setting value should be automatically written to the acceleration/deceleration in the applicable position numbers when the target position gets written to the unregistered position table. This setting also gets reflected to the jog/inching operations with a teaching tool.
Enter frequently used values for convenience.

[Positioning Band (In-Position) Initial Value (Parameter No. 10)]

No.	Name	Unit	Input range	Default initial value setting
10	Positioning band initial value	mm (deg)	0.01 (Note 1) ~ 999.99	In accordance with actuator

This value will be written automatically in the positioning width field of the applicable position No. when target position is written in an unregistered position table. Enter frequently used values for convenience.

Caution

For the initial positioning band width, set a value of or higher than the minimum positioning band width.

The minimum resolution can be calculated with the equation below.

Minimum resolution [mm/pulse] = Actuator lead [mm/r] / Encoder resolution [pulse/r]

For RCP2/3/4/5 Series, a value 3 times the minimum resolution will be the minimum positioning width.

Note 1 For RCP4 and RCP5 Series actuators, the minimum setting should be the value for the minimum positioning band width.

Stepper motor specification only

[Current Limit During Positioning Stop (Parameter No. 12)]

No.	Name	Unit	Input range	Default initial value setting
12	Current limit during positioning stop	%	0 to 70	In accordance with actuator

By increasing the value, torque retention during stop will be increased.
There is normally no need to make changes. If significant external force is applied during the stop, it is necessary to increase the set value. Contact IAI.

[Current Limit During Homing (Parameter No. 13)]

No.	Name	Unit	Input range	Default initial value setting	Specifications
13	Current limit during homing	%	0 to 100	In accordance with actuator	Stepper motor specification
			0 to 300		AC servo motor specification DC brush-less motor specification

A current value suited to the actuator standard specifications is set at shipment.
By increasing the value, home return torque will be increased.
There is normally no need to make changes. During vertical use, if home return motion completes before the normal position due to the fixing method or load bearing conditions, it is necessary to increase the set value. Contact IAI.

200V AC servo motor specification only

[Dynamic brake (Parameter No. 14)]

No.	Name	Unit	Input range	Default initial value setting
14	Dynamic brake	–	0 : Disabled, 1 : Enabled	1

This parameter defines whether the dynamic brake is enabled or disabled while the actuator is at standstill.
Normally it need not be changed.

AC servo motor specification and stepper motor specification only

[Home Sensor Polarity (Parameter No. 18)]

No.	Name	Unit	Input range	Default initial value setting
18	Home sensor polarity	–	0 to 2	In accordance with actuator

A parameter to select input polarity of the home sensor.
Home sensor is optional.

Set value	Content
0	Standard specification (home sensor not in use)
1	Input is a-contact
2	Input is b-contact

200V AC servo motor specification only

[Overrun sensor input polarity (Parameter No. 19)]

No.	Name	Unit	Input range	Default initial value setting
19	Overrun sensor input polarity	–	0 to 2	In accordance with actuator

This parameter is set properly prior to the shipment according to the specification of the actuator.

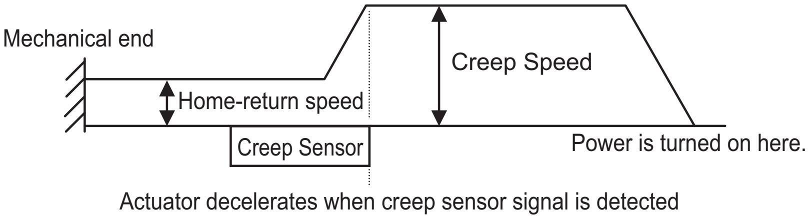
Set value	Content
0	Standard specification without sensor
1	Over travel detection sensor input is a contact
2	Over travel detection sensor input is b contact

200V AC servo motor specification only

[Creep sensor input polarity (Parameter No. 20)]

No.	Name	Unit	Input range	Default initial value setting
20	Creep sensor input polarity	–	0 to 2	In accordance with actuator

Even though the movement speed for most of the actuators at the home return is 20mm/s, there are some actuators with other settings. Refer to the instruction manual of each actuator.
Even though the actuator with long stroke requires time to home-return if the power is shut at a point far from the home position, the required time can be improved with using the creep sensor.
The actuator moves at the creep speed (100mm/s or less) until a creep sensor signal is detected, upon which the actuator will decelerate to the home return speed.
Creep sensor is an option for the line axis type.
This parameter is set properly prior to the shipment according to the specification of the actuator.



Set value	Content
0	Not to use
1	Input is a contact
2	Input is b contact

[Homing offset (Parameter No. 22)]

No.	Name	Unit	Input range	Default initial value setting
22	Homing offset	mm (deg)	0.00 to 9,999.99	In accordance with actuator

Sets the distance from the mechanical end to the home position.
Home is adjustable in the following cases.

- ·To match the actuator home position and the mechanical home position after assembly into equipment.
- ·To set a new home position after reversing the default home direction.
- ·To eliminate a slight deviation from the previous home position generated after replacing the actuator.

Adjustment process
(1) Perform home return motion.
(2) Check amount of deviation.
(3) Change the parameter.
(4) After setting, repeat home return motion several times to confirm that the actuator always returns to the same home position.

Caution

- If the homing offset has been changed, the software limit parameter also needs to be reviewed.
  If the value must be set above the default setting, contact IAI.
- For the absolute specification, if a value close to an integral multiplication of the lead length (including homing offset 0) is set for the homing offset, servo lock status may ensue in the Z-phase during the absolute reset, and coordinates may deviate by the lead length.
- For absolute specification, never set a value close to an integral multiplication of the lead length. Secure sufficient margin.

[Zone Boundary 2 + Side, Zone Boundary 2 - Side (Parameter No. 23, No. 24)]

Refer to page B6-6 (Parameter No. 23, No. 24) for more information.

[PIO Jog Velocity (Parameter No. 26)]

No.	Name	Unit	Input range	Default initial value setting
26	PIO Jog velocity	mm/s (deg/s)	1 ~ Actuator maximum speed	In accordance with actuator

A setting for jog operation speed when jog speed/inching switch signal JVEL is OFF.
Set an ideal value to suit the application.

24V AC servo motor specification
and stepper motor specification only

[Excitation Signal Detection Operation Travel Direction (Parameter No. 28)]

No.	Name	Unit	Input range	Default initial value setting
28	Excitation signal detection operation travel direction	–	0: Reverse 1: Forward	In accordance with actuator

After turning the power ON, the first servo ON detects excitation. Operation direction during detection is set.
There is normally no need to make changes. Set in a direction which makes movement of the motor easy if the mechanical end or an obstacle is contacted when power is turned ON.
If the direction without contact is the same as the home return direction, set the same value as Parameter No. 5 "Home Return Direction." If the direction is opposite, set the value opposite to that of Parameter No. 5 (1 if No. 5 is 0, 0 if No. 5 is 1).
For simple absolute specification and RCP5 Series, it detects excitation upon home return motion complete.

24V AC servo motor specification
and stepper motor specification only

[Excitation Signal Detection Time (Parameter No. 29)]

No.	Name	Unit	Input range	Default initial value setting	Specifications
29	Excitation signal detection time	ms	1 to 999	10	Stepper motor specification
			50 to 999	128	24V AC servo motor specification

After turning the power ON, the first servo ON detects excitation. Set this detection time.
There is normally no need to make changes. Adjustment of this parameter can be effective at times when an excitation detection error or abnormal operation has occurred.
Contact IAI when changing this parameter.
For simple absolute specification and RCP5 Series, it detects excitation upon home return motion complete.

Stepper motor specification only

[Excitation Detection Type (Parameter No. 30)]

No.	Name	Unit	Input range	Default initial value setting
30	Excitation detection type	–	0: Conventional mode 1: New mode 1 (For vertical mount) 2: New mode 2 (For horizontal mount)	1

After turning the power ON, the first servo ON detects excitation. The new mode makes this operation smooth and quiet.

For example, if the actuator is mounted vertically, setting new mode 2 (for horizontal mount) may cause the slider or rod to fall during excitation detection operation. Be sure to mount in the designated direction. Set new mode 1 if anything falls even if mounted in the designated direction.

For simple absolute specification and RCP5 Series, it detects excitation upon home return motion complete.

24V AC servo motor specification only

[Pole Sense Type (Parameter No. 30)]

No.	Name	Unit	Input range	Default initial value setting
30	Pole sense type	–	0: Current control 1: Distance control 1 2: Distance control 2	1

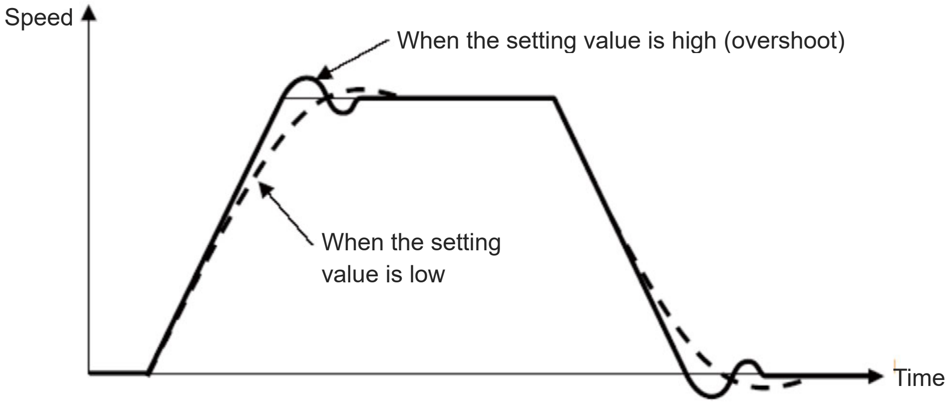
After turning the power ON, the first servo ON detects polarity. The operation method is set at this time.

There is normally no need to make changes.

[Velocity Loop Proportional Gain (Parameter No. 31)]

No.	Name	Unit	Input range	Default initial value setting
31	Velocity loop proportional gain	–	1 to 99,999,999	In accordance with actuator

This parameter determines the response of the velocity loop. The increased set value improves tracking of speed command. The higher the setting value, the greater the load inertia becomes. If it is too high, overshoot and oscillation, as well as vibration in the mechanical system may occur.



For the conditions for using this item in the stepper motor specification, refer to [Selection and use of Velocity Loop Proportional Gain and Velocity Loop Integral Gain] at the bottom of the following page.

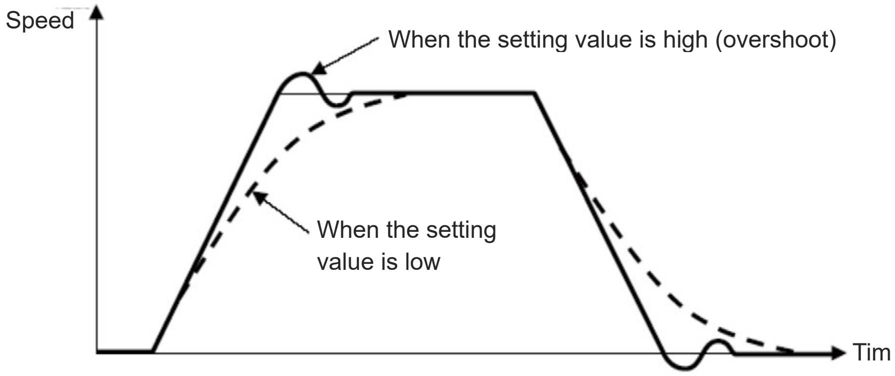
[Velocity Loop Integral Gain (Parameter No. 32)]

No.	Name	Unit	Input range	Default initial value setting
32	Velocity loop integral gain	–	1 to 99,999,999	In accordance with actuator

Machines have friction. "Velocity Loop Integral Gain" is the parameter which corresponds to deviation caused by external factors, such as friction. The increased set value improves the repulsive force against load fluctuation.

If it is too high, overshoot and oscillation, as well as vibration in the mechanical system may occur.

Adjust appropriately while observing the response.



For the conditions for using this item in the stepper motor specification, refer to [Selection and use of Velocity Loop Proportional Gain and Velocity Loop Integral Gain] below.

[Selection and use of Velocity Loop Proportional Gain and Velocity Loop Integral Gain]

Each of the 3 parameters - No. 31, 145, and 153 for Velocity Loop Proportional Gain and Parameters No. 32, 146, and 154 for Velocity Loop Integral Gain - of the stepper motor specification can be set, but only 1 of them will be enabled at the time of operation.

The conditions for selecting which parameter No. setting value is enabled are shown below.

Enabled Parameter No.

		High Output Setting (Parameter No.152)	
		0 (Disabled)	1 (Enabled)
Gain scheduling (Parameter No.144)	~ 100 (Disabled)	Parameters No.31, 32	Parameters No.153, 154
	101 ~ (Enabled)	Parameters No.145, 146	Parameters No.145, 146

[Torque Filter Constant (Parameter No. 33)]

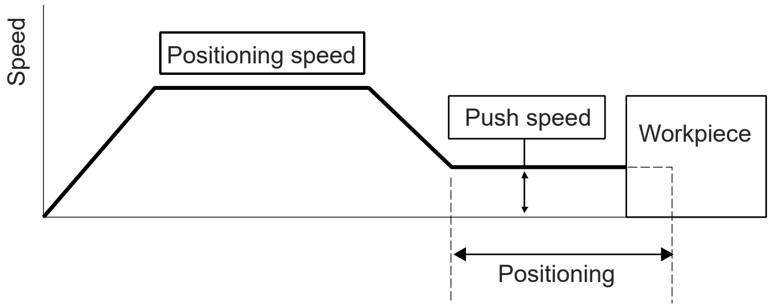
No.	Name	Unit	Input range	Default initial value setting
33	Torque filter constant	–	0 to 2,500	In accordance with actuator

This parameter sets the filter time constant for the torque command. This parameter may prevent resonance if vibration or noise is generated during operation due to mechanical resonance. It is effective for torsional resonance of the ball screw (several hundred Hz).

[Push Velocity (Parameter No. 34)]

No.	Name	Unit	Input range	Default initial value setting
34	Push velocity	mm/s (deg/s)	1 ~ Actuator maximum push speed	In accordance with actuator

A parameter to set speed during push-motion operation.
The setting at shipment is according to the actuator specifications. For details, refer to "Appendix Chapter 2 Connectable Actuators".
Contact IAI if the setting needs to be changed. The designated push force may not be attainable if the speed is changed. Also, when setting slower speeds, the limit should be 5 mm/s.



Caution

- If positioning speed of the position table is set below this parameter, the push speed will be the same as the positioning speed.
- Note that if the push speed is set in the position table in parameter No. 191 "Position data expansion function setting", that set value becomes enabled.

[Safety Velocity (Parameter No. 35)]

No.	Name	Unit	Input range	Default initial value setting
35	Safety velocity	mm/s (deg/s)	1 to 250 (Maximum speed should be the upper limit for actuators with maximum speed less than 250)	100

A parameter to set the maximum speed for manual operation under safety speed selection on the teaching tool. For your safety, do not attempt to set unless it is necessary.

[Automatic Servo OFF Delay Time 1, 2 & 3 (Parameter No. 36, No. 37 & No. 38)]

No.	Name	Unit	Input range	Default initial value setting
36	Automatic servo OFF delay time 1	s	0 to 9,999	0
37	Automatic servo OFF delay time 2	s	0 to 9,999	0
38	Automatic servo OFF delay time 3	s	0 to 9,999	0

Set the duration from the time after positioning complete until automatic servo OFF when using the power-saving function.
For details, refer to "6.2 Various Functions / Power-Saving Function (page B6-76)".

[Positioning Complete Signal Output Method (Parameter No. 39)]

No.	Name	Unit	Input range	Default initial value setting
39	Positioning complete signal output method	–	0: PEND 1: INP	0

A parameter to select the positioning complete signal type.
Output status after positioning complete varies according to whether the servo is ON or OFF.

Set value	Signal identification	During servo ON（during positioning complete）	During servo OFF
0	PEND	Will not turn OFF even if present position is outside the range of positioning width	Unconditional OFF
1	INP	Will turn ON if present position is within the range of positioning width and OFF outside the range.	

Output format will be the same for the complete position No. output PM1 to PM **.

24V AC servo motor specification and stepper motor specification only

[Home Confirmation Sensor Input Polarity (Parameter No. 43)]

No.	Name	Unit	Input range	Default initial value setting
43	Home confirmation sensor input polarity	–	0: Sensor not in use 1: a-contact 2: b-contact	In accordance with actuator

Sets input signal polarity of the home confirmation sensor (optional).
The home confirmation sensor is mounted on the mechanical end. If inverted before reaching the mechanical end due to interference, etc. it will be recognized as a positioning diversion and alarm code 0BA "Home Sensor Undetected" will be output.
There is normally no need to make changes.

Set value	Content
0	Home confirmation sensor not in use
1	Sensor polarity is a-contact
2	Sensor polarity is b-contact

[Velocity Override (Parameter No. 46)]

No.	Name	Unit	Input range	Default initial value setting
46	Velocity override	%	1 to 100	100

When executing travel commands from the PLC side, override can be applied against the travel speed set in the "Speed" field in the position table. Minimum setting unit is 1%, and input range is 1 to 100%.
Invalid against travel commands from a teaching tool such as PC software.
Actual travel speed = [speed set in position table] x [set value of Parameter No. 46]

Example) If the value in the "Speed" column of the position table is 500 mm/s and parameter No. 46 is 20%, the actual travel speed will be 100 mm/s.

[PIO Jog Velocity 2 (Parameter No. 47)]

No.	Name	Unit	Input range	Default initial value setting
47	PIO Jog velocity 2	mm/s (deg/s)	1 ~ Actuator maximum speed	In accordance with actuator

A setting for jog operation speed when jog speed/inching switch signal JVEL is ON.
Set an ideal value to suit the application.

Note that for direct numerical control mode, it operates only at this parameter value if JVEL signal is ON and speed setting value = 0.
(Operates at speed setting value if the JVEL signal is ON and speed set value ≠ 0.)

[PIO Inching Distance and PIO Inching Distance 2 (Parameter No. 48 & No. 49)]

No.	Name	Unit	Input range	Default initial value setting	Specification
48	PIO inching distance	mm	0.01 to 1.00	1.00	Stepper motor specification 24V AC servo motor specification DC brush-less motor specification
				0.10	200V AC servo motor specification
49	PIO inching distance 2	mm	0.01 to 1.00	0.10	

Sets inching distance against inching input command from PLC.
Parameter No. 49 is for inching distance when JOG speed/inching distance switch signal JVEL is ON.
Setting over 1mm is not possible.

200V AC servo motor specification and stepper motor specification only

[Load Output Judgment Time (Parameter No. 50)]

No.	Name	Unit	Input range	Default initial value setting
50	Load output judgment time	ms	0 to 9,999	255

Sets the time required to judge the load output judgment status (LOAD) ON.
For details, refer to "3.8 I/O Signals/Other basic operations/Push-motion Operation (7) Pressing operation commanded torque level detection (page A3-135)", "6.2 Various Functions / Collision detection function (page B6-73)".

[Acc/Dec Mode Initial Value (Parameter No. 52)]

No.	Name	Unit	Input range	Default initial value setting
52	Acc/Dec mode initial value	–	0: Trapezoid pattern 1: S-motion 2: First-order delay filter	0

This value will be set automatically as "Acc/Dec mode" of the applicable position No. when the target position is wBritten in an unregistered position table.
For the acceleration/deceleration mode, refer to "3.7 Address Configuration / Position table (page A3-51)".

[Stop Mode Initial Value (Parameter No. 53)]

No.	Name	Unit	Input range	Default initial value setting
53	Stop mode initial value	–	0 to 3 (Except for stepper motor specification) 0 to 7 (Stepper motor specification)	0 (Not in use)

A parameter to set the power-saving function.
For details, refer to "6.2 Various Functions / Power-saving function (page B6-76)".

AC Servo Motor Specification and DC brush-less motor specification only

[Current Control Width Number (Parameter No. 54)]

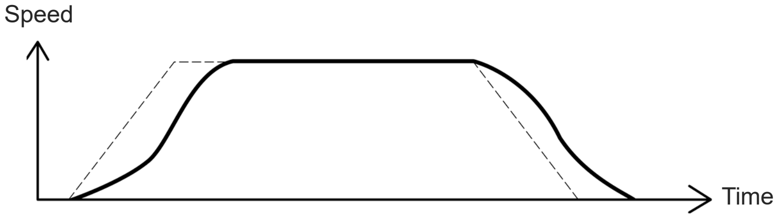
No.	Name	Unit	Input range	Default initial value setting
54	Current control width number	–	0 to 15	In accordance with actuator

This parameter is a manufacturer adjustment parameter that determines the responsiveness of the current loop control. Therefore, it must not be changed. The stability of the control system may be impaired, which is extremely dangerous.

[Position Command Primary Filter Time Constant (Parameter No. 55)]

No.	Name	Unit	Input range	Default initial value setting
55	Position command primary filter time constant	ms	0.0 to 100.0	0.0

Used when the value of "Acc/Dec mode" field in the position table is set to 2(First-order delay filter).
This draws a more gentle acceleration/deceleration curve compared to trapezoidal patterns.
The shock at acceleration/deceleration is relieved, but the cycle time becomes longer.
Use for applications where minor vibrations to the workpiece during acceleration/deceleration are to be avoided.



The amount of first-order delay is set by parameter No. 55 "Position command primary filter time constant". The setting unit is ms and can be set from 0.0 to 100.0 in 0.1ms increments.
However, this is not reflected for jogging/inching operations via a PC or teaching pendant.

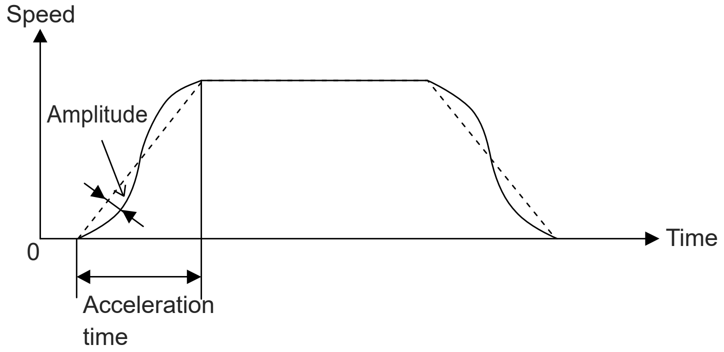
Caution

- In the following cases the first-order delay filter becomes disabled.
  (1) When a position command or direct numerical value command with the first-order delay filter is set during actuator operation.
  (2) When using a rotary actuator in index mode.
  (3) When parameter No. 55 is set to 0.

[S-Motion Ratio Setting (Parameter No. 56)]

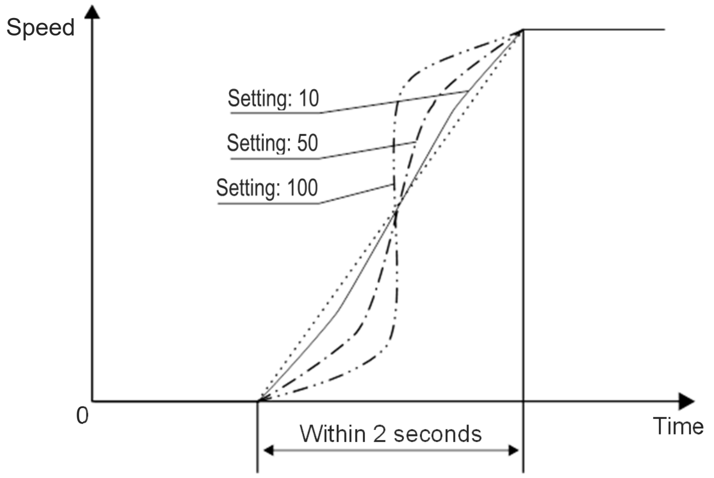
No.	Name	Unit	Input range	Default initial value setting
56	S-motion ratio setting	%	0 to 100	0

Used when the value of "Acc/Dec mode" field in the position table is set to 1 (S-motion ratio setting).
This softens the shocks of acceleration/deceleration without extending the cycle time.



S-motion is the sinusoidal waveform of a single cycle of acceleration time.
This parameter specifies degree of amplitude.

Setting [%]	Degree of amplitude
0	No S-motion (dotted line in the image diagram)
10	Amplitude of sinusoidal wave x 0.1 (solid line in the image diagram)
50	Amplitude of sinusoidal wave x 0.5 (single-dot chain line in the image diagram)
100	Amplitude of sinusoidal wave x 1 (double-dot chain line in the image diagram)



Caution

- Be sure to execute the command while the actuator is stopped.
- Because it changes speed, etc. during travel, even if executing position command or direct numerical value command with S-motion setting while the actuator is under operation, the control will be trapezoid instead of S-motion.
- For rotary actuator in the index mode, S-motion control is disabled. Even if S-motion control is specified, the control will be trapezoid.
- Do not use S-motion control if the setting of the acceleration time or the deceleration time exceeds 2 seconds. The control will be trapezoid.
- Avoid pauses during acceleration or deceleration operation. Speed changes (acceleration) will occur, which may be dangerous.

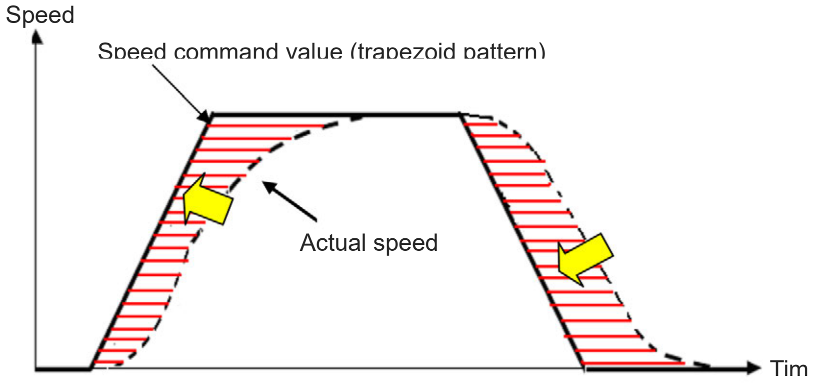
[Positional Feedforward Gain (Parameter No. 71)]

No.	Name	Unit	Input range	Default initial value setting	Specifications
71	Positional feed forward gain	–	0 to 100	0	AC servo motor specification Stepper motor specification
				50	DC brush-less motor specification

Sets the feed forward gain amount of the position control system.
Performing this setting increases the servo gain and improves responsiveness of the position control loop. Properly adjust Parameter No. 7 "Servo Gain Number" and Parameter No. 31 "Velocity Loop Proportional Gain", etc., to further improve the tact time and following performance. As a result, positioning time can be shortened.
Gain adjustment of position, speed, and current loop in the feedback control directly changes the response of the servo control system, so affecting the stability of the control system due to inappropriate setting may cause vibration and abnormal noise. However, this parameter only changes the speed command value, so it is irrelevant to the servo loop, and it does not make the control system unstable or generate persistent vibration and noise. However, if the setting is excessive, every time it operates, vibration and noise may be generated until the machine follows the command value.

For the trapezoidal operation pattern, the value obtained by multiplying speed command by "feed forward gain" is added to the speed command so as to reduce the following delay of the speed and the position deviation.

Control delay occurs in feedback control that performs control according to the results. In contrast, compensation control independent of control delay is performed.



Caution

- Vibration damping control function cannot be used when using feed forward gain (setting other than 0).

200V AC servo motor specification only

[Encoder voltage level (Parameter No. 73)]

No.	Name	Unit	Input range	Default initial value setting
73	Encoder voltage level	–	0 to 3	Depending on encoder cable length

To stabilize encoder detection signals, this parameter defines the voltage supplied to the encoder circuit to one of four levels in accordance with the encoder type and the length of the encoder relay cable.
Normally this parameter need not be changed. If you have changed the length of the encoder relay cable after the shipment, the value of the parameter may be changed.
If you wish to change this parameter, always consult us in advance. If the setting is not optimum, it may cause an operation error of the actuator or malfunction of the encoder.

200V AC servo motor specification only

[Electromagnetic Brake Power Supply Monitoring (Parameter No. 75)]

No.	Name	Unit	Input range	Default initial value setting
75	Electromagnetic Brake Power Supply Monitoring	–	0: Disabled, 1: Enabled	In accordance with actuator

For an actuator equipped with a brake, it is equipped with a power supply monitoring feature in order to protect in advance from an error operation of the actuator or component malfunction due to voltage error of the 24V power supply for brake.
As the setting is established in accordance with equipped or not equipped with a brake, it is generally no need of making a change.

Set value	Content
0	Disabled (Without brake)
1	Enabled (With brake)

⚠ Caution

- Set the brake unactivated and the brake control would not be performed.

200V AC servo motor specification only

[Belt breaking sensor input polarity (Parameter No. 76)]

No.	Name	Unit	Input range	Default initial value setting
76	Belt breaking sensor input polarity	–	0 to 2	In accordance with actuator

Set the sensor input polarity for Alarm Code 0D7 “Belt Break Detection” for Ultra-High Thrust Type RCS2-RA13R.

Set value	Content
0	not used
1	Input is a contact
2	Input is b contact

Caution

- Changing the setting of this parameter disables the alarm to be detected.

[Lead Size of Ball Screw (Parameter No. 77)]

No.	Name	Unit	Input range	Default initial value setting
77	Ball screw lead length	mm	0.01 to 999.99	In accordance with actuator

Sets ball screw lead length.
A value suited to the actuator characteristics is set at shipment.

Caution

- Changing the setting will not only make operation at the instructed speed, acceleration/deceleration or travel distance impossible but also cause an alarm or malfunction to occur.

[Axis Motion Type (Parameter No. 78)]

No.	Name	Unit	Input range	Default initial value setting
78	Axis motion type	–	0: Linear axis 1: Rotary axis	In accordance with actuator

Sets the type of actuator to use.

Connecting actuator	Set value	Remarks
Linear axis	0	Actuator other than rotary type
Rotary axis	1	Rotary type actuator

Caution

- Do not attempt to change the setting. This may lead to alarms or malfunctions.

[Rotary Axis Mode Select (Parameter No. 79)]

No.	Name	Unit	Input range	Default initial value setting
79	Rotary axis mode select	–	0: Normal mode 1: Index mode	In accordance with actuator

Sets rotary axis mode.
When parameter No. 78 "Axis Motion Type" is set to "1: Rotary axis," the present value expression will be fixed to 0 ~ 359.99 by selecting index mode. Selection of the index mode will enable shortcut control.

Set value	Content
0	Normal mode
1	Index mode

Index mode cannot be specified with an absolute specification actuator.

⚠ Caution

- Push-motion operation is not available during index mode. Even if data is input for the push-motion of position data, it will become invalid and normal travel will be executed. Also, the positioning width will be the parameter positioning width initial value.
- When changing the index mode setting to normal mode, the software limit value should also be changed. If the software limit value is set to 0, a parameter data error will occur. Value extended by 0.3mm to the outside of the effective stroke should be set.
- In DD motor, switchover between the normal mode and the index mode cannot be made in this parameter. Do not attempt to change the settings.

[Rotary Axis Shortcut Select (Parameter No. 80)]

No.	Name	Unit	Input range	Default initial value setting
80	Rotary axis shortcut select	–	0: Disabled, 1: Enabled	In accordance with actuator

Sets whether to enable or disable shortcut when positioning other than relative position travel with multi-rotation specification rotary actuator.
Shortcut refers to performing an operation in a direction that requires less travel towards the next positioning.

Set value	Content
0	Shortcut disabled
1	Shortcut enabled

For details, refer to "3.8 I/O Signals / Shortcut control of multi-rotation specification rotary actuator (page A3-144)".

24V AC servo motor specification and stepper motor specification only

[Absolute Unit (Parameter No.83)]

No.	Name	Unit	Input range	Default initial value setting
83	Absolute Unit	–	0: Not in use, 1: Used	0 (not in use)

For stepper motor specification
Set 1 for simple absolute specification.
For the battery-less absolute specification, the factory default value is 1. Change the setting to 0 when using in incremental specification.

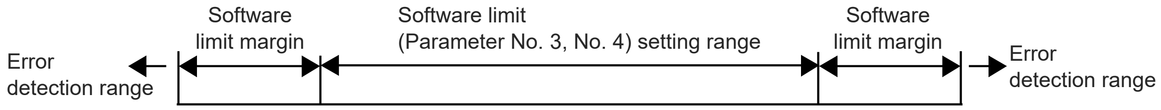
For 24V AC servo motor specification
Set 1 for simple absolute specification.
Battery-less absolute specification cannot be used in incremental specification.

[Software Limit Margin (Parameter No. 88)]

No.	Name	Unit	Input range	Default initial value setting
88	Software limit margin	mm (deg)	0 to 9,999.99	0

A parameter for over error detection setting with regard to the values set for Parameter No. 3 and Parameter No. 4.

Normally, setting change is not required.



200V AC servo motor specification only

[Allowable time of exceeding torque allowing continuous pressing (Parameter No. 89)]

No.	Name	Unit	Input range	Default initial value setting
89	Allowable time of exceeding torque allowing continuous pressing	sec	0 to 300	In accordance with actuator

This is the parameter to limit the continuous pressing time when using RCS2-RA13R with the pressing setting of 71% or more.

When the unit is used beyond this limit, Alarm Code 0C4 “continuous pressing capable torque time over” will be generated to prevent the temperature rise on the motor due to the continuous pressing operation.

For operation of RCS2-RA13R, make sure to check how to select operating conditions and others described in the actuator instruction manual and use it in the specification range.

Set value	Content
0	Do not judge
1 to 300sec	Allowable time of continuous pressing (when pressing setting of 71% or more is used in RCS2-RA13R)

[Current Limit Value During Contactless Push Stop (Parameter No. 91)]

No.	Name	Unit	Input range	Default initial value setting
91	Current limit value during contactless push stop	–	0: Current limit value during stop 1: Current limit value during push	0

Select current limit value during stop when contactless push has occurred.
Servo will be locked by this current limit value until the next travel command.

Set value	Content
0	Uses Current Limit During Positioning Stop (Parameter No. 12).
1	Uses the current limit value during push-motion set in the position table.

AC servo motor specification only

[Damping Characteristics Coefficient 1, 2 / Natural Frequency / Notch Filter Gain (Parameters No. 97 to 108)]

	No.	Name	Unit	Input range	Default initial value setting
Vibration Control Parameters Set 1	97	Damping characteristics coefficient 1	–	0 to 1,000	10
	98	Damping characteristics coefficient 2	–	0 to 1,000	1,000
	99	Natural frequency	1/1,000Hz	500 to 30,000	10,000
	100	Notch filter gain	–	1 to 20,000	9,990
Vibration Control Parameters Set 2	101	Damping characteristics coefficient 1	–	0 to 1,000	10
	102	Damping characteristics coefficient 2	–	0 to 1,000	1,000
	103	Natural frequency	1/1,000Hz	500 to 30,000	10,000
	104	Notch filter gain	–	1 to 20,000	9,990
Vibration Control Parameters Set 3	105	Damping characteristics coefficient 1	–	0 to 1,000	10
	106	Damping characteristics coefficient 2	–	0 to 1,000	1,000
	107	Natural frequency	1/1,000Hz	500 to 30,000	10,000
	108	Notch filter gain	–	1 to 20,000	9,990

A parameter dedicated to vibration damping control.
For details, refer to "6.2 Various Functions/Vibration damping control function (page B6-66)".

AC servo motor specification only

[Vibration Suppression No. Initial Value (Parameter No. 109)]

No.	Name	Unit	Input range	Default initial value setting
109	Vibration suppression No. initial value	–	0 to 3	0

A parameter dedicated to vibration damping control.
For details, refer to "6.2 Various Functions/Vibration damping control function (page B6-66)".

[Stop Method During SrvOFF (Parameter No. 110)]

No.	Name	Unit	Input range	Default initial value setting
110	Stop method during SrvOFF	–	0: Sudden stop 1: Decelerating stop	0

Selects Servo OFF command, drive source cutoff, and stop mode of actuator during alarm generation (operation cancel level).

Stop command	Set value			
	0: Sudden stop		1: Decelerating stop	
	During vibration control	During normal positioning control	During vibration control	During normal positioning control
Pausing	Vibration control decelerating stop	Normal decelerating stop	Vibration control decelerating Stop	Normal decelerating Stop
Servo OFF	Sudden stop with emergency stop torque			
Drive-source cutoff				
Alarm (Operation cancel level)				
Alarm (Cold start)	Sudden stop with emergency stop torque			

[Monitoring Mode Select (Parameter No. 112)]

No.	Name	Unit	Input range	Default initial value setting
112	Monitoring mode select	–	0: Not in use 1: Monitor function 1 2: Monitor function 2 3: Monitor function 3	1

Servo monitoring can be performed by connecting PC software.
Select monitoring mode function (number of channels for servo monitor) with this parameter.
Refer to the manual for PC software (ME0155).

Set value	Content
0	Not in use
1	Set in 4CH record mode
2	Set in 8CH record mode
3	Set in 2CH record mode

[Monitoring Cycle (Parameter No. 113)]

No.	Name	Unit	Input range	Specification	Default initial value setting
113	Monitoring cycle	ms	1 to 60,000	Stepper motor specification 24V AC servo motor specification DC brush-less motor specification	1
			1 to 1,000	200V AC servo motor specification	

Sets initial value (Note 1) of time cycle (sampling cycle) to obtain data when monitoring mode is selected.
Data obtaining interval can be extended by increasing the value of this parameter.
The initial value is set at 1ms. Up to 60,000 ms (Up to 1,000m for 200V driver unit) can be set in 1ms increments.

For RCON-PC/PCF/AC		For RCON-DC	
1ms cycle setting	60,000ms cycle setting	1ms cycle setting	60,000ms cycle setting
During 4CH record mode: Maximum 3,584 seconds	During 4CH record mode: Maximum 59 hours and 44 minutes	During 4CH record mode: Maximum 4,096 seconds	During 4CH record mode: Maximum 68 hours and 16 minutes
During 8CH record mode: Maximum 1,792 seconds	During 8CH record mode: Maximum 29 hours and 52 minutes	During 8CH record mode: Maximum 2,048 seconds	During 8CH record mode: Maximum 34 hours and 8 minutes
During 2CH record mode: Maximum 7,168 seconds	During 2CH record mode: Maximum 119 hours and 28 minutes	During 2CH record mode: Maximum 8,192 seconds	During 2CH record mode: Maximum 136 hours and 32 minutes

Note 1: Sampling cycle can be changed by using PC software.

AC servo motor specification only

[Servo Gain Number / Positional Feedforward Gain / Velocity Loop Proportional Gain / Velocity Loop Integral Gain / Torque Filter Constant / Current Control Width Number (Parameters No. 120 to 137)]

	No.	Name	Unit	Input range	Default initial value setting
Gain set 1	120	Servo gain number 1	–	0 to 31	In accordance with actuator
	121	Positional feedforward gain 1	–	0 to 100	
	122	Velocity loop proportional gain 1	–	1 to 27,661 (24V AC servo motor specification) 1 to 99,999,999 (200V AC servo motor specification)	
	123	Velocity loop integral gain 1	–	1 to 217,270 (24V AC servo motor specification) 1 to 99,999,999 (200V AC servo motor specification)	
	124	Torque filter constant 1	–	0 to 2,500	
	125	Current control width number 1	–	0 to 15	
Gain set 2	126	Servo gain number 2	–	0 to 31	In accordance with actuator
	127	Positional feedforward gain 2	–	0 to 100	
	128	Velocity loop proportional gain 2	–	1 to 27,661 (24V AC servo motor specification) 1 to 99,999,999 (200V AC servo motor specification)	
	129	Velocity loop integral gain 2	–	1 to 217,270 (24V AC servo motor specification) 1 to 99,999,999 (200V AC servo motor specification)	
	130	Torque filter constant 2	–	0 to 2,500	
	131	Current control width number 2	–	0 to 15	
Gain set 3	132	Servo gain number 3	–	0 to 31	In accordance with actuator
	133	Positional feedforward gain 3	–	0 to 100	
	134	Velocity loop proportional gain 3	–	1 to 27,661 (24V AC servo motor specification) 1 to 99,999,999 (200V AC servo motor specification)	
	135	Velocity loop integral gain 3	–	1 to 217,270 (24V AC servo motor specification) 1 to 99,999,999 (200V AC servo motor specification)	
	136	Torque filter constant 3	–	0 to 2,500	
	137	Current control width number 3	–	0 to 15	

- Servo Gain Number 1/2/3 (Parameters No. 120, 126, 132)
  These parameters determine the response of the position control loop.
  For details, refer to Parameter No. 7 "Servo Gain Number (page B6-11)".

- Positional Feedforward Gain 1/2/3 (Parameters No. 121, 127, 133)
  Sets the feed forward gain amount of the position control system.
  For details, refer to Parameter No. 71 "Positional Feedforward Gain (page B6-29)".

- Velocity Loop Proportional Gain 1/2/3 (Parameters No. 122, 128, 134)
  This parameter determines the response of the speed control loop.
  For details, refer to Parameter No. 31 "Velocity Loop Proportional Gain (page B6-19)".

- Velocity Loop Integral Gain 1/2/3 (Parameters No. 123, 129, 135)
  This parameter determines the response of the speed control loop.
  For details, refer to Parameter No. 32 "Velocity Loop Integral Gain (page B6-20)".

- Torque Filter Constant 1/2/3 (Parameters No. 124, 130, 136)
  This parameter determines the filter time constant for the torque command.
  For details, refer to Parameter No. 33 "Torque Filter Constant (page B6-21)".

- Current Control Width Number 1/2/3 (Parameters No. 125, 131, 137)
  Set the control band of the current control system.
  For details, refer to Parameter No. 54 "Current Control Width Number (page B6-25)".

[Reference] Refer to "3.7 Address Configuration / Position Table (page A3-51)".

AC servo motor specification only

[Servo Gain Switch Time Constant (Parameter No.138)]

No.	Name	Unit	Input range	Default initial value setting
138	Servo gain switch time constant	ms	10 to 2,000	10

If the position table is instructed to switch the servo gain set, switching will be completed after a period that exceeds 3 times the setting time of this parameter after the operation of the specified position No. starts.

Caution

- If the setting is shortened, operation of the actuator may become unstable due to sudden gain change.

AC servo motor specification only

[Home preset value (Parameter No.139)]

No.	Name	Unit	Input range	Default initial value setting
139	Home preset value	mm	-9,999.99 to 9,999.99	In accordance with actuator

When using an actuator of absolute specification, set "homing offset value+ this parameter set value" within the range of "0 to ball screw lead length". (Z-phase near the mechanical end must be registered as reference)

The allowable values are multiples of ± ball screw lead length including 0.00.

(0.00 if the homing offset value is within the range of 0 to ball screw lead length)

Also, if a value other than 0.00 is set to this parameter, the home return complete position will not be 0.00, but the home position + this parameter position.

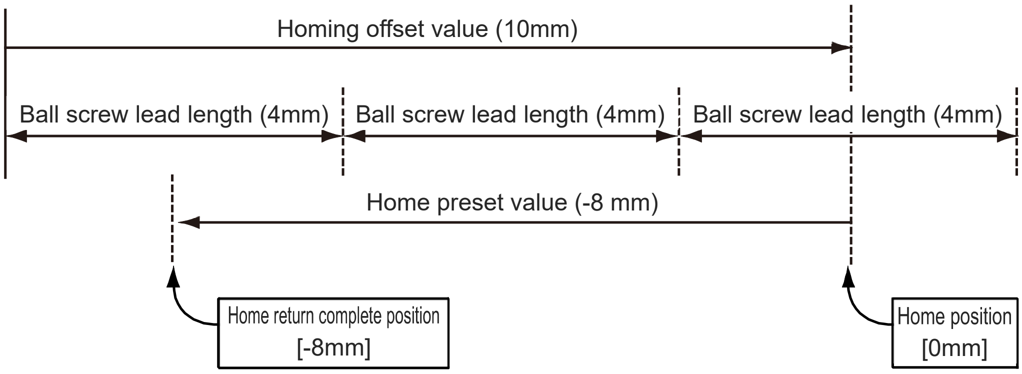
For the incremental specification actuator, be sure to set to 0.00.

Caution

- If the homing offset value and this parameter setting do not meet the above conditions, the home position may be shifted by the multiple of the ball screw lead length when restarted after home return.

<Configuration example 1>

For ball screw lead length of 4 mm and homing offset of 10 mm, set this parameter to -8 mm.



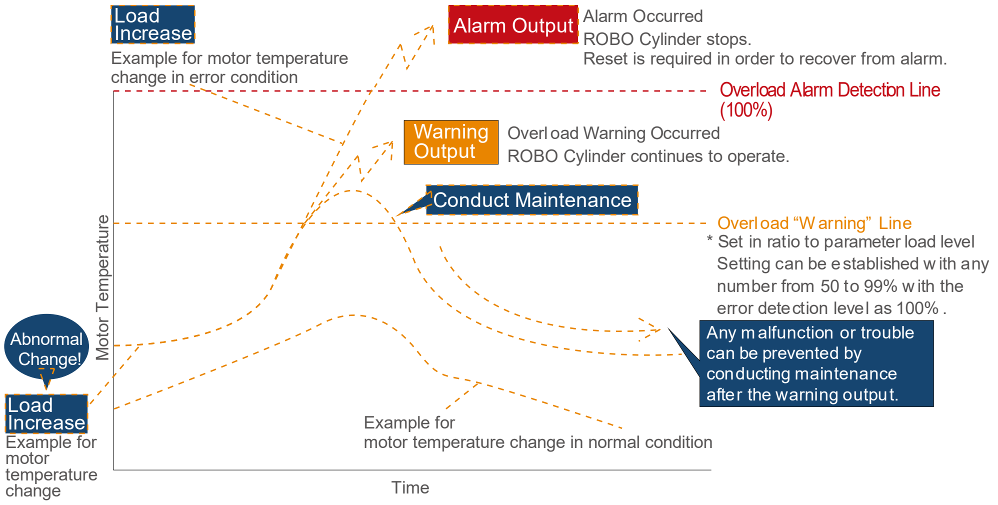
[Overload Load Level Ratio (Parameter No.143)]

No.	Name	Unit	Input range	Default initial value setting
143	Overload load level ratio	%	50 to 100	100

Outputs alarm code 048 overload warning (message level) when motor temperature exceeds the ratio set in this parameter if motor temperature under rated operation is set as 100%.
For details, refer to " Maintenance Section Chapter 1, 1.5 Predictive Maintenance Function / Overload warning (page C1-15)".

No judgment will be made when set as 100%.

Using this function enables monitoring of motor temperature changes caused by dried-up grease or wear and tear on parts.
A warning is output when the preset value is exceeded.
This enables detection of abnormalities before a breakdown or a malfunction occurs.



Warning output enables detection of items such as those below.

- Time to supply grease
- Time to replace components
- Time to implement mechanical tuning

Stepper motor specification only

[GS Magnification Upper Limit (Parameter No.144)]

No.	Name	Unit	Input range	Default initial value setting
144	GS magnification upper limit	%	0 to 1,023	0 (Disabled)

Gain scheduling is a function that changes the gain according to the operation speed.
For this parameter, set the high magnification to change the gain.
The set value of GS Velocity Loop Proportional Gain (Parameter No. 145) and GS Velocity Loop Integral Gain (Parameter No. 146) changes at the set magnification.

Set value	Content
100 or less	Gain scheduling disabled
101 to 1,023	Gain scheduling enabled (Recommended value 300)

Stepper motor specification only

[GS Velocity Loop Proportional Gain (Parameter No. 145)]

No.	Name	Unit	Input range	Default initial value setting
145	GS velocity loop proportional gain	–	1 to 99999999	In accordance with actuator

When Parameter No. 144 "GS Magnification Upper Limit" is set to 101 or higher, the setting of this parameter becomes valid for the Velocity Loop Proportional Gain.
For details, refer to Parameter No. 31 "Velocity Loop Proportional Gain (page B6-19)".

For the conditions for using this item, refer to [Selection and use of Velocity Loop Proportional Gain and Velocity Loop Integral Gain] on the bottom of page B6-20.

Stepper motor specification only

[GS Velocity Loop Integral Gain (Parameter No. 146)]

No.	Name	Unit	Input range	Default initial value setting
146	GS velocity loop integral gain	–	1 to 99999999	In accordance with actuator

When Parameter No. 144 "GS Magnification Upper Limit" is set to 101 or higher, the setting of this parameter becomes valid for the Velocity Loop Integral Gain.
For details, refer to Parameter No. 32 "Velocity Loop Integral Gain (page B6-20)".

For the conditions for using this item, refer to [Selection and use of Velocity Loop Proportional Gain and Velocity Loop Integral Gain] on the bottom of page B6-20.

[Total Travel Count Threshold (Parameter No.147)]

No.	Name	Unit	Input range	Default initial value setting
147	Total travel count threshold	times	0 to 999,999,999	0 (Disabled)

When total travel count exceeds the set value of this parameter, alarm code 04E "Travel Count Threshold Over" will send a notification.
No judgment will be made when set as 0.

[Total Travel Distance Threshold (Parameter No. 148)]

No.	Name	Unit	Input range	Default initial value setting
148	Total travel distance threshold	m	0 to 999,999,999	0 (Disabled)

When total travel distance exceeds the set value of this parameter, alarm code 04F "Travel Distance Threshold Over" will send a notification.
No judgment will be made when set as 0.

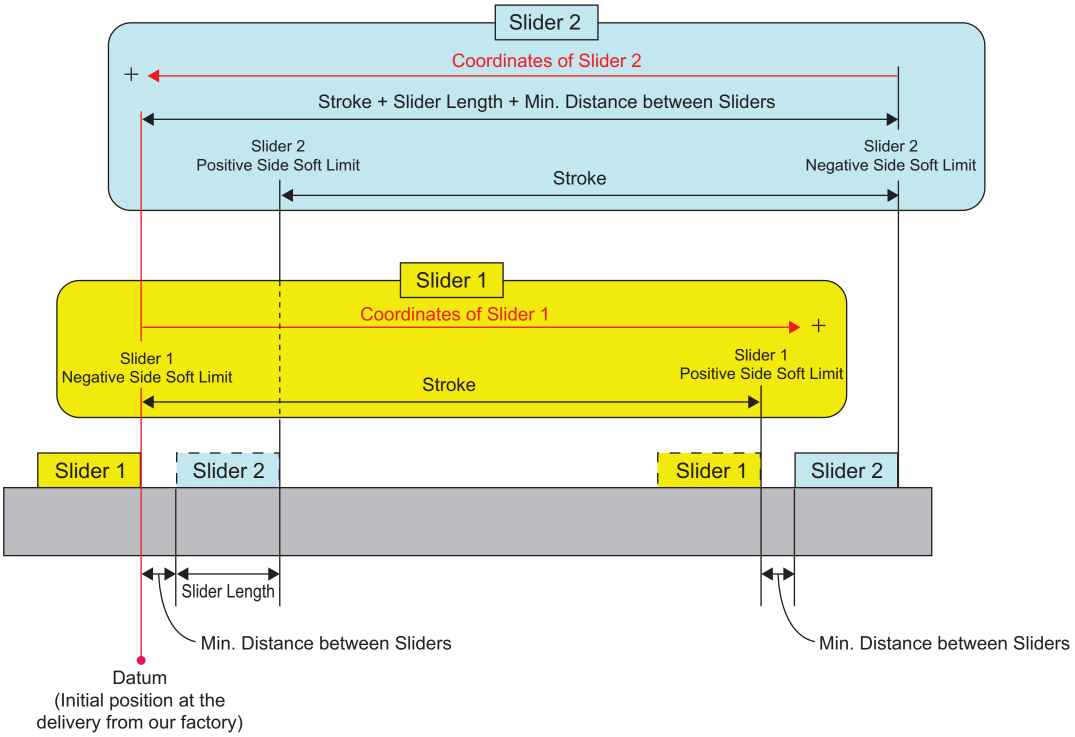
200V AC servo motor specification only

[Linear Absolute Home Preset Value (Parameter No. 150)]

No.	Name	Unit	Input range	Default initial value setting
150	Linear Absolute Home Preset Value	mm	-9,999.99 to 9,999.99	In accordance with actuator

This can set the home position of the actuator for Spurious Absolute Type.

This can set the home position of the actuator for Spurious Absolute Type. The diagram below shows the position of each part related to the datum (the initial position at the delivery from our factory):



Caution

- Note the initial parameter at the delivery from our factory in a memo before changing the settings.
- Take the initial parameter at the delivery from our factory as the datum when giving a change to the settings.
- After having a change to the settings, make sure to have an operation check with low speed.
- For the spurious absolute type actuator, No.22: Home-return Offset Value and No.139: Home Preset Value are invalid.

[Minor Trouble Alarm Output Select (Parameter No. 151)]

No.	Name	Unit	Input range	Default initial value setting
151	Minor trouble alarm output select	–	0: Overload warning output 1: Message level alarm output	1

If 0 is set, when parameter No. 143 "Overload Load Level Ratio" is exceeded, the minor malfunction alarm signal *ALML will be output.
If 1 is set, when a message level alarm is generated, *ALML signal will be output.

[High Output Setting (Parameter No.152)]

Stepper motor specification only

No.	Name	Unit	Input range	Default initial value setting
152	High output setting	–	0: Disabled 1: Enabled	In accordance with actuator

Set if high output function is to be used. However, it is necessary to connect an actuator that supports high output.
(Actuators that support high output: RCP4, RCP5 and RCP6 Series)

[BU Velocity Loop Proportional Gain (Parameter No. 153)]

Stepper motor specification only

No.	Name	Unit	Input range	Default initial value setting
153	BU velocity loop proportional gain	–	1 to 99999999	In accordance with actuator

When Parameter No. 152 "High Output Setting" is enabled and Parameter No. 144 "GS Magnification Upper Limit" is set to 100 or less, the setting of this parameter is enabled for Velocity Loop Proportional Gain.
For details, refer to Parameter No. 31 "Velocity Loop Proportional Gain (page B6-19)".

For the conditions for using this item, refer to [Selection and use of Velocity Loop Proportional Gain and Velocity Loop Integral Gain] on the bottom of page B6-20.

Stepper motor specification only

[BU Velocity Loop Integral Gain (Parameter No. 154)]

No.	Name	Unit	Input range	Default initial value setting
154	BU velocity loop integral gain	–	1 to 99999999	In accordance with actuator

When Parameter No. 152 "High Output Setting" is enabled and Parameter No. 144 "GS Magnification Upper Limit" is set to 100 or less, the setting of this parameter is enabled for Velocity Loop Integral Gain.
For details, refer to Parameter No. 32 "Velocity Loop Integral Gain (page B6-20)".

For the conditions for using this item, refer to [Selection and use of Velocity Loop Proportional Gain and Velocity Loop Integral Gain] on the bottom of page B6-20.

24V AC servo motor specification and
stepper motor specification only

[ABS Battery Retaining Time (Parameter No. 155)]

No.	Name	Unit	Input range	Default initial value setting
155	ABS battery retaining time	–	0: 20 days 1: 15 days 2: 10 days 3: 5 days	0

This function is limited to the simple absolute specification. Set encoder positional data retention time after turning the power supply to the actuator OFF. The setting is available in 4 levels. The lower the motor rotation speed setting is, the longer the retention time of the positional data can be. If there is a possibility of external force moving the workpiece conveying components of the actuator such as the slider or rod while power is OFF, refer to the following table and calculate motor revolution based on movement speed and set the value of this parameter faster. If the motor revolution exceeds the set value, positional data will be lost.

The motor rotation speed can be calculated with the equation below.

Motor revolution [r/min] = Movement speed [mm/s] / Actuator lead [mm] x 60 [s/min]

For details, refer to "Startup Section Chapter 3, 3.5 Absolute Battery (page B3-11)".

Parameter No.155 settings	Upper limit of encoder rotation speed when power is OFF [r/min]		Battery retaining time guideline [days]	Retaining time per 1 hour of charge time (guideline) [h]
	If connected actuator is not RCA2-***NA	If connected actuator is RCA2-***NA		
0	100	75	20	6.6
1	200	150	15	5.0
2	400	300	10	3.3
3	800	600	5	1.6

24V AC servo motor specification,
DC brush-less motor specification
and Stepper motor specification only

[Enabled/Disabled Axis Select (Parameter No. 158)]

No.	Name	Unit	Input range	Default initial value setting
158	Enabled/disabled axis select	–	0: Enabled 1: Disabled	0

If operation is required with fewer axes than the purchased number of axes, alarms can be avoided by disabling this parameter.
During startup, etc., operation can be performed by connecting specific axes only, or to use for future expansion.

Stepper motor specification only

[Startup Current Limit Expansion Function (Parameter No. 166)]

No.	Name	Unit	Input range	Default initial value setting
166	Startup current limit expansion function	–	0: Disabled 1: Enabled	0

Change the setting when this feature is necessary in the models stated below.

Applicable Models: RCP2-GRS/GRSS/GRST/GRM/GR3□S/GRLS

When the load is high at the start of movement to the target point, by having high current flowed for a certain period of time, the actuator operates with large force. It is expected to work well on an actuator with high static friction of load such as a condition of getting sticky.

Warning

Do not attempt to set this parameter valid unless necessary.
Make sure to confirm the followings when it is to be changed.

- As it generates high force in case also of load other than static friction, it may cause injury, damage on a workpiece or influence to the actuator life.
- As current higher than usual flows, it may require higher current amperage.

Also, note that this feature would not activate at the start of movement for following situations even if this parameter is set valid.

1) Home return
2) Operation resumed by cancelling pause
3) When movement command is issued during operation
4) Movement backward or forward by the actuator pushed due to such as deformation of a workpiece in a condition after pressing operation is finished and there is no next movement command

Stepper motor specification only

[Collision Detection Function (Parameter No. 168)]

No.	Name	Unit	Input range	Default initial value setting
168	Collision detection function	–	0 to 7	0

A function to generate a collision detection alarm and stop traveling (servo OFF) when the actuator collides. Detects within the set range of the position zone.
For details, refer to "6.2 Various Functions / Collision detection function (page B6-73)".

Set value	Content	Alarm level
0	No detection will be made (same even if 2, 4, 6 are set)	–
1	Detects within the set range of the position zone.	Operation cancel level
3 (Note 1)	Detects within the set range of the position zone; however, no detection will be made in the following cases. ·First travel after pause release ·Travel from stop status within position zone range	
5	Detects within the set range of the position zone.	Message level
7 (Note 1)	Detects within the set range of the position zone; however, no detection will be made in the following cases. ·First travel after pause release ·Travel from stop status within position zone range	

Note 1: This setting can avoid occurrence of false detection due to current value during acceleration.

24V AC servo motor specification,
DC brush-less motor specification
and Stepper motor specification only

[Push Mode (Parameter No. 181)]

No.	Name	Unit	Input range	Default initial value setting
181	Push mode	–	0: CON mode 1: SEP mode	0

Selects CON mode or SEP mode for the push mode. (Note)

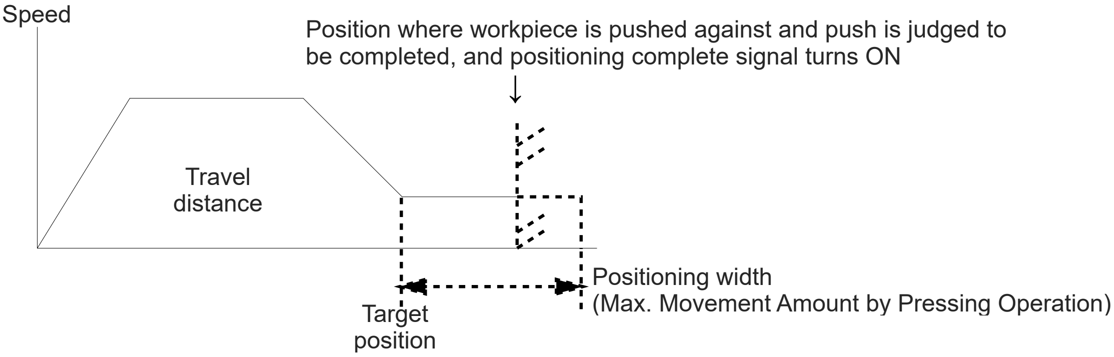
Note: The pressing type of the 200V driver unit is only the CON system.

(1) CON mode push

After reaching the target position (Note 1) from the current position, the actuator moves with the pressing speed for the distance set as the positioning band width (Note 2).

During push motion, once the workpiece is pushed against and the push is judged to be completed, positioning complete signal PEND will turn ON.

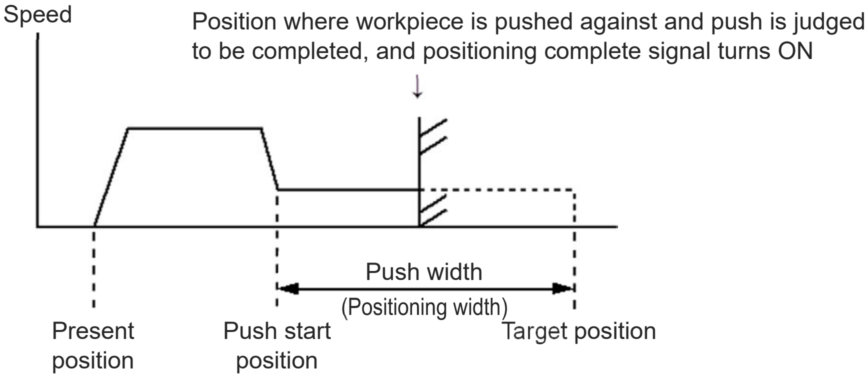
Note 1: In direct numerical control mode, it is the value input in the target position register.



(2) SEP mode push

Push-motion operation is performed with the position obtained by subtracting the distance set for the positioning width (Note 2) from the target position (Note 1) (position data specified value) as the start position. Pull-motion operation is not available.

During push motion, once the workpiece is pushed against and the push is judged to be completed, PEND will turn ON.



Note 1: It should be the value input in the position data indication register for direct indication and the simple direct mode.

Note 2: It should be the value input in the positioning band width indication register in the direct indication mode.

Stepper motor specification only

[Auto Current Adj. Select (Parameter No. 182)]

No.	Name	Unit	Input range	Default initial value setting
182	Auto current adj. select	–	0: Disabled 1: Enabled	0

When automatic current down function is not used, regardless of the size of the external force, the current set in parameter No. 12 "Current Limit During Positioning Stop" applies after positioning stop.
When automatic current down function is enabled, it maintains the present position at the current in accordance with the size of the external force. Effective for reduction of power consumption when transported load is small.
For details, refer to "4.8 Various Functions / Power-saving function (page B6-76)".

Stepper motor specification only

[Servo ON Delay Time Adjustment (Parameter No. 190)]

No.	Name	Unit	Input range	Default initial value setting
190	Servo ON delay time adjustment	ms	0 to 9,999	0

This parameter adjusts the time from when servo ON command signal SON is input until servo ON. By shifting the timing of each actuator, instantaneous power can be suppressed when the servo ON command is applied at the same time.

[Position Data Expansion Function Setting (Parameter No. 191)]

No.	Name	Unit	Input range	Default initial value setting
191	Position data expansion function setting	–	0: No function 1: Drive torque limit 2: Push speed	0 (No function)

The "parameter selection area" function in the position data table can be selected.

Set value	Display item
0	Not displayed
1	Drive torque limit
2	Push speed

Drive torque limit : Sets the travel current limit value during position travel. [%]
Push speed : Sets the push speed limit value during position travel. [mm/s]

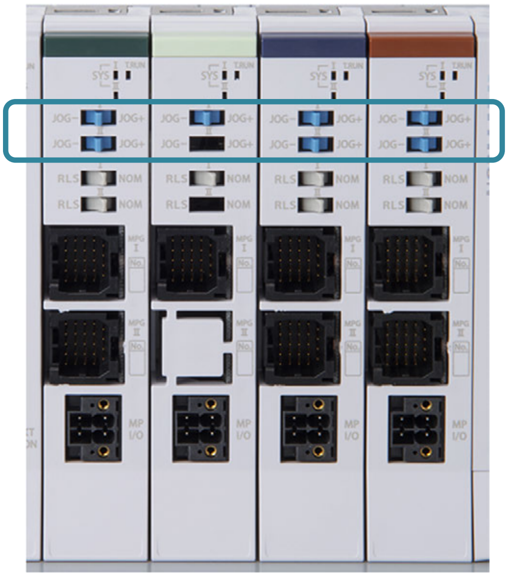
[JOG Switch (Parameter No. 194)]

No.	Name	Unit	Input range	Default initial value setting
194	JOG switch	–	0: Enabled 1: Disabled	0 (Enabled)

Enable/disable can be selected on the jog switch allocated on the front of the driver units.

Either Enabled or Disabled can be selected for the JOG switch on the front of the driver unit. When Disabled is selected with this parameter, the actuator does not operate even if the JOG switch is operated.

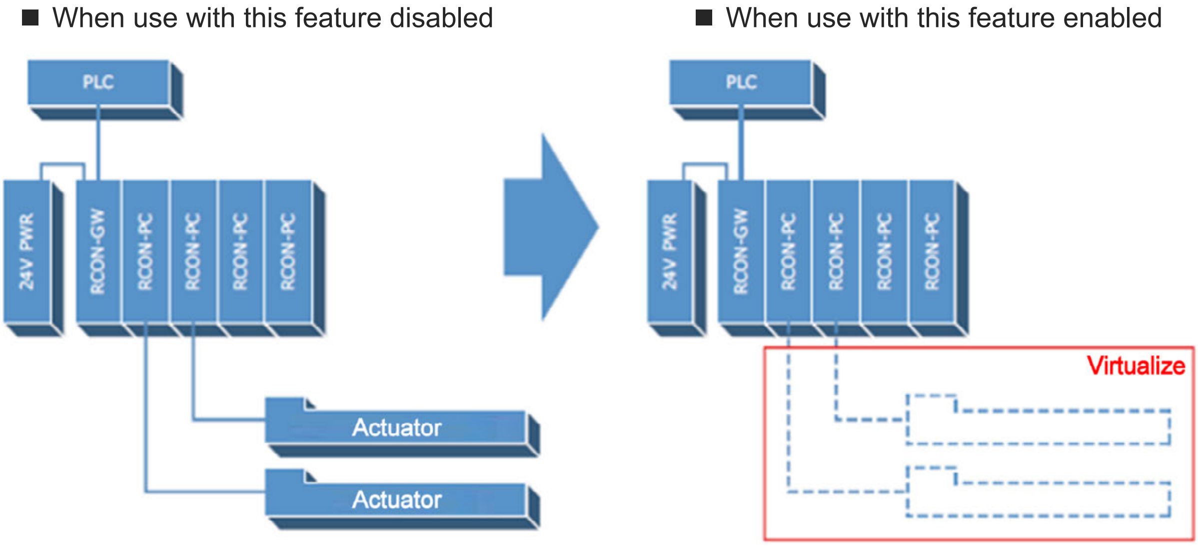
* Selection of activation / deactivation of the jog switch on the EC connection unit should be made in the gateway parameter setting tool.
Refer to “Specifications Section 3.9 Gateway Parameter Configuration Tool / Special parameter setting function descriptions (Page A3-159)” for detail.



[Virtual Axis (Parameter No. 195)]

No.	Name	Unit	Input range	Default initial value setting
195	Virtual axis	–	0: Enabled 1: Disabled	0

Status data such as the current position and the current velocity should be generated "as if there was an axis connected".



■ When use with this feature disabled

■ When use with this feature enabled

[Virtual Axis Absolute Initial Position (Parameter No. 196)]

No.	Name	Unit	Input range	Default initial value setting
196	Virtual axis absolute initial position	mm*	-9,999.99 to 9,999.99	0

The absolute initial position setting of the feature capable of operation simulation without connecting an axis should be established.

* The unit should be [deg] for the rotary.

Parameter list for ELECYLINDER

No.	Name	Unit	Input range	Default setting at shipping	Reference Page
1	Operation range adjustment	mm	0 to 9,999.69	Maximum stroke	B6-56
2	Auto switch "LS" signal detection range adjustment	mm	Actuator Depended to 9,999.99	0.10	B6-57
3	Change home return direction	-	Reverse, forward	According to ELECYLINDER specifications	B6-58
4	Home position adjustment	mm	0 to 9,999.99	According to ELECYLINDER specifications	B6-59
5	Smooth accel/decel setting	-	Disabled, enabled	Disabled	B6-60
6	Current control setting at stop	-	Disabled, Powerful stop Enabled, Energy-saving stop	Disabled	B6-61
7	Wireless function setting	-	Disabled, enabled	Enabled	B6-62
8	Power-saving setting	-	Disabled, enabled	Disabled	B6-62
9	Select Electromagnetic Valve System (Operation System)	-	Double, Single	Double (Not Available for Change)	----

Caution

- No. 1/3/4 default factory settings differ according to ELECYLINDER specifications.
- No. 7 Wireless function setting parameter is not displayed on ELECYLINDERs without wireless circuit boards (no WL, WL2 in the Option model number).
- Do not attempt to change No. 9 Select Electromagnetic Valve System (Operation System) parameter from Double.

Parameter Details of ELECYLINDER

Elecylinder only

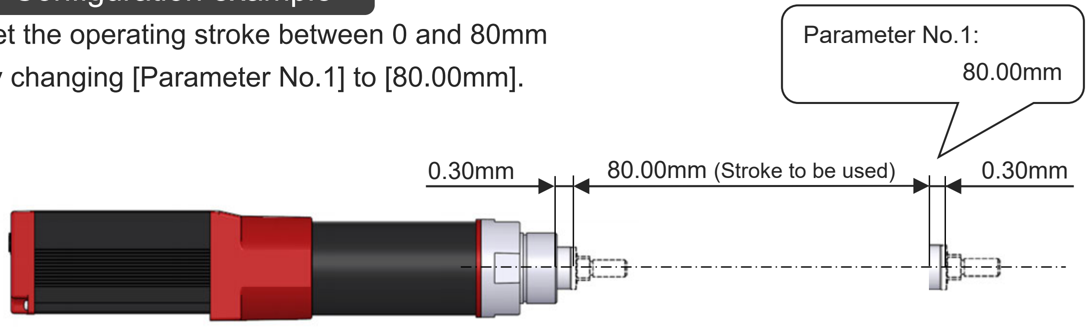
[Operation range adjustment (Parameter No. 1)]

No.	Name	Unit	Input range	Default initial value setting
1	Operation range adjustment	mm	0 to 9,999.69	0

- The ELECYLINDER operation range can be adjusted to suit your system.
- The minimum setting unit is 0.01mm.
- Set to your desired stroke length.
  The controller automatically adds 0.30mm and controls/monitors the operation range.

Configuration example

Set the operating stroke between 0 and 80mm by changing [Parameter No.1] to [80.00mm].



Caution

- Set within the ELECYLINDER movable range.
  Setting to a value that exceeds the maximum stroke will result in collision with the forward side mechanical stopper
- This may damage the ELECYLINDER, workpiece or peripheral devices.

Elecylinder only

[Auto switch "LS" signal detection range adjustment (Parameter No. 2)]

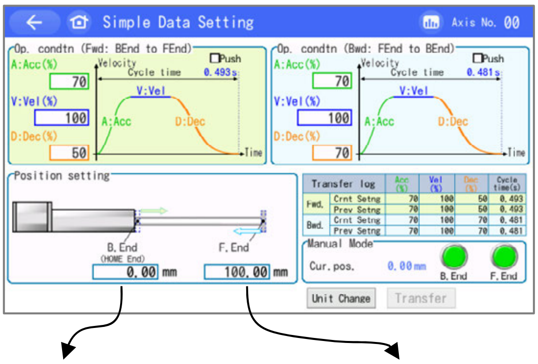
No.	Name	Unit	Input range	Default initial value setting
2	Auto switch "LS" signal detection range adjustment	mm	Actuator Depended to 9999.99	0.10

- Sets the backward complete/forward complete ON trigger range relative to the backward end/forward end.
- When the ELECYLINDER enters the detection range, the backward complete or forward complete signal turns ON.
- The minimum setting unit is 0.01mm.

Configuration example

The LS signal detection range for the conditions below is shown in the figure.

Backward end:	0.00mm
Forward end:	100.00mm
Parameter No.2 :	0.10mm



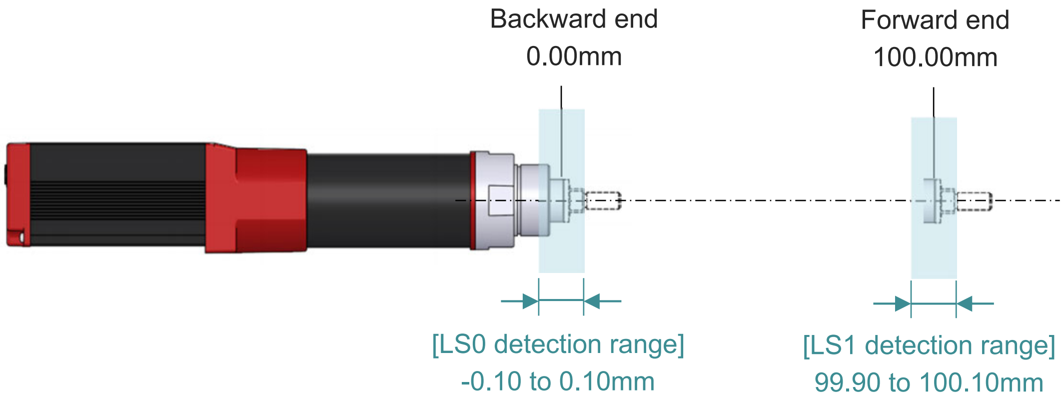
Op. condtn (Fwd: BEnd to FEnd) ☐Push
A:Acc(%) 70
V:Vel(%) 100
D:Dec(%) 50
Cycle time 0.493s

Op. condtn (Bwd: FEnd to BEnd) ☐Push
A:Acc(%) 70
V:Vel(%) 100
D:Dec(%) 70
Cycle time 0.481s

B.End 0.00 mm
F.End 100.00 mm

Transfer log		Acc (%)	Vel (%)	Dec (%)	Cycle time(s)
Fwd.	Crnt Setng	70	100	50	0.493
	Prev Setng	70	100	50	0.493
Bwd.	Crnt Setng	70	100	70	0.481
	Prev Setng	70	100	70	0.481

Cur. pos. 0.00mm



Caution

- A value smaller than the minimum resolution cannot be set.
  Minimum resolution [mm/p] = ball screw lead [mm/r] ÷ 800 [p/r]

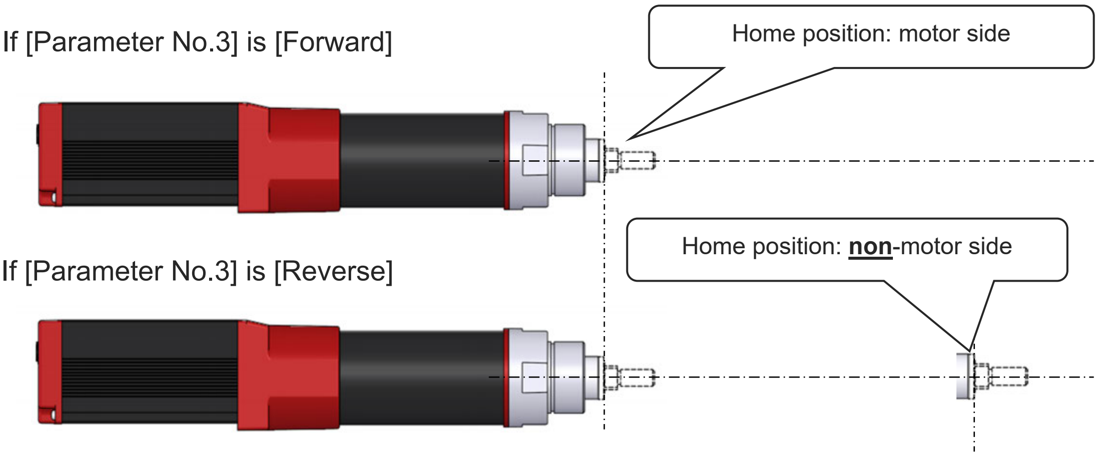
Elecylinder only

[Change home return direction (Parameter No. 3)]

No.	Name	Unit	Input range	Default initial value setting
3	Change home return direction	–	Reverse, forward	According to ELECYLINDER specifications

- Setting is established at delivery based on the ELECYLINDER specifications. It is not necessary to adjust the setting in normal use.
- The home return operation direction can be selected.
- To set the opposite direction, switch to the opposite setting value. ("Forward" → "Reverse" or "Reverse" → "Forward")
- For standard specification, the motor side is home.

Configuration example



Caution

- Changing the home return direction reverses the operation direction.
- After changing this parameter, always perform home return reset (absolute reset).
- Even if the operation direction is reversed, check that the moving parts do not interfere with any other objects.
  If the moving parts collide, they may damage the ELECYLINDER, workpiece or peripheral devices.
- Changing the home return direction after purchasing will cause a mismatch with the ELECYLINDER model number. Make sure to change parameters again if the controller or body is replaced

Elecylinder only

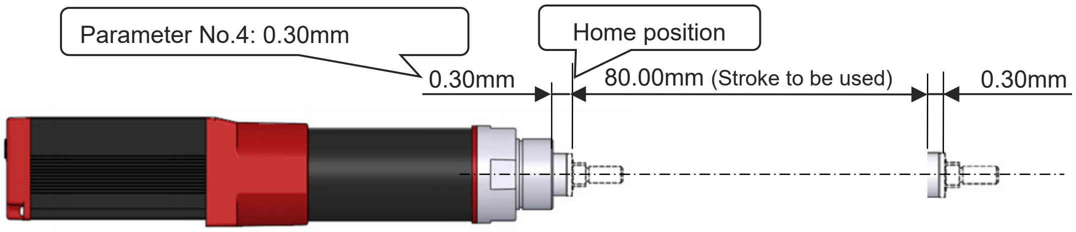
[Home position adjustment (Parameter No. 4)]

No.	Name	Unit	Input range	Default initial value setting
4	Home position adjustment	mm	0 to 9999.99	According to ELECYLINDER specifications

- Setting is established at delivery based on the ELECYLINDER specifications. It is not necessary to adjust the setting in normal use.
- Sets the distance between the home side mechanical stopper and the home position.
- The minimum setting unit is 0.01mm.
- Adjustment with this parameter is possible in the following situations.
  (1) To match the ELECYLINDER home position and the mechanical home position after assembly into equipment.
  (2) To adjust the new home position upon reversing the default home return direction after purchase.
  (3) To eliminate a slight deviation from the previous home position generated after replacing the ELECYLINDER.

Configuration example

If [Parameter No.4] is [0.30mm],
the relationship between mechanical stopper and home position is as follows.



Caution

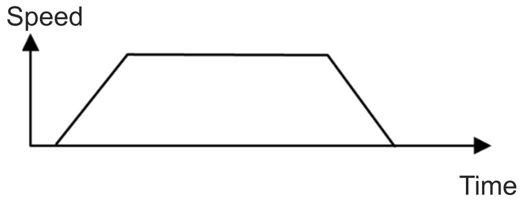
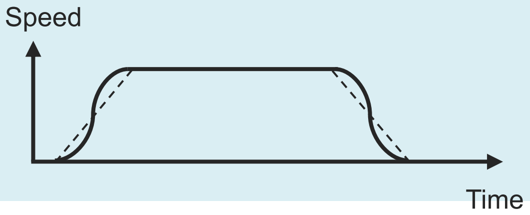
- If adjusting Parameter No.4, simultaneously adjust Parameter No.1.
  Operation range adjustment with parameter No.1 uses the home position as the datum.
- Do not set Parameter No.4 to a value smaller than the default setting at shipping.
  This may result in abnormal home return operation, alarm triggering or abnormal operation. If the value must be set small, please contact IAI.
- After changing this parameter, always perform home return reset (absolute reset).

Elecylinder only

[Smooth accel/decel setting (Parameter No. 5)]

No.	Name	Unit	Input range	Default initial value setting
5	Smooth accel/decel setting	–	Disabled, enabled	Disabled, enabled

- The movement waveform for ELECYLINDER operation can be selected.
- When [Enabled], accel/decel operation becomes smoother (less abrupt). This softens the shocks of acceleration/deceleration without delaying the operation time.
- If [Disabled], the above functionality is not enabled.

Setting	Acceleration/deceleration pattern	Operation waveform image
Disabled	Trapezoid	
Enabled	S-motion	

Caution

- For operation in which the acceleration time or deceleration time exceeds 2 seconds, do not [Enable] smooth accel/decel settings.
  Normal operation will not be possible.
- Avoid momentary stops during acceleration or deceleration operation.
  Sudden changes (acceleration) will occur, which may be dangerous.

Elecylinder only

[Current control setting at stop (Parameter No. 6)]

No.	Name	Unit	Input range	Default initial value setting
6	Current control setting at stop	–	Disabled : Powerful stop Enabled : Energy-saving stop	Disabled

- The control method for ELECYLINDER stop can be selected.
- If [Disabled], a constant current value will be transmitted to the motor, stopping it. This limits fine vibration when stopping, bringing the unit to a complete stop.
- If [Enabled], a current appropriate to the load will be transmitted to the motor, stopping it. This limits the amount of power consumed while stopping.
- If abnormal noise or vibration occurs during a gradual stop, setting to [Enabled] may fix the issue. Moreover, setting to [Enabled] can also fix issues in which the command position cannot quite be attained.

Caution

- If [Disabled], even if a pulse deviation within ±2 from the target position remains, movement towards the target position will not continue.
- If [Enabled], if a pulse deviation of ±1 or more from the target position remains, movement towards the target position will continue.

Elecylinder only

[Wireless function setting (Parameter No. 7)]

No.	Name	Unit	Input range	Default initial value setting
7	Wireless function setting	–	Disabled, Enabled	Enabled

- Either Enabled or Disabled can be selected for the ELECYLINDER wireless function.
- When [Enabled] is selected, wireless communication between the ELECYLINDER and the Touch Panel Teaching Pendant is possible.
- When [Disabled] is selected, wireless communication between the ELECYLINDER and the Touch Panel Teaching Pendant is not possible. There is no transmission or reception of wireless communication radio waves.

Caution

- This parameter is not displayed on ELECYLINDERs without wireless circuit boards (no WL, WL2 in the Option model number).

Elecylinder only

[Power-saving setting (Parameter No. 8)]

No.	Name	Unit	Input range	Default initial value setting
8	Power-saving setting	–	Disabled, Enabled	Disabled

- Either Enabled or Disabled can be selected for the ELECYLINDER power-saving setting.
- When "Enabled," the power capacity can be reduced up to 40% compared to "Disabled" mode, but the maximum speed, maximum acceleration/deceleration, and payload decrease in comparison.
  For details, refer to each ELECYLINDER instruction manual of "Lead and Payload (Power-saving: Enabled)", "Stroke and Max. Speed (Power-saving: Enabled)", and "Payload by Speed/Acceleration (Power-saving: Enabled)"
- When "Disabled," the maximum speed, maximum acceleration/deceleration, and payload increase compared to "Enabled" mode.
  For details, refer to each ELECYLINDER instruction manual of "Lead and Payload (Power-saving: Disabled)", "Stroke and Max. Speed (Power-saving: Disabled)", and "Payload by Speed/Acceleration (Power-saving: Disabled)"

Servo gain adjustment

At shipment from factory, parameters are set so that operation at rated load (maximum) is within the payload capacity of the actuator and with stable operating characteristics.
However, at the actual usage sites, it may be necessary to perform servo adjustment.
This section explains the basic servo adjustment method.

Caution

- It is dangerous to make excessive settings suddenly. Damage to the equipment or the actuator or injury may occur, so proceed with caution.
- Also, make sure to keep a record as you work so that it can be restored at any time.
- If you face problems which cannot be resolved, contact IAI.

Adjustment of stepper motor and AC servo motor

No.	Problems	Adjustment method
1	• Positioning takes time • Positioning accuracy is insufficient • Tact time needs to be shorter	• Set Parameter No. 55 "Position Command Primary Filter Time Constant" to "0" if it is set. • Increase Parameter No. 7 "Servo Gain Number". The increased set value improves tracking of position command. As a guideline for setting, set 3 to 10, at most 15 or less. If it is too high, overshoot may occur, which will cause sound and vibration. • When increasing Parameter No. 7 "Servo Gain Number", Parameter No. 31 "Velocity Loop Proportional Gain" should also be increased accordingly in order to ensure stability of the control system. • When increasing Parameter No. 31 "Velocity Loop Proportional Gain", make sure to set it to about 20% of the initial value. Adjust Parameter No. 7 "Servo Gain Number" as a priority.
2	Vibration occurs during acceleration/deceleration	• This may be caused by excessive "Acceleration/Deceleration Setting," or inadequate rigidity of the device on which the actuator is mounted. • Lower "Acceleration/Deceleration Setting". • Lower Parameter No. 7 "Servo Gain Number". If Parameter No. 7 "Servo Gain Number" is too low, convergence will take longer. • Or consider reinforcing the device.

No.	Problems	Adjustment method
3	• Speed irregularity occurs during travel • Speed accuracy is insufficient	• Increase Parameter No. 31 "Velocity Loop Proportional Gain". The increased set value improves tracking of speed command. If it is too large, mechanical system vibration may occur. As a setting guideline, try to increase the initial values by about 20% respectively.
4	Abnormal noise In particular, high-pitched noise occurs when stopping or at low speed (50 mm/s or less).	• Enter Parameter No. 33 "Torque Filter Constant". As a setting guideline, try to increase by 50 respectively. If it is too large, stability of the control system may be impaired and vibration may occur. [Important] Before adjustment This phenomenon is likely to occur when the rigidity of the mechanical system is not maintained. Even with the actuator alone, resonance may occur in the belt drive or if the stroke exceeds 600 mm. Before adjustment, make sure that: (1) Parameter No. 7 "Servo Gain Number", Parameter No. 31 "Velocity Loop Proportional Gain" and Parameter No. 32 "Velocity Loop Integral Gain" are not set too high. (2) Rigidity of the load is maintained as much as possible. Mounting is not loose and there is no play, etc. (3) The actuator body has been installed firmly with the prescribed torque. (4) There is no distortion on the mounting surface of the actuator.
5	• Trajectory accuracy needs to be higher • Constant speed needs to be higher • Response needs to be better	• Refer to adjustment methods No. 1 to 3 described above and adjust Parameter No. 7 "Servo Gain Number" and Parameter No. 31 "Velocity Loop Proportional Gain" to optimize the conditions. [Reference] Selection of the actuator (motor) is the most important factor. The servo motor is very sensitive to the magnitude of load inertia. If the moment of inertia on the load side (load inertia) is too large with respect to the moment of inertia of the motor itself (motor inertia), the servo motor will cause the motor to be wagged by the load, as it were, resulting in unstable control. Therefore, in order to improve trajectory, position, speed, response, etc., it is necessary to reduce the load inertia ratio. For applications such as coating, if trajectory accuracy, constant velocity, response, etc. are called for, it is recommended to make the actuator ball screw lead as small as possible and to select an actuator with a higher motor capacity.

No.	Problems	Adjustment method
6	• The static friction of the load is large and travel start is slow • The load inertia is large and response is poor when stopping • Operation time needs to be shorter	• Set Parameter No. 71 "Positional Feedforward Gain". Estimated setting is from 10 to 50. As the set value increases, the deviation amount is reduced and responsiveness improves. Setting a high value may cause vibration or noise. • Adjust Parameter No. 7 "Servo Gain Number" and Parameter No. 31 "Velocity Loop Proportional Gain" to further improve responsiveness.
7	There is a shock when starting or stopping	• Set Parameter No. 55 "Position Command Primary Filter Time Constant" to about 50 ms. If no improvement is observed, increase gradually. If improvement is observed, gradually lower the set value to the limit. If this setting is made, the settling time will be extended and the tact time will increase. Positioning accuracy also deteriorates.

Adjustment of DC brush-less motor

<table>
<tr><th>No.</th><th>Problems</th><th>Adjustment method</th></tr>
<tr><td>1</td><td>• Hunting occurs when positioning stops
• Speed irregularity occurs during travel
• Speed accuracy is insufficient</td><td>Set the parameters following the procedure below and check the operation.
When the motion improves, end the adjustment. There is no need to proceed to the next step.
Step 1: Change Parameter No. 32 "Velocity Loop Integral Gain", set the following 5 values in order and check the operation.
<table>
<tr><th>Setting order</th><th>Velocity loop integral gain setting value</th></tr>
<tr><td>1</td><td>411</td></tr>
<tr><td>2</td><td>592</td></tr>
<tr><td>3</td><td>925</td></tr>
<tr><td>4</td><td>1,645</td></tr>
<tr><td>5</td><td>3,700</td></tr>
</table>
If the operation does not improve, perform step 2.
Step 2: Change Parameter No. 31 "Velocity Loop Proportional Gain" and Parameter No. 32 "Velocity Loop Integral Gain"
Set the following 6 values in order and check the operation.
<table>
<tr><th colspan="3">● Load is 0.2 kg or less</th></tr>
<tr><th>Setting order</th><th>Velocity loop proportional gain setting value</th><th>Velocity loop integral gain setting value</th></tr>
<tr><td>1</td><td>42</td><td>382</td></tr>
<tr><td>2</td><td>42</td><td>520</td></tr>
<tr><td>3</td><td>42</td><td>749</td></tr>
<tr><td>4</td><td>42</td><td>1,171</td></tr>
<tr><td>5</td><td>42</td><td>2,081</td></tr>
<tr><td>6</td><td>42</td><td>4,683</td></tr>
</table>
<table>
<tr><th colspan="3">● Load is heavier than 0.2 kg</th></tr>
<tr><th>Setting order</th><th>Velocity loop proportional gain setting value</th><th>Velocity loop integral gain setting value</th></tr>
<tr><td>1</td><td>32</td><td>231</td></tr>
<tr><td>2</td><td>32</td><td>315</td></tr>
<tr><td>3</td><td>32</td><td>453</td></tr>
<tr><td>4</td><td>32</td><td>708</td></tr>
<tr><td>5</td><td>32</td><td>1,259</td></tr>
<tr><td>6</td><td>32</td><td>2,833</td></tr>
</table>
If the operation does not improve, contact IAI.</td></tr>
<tr><td>2</td><td>Abnormal noise
In particular, high-pitched noise occurs when stopping or at low speed（20 mm/s or less）</td><td>Change Parameter No. 31 "Velocity Loop Proportional Gain" and Parameter No. 32 "Velocity Loop Integral Gain" to the following values and confirm.
Velocity Loop Proportional Gain: 32
Velocity Loop Integral Gain: 231</td></tr>
</table>

6.2 Various Functions

Vibration damping control function

AC servo motor specification only

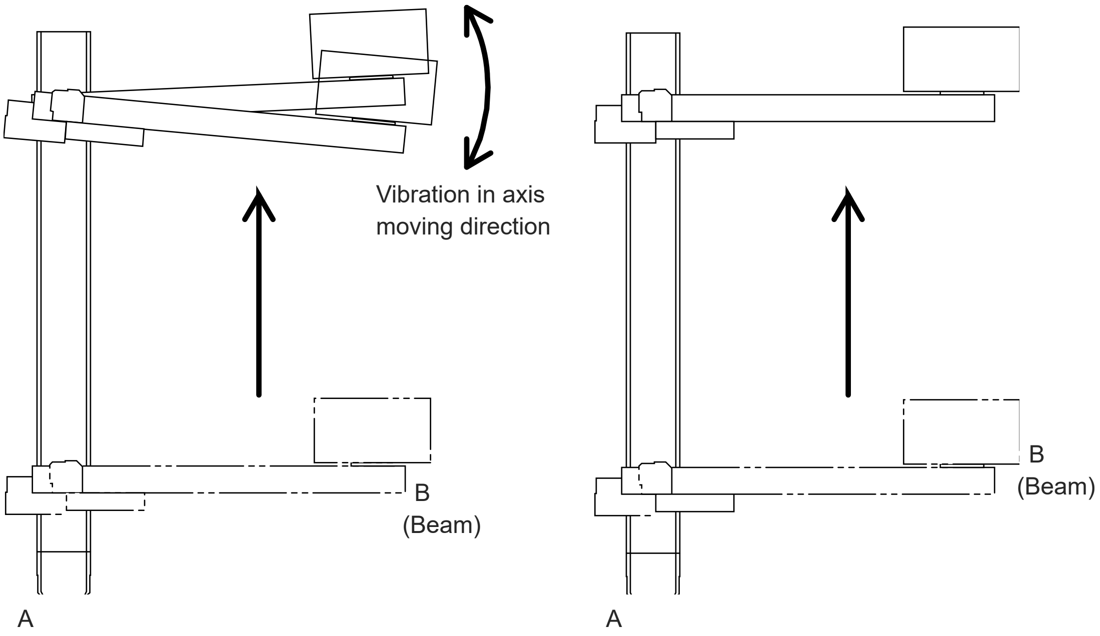
Vibration damping control function controls the vibration caused by operation of IAI actuators. The vibration which can be suppressed is vibration in the same direction as operation of the actuator, with frequency ranging from 0.5 to 30Hz.
Measure the generated vibration frequency and set with the parameter. Three types of frequency are available to set for the parameter which can be selected using the position table to be reflected to vibration control of the operation. Multiple setting is not available for a single travel command (position data).

This function is dedicated for the AC servo motor specification. Also, it is not available with direct numerical control mode.
When using this function, check the precautions on the next page.

[Operational Image of the Function]

The following diagram is an example of 2-axis configuration of an IAI actuator.
Operation of actuator A causes vibration to actuator B which is equivalent to a beam. By measuring vibration B in the travel direction of actuator A, and performing vibration damping control against the operation of A, vibration B can be suppressed. Vibration B caused by the operation of actuator B cannot be suppressed by actuator A.

★ When vibration damping control is disabled ☆ When vibration damping control is enabled



Caution

- Use of frequency analysis tool for vibration damping control

  To use the frequency analysis tool for vibration damping control built into the PC software, it is necessary to acquire the key file (Fam.dll) and copy it into the folder containing the file to execute the PC software (RcPc.exe). Consult with IAI about the key file.

  For operation method, refer to "Chapter 14 Frequency Analysis Function for Vibration Damping Control" in the instruction manual for the PC software.

- Vibration subject to vibration damping control

  The vibration is caused by an IAI actuator, in the same direction as the travel direction of the actuator.

- Vibration not subject to vibration damping control

  1) The vibration source is other than operation of the actuator
  2) The vibration source is in a direction different from the travel direction of the actuator
  3) Vibration of vibrating objects (This function is to move objects that are susceptible to vibration without vibrating, and it cannot control vibrations which have already started)

- Conditions when vibration damping control is unlikely to be effective

  1) When the vibration frequency desired to be controlled matches the frequency of the motor mechanical angle (motor rotation speed), or frequency of the motor electrical angle

     Frequency of motor mechanical angle (motor rotation speed): Operation speed [mm/s]/lead length [mm]

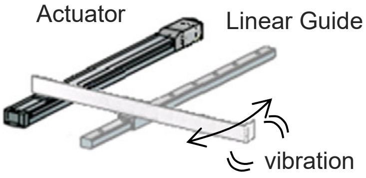
     Frequency of motor electrical angle: Frequency of the shaft with servo-motor is 4 times the mechanical angle

     Example: Shaft with servo-motor

     For lead length: 20mm, operation speed 100mm/s

     Frequency of mechanical angle (motor rotation speed): 5Hz

     Frequency of electrical angle (4 times frequency of mechanical angle): 20Hz
  2) When the vibration damping requires higher speed response than the set speed control response, speed response cannot catch up with vibration control.
  3) For those type of equipment as shown in the figure on the right, the effect may be small or even no effect can be gain as the actuator is not capable of controlling vibration directly.



Caution

- Home return motion and push-motion operation are not subject to vibration damping control

  Vibration cannot be suppressed during home return motion and push-motion operation. When operation is performed by setting push motion, alarm code 0A2 "Position data error" will occur.

- Usage in conjunction with feed forward gain is forbidden

  This function cannot be used in conjunction with feed forward gain.

- Usage and switching of vibration damping control during travel operation are forbidden

  During operation of the actuator, vibration damping control and positioning operation are not switchable. If switching is commanded, alarm code 0C5 "Unauthorized control system transmission command error" will occur.

- Responsivity of vibration damping control

  Vibration damping control causes a "delay" in the speed commanded based on an operation plan. Therefore, the cycle time will be longer.

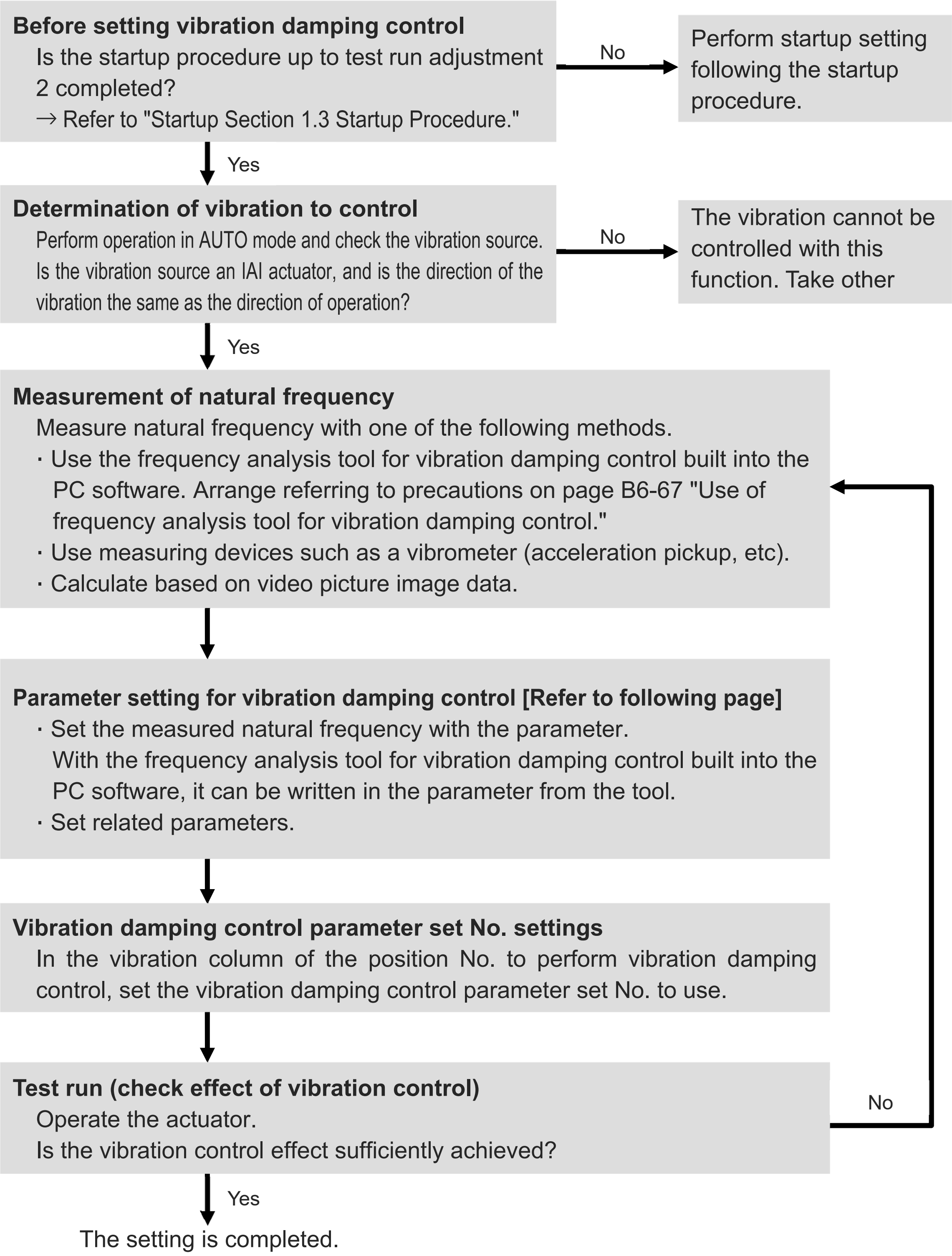
  The lower the set vibration frequency is, the more significant the "delay" will be.

- Considering servo gain

  If the servo gain is not appropriately set, the effect of vibration damping control may be reduced. Before setting the vibration damping control, adjust servo gain first.

[Setting Procedure]

Use by following the procedures of measurement and setting below.



Before setting vibration damping control

Is the startup procedure up to test run adjustment 2 completed?

→ Refer to "Startup Section 1.3 Startup Procedure."

Perform startup setting following the startup procedure.

Determination of vibration to control

Perform operation in AUTO mode and check the vibration source. Is the vibration source an IAI actuator, and is the direction of the vibration the same as the direction of operation?

The vibration cannot be controlled with this function. Take other

Measurement of natural frequency

Measure natural frequency with one of the following methods.

- Use the frequency analysis tool for vibration damping control built into the PC software. Arrange referring to precautions on page B6-67 "Use of frequency analysis tool for vibration damping control."
- Use measuring devices such as a vibrometer (acceleration pickup, etc).
- Calculate based on video picture image data.

Parameter setting for vibration damping control [Refer to following page]

- Set the measured natural frequency with the parameter.
  With the frequency analysis tool for vibration damping control built into the PC software, it can be written in the parameter from the tool.
- Set related parameters.

Vibration damping control parameter set No. settings

In the vibration column of the position No. to perform vibration damping control, set the vibration damping control parameter set No. to use.

Test run (check effect of vibration control)

Operate the actuator.

Is the vibration control effect sufficiently achieved?

The setting is completed.

[Parameter Setting for Vibration Damping Control]

Set parameters related to vibration damping control. Related parameters are as described below.

Parameters No.	Parameters Set No.	Parameter Name	Unit	at shipping	Input range
97	1	Damping characteristics coefficient 1	Rate	10	0 ~ 1,000
98		Damping characteristics coefficient 2	Rate	1,000	0 ~ 1,000
99		Natural frequency	1/1,000Hz	10,000	500 ~ 30,000
100		Notch filter gain	Rate	9,990	1 ~ 20,000
101	2	Damping characteristics coefficient 1	Rate	10	0 ~ 1,000
102		Damping characteristics coefficient 2	Rate	1,000	0 ~ 1,000
103		Natural frequency	1/1,000Hz	10,000	500 ~ 30,000
104		Notch filter gain	Rate	9,990	1 ~ 20,000
105	3	Damping characteristics coefficient 1	Rate	10	0 ~ 1,000
106		Damping characteristics coefficient 2	Rate	1,000	0 ~ 1,000
107		Natural frequency	1/1,000Hz	10,000	500 ~ 30,000
108		Notch filter gain	Rate	9,990	1 ~ 20,000
109		Vibration suppression No. initial value		0	0 ~ 3
110		Stop method during SrvOFF		0	0, 1

[Damping Characteristics Coefficient 1, 2 (Parameter No. 97/98, 101/102, 105/106)]

Do not attempt to change this item.

[Natural Frequency [1/1,000Hz] (Parameter No. 99, 103, 107)]

Set the measured natural frequency of the load. With the frequency analysis tool for vibration damping control built into the PC software, it can be set in the parameter directly from the tool. Exhibits even higher vibration control performance if the setting is made as close as possible to the natural frequency of the load.

[Reference] Other vibration measuring methods

- Use measuring devices such as a vibrometer (acceleration pickup, etc)
- Calculate from video picture image data

[Notch Filter Gain (Parameter No. 100, 104, 108)]

Set the notch filter gain following the table below in accordance with the measured natural frequency of the load. Make fine adjustments if overshooting, etc. occurs.
If the notch filter gain setting is high, overshooting will occur during positioning stop.
If the notch filter gain setting is low, undershooting will occur during positioning stop.

Measured natural frequency [Hz]	Notch filter gain set value
0.5	9,900
1	9,980
2 ~ 30	9,990

[Vibration Suppression No. Initial Value (Parameter No. 109)]

When position is written in an unregistered position table, the initial value of this parameter will be automatically set in the "Vibration Suppression No.". To change the setting, rewrite the set value by editing the position table afterwards.

0: Normal positioning control (initial value)
1: Use vibration damping control parameter set 1
2: Use vibration damping control parameter set 2
3: Use vibration damping control parameter set 3

[Stop Method during SrvOFF (Parameter No. 110)]

The relations between parameter setting and each stop command are as described below.

Stop command	Stop method during servo OFF Set value			
	0: Sudden stop		1: Decelerating stop	
	During vibration control	During normal positioning control	During vibration control	During normal positioning control
Pausing	Vibration control decelerating stop	Normal decelerating stop	Vibration control decelerating stop	Normal decelerating stop
Servo OFF	Sudden stop with emergency stop torque			
Drive-source cutoff				
Alarm (Operation cancel level)				
Alarm (Cold start)	Sudden stop with emergency stop torque			

[Position Data Setting]

In order to enable vibration damping control, set the parameter set No. to use in the vibration damping No. column of the position data.

(Note) Vibration damping control cannot be used during push-motion operation.

No.	Position [mm]	Speed [mm/s]	Acceleration [G]	Deceleration [G]	Push [%]	Threshold [%]	Positioning width [mm]	Zone+ [mm]	Zone- [mm]	Acceleration/ deceleration mode	Incremental	Gain set	Stop mode	Vibration damping No.
0														
1	0.00	50.00	0.01	0.01	0	0	0.10	0.00	0.00	0	0	0	0	0
2	50.00	50.00	0.01	0.01	0	0	0.10	0.00	0.00	0	0	0	0	1
3	50.00	50.00	0.01	0.01	50	0	0.10	0.00	5.00	0	0	0	0	3
4														

Set natural frequency 1 (enabled)

Set natural frequency 3 (Alarm generation: "0A2 Position data error" cannot be used in conjunction with push-motion operation.)

Stepper motor specification only

Collision detection function

This function stops the operation immediately when the actuator comes into contact with an object.
Fully understand the descriptions in this section and use without any safety or operational issues.
The collision detection function is a function to stop operation by generating an alarm and turning the servo OFF when the command current value exceeds the set value. Detection range can also be set.

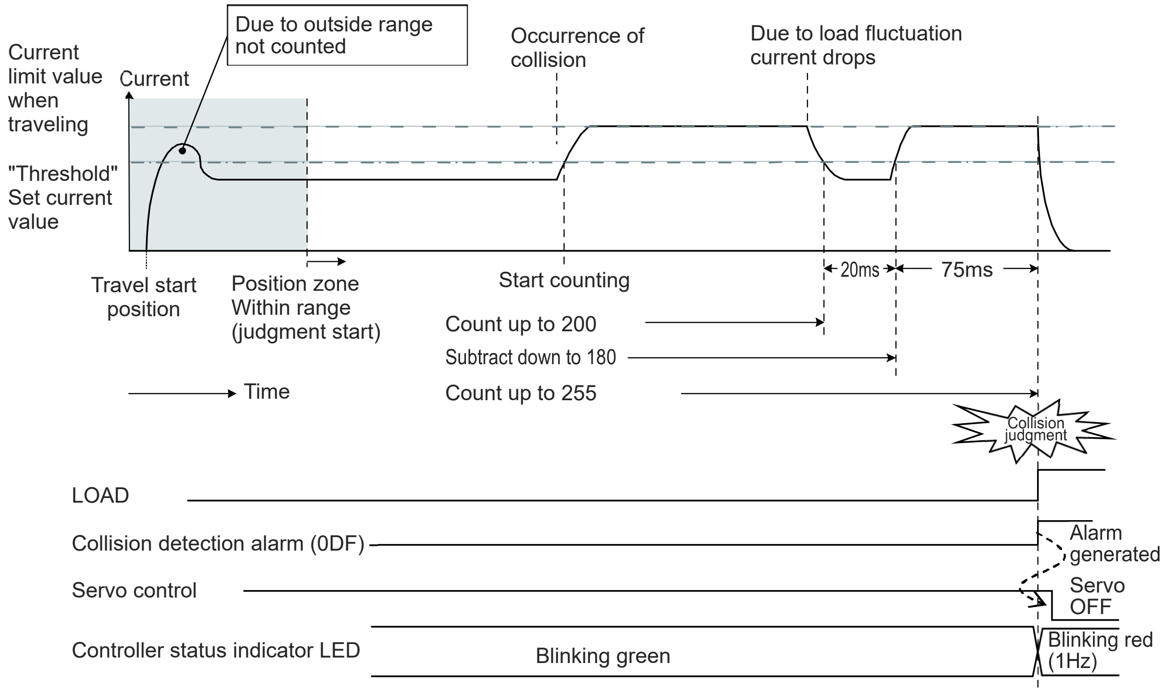
Caution

- This is an auxiliary function to reduce damage to workpieces, etc. in case of unexpected events.
- This feature is not used in the direct indication mode.
- No compensation will be offered for unexpected damages.
- This function must be set in accordance with expected collisions, therefore appropriate values vary depending on the system. Check thoroughly before use.

[Collision Judgment]

When the present position is within the position zone range and the time set in parameter No. 50 "Load output judgment time" is exceeded and the command torque value set in the position table "Threshold" is exceeded, a collision is judged to have happened.
After judgment, the load output judgment status (LOAD) turns ON, the collision detection alarm is generated and the servo turns OFF.

◎ Example of Judgment (at judgment time of 255 ms)



[Setting]

(1) Selecting functions to be used

Set with a parameter. Set Parameter No. 168 "Collision Detection Function."

Set value	Content	Alarm level
0	No detection will be made（same even if 2, 4, 6 are set）	–
1	Detects within the set range of the position zone.	Operation cancel level
3 (Note 1)	Detects within the set range of the position zone; however, no detection will be made in the following cases. · First travel after pause release · Travel from stop status within position zone range	
5	Detects within the set range of the position zone.	Message level
7 (Note 1)	Detects within the set range of the position zone; however, no detection will be made in the following cases. · First travel after pause release · Travel from stop status within position zone range	

Note 1: This setting helps to avoid false detection due to increased current during acceleration.

(2) Setting of detection current value

Set the "threshold" field of the position table to 0 ~ 100 [%]. No detection will be made if 0 is set.

(3) Setting of judgment time

Set with a parameter. Set Parameter No. 50 "Load Output Judgment Time."

Set range: 0 to 9,999 [ms] (initial value 255ms)

(4) Setting of judgment range (position zone)

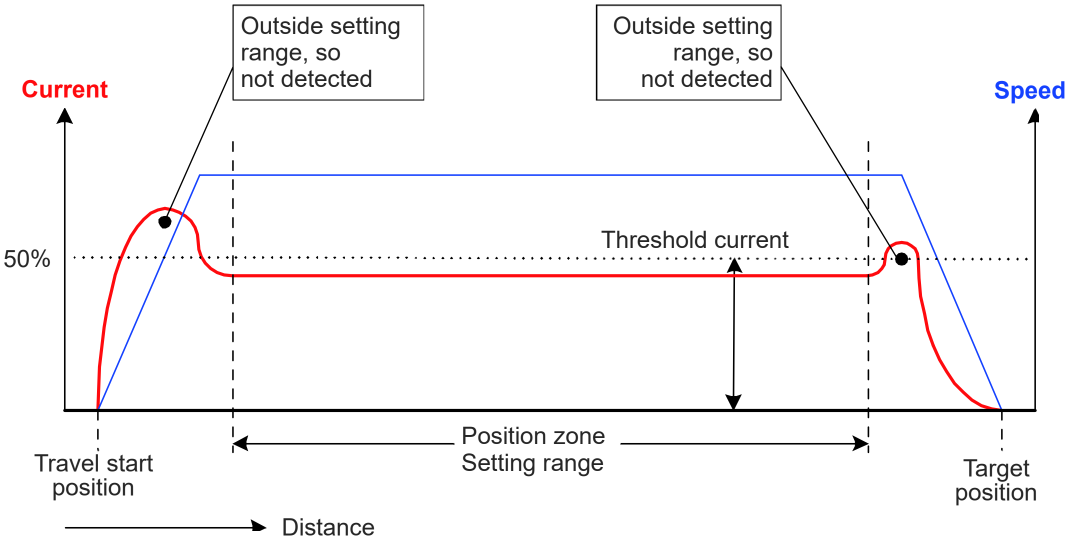
Set the range in "zone +" and "zone -" of the position table. When setting, be sure to set the value of "zone -" smaller than that of "zone +."

Set range: 0.00 to actuator stroke length [mm]

[Adjustment]

Make adjustments using the following descriptions as a guideline.

- Judgment range: Avoid acceleration regions that may require a large amount of current, and configure over the range where collisions may occur.
- Detection current value: Consider travel speed, weight of the workpiece, etc., and set as low as possible over ranges where false detection is unlikely to occur. (Set the current value slightly higher than required during constant travel and make fine adjustments.)



Power-saving function

[AUTO Servo OFF and Full Servo Function]

Equipped with AUTO servo OFF (setting available for all motor specifications) and full servo function (stepper motor specification only) to reduce power consumption while the actuator is stopped. Fully understand the descriptions in this section and use without any safety or operational issues.

With automatic servo OFF function, the servo turns OFF automatically after a certain period of time once positioning is completed. Once the next positioning start signal CSTR is commanded, the servo automatically turns ON and executes positioning operation. Since holding current does not flow during the stop, power consumption can be reduced.
Three types of setting are available for the period of time from positioning complete to servo OFF.

With the full servo function, the power consumption can be reduced by servo-controlling the stepper motor with a relatively large stop current.
To stop the stepper motor completely with minimal vibration, a current is constantly supplied. Also, when the value of the encoder deviates from the target position by ±4 counts, it will not be returned to the target position. However, activating the full servo function will enable returning even with the deviation of 1 count.
As with the full servo function, the RCP6 Series performs home return even with deviation of 1 count. Therefore, the full servo function cannot be used for RCP6.

With the power-saving function, the status of the actuator determines which is to be enabled: the setting of Parameter No. 53, or "stop mode" in the position table. The details are as described below.

Status	Setting
Home return complete and on stand-by (positioning to the target position not performed)	Execution of power-saving function at the value set for Parameter No. 53 (Stop mode setting of position No. disabled)
After turning the power ON, stand-by state with servo ON (positioning to the target position not performed)	Execution of power-saving function at the value set for Parameter No. 53 (Stop mode setting of position No. disabled)
Positioning complete in the target position set in the position table	Execution of power-saving function at the value set for "stop mode" of each position No. (Set value of Parameter No. 53 disabled)

Caution

- Do not use this function if operation after automatic servo OFF is pitch feed (relative travel).
- Slight position deviation may occur due to turning the servo ON/OFF. Additionally, if the position deviates due to application of external force during servo OFF, positioning to the correct position will become impossible since the position at startup is the reference point for pitch feed operation.
- Automatic servo OFF function is disabled for push-motion operation. Do not use it. This function will be enabled upon completion of positioning operation. For push-motion operation, it will be enabled only when contactless (completion of operation without contact = same status as positioning complete).
- There is no holding torque during AUTO servo OFF. The actuator will move if external force is applied. Take extra care regarding interference and safety when setting.
- If jog or inching operation is performed while operating with full servo function, full servo function will be disabled. Full servo function will be enabled again by moving to the position No. for which full servo function is enabled.

[Setting Time until Automatic Servo OFF]

Three types of setting are available for delay time from positioning complete until servo OFF. Set in the following parameters in units of second [s].

Parameter No.	Name	Unit	Input range	Initial value
36	Automatic servo OFF delay time 1	s	0 ~ 9,999	0
37	Automatic servo OFF delay time 2	s	0 ~ 9,999	0
38	Automatic servo OFF delay time 3	s	0 ~ 9,999	0

[Setting of Power-saving Method]

Select from the following conditions, and set in "stop mode" of the position table, or with Parameter No. 53 using a numerical value.
For AC servo motor specification and DC brush-less motor specification, select from 0 to 3.
For stepper motor specification, select from 0 to 7.
[Reference] Refer to "3.7 Address Configuration / Position table (page A3-51)".

Set value	Operation after positioning complete	Selectable specifications
0	Servo ON as is	All specifications
1	After a fixed time (parameter No. 36 set value) automatic servo OFF	All specifications
2	After a fixed time (parameter No. 37 set value) automatic servo OFF	All specifications
3	After a fixed time (parameter No. 38 set value) automatic servo OFF	All specifications
4	Full servo control	Stepper motor specification (Excluding RCP6 Series)
5	After full servo control for a fixed time (parameter No. 36 set value), automatic servo OFF	Stepper motor specification
6	After full servo control for a fixed time (parameter No. 37 set value), automatic servo OFF	Stepper motor specification
7	After full servo control for a fixed time (parameter No. 38 set value), automatic servo OFF	Stepper motor specification

Caution

- There is no holding torque during AUTO servo OFF. The actuator will move if external force is applied. Take extra care when setting.
- Do not use AUTO servo OFF when the next travel command is relative specifications (pitch feed). Misalignment may occur.
- Do not use AUTO servo OFF with push-motion operation. The pushing force will be lost.
- AUTO servo OFF does not function if operating in teaching mode with PC software.

[Status of Positioning Complete Signal when AUTO Servo OFF Selected]

If AUTO servo OFF is executed, the status is no longer positioning complete as the servo is turned OFF. Therefore, the positioning complete signal PEND turns OFF. By changing the PEND signal into an in-position signal that determines if the unit is stopped in the range of positioning width instead of the positioning complete signal, the signal can be made not to turn OFF even during servo OFF.

Perform this setting with Parameter No. 39.

Set value of parameter No.39	Description of PEND signal	Signal output status during AUTO servo OFF
		PEND
0	Positioning complete signal	OFF
1	In-position signal	ON

(Note) Status LED SYS blinks green during AUTO servo OFF.

(1) When Parameter No. 39 = 0

Operation of actuator	Positioning operation	AUTO servo OFF stand-by	Servo OFF	Positioning operation
Servo status	ON	ON	OFF	ON
Complete position No. output (Present position number output)	PM1~** = 0	PM1~** = Output	PM1~** = 0	PM1~** = 0
Positioning complete signal PEND	OFF	ON	OFF	OFF

Servo OFF delay time
(Parameter No.36~38)

(2) When Parameter No. 39 = 1

Operation of actuator	Positioning operation	AUTO servo OFF stand-by	Servo OFF	Positioning operation
Servo status	ON	ON	OFF	ON
Complete position No. output (Present position number output)	PM1~** = 0	PM1~** = Output	PM1~** = Output	PM1~** = 0
Positioning complete signal PEND	OFF	ON	ON	OFF

Servo OFF delay time
(Parameter No.36~38)

[Auto current down function]

Stepper motor specification only

(1) Function selection parameter

Energized at a set current (Note 1) regardless of size of the external force for complete stop after positioning operation, and when auto current down adjustment is not used. With the use of auto current down adjustment, energization is done with consideration of the impact of external force, so it is effective for reduction of power consumption when transported load is small, etc.

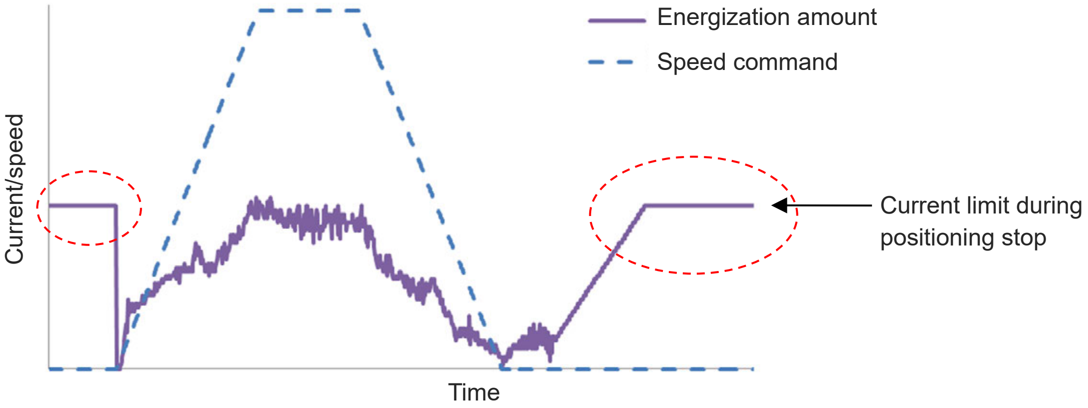
Note 1: Parameter No. 12 "Current Limit during Positioning Stop"

Set auto current down adjustment enable/disable with Parameter No. 182.

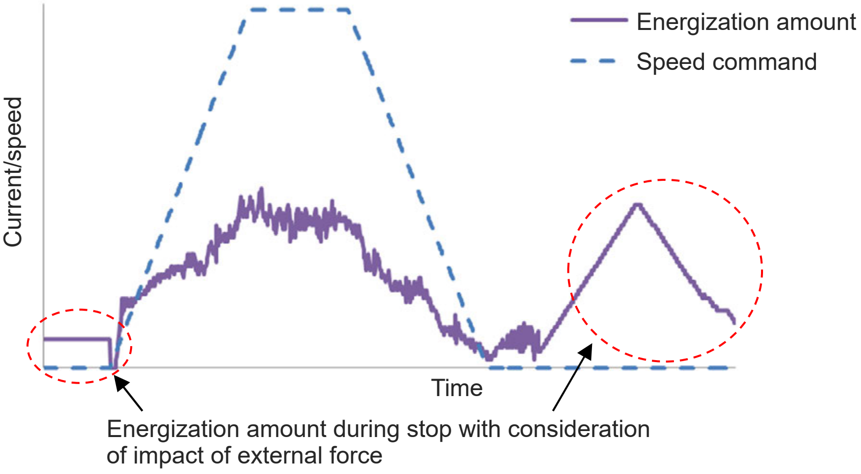
Parameter No.	Name	Unit	Input range	at shipping
182	Auto current adj. select	–	0: Disabled, 1: Enabled	0

"Relations of energization amount and speed command during positioning operation" are shown below for disabled/enabled auto current down function.

●Auto current down adjustment: Disabled



●Auto current down adjustment: Enabled



(2) Control with function enabled

1) The same process as the existing complete stop function will be performed until the energization amount reaches current limit during positioning stop (parameter).

2) After completion of current energization during stop, the state is maintained until target position deviation does not occur (zero).

3) In accordance with whether target deviation is present or not, the energization amount will be manipulated.
  - Without target position deviation, energization decreases by a fixed amount
  - With target position deviation, energization increases by a fixed amount

The following restrictions are applicable for the manipulation of the energization amount.

· Decrease in energization amount ⇒ When process transition of increase is performed more than a set number of times, only increase process will be executed.

· Minimum energization amount is defined per actuator basis, and without position deviation, it allows energization amount to increase to the applicable amount.

· Maximum energization amount is current limit value during positioning stop (parameter), and allows energization amount to increase to the applicable amount.

(3) Precautions

1) Difference in target position deviation depending on the encoder resolution

For actuator with lead length 24 [mm/r]

■ If the encoder resolution is 800 [pulse/r], it allows the energization amount to decrease until target position deviation of 24÷800 = 0.0300 [mm] is generated.

■ If the encoder resolution is 8,192 [pulse/r], it allows the energization amount to decrease until target position deviation of 24÷8,192 = 0.0029... [mm] is generated.

2) Precautions for high-resolution encoder

For an actuator with built-in high resolution encoder, when positioning complete status continues for an extended period of time, even if this function is enabled, the energization amount will eventually rise to current limit value during positioning stop (parameter).

Maintenance Section

Chapter 1

Maintenance and Inspection

1.1 Periodic Inspection

In order to use the RCON system functions in the best possible condition, it is necessary to perform daily or periodic inspections.
Refer to an instruction manual for each ELECYLINDER for the maintenance for ELECYLINDER.

⚠ **Danger**

- Do not touch the terminal while live. This may result in electric shock.
- Connect the absolute battery correctly. Do not charge, disassemble, heat, throw into fire, short-circuit or solder. Incorrect handling of the absolute battery may cause injury or fire due to heating, rupturing or ignition.
- Always shut off the RCON system power supply before cleaning or assembling/disassembling the unit. Electric shocks may result if the power is not shut off.
- Malfunctions may result if the unit connections are tightened loosely.

⚠ **Caution**

- Do not disassemble or modify any unit. This may result in breakdowns, malfunctions, injury or fire.
- Always shut off the RCON system power supply before attaching or removing modules or motor/encoder cables. If not shut off, module breakdowns or malfunctions may result.
- Do not apply shocks to or drop the absolute battery.
  Drops and shocks can damage the absolute battery, causing the liquid inside to leak. If the absolute battery is dropped or suffers impact, do not use and instead discard.
- Before touching a unit, always touch a grounded metallic part to discharge any static electricity accumulated on the body. If static electricity is not discharged, module breakdowns or malfunctions may result.

Periodic inspection items

The RCON systems contain electronic components that may degrade due to the operating environment and require periodic inspection.
It is standard to conduct periodic inspection once every 6 months to one year, but the interval should be shortened in accordance with operating environment.

No.	Inspection items	Inspection details	Judgment criteria	Countermeasures
1	Power supply	Measure between the power supply terminal block to check that the voltage fluctuation is within the reference range	Within voltage fluctuation range 24 V ±10%	Adjust so that the power supply voltage falls within the judgment criteria.
2	Operating environment	Ambient temperature (If used in a panel, the panel temperature is the ambient temperature)	0 to 55°C	Measure the operating temperature with a thermometer and adjust the environment so that it falls within the ambient operating temperature. However, simple absolute units and SCON controllers are 0 to 40°C.
		Operating humidity (Panel humidity if using in a panel)	5%RH to 85%RH Non-condensing or freezing	Measure the operating humidity with a hygrometer and adjust the environment so that it falls within the ambient operating humidity.
		Atmosphere	No corrosive or flammable gas	Check with an odor or gas sensor.
			No splatters of water, oil, or chemicals	Remove and shield.
			No accumulated dust, debris, salt, or metal powder	Remove and shield.
		Directly exposed to sunlight?	Out of direct sunlight	Shield.
		Subjected to direct vibrations or impacts?	Vibration damping and shock-resistant specifications should be within the range	Install a cushion, etc., for vibration damping and shock resistance.
		Close to a noise source?	None	Move the noise source further away or take shielding countermeasures.
3	Mounting status	Mounting state on each DIN rail	No slack in unit mounting	Re-attach and lock.
4	Connection status	Units firmly connected?	The connector should be tightened firmly	Tighten so that it is no longer loose.

No.	Inspection items	Inspection details	Judgment criteria	Countermeasures
4	Connection status	Wiring connectors loose? (Motor encoder cable, field network cable, stop circuit, connection cable between SCON extension unit and SCON, cable between simple absolute unit and driver unit, etc.)	No looseness	Insert until the lock engages.
		Wiring cable frayed?	No visual abnormalities	Check visually and replace the cable.
5	Absolute battery	Simple absolute unit's absolute battery (AB-7) beyond expiry date or lifespan?	The expiry date is 3 years and should not exceed the date written on a sticker adhered to the battery body	Even if the absolute battery is free of errors, replace it if the expiry date has passed. Refer to “Specifications Section Chapter 7, 7.4 General Specifications [How to Replace Absolute Battery]” for how to make replacement.
6	Preventive/ predictive maintenance function	Preventive/predictive maintenance alarms generated?	No alarm generated	Refer to "1.4 Preventive Maintenance Function" and "1.5 Predictive Maintenance Function" for countermeasures.

1.2 Requests When Replacing Units

Pay attention to the following precautions when replacing units after discovering a fault during inspection.

- Unit replacement should be conducted with the power off.
- After replacement, check that the new unit does not have any errors.
- If returning a faulty unit for repairs, write out the nature of the error in as much detail as possible and attach it to the product.
- Be sure to back up position data, parameters and PLC data just in case something goes wrong.

[Items for Reference]

- How to Replace Absolute Battery

  Refer to "Specifications Section Chapter 7, 7.4 General Specifications [How to Replace Absolute Battery]".
- How to Replace Fan Unit
  - ● 24V Driver Unit

    Refer to "Specifications Section Chapter 4, 4.4 Part Names/Functions and External Dimensions [How to Replace Fan Unit]".
  - ● 200V Driver Unit

    Refer to "Specifications Section Chapter 5, 5.4 Part Names/Functions and External Dimensions [How to Replace Fan Unit for 200V Driver Unit]".
  - ● 200V Power Supply Unit

    Refer to "Specifications Section Chapter 5, 5.4 Part Names/Functions and External Dimensions [How to Replace Fan Unit]".

1.3 Consumable Parts

The life of components used in the RCON system is as follows. Refer to "1.4 Preventive Maintenance Function" and "1.5 Predictive Maintenance Function" for information about preventive and predictive maintenance.

Item	Guidelines for life	Preventative maintenance function	Predictive maintenance function	Condition
Electrolytic capacitor	5 years	○	-	Ambient temperature 40°C, rated operating mode
Backup capacitor for calendar functions	5 years	○	-	12 h/day ON time at 40°C environment 12 h 20°C environment when stopped (power OFF)
Simple absolute battery	3 years	-	-	Ambient temperature 40°C
Fan unit	3 years	-	○	Ambient temperature 40°C

1.4 Preventive Maintenance Function

The RCON system has a preventive maintenance function for the capacitor and a predictive maintenance function for the fan unit.

Driver unit

The temperature of the capacitor for the motor power supply of the driver unit is monitored to calculate the service life.

A message level alarm is generated (alarm code 04A "Estimated life exceeded warning") when the electrostatic capacity decreases 20%. When an alarm is generated, although the capacity of the capacitor is not zero (dried-out), we recommend replacing it as soon as possible.

Gateway unit

The temperature of the capacitor for the gateway unit calendar function is monitored to calculate the service life.

A message level alarm is generated (alarm code 84C "Calendar function backup capacitor estimated life exceeded") when the electrostatic capacity decreases 50%. When an alarm is generated, although the capacity of the capacitor is not zero (dried-out), we recommend replacing it as soon as possible.

Maintenance Information

[For driver unit]

The following data should be integrated and recorded to the driver unit.

- Total moving count (The number of times the actuator has moved)

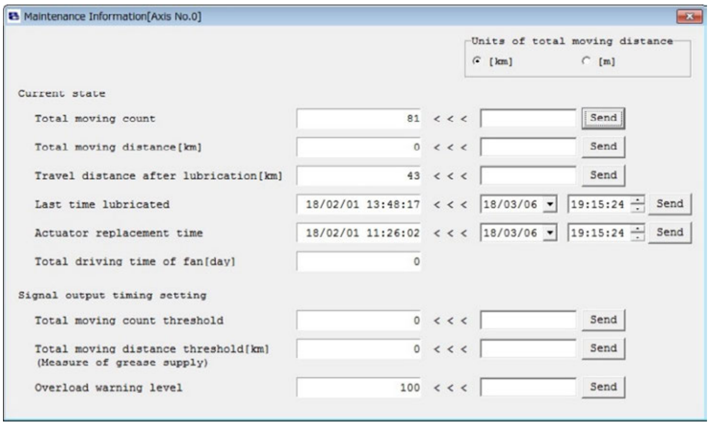
Name	Unit	Input range	Default initial value setting
Total moving count	time	0 to 999,999,999	0 (disabled setting)

- Total moving distance (The number of times the travel distance)

Name	Unit	Input range	Default initial value setting
Total moving distance	m km	0 to 999,999,999	0 (disabled setting)

If the set count or distance (Note 1) is exceeded, an alarm (Note 2) and external signal (Note 3) can be output. This enables checking the timing for lubrication and periodic inspection.

The recorded data should be able to be checked in a teaching tool.



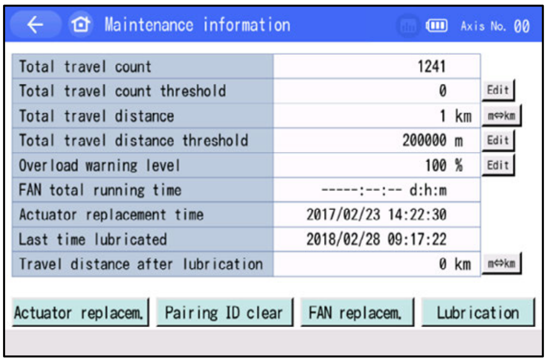
Current state

Total moving count	81	< < <			Send
Total moving distance[km]	0	< < <			Send
Travel distance after lubrication[km]	43	< < <			Send
Last time lubricated	18/02/01 13:48:17	< < <	18/03/06	19:15:24	Send
Actuator replacement time	18/02/01 11:26:02	< < <	18/03/06	19:15:24	Send
Total driving time of fan[day]	0				

Signal output timing setting

Total moving count threshold	0	< < <		Send
Total moving distance threshold[km] (Measure of grease supply)	0	< < <		Send
Overload warning level	100	< < <		Send

"PC Software Maintenance Information" screen



Total travel count	1241
Total travel count threshold	0
Total travel distance	1 km
Total travel distance threshold	200000 m
Overload warning level	100 %
FAN total running time	-----:--:-- d:h:m
Actuator replacement time	2017/02/23 14:22:30
Last time lubricated	2018/02/28 09:17:22
Travel distance after lubrication	0 km

"TB-02 Maintenance Information"

Note 1: Setting should be established in the following parameters or the maintenance information screen in the teaching tool.

- Parameter No. 147 "Total travel count target value"
- Parameter No. 148 "Total travel distance target value"

Note 2: Outputs a message level alarm "04E travel count target value exceeded" or "04F travel distance target value exceeded".

For details, refer to "Maintenance Section Chapter 2 Troubleshooting".

Note 3: Outputs a minor malfunction alarm (ALML).

[In case of EC connection unit (elecylinder)]

"Total number of movements" and "Total distance traveled" can be set and managed as the maintenance information.

For ELECYLINDER, it is not in the parameters, but in the maintenance information screen in the teaching tool to set the maintenance information. When each setting values are exceeded, there should be a "maintenance warning" generated and the status LED on ELECYLINDER should flash in green and red in turns to notify.

Even if a "maintenance warning" is generated, the ELECYLINDER will continue to operate without interruption.

🔴 / 🟢 alternate blinking

All of maintenance warning LEDs from 1 to 3 on ELECYLINDER flash in green and red in turns.

- When the total travel count exceeds the set value, the user will be notified with "Maintenance warning 1".
- When "Maintenance warning 1" is output, maintenance is recommended, such as greasing. Set the target value to a value larger than the present one and update.
- Setting it to "0 times" will disable this function.

- When the total travel distance exceeds the set value, the user will be notified with "Maintenance warning 2".
- When "Maintenance warning 2" is output, maintenance is recommended, such as greasing. Set the target value to a value larger than the present one and update.
- Setting it to "0m" will disable this function.
- The displayed units can be switched. (m ⇔ km)

[Maintenance Information Setting in Teaching Tool]

Maintenance information can be checked and set with the following procedures.

- TB-02/TB-03 [Monitor] → [Maintenance]
- TB-02/TB-03 [Information] → [Maintenance Information]
- PC software [Monitor (M)] → [Maintenance Information (I)] → Axis selection

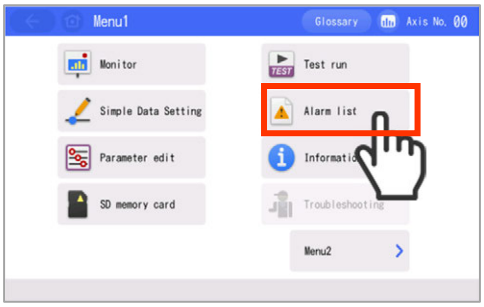
As a reference, shown below is how to operate using a teaching pendant TB-02.
Refer to an instruction manual for each teaching tool for detail.

● Switchover to Maintenance Information Screen Using TB-02

1 Touch "Information" on the Menu 1 screen.

Action

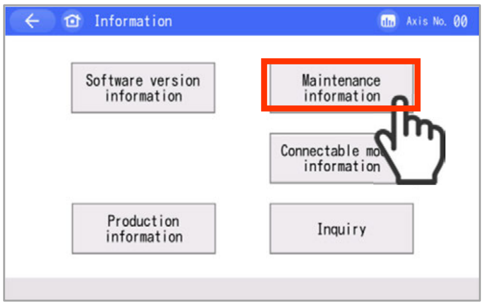
The screen will switch to the Information screen.
If the TP operation mode is not Monitor mode, a confirmation screen will appear for switching to Monitor mode.

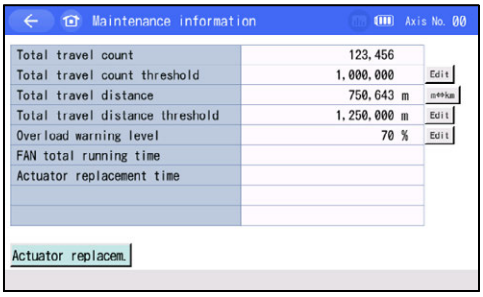


2 Touch "Maintenance information" on the Information screen.

Action

The maintenance information screen opens.




Maintenance information   Axis No. 00

Total travel count	123,456	
Total travel count threshold	1,000,000	Edit
Total travel distance	750,643 m	m⇔km
Total travel distance threshold	1,250,000 m	Edit
Overload warning level	70 %	Edit
FAN total running time		
Actuator replacement time		

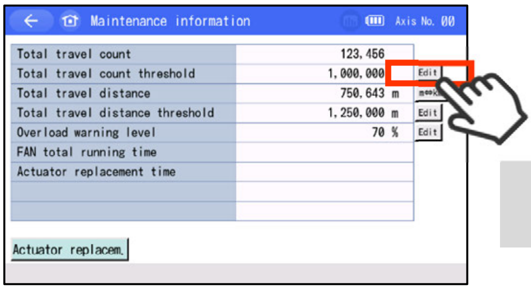
Actuator replacem.

- Basic Operation in Maintenance Information Screen Using TB-02

1 To set the target value,
touch the Edit button of the relevant item.

Action

The set value will blink and Ten Key screen will open.

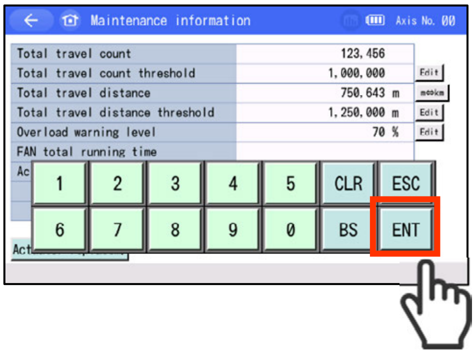


Total travel count	123,456	
Total travel count threshold	1,000,000	Edit
Total travel distance	750,643 m	m⇔km
Total travel distance threshold	1,250,000 m	Edit
Overload warning level	70 %	Edit
FAN total running time		
Actuator replacement time		

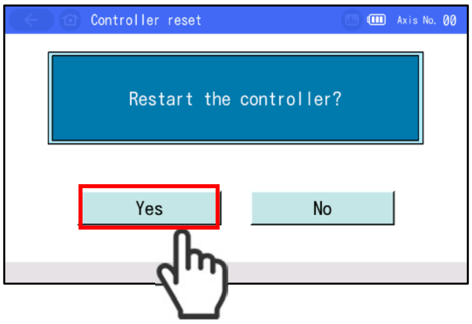
2 Enter the value with the Ten Key pad
and touch the [ENT] key.

Action

- The target value will change.
  If you touch [ESC],
  the target value will not be changed and
  the original screen will return.
- A confirmation message will be displayed to reboot the controller when leaving the maintenance screen.
  The setting change will take effect after rebooting.



Total travel count	123,456	
Total travel count threshold	1,000,000	Edit
Total travel distance	750,643 m	m⇔km
Total travel distance threshold	1,250,000 m	Edit
Overload warning level	70 %	Edit
FAN total running time		

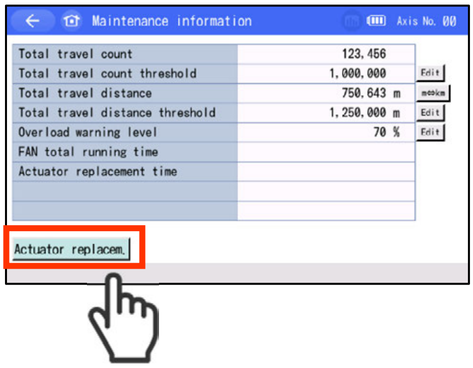


Restart the controller?

3 If the actuator has been replaced,
touch the "Actuator replacement" button.

Action

"Total travel count" and "Total travel distance" will be cleared to "0".



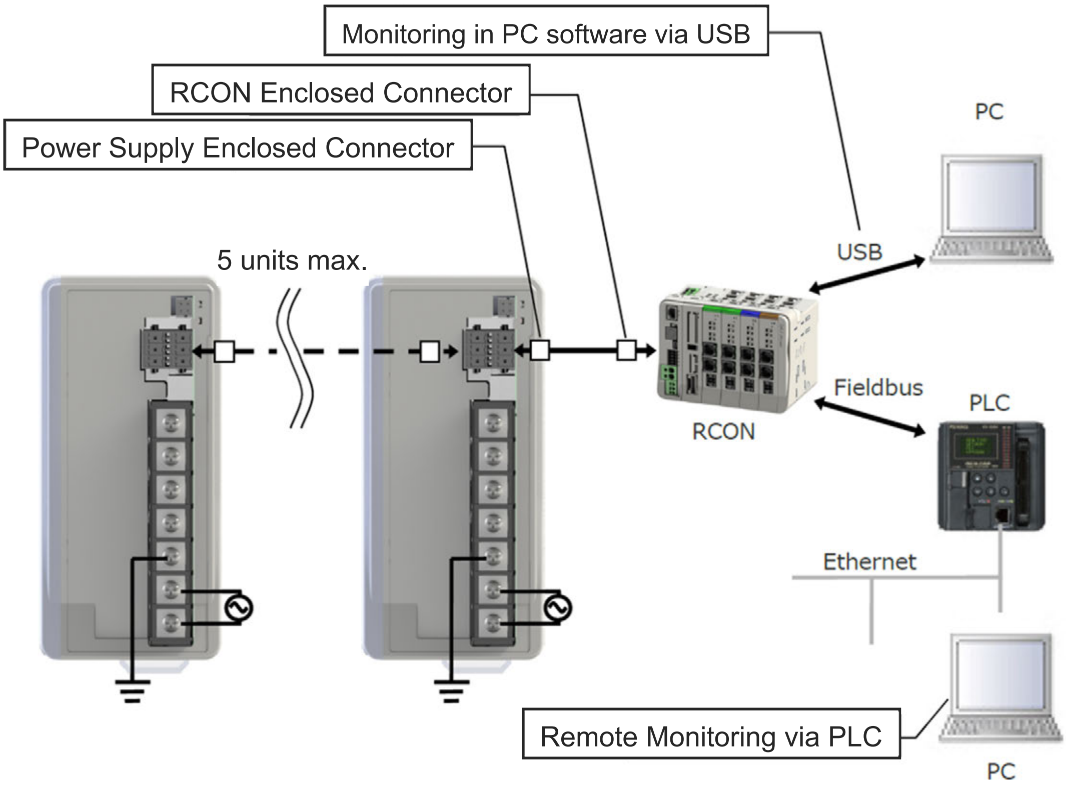
Total travel count	123,456	
Total travel count threshold	1,000,000	Edit
Total travel distance	750,643 m	m⇔km
Total travel distance threshold	1,250,000 m	Edit
Overload warning level	70 %	Edit
FAN total running time		
Actuator replacement time		

PSA-24 Status Data Monitor

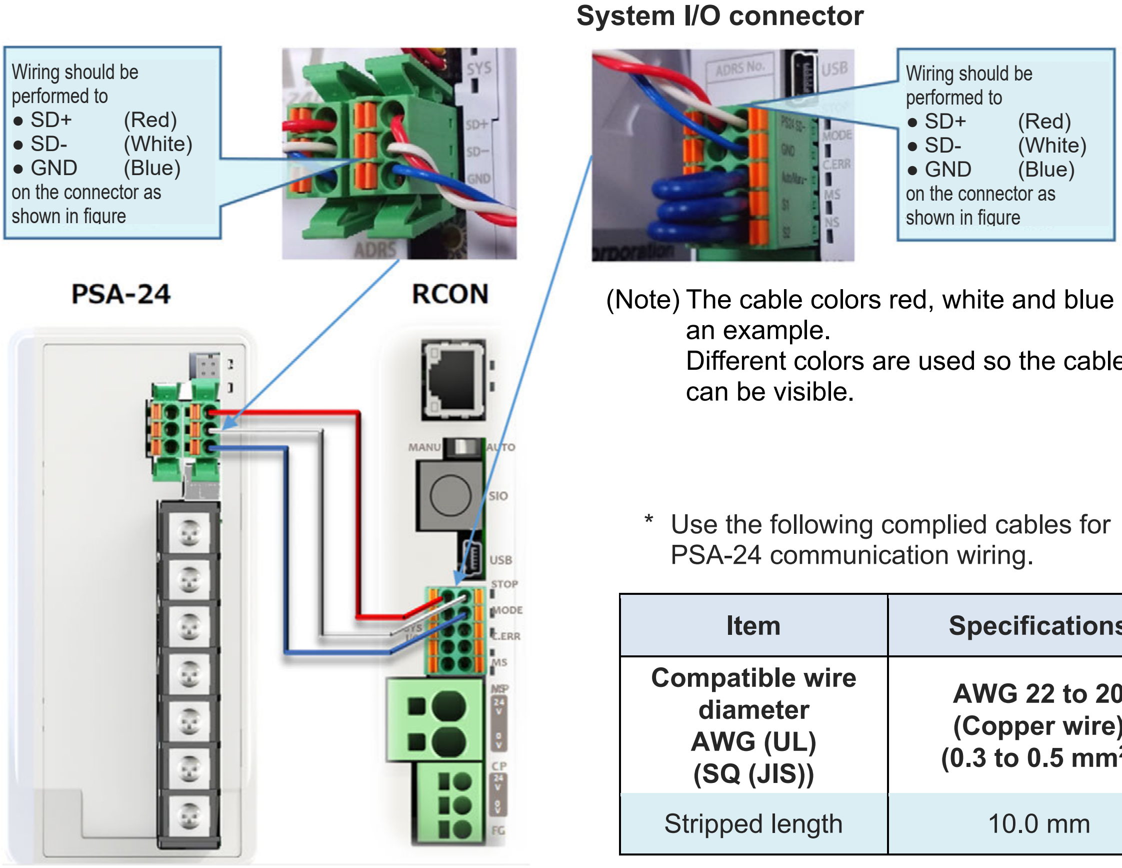
IAI 24V DC Power Supply Unit: PSA-24 possesses a feature to monitor the status data from a host device as a preventive maintenance feature in purpose of improving efficiency of management and maintenance for equipment.
For the preventive maintenance features equipped on PSA-24 other than status data monitor, refer to “PSA-24 Instruction Manual (ME0379)”.

[How to Establish Connection]

Connect the gateway board on RCON to PSA-24 in order to monitor the status data of the power source via RCON. If it is preferred to monitor the status data using the PC software (Software Version RCM-101: V13.00.00 and later, IA-OS: V1.00.00.00 and later), establish the connection using the USB interface on RCON.
As the status data of the power source is also uploaded to the field network, it is available to monitor the status data in the host network via PLC. (For details, refer to "Chapter 3, 3.7 Address Configuration/ Power supply unit (PSA-24) status signal".)



- How to Connect with PSA-24



Wiring should be performed to
- SD+ (Red)
- SD- (White)
- GND (Blue)

on the connector as shown in figure

Wiring should be performed to
- SD+ (Red)
- SD- (White)
- GND (Blue)

on the connector as shown in figure

(Note) The cable colors red, white and blue are an example.
Different colors are used so the cables can be visible.

* Use the following complied cables for PSA-24 communication wiring.

Item	Specifications
Compatible wire diameter AWG (UL) (SQ (JIS))	**AWG 22 to 20 (Copper wire) (0.3 to 0.5 mm^2)**
Stripped length	10.0 mm

* Use cables with their rated temperature on the isolation sheath at 60°C or higher.

Caution

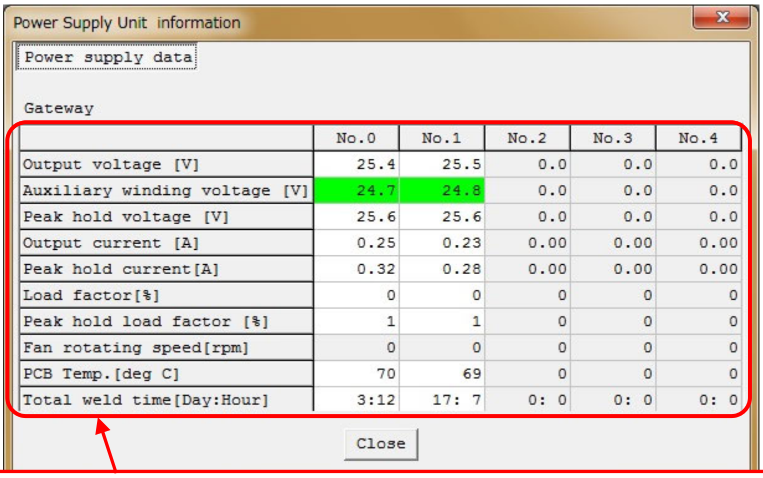
- There could be a concern of communication failure if using thinner cables than the complied cable diameter. Also, make sure to use twisted pair cables for the differential lines.
- A communication line on one unit of PSA-24 is not available for connecting to multiple gateway units.
  Connecting to multiple units should generate the alarm of "86D Power Supply Unit Communication Error" (Gateway Version V0009 or later) or "8FA CPU Error" (Gateway Version V0008 or earlier).

[Status data]

The status data available for monitoring is as listed below.

Item	Details
Output Voltage	Output voltage AD converted value. As this power source fluctuates the output voltage, the output voltage monitored value changes from moment to moment. Note that it is not an error.
Supplement Coil Voltage	Control power voltage inside power source AD converted value. It changes in response to the load on output voltage side as it does for the output voltage, which is not an error.
Peak Hold Voltage	Output voltage AD converted value. Comparison is performed every time AD conversion is executed and the maximum voltage is saved.
Output Current	Output current AD converted value. It shows the transient value.
Peak Hold Current	Output current peak value. Comparison is performed every time AD conversion is executed and the maximum current is saved.
Load Ratio	It is the value expressed in percentage for the ratio of output current integral value and the rated output current used for overload judgment internally. If this value exceeds 100%, an overload error should be generated and output voltage will be cut off.
Peak Hold Load Ratio	Comparison is performed every time overload calculation is executed and the maximum load ratio is saved.
Fan Revolution Speed	It is the value of number of fan revolution calculated by pulse signal input from the fan.
PCB Temperature	It is the AD converted value of the temperature sensor around the secondary side output capacitor.
Total Conducting Time	It is the time the values saved in the internal memory regularly were integrated by conducting time was counted in CPU.

[PC software Current monitor screen (Model: For RCM-101-*-*)]



	No.0	No.1	No.2	No.3	No.4
Output voltage [V]	25.4	25.5	0.0	0.0	0.0
Auxiliary winding voltage [V]	24.7	24.8	0.0	0.0	0.0
Peak hold voltage [V]	25.6	25.6	0.0	0.0	0.0
Output current [A]	0.25	0.23	0.00	0.00	0.00
Peak hold current[A]	0.32	0.28	0.00	0.00	0.00
Load factor[%]	0	0	0	0	0
Peak hold load factor [%]	1	1	0	0	0
Fan rotating speed[rpm]	0	0	0	0	0
PCB Temp.[deg C]	70	69	0	0	0
Total weld time[Day:Hour]	3:12	17: 7	0: 0	0: 0	0: 0

The background color should change depending on the status of the acquired status of the power supply unit.

Auxiliary winding voltage : Yellowish green when 15V or more and white when 10V or less

Load factor : Yellowish green when 330W with fan equipped and white when 220W with no fan equipped

Fan rotating speed : Gray when no fan equipped, white when fan in normal operation, yellow when in warning and red when error

Refer to “9.8 Power Supply Unit Information Screen” or the guiding features installed in IA-OS in PC Software Instruction Manual (ME0155).

1.5 Predictive Maintenance Function

Fan

The fan rotation speed of the fan unit attached to the driver unit is monitored.

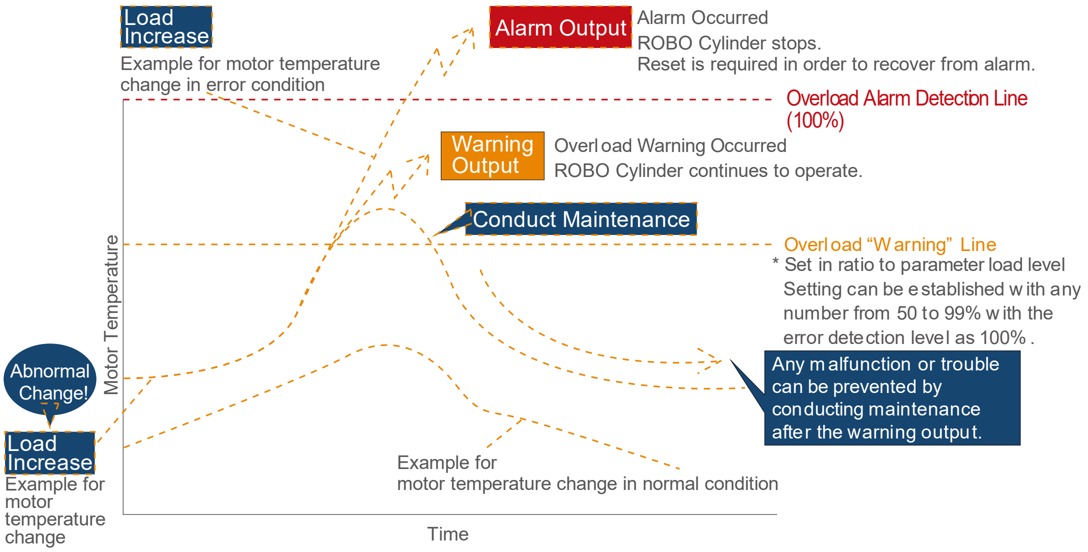
A message level alarm is generated (alarm code 04C "Fan rotation speed drop") when the fan rotation speed decreases 30%. When an alarm is generated, although the fan will not have stopped completely, we recommend replacing it as soon as possible.

Note that if the fan rotation speed drops 50%, an operation cancel level alarm (alarm code 0D6 "Fan error detection") is generated, and the actuator stops. Replace the fan and reset the alarm to resume operation.

Refer to the following for the replacement method.
● 24V Driver Unit
Refer to "Specifications Section Chapter 4, 4.4 Part Names/Functions and External Dimensions [How to Replace Fan Unit]".
● 200V Driver Unit
Refer to "Specifications Section Chapter 5, 5.4 Part Names/Functions and External Dimensions [How to Replace Fan Unit for 200V Driver Unit]".
● 200V Power Supply Unit
Refer to "Specifications Section Chapter 5, 5.4 Part Names/Functions and External Dimensions [How to Replace Fan Unit]".

Overload warning

Using this function enables monitoring of motor temperature changes caused by dried-up grease or wear and tear on parts. A warning is output when the preset value is exceeded. This enables detection of abnormalities before a breakdown or a malfunction occurs.



Warning output enables detection of items such as those below.

- Time to supply grease
- Time to replace components
- Time to implement mechanical tuning

Parameters related are as follows.

[Overload Load Level Ratio (Parameter No.143)]

No.	Name	Unit	Input range	Default initial value setting
143	Overload load level ratio	%	50 to 100	100

Outputs alarm code 048 overload warning (message level) when motor temperature exceeds the ratio set in this parameter if motor temperature under rated operation is set as 100%.
No judgment will be made when set as 100%.
The ratio also can be set in the maintenance information screen in the teaching tool.

[Minor Trouble Alarm Output Select (Parameter No. 151)]

No.	Name	Unit	Input range	Default initial value setting
151	Minor trouble alarm output select	–	0: At overload warning Output 1: Message level alarm output	1

If 0 is set, when overload load level ratio (Parameter No. 143) is exceeded, a minor malfunction alarm signal *ALML will be output.
If 1 is set, when a message level alarm is generated, *ALML signal will be output.

[In case of EC connection unit (elecylinder)]

- For ELECYLINDER, it is not in the parameters, but in the maintenance information screen in the teaching tool to set the ratio. When each setting values are exceeded, there should be "Maintenance Warning 3" generated and the status LED on ELECYLINDER should flash in green and red in turns to notify.
- When the motor temperature rise value falls below the ratio set as "overload warning level", "Maintenance warning 3" will be automatically cleared.
- When "Maintenance warning 3" is output, investigate the cause of the increase in load. Maintenance such as greasing or reviewing the operating conditions is recommended.
- Setting it to "100%" will disable this function.

🔴 / 🟢 alternate blinking

All of maintenance warning LEDs from 1 to 3 on ELECYLINDER flash in green and red in turns.

Maintenance Section

Chapter 2

Troubleshooting

2.1 Troubleshooting

If a problem occurs, check the following points first in order to ensure quick recovery and prevent recurrence of the problem.

(1) Check the status LED (SV/ALM LED) of each RCON system device
  Check the SCON controller LED status for each gateway unit, driver unit, simple absolute unit or SCON extension unit connected.
(2) Check for abnormality in the host device (PLC, etc.)
(3) Check the control power supply, motor power supply and field network power supply voltages
  Check for momentary power failure, voltage drop, power failure, etc.
(4) Confirm the generated alarm
  Check the alarm information with the teaching tool.
(5) Check the connectors for disconnection or incomplete connection
(6) Check the cables for connection error, disconnection or snagging.
  Cut off the main power supply of the equipment (to avoid electric shock) and remove the cables around the measurement point (to avoid conductivity through the surrounding circuit) before checking the conductivity.
(7) Check the network terminal resistor mounting status and resistance
(8) Check the I/O signals
  Use a teaching pendant to check for inconsistency or abnormality in the input/output signal status of the host device and RCON system.
(9) Check the noise elimination measures (grounding, connection of noise suppressor, etc.)
(10) Check the events leading to the occurrence of the problem, as well as the operating conditions at the time of occurrence
(11) Analyze the cause
(12) Countermeasures

⚠ **Caution**

- When proceeding with troubleshooting, exclude normally functioning parts from the targets to narrow down the causes.
- First, check (1) to (12) so that countermeasures can be taken swiftly.

2.2 Failure Diagnostics

Abnormal conditions can be roughly divided into the following four types.

- Operation failure
- Low positioning and velocity accuracy (incorrect operation)
- Generation of abnormal noise or vibration
- Failure to communicate

Operation failure

Situation	Possible cause	Confirmation/countermeasure
Gateway unit SYS LED light glows orange at power ON, STOP LED glows red, or driver unit SYSI/SYSII LED light glows red.	(1) Alarm generated. (2) In the process of drive-source cutoff. 1) Stop switch has been pressed. 2) System I/O connector STOP- is not connected. 3) Safety category specification is used but dummy plug is not attached.	(1) Connect a teaching tool and check the error code, then refer to the alarm list to resolve the cause. [See Section 2.3 (page C2-5) and Section 2.4 (page C2-10)] (2) 1) Release the stop switch. 2) Check the system I/O connector (STOP-) wiring connections. [Refer to Specifications Section Chapter 2, 2.5 Connection Diagrams (page A2-32)] 3) Insert dummy plug (model number: DP-5) into SIO connector.
Actuator does not operate even though position No. and start signal have been input.	1) Servo OFF status 2) Pause signal is ON 3) Executed positioning command in the stopped position. 4) No positioning data is set in the commanded position No. 5) For direct numerical control mode, the information writing region is incorrect.	1) Is the LED light (SYSI/SYSII) for the driver unit connected to the operating axis glowing green? [Refer to Specifications Section Chapter 4, 4.4 Part Names/Functions and External Dimensions] Turn ON Servo ON signal SON. 2) Operation is possible when pause signal STP is OFF, pausing when ON. Turn OFF. 3) Check the sequence or position table setting. 4) Alarm code 0A2 "Position Data Error" appears. Set position data table. 5) Confirm that the writing range is correct.

Situation	Possible cause	Confirmation/countermeasure
Unable to operate even though teaching tool is connected and gateway unit motor and control power are supplied. (Stop switch is in release status on the teaching tool)	1) Stop due to the influence of circuits throughout the facility. 2) Operation mode is AUTO, or is MANU but in monitor mode. 3) Servo OFF status.	1) Supply 24 VDC to STOP- terminal of the system I/O connector. ⚠Warning When using the process in 1), return to the original status immediately after adjustment. If operated as is, the disabled stop could lead to a serious accident. 2) Turn AUTO/MANU switch on the front panel of the gateway unit to MANU, and select teaching mode with the teaching tool. 3) Turn the servo ON with the teaching tool.

Low positioning and velocity accuracy (incorrect operation)

Situation	Possible cause	Confirmation/countermeasure
Motion is completed in the middle of home return operation.	The standard IAI home return motion specification is a positioning stop at the home position after pushing against the mechanical end and reversing. When the load is excessive or the unit encounters an obstacle, it may determine that the mechanical end has been reached, without actually having done so. 1) Weight exceeding the rated load is loaded. 2) The unit is striking an obstacle while traveling. 3) The guide has torsional stress due to the securing method of the actuator or uneven tightening of bolts. 4) The sliding resistance of the actuator itself is excessive.	1) Reduce the load. 2) Remove the interfering object. 3) Try loosening the fixing bolt and check if the slider part moves smoothly. If it moves smoothly, check for distortion of the mounting surface, etc., and remount the unit according to the mounting method shown in the actuator instruction manual. 4) Contact IAI.
There is a shock when starting or stopping.	Acceleration/deceleration setting is too high.	Lower the acceleration/deceleration setting.
Overshooting occurs during decelerating stop.	Load inertia is excessive. Deceleration setting is too high.	Lower the deceleration setting.
Positioning accuracy is insufficient.	[Refer to Startup Section Chapter 6, 6.1 Parameter/Servo gain adjustment (page B6-63)]	
Uneven speed when traveling.		
Unable to smoothly accelerate/decelerate (speed response is insufficient).		
Positioning completes but positioning complete signal PEND is not output.	Positioning start signal CSTR has not been turned OFF.	CSTR signal must be turned OFF before positioning complete, by turning OFF PEND signal, etc., after traveling starts.

Generation of abnormal noise or vibration

Situation	Possible cause	Confirmation/countermeasure
Generation of abnormal noise or vibration from the actuator itself.	Possible causes of abnormal noise or vibration vary, including load condition, actuator mounting condition, rigidity of the device on which the actuator is mounted, etc.	In some cases, servo adjustment can improve the situation. [Refer to Startup Section Chapter 6, 6.1 Parameter/Servo gain adjustment (page B6-63)]
Vibration of load.	1) Acceleration/deceleration setting is too high. 2) Mounting structure or load susceptible to acceleration/deceleration is mounted.	1) Lower the acceleration/deceleration setting. 2) Review the mounting structure or load.

Communication failure

Situation	Possible cause	Confirmation/countermeasure
Unable to connect to host device.	1) Communication speed is mismatched. 2) Machine number (station number) setting is duplicated with another device, or value is outside range. 3) Faulty wiring or disconnection, etc., of communication cables.	1) Match the setting with the host device. [Refer to host device instruction manual] 2) Revise machine number (station number) setting. Machine number (station number) differs depending on the communication method. Refer to field network specification address map and host device instruction manual for details. 3) Review wiring. Confirm that the terminal resistor is connected to the network terminal at the correct value. For DeviceNet specification, confirm that communication power is supplied correctly. [Refer to host device instruction manual]

2.3 Gateway Unit Alarm Causes and Countermeasures

Causes and countermeasures of individual alarms

The alarm codes will be read out in gateway status signal 0 ALMC1 ~ 128 (b0 ~ b7).
For details, refer to "Specifications Section Chapter 3, 3.7 Address Configuration (page A3-31)".
(Note) Alarm codes displayed on the gateway parameter configuration tool have "8" added at the beginning of the alarm codes listed below. (Example) If the alarm code is 43, it will be displayed as 843.

Alarm code	Alarm name	Causes/countermeasures
4A (84A)	Real-time clock vibration stop detection	Cause: Time data was lost. Time data can be retained for about 10 days after turning gateway unit power OFF. Countermeasure: Set the time again from the gateway parameter.
4B (84B)	Real-time clock access error	Cause: RCON internal error. Retrieval of internal time data failed. Countermeasure: Reboot the power. If it occurs again, contact IAI.
4C (84C)	Estimated life of backup capacitor for calendar function exceeded	Cause: Gateway interior capacitor capacitance has dropped by 50%. Countermeasure: Replace the gateway body as soon as possible.
50 (850)	Field network communication error (ERR-C)	Cause: Field network link error. If a latch is set with the gateway parameter configuration tool while this error is generated, actuator operation will stop in error status and commands will be ignored until the cancel signal is received. Countermeasure: Check field network settings (node address, communication speed, etc.), wiring, etc.
60 (860)	Dependent axis communication error (ERR-T)	Cause: RCON internal communication error. Communication failure with driver unit connecting actuator axes. Countermeasure: Driver unit may not be inserted, mounting may be faulty (connector not fully inserted), etc.
61 (861)	Dependent axis internal communication error (transmission)	Cause: RCON internal communication error. Communication failure with driver unit connecting actuator axes. Countermeasure: Reboot the power. If it occurs again, contact IAI.
62 (862)	Dependent axis internal communication error (reception)	Cause: RCON internal communication error. Communication failure with driver unit connecting actuator axes. Countermeasure: Reboot the power. If it occurs again, contact IAI.

Alarm code	Alarm name	Causes/countermeasures
6D (86D)	Power supply unit communication error	Cause: It is a communication error between the gateway unit and IAI 24V DC power supply unit (model code: PSA-24). 1) Communication cable disconnection or connector contact failure 2) Incorrect setting of number of power supply units connected 3) The address setting on the rotary switch on the power supply unit is inappropriate. 4) A communication line on one unit of the power supply unit is connected to multiple gateway units. 5) Influence from noise Countermeasure: 1) Check the cable and connector. 2) Confirm with gateway setting tool. 3) Confirm whether address is duplicated. 4) A communication line on one unit of the power supply unit is to be connected to one gateway unit. 5) Take measures against noise, such as revising cable arrangements.
80 (880)	Gateway parameter error	Cause: Gateway parameters are abnormal. Countermeasure: Check connected axes, operation mode, etc. with gateway parameter configuration tool.
81 (881)	Parameter check sum error	Cause: RCON internal memory data may be damaged. Countermeasure: Reset with the gateway parameter configuration tool, or if backup is available, write in the backup data.
9B (89B)	Field network module error	Cause: Field network module failure is possible. Countermeasure: Contact IAI if this reoccurs even after turning ON the power again.
9C (89C)	Field network module undetected	Cause: Communication circuit board for field network could not be confirmed. 1) Communication circuit board is not inserted. 2) Malfunction of communication circuit board Countermeasure: Reboot the power. If it occurs again, contact IAI.
9D (89D)	Field network module initialization timeout	Cause: Initialization of field network module did not complete after a given period of time. Countermeasure: Reboot the power. If it occurs again, contact IAI.
A0 (8A0)	Excessive control power supply voltage	Cause: Control power supply voltage exceeded the overvoltage judgment value (120% of 24 VDC = 28.8 V). 1) 24 VDC power supply voltage is high 2) Malfunction of parts inside the gateway unit 3) During acceleration/deceleration or servo ON, etc,, consumption current rises momentarily. When remote sensing function is used with power of barely sufficient current capacity, overvoltage may occur in response to the current change. Countermeasure: 1) 2) Check power supply voltage. 3) Consider using a power supply with sufficient current capacity, or avoid using the remote sensing function. If voltage value is normal, contact IAI.

Alarm code	Alarm name	Causes/countermeasures
A1 (8A1)	Control power supply voltage drop	Cause: Control power supply voltage went below the voltage drop judgment value (70% of 24 VDC = 16.8 V). 1) 24 VDC power supply voltage is low 2) Malfunction of parts inside the gateway unit Countermeasure: Check power supply voltage. If voltage value is normal, contact IAI.
A7 (8A7)	External wiring power supply voltage drop	Cause: Gateway unit control power supply voltage has dropped to or below 16.8 V (70% of 24 VDC). 1) Control power supply voltage drop 2) Malfunction of parts inside the gateway unit Countermeasure: 1) Confirm that voltage of 24 VDC ±10% is being applied to the gateway unit control power connector. If the voltage is low, the 24 VDC power supply may have failed. 2) Contact IAI.
B9 (8B9)	Driver Parameter Readout Error during Initialization	Cause: A readout of a parameter from a driver unit failed. 1) A readout of a parameter from a driver unit failed. 2) Contact error 3) Influence of noise 4) Malfunction of driver unit 5) Malfunction of gateway unit Countermeasure: 1) Version update necessary. Contact IAI. 2) Disconnect then connect the gateway unit, driver unit, etc. again to check if the alarm gets generated again. 3) Take a counteraction for noise such as to revive the cable wiring. 4) Replace the driver unit. 5) Replace the gateway unit.
BA (8BA)	Number of axes/operation mode mismatch	Cause: 1) Number of axes set with gateway parameters does not match the number of axes calculated from the operation mode set for the gateway. 2) Driver units of 17 axes or more are connected. Countermeasure: 1) As the parameter set value is incorrect, reset the gateway parameters. 2) Reduce the driver units to 16 axes or fewer and set the appropriate gateway parameters.
BC (8BC)	Attached axis communication error	Cause: Communication error generated at total frame communication initial communication. 1) Connector or SCON cable connector is not correctly connected. 2) Interior signal line or SCON connection cable is disconnected. 3) Terminal unit or terminal connector (for SCON) has not been mounted. 4) Communication error due to noise Countermeasure: 1) 2) Confirm that units are firmly connected together. Disconnect the units and then connect them again. Contact IAI if this reoccurs even after turning ON the power again. 3) Mount the terminal unit or terminal connector. 4) Take measures against noise, such as changing cable arrangements.

Alarm code	Alarm name	Causes/countermeasures
BE (8BE)	Option Unit Initial Communication Error	Cause: There was a communication error occurred at initial communication of the total frame communication to the option unit (EC connection unit). 1) Connector is not correctly connected. 2) Interior signal line cable is disconnected. 3) Terminal unit has not been mounted. 4) Communication error due to noise Countermeasure: 1) 2) Confirm that units are firmly connected together. Disconnect the units and then connect them again. Contact IAI if this reoccurs even after turning ON the power again. 3) Mount the terminal unit 4) Take measures against noise, such as changing cable arrangements.
D0 (8D0)	Option Unit Connected Number of Units Error	Cause: The number of units connected to the option unit (EC connection unit) differs from the number of connected units set in the gateway parameter. Countermeasure: Align the number of option units in the setting to the number of connected units.
D1 (8D1)	Inapplicable Option Unit Connected	Cause: An option unit not applicable was connected. Countermeasure: Connect an option unit that is applicable.
DD (8DD)	Unit connection check signal error	Cause: Units may not be correctly connected. 1) Connector or SCON cable connector is not correctly connected. 2) Interior signal line or SCON connection cable is disconnected. 3) Terminal unit or terminal connector (for SCON) has not been mounted. Countermeasure: 1) 2) Confirm that units are firmly connected together. Disconnect the units and then connect them again. Contact IAI if this reoccurs even after turning ON the power again. 3) Mount the terminal unit or terminal connector.
DE (8DE)	Driver unit communication error	Cause: Communication error generated in total frame communication. 1) Connector or SCON cable connector is not correctly connected. 2) Interior signal line or SCON connection cable is disconnected. 3) Terminal unit or terminal connector (for SCON) has not been mounted. 4) Communication error due to noise Countermeasure: 1) 2) Confirm that units are firmly connected together. Disconnect the units and then connect them again. Contact IAI if this reoccurs even after turning ON the power again. 3) Mount the terminal unit or terminal connector. 4) Take measures against noise, such as changing cable arrangements.

Alarm code	Alarm name	Causes/countermeasures
DF (8DF)	Option Unit Communication Error	Cause: There was a communication error occurred in the total frame communication between the gateway unit and the option unit (EC connection unit). 1) Connector is not correctly connected. 2) Interior signal line cable is disconnected. 3) Terminal unit has not been mounted. 4) Communication error due to noise Countermeasure: 1) 2) Confirm that units are firmly connected together. Disconnect the units and then connect them again. Contact IAI if this reoccurs even after turning ON the power again. 3) Mount the terminal unit 4) Take measures against noise, such as changing cable arrangements.
FA (8FA)	CPU error	Cause: 1) Abnormal reset detected in gateway board interior CPU. 2) A communication line on one unit of a 24V DC power supply unit supplied by IAI (model code: PSA-24) is connected to multiple gateway units. Countermeasure: 1) Reboot the power. If it occurs again, contact IAI. 2) A communication line on one unit of the power supply unit is to be connected to one gateway unit.
FFF	Power ON log	A log created when power is turned ON (not an error)

2.4 Driver Unit/Simple Absolute Unit Alarm Causes and Countermeasures

Alarm levels

Alarms are classified into 3 levels depending on the content of the error.

Alarm level	SYS LED I/II	ALM signal	Situation when generated	Alarm content and cancellation method
Message	Green ON	No output	Does not stop	Alarm reset will cancel maintenance output such as overload warning or low battery voltage, or minor issues alarms, including teaching tools. [Refer to tool instruction manuals for details]
Operation cancel	Red ON	Outputs	After decelerating stop Servo OFF	Medium-level issue. Alarm can be canceled with alarm reset via PIO or teaching tools.
Cold start	Red ON	Outputs	After decelerating stop Servo OFF	Perform software reset with the teaching tool, or by turning the power ON again. Home return is required for any actuators of incremental specification.

Caution

- Clear alarms only after investigating and resolving the cause in all cases.
  If the cause of the alarm cannot be resolved or the alarm cannot be cleared after resolving the cause, contact IAI.
- If the same error occurs again after clearing the alarm, the cause of the alarm has not been resolved.

Simple alarm codes

When an alarm is generated, the simple alarm code is read by the complete position register (PM8 to PM1) in each mode: simple direct, positioner 1, positioner 2, and positioner 5.

○: ON ●: OFF

ALM	ALM8 (PM8)	ALM4 (PM4)	ALM2 (PM2)	ALM1 (PM1)	Binary Code	Contents: ( ) indicates alarm code
●	●	●	●	●	–	Normal
○	●	●	●	○	1	Collision detection (0DF)
○	●	●	○	●	2	Software reset in servo ON status (090) Position No. error during teaching (091) PWRT signal detected while traveling (092) PWRT signal detected in homing incomplete status (093) Servo ON command after encoder FRAM read/write (09C)
○	●	●	○	○	3	Travel command in servo OFF status (080) Position command in homing incomplete status (082) Absolute position travel command in homing incomplete status (083) Travel command during home return execution (084) Position No. error during travel (085) Position command information data error (0A3) Command deceleration error (0A7)
○	●	○	●	●	4	Fan error detection (0D6) PCB mismatch (0F4)
○	●	○	●	○	5	Internal communication error (09B) Cyclic synchronization error (09F)
○	●	○	○	●	6	Parameter data error (0A1) Position data error (0A2) Motor/encoder type not supported (0A8)
○	●	○	○	○	7	Z-phase position error (0B5) Z-phase detection timeout (0B6) Magnetic pole uncertain (0B7) Excitation detection error (0B8) Home sensor not detected (0BA) Home return timeout (0BE) Creep sensor not detected (0BF)
○	○	●	●	●	8	Excessive actual speed (0C0) Overrun sensor detected (0C2)

○: ON ●: OFF

ALM	ALM8 (PM8)	ALM4 (PM4)	ALM2 (PM2)	ALM1 (PM1)	Binary Code	Contents: ( ) indicates alarm code
○	○	●	●	○	9	Overcurrent (0C8) Overvoltage (0C9) Overheating (0CA) Current sensor offset adjustment error (0CB) Control power supply voltage error (0CC) Drive Cutoff Relay Welded Detection Error (0CD) Control power supply voltage drop (0CE) Drive source error (0D4)
○	○	●	○	○	11	Deviation counter in homing incomplete status overflow (0D5) Deviation overflow (0D8) Software stroke limit over error (0D9) Push-motion operation range over error (0DC)
○	○	○	●	●	12	Electrical angle mismatch (0B4) Servo error (0C1) Exceeded allowable time of exceeding torque allowing continuous pressing (0C4) Unauthorized control system transition command (0C5) Excessive motor power supply voltage (0D2) Motor power supply voltage low (0D3) Belt breaking sensor detected (0D7) Overload (0E0) Driver logic error (0F0)
○	○	○	●	○	13	Linear spurious absolute error (0B3) Encoder transmission error (0E4) Encoder reception error (0E5) Encoder count error (0E6) A, B, Z-phase disconnection (0E7) A, B-phase disconnection (0E8) BLA encoder error detection (0EB) PS-phase disconnection (0EC) Absolute encoder error detection 1 (0ED) Absolute encoder error detection 2 (0EE) Absolute encoder error detection 3 (0EF)
○	○	○	○	●	14	CPU error (0FA) Logic error (0FC)
○	○	○	○	○	15	Non-volatile memory write verify error (0F5) Non-volatile memory write timeout (0F6) Non-volatile memory data destruction (0F8)

Causes and countermeasures of individual alarms

If corresponding driver units are limited, a symbol for the type of the corresponding driver unit is indicated in the alarm code column. Alarm codes with no symbols indicated are common to all driver units.

P: Stepper motor·············RCP2, RCP3, RCP4, RCP5, and RCP6 Series
A: 24V AC Servo motor ····RCA, RCA2, and RCL Series
D: DC brush-less motor ····RCD Series
S: 200V AC Servo motor ··RCS and ISB Series etc.

(1) Message level

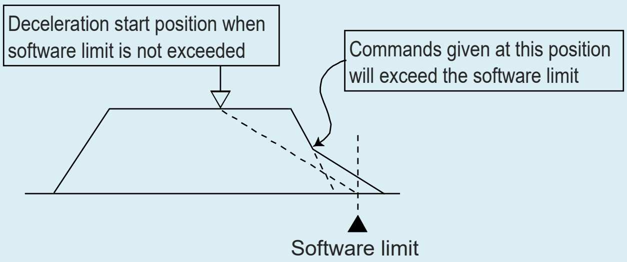
Alarm code	Alarm name	Causes/countermeasures
047 P, A, D Driver limited	Deviation exceeded warning	Cause: Present operating conditions or high actuator sliding resistance may be causing excess deviation. Countermeasure: Lower the acceleration/deceleration setting. Perform maintenance such as greasing, etc.
048	Driver overload warning	Cause: The motor rising temperature calculated from the load current has exceeded the setting in Parameter No. 143 "Overload Level Ratio". This alarm retains alarm status until it is reset. This alarm turns on when the motor rising temperature calculated from the load current exceeds the setting from the state of the temperature below the setting. Countermeasure: 1) Reduce the load to the actuator. 2) Lower the acceleration/deceleration setting. 3) Increase the pause ratio.
049 P Driver limited	Collision warning	Cause: The current value of the motor reached the detection current value set by the collision detection function. Countermeasure: Remove the cause of the collision. For an unexpected detection, readjust the collision detection function. [Refer to Startup Section Chapter 6, 6.2 Various Functions/Collision detection function (page B6-73)]
04A	Estimated life exceeded warning	Cause: The capacitance of the motor power supply capacitor for the driver unit has exceeded its calculated life. Countermeasure: Replace the driver unit as soon as possible.
04C	Low Fan rotation speed	Cause: 1) The number of revolution of the fan in the fan unit mounted on the driver unit has dropped by 30%. 2) The number of revolution of the fan unit mounted on the 200V system power supply unit has dropped by 30%. (When detail code is 0001H in the alarm list in the teaching tool) * The detail code should represent 0002H when the revolution of the driver unit and the fan unit on the 200V power supply unit dropped by 30% at the same time. Countermeasure: Replace the fan unit as soon as possible. Refer to "Specifications Section Chapter 4, 4.4 Part Names/Functions and External Dimensions [How to replace Fan unit]" for how to make replacement.

Alarm code	Alarm name	Causes/countermeasures
04D	Fan total running time exceeded	Cause: Fan total running time has exceeded the replacement guidelines. Countermeasure: The alarm can be canceled without replacing the fan unit, but we recommend replacing the fan unit before it breaks down as an aspect of preventive maintenance. Refer to "Specifications Section Chapter 4, 4.4 Part Names/Functions and External Dimensions [How to replace Fan unit]" for how to make replacement.
04E	Travel count target value exceeded	Cause: The total travel count set by Parameter No.147 "Total Travel Count Target Value" has been exceeded.
04F	Travel distance target value exceeded	Cause: The total travel distance set by Parameter No.148 "Total Travel Distance Target Value" has been exceeded.
068 S Driver limited	SRAM access error	Cause: Servo monitor is not operated in the normal condition because of noise or malfunction of consisting parts. Countermeasure: 1) Take proper measures against noise. 2) When the servo monitoring function is not used, set parameter No.112 “Monitoring mode” to “0”. 3) If the operation is not improved in use of the servo monitoring function in spite of measures against noise, Please contact IAI.
06B	Maintenance information data error	Cause: Maintenance information (total travel count, total travel distance) has been lost. Countermeasure: Contact IAI.
100~ 1FF	Teaching tool alarm	[Refer to teaching tool instruction manual]

(2) Operation cancel level

Alarm code	Alarm name	Causes/countermeasures
080	Travel command during servo OFF	Cause: Travel command was issued in servo OFF status. Countermeasure: Execute travel commands after confirming servo ON status (servo ON signal SV or positioning complete signal PEND is ON).
082	Position travel command in homing incomplete status	Cause: Position travel command was input with home return status incomplete. Countermeasure: Execute travel commands after confirming the home return complete signal HEND is ON.
083	Numerical command with homing incomplete	Cause: Absolute position direct numerical command was issued in incomplete home return status. (Direct numerical command via field network, etc.) Countermeasure: Perform home return motion, confirm the home return complete signal HEND, and then perform direct numerical command.
084	Travel command during home return execution	Cause: Travel command was issued during home return execution. Countermeasure: Perform home return motion, confirm the home return complete signal HEND, and then perform travel command.
085	Position No. error during travel	Cause: Position number that does not exist (invalid) in positioner mode was specified. Countermeasure: Check the position table again and specify a valid position number.
086	Movement commands when pulse train input enabled	Cause: An actuator operation command was issued from the serial communication while the motion command is enabled. Countermeasure: Do not attempt to issue any actuator operation command from the serial communication in the motion mode.
090	Software reset command in servo ON status	Cause: A software reset command was issued in servo ON status. Countermeasure: Check that servo is in OFF status (SV signal is OFF status) and issue a software reset command.
091	Position No. error during teaching	Cause: A position number out of the range was indicated in the current position writing command. Or, the teaching command was issued to a position of the one-line comment. Countermeasure: 1) Set the specified position number to 128 or less in positioner 1/2/3 mode, or 15 or less in positioner 5 mode. 2) Revise the position data or PLC ladder so the current position writing command would not be issued to a position of the one-line comment.
092	PWRT signal detected while traveling	Cause: Input was performed while the present position write signal PWRT was carrying out actuator operation. Countermeasure: Input after making sure the unit has stopped (moving signal MOVE is OFF).
093	Homing incomplete status PWRT signal detected	Cause: The present position write signal PWRT was input while home return was incomplete. Countermeasure: Input the home return signal HOME first, perform home return, confirm that home return is complete (HEND signal is ON) and then input the signal.

Alarm code	Alarm name	Causes/countermeasures
096 P/A/S Driver limited	Home-Return Operation Error	Cause: 1) The home-return operation was attempted while the actuator was not stopped. 2) The actuator was moved by an external force during the home-return operation. Countermeasure: Have the home-return operation conducted while the actuator is stopped.
09F	Cyclic synchronization error	Cause: Communication error generated in total frame communication. 1) Connector or SCON cable connector is not correctly connected. 2) Interior signal line or SCON connection cable is disconnected. 3) Terminal unit or terminal connector (for SCON) has not been mounted. 4) Communication error due to noise Countermeasure: 1) 2) Confirm that units are firmly connected together. Disconnect the units and then connect them again. Contact IAI if this reoccurs even after turning ON the power again. 3) Mount the terminal unit or terminal connector. 4) Take measures against noise, such as changing cable arrangements.
0A2	Position data error	Cause: 1) A movement command was attempted to an empty position. 2) Target position value in "Position" field exceeds Parameter No. 3, 4 "Soft Limit Setting Value". 3) Push-motion operation was specified while the damping control function was enabled. 4) A movement command was attempted to a position of the one-line comment. 5) A linkage was indicated to the same position as that for the absolute value position indication. 6) The position data was crushed in the position data check at the startup. Countermeasure: 1) Set the position data. 2) Bring the target position value within the software limit set value. 3) The damping control function and push-motion operation cannot be used at the same time. Set so that only one of the functions is enabled. 4) Do not attempt to issue a movement command to a position of the one-line comment. 5) Do not attempt to indicate a linkage to the same position as that for the absolute value position indication. 6) Contact IAI.

<table>
<tr><th>Alarm code</th><th>Alarm name</th><th>Causes/countermeasures</th></tr>
<tr><td>0A3</td><td>Position command information data error</td><td>Cause: 1) The command value at direct numerical command exceeds the set maximum value.
2) Push-motion operation was specified while the damping control function was enabled.
Countermeasure: 1) The code of the command item exceeding the detailed address is displayed. Refer to these values and enter the appropriate values.
<table>
<tr><th>Detailed address (Command item code)</th><th>Command item</th></tr>
<tr><td>0F00</td><td>Target position</td></tr>
<tr><td>0F02</td><td>Command speed</td></tr>
<tr><td>0F04</td><td>Acceleration</td></tr>
<tr><td>0F06</td><td>Deceleration</td></tr>
<tr><td>0F08</td><td>Positioning width</td></tr>
<tr><td>0F0C</td><td>Pushing current limit value</td></tr>
<tr><td>0F0D</td><td>Control signal</td></tr>
</table>
2) The damping control function and push-motion operation cannot be used at the same time. Set so that only one of the functions is enabled.</td></tr>
<tr><td>0A7</td><td>Command deceleration error</td><td>Cause: Insufficient deceleration distance when deceleration has been reduced during travel. The software limit has been exceeded when decelerating from the current position after the change.


This occurs because the timing of the next travel command when changing the speed during travel is delayed.
Countermeasure: Set the travel command timing for deceleration change faster.</td></tr>
<tr><td>0AB</td><td>Command speed error</td><td>Cause: A command from PLC exceeds the maximum velocity of an actuator in the motion network.
Countermeasure: Revise the parameters and programs in PLC.</td></tr>
<tr><td>0AC</td><td>Estimated life over error</td><td>Cause: The motor power supply capacitor for the driver unit has exceeded its calculated life.
Countermeasure: Replace the driver unit as soon as possible.</td></tr>
<tr><td>0B5
A/S
Driver
limited</td><td>Z-phase position error</td><td>Cause: The Z-phase could not be defected after reversed at the mechanical end and moved for the specified distance in the home-return operation.
Countermeasure: Contact IAI.</td></tr>
</table>

<table>
<tr><th>Alarm code</th><th>Alarm name</th><th>Causes/countermeasures</th></tr>
<tr><td>0B6
A
Driver limited</td><td>Z-phase detection timeout</td><td>Cause: With simple absolute specification, Z-phase could not be detected at the first servo ON or home return after turning the power on.
1) Contact failure or disconnection of the connector part of the actuator connecting cable.
2) For models with brake, the brake cannot be released.
3) External force is applied and the motor cannot perform detection.
4) The sliding resistance of the actuator itself is excessive.
Countermeasure: 1) Check the wiring status of the actuator connecting cable.
2) Check the wiring condition of the brake cable and whether the brake part makes "clicking" sounds when toggling the brake release switch. If not, confirm that power is supplied to the brake.
3) Confirm that there are no assembly errors.
4) If the loading weight is normal, turn OFF the power and then move by hand to check the sliding resistance.
If the cause is in the actuator itself, contact IAI.</td></tr>
<tr><td>0BA</td><td>Home sensor not detected</td><td>Cause: Indicates that the home return motion of an actuator with home sensor has not completed normally.
1) The workpiece interferes with the surroundings during home return.
2) The sliding resistance of the actuator is excessive.
3) Poor mounting, malfunction, or disconnection of the home sensor.
Countermeasures: If the workpiece does not interfere with the surroundings, 2) and 3) should be considered. Contact IAI.</td></tr>
<tr><td>0BE</td><td>Home return timeout</td><td>Cause: 1) Home return motion has not completed within a given period of time from the start.
2) The home sensor is always detecting due to malfunction of the home sensor.
<table>
<tr><th>Detailed code</th><th>Target operation</th></tr>
<tr><td>01</td><td>Home return motion timeout</td></tr>
<tr><td>02</td><td>LS retreat operation timeout</td></tr>
</table>
Countermeasure: This does not occur in normal operation. The combination of driver unit and actuator may be incorrect. Contact IAI.</td></tr>
<tr><td>0BF
S
Driver limited</td><td>Creep sensor not detected</td><td>Cause: This indicates the actuator detected the creep sensor (option) before detecting the origin sensor (option except for rotary actuator), or the actuator reached the mechanical end (or the actuator cannot move anymore because the load is too large).
1) The position to apply the creep sensor is not appropriate.
2) The creep sensor is faulty.
3) The cable is disconnected or the connector is not plugged in properly.
4) The actuator cannot move due to heavy load caused by interference.
Countermeasure: 1) Readjust the sensor installation position.
2) Replace the creep sensor.
3) Perform continuity check to see if the connector is plugged in properly.
4) Check the interference and the transportable weight and make sure there is no external force applied.</td></tr>
</table>

Alarm code	Alarm name	Causes/countermeasures
0C0	Excessive actual speed	Cause: Motor rotation speed exceeded the allowable rotation speed. 1) The sliding resistance of the actuator is locally excessive. 2) External force is applied momentarily. A sudden speed increase may have occurred before detecting the servo error. Countermeasure: This does not occur in normal operation, so confirm that there are no assembly errors. Also, confirm whether external force is applied in the direction of travel.
0C1	Servo error	Cause: 2 or more seconds have passed without being able to move after receiving the travel command. 1) Connection failure or disconnection of the actuator connecting cable. 2) The brake cannot be released (for models with brake). 3) The load on the motor is large due to external force. 4) The sliding resistance of the actuator is excessive. Countermeasure: 1) Check the wiring status of the actuator connecting cable. 2) If there is no problem with the 24 VDC power supplied to the control power connector of the gateway unit, the RCON system may be faulty. Contact IAI. 3) Confirm that there are no assembly errors in machine components. 4) If the load weight is within the specifications, turn OFF the power supply and manually check the sliding resistance.
0C2 S Driver limited	Overrun sensor detected	Cause: This indicates that a signal from the OT sensor (option) installed at the mechanical end is detected. 1) The actuator was moved by hand or received external force while the servo was OFF (normal detection). 2) A jog operation was made under a condition that the home coordinates are not established and the soft stroke limit would not work properly. 3) The home position achieved by home return is not correct, or in the case of an absolute type controller the coordinates have shifted due to an inappropriate absolute reset position. 4) There is a mismatch between the sensor characteristics and the setting in Parameter No.19 “Overrun sensor input polarity”, or the wiring layout is wrong. 5) There is a mistake in the combination of the controller and actuators, or the setting in Parameter No. 3 and 4 “Soft Limit” or Parameter No. 77 “Ball Screw Lead Length” is inappropriate. Countermeasure: If 1) or 2) is suspected, move the actuator in the opposite direction by hand. If this error occurred inside the effective stroke range, 3), 4), or 5) is a likely cause. If 3) is suspected, check the home position. Conduct the absolute reset again if it is the absolute type. If 4) or 5) is suspected, please contact IAI.

Alarm code	Alarm name	Causes/countermeasures
0C5 A/S Driver limited	Unauthorized control system transition command	Cause: 1) Operation was switched to normal position control operation during "damping control" operation. 2) Operation was switched to "damping control" operation during normal position control operation. 3) The anti-vibration number has been switched over during operation in "Anti-Vibration Control". Countermeasure: For each, change the sequence so that the next operation is performed after confirming that positioning complete signal PEND is ON.
0CE	Control power supply voltage drop	Cause: Gateway unit control power supply voltage has dropped to or below 16.8V (70% of 24 VDC). 1) Control power supply voltage drop 2) Malfunction of parts inside the RCON system Countermeasure: 1) Confirm that voltage of 24 VDC ±10% is being applied to the gateway unit control power connector. If the voltage is low, the 24 VDC power supply may have failed. When the power source is used for the control power supply and the motor power supply, the current amperage necessary for the actuator operation is not secured. Check the necessary current amperage in the instruction manual, and replace the 24V DC power source. 2) Contact IAI.
0D2 A/D/S Driver limited	Excessive motor power supply voltage	Cause: There is a possibility of component failure inside the RCON system. Countermeasure: If it occurs frequently, the probability of RCON system failure is high. Contact IAI.
0D6	Fan error detection	Cause: 1) The number of revolution of the fan in the fan unit mounted on the driver unit has dropped by 50%. 2) The number of revolution of the fan unit mounted on the 200V system power supply unit has dropped by 50%. (When detail code is 0001H in the alarm list in the teaching tool) * The detail code should represent 0002H when the revolution of the driver unit and the fan unit on the 200V power supply unit dropped by 50% at the same time. Countermeasure: 1) 2) Replace the fan unit. Refer to "Specifications Section Chapter 4, 4.4 [How to replace Fan unit]" and "Specifications Section Chapter 5, 5.4 [How to Replace Fan Unit for 200V Driver Unit]" for how to make replacement.

Alarm code	Alarm name	Causes/countermeasures
0D8	Deviation overflow	Cause: The position deviation counter overflowed. 1) The unit decelerated or stopped due to the influence of external force or overload during travel. 2) The excitation detection operation after power ON is unstable. 3) The power supply voltage has dropped. 4) The servo gain number is too low. Countermeasure: 1) This occurs when the actuator cannot operate according to commands. Check the load condition, such as whether the workpiece is interfering with surrounding objects, whether the brake is released, etc., and resolve the cause. 2) Revise the payload as overloading is concerned, and reboot the power supply. 3) Check power supply voltage. 4) Adjust the servo gain number.
0D9	Software stroke limit over error	Cause: The present position of the actuator exceeds the software stroke limit Countermeasure: Return to the software stroke limit range.
0DC	Push-motion operation range exceeded error	Cause: 1) The push-back force was too strong after pushing was completed, pushing back to the push-motion start setting position. Countermeasures: 1) Re-set and reduce the push-back force.
0DF P Driver limited	Collision detection	Cause: Collision of the actuator was detected. Countermeasure: Remove the cause of the collision. For an unexpected detection, readjust the collision detection function. [Refer to Startup Section Chapter 6, 6.2 Various Functions/Collision detection function (page B6-73)]
0ED P/A Driver limited	Absolute encoder error detection 1	Cause: The present position changed while reading or saving absolute data. Countermeasures: Do not apply vibration to the actuator.
0EE P/A/S Driver limited	Absolute encoder error detection 2	Cause: The encoder cannot detect position information normally with battery-less absolute specification or simple absolute specification. 1) The first time power is turned ON after replacing the motor with battery-less absolute specification, or with simplified absolute specification. (Before executing absolute reset) 2) Absolute battery voltage drop. (Simple absolute specification) (When the detail code in the teaching tool alarm list is 0001H) 3) Disconnection of the actuator connection cable, actuator side attached cable, connector connection failure, or cable insertion/removal. (Detail code 0002H) 4) Driver unit parameters have been changed. Countermeasure: 2) After supplying power for 72 hours or more, charge the battery, then perform absolute reset. If it seems to occur frequently even when sufficiently charged, the battery life may be the problem. Replace the battery. Refer to "Specifications Section Chapter 5, 5.4 General Specifications [How to Replace Absolute Battery]" for how to make replacement. For (1), (3), and (4), perform absolute reset. [Refer to Startup Section Chapter 3 Absolute Reset]

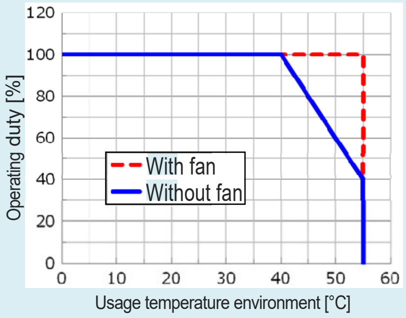
Alarm code	Alarm name	Causes/countermeasures
0EF P/A Driver limited	Absolute encoder error detection 3	Cause: The encoder cannot detect position information normally with simple absolute specification. (Encoder overspeed error) The present position changed at a speed higher than the rotation speed setting due to an external factor at power cutoff. Countermeasure: Set the rotation speed setting so that it supports higher rotation speeds than the current rotation speed setting. If it occurs again, absolute reset is required. [Refer to Startup Section Chapter 3 Absolute Reset]
0F5	Non-volatile memory write verify error	Cause: When data is written to the non-volatile memory, comparison (verification) is performed to confirm whether the data in the memory matches the write data. At this time, a mismatch was detected. (Failure of non-volatile memory) Countermeasure: Contact IAI if this reoccurs even after turning ON the power again.
200~ 2FF	Teaching tool alarm	[Refer to teaching tool instruction manual]

(3) Cold start level

<table>
<tr><th>Alarm code</th><th>Alarm name</th><th>Causes/countermeasures</th></tr>
<tr><td>09B</td><td>Internal communication error</td><td>Cause: There was an internal communication error occurred between the gateway unit and driver unit.
1) Installation error or contact error on the link connector between gateway unit and driver unit.
2) Influence of noise generated by a peripheral device
3) Malfunction of gateway unit or driver unit
Countermeasure: 1) Disconnect and then connect the link between the gateway unit and driver unit to see if the alarm gets generated. If it does, check (2) and (3).
2) Shut down the power on peripheral devices and operate only with the controller and actuators to see if this alarm gets generated again. If the alarm does not get generated, there is a concern of influence of noise from a peripheral device. Revise the noise prevention on peripheral devices such as grounding and electrostatic shielding.
3) Replace the gateway unit or driver unit. The driver unit number to be replaced can be checked in the table below based on the detail address displayed in the alarm list.
<table>
<tr><th>Detail address</th><th>driver unit number</th><th>Detail address</th><th>driver unit number</th></tr>
<tr><td>0001</td><td>0</td><td>0801</td><td>8</td></tr>
<tr><td>0101</td><td>1</td><td>0901</td><td>9</td></tr>
<tr><td>0201</td><td>2</td><td>0A01</td><td>10</td></tr>
<tr><td>0301</td><td>3</td><td>0B01</td><td>11</td></tr>
<tr><td>0401</td><td>4</td><td>0C01</td><td>12</td></tr>
<tr><td>0501</td><td>5</td><td>0D01</td><td>13</td></tr>
<tr><td>0601</td><td>6</td><td>0E01</td><td>14</td></tr>
<tr><td>0701</td><td>7</td><td>0F01</td><td>15</td></tr>
</table></td></tr>
<tr><td>0A1</td><td>Parameter data error</td><td>Cause: Data input range of parameter domain is not appropriate.
(Example 1) This error occurs when the magnitude correlation is obviously inappropriate, such as when 300 mm was incorrectly input as the value of the software limit negative side while the value of the software limit positive side was 200.3 mm.
(Example 2) It occurs when the initial positioning band value [refer to Startup Section Chapter 6, 6.1 Parameter (page B6-12)] is smaller than the minimum positioning band width when an actuator in RCP2, RCP3, RCP4 or RCP5 Series is connected. Set the initial positioning band value to the minimum positioning band width (lead length ÷ number of encoder pulse: 800) × 3 or more.
Countermeasure: Change to an appropriate value.</td></tr>
<tr><td>0A8</td><td>Motor/encoder type not supported</td><td>Cause: The types of the motor and the encoder set to the parameter is not defined.
Countermeasure: Contact IAI if this alarm is generated with an actuator being controlled, or in case it reoccurs even after reboot.</td></tr>
<tr><td>0B3

S
Driver limited</td><td>Linear spurious absolute error</td><td>Cause: Home-return operation was not performed properly.
1) Work is interfering with peripheral equipment in the middle of home return.
2) Encoder Error
Countermeasure: 1) Remove the interference.
2) It is necessary to replace the motor. Please contact IAI.</td></tr>
</table>

Alarm code	Alarm name	Causes/countermeasures
0B4 A/S Driver limited	Electrical angle mismatch (inconsistency)	Cause: An error was detected during the electromagnetic phase detection operation when the servo was turned on after the power was supplied. <When detail code is 0000H> Position deviation counter has overflown before Z-axis was detected. 1) Operation unable due to external force 2) Sliding resistance on actuator itself is high <When detail code is 0001H> Z-phase was detected two times before the motor makes one turn. 3) Malfunction of encoder Countermeasure: 1) Check if there is any failure in actuator installation. 2) If the payload is in normal condition, shut off the power and move the slider manually with hand to see the sliding resistance. In case there is a cause on the actuator, contact IAI. 3) The motor requires to be replaced. Contact IAI.
0B7 A/S Driver limited	Magnetic pole uncertain	Cause: When magnetic pole phase detection (carried out even with simple absolute specification) was performed in the first servo ON process after power ON, magnetic pole phase could not be detected after a given period of time. 1) Contact failure or disconnection of the connector part of the actuator connecting cable. 2) For models with brake, the brake cannot be released. 3) External force is applied and the motor cannot perform detection. 4) The sliding resistance of the actuator itself is excessive. Countermeasure: 1) Check the wiring status of the actuator connecting cable. 2) Check the wiring condition of the brake cable and whether the brake part makes "clicking" sounds when toggling the brake release switch. If not, confirm that power is supplied to the brake. 3) Confirm that there are no assembly errors. 4) If the loading weight is normal, turn OFF the power and then move by hand to check the sliding resistance. If the cause is in the actuator itself, contact IAI.
0B8 P Driver limited	Excitation detection error	Cause: When excitation detection was performed in the first servo ON process after power ON, excitation detection operation did not complete after a given period of time. 1) Connection failure or disconnection of the actuator connecting cable. 2) The brake cannot be released (for models with brake). 3) The load on the motor is large due to external force. 4) The power was turned ON while in contact with the mechanical end. 5) The sliding resistance of the actuator is excessive. Countermeasure: 1) Check the wiring status of the actuator connecting cable. 2) If there is no problem with the 24 VDC power supplied to the control power connector of the gateway unit, the RCON system may be faulty. Contact IAI. 3) Confirm that there are no assembly errors in machine components. 4) Move the slider or the rod tip to a point where it will not hit the mechanical end and reboot the power. 5) If the load weight is within the specifications, turn OFF the power supply and manually check the sliding resistance.

Alarm code	Alarm name	Causes/countermeasures
0C4 S Driver limited	Exceeded allowable time of exceeding torque allowing continuous pressing	Cause: The time of continuous pressing with the pressing setting above 70% has exceeded the time set in Parameter No. 89 "Continuous Pressing Applicable Torque Exceeding Allowable Time". Countermeasure: Check the sequence again. Set the pressing time to be within the setting time.
0C8	Overcurrent	Cause: The output current of the power supply circuit was abnormally high. Countermeasure: This does not normally occur. There may be insulation deterioration of the motor coil, RCON system failure, etc. Contact IAI. ⚠ Caution Before resuming operation, make sure to remove the cause of the error. Turning the power on and off repeatedly without removing the cause could burnout of the motor coil.
0C9 P Driver limited	Overvoltage	Cause: The power regenerative circuit voltage reached the judgment value or higher. Countermeasure: There may be an RCON system failure. Contact IAI.
0CA	Overheating	Cause: The temperature of the controller internal parts has exceeded the temperature defined for each actuator. 1) Operating with load conditions exceeding the specified range. 2) The ambient temperature is high. 3) The load on the motor is large due to external force. 4) Defective parts inside the RCON system.  (When detail code is 0008H or 0009H in the alarm list in the teaching tool, it is an error of the 200V power supply unit) Countermeasure: 1) Revise the operation conditions, such as decreasing the acceleration/deceleration speed. 2) Lower the ambient temperature of the RCON system. 3) Confirm that there are no assembly errors in machine components. Note: This error does not normally occur. If it occurs, confirm that it is not (1) to (3) above. If the same problem reoccurs, there may be an RCON system failure. Contact IAI. ⚠ Caution Before resuming operation, make sure to remove the cause of the error. Turning the power on and off repeatedly without removing the cause could burnout of the motor coil.
0CB	Current sensor offset adjustment error	Cause: During the current detection sensor status check conducted in the startup initialization process, a sensor error was found. 1) Failure of the current detection sensor and peripheral components. Countermeasure: In case this occurs again even after the power supply is rebooted, it is necessary to replace and adjust the PC board. Contact IAI.

Alarm code	Alarm name	Causes/countermeasures
0CC	Control power supply voltage error	Cause: Driver unit control power supply voltage has increased to or above 28.8V (120% of 24V DC). 1) Control power supply voltage rise 2) Malfunction of parts inside the RCON system Countermeasure: 1) Confirm that voltage of 24V DC ±10% is being applied to the gateway unit control power connector. If the voltage is low, the 24V DC power supply may have failed. 2) Contact IAI.
0CD S Driver limited	Drive Cutoff Relay Welded Detection Error	Cause: The drive cutoff relay inside the controller has crushed. Countermeasure: The relay or controller must be replaced. Please contact IAI.
0D3 S Driver limited	Motor power supply voltage low	Cause: 1) If the power source is shut off in the controller external circuit, servo-on command was made during the power is shut. 2) Overcurrent occurred on the 200V motor power supply line. 3) There is a concern of a malfunction of the controller internal components. Countermeasure: 1) Check the controller external circuit. 2) Check the wiring between actuators and the driver unit. In case it occurs frequently, contact IAI and tell the environment of use and operating conditions. 3) If this error occurs often, there is a concern of a controller malfunction. Please contact us.
0D4 P/A/D Driver limited	Drive source error	Cause: 1) 24V Motor power input voltage (input to MPI terminal) is excessive. During acceleration/deceleration or servo ON, etc,, consumption current rises momentarily. When remote sensing function is used with power of barely sufficient capacity, overvoltage may occur in response to the current change. 2) Overcurrent generated in 24V motor power line. Countermeasure: 1) Check power supply voltage being input to MPI terminal. Consider using a power supply with sufficient capacity, or avoid using the remote sensing function. 2) Check the wiring between the actuator and the driver unit. If this error occurs frequently, contact IAI regarding the operating environment and operating conditions.
0D5 P Driver limited	Deviation counter overflow in homing incomplete status	Cause: The position deviation counter overflowed. 1) Impact of external force, etc. or collision with mechanical end during JOG operation, or overload during travel caused the unit to decelerate or stop. 2) The excitation detection operation after power ON is unstable. Countermeasure: 1) This occurs when the actuator cannot operate according to commands. Check the load condition, such as whether the workpiece is interfering with surrounding objects, whether the brake is released, etc., and resolve the cause. 2) There may be an overload, so review the payload.

Alarm code	Alarm name	Causes/countermeasures
0D7 S Driver limited	Belt breaking sensor detected	Cause: The belt at the motor reversed part has broken on the actuators below. RCS2-RA13R, RCS3-RA15R, RCS3-RA20R Countermeasure: Belt must be replaced. Please contact IAI.
0E0	Overload	Cause: 1) The workpiece weight exceeds the rated weight, or an external force is applied and the load increased. 2) The brake is not released. (With brake) 3) The sliding resistance of the actuator is locally excessive. Countermeasure: 1) Review the workpiece and its surroundings and remove the cause. 2) If there is no problem with the 24 VDC power supplied to the control power connector of the gateway unit, the RCON system may be faulty. If not released, there may be brake failure, cable disconnection, or RCON system failure. Contact IAI. 3) Move the workpiece by hand if possible and check for any location with excessive sliding resistance. Check for any distortions on the mounting surface. If this error occurs even with a single actuator, contact IAI. ⚠ Caution Make sure to resolve the cause before resuming operation. If you cannot judge whether the cause has been fully resolved, wait at least 30 minutes before switching the power ON to prevent motor coil burnout.
0E4 P/A/S Driver limited	Encoder transmission error	Cause: Data transmission and reception between the driver unit and encoder is conducted by serial communication. This error indicates that the data sent from the driver unit was not received properly at the encoder side. 1) Encoder cable is partially disconnected, or connector is not connected properly. 2) Influence from noise. 3) Failure of communication IC mounted on the encoder circuit board. 4) Failure of communication IC mounted on the driver unit circuit board. Countermeasure: 1) Confirm that there is no failure in the cable and connector coupler. 2) Try turning OFF power to all peripheral devices and moving only the driver unit and actuator. If no error is generated, the culprit may be noise. Take measures against noise. If 3) or 4) is the case, replace the encoder or driver unit. Contact IAI if the cause cannot be determined.

Alarm code	Alarm name	Causes/countermeasures
0E5 P/A/S Driver limited	Encoder reception error	Cause: Data from the encoder was not normally received by the driver unit. 1) Encoder cable line breakage or connector connection failure (when the detail code in the teaching tool alarm list is 0002H) 2) Influence from noise (Detail code 0001H). 3) Actuator internal part malfunction (communication part). 4) Driver unit internal part malfunction (communication part). [Only for P Driver] 5) Initialization of battery-less absolute encoder incomplete (Detail code 000AH) 6) Communication error occurred to battery-less absolute encoder (Detail code 000CH) Countermeasure: 1) Check for any wire breakage on a connector and inspect the condition of the wire connections. 2) Try turning OFF power to all peripheral devices and moving only the driver unit and actuator. If no error is generated, the culprit may be noise. Take measures against noise. In case of 3), 4) or 5), replace the actuator (motor part) and/or the driver unit. 6) Check the encoder cable line breakage and connection at connectors. For the high-resolution battery-less absolute encoder, check the capacity of the 24V DC power source and connection at the power supply cables. Contact IAI if the cause cannot be determined.
0E6 P/A/S Driver limited	Encoder count error	Cause: The encoder cannot detect location information properly. 1) Disconnection of the encoder relay cable or actuator side attached cable, or connector connection failure. 2) Failure of the encoder itself. 3) Influence from noise. Countermeasure: 1) Check for any wire breakage on a connector and inspect the condition of the wire connections. If there is no cable malfunction, encoder failure may be possible. Contact IAI.
0E7 S Driver limited	A-, B- and Z-phase wire breaking	Cause: Encoder signals cannot be detected correctly. 1) The encoder relay cable or supplied actuator cable is disconnected or its connector is not plugged in correctly. 2) The encoder itself is faulty. Countermeasure: 1) Check if any wire breakage on a connector and the condition of wire connections. If the cables are normal, faulty encoder is suspected. Please contact IAI.

Alarm code	Alarm name	Causes/countermeasures
0E8 P/A/D Driver limited	A-, B-phase disconnection	Cause: The encoder signal cannot be detected normally. 1) Disconnection of the actuator connection cable, actuator side attached cable, or connector connection failure. 2) Failure of the encoder itself. 3) Disconnected axis parameter No. 158 "Enabled/Disabled Axis Select" is 0: Enabled. Countermeasure: 1) Check for any wire breakage on a connector and inspect the condition of the wire connections. 2) If there is no cable malfunction, encoder failure may be possible. Contact IAI. 3) Parameter No. 158 "Enabled/Disabled Axis Select" 1: Disabled. * When the actuator is not connected, this alarm is generated just by setting the reserved axis in the gateway parameter configuration tool or setting the driver unit to "Not set".
0EB P/A/S Driver limited	Battery-less Absolute Encoder error detected	Cause: Battery-less absolute encoder cannot detect location information normally. Countermeasure: Check for any wire breakage on a connector and inspect the condition of the wire connections. If there is no cable malfunction, encoder failure may be possible. Contact IAI.
0EC D Driver limited	PS-phase disconnection	Cause: There is a concern of looseness or line breakage at the connectors of the actuator connection cables. Countermeasure: Check the conditions of connectivity on the actuator connection cables and have a conductivity check on them. Consult with IAI if they are in the normal conditions.
0F0 A/D/S Driver limited	Driver logic error	Cause: CPU is not working properly. 1) Malfunction of CPU 2) Operation error due to noise Countermeasure: Consult with IAI if the same phenomenon occurs even after reboot of the power.
0F4 P/A Driver limited	PCB mismatch	Cause: RCON-PC The circuit board is not supported by the connection motor at startup check. There may be a mismatch between the actuator and driver unit. Check the model numbers. RCON-AC The simple absolute unit was connected when the encoder type set in the parameter was at a value that the simple absolute unit is not available. Countermeasure: Contact IAI if this error occurs.
0F5	Non-volatile memory write verify error	Cause: When data is written to the non-volatile memory, comparison (verification) is performed to confirm whether the data in the memory matches the write data. At this time, a mismatch was detected. (Failure of non-volatile memory) Countermeasure: Contact IAI if this reoccurs even after turning ON the power again.
0F6	Non-volatile memory write timeout	Cause: There is no response within the specified time during the data writing to the non-volatile memory. (Failure of non-volatile memory) Countermeasure: Contact IAI if this reoccurs even after turning ON the power again.

Alarm code	Alarm name	Causes/countermeasures
0F8	Non-volatile memory data destruction	Cause: Abnormal data was detected by non-volatile memory check at startup. (Failure of non-volatile memory) Countermeasure: Contact IAI if this reoccurs even after turning ON the power again.
0FA	CPU error	Cause: CPU is not operating normally. 1) CPU malfunction. 2) Malfunction caused by noise. Countermeasure: Contact IAI if this reoccurs even after turning ON the power again.
0FC	Logic error (Controller part error)	Cause: RCON system interior is not working properly. 1) CPU malfunction. 2) Malfunction caused by noise. Countermeasure: Reboot the power. If the error occurs again, check for presence of noise. If a spare driver unit is available, replace it and try again. A recurring error with the spare controller suggests presence of noise. Contact IAI if the cause cannot be determined.
300~ 3FF	Teaching tool alarm	[Refer to teaching tool instruction manual]

2.5 Causes and countermeasures for ELECYLINDER alarms

ELECYLINDER Alarm Group

The alarm groups and warnings occurred in ELECYLINDER are as show below.
For details and countermeasures, refer to the next section, [Troubleshooting by alarm groups].

Alarm group	Content	Main content and typical countermeasures	
A	Overload alarm	[Content] [Countermeasure]	Moving parts stopped abnormally. Make sure that there are no obstructions or obstacles.
B	Motor error alarm	[Content] [Countermeasure]	Motor abnormality occurred. Replace the motor or controller.
C	Elecylinder control unit error alarm	[Content] [Countermeasure]	Elecylinder control unit abnormality occurred. Replace the elecylinder control unit.
D	Elecylinder control unit-encoder abnormality alarm	[Content] [Countermeasure]	An abnormality occurred between the elecylinder control unit and encoder. Turn the power off and then on again. If the unit still does not recover, replace the motor or elecylinder control unit.
E	Power supply voltage/Power supply capacity error alarm	[Content] [Countermeasure]	Elecylinder control unit abnormality occurred. Check the power supply voltage for any abnormality.

Alarm group	Content	Main content and typical countermeasures	
Warning	Maintenance warning	[Content] [Countermeasure]	The "maintenance period" has come to an end. Perform maintenance for the unit.

Troubleshooting for ELECYLINDER alarm groups

Elecylinder alarms are classified into "alarms" and "warnings" depending on the content.
"Alarms" are grouped into 5 types.

Alarm level	SV/ALM LED	* ALM signal	Situation when generated	Clearing method
Alarm	Red ON	OFF	Servo OFF after gradual stop	Cleared by resetting the alarm. If it cannot be cleared by resetting the alarm, turn off the power, then turn it on again.
Warning	Red/green alternate blinking	ON	Continued operation	● Maintenance Warnings 1/2 (Total travel count/Total travel distance) are cleared by updating the set values in the maintenance information window. ● Maintenance Warning 3 (Overload warning) is cleared by resetting the alarm.

Caution

- Clear alarms only after investigating and resolving the cause.
- If the same alarm recurs after clearance, it is highly probable that the cause of the alarm has not been resolved.
- If the cause of the alarm cannot be resolved or the alarm cannot be cleared after resolving the cause, contact IAI.
- Set to the disable status on the deadman’s switch in the teaching pendant, and ELECYLINDER gets to the motor voltage drop condition (teaching pendant alarm: 203).

[Alarm group A: Overload alarm]

Moving parts of ELECYLINDER stopped abnormally while moving to the target position.

No.	Cause	Countermeasure
1	Operation may not be possible due to contact with or snagging on external obstacles.	Remove any external obstacles or other external loads.
2	The ELECYLINDER may be being used under conditions exceeding the specifications described in the catalog.	Check the specification values such as payload, acceleration/deceleration and speed, and adjust them appropriately.
3	Causes may include foreign matter, brake failure or motor failure.	Visually check for the depletion of grease on the ball screw/guide inside the ELECYLINDER, intrusion of foreign matter, etc. If this is the case, clean the inside of the ELECYLINDER and replenish the grease.
		Remove the motor and check the sliding movement of the ELECYLINDER body. If there is no abnormality in the sliding motion, there is a possibility of motor or brake failure. Replacement of the motor is recommended.
4	The base may have been distorted when mounting the ELECYLINDER, increasing the sliding resistance of the guide.	The ELECYLINDER mounting surface should be a machined surface or a plane with similar accuracy, with flatness within 0.05mm/m. Refer to the instruction manual of each ELECYLINDER for the recommended tightening torque of the bolt for fixing the base.
5	The peak power capacity of the 24V power supply is less than 4.2A.	Use a power supply with peak current of 4.2 A or higher (per axis).
6	As there is a contact error at the terminals on the EC connection unit cable, the peak current would not flow.	Check if there is any looseness, contact error or line breakage on the terminals or connectors of the EC connection unit cable.
7	The deceleration distance was insufficient and the calculation result of the arrival position exceeded the operation range of the ELECYLINDER due to the "next movement command" being issued too soon during operation with "Smooth accel/decel setting" enabled.	Adjust the timing of the "next movement command" so that the command will be given after the first movement is completed.
8	24V power was turned ON while the moving parts of the ELECYLINDER were immobilized or pressed against the mechanical stopper.	Resolve the state of immobilization. If the unit is pressed against the mechanical stopper, move it at least 5mm away, then turn on the power again.

[Alarm group B: Motor abnormality alarm]

Motor abnormality occurred.

No.	Cause	Countermeasure
1	The internal temperature of the motor may be too high.	Improve the surrounding environment of the motor so that the ambient temperature is 40 °C or less. If the abnormality is resolved upon turning the power back on after the ambient temperature is lowered, the internal temperature may have been excessive. [Countermeasure examples] Remove the heat source/turn OFF the heat source/install a fan/install a temperature shield/improve thermal conductivity of the base/install a heat dissipation fin, etc.
2	The ELECYLINDER may be being used under conditions exceeding the specifications described in the catalog.	Check the specification values such as payload, acceleration/deceleration and speed, and adjust them appropriately.
3	If this alarm recurs after performing the inspection above and improving the power supply environment, it is highly likely that the motor has failed.	Replacement of the motor is required. For some models, the motor cannot be replaced by the customer. In that case, please contact IAI.

[Alarm group C: ELECYLINDER control unit abnormality alarm]

ELECYLINDER control unit abnormality occurred.

No.	Cause	Countermeasure
1	The ELECYLINDER control unit is affected by the noise of a peripheral device and cannot operate normally.	Shut down the power supply of the peripheral device and operate only with the ELECYLINDER, then check to see whether this alarm persists. If it does not, there is a possibility that the ELECYLINDER is affected by the noise from the peripheral device. Reconsider the noise countermeasures (grounding, power line wiring, electrostatic shielding, etc.) for the peripheral device.
2	If this alarm recurs after performing the inspection above and improving the power supply environment, it is highly likely that the ELECYLINDER control unit has failed.	Replace the controller cover assembly of the ELECYLINDER. → For the replacement method, refer to the instruction manual for each ELECYLINDER.

[Alarm group D: ELECYLINDER control unit-encoder abnormality alarm]

An abnormality occurred between the ELECYLINDER control unit and encoder.

No.	Cause	Countermeasure
1	In case the alarm gets generated even after rebooting the power, it could be concerned that there is a contact error at a connector on the cable between the ELECYLINDER control part and the motor.	Shut the power down and take off the connectors on the cable inside ELECYLINDER, and insert again firmly till it stops. If this does not improve the situation, the cable may be disconnected, in which case the connection cable should be replaced.
2	The specifications of the replaced ELECYLINDER control unit and the motor may not match. [Example] An incremental-type motor and battery-less absolute spec ELECYLINDER control unit have been combined by mistake	Cut off the power supply and make sure that the specifications of the replaced motor and ELECYLINDER control unit are both "battery-less absolute specification" or "incremental specification". → For the replacement method, refer to the instruction manual for each ELECYLINDER.
3	The communication between the ELECYLINDER control unit and encoder is affected by the noise of a peripheral device and cannot operate normally.	Shut down the power supply of the peripheral device and operate only with the ELECYLINDER, then check to see whether this alarm persists. If it does not, there is a possibility that the ELECYLINDER is affected by the noise from the peripheral device. Reconsider the noise countermeasures (grounding protection, power line wiring, electrostatic shielding, etc.) for the peripheral device.
4	If this alarm recurs after performing the inspection above and improving the power supply environment, it is highly likely that the motor or ELECYLINDER control unit has failed.	Replace the motor or ELECYLINDER controller cover assembly. For some models, the motor cannot be replaced by the customer. In that case, please contact IAI. → For the replacement method, refer to the instruction manual for each ELECYLINDER.

[Alarm group E: Supply voltage/power capacity abnormality alarm]

An abnormality occurred in the power supply voltage and capacity supplied to the rear of the ELECYLINDER.

No.	Cause	Countermeasure
1	The ELECYLINDER may be being used under conditions exceeding the specifications described in the catalog.	Check the specification values such as payload, acceleration/deceleration and speed, and adjust them appropriately.
2	The power supply voltage has been detected outside the range of 21.6V to 26.4V.	Inspect with a tester to see whether the power supply voltage is in the range of 21.6 V to 26.4 V. If it is out of range, the 24VDC power supply voltage has insufficient capacity. Refer to our catalog for the required capacity and improve the power supply environment.
3	If this alarm recurs after performing the inspection above and improving the power supply environment, it is highly likely that the ELECYLINDER control unit has failed.	Replace the controller cover assembly of the ELECYLINDER. → For the replacement method, refer to the instruction manual for each ELECYLINDER.

[Warning: Maintenance warning 1]

This is an alert that the target value of the "total travel count" set by the customer has been reached.

No.	Cause	Countermeasure
1	For safe use and long service life of the ELECYLINDER, periodic lubrication is recommended. * To disable this warning, change the target value to 0.	[Countermeasure 1] Perform maintenance and inspection such as greasing. → For how to grease, refer to the instruction manual for each ELECYLINDER. [Countermeasure 2] When updating this function, be sure to set the target value to a value larger than the current value.

* For details on the maintenance warning settings, see [1.4 Maintenance Information in Maintenance Section].

[Warning: Maintenance warning 2]

This is an alert that the target value of the "total travel distance" set by the customer has been reached.

No.	Cause	Countermeasure
1	For safe use and long service life of the ELECYLINDER, periodic lubrication is recommended. * To disable this warning, change the target value to 0.	[Countermeasure 1] Perform maintenance and inspection such as greasing. → For how to grease, refer to the instruction manual for each ELECYLINDER. [Countermeasure 2] When updating this function, be sure to set the target value to a value larger than the current value.

* For details on the maintenance warning settings, see [1.4 Maintenance Information in Maintenance Section].

[Warning: Maintenance warning 3]

This is an alert that the target value of the "overload warning level" set by the customer has been reached.

No.	Content	Causes and countermeasures
1	Before the ELECYLINDER stops operation due to the "overload alarm", follow the troubleshooting procedure and conduct visual inspection and maintenance. * To disable this warning, change the "overload warning level" in "Maintenance Information" to 100%.	[Causes] The warning may be caused by the depletion of grease on the ball screw/guide inside the ELECYLINDER, intrusion of foreign matter, brake failure, motor failure, contact with peripheral equipment, etc.
		[Countermeasure 1] Visually check for the depletion of grease on the ball screw/guide inside the ELECYLINDER, intrusion of foreign matter, etc. If this is the case, clean the inside of the ELECYLINDER and replenish the grease. → Refer to the instruction manual of each ELECYLINDER for the cleaning method.
		[Countermeasure 2] Remove the motor and check the sliding movement of the ELECYLINDER body. If there is no abnormality in the sliding motion, there is a possibility of motor or brake failure. Replacement of the motor is recommended. For some models, the motor cannot be replaced by the customer. In that case, please contact us.

* For details on the maintenance warning settings, see [1.4 Maintenance Information in Maintenance Section].

Appendix

Chapter 1

Conforming to Safety Category

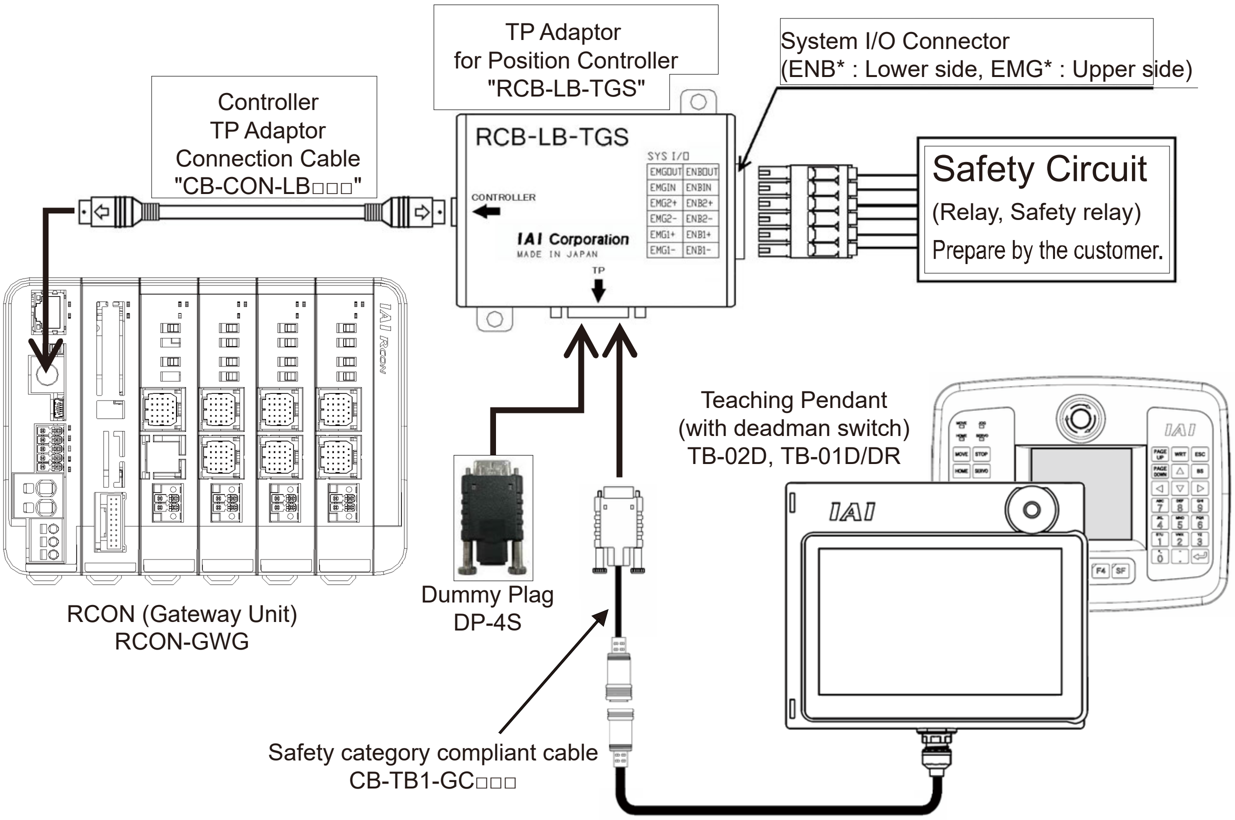
1.1 Conforming to safety category

In this section, picks up some examples of circuit complies with Safety Categories. However, it is yourself to ensure conformation to your own condition of use. Therefore, it is necessary to construct yourself the circuit that conforms to your condition of use and the applicable category.

System configuration

When it is necessary to construct a system complied with Safety Categories, make sure to use RCON Gateway Unit (model code: RCON-GWG) and TP adapter (model code: RCB-LB-TGS) that are complied with Safety Categories.

By changing the connection of the system I/O connector, it can conform up to Safety Categories B to 4. In order to comply with Safety Categories from B to 3, it is recommended to use the teaching pendant equipped with a dead man's switch (model code: TB-02D or TB-01D/DR). In order to comply with Safety Category 4, take off a teaching pendant and connect the dummy plug (model code: DP-4S).



Wiring and Setting of Safety Circuit

[Power supply]

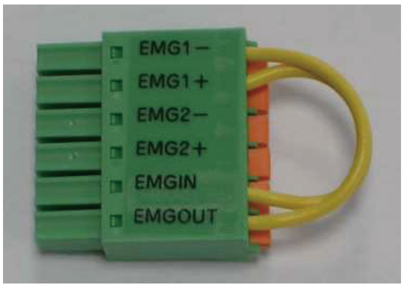
To use safty relays and/or contactors of 24V DC specification in the safety circuit, the control power supply should be used only for the circuit as much as possible. (Do not attempt to use the same power source as this this controller.)
For example, to supply power to the safety circuit, do not use the power supply driving our robocylinder controller ACON or PCON.
It is the risk prevention treatment preparing for the cases such as the operation error of the safety circuit caused by not enough power capacity.

[Specification of system I/O connector for TP adapter]

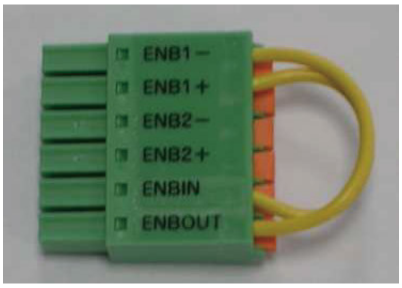
Connector Name		System I/O Connector		Applicable Wire
Upper side (EMG side)	Cable side	FMC1.5/6-ST-3.5(Note 1)	Phoenix Contact	AWG24 to 16 (0.2～1.25m^2)
	TP adapter side	MCDN1.5/6-G1-3.5P26THR		
Lower side (ENB side)	Cable side	FMC1.5/6-ST-3.5(Note 1)		
	TP adapter side	MCDN1.5/6-G1-3.5P26THR		

	Pin No.	Signal Name	Description
Upper side (EMG side)	1	EMG1-	Emergency stop contact 1 (30V DC or less, 100mA or less)
	2	EMG1+	
	3	EMG2-	Emergency stop contact 2 (30V DC or less, 100mA or less)
	4	EMG2+	
	5	EMGIN	Emergency stop detection input
	6	EMGOUT	24V power supply output for emergency stop detection input
Lower side (ENB side)	7	ENB1-	Emergency stop contact 1 (30V DC or less, 100mA or less)
	8	ENB1+	
	9	ENB2-	Emergency stop contact 2 (30V DC or less, 100mA or less)
	10	ENB2+	
	11	ENBIN	Enable detection input
	12	ENBOUT	24V power supply output for enable detection input

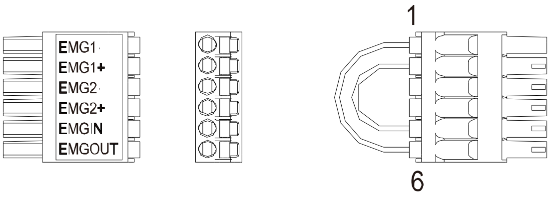
Note 1 : Connectors on the cable side are attached under conditions where initial wiring has been conducted.
In order to support each category, remove the initial wiring and wire your safety circuit.

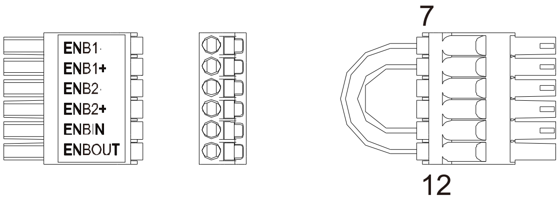


- Upper side (EMG) connector



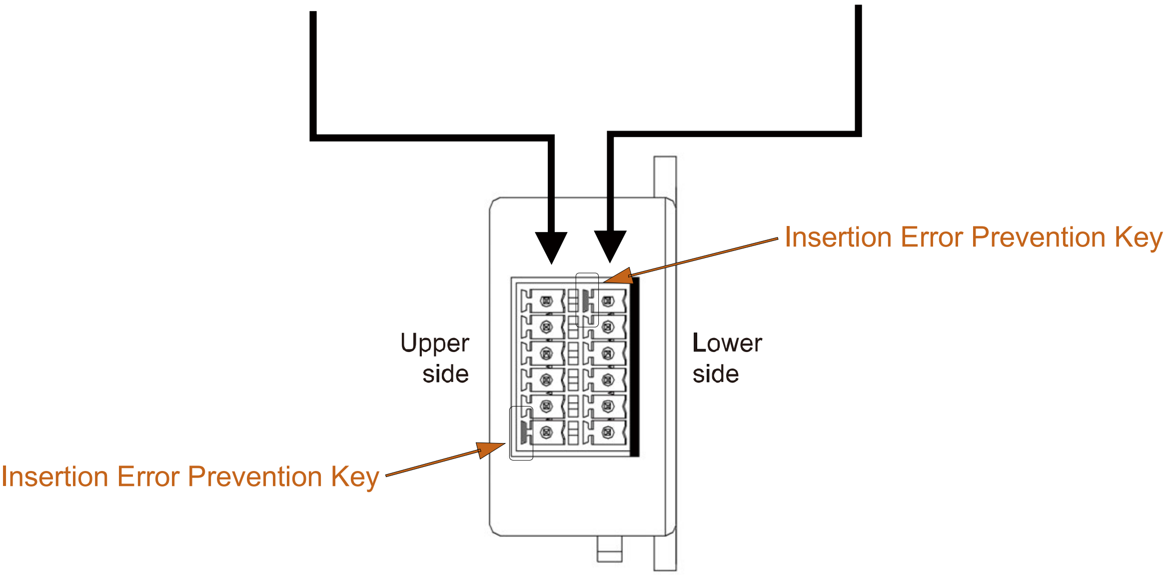
- Lower side (ENB) connector





Wiring	Color	Signal	No.
AWG24	Yellow	EMG1-	1
	Yellow	EMG1+	2
	—	EMG2-	3
	—	EMG2+	4
	Yellow	EMGIN	5
	Yellow	EMGOUT	6

Wiring	Color	Signal	No.
AWG24	Yellow	ENB1-	7
	Yellow	ENB1+	8
	—	ENB2-	9
	—	ENB2+	10
	Yellow	ENBIN	11
	Yellow	ENBOUT	12



TP Adapter Side View

[Connection of Dummy Plug on TP Adapter]

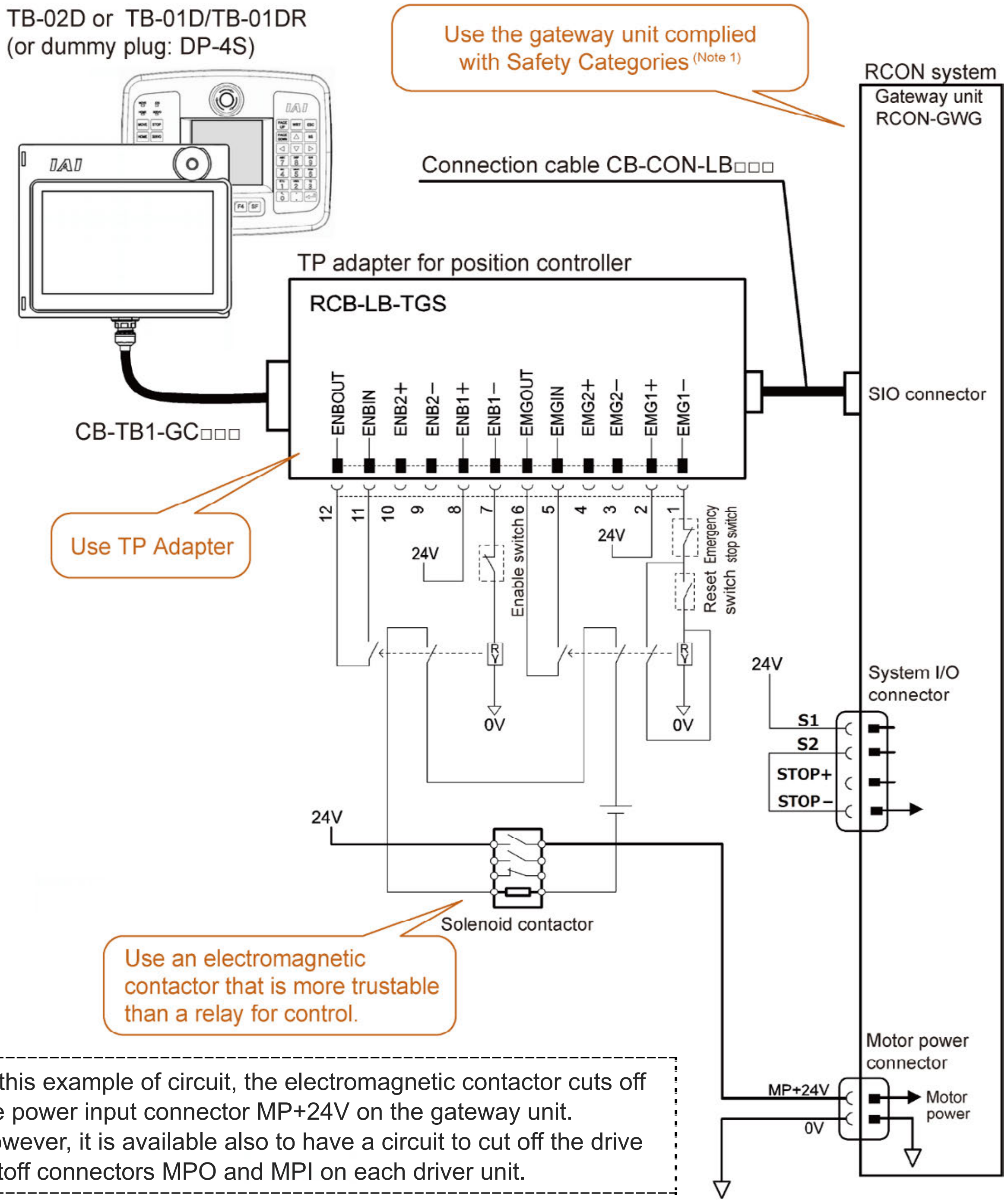
When operating the controller with AUTO Mode, make sure to connect the dummy plug DP-4S.

Examples of Safety Circuits

[Safety category 1] Summary of Requirements

- Use well tried highly trusted components and follow the safety principles to ensure safety.

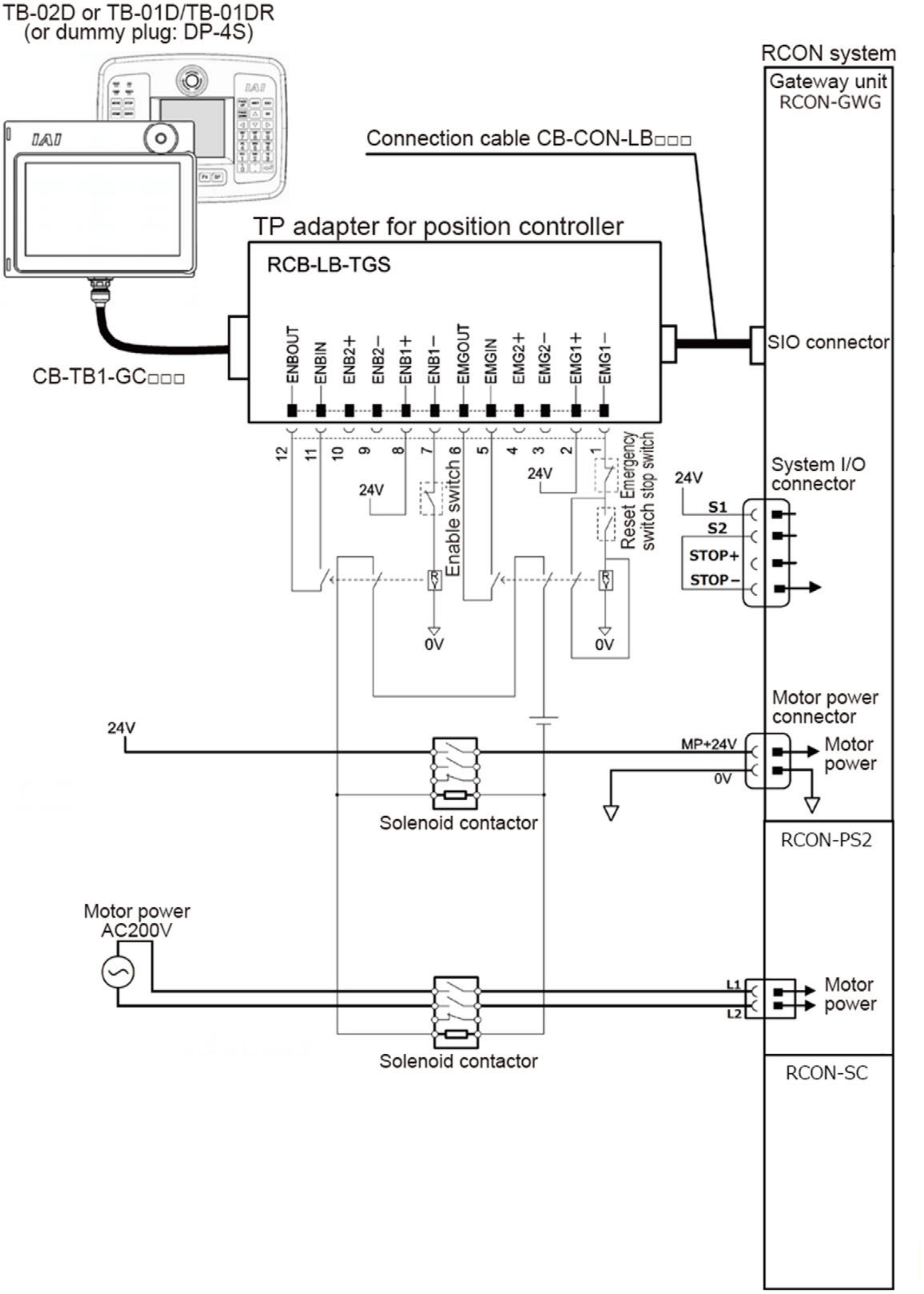
[1] -1 Category 1 (When SCON is not to be connected)



In this example of circuit, the electromagnetic contactor cuts off the power input connector MP+24V on the gateway unit. However, it is available also to have a circuit to cut off the drive cutoff connectors MPO and MPI on each driver unit.

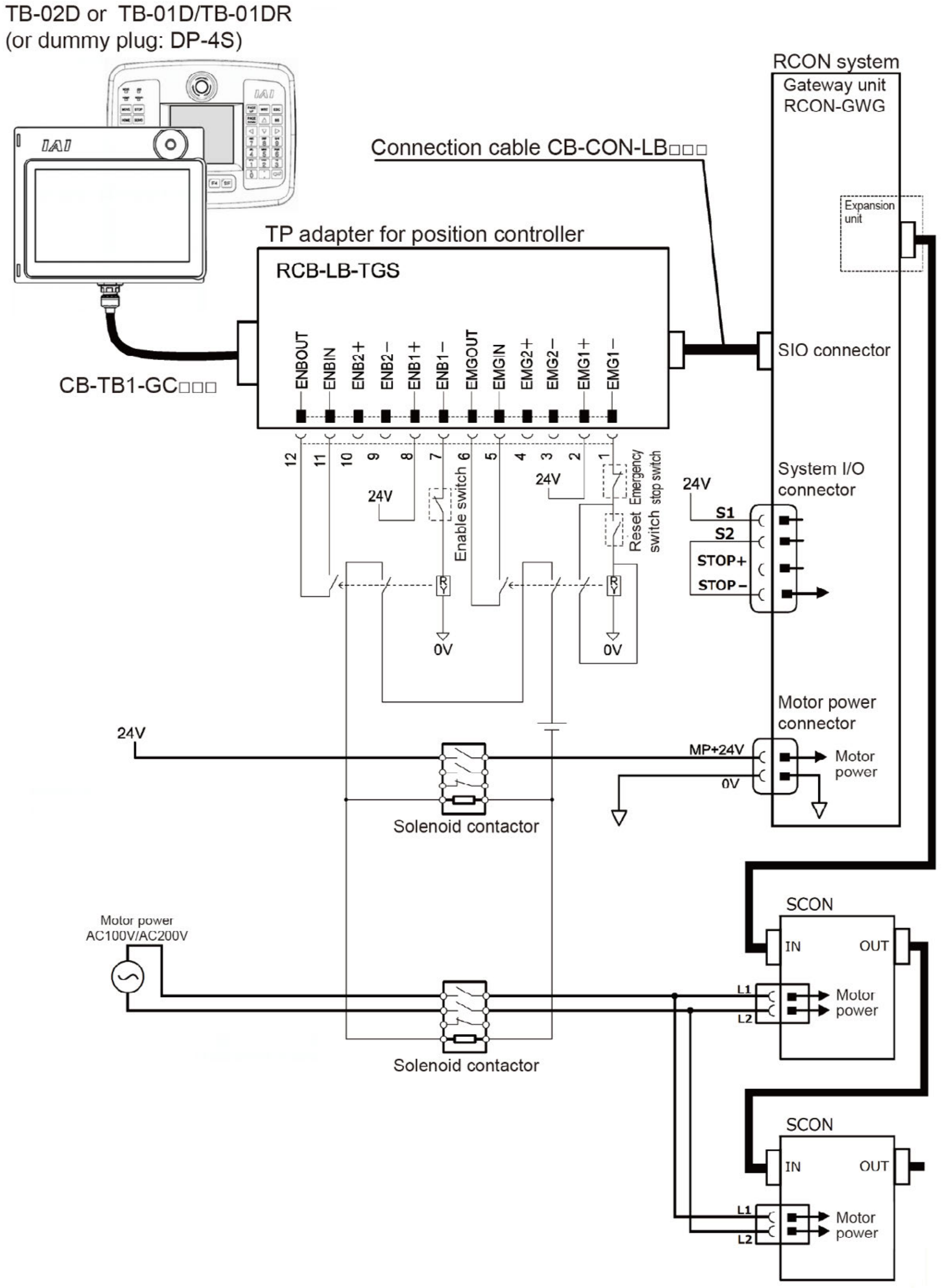
Note 1 : The gateway unit complied with Safety Categories (RCON-GWG) is not equipped with a relay to switch over the lines by automatic identification of a teaching tool being inserted to the SIO connector.

[1] -2 Category 1 (When connecting RCON-SC (single-phase 200V))



The electromagnetic contactor cuts off the motor power supply to 24V and 200V.
In this example for a circuit, the drive is cut off at the power supply input connector MP+24V on the gateway and 200V AC on RCON-PS2. It is also available to have a circuit to cut off at the drive cutoff connector MPO and MPI on 24 V driver unit.
Cut off the 200V AC for RCON-PS2.

[1] -3 Category 1 (When connecting SCON using an SCON extension unit)

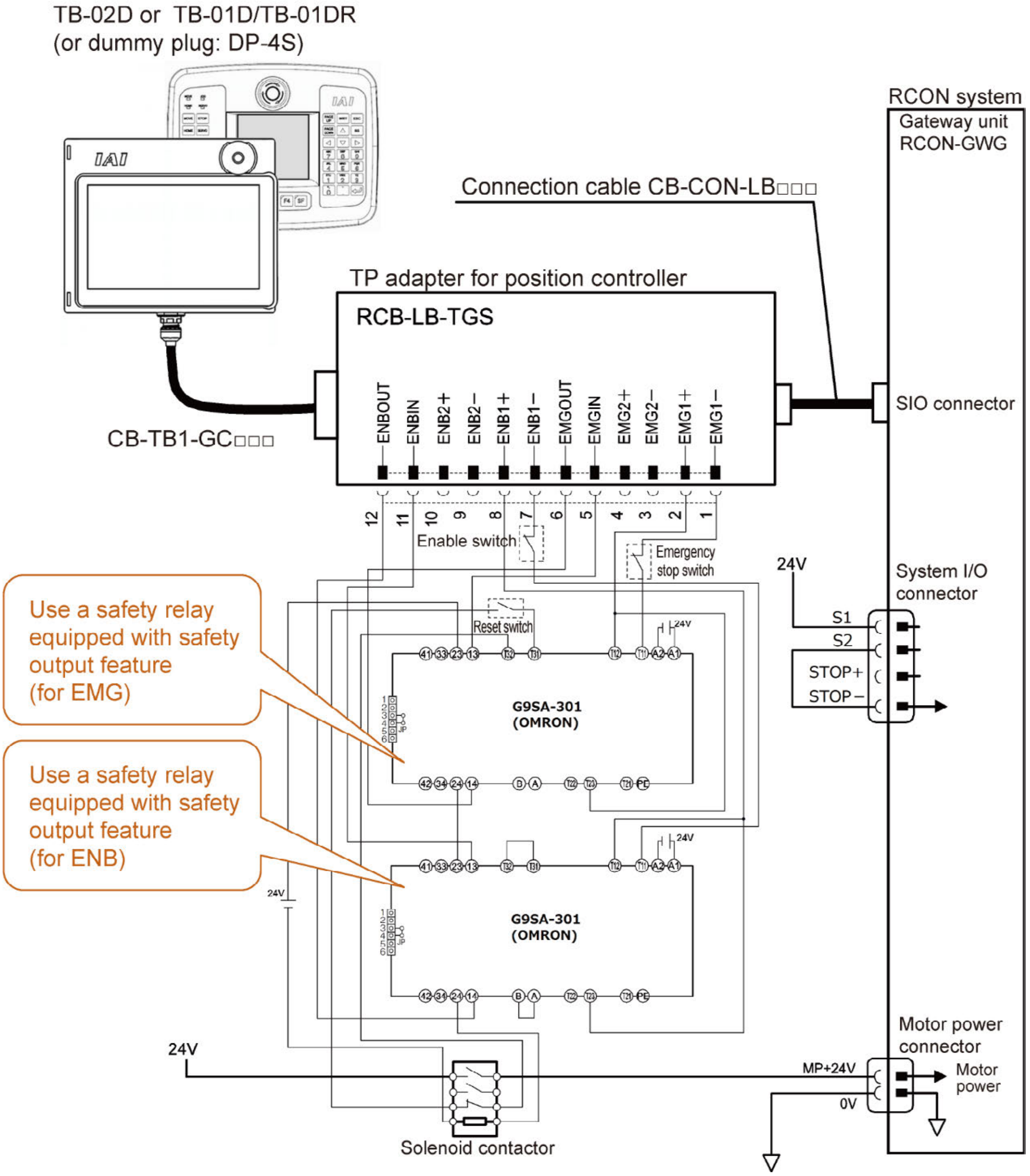


The electromagnetic contactor cuts off the motor power supply to RCON and SCON.
In this example of circuit, the RCON circuit cuts off the power input connector MP+24V on the gateway unit. However, it is available also to have a circuit to cut off the drive cutoff connectors MPO and MPI on each driver unit.

[Safety category 2] Summary of Requirements

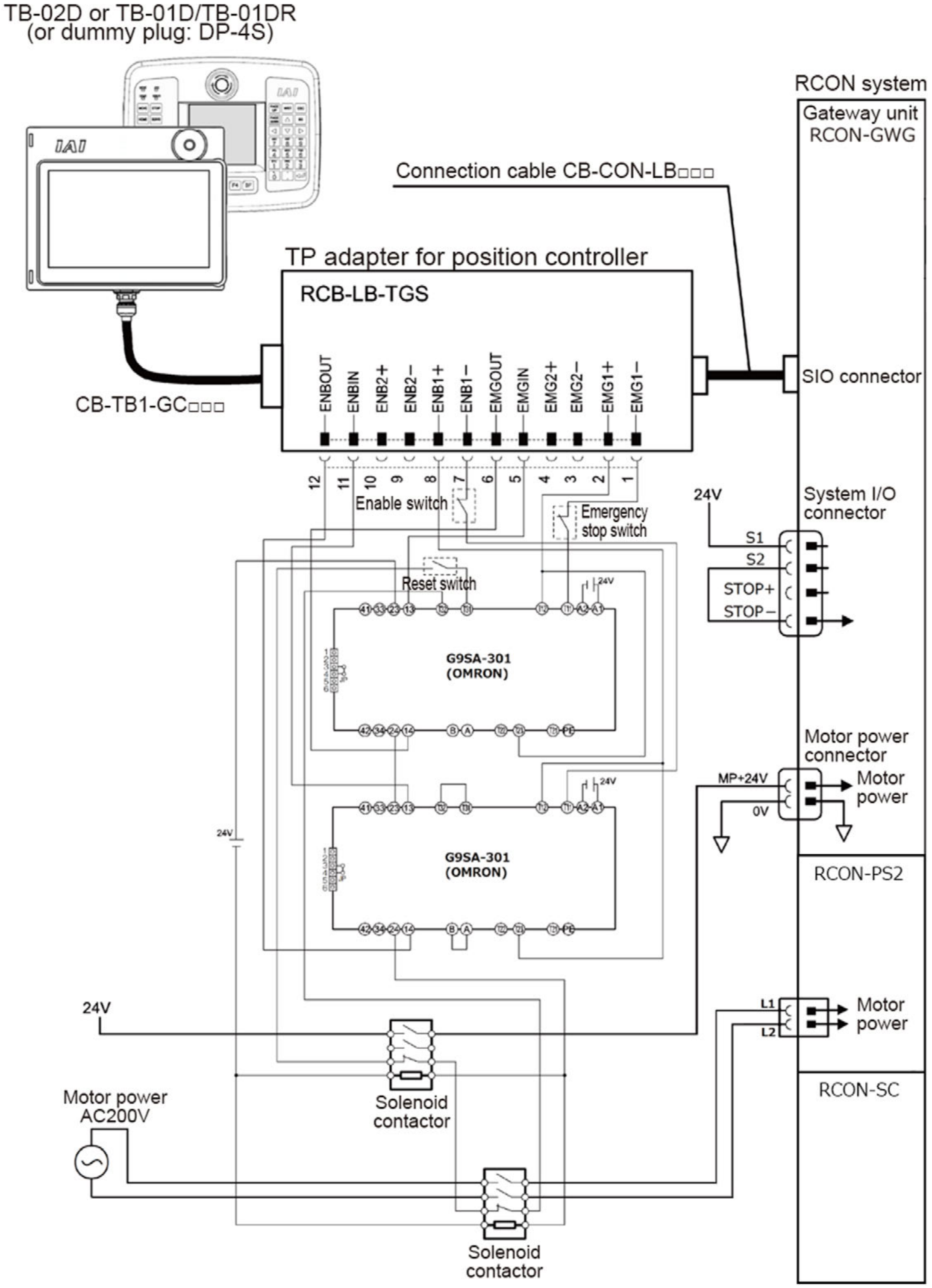
- Follow the safety principles to ensure safe.
- The safety function(s) shall be checked periodically by the machine control system.

[2] -1 Category 2 (When SCON is not to be connected)



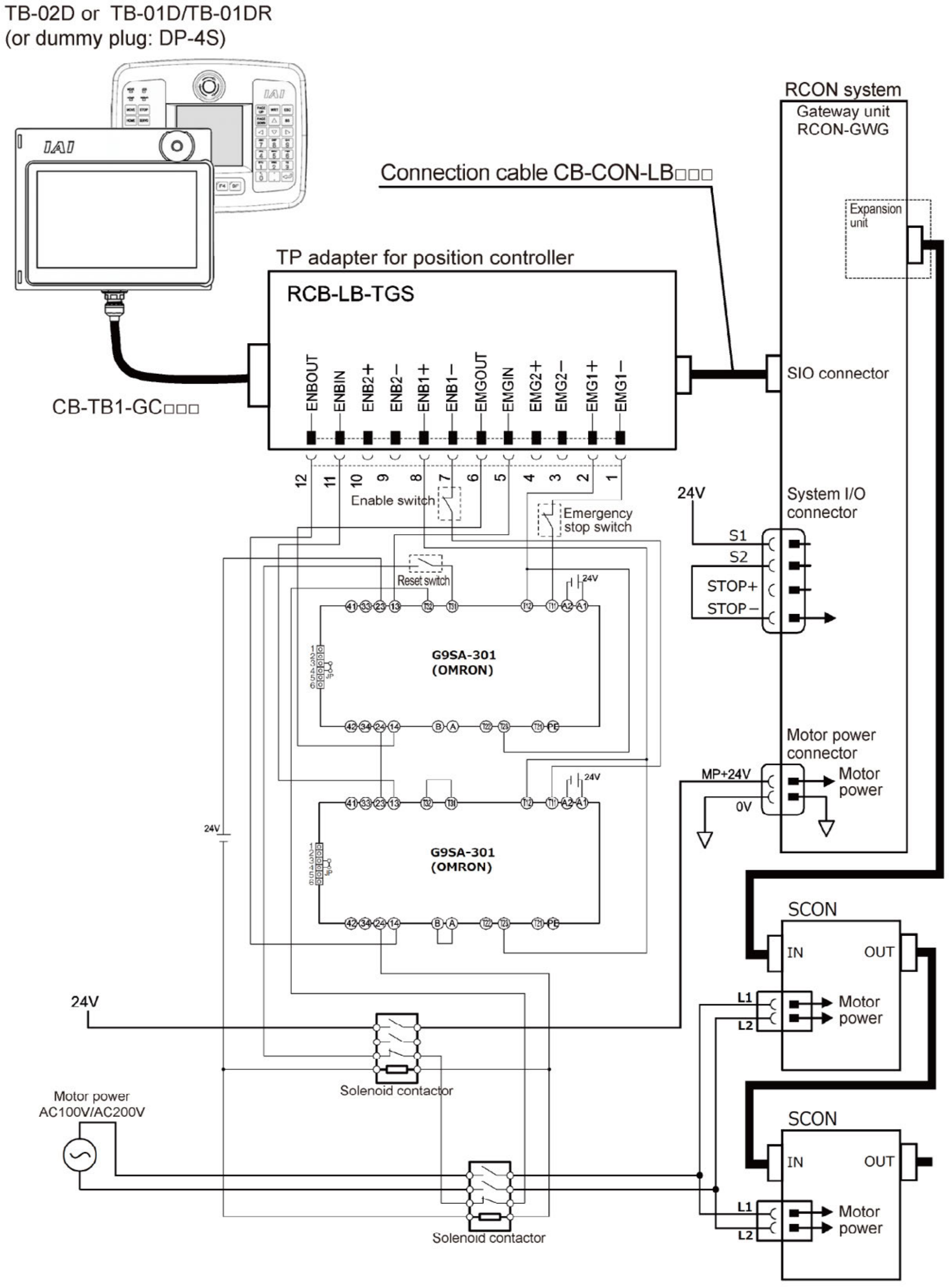
In this example of circuit, the electromagnetic contactor cuts off the power input connector MP+24V on the gateway unit. However, it is available also to have a circuit to cut off the drive cutoff connectors MPO and MPI on each driver unit.

[2] -2 Category 2 (When connecting RCON-SC (single-phase 200V))



The electromagnetic contactor cuts off the motor power supply to 24V and 200V.
In this example for a circuit, the drive is cut off at the power supply input connector MP+24V on the gateway and 200V AC on RCON-PS2. It is also available to have a circuit to cut off at the drive cutoff connector MPO and MPI on 24V driver unit.
Cut off the 200V AC for RCON-PS2.

[2] -3 Category 2 (When connecting SCON using an SCON extension unit)

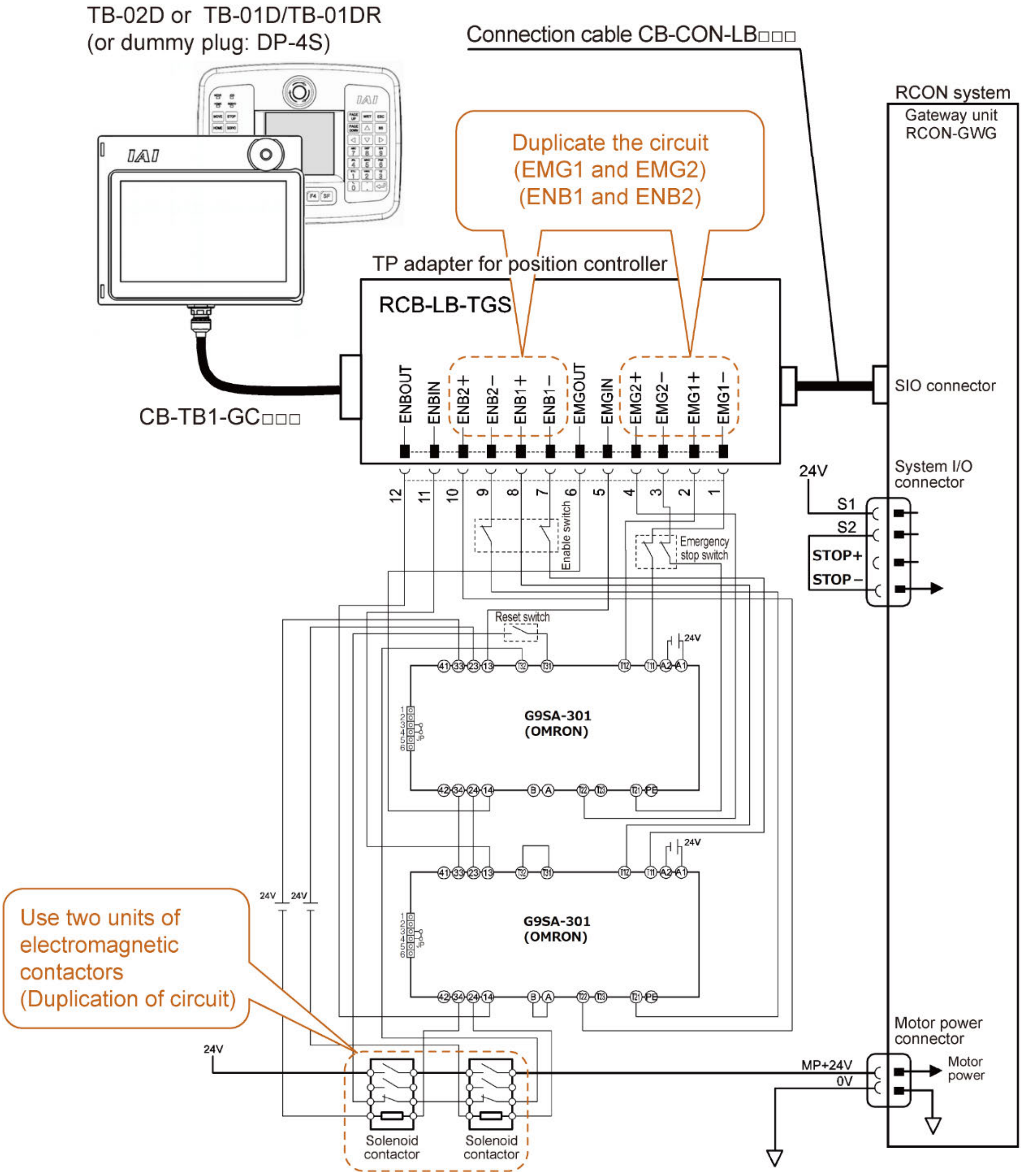


The electromagnetic contactor cuts off the motor power supply to RCON and SCON.
In this example of circuit, the RCON circuit cuts off the power input connector MP+24V on the gateway unit. However, it is available also to have a circuit to cut off the drive cutoff connectors MPO and MPI on each driver unit.

[Safety category 3] Summary of Requirements

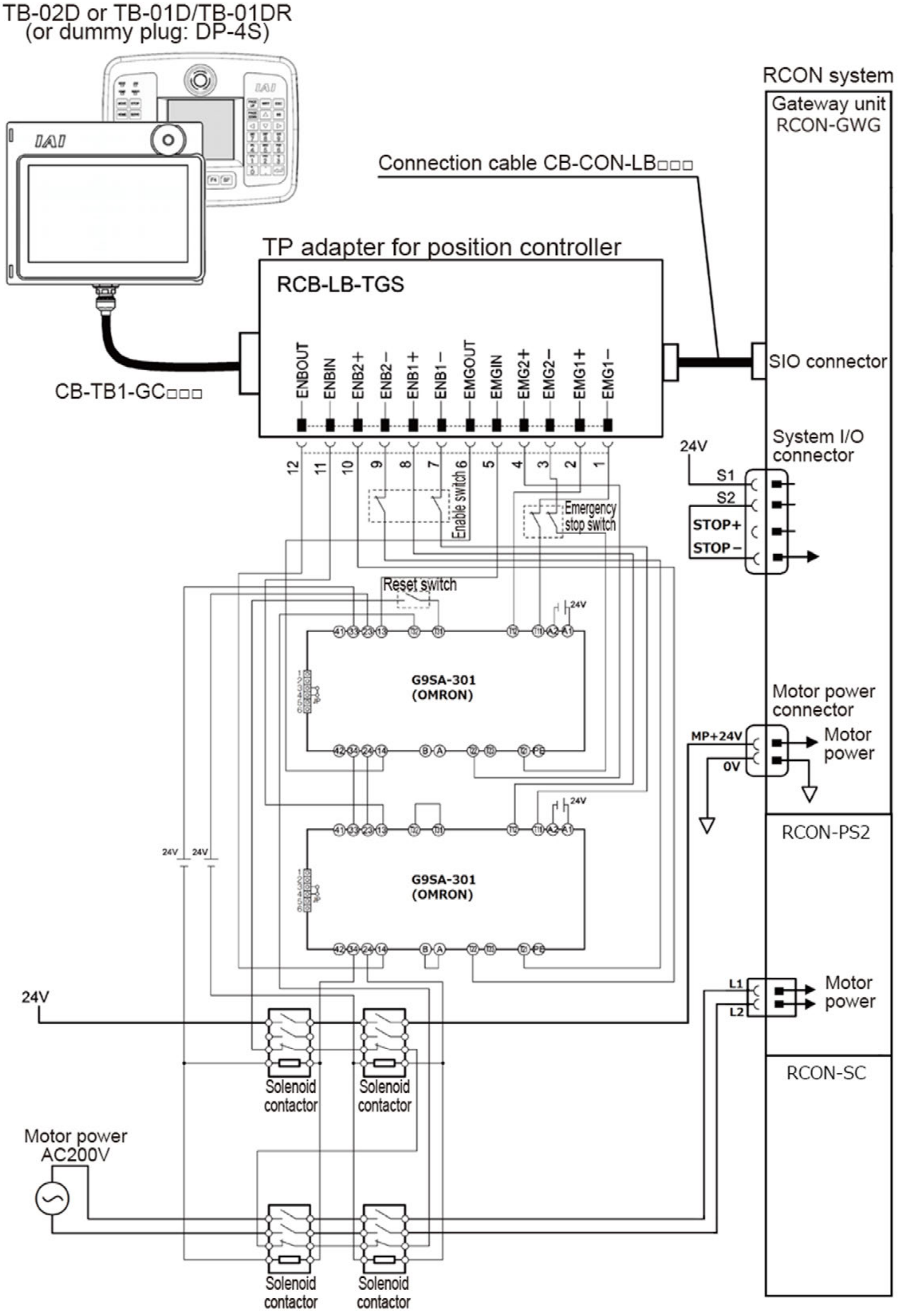
- Follow the safety principles to ensure safety.
- The safety related parts shall be designed under the following directions
  - (1) A single fault in any of its parts shall not lead to the loss of a safety function.
  - (2) A single fault shall be detected as much as possible.

[3] -1 Category 3 (When SCON is not to be connected)



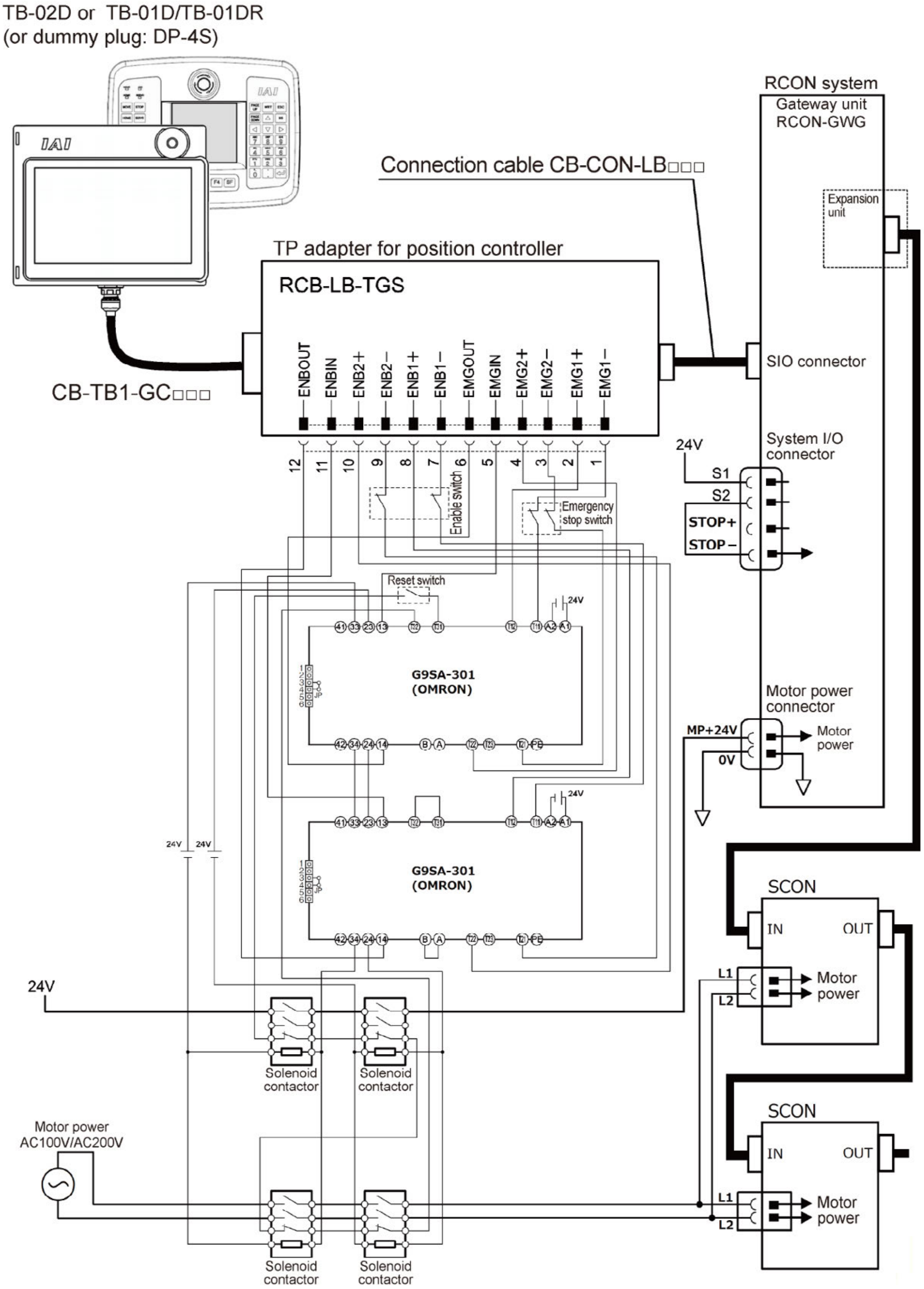
In this example of circuit, the electromagnetic contactor cuts off the power input connector MP+24V on the gateway unit. However, it is available also to have a circuit to cut off the drive cutoff connectors MPO and MPI on each driver unit.

[3] -2 Category 3 (When connecting RCON-SC (single-phase 200V))



The electromagnetic contactor cuts off the motor power supply to 24V and 200V.
In this example for a circuit, the drive is cut off at the power supply input connector MP+24V on the gateway and 200V AC on RCON-PS2. It is also available to have a circuit to cut off at the drive cutoff connector MPO and MPI on 24 V driver unit.
Cut off the 200V AC for RCON-PS2.

[3] -3 Category 3 (When connecting SCON using an SCON extension unit)

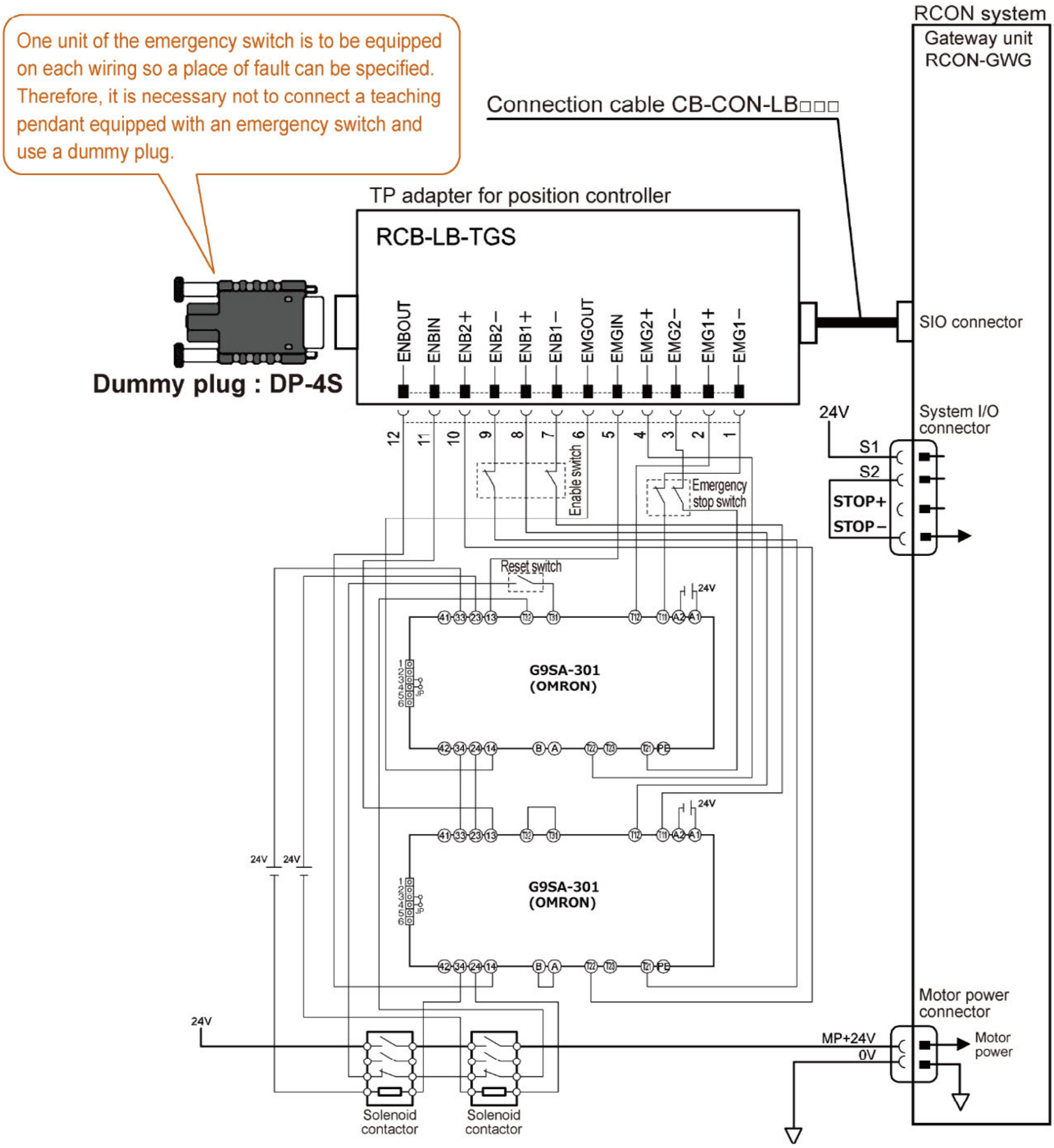


The electromagnetic contactor cuts off the motor power supply to RCON and SCON.
In this example of circuit, the RCON circuit cuts off the power input connector MP+24V on the gateway unit. However, it is available also to have a circuit to cut off the drive cutoff connectors MPO and MPI on each driver unit.

[Safety category 4] Summary of Requirements

- Follow the safety principles to ensure safety.
- The safety related parts shall be designed under the following directions
  (1) A single fault in any of its parts shall not lead to the loss of a safety function.
  (2) The single fault shall be detected at or before the next demand on the safety function. If this detection is not possible then an accumulation of faults shall not lead to a loss of safety function.

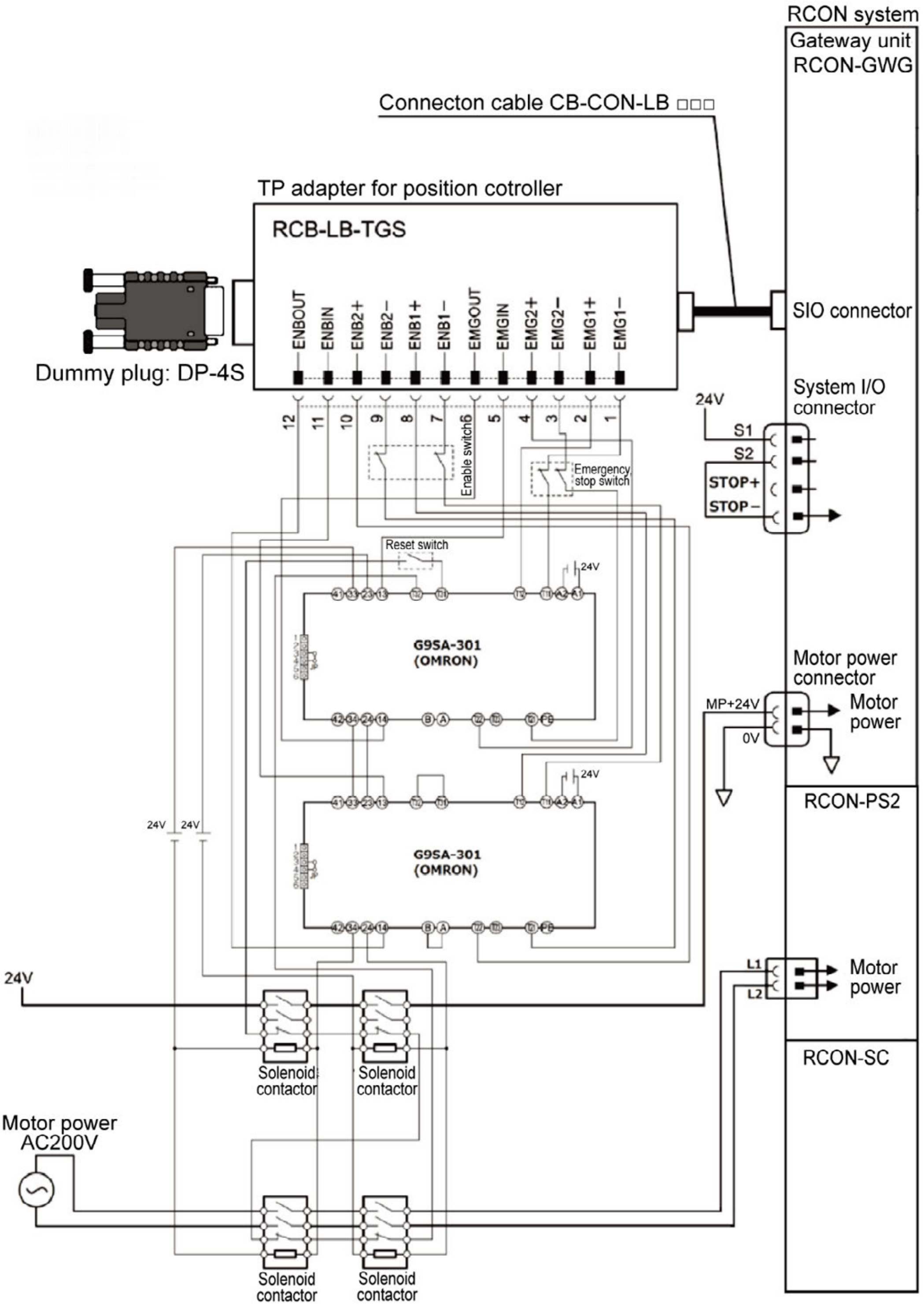
[4]-1 Category 4 (When SCON is not to be connected)



One unit of the emergency switch is to be equipped on each wiring so a place of fault can be specified. Therefore, it is necessary not to connect a teaching pendant equipped with an emergency switch and use a dummy plug.

In this example of circuit, the electromagnetic contactor cuts off the power input connector MP+24V on the gateway unit. However, it is available also to have a circuit to cut off the drive cutoff connectors MPO and MPI on each driver unit.

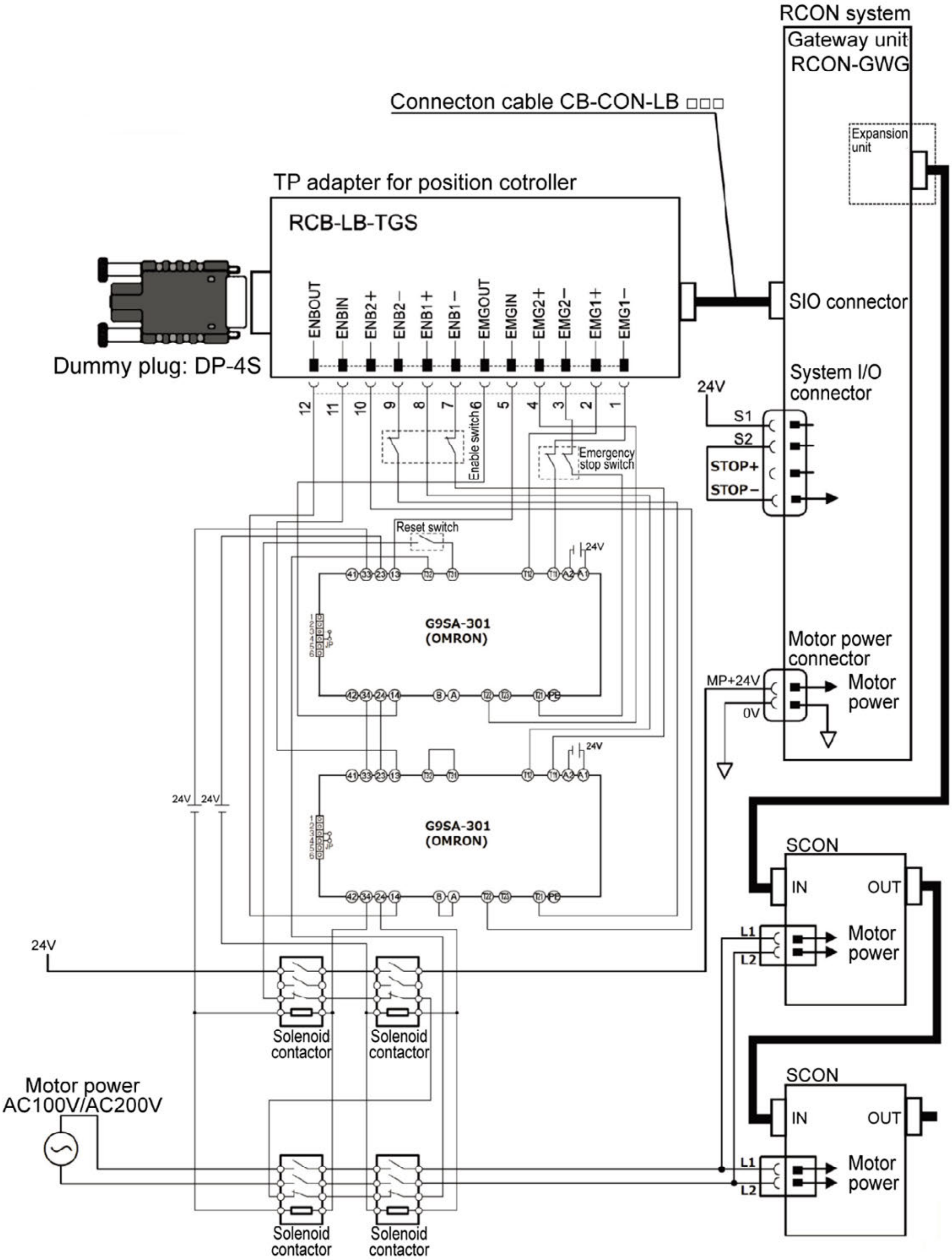
[4] -2 Category 4 (When connecting RCON-SC (single-phase 200V))



The electromagnetic contactor cuts off the motor power supply to 24V and 200V.
In this example for a circuit, the drive is cut off at the power supply input connector MP+24V on the gateway and 200V AC on RCON-PS2. It is also available to have a circuit to cut off at the drive cutoff connector MPO and MPI on 24 V driver unit.

Cut off the 200V AC for RCON-PS2.

[4] -3 Category 4 (When connecting SCON using an SCON extension unit)

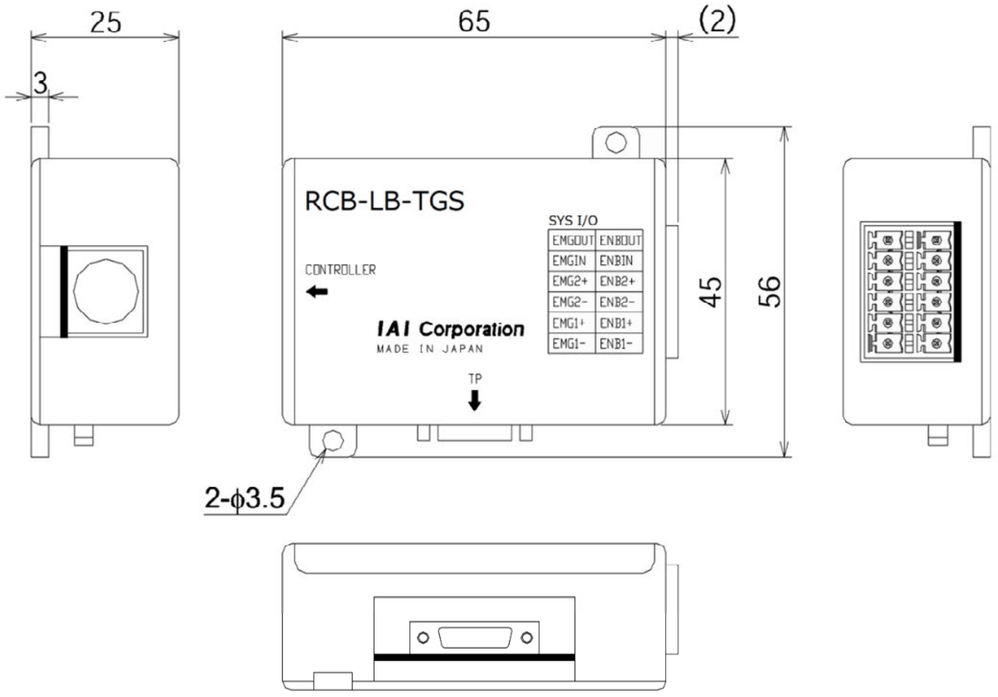


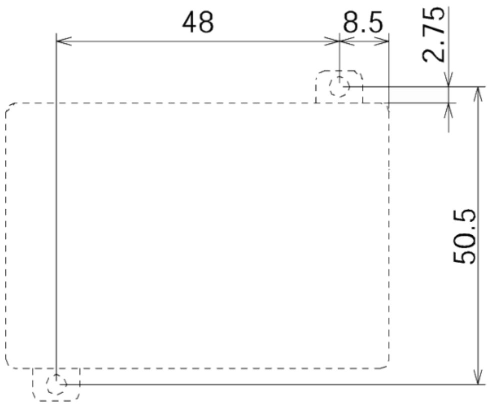
The electromagnetic contactor cuts off the motor power supply to RCON and SCON.
In this example of circuit, the RCON circuit cuts off the power input connector MP+24V on the gateway unit. However, it is available also to have a circuit to cut off the drive cutoff connectors MPO and MPI on each driver unit.

TP Adapter and Related Parts

[TP Adapter]

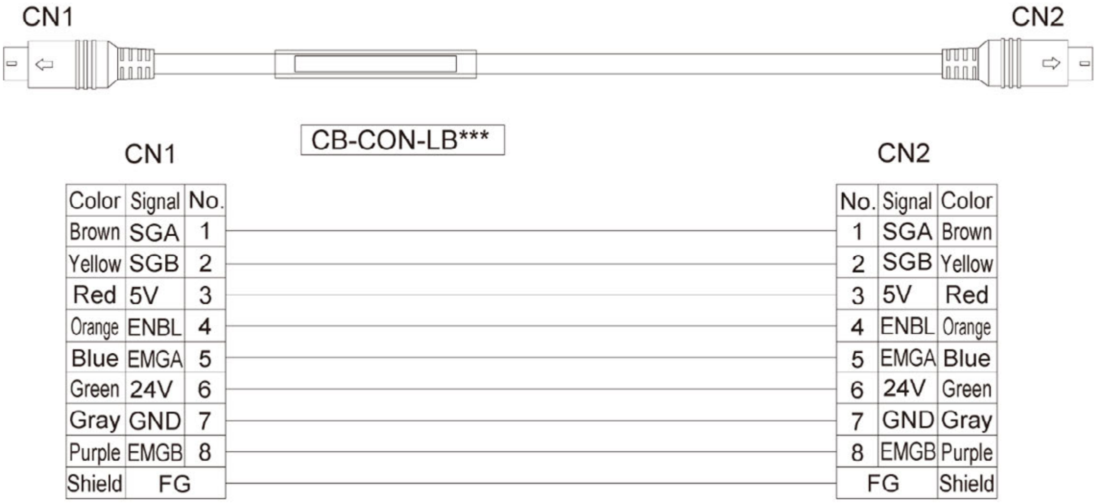
External dimensions





[Connection cable]

- Connection Cable between Gateway Unit and TP Adapter
  Use this cable to connect the gateway unit and TP adapter.
  Model : CB-CON-LB005 (standard cable length : 0.5m)
  Maximum cable length : 2.0m

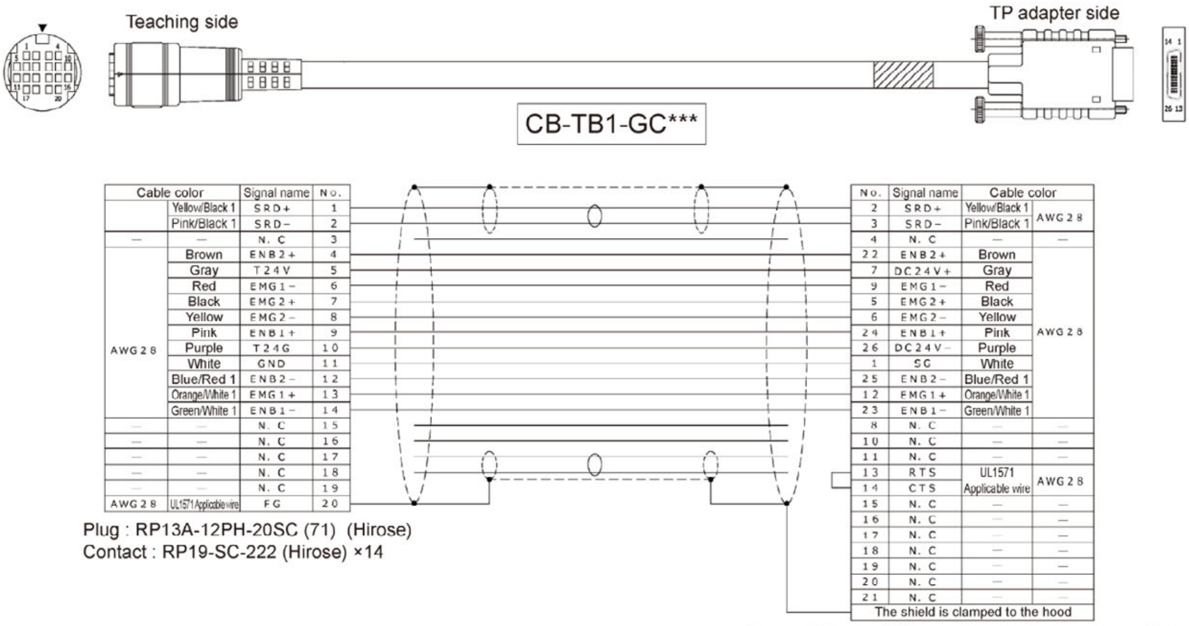


Color	Signal	No.
Brown	SGA	1
Yellow	SGB	2
Red	5V	3
Orange	ENBL	4
Blue	EMGA	5
Green	24V	6
Gray	GND	7
Purple	EMGB	8
Shield	FG	

No.	Signal	Color
1	SGA	Brown
2	SGB	Yellow
3	5V	Red
4	ENBL	Orange
5	EMGA	Blue
6	24V	Green
7	GND	Gray
8	EMGB	Purple
	FG	Shield

8PIN MIN DIN Connector (Integrally molded)   8PIN MIN DIN Connector (Integrally molded)

- Connection Cable between Teaching Pendant and TP Adapter
  Use this cable to connect the teaching pendant and TP adapter.
  Model : CB- TB1-GC□□□
  Maximum cable length : 10.0m, Minimum cable length : 0.2m



Cable color		Signal name	No.
	Yellow/Black 1	SRD+	1
	Pink/Black 1	SRD−	2
—	—	N. C	3
AWG28	Brown	ENB2+	4
	Gray	T24V	5
	Red	EMG1−	6
	Black	EMG2+	7
	Yellow	EMG2−	8
	Pink	ENB1+	9
	Purple	T24G	10
	White	GND	11
	Blue/Red 1	ENB2−	12
	Orange/White 1	EMG1+	13
	Green/White 1	ENB1−	14
—	—	N. C	15
—	—	N. C	16
—	—	N. C	17
—	—	N. C	18
—	—	N. C	19
AWG28	UL1571 Applicable wire	FG	20

Plug : RP13A-12PH-20SC (71) (Hirose)
Contact : RP19-SC-222 (Hirose) ×14

No.	Signal name	Cable color	
2	SRD+	Yellow/Black 1	AWG28
3	SRD−	Pink/Black 1	
4	N. C	—	—
22	ENB2+	Brown	AWG28
7	DC24V+	Gray	
9	EMG1−	Red	
5	EMG2+	Black	
6	EMG2−	Yellow	
24	ENB1+	Pink	
26	DC24V−	Purple	
1	SG	White	
25	ENB2−	Blue/Red 1	
12	EMG1+	Orange/White 1	
23	ENB1−	Green/White 1	
8	N. C	—	—
10	N. C	—	—
11	N. C	—	—
13	RTS	UL1571 Applicable wire	AWG28
14	CTS		
15	N. C	—	—
16	N. C	—	—
17	N. C	—	—
18	N. C	—	—
19	N. C	—	—
20	N. C	—	—
21	N. C	—	—
The shield is clamped to the hood			

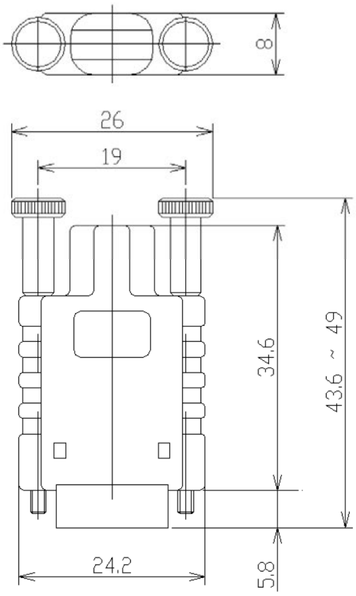
Plug : HDR-E26MSG1 + (Honda Tsushin Kogyo Col., Ltd.)
Case : HDR-E26LPH (Honda Tsushin Kogyo Col., Ltd.)

[Dummy plug]

Connect a dummy plug to the teaching pendant connecting connector.
Make sure to connect a dummy plug if the AUTO mode is specified.
Without the connection, it will be the emergency stop condition.
Model: DP-4S

DP-4S

Plug: HDR-E26MSG1



Signal	No.
GND	1
EMGS	2
VCC	3
DTR	4
EMGOUT2	5
EMGIN2	6
NC	7
RSVCC	8
EMGIN1	9
NC	10
NC	11
EMGOUT1	12
RTS	13
CTS (GND)	14
TXD	15
RXD	16
DSR	17
NC	18
NC	19
RSVTBX1	20
RSVTBX2	21
ENBVCC2	22
ENBTBX1	23
ENBVCC1	24
ENBTBX2	25
GND	26

Short-circuit processing.

Appendix

Chapter 2

Connectable Actuators

2.1 List of Actuator Specifications

The specifications included in this list are limited to those needed to set operating conditions and parameters. For other detailed specifications, refer to the catalog or operation manual for your actuator.
Also, refer to an instruction manual of each ELECYLINDER for the ELECYLINDER specifications.

Caution

- The push force is based on the rated push speed (factory setting) indicated in the list, and provides only a guideline.
- Make sure the actual push force is equal to or greater than the minimum push force. If not, the push force will not stabilize.
- Do not change the setting of push speed (parameter No.34). If you must change the push speed, consult IAI.
- If, among the operating conditions, the positioning speed is set to a value equal to or smaller than the push speed, the push speed will become the set speed and the specified push force will not generate.

Specifications for Pulse Motor Type Actuator

RCP6 Series

Actuator series	Type	Feed screw	No. of encoder pulses	Lead [mm]	Mounting direction	Minimum speed [mm/s]	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCP6 RCP6CR (Slider type) Standard type / Cleanroom type	[Standard] SA4C SA4R [Cleanroom] SA4C	Ball screw	8192	16	Horizontal	20	1260 (at 50 to 400st) 1060 (at 450st) 875 (at 500st)	1	21	48	20
					Vertical		SA4C: 1260 (at 50 to 400st) 1060 (at 450st) 875 (at 500st) SA4R: 1120 (at 50 to 400st) 1060 (at 450st) 875 (at 500st)	0.5			
				10	Horizontal	13	785 (at 50 to 400st) 675 (at 450st) 555 (at 500st)	1	22	77	
					Vertical			0.5			
				5	Horizontal	7	390 (at 50 to 400st) 330 (at 450st) 275 (at 500st)	1	44	155	
					Vertical			0.5			
				2.5	Horizontal	4	195 (at 50 to 400st) 165 (at 450st) 135 (at 500st)	1	89	310	
					Vertical			0.5			

Note *The values of the maximum velocity and maximum acceleration/deceleration for RCP6/RCP6CR/RCP6W are the ones when the high-output feature is activated. (There are also some models that are not related to the high-output setting.)*

RCP6 Series

Actuator series	Type	Feed screw	No. of encoder pulses	Lead [mm]	Mounting direction	Minimum speed [mm/s]	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCP6 RCP6CR (Slider type) Standard type / Cleanroom type	[Standard] SA6C SA6R [Cleanroom] SA6C	Ball screw	8192	20	Horizontal	25	SA6C: 1440 (at 50 to 450st) 1335 (at 500st) 1130 (at 550st) 970 (at 600st) 840 (at 650st) 735 (at 700st) 650 (at 750st) 575 (at 800st) SA6R: 1280 (at 50 to 500st) 1130 (at 550st) 970 (at 600st) 840 (at 650st) 735 (at 700st) 650 (at 750st) 575 (at 800st)	1	16	56	20
					Vertical		SA6C: 1280 (at 50 to 500st) 1130 (at 550st) 970 (at 600st) 840 (at 650st) 735 (at 700st) 650 (at 750st) 575 (at 800st) SA6R: 1120 (at 50 to 550st) 970 (at 600st) 840 (at 650st) 735 (at 700st) 650 (at 750st) 575 (at 800st)	0.5			
				12	Horizontal	15	900 (at 50 to 400st) 885 (at 450st) 735 (at 500st) 620 (at 550st) 535 (at 600st) 460 (at 650st) 405 (at 700st) 355 (at 750st) 315 (at 800st)	1	27	93	
					Vertical		SA6C: 900 (at 50 to 400st) 885 (at 450st) 735 (at 500st) 620 (at 550st) 535 (at 600st) 460 (at 650st) 405 (at 700st) 355 (at 750st) 315 (at 800st) SA6R: 800 (at 50 to 450st) 735 (at 500st) 620 (at 550st) 535 (at 600st) 460 (at 650st) 405 (at 700st) 355 (at 750st) 315 (at 800st)	0.5	27	93	

Note *The values of the maximum velocity and maximum acceleration/deceleration for RCP6/RCP6CR/RCP6W are the ones when the high-output feature is activated. (There are also some models that are not related to the high-output setting.)*

RCP6 Series

Actuator series	Type	Feed screw	No. of encoder pulses	Lead [mm]	Mounting direction	Minimum speed [mm/s]	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCP6 RCP6CR (Slider type) Standard type / Cleanroom type	[Standard] SA6C SA6R [Cleanroom] SA6C	Ball screw	8192	6	Horizontal	8	450 (at 50 to 400st) 435 (at 450st) 365 (at 500st) 305 (at 550st) 265 (at 600st) 230 (at 650st) 200 (at 700st) 175 (at 750st) 155 (at 800st)	1	53	185	20
					Vertical			0.5			
				3	Horizontal	4	225 (at 50 to 400st) 215 (at 450st) 180 (at 500st) 150 (at 550st) 130 (at 600st) 115 (at 650st) 100 (at 700st) 85 (at 750st) 75 (at 800st)	1	106	370	
					Vertical			0.5			
	[Standard] SA7C SA7R [Cleanroom] SA7C	Ball screw	8192	24	Horizontal	30	SA7C: 1200 (at 50 to 600st) 1095 (at 650st) 965 (at 700st) 850 (at 750st) 760 (at 800st) SA7R: 1080 (at 50 to 650st) 965 (at 700st) 850 (at 750st) 760 (at 800st)	1	40	139	20
					Vertical			0.5			
				16	Horizontal	20	SA7C: 980 (at 50 to 500st) 965 (at 550st) 830 (at 600st) 720 (at 650st) 635 (at 700st) 560 (at 750st) 500 (at 800st) SA7R: 840 (at 50 to 550st) 830 (at 600st) 720 (at 650st) 635 (at 700st) 560 (at 750st) 500 (at 800st)	1	60	209	
					Vertical		SA7C: 840 (at 50 to 550st) 830 (at 600st) 720 (at 650st) 635 (at 700st) 560 (at 750st) 500 (at 800st) SA7R: 700 (at 50 to 650st) 635 (at 700st) 560 (at 750st) 500 (at 800st)	0.5			

Note The values of the maximum velocity and maximum acceleration/deceleration for RCP6/RCP6CR/RCP6W are the ones when the high-output feature is activated. (There are also some models that are not related to the high-output setting.)

RCP6 Series

Actuator series	Type	Feed screw	No. of encoder pulses	Lead [mm]	Mounting direction	Minimum speed [mm/s]	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCP6 RCP6CR (Slider type) Standard type / Cleanroom type	[Standard] SA7C SA7R [Cleanroom] SA7C	Ball screw	8192	8	Horizontal	10	SA7C: 490 (at 50 to 500st) 475 (at 550st) 410 (at 600st) 355 (at 650st) 315 (at 700st) 275 (at 750st) 245 (at 800st) SA7R: 420 (at 50 to 550st) 410 (at 600st) 355 (at 650st) 315 (at 700st) 275 (at 750st) 245 (at 800st)	1	119	418	20
					Vertical			0.5			
				4	Horizontal	5	SA7C: 245 (at 50 to 500st) 235 (at 550st) 205 (at 600st) 175 (at 650st) 155 (at 700st) 135 (at 750st) 120 (at 800st) SA7R: 210 (at 50 to 550st) 205 (at 600st) 175 (at 650st) 155 (at 700st) 135 (at 750st) 120 (at 800st)	1	239	836	
					Vertical		210 (at 50 to 550st) 205 (at 600st) 175 (at 650st) 155 (at 700st) 135 (at 750st) 120 (at 800st)	0.5			
	[Standard] SA8C SA8R [Cleanroom] SA8C	Ball screw	8192	30	Horizontal	38	1200 (at 50 to 750st) 1155 (at 800st) 1040 (at 850st) 940 (at 900st) 855 (at 950st) 780 (at 1000st) 715 (at 1050st) 660 (at 1100st)	1	46	159	20
					Vertical		850 (at 50 to 950st) 780 (at 1000st) 715 (at 1050st) 660 (at 1100st)	0.5			
				20	Horizontal	25	1000 (at 50 to 650st) 950 (at 700st) 860 (at 750st) 770 (at 800st) 695 (at 850st) 630 (at 900st) 570 (at 950st) 520 (at 1000st) 480 (at 1050st) 440 (at 1100st)	1	68	239	

Note The values of the maximum velocity and maximum acceleration/deceleration for RCP6/RCP6CR/RCP6W are the ones when the high-output feature is activated. (There are also some models that are not related to the high-output setting.)

RCP6 Series

Actuator series	Type	Feed screw	No. of encoder pulses	Lead [mm]	Mounting direction	Minimum speed [mm/s]	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCP6 RCP6CR (Slider type) Standard type / Cleanroom type	[Standard] SA8C SA8R [Cleanroom] SA8C	Ball screw	8192	20	Vertical	25	800 (at 50 to 750st) 770 (at 800st) 695 (at 850st) 630 (at 900st) 570 (at 950st) 520 (at 1000st) 480 (at 1050st) 440 (at 1100st)	0.5	68	239	20
				10	Horizontal	13	500 (at 50 to 650st) 480 (at 700st) 430 (at 750st) 385 (at 800st) 345 (at 850st) 310 (at 900st) 285 (at 950st) 260 (at 1000st) 235 (at 1050st) 220 (at 1100st)	1	137	478	
					Vertical			0.5			
				5	Horizontal	7	SA8C: 250 (at 50 to 650st) 240 (at 700st) 215 (at 750st) 190 (at 800st) 175 (at 850st) 155 (at 900st) 140 (at 950st) 130 (at 1000st) 120 (at 1050st) 110 (at 1100st) SA8R: 250 (at 50 to 650st) 240 (at 700st) 215 (at 750st) 190 (at 800st) 175 (at 850st) 155 (at 900st) 145 (at 950st) 130 (at 1000st) 120 (at 1050st) 110 (at 1100st)	1	273	956	
					Vertical			0.5			
RCP6 RCP6CR (Wide slider type) Standard type / Cleanroom type	[Standard] WSA10C WSA10R [Cleanroom] WSA10C	Ball screw	8192	16	Horizontal	20	840 (at 50 to 400st) 775 (at 450st) 660 (at 500st)	1	21	48	20
				10	Horizontal	13	610 (at 50 to 350st) 590 (at 400st) 490 (at 450st) 415 (at 500st)	1	22	77	
				5	Horizontal	7	390 (at 50 to 300st) 355 (at 350st) 290 (at 400st) 245 (at 450st) 205 (at 500st)	1	44	155	
					Vertical		WSA10C: 350 (at 50 to 350st) 290 (at 400st) 245 (at 450st) 205 (at 500st) WSA10R: 305 (at 50 to 350st) 290 (at 400st) 245 (at 450st) 205 (at 500st)	0.5			

Note The values of the maximum velocity and maximum acceleration/deceleration for RCP6/RCP6CR/RCP6W are the ones when the high-output feature is activated. (There are also some models that are not related to the high-output setting.)

RCP6 Series

Actuator series	Type	Feed screw	No. of encoder pulses	Lead [mm]	Mounting direction	Minimum speed [mm/s]	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCP6 RCP6CR (Wide slider type) Standard type / Cleanroom type	[Standard] WSA10C WSA10R [Cleanroom] WSA10C	Ball screw	8192	2.5	Horizontal	4	195 (at 50 to 300st) 175 (at 350st) 145 (at 400st) 120 (at 450st) 100 (at 500st)	1	89	310	20
					Vertical		175 (at 50 to 350st) 145 (at 400st) 120 (at 450st) 100 (at 500st)	0.5			
	[Standard] WSA12C WSA12R [Cleanroom] WSA12C	Ball screw	8192	20	Horizontal	25	800 (at 50 to 600st) 740 (at 650st) 650 (at 700st) 580 (at 750st) 520 (at 800st)	1	16	56	20
				12	Horizontal	15	600 (at 50 to 500st) 535 (at 550st) 465 (at 600st) 405 (at 650st) 355 (at 700st) 315 (at 750st) 285 (at 800st)	1	27	93	
				6	Horizontal	8	450 (at 50 to 350st) 435 (at 400st) 365 (at 450st) 310 (at 500st) 265 (at 550st) 230 (at 600st) 200 (at 650st) 175 (at 700st) 155 (at 750st) 140 (at 800st)	1	53	185	
					Vertical		400 (at 50 to 400st) 365 (at 450st) 310 (at 500st) 265 (at 550st) 230 (at 600st) 200 (at 650st) 175 (at 700st) 155 (at 750st) 140 (at 800st)	0.5			
				3	Horizontal	4	225 (at 50 to 350st) 215 (at 400st) 180 (at 450st) 150 (at 500st) 130 (at 550st) 115 (at 600st) 100 (at 650st) 85 (at 700st) 75 (at 750st) 70 (at 800st)	1	106	370	
					Vertical			0.5			
	[Standard] WSA14C WSA14R [Cleanroom] WSA14C	Ball screw	8192	24	Horizontal	30	700 (at 50 to 750st) 665 (at 800st)	1	40	139	20
				16	Horizontal	20	560 (at 50 to 650st) 550 (at 700st) 490 (at 750st) 440 (at 800st)	1	60	209	

Note The values of the maximum velocity and maximum acceleration/deceleration for RCP6/RCP6CR/RCP6W are the ones when the high-output feature is activated. (There are also some models that are not related to the high-output setting.)

Appendix

Chapter 2 Connectable Actuators

RCP6 Series

Actuator series	Type	Feed screw	No. of encoder pulses	Lead [mm]	Mounting direction	Minimum speed [mm/s]	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCP6 RCP6CR (Wide slider type) Standard type / Cleanroom type	[Standard] WSA14C WSA14R [Cleanroom] WSA14C	Ball screw	8192	8	Horizontal	10	420 (at 50 to 500st) 400 (at 550st) 350 (at 600st) 305 (at 650st) 270 (at 700st) 240 (at 750st) 215 (at 800st)	1	119	418	20
					Vertical		350 (at 50 to 600st) 305 (at 650st) 270 (at 700st) 240 (at 750st) 215 (at 800st)	0.5			
				4	Horizontal	5	WSA14C: 210 (at 50 to 500st) 200 (at 550st) 170 (at 600st) 150 (at 650st) 135 (at 700st) 120 (at 750st) 105 (at 800st) WSA14R: 175 (at 50 to 550st) 170 (at 600st) 150 (at 650st) 135 (at 700st) 120 (at 750st) 105 (at 800st)	1	239	836	
					Vertical		175 (at 50 to 550st) 170 (at 600st) 150 (at 650st) 135 (at 700st) 120 (at 750st) 105 (at 800st)	0.5			
	[Standard] [Cleanroom] WSA16C	Ball screw	8192	20	Horizontal	25	720 (at 50 to 750st) 715 (at 800st) 645 (at 850st) 590 (at 900st) 535 (at 950st) 490 (at 1000st) 450 (at 1050st) 415 (at 1100st)	1	68	239	20
				10	Horizontal	13	450 (at 50 to 650st) 440 (at 700st) 395 (at 750st) 355 (at 800st) 320 (at 850st) 290 (at 900st) 265 (at 950st) 240 (at 1000st) 225 (at 1050st) 205 (at 1100st)	1	137	478	
					Vertical		240 (at 50 to 1000st) 225 (at 1050st) 205 (at 1100st)	0.5			

Note The values of the maximum velocity and maximum acceleration/deceleration for RCP6/RCP6CR/RCP6W are the ones when the high-output feature is activated. (There are also some models that are not related to the high-output setting.)

RCP6 Series

Actuator series	Type	Feed screw	No. of encoder pulses	Lead [mm]	Mounting direction	Minimum speed [mm/s]	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCP6 RCP6CR (Wide slider type) Standard type / Cleanroom type	[Standard] [Cleanroom] WSA16C	Ball screw	8192	5	Horizontal	7	195 (at 50 to 750st) 175 (at 800st) 160 (at 850st) 145 (at 900st) 130 (at 950st) 120 (at 1000st) 110 (at 1050st) 100 (at 1100st)	1	273	956	20
					Vertical		170 (at 50 to 800st) 160 (at 850st) 145 (at 900st) 130 (at 950st) 120 (at 1000st) 110 (at 1050st) 100 (at 1100st)	0.5			
RCP6 (Wide slider type)	[Standard] WSA16R	Ball screw	8192	20	Horizontal	25	600 (at 50 to 850st) 590 (at 900st) 535 (at 950st) 490 (at 1000st) 450 (at 1050st) 415 (at 1100st)	1	68	239	20
				10	Horizontal	13	365 (at 50 to 750st) 355 (at 800st) 320 (at 850st) 290 (at 900st) 265 (at 950st) 240 (at 1000st) 225 (at 1050st) 205 (at 1100st)	1	137	478	
					Vertical		210 (at 50 to 1050st) 205 (at 1100st)	0.5			
				5	Horizontal	7	170 (at 50 to 800st) 160 (at 850st) 145 (at 900st) 130 (at 950st) 120 (at 1000st) 110 (at 1050st) 100 (at 1100st)	1	273	956	
					Vertical		145 (at 50 to 900st) 130 (at 950st) 120 (at 1000st) 110 (at 1050st) 100 (at 1100st)	0.5			
RCP6 (Rod type)	RA4C RA4R	Ball screw	8192	16	Horizontal	20	840	1	21	48	20
					Vertical			0.5			
				10	Horizontal	13	RA4C: 700 RA4R: 610	1	22	77	
					Vertical			0.5			
				5	Horizontal	7	350	1	44	155	
					Vertical			0.5			
				2.5	Horizontal	4	175	1	88	310	
					Vertical			0.5			
	RA6C RA6R	Ball screw	8192	20	Horizontal	25	800	1	16	56	20
					Vertical			0.5			
				12	Horizontal	15	700	1	26	93	
					Vertical			0.5			
				6	Horizontal	8	450	1	53	185	
					Vertical			0.5			
				3	Horizontal	4	225	1	106	370	
					Vertical			0.5			

Note *The values of the maximum velocity and maximum acceleration/deceleration for RCP6/RCP6CR/RCP6W are the ones when the high-output feature is activated. (There are also some models that are not related to the high-output setting.)*

RCP6 Series

Actuator series	Type	Feed screw	No. of encoder pulses	Lead [mm]	Mounting direction	Minimum speed [mm/s]	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCP6 (Rod type)	RA7C RA7R	Ball screw	8192	24	Horizontal	30	RA7C: 860 RA7R: 800	1	52	182	20
					Vertical		640	0.5			
				16	Horizontal	20	RA7C: 700 RA7R: 560	1	78	273	
					Vertical		560	0.5			
				8	Horizontal	10	420	1	156	547	
					Vertical		350	0.5			
				4	Horizontal	5	RA7C: 210 RA7R: 175	1	312	1094	
					Vertical		175	0.5			
	RA8C RA8R	Ball screw	8192	20	Horizontal	25	RA8C: 600 RA8R: 400	0.2	167	500	10
					Vertical		RA8C: 450 RA8R: 400				
				10	Horizontal	13	RA8C: 300 RA8R: 200	0.2	333	1000	
					Vertical		RA8C: 250 RA8R: 200				
				5	Horizontal	7	RA8C: 150 RA8R: 100	0.1	667	2000	
					Vertical						
RCP6 (Radial cylinder)	RRA4C RRA4R	Ball screw	8192	16	Horizontal	20	RRA4C: 1120 (at 60 to 360st) 1080 (at 410st) RRA4R: 840	1	21	48	20
					Vertical			0.5			
				10	Horizontal	13	RRA4C: 700 (at 60 to 360st) 685 (at 410st) RRA4R: 610	1	22	77	
					Vertical			0.5			
				5	Horizontal	7	350 (at 60 to 360st) 340 (at 410st)	1	44	155	
					Vertical			0.5			
				2.5	Horizontal	4	175 (at 60 to 360st) 170 (at 410st)	1	89	310	
					Vertical			0.5			
	RRA6C RRA6R	Ball screw	8192	20	Horizontal	25	800	1	16	56	20
					Vertical			0.5			
				12	Horizontal	15	700	1	26	93	
					Vertical			0.5			
				6	Horizontal	8	450	1	53	185	
					Vertical			0.5			
				3	Horizontal	4	225 (at 65 to 365st) 220 (at 415st)	1	106	370	
					Vertical			0.5			
	RRA7C RRA7R	Ball screw	8192	24	Horizontal	30	860	1	52	182	20
					Vertical		640	0.5			
				16	Horizontal	20	RRA7C: 700 RRA7R: 560	1	78	273	
					Vertical		560	0.5			
				8	Horizontal	10	420	1	156	547	
					Vertical		RRA7C: 420 RRA7R: 350	0.5			
				4	Horizontal	5	RRA7C: 210 RRA7R: 175	1	312	1094	
					Vertical			0.5			

Note The values of the maximum velocity and maximum acceleration/deceleration for RCP6/RCP6CR/RCP6W are the ones when the high-output feature is activated. (There are also some models that are not related to the high-output setting.)

RCP6 Series

Actuator series	Type	Feed screw	No. of encoder pulses	Lead [mm]	Mounting direction	Minimum speed [mm/s]	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCP6 (Radial cylinder)	RRA8C	Ball screw	8192	20	Horizontal	25	280 (at 50st) 405 (at 100st) 505 (at 150st) 585 (at 200st) 600 (at 250 to 350st) 520 (at 400st) 440 (at 450st) 360 (at 500st) 320 (at 550st) 280 (at 600st) 240 (at 650st) 220 (at 700st)	0.2	167	500	10
					Vertical		280 (at 50st) 405 (at 100st) 450 (at 150 to 400st) 440 (at 450st) 360 (at 500st) 320 (at 550st) 280 (at 600st) 240 (at 650st) 220 (at 700st)				
				10	Horizontal	13	280 (at 50st) 300 (at 100 to 350st) 260 (at 400st) 220 (at 450st) 180 (at 500st) 160 (at 550st) 140 (at 600st) 120 (at 650st) 110 (at 700st)	0.2	333	1000	
					Vertical		250 (at 50 to 400st) 220 (at 450st) 180 (at 500st) 160 (at 550st) 140 (at 600st) 120 (at 650st) 110 (at 700st)				
				5	Horizontal /vertical	7	150 (at 50 to 350st) 130 (at 400st) 110 (at 450st) 90 (at 500st) 80 (at 550st) 70 (at 600st) 60 (at 650st) 55 (at 700st)	0.1	667	2000	
	RRA8R	Ball screw	8192	20	Horizontal /vertical	25	280 (at 50st) 400 (at 100 to 450st) 360 (at 500st) 320 (at 550st) 280 (at 600st) 240 (at 650st) 220 (at 700st)	0.2	167	500	10
				10	Horizontal /vertical	13	200 (at 50 to 450st) 180 (at 500st) 160 (at 550st) 140 (at 600st) 120 (at 650st) 110 (at 700st)	0.2	333	1000	

Note The values of the maximum velocity and maximum acceleration/deceleration for RCP6/RCP6CR/RCP6W are the ones when the high-output feature is activated. (There are also some models that are not related to the high-output setting.)

RCP6 Series

Actuator series	Type	Feed screw	No. of encoder pulses	Lead [mm]	Mounting direction	Minimum speed [mm/s]	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCP6 (Radial cylinder)	RRA8R	Ball screw	8192	5	Horizontal /vertical	7	100 (at 50 to 450st) 90 (at 500st) 80 (at 550st) 70 (at 600st) 60 (at 650st) 55 (at 700st)	0.1	667	2000	10
RCP6 (Wide radial cylinder)	WRA10C WRA10R	Ball screw	8192	16	Horizontal	20	700	WRA10C: 1 WRA10R: 0.7	21	48	20
				10	Horizontal	13	525 (at 50 to 450st) 490 (at 500st)	1	22	77	
				5	Horizontal	7	350 (at 50 to 400st) 290 (at 450st) 240 (at 500st)	1	44	155	
					Vertical		260 (at 50 to 450st) 240 (at 500st)	0.5			
				2.5	Horizontal	4	175 (at 50 to 400st) 145 (at 450st) 120 (at 500st)	1	89	310	
					Vertical		WRA10C: 175 (at 50 to 400st) 145 (at 450st) 120 (at 500st) WRA10R: 150 (at 50 to 400st) 145 (at 450st) 120 (at 500st)	0.5			
	WRA12C WRA12R	Ball screw	8192	20	Horizontal	25	800	1	16	56	20
				12	Horizontal	15	560	1	26	93	
				6	Horizontal	8	400 (at 50 to 450st) 375 (at 500st)	1	53	185	
					Vertical		WRA12C: 340 WRA12R: 280	0.5			
				3	Horizontal	4	225 (at 50 to 400st) 220 (at 450st) 185 (at 500st)	1	106	370	
					Vertical		200 (at 50 to 450st) 185 (at 500st)	0.5			
	WRA14C WRA14R	Ball screw	8192	24	Horizontal	30	630	1	52	182	20
				16	Horizontal	20	560	1	78	273	
				8	Horizontal	10	WRA14C: 420 (at 50 to 550st) 395 (at 600st) WRA14R: 350	1	156	547	
					Vertical		210	0.5			
				4	Horizontal	5	WRA14C: 210 (at 50 to 550st) 195 (at 600st) WRA14R: 175	1	312	1094	
					Vertical		130	0.5			

Note The values of the maximum velocity and maximum acceleration/deceleration for RCP6/RCP6CR/RCP6W are the ones when the high-output feature is activated. (There are also some models that are not related to the high-output setting.)

RCP6 Series

Actuator series	Type	Feed screw	No. of encoder pulses	Lead [mm]	Mounting direction	Minimum speed [mm/s]	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCP6 (Wide radial cylinder)	WRA16C WRA16R	Ball screw	8192	20	Horizontal	25	WRA16C: 280 (at 50st) 405 (at 100st) 450 (at 150 to 450st) 400 (at 500st) 340 (at 550st) 295 (at 600st) 260 (at 650st) 225 (at 700st) 200 (at 750st) 180 (at 800st) WRA16R: 280 (at 50st) 405 (at 100st) 420 (at 150 to 450st) 400 (at 500st) 340 (at 550st) 295 (at 600st) 260 (at 650st) 225 (at 700st) 200 (at 750st) 180 (at 800st)	0.2	167	500	10
				10	Horizontal	13	240 (at 50 to 400st) 230 (at 450st) 195 (at 500st) 165 (at 550st) 145 (at 600st) 125 (at 650st) 110 (at 700st) 100 (at 750st) 90 (at 800st)	0.2	333	1000	
					Vertical		WRA16C: 200 (at 50 to 450st) 195 (at 500st) 165 (at 550st) 145 (at 600st) 125 (at 650st) 110 (at 700st) 100 (at 750st) 90 (at 800st) WRA16R: 180 (at 50 to 450st) 195 (at 500st) 165 (at 550st) 145 (at 600st) 125 (at 650st) 110 (at 700st) 100 (at 750st) 90 (at 800st)				
				5	Horizontal	7	WRA16C: 130 (at 50 to 400st) 115 (at 450st) 95 (at 500st) 80 (at 550st) 70 (at 600st) 60 (at 650st) 55 (at 700st) 50 (at 750st) 45 (at 800st)	0.1	667	2000	

Note The values of the maximum velocity and maximum acceleration/deceleration for RCP6/RCP6CR/RCP6W are the ones when the high-output feature is activated. (There are also some models that are not related to the high-output setting.)

RCP6 Series

Actuator series	Type	Feed screw	No. of encoder pulses	Lead [mm]	Mounting direction	Minimum speed [mm/s]	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCP6 (Wide radial cylinder)	WRA16C WRA16R	Ball screw	8192	5	Horizontal	7	WRA16R: 120 (at 50 to 400st) 115 (at 450st) 95 (at 500st) 80 (at 550st) 70 (at 600st) 60 (at 650st) 55 (at 700st) 50 (at 750st) 45 (at 800st)	0.1	667	2000	10
					Vertical		100 (at 50 to 450st) 95 (at 500st) 80 (at 550st) 70 (at 600st) 60 (at 650st) 55 (at 700st) 50 (at 750st) 45 (at 800st)				
RCP6W (Dust and drip proof rod type)	RA4C RA4R	Ball screw	8192	10	Horizontal	13	525	1	33	77	20
					Vertical		435	0.5			
					Horizontal		435 (In ambient temp. 5degC or lower)	1			
					Vertical			0.5			
				5	Horizontal	7	350	1	66	155	
					Vertical			0.5			
					Horizontal		260 (In ambient temp. 5degC or lower)	1			
					Vertical			0.5			
				2.5	Horizontal	4	175	1	133	310	
					Vertical		150	0.5			
					Horizontal		130 (In ambient temp. 5degC or lower)	1			
					Vertical			0.5			
	RA6C RA6R	Ball screw	8192	12	Horizontal	15	630	1	40	93	20
					Vertical		525	0.5			
					Horizontal		525 (In ambient temp. 5degC or lower)	1			
					Vertical			0.5			
				6	Horizontal	8	420	1	79	185	
					Vertical		370	0.5			
					Horizontal		315 (In ambient temp. 5degC or lower)	1			
					Vertical			0.5			
				3	Horizontal	4	210	1	159	370	
					Vertical			0.5			
					Horizontal		105 (In ambient temp. 5degC or lower)	1			
					Vertical			0.5			
	RA7C RA7R	Ball screw	8192	16	Horizontal	20	420	1	117	273	20
					Vertical			0.5			
					Horizontal		280 (In ambient temp. 5degC or lower)	1			
					Vertical			0.5			
				8	Horizontal	10	350	1	234	547	
					Vertical		280	0.5			
					Horizontal		140 (In ambient temp. 5degC or lower)	1			
					Vertical			0.5			
				4	Horizontal	5	140	1	469	1094	
					Vertical			0.5			
					Horizontal		105 (In ambient temp. 5degC or lower)	1			
					Vertical			0.5			

Note The values of the maximum velocity and maximum acceleration/deceleration for RCP6/RCP6CR/RCP6W are the ones when the high-output feature is activated. (There are also some models that are not related to the high-output setting.)

RCP6 Series

Actuator series	Type	Feed screw	No. of encoder pulses	Lead [mm]	Mounting direction	Minimum speed [mm/s]	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCP6W (Dust and drip proof rod type)	RA8C RA8R	Ball screw	8192	20	Horizontal	25	350	0.2	250	500	10
					Vertical		330				
					Horizontal /vertical		300 (In ambient temp. 5degC or lower)				
				10	Horizontal /vertical	13	200	0.2	500	1000	
					Horizontal /vertical		170 (In ambient temp. 5degC or lower)				
				5	Horizontal /vertical	7	100	0.1	1000	2000	
					Horizontal /vertical		80 (In ambient temp. 5degC or lower)				
RCP6W (Dust and drip proof radial cylinder)	RRA4C RRA4R	Ball screw	8192	10	Horizontal	13	525	1	33	77	20
					Vertical		435	0.5			
					Horizontal		435 (In ambient temp. 5degC or lower)	1			
					Vertical			0.5			
				5	Horizontal	7	350(at 50 to 350st) 340(at 400st)	1	66	155	
					Vertical			0.5			
					Horizontal		260 (In ambient temp. 5degC or lower)	1			
					Vertical			0.5			
				2.5	Horizontal	4	175(at 50 to 350st) 170(at 400st)	1	133	310	
					Vertical		150	0.5			
					Horizontal		105 (In ambient temp. 5degC or lower)	1			
					Vertical			0.5			
	RRA6C RRA6R	Ball screw	8192	12	Horizontal	15	630	1	40	93	20
					Vertical		525	0.5			
					Horizontal		525 (In ambient temp. 5degC or lower)	1			
					Vertical			0.5			
				6	Horizontal	8	420	1	79	185	
					Vertical		370	0.5			
					Horizontal		315 (In ambient temp. 5degC or lower)	1			
					Vertical			0.5			
				3	Horizontal	4	210	1	159	370	
					Vertical			0.5			
					Horizontal		105 (In ambient temp. 5degC or lower)	1			
					Vertical			0.5			
	RRA7C RRA7R	Ball screw	8192	16	Horizontal	20	420	1	117	273	20
					Vertical			0.5			
					Horizontal		280 (In ambient temp. 5degC or lower)	1			
					Vertical			0.5			
				8	Horizontal	10	350	1	234	547	
					Vertical		280	0.5			
					Horizontal		140 (In ambient temp. 5degC or lower)	1			
					Vertical			0.5			
				4	Horizontal	5	140	1	469	1094	
					Vertical			0.5			
					Horizontal		105 (In ambient temp. 5degC or lower)	1			
					Vertical			0.5			

Note The values of the maximum velocity and maximum acceleration/deceleration for RCP6/RCP6CR/RCP6W are the ones when the high-output feature is activated. (There are also some models that are not related to the high-output setting.)

RCP6 Series

Actuator series	Type	Feed screw	No. of encoder pulses	Lead [mm]	Mounting direction	Minimum speed [mm/s]	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCP6W (Dust and drip proof radial cylinder)	RRA8C RRA8R	Ball screw	8192	20	Horizontal	25	280 (at 50st) 350 (at 100 to 500st) 320 (at 550st) 280 (at 600st) 240 (at 650st) 220 (at 700st)	0.2	250	500	10
					Vertical		280 (at 50st) 330 (at 100 to 500st) 320 (at 550st) 280 (at 600st) 240 (at 650st) 220 (at 700st)				
					Horizontal /vertical		210 (In ambient temp. 5degC or lower)				
				10	Horizontal /vertical	13	200 (at 50 to 450st) 180 (at 500st) 160 (at 550st) 140 (at 600st) 120 (at 650st) 110 (at 700st)	0.2	500	1000	
							130 (at 50 to 600st) 120 (at 650st) 110 (at 700st) (In ambient temp. 5degC or lower)				
				5	Horizontal /vertical	7	100 (at 50 to 450st) 90 (at 500st) 80 (at 550st) 70 (at 600st) 60 (at 650st) 55 (at 700st)	0.1	1000	2000	
							60 (at 50 to 650st) 55 (at 700st) (In ambient temp. 5degC or lower)				
RCP6W (Dust and drip proof wide radial cylinder)	WRA10C WRA10R	Ball screw	8192	10	Horizontal	13	525 (at 50 to 450st) 490 (at 500st)	1	33	77	20
							350 (In ambient temp. 5degC or lower)				
				5	Horizontal	7	350 (at 50 to 400st) 290 (at 450st) 240 (at 500st)	1	66	155	
					Vertical		215	0.5			
					Horizontal		215 (In ambient temp. 5degC or lower)	1			
					Vertical			0.5			
				2.5	Horizontal	4	175 (at 50 to 400st) 145 (at 450st) 120 (at 500st)	1	133	310	
					Vertical		150 (at 50 to 400st) 145 (at 450st) 120 (at 500st)	0.5			
					Horizontal		65 (In ambient temp. 5degC or lower)	1			
					Vertical			0.5			
	WRA12C WRA12R	Ball screw	8192	12	Horizontal	15	560	1	40	93	20
							320 (In ambient temp. 5degC or lower)				

Note The values of the maximum velocity and maximum acceleration/deceleration for RCP6/RCP6CR/RCP6W are the ones when the high-output feature is activated. (There are also some models that are not related to the high-output setting.)

RCP6 Series

Actuator series	Type	Feed screw	No. of encoder pulses	Lead [mm]	Mounting direction	Minimum speed [mm/s]	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCP6W (Dust and drip proof wide radial cylinder)	WRA12C WRA12R	Ball screw	8192	6	Horizontal	8	400 (at 50 to 450st) 375 (at 500st)	1	79	185	20
					Vertical		220	0.5			
					Horizontal		220 (In ambient temp. 5degC or lower)	1			
					Vertical			0.5			
				3	Horizontal	4	225 (at 50 to 400st) 220 (at 450st) 185 (at 500st)	1	159	370	
					Vertical		140	0.5			
					Horizontal		80 (In ambient temp. 5degC or lower)	1			
					Vertical			0.5			
	WRA14C WRA14R	Ball screw	8192	16	Horizontal	20	420	1	117	273	20
							280 (In ambient temp. 5degC or lower)				
				8	Horizontal	10	280	1	234	547	
					Vertical		210	0.5			
					Horizontal		140 (In ambient temp. 5degC or lower)	1			
					Vertical			0.5			
				4	Horizontal	5	130	1	469	1094	
					Vertical			0.5			
					Horizontal		70 (In ambient temp. 5degC or lower)	1			
					Vertical			0.5			
	WRA16C WRA16R	Ball screw	8192	20	Horizontal	25	280 (at 50st) 360 (at 100 to 500st) 340 (at 550st) 295 (at 600st) 260 (at 650st) 225 (at 700st) 200 (at 750st) 180 (at 800st)	0.2	250	500	10
							240 (at 50 to 650st) 225 (at 700st) 200 (at 750st) 180 (at 800st) (In ambient temp. 5degC or lower)				
				10	Horizontal	13	220 (at 50 to 450st) 195 (at 500st) 165 (at 550st) 145 (at 600st) 125 (at 650st) 110 (at 700st) 100 (at 750st) 90 (at 800st)	0.2	500	1000	
					Vertical		160 (at 50 to 550st) 145 (at 600st) 125 (at 650st) 110 (at 700st) 100 (at 750st) 90 (at 800st)				
					Horizontal /vertical		120 (at 50 to 650st) 110 (at 700st) 100 (at 750st) 90 (at 800st) (In ambient temp. 5degC or lower)				

Note The values of the maximum velocity and maximum acceleration/deceleration for RCP6/RCP6CR/RCP6W are the ones when the high-output feature is activated. (There are also some models that are not related to the high-output setting.)

RCP6 Series

Actuator series	Type	Feed screw	No. of encoder pulses	Lead [mm]	Mounting direction	Minimum speed [mm/s]	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCP6W (Dust and drip proof wide radial cylinder)	WRA16C WRA16R	Ball screw	8192	5	Horizontal	7	110 (at 50 to 450st) 95 (at 500st) 80 (at 550st) 70 (at 600st) 60 (at 650st) 55 (at 700st) 50 (at 750st) 45 (at 800st)	0.1	1000	2000	10
					Vertical		90 (at 50 to 500st) 80 (at 550st) 70 (at 600st) 60 (at 650st) 55 (at 700st) 50 (at 750st) 45 (at 800st)				
					Horizontal /vertical		80 (at 50 to 550st) 70 (at 600st) 60 (at 650st) 55 (at 700st) 50 (at 750st) 45 (at 800st) (In ambient temp. 5degC or lower)				
RCP6 (Table type)	TA4C TA4R (Single Block Type)	Ball screw	8192	16	Horizontal	20	980	1	21	48	20
					Vertical		700	0.5			
				10	Horizontal	13	785	1	22	77	
					Vertical		700	0.5			
				5	Horizontal	7	390	1	44	155	
					Vertical			0.5			
				2.5	Horizontal	4	195	1	89	310	
					Vertical			0.5			
	TA4C TA4R (Double Block Type)	Ball screw	8192	10	Horizontal	13	TA4C: 785 (at 40 to 190st) 680 (at 240st) TA4R: 700 (at 40 to 190st) 680 (at 240st)	1	22	77	20
					Vertical		TA4C: 700 (at 40 to 190st) 680 (at 240st) TA4R: 525	0.5			
				5	Horizontal	7	390 (at 40 to 190st) 340 (at 240st)	1	44	155	
					Vertical			0.5			
				2.5	Horizontal	4	195 (at 40 to 190st) 170 (at 240st)	1	89	310	
					Vertical			0.5			
	TA6C TA6R (Single Block Type)	Ball screw	8192	20	Horizontal	25	1120	1	16	56	20
					Vertical		800	0.5			
				12	Horizontal	15	800	1	26	93	
					Vertical		TA6C: 800 TA6R: 680	0.5			
				6	Horizontal	8	400	1	53	185	
					Vertical			0.5			
				3	Horizontal	4	200	1	106	370	
					Vertical			0.5			

Note The values of the maximum velocity and maximum acceleration/deceleration for RCP6/RCP6CR/RCP6W are the ones when the high-output feature is activated. (There are also some models that are not related to the high-output setting.)

RCP6 Series

Actuator series	Type	Feed screw	No. of encoder pulses	Lead [mm]	Mounting direction	Minimum speed [mm/s]	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCP6 (Table type)	TA6C TA6R (Double Block Type)	Ball screw	8192	12	Horizontal	15	800 (at 45 to 220st) 735 (at 270st) 575 (at 320st)	1	26	93	20
					Vertical		680 (at 45 to 270st) 575 (at 320st)	0.5			
				6	Horizontal	8	400 (at 45 to 220st) 365 (at 270st) 285 (at 320st)	1	53	185	
					Vertical			0.5			
				3	Horizontal	4	200 (at 45 to 220st) 185 (at 270st) 140 (at 320st)	1	106	370	
					Vertical			0.5			
	TA7C TA7R (Single Block Type)	Ball screw	8192	24	Horizontal	30	1080	1	40	139	20
					Vertical		860	0.5			
				16	Horizontal	20	700	1	60	209	
					Vertical		560	0.5			
				8	Horizontal	10	420	1	119	418	
					Vertical		350	0.5			
				4	Horizontal	5	210	1	239	836	
					Vertical			0.5			
	TA7C TA7R (Double Block Type)	Ball screw	8192	16	Horizontal	20	700 (at 40 to 340st) 600 (at 390st)	1	60	209	20
					Vertical		560	0.5			
				8	Horizontal	10	420 (at 40 to 290st) 365 (at 340st) 300 (at 390st)	1	119	418	
					Vertical		350 (at 40 to 340st) 300 (at 390st)	0.5			
				4	Horizontal	5	210 (at 40 to 290st) 180 (at 340st) 150 (at 390st)	1	239	836	
					Vertical			0.5			
RCP6 (Gripper type)	GRT7A	-	8192	1 (Note 1)	-	1.25	75	0.3	34 (Both Ends)	120 (Both Ends)	5
	GRT7B			1.6 (Note 1) (Gear Ratio Pattern 1)		2	120		42 (Both Ends)	150 (Both Ends)	
				0.8 (Note 1) (Gear Ratio Pattern 2)		1	60		86 (Both Ends)	300 (Both Ends)	
	GRST6C GRST6R	Trapezoid thread on right and left	8192	8	-	10	180	0.3	30 (Both Ends)	110 (Both Ends)	Lead 8: 10 Lead 2: 5
				2		5	45		110 (Both Ends)	310 (Both Ends)	
	GRST7C GRST7R			8		10	180 140 (In ambient temp. 5degC or lower)		100 (Both Ends)	340 (Both Ends)	
				2		5	45		330 (Both Ends)	880 (Both Ends)	
RCP6 (Rotary type)	RTFML	-	8192	12 deg (Gear Ratio 1/30)	-	15 (deg/s)	800 (deg/s)	0.7	–	–	–
RCP6 (Rotary Chuck) * Rotary part	RTCKSPE RTCKSPI RTCKSRE RTCKSRI	-	8192	90 deg (Gear Ratio 1/4)	-	113 (deg/s)	1800 (deg/s)	3	–	–	–
	RTCKMPE RTCKMPI RTCKMRE RTCKMRI	-	8192	72 deg (Gear Ratio 1/5)	-	90 (deg/s)	1800 (deg/s)	3	–	–	–

Note The values of the maximum velocity and maximum acceleration/deceleration for RCP6/RCP6CR/RCP6W are the ones when the high-output feature is activated. (There are also some models that are not related to the high-output setting.)

Note 1 It is the lead length converted value including the pulley gear ratio.

RCP5 Series

Actuator series	Type	Feed screw	No. of encoder pulses	Lead [mm]	Mounting direction	Minimum speed [mm/s]	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCP5 RCP5CR (Slider type) Standard type / Cleanroom type	[Standard] SA4C SA4R [Cleanroom] SA4C	Ball screw	800	16	Horizontal	20	1260 (at 50 to 400st) 1060 (at 450st) 875 (at 500st)	1.0	21	48	20
					Vertical			0.5			
				10	Horizontal	13	785 (at 50 to 400st) 675 (at 450st) 555 (at 500st)	1.0	22	77	
					Vertical			0.5			
				5	Horizontal	7	390 (at 50 to 400st) 330 (at 450st) 275 (at 500st)	1.0	44	155	
					Vertical			0.5			
				2.5	Horizontal	4	195 (at 50 to 400st) 165 (at 450st) 135 (at 500st)	1.0	88	310	
					Vertical			0.5			
	[Standard] SA6C SA6R [Cleanroom] SA6C	Ball screw	800	20	Horizontal	25	SA6C: 1440 (at 50 to 450st) 1335 (at 500st) 1130 (at 550st) 970 (at 600st) 840 (at 650st) 735 (at 700st) 650 (at 750st) 575 (at 800st) SA6R: 1280 (at 50 to 500st) 1130 (at 550st) 970 (at 600st) 840 (at 650st) 735 (at 700st) 650 (at 750st) 575 (at 800st)	1.0	16	56	20
					Vertical		1280 (at 50 to 500st) 1130 (at 550st) 970 (at 600st) 840 (at 650st) 735 (at 700st) 650 (at 750st) 575 (at 800st)	0.5			
				12	Horizontal	15	900 (at 50 to 400st) 885 (at 450st) 735 (at 500st) 620 (at 550st) 535 (at 600st) 460 (at 650st) 405 (at 700st) 355 (at 750st) 315 (at 800st)	1.0	26	93	
					Vertical		SA6C: 900 (at 50 to 400st) 885 (at 450st) 735 (at 500st) 620 (at 550st) 535 (at 600st) 460 (at 650st) 405 (at 700st) 355 (at 750st) 315 (at 800st) SA6R: 800 (at 50 to 450st) 735 (at 500st) 620 (at 550st) 535 (at 600st) 460 (at 650st) 405 (at 700st) 355 (at 750st) 315 (at 800st)	0.5			

Note The values of the maximum velocity and maximum acceleration/deceleration for RCP5/RCP5CR/RCP5W are the ones when the high-output feature is activated. (There are also some models that are not related to the high-output setting.)

RCP5 Series

Actuator series	Type	Feed screw	No. of encoder pulses	Lead [mm]	Mounting direction	Minimum speed [mm/s]	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCP5 RCP5CR (Slider type) Standard type / Cleanroom type	[Standard] SA6C SA6R [Cleanroom] SA6C	Ball screw	800	6	Horizontal	8	450 (at 50 to 400st) 435 (at 450st) 365 (at 500st) 305 (at 550st) 265 (at 600st) 230 (at 650st) 200 (at 700st) 175 (at 750st) 155 (at 800st)	1.0	53	185	20
					Vertical			0.5			
				3	Horizontal	4	225 (at 50 to 400st) 215 (at 450st) 180 (at 500st) 150 (at 550st) 130 (at 600st) 115 (at 650st) 100 (at 700st) 85 (at 750st) 75 (at 800st)	1.0	106	370	
					Vertical			0.5			
	[Standard] SA7C SA7R [Cleanroom] SA7C	Ball screw	800	24	Horizontal	30	SA7C: 1200 (at 50 to 600st) 1145 (at 650st) 1000 (at 700st) 885 (at 750st) 785 (at 800st) SA7R: 1000 (at 50 to 700st) 885 (at 750st) 785 (at 800st)	1.0	40	139	20
					Vertical			0.5			
				16	Horizontal	20	SA7C: 980 (at 50 to 550st) 875 (at 600st) 755 (at 650st) 660 (at 700st) 585 (at 750st) 520 (at 800st) SA7R: 840 (at 50 to 600st) 755 (at 650st) 660 (at 700st) 585 (at 750st) 520 (at 800st)	1.0	60	209	
					Vertical		SA7C: 840 (at 50 to 600st) 755 (at 650st) 660 (at 700st) 585 (at 750st) 520 (at 800st) SA7R: 700 (at 50 to 650st) 660 (at 700st) 585 (at 750st) 520 (at 800st)	0.5			
				8	Horizontal	10	SA7C: 490 (at 50 to 550st) 430 (at 600st) 375 (at 650st) 325 (at 700st) 290 (at 750st) 255 (at 800st) SA7R: 420 (at 50 to 600st) 375 (at 650st) 325 (at 700st) 290 (at 750st) 255 (at 800st)	1.0	119	418	
					Vertical			0.5			

Note *The values of the maximum velocity and maximum acceleration/deceleration for RCP5/RCP5CR/RCP5W are the ones when the high-output feature is activated. (There are also some models that are not related to the high-output setting.)*

RCP5 Series

Actuator series	Type	Feed screw	No. of encoder pulses	Lead [mm]	Mounting direction	Minimum speed [mm/s]	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCP5 RCP5CR (Slider type) Standard type / Cleanroom type	[Standard] SA7C SA7R [Cleanroom] SA7C	Ball screw	800	4	Horizontal	5	SA7C: 245 (at 50 to 550st) 215 (at 600st) 185 (at 650st) 160 (at 700st) 140 (at 750st) 125 (at 800st) SA7R: 210 (at 50 to 600st) 185 (at 650st) 160 (at 700st) 140 (at 750st) 125 (at 800st)	1.0	239	836	20
					Vertical		210 (at 50 to 600st) 185 (at 650st) 160 (at 700st) 140 (at 750st) 125 (at 800st)	0.5			
RCP5 (Rod type)	RA4C RA4R	Ball screw	800	16	Horizontal	20	RA4C: 1120 (at 60 to 360st) 1080 (at 410st) RA4R: 840	1.0	21	48	20
					Vertical			0.5			
				10	Horizontal	13	RA4C: 700 (at 60 to 360st) 685 (at 410st) RA4R: 610	1.0	22	77	
					Vertical			0.5			
				5	Horizontal	7	350 (at 60 to 360st) 340 (at 410st)	1.0	44	155	
					Vertical			0.5			
				2.5	Horizontal	4	175 (at 60 to 360st) 170 (at 410st)	1.0	88	310	
					Vertical			0.5			
	RA6C RA6R	Ball screw	800	20	Horizontal	25	800	1.0	16	56	20
					Vertical			0.5			
				12	Horizontal	15	700	1.0	26	93	
					Vertical			0.5			
				6	Horizontal	8	450	1.0	53	185	
					Vertical			0.5			
				3	Horizontal	4	225 (at 65 to 365st) 220 (at 415st)	1.0	106	370	
					Vertical			0.5			
	RA7C RA7R	Ball screw	800	24	Horizontal	30	800	1.0	52	182	20
					Vertical		600	0.5			
				16	Horizontal	20	RA7C: 700 RA7R: 560	1.0	78	273	
					Vertical		560	0.5			
				8	Horizontal	10	RA7C: 420 RA7R: 350	1.0	156	547	
					Vertical			0.5			
				4	Horizontal	5	RA7C: 210 RA7R: 175	1.0	312	1094	
					Vertical			0.5			

Note The values of the maximum velocity and maximum acceleration/deceleration for RCP5/RCP5CR/RCP5W are the ones when the high-output feature is activated. (There are also some models that are not related to the high-output setting.)

RCP5 Series

Actuator series	Type	Feed screw	No. of encoder pulses	Lead [mm]	Mounting direction	Minimum speed [mm/s]	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCP5 (Rod type)	RA8C RA8R	Ball screw	800	20	Horizontal	25	RA8C: 280 (at 50) 405 (at 100st) 505 (at 150st) 585 (at 200st) 600 (at 250 to 350st) 520 (at 400st) 440 (at 450st) 360 (at 500st) 320 (at 550st) 280 (at 600st) 240 (at 650st) 220 (at 700st) RA8R: 280 (at 50) 400 (at 100 to 450st) 360 (at 500st) 320 (at 550st) 280 (at 600st) 240 (at 650st) 220 (at 700st)	0.2	167	500	10
					Vertical		RA8C: 280 (at 50) 405 (at 100st) 450 (at 150 to 400st) 440 (at 450st) 360 (at 500st) 320 (at 550st) 280 (at 600st) 240 (at 650st) 220 (at 700st)				
							RA8R: 280 (at 50) 400 (at 100 to 450st) 360 (at 500st) 320 (at 550st) 280 (at 600st) 240 (at 650st) 220 (at 700st)				
				10	Horizontal	13	RA8C: 280 (at 50) 300 (at 100 to 350st) 260 (at 400st) 220 (at 450st) 180 (at 500st) 160 (at 550st) 140 (at 600st) 120 (at 650st) 110 (at 700st) RA8R: 200 (at 50 to 450st) 180 (at 500st) 160 (at 550st) 140 (at 600st) 120 (at 650st) 110 (at 700st)	0.2	333	1000	
					Vertical		RA8C: 250 (at 50 to 400st) 220 (at 450st) 180 (at 500st) 160 (at 550st) 140 (at 600st) 120 (at 650st) 110 (at700st)				

Note *The values of the maximum velocity and maximum acceleration/deceleration for RCP5/RCP5CR/RCP5W are the ones when the high-output feature is activated. (There are also some models that are not related to the high-output setting.)*

RCP5 Series

Actuator series	Type	Feed screw	No. of encoder pulses	Lead [mm]	Mounting direction	Minimum speed [mm/s]	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCP5 (Rod type)	RA8C RA8R	Ball screw	800	10	Vertical	13	RA8R: 200 (at 50 to 450st) 180 (at 500st) 160 (at 550st) 140 (at 600st) 120 (at 650st) 110 (at 700st)	0.2	333	1000	10
				5	Horizontal /vertical	7	RA8C: 150 (at 50 to 350st) 130 (at 400st) 110 (at 450st) 90 (at 500st) 80 (at 550st) 70 (at 600st) 60 (at 650st) 55 (at 700st) RA8R: 100 (at 50 to 450st) 90 (at 500st) 80 (at 550st) 70 (at 600st) 60 (at 650st) 55 (at 700st)	0.1	667	2000	
	RA10C RA10R	Ball screw	800	10	Horizontal	13	RA10C: 117 (at 50st) 167 (at 100st) 200 (at 150st) 250 (at 200 to 500st) 220 (at 550st) 200 (at 600st) 180 (at 650st) 160 (at 700st) 140 (at 750st) 120 (at 800st) RA10R: 117 (at 50st) 167 (at 100st) 200 (at 150 to 600st) 180 (at 650st) 160 (at 700st) 140 (at 750st) 120 (at 800st)	0.04	429	1500	10
					Vertical		RA10C: 117 (at 50st) 167 (at 100 to 650st) 160 (at 700st) 140 (at 750st) 120 (at 800st) RA10R: 117 (at 50st) 140 (at 100 to 750st) 120 (at 800st)				
				5	Horizontal /vertical	7	RA10C: 83 (at 50st) 125 (at 100 to 400st) 110 (at 450st) 90 (at 500st) 80 (at 550st) 70 (at 600st) 60 (at 650st) 55 (at 700st) 50 (at 750st) 45 (at 800st)	0.02	857	3000 (at 550st) 2900 (at 600st) 2500 (at 650st) 2200 (at 700st) 2000 (at 750st) 1800 (at 800st)	

Note *The values of the maximum velocity and maximum acceleration/deceleration for RCP5/RCP5CR/RCP5W are the ones when the high-output feature is activated. (There are also some models that are not related to the high-output setting.)*

RCP5 Series

Actuator series	Type	Feed screw	No. of encoder pulses	Lead [mm]	Mounting direction	Minimum speed [mm/s]	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCP5 (Rod type)	RA10C RA10R	Ball screw	800	5	Horizontal /vertical	7	RA10R: 83 (at 50st) 100 (at 100 to 450st) 90 (at 500st) 80 (at 550st) 70 (at 600st) 60 (at 650st) 55 (at 700st) 50 (at 750st) 45 (at 800st)	0.02	857	3000 (at 550st) 2900 (at 600st) 2500 (at 650st) 2200 (at 700st) 2000 (at 750st) 1800 (at 800st)	10
				2.5	Horizontal /vertical	4	RA10C: 63 (at 50 to 500st) 55 (at 550st) 50 (at 600st) 45 (at 650st) 40 (at 700st) 35 (at 750st) 30 (at 800st) RA10R: 50 (at 50 to 600st) 45 (at 650st) 40 (at 700st) 35 (at 750st) 30 (at 800st)	0.01	1714	6000 (at 700st) 5900 (at 750st) 5400 (at 800st)	
RCP5W (Dust and drip proof rod type)	RA6C	Ball screw	800	12	Horizontal	15	500 (at 50st) 560 (at 100 to 400st)	1	40	93	20
					Vertical		500	0.5			
					Horizontal		450 (In ambient temp. 5degC or lower)	1			
					Vertical		400 (In ambient temp. 5degC or lower)	0.5			
				6	Horizontal	7.5	360	1	79	185	
					Vertical			0.5			
					Horizontal		300 (In ambient temp. 5degC or lower)	1			
					Vertical			0.5			
				3	Horizontal	3.75	180	1	159	370	
					Vertical			0.5			
					Horizontal		150 (In ambient temp. 5degC or lower)	1			
					Vertical			0.5			
				3 (Motor Type: 42SP)	Vertical	3.75	70	0.5	354	590	
	RA7C	Ball screw	800	16	Horizontal	20	500 (at 50st) 560 (at 100 to 500st)	1	94	219	20
					Vertical		500 (at 50st) 400 (at 100 to 500st)	0.5			
					Horizontal		450 (In ambient temp. 5degC or lower)	1			
					Vertical		300 (In ambient temp. 5degC or lower)	0.5			
				8	Horizontal	10	340	1	187	437	
					Vertical		280	0.5			
					Horizontal		300 (In ambient temp. 5degC or lower)	1			
					Vertical		250 (In ambient temp. 5degC or lower)	0.5			
				4	Horizontal	5	170	1	375	875	
					Vertical		140	0.5			

Note The values of the maximum velocity and maximum acceleration/deceleration for RCP5/RCP5CR/RCP5W are the ones when the high-output feature is activated. (There are also some models that are not related to the high-output setting.)

RCP5 Series

Actuator series	Type	Feed screw	No. of encoder pulses	Lead [mm]	Mounting direction	Minimum speed [mm/s]	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCP5W (Dust and drip proof rod type)	RA7C	Ball screw	800	4	Horizontal	5	150 (In ambient temp. 5degC or lower)	1	375	875	20
					Vertical		125 (In ambient temp. 5degC or lower)	0.5			
				4 (Motor Type: 56SP)	Vertical	5	80	0.5	515	1030	
	RA8C	Ball screw	800	20	Horizontal	25	280 (at 50st) 405 (at 100st) 480 (at 150 to 400st) 440 (at 450st) 360 (at 500st) 320 (at 550st) 280 (at 600st) 240 (at 650st) 220 (at 700st)	0.2	167	500	10
					Vertical		280 (at 50st) 360 (at 100 to 500st) 320 (at 550st) 280 (at 600st) 240 (at 650st) 220 (at 700st)				
				10	Horizontal	13	240 (at 50 to 400st) 220 (at 450st) 180 (at 500st) 160 (at 550st) 140 (at 600st) 120 (at 650st) 110 (at 700st)	0.2	333	1000	
					Vertical		200 (at 50 to 450st) 180 (at 500st) 160 (at 550st) 140 (at 600st) 120 (at 650st) 110 (at 700st)				
					Horizontal		210 (at 50 to 450st) 180 (at 500st) 160 (at 550st) 140 (at 600st) 120 (at 650st) 110 (at 700st) (In ambient temp. 5degC or lower)				
					Vertical		175 (at 50 to 500st) 160 (at 550st) 140 (at 600st) 120 (at 650st) 110 (at 700st) (In ambient temp. 5degC or lower)				
				5	Horizontal	7	120 (at 50 to 400st) 110 (at 450st) 90 (at 500st) 80 (at 550st) 70 (at 600st) 60 (at 650st) 55 (at 700st)	0.1	667	2000	
					Vertical		100 (at 50 to 450st) 90 (at 500st) 80 (at 550st) 70 (at 600st) 60 (at 650st) 55 (at 700st)				

Note The values of the maximum velocity and maximum acceleration/deceleration for RCP5/RCP5CR/RCP5W are the ones when the high-output feature is activated. (There are also some models that are not related to the high-output setting.)

RCP5 Series

Actuator series	Type	Feed screw	No. of encoder pulses	Lead [mm]	Mounting direction	Minimum speed [mm/s]	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCP5W (Dust and drip proof rod type)	RA8C	Ball screw	800	5	Horizontal	7	100 (at 50 to 450st) 90 (at 500st) 80 (at 550st) 70 (at 600st) 60 (at 650st) 55 (at 700st) (In ambient temp. 5degC or lower)	0.1	667	2000	10
					Vertical		75 (at 50 to 550st) 70 (at 600st) 60 (at 650st) 55 (at 700st) (In ambient temp. 5degC or lower)				
	RA10C	Ball screw	800	10	Horizontal	13	117 (at 50st) 167 (at 100st) 200 (at 150 to 600st) 180 (at 650st) 160 (at 700st) 140 (at 750st) 120 (at 800st)	0.04	429	1500	10
					Vertical		117 (at 50st) 130 (at 100 to 750st) 120 (at 800st)				
				5	Horizontal /vertical	7	83 (at 50st) 100 (at 100 to 450st) 90 (at 500st) 80 (at 550st) 70 (at 600st) 60 (at 650st) 55 (at 700st) 50 (at 750st) 45 (at 800st)	0.02	857	3000 (at 550st) 2900 (at 600st) 2500 (at 650st) 2200 (at 700st) 2000 (at 750st) 1800 (at 800st)	
				2.5	Horizontal /vertical	4	50 (at 50 to 600st) 45 (at 650st) 40 (at 700st) 35 (at 750st) 30 (at 800st)	0.01	1714	6000 (at 700st) 5900 (at 750st) 5400 (at 800st)	
RCP5 (Belt type)	BA4 BA4U	Belt	800	Equivalent to 48	Horizontal	150	890 (at 300st) 1040 (at 400st) 1120 (at 500st) 1160 (at 600st) 1200 (at 700 to 1200st)	0.5	-	-	-
	BA6 BA6U	Belt	800	Equivalent to 48	Horizontal	60	890 (at 300st) 1070 (at 400st) 1220 (at 500st) 1340 (at 600st) 1400 (at 700st) 1440 (at 800st) 1500 (at 900 to 2200st)	0.5	-	-	-
	BA7 BA7U	Belt	800	Equivalent to 48	Horizontal	100	890 (at 300st) 1070 (at 400st) 1220 (at 500st) 1340 (at 600st) 1450 (at 700st) 1520 (at 800st) 1550 (at 900st) 1600 (at 1000 to 2600st)	0.5	-	-	-

Note The values of the maximum velocity and maximum acceleration/deceleration for RCP5/RCP5CR/RCP5W are the ones when the high-output feature is activated. (There are also some models that are not related to the high-output setting.)

RCP4 Series

Actuator series	Type	Feed screw	No. of encoder pulses	Lead [mm]	Mounting direction	Minimum speed [mm/s]	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCP4 RCP4CR (Slider type) Standard type / Cleanroom type	[Standard] SA3C SA3R [Cleanroom] SA3C	Ball screw	800	6	Horizontal	8	420	1.0	16	58	20
					Vertical			0.5			
				4	Horizontal	5	280	1.0	25	86	
					Vertical			0.5			
				2	Horizontal	3	140	1.0	49	173	
					Vertical			0.5			
	[Standard] SA5C SA5R [Cleanroom] SA5C	Ball screw	800	20	Horizontal	25	1440 (at 50 to 500st) 1225 (at 550st) 1045 (at 600st) 900 (at 650st) 785 (at 700st) 690 (at 750st) 610 (at 800st)	1.0	16	56	20
					Vertical		SA5C: 1280 (at 50 to 500st) 1225 (at 550st) 1045 (at 600st) 900 (at 650st) 785 (at 700st) 690 (at 750st) 610 (at 800st) SA5R: 1120 (at 50 to 550st) 1045 (at 600st) 900 (at 650st) 785 (at 700st) 690 (at 750st) 610 (at 800st)	0.5			
				12	Horizontal	15	900 (at 50 to 450st) 795 (at 500st) 665 (at 550st) 570 (at 600st) 490 (at 650st) 425 (at 700st) 375 (at 750st) 330 (at 800st)	1.0	26	93	
					Vertical		SA5C: 900 (at 50 to 450st) 795 (at 500st) 665 (at 550st) 570 (at 600st) 490 (at 650st) 425 (at 700st) 375 (at 750st) 330 (at 800st) SA5R: 800 (at 50 to 450st) 795 (at 500st) 665 (at 550st) 570 (at 600st) 490 (at 650st) 425 (at 700st) 375 (at 750st) 330 (at 800st)	0.5			
				6	Horizontal	8	450 (at 50 to 450st) 395 (at 500st) 335 (at 550st) 285 (at 600st) 245 (at 650st) 215 (at 700st) 185 (at 750st) 165 (at 800st)	1.0	53	185	
					Vertical			0.5			

Note *The values of the maximum velocity and maximum acceleration/deceleration for RCP4/RCP4CR/RCP4W are the ones when the high-output feature is activated. (There are also some models that are not related to the high-output setting.)*

RCP4 Series

Actuator series	Type	Feed screw	No. of encoder pulses	Lead [mm]	Mounting direction	Minimum speed [mm/s]	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCP4 RCP4CR (Slider type) Standard type / Cleanroom type	[Standard] SA5C SA5R [Cleanroom] SA5C	Ball screw	800	3	Horizontal	4	225 (at 50 to 450st) 195 (at 500st) 165 (at 550st) 140 (at 600st) 120 (at 650st) 105 (at 700st) 90 (at 750st) 80 (at 800st)	1.0	106	370	20
					Vertical			0.5			
	[Standard] SA6C SA6R [Cleanroom] SA6C	Ball screw	800	20	Horizontal	25	SA6C: 1440 (at 50 to 500st) 1230 (at 550st) 1045 (at 600st) 905 (at 650st) 785 (at 700st) 690 (at 750st) 615 (at 800st) SA6R: 1280 (at 50 to 500st) 1230 (at 550st) 1045 (at 600st) 905 (at 650st) 785 (at 700st) 690 (at 750st) 615 (at 800st)	1.0	16	56	20
					Vertical		SA6C: 1280 (at 50 to 500st) 1230 (at 550st) 1045 (at 600st) 905 (at 650st) 785 (at 700st) 690 (at 750st) 615 (at 800st) SA6R: 1120 (at 50 to 550st) 1045 (at 600st) 905 (at 650st) 785 (at 700st) 690 (at 750st) 615 (at 800st)	0.5			
				12	Horizontal	15	900 (at 50 to 450st) 795 (at 500st) 670 (at 550st) 570 (at 600st) 490 (at 650st) 430 (at 700st) 375 (at 750st) 335 (at 800st)	1.0	26	93	
					Vertical			0.5			
				6	Horizontal	8	450 (at 50 to 450st) 395 (at 500st) 335 (at 550st) 285 (at 600st) 245 (at 650st) 215 (at 700st) 185 (at 750st) 165 (at 800st)	1.0	53	185	
					Vertical			0.5			
				3	Horizontal	4	225 (at 50 to 450st) 195 (at 500st) 165 (at 550st) 140 (at 600st) 120 (at 650st) 105 (at 700st) 90 (at 750st) 80 (at 800st)	1.0	106	370	
					Vertical			0.5			

Note *The values of the maximum velocity and maximum acceleration/deceleration for RCP4/RCP4CR/RCP4W are the ones when the high-output feature is activated. (There are also some models that are not related to the high-output setting.)*

RCP4 Series

Actuator series	Type	Feed screw	No. of encoder pulses	Lead [mm]	Mounting direction	Minimum speed [mm/s]	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCP4 RCP4CR (Slider type) Standard type / Cleanroom type	[Standard] SA7C SA7R [Cleanroom] SA7C	Ball screw	800	24	Horizontal	30	SA7C: 1200 (at 50 to 600st) 1155 (at 650st) 1010 (at 700st) 890 (at 750st) 790 (at 800st) SA7R: 1000 (at 50 to 700st) 890 (at 750st) 790 (at 800st)	1.0	40	139	20
					Vertical			0.5			
				16	Horizontal	20	SA7C: 980 (at 50 to 550st) 865 (at 600st) 750 (at 650st) 655 (at 700st) 580 (at 750st) 515 (at 800st) SA7R: 840 (at 50 to 600st) 750 (at 650st) 655 (at 700st) 580 (at 750st) 515 (at 800st)	1.0	60	209	
					Vertical		SA7C: 840 (at 50 to 600st) 750 (at 650st) 655 (at 700st) 580 (at 750st) 515 (at 800st) SA7R: 700 (at 50 to 650st) 655 (at 700st) 580 (at 750st) 515 (at 800st)	0.5			
				8	Horizontal	10	SA7C: 490 (at 50 to 550st) 430 (at 600st) 375 (at 650st) 325 (at 700st) 290 (at 750st) 255 (at 800st) SA7R: 420 (at 50 to 600st) 375 (at 650st) 325 (at 700st) 290 (at 750st) 255 (at 800st)	1.0	119	418	
					Vertical			0.5			
				4	Horizontal	5	SA7C: 245 (at 50 to 550st) 215 (at 600st) 185 (at 650st) 160 (at 700st) 145 (at 750st) 125 (at 800st) SA7R: 210 (at 50 to 600st) 185 (at 650st) 160 (at 700st) 145 (at 750st) 125 (at 800st)	1.0	239	836	
					Vertical		210 (at 50 to 600st) 185 (at 650st) 160 (at 700st) 145 (at 750st) 125 (at 800st)	0.5			

Note *The values of the maximum velocity and maximum acceleration/deceleration for RCP4/RCP4CR/RCP4W are the ones when the high-output feature is activated. (There are also some models that are not related to the high-output setting.)*

RCP4 Series

Actuator series	Type	Feed screw	No. of encoder pulses	Lead [mm]	Mounting direction	Minimum speed [mm/s]	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCP4W (Dust and drip proof slider type)	SA5C	Ball screw	800	10	Horizontal	13	330	0.6	38.2	66.9	20
				5	Horizontal	7	165		42.3	147.9	
	SA6C	Ball screw	800	12	Horizontal	15	400	0.6	35.5	82.8	20
				6	Horizontal	8	200		51.3	179.5	
	SA7C	Ball screw	800	16	Horizontal	20	530	0.6	60	209	20
				8	Horizontal	10	265		119	418	
RCP4 (Rod type)	RA3C RA3R	Ball screw	800	16	Horizontal	20	1120	1.0	15	36	20
					Vertical			0.5			
				10	Horizontal	13	700	1.0	16	57	
					Vertical			0.5			
				5	Horizontal	7	350	1.0	33	114	
					Vertical			0.5			
				2.5	Horizontal	4	175	1.0	65	229	
					Vertical			0.5			
	RA5C RA5R	Ball screw	800	20	Horizontal	25	800	1.0	16	56	20
					Vertical			0.5			
				12	Horizontal	15	700	1.0	26	93	
					Vertical			0.5			
				6	Horizontal	8	450	1.0	53	185	
					Vertical			0.5			
				3	Horizontal	4	225	1.0	106	370	
					Vertical			0.5			
				3 (Motor Type: 42SP)	Vertical	4	80	0.5	370	750	
	RA6C RA6R	Ball screw	800	24	Horizontal	30	800	1.0	52	182	20
					Vertical		600	0.5			
				16	Horizontal	20	RA6C: 700 RA6R: 560	1.0	78	273	
					Vertical		560	0.5			
				8	Horizontal	10	420	1.0	156	547	
					Vertical		RA6C: 420 RA6R: 350	0.5			
				4	Horizontal	5	RA6C: 210 RA6R: 175	1.0	312	1094	
					Vertical			0.5			
				4 (Motor Type: 56SP)	Vertical	5	90	0.5	470	1106	
RCP4W (Dust and drip proof rod type)	RA6C	Ball screw	800	12	Horizontal	15	500 (at 50st) 560 (at 100 to 400st)	1.0	40	93	20
					Vertical		500	0.5			
					Horizontal		450 (In ambient temp. 5degC or lower)	1.0			
					Vertical		400 (In ambient temp. 5degC or lower)	0.5			
				6	Horizontal	8	360	1.0	79	185	
					Vertical			0.5			
					Horizontal		300 (In ambient temp. 5degC or lower)	1.0			
					Vertical			0.5			
				3	Horizontal	4	180	1.0	159	370	
					Vertical			0.5			
					Horizontal		150 (In ambient temp. 5degC or lower)	1.0			
					Vertical			0.5			
				3 (Motor Type: 42SP)	Vertical	4	70	0.5	354	590	

Note The values of the maximum velocity and maximum acceleration/deceleration for RCP4/RCP4CR/RCP4W are the ones when the high-output feature is activated. (There are also some models that are not related to the high-output setting.)

RCP4 Series

Actuator series	Type	Feed screw	No. of encoder pulses	Lead [mm]	Mounting direction	Minimum speed [mm/s]	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCP4W (Dust and drip proof rod type)	RA7C	Ball screw	800	16	Horizontal	20	500 (at 50st) 560 (at 100 to 500st)	1.0	94	219	20
					Vertical		500 (at 50st) 400 (at 100 to 500st)	0.5			
					Horizontal		450 (In ambient temp. 5degC or lower)	1.0			
					Vertical		300 (In ambient temp. 5degC or lower)	0.5			
				8	Horizontal	10	340	1.0	187	437	
					Vertical		280	0.5			
					Horizontal		300 (In ambient temp. 5degC or lower)	1.0			
					Vertical		250 (In ambient temp. 5degC or lower)	0.5			
				4	Horizontal	5	170	1.0	375	875	
					Vertical		140	0.5			
					Horizontal		150 (In ambient temp. 5degC or lower)	1.0			
					Vertical		125 (In ambient temp. 5degC or lower)	0.5			
				4 (Motor Type: 56SP)	Vertical	5	80	0.5	515	1030	
RCP4 (Gripper type)	GRSML	-	800	1.88	-	5	94	0.3	25 (Both Ends)	87 (Both Ends)	5
	GRSLL			2.52		5	125		40 (Both Ends)	140 (Both Ends)	
	GRSWL			3.14		5	157		50 (Both Ends)	220 (Both Ends)	
	GRLM			12		20 (deg/s)	600 (deg/s)		10 (Both Ends)	35 (Both Ends)	
	GRLL			12		20 (deg/s)	600 (deg/s)		10 (Both Ends)	60 (Both Ends)	
	GRLW			12.86		20 (deg/s))	643 (deg/s)		23 (Both Ends)	90 (Both Ends)	

Note *The values of the maximum velocity and maximum acceleration/deceleration for RCP4/RCP4CR/RCP4W are the ones when the high-output feature is activated. (There are also some models that are not related to the high-output setting.)*

RCP3 Series

Actuator series	Type	Feed screw	No. of encoder pulses	Lead [mm]	Mounting direction	Minimum speed [mm/s]	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCP3 (Slider type)	SA2AC SA2AR	Lead screw	800	4	Horizontal	5	180 (at 25st) 200 (at 50 to 100st)	0.2	-	-	-
				2		3	100				
				1		2	50				
	SA2BC SA2BR	Lead screw	800	6	Horizontal	8	180 (at 25st) 280 (at 50st) 300 (at 75 to 150st)	0.2	-	-	-
				4		5	180 (at 25st) 200 (at 50 to 150st)				
				2		3	100				
	SA3C SA3R	Ball screw	800	6	Horizontal	8	300	0.3	16	30	20
					Vertical			0.2			
				4	Horizontal	5	200	0.3	25	45	
					Vertical			0.2			
				2	Horizontal /vertical	3	100	0.2	50	90	
	SA4C SA4R	Ball screw	800	10	Horizontal	13	500	0.7	25	40	20
					Vertical			0.3			
				5	Horizontal	7	250	0.7	50	80	
					Vertical			0.3			
				2.5	Horizontal	4	125	0.7	100	160	
					Vertical			0.3			
	SA5C SA5R	Ball screw	800	20 (Only for SA5C)	Horizontal	25	1000 (at 50 to 600st) 910 (at 650st) 790 (at 700st) 690 (at 750st) 610 (at 800st)	0.7	20	34	20
					Vertical			0.2			
				12	Horizontal	15	600 (at 50 to 550st) 570 (at 600st) 490 (at 650st) 425 (at 700st) 370 (at 750st) 330 (at 800st)	0.7	40	58	
					Vertical			0.3			
				6	Horizontal	8	300 (at 50 to 550st) 285 (at 600st) 245 (at 650st) 210 (at 700st) 185 (at 750st) 165 (at 800st)	0.7	80	115	
					Vertical			0.3			
				3	Horizontal	4	150 (at 50 to 550st) 140 (at 600st) 120 (at 650st) 105 (at 700st) 90 (at 750st) 80 (at 800st)	0.7	160	230	
					Vertical			0.3			
	SA6C SA6R	Ball screw	800	20 (Only for SA6C)	Horizontal	25	1000 (at 50 to 600st) 910 (at 650st) 790 (at 700st) 690 (at 750st) 610 (at 800st)	0.7	20	34	20
					Vertical			0.2			
				12	Horizontal	15	600 (at 50 to 550st) 570 (at 600st) 490 (at 650st) 425 (at 700st) 370 (at 750st) 330 (at 800st)	0.7	40	58	
					Vertical			0.3			

RCP3 Series

Actuator series	Type	Feed screw	No. of encoder pulses	Lead [mm]	Mounting direction	Minimum speed [mm/s]	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCP3 (Slider type)	SA6C SA6R	Ball screw	800	6	Horizontal	8	300 (at 50 to 550st) 285 (at 600st) 245 (at 650st) 210 (at 700st) 185 (at 750st) 165 (at 800st)	0.7	80	115	20
					Vertical			0.3			
				3	Horizontal	4	150 (at 50 to 550st) 140 (at 600st) 120 (at 650st) 105 (at 700st) 90 (at 750st) 80 (at 800st)	0.7	160	230	
					Vertical			0.3			
RCP3 (Rod type)	RA2AC RA2AR	Lead screw	800	4	Horizontal /vertical	5	180 (at 25st) 200 (at 50 to 100st)	0.2	0.9	6.6	5
				2		3	100		1.9	13.2	
				1		2	50		3.8	26.4	
		Ball screw Standard type		4	Horizontal	5	180 (at 25st) 200 (at 50 to 100st)	0.3	3.6	12.6	
					Vertical			0.2			
				2	Horizontal	3	100	0.3	7.2	25.2	
					Vertical			0.2			
				1	Horizontal	2	50	0.3	14.4	50.4	
					Vertical			0.2			
		Ball screw High thrust type		4	Horizontal	5	180 (at 25st) 200 (at 50 to 100st)	0.3	6.6	23.1	
					Vertical			0.2			
				2	Horizontal	3	100	0.3	13.2	46.2	
					Vertical			0.2			
				1	Horizontal	2	50	0.3	26.4	92.4	
					Vertical			0.2			
	RA2BC RA2BR	Lead screw	800	6	Horizontal /vertical	8	180 (at 25st) 280 (at 50st) 300 (at 75 to 150st)	0.2	0.6	4.4	5
				4		5	180 (at 25st) 200 (at 50 to 150st)		0.9	6.6	
				2		3	100		1.9	13.2	
		Ball screw Standard type		6	Horizontal	8	180 (at 25st) 280 (at 50st) 300 (at 75 to 150st)	0.3	1.8	6.3	
					Vertical			0.2			
				4	Horizontal	5	180 (at 25st) 200 (at 50 to 150st)	0.3	3.6	12.6	
					Vertical			0.2			
				2	Horizontal	3	100	0.3	7.2	25.2	
					Vertical			0.2			
				1	Horizontal	2	50	0.3	14.4	50.4	
					Vertical			0.2			
		Ball screw High thrust type		6	Horizontal	8	180 (at 25st) 280 (at 50st) 300 (at 75 to 150st)	0.3	4.4	15.4	
					Vertical			0.2			
				4	Horizontal	5	180 (at 25st) 200 (at 50 to 150st)	0.3	6.6	23.1	
					Vertical			0.2			
				2	Horizontal	3	100	0.3	13.2	46.2	
					Vertical			0.2			
				1	Horizontal	2	50	0.3	26.4	92.4	
					Vertical			0.2			

RCP3 Series

Actuator series	Type	Feed screw	No. of encoder pulses	Lead [mm]	Mounting direction	Minimum speed [mm/s]	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCP3 (Table type)	TA3C TA3R	Ball screw	800	6	Horizontal	8	300	0.3	10	15	20
					Vertical		200	0.2			
				4	Horizontal	5	200	0.3	15	22	
					Vertical		133	0.2			
				2	Horizontal	3	100	0.2	30	45	
					Vertical		67				
	TA4C TA4R	Ball screw	800	6	Horizontal	8	300	0.3	15	25	20
					Vertical			0.2			
				4	Horizontal	5	200	0.3	22	37	
					Vertical			0.2			
				2	Horizontal /vertical	3	100	0.2	45	75	
	TA5C TA5R	Ball screw	800	10	Horizontal	13	465	0.3	21	34	20
					Vertical		400	0.2			
				5	Horizontal	7	250	0.3	41	68	
					Vertical			0.2			
				2.5	Horizontal /vertical	4	125	0.2	82	136	
	TA6C TA6R	Ball screw	800	12	Horizontal	15	560	0.3	35	60	20
					Vertical		500	0.2			
				6	Horizontal	8	300	0.3	70	110	
					Vertical			0.2			
				3	Horizontal /vertical	4	150	0.2	140	189	
	TA7C TA7R	Ball screw	800	12	Horizontal	15	600	0.3	35	60	20
					Vertical		580	0.2			
				6	Horizontal	8	300	0.3	70	110	
					Vertical			0.2			
				3	Horizontal /vertical	4	150	0.2	140	189	

RCP2 Series

Actuator series	Type	Feed screw	No. of encoder pulses	Lead [mm]	Mounting direction	Minimum speed [mm/s]	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCP2 (Slider type)	SA5C	Ball screw	800	20	Horizontal	25	380 (at 50st) 540 (at 100st) 660 (at 150st) 770 (at 200st) 860 (at 250st) 940 (at 300st) 1000 (at 350 to 550st) 980 (at 600st) 850 (at 650st) 740 (at 700st) 650 (at 750st) 580 (at 800st)	0.7	11	39	20
					Vertical		380 (at 50st) 540 (at 100st) 660 (at 150st) 770 (at 200st) 800 (at 250 to 600st) 740 (at 700st) 650 (at 750st) 580 (at 800st)	0.2			
				12	Horizontal	15	600 (at 50 to 550st) 540 (at 600st) 460 (at 650st) 400 (at 700st) 360 (at 750st) 300 (at 800st)	0.7	40	115	
					Vertical			0.3			
				6	Horizontal	8	300 (at 50 to 550st) 270 (at 600st) 230 (at 650st) 200 (at 700st) 180 (at 750st) 150 (at 800st)	0.7	70	210	
					Vertical			0.3			
				3	Horizontal	4	150 (at 50 to 550st) 135 (at 600st) 115 (at 650st) 100 (at 700st) 90 (at 750st) 75 (at 800st)	0.7	140	330	
					Vertical			0.3			
	SA5R	Ball screw	800	12	Horizontal	15	600 (at 50 to 550st) 540 (at 600st) 460 (at 650st) 400 (at 700st) 360 (at 750st) 300 (at 800st)	0.3	-	-	-
					Vertical			0.2			
				6	Horizontal	8	300 (at 50 to 550st) 270 (at 600st) 230 (at 650st) 200 (at 700st) 180 (at 750st) 150 (at 800st)	0.3			
					Vertical			0.2			
				3	Horizontal /vertical	4	150 (at 50 to 550st) 135 (at 600st) 115 (at 650st) 100 (at 700st) 90 (at 750st) 75 (at 800st)	0.2			

RCP2 Series

Actuator series	Type	Feed screw	No. of encoder pulses	Lead [mm]	Mounting direction	Minimum speed [mm/s]	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCP2 (Slider type)	SA6C	Ball screw	800	20	Horizontal	25	380 (at 50st) 540 (at 100st) 660 (at 150st) 770 (at 200st) 860 (at 250st) 940 (at 300st) 1000 (at 350 to 550st) 980 (at 600st) 850 (at 650st) 740 (at 700st) 650 (at 750st) 580 (at 800st)	0.7	11	39	20
					Vertical		380 (at 50st) 540 (at 100st) 660 (at 150st) 770 (at 200st) 800 (at 250 to 600st) 740 (at 700st) 650 (at 750st) 580 (at 800st)	0.2			
				12	Horizontal	15	600 (at 50 to 550st) 540 (at 600st) 460 (at 650st) 400 (at 700st) 360 (at 750st) 300 (at 800st)	0.7	40	115	
					Vertical			0.3			
				6	Horizontal	8	300 (at 50 to 550st) 270 (at 600st) 230 (at 650st) 200 (at 700st) 180 (at 750st) 150 (at 800st)	0.7	70	210	
					Vertical			0.3			
				3	Horizontal	4	150 (at 50 to 550st) 135 (at 600st) 115 (at 650st) 100 (at 700st) 90 (at 750st) 75 (at 800st)	0.7	140	330	
					Vertical			0.3			
	SA6R	Ball screw	800	12	Horizontal	15	600 (at 50 to 550st) 540 (at 600st) 460 (at 650st) 400 (at 700st) 360 (at 750st) 300 (at 800st)	0.3	-	-	-
					Vertical			0.2			
				6	Horizontal	8	300 (at 50 to 550st) 270 (at 600st) 230 (at 650st) 200 (at 700st) 180 (at 750st) 150 (at 800st)	0.3			
					Vertical			0.2			
				3	Horizontal /vertical	4	150 (at 50 to 550st) 135 (at 600st) 115 (at 650st) 100 (at 700st) 90 (at 750st) 75 (at 800st)	0.2			

RCP2 Series

Actuator series	Type	Feed screw	No. of encoder pulses	Lead [mm]	Mounting direction	Minimum speed [mm/s]	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCP2 (Slider type)	SA7C	Ball screw	800	16	Horizontal	20	533 (at 50 to 700st) 480 (at 800st)	0.3	90	250	20
					Vertical			0.2			
				8	Horizontal	10	266 (at 50 to 700st) 240 (at 800st)	0.3	150	500	
					Vertical			0.2			
				4	Horizontal /vertical	5	133 (at 50 to 700st) 120 (at 800st)	0.2	280	800	
	SA7R	Ball screw	800	16	Horizontal	20	533 (at 50 to 700st) 480 (at 800st)	0.3	-	-	-
					Vertical		400	0.2			
				8	Horizontal	10	266 (at 50 to 700st) 240 (at 800st)	0.3			
					Vertical			0.2			
				4	Horizontal /vertical	5	133 (at 50 to 700st) 120 (at 800st)	0.2			
	SS7C	Ball screw	800	12	Horizontal	15	600 (at 50 to 500st) 470 (at 600st)	0.3	40	115	20
					Vertical			0.2			
				6	Horizontal	8	300 (at 50 to 500st) 230 (at 600st)	0.3	70	210	
					Vertical			0.2			
				3	Horizontal /vertical	4	150 (at 50 to 500st) 115 (at 600st)	0.2	140	330	
	SS7R	Ball screw	800	12	Horizontal	15	600 (at 50 to 500st) 470 (at 600st)	0.3	-	-	-
					Vertical		440	0.2			
				6	Horizontal	8	250 (at 50 to 500st) 230 (at 600st)	0.3			
					Vertical			0.2			
				3	Horizontal /vertical	4	105	0.2			
	SS8C	Ball screw	800	20	Horizontal	25	666 (at 50 to 800st) 625 (at 900st) 515 (at 1000st)	0.3	50	180	20
					Vertical		600 (at 50 to 900st) 515 (at 1000st)	0.2			
				10	Horizontal	13	333 (at 50 to 800st) 310 (at 900st) 255 (at 1000st)	0.3	95	320	
					Vertical		300 (at 50 to 900st) 255 (at 1000st)	0.2			
				5	Horizontal	7	165 (at 50 to 800st) 155 (at 900st) 125 (at 1000st)	0.2	180	630	
					Vertical		150 (at 50 to 900st) 125 (at 1000st)				
	SS8R	Ball screw	800	20	Horizontal	25	600 (at 50 to 900st) 515 (at 1000st)	0.3	-	-	-
					Vertical		333	0.2			
				10	Horizontal	13	300 (at 50 to 900st) 255 (at 1000st)	0.3			
					Vertical		250	0.2			
				5	Horizontal	7	160 (at 50 to 800st) 155 (at 900st) 125 (at 1000st)	0.2			
					Vertical		140				
	HS8C HS8R	Ball screw	800	30	Horizontal	100	1200 (at 50 to 800st) 1000 (at 900st) 800 (at 1000st)	0.5	-	-	-
					Vertical		750	0.2			

RCP2 Series

Actuator series	Type	Feed screw	No. of encoder pulses	Lead [mm]	Mounting direction	Minimum speed [mm/s]	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCP2W (Dust and drip proof slider type)	SA16C	Ball screw	800	8	Horizontal	10	180	0.2	-	-	-
				4		5	133				
RCP2 (Belt type)	BA6 BA6U	Belt	800	Equivalent to 54	Horizontal	100	1000	0.5	-	-	-
	BA7 BA7U	Belt	800	Equivalent to 54	Horizontal	100	1500	0.5	-	-	-
RCP2 (Rod type)	RA2C (注 1)	Ball screw	800	1	Horizontal /vertical	2	25	0.05	50	100	3
	RA3C	Ball screw	800	5	Horizontal /vertical	7	187	0.2	21	73.5	20
				2.5	Horizontal /vertical	4	114		50	156.8	
	RGD3C	Ball screw	800	5	Horizontal /vertical	7	187	0.2	21	73.5	20
				2.5	Horizontal	4	114		50	156.8	
					Vertical		93				
	RA4C RGS4C RGD4C	Ball screw	800	10	Horizontal /vertical	13	458 (at 50 to 250st) 350 (at 300st)	0.2	30	150	20
				5	Horizontal /vertical	7	250 (at 50 to 200st) 237 (at 250st) 175 (at 300st)		75	284	
				2.5	Horizontal	4	125 (at 50 to 200st) 118 (at 250st) 87 (at 300st)		150	358	
					Vertical		114 (at 50 to 250st) 87 (at 300st)				
	RA6C RGS6C RGD6C	Ball screw	800	16	Horizontal	20	450	0.2	75	240	20
					Vertical		400				
				8	Horizontal /vertical	10	210		130	470	
				4	Horizontal /vertical	5	130		300	800	
	RA8C RA8R	Ball screw	800	10	Horizontal /vertical	13	RA8C: 300 RA8R: 200	0.2	286	1000	10
				5	Horizontal /vertical	7	RA8C: 150 RA8R: 100	0.1	571	2000	
	RA10C	Ball screw	800	10	Horizontal	10	250	0.04	500	1500	10
					Vertical		167				
				5	Horizontal /vertical	5	125	0.02	1000	3000	
				2.5	Horizontal /vertical	1	63	0.01	3100	6000	
	SRA4R SRGS4R SRGD4R	Ball screw	800	5	Horizontal	7	250	0.3	32	112	20
					Vertical			0.2			
				2.5	Horizontal /vertical	4	125	0.2	64	224	
RCP2W (Dust and drip proof rod type)	RA4C	Ball screw	800	10	Horizontal	13	450 (at 50 to 250st) 350 (at 300st)	0.2	30	150	20
					Vertical		250				
				5	Horizontal /vertical	7	190 (at 50 to 250st) 175 (at 300st)		75	284	
				2.5	Horizontal	4	125 (at 50 to 200st) 115 (at 250st) 85 (at 300st)		150	358	
					Vertical		115 (at 50 to 250st) 85 (at 300st)				

Note 1 For RCP2-RA2C, a ball screw with its lead length 1mm and a speed reducer with its gear ratio 1/2 are joined directly.

RCP2 Series

Actuator series	Type	Feed screw	No. of encoder pulses	Lead [mm]	Mounting direction	Minimum speed [mm/s]	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCP2W (Dust and drip proof rod type)	RA6C	Ball screw	800	16	Horizontal	20	320	0.2	75	240	20
					Vertical		265				
				8	Horizontal /vertical	10	200		130	470	
				4	Horizontal /vertical	5	100		300	800	
	RA10C	Ball screw	800	10	Horizontal	10	250	0.04	500	1500	10
					Vertical		167				
				5	Horizontal /vertical	5	125	0.02	1000	3000	
				2.5	Horizontal /vertical	1	63	0.01	3100	6000	
RCP2 (Gripper type)	GRSS	-	800	1.57	-	5	78	-	4 (Both Ends)	14 (Both Ends)	5
	GRLS			12		5 (deg/s)	600 (deg/s)		1.8 (Both Ends)	6.4 (Both Ends)	20 (deg/s)
	GRS			1		5	33		9 (Both Ends)	21 (Both Ends)	5
	GRM			1.1		5	36		23 (Both Ends)	80 (Both Ends)	5
	GRHM			2		5	100		25 (Both Ends)	125 (Both Ends)	5
	GRHB			2		5	100		60 (Both Ends)	200 (Both Ends)	5
	GRST			1.05		5	34 (Standard Type)		15 (Both Ends)	40 (Both Ends)	5
				2.27		5	75 (High Speed Type)		7.5 (Both Ends)	20 (Both Ends)	5
	GR3SS			2.5		5	40		7 (Both Ends)	22 (Both Ends)	5
	GR3SM			3		5	50		30 (Both Ends)	102 (Both Ends)	5
	GR3LS			12		5 (deg/s)	200 (deg/s)		5 (Both Ends)	18 (Both Ends)	20 (deg/s)
	GR3LM			12		5 (deg/s)	200 (deg/s)		15 (Both Ends)	51 (Both Ends)	20 (deg/s)
RCP2CR RCP2W (Cleanroom type / Dust and drip proof gripper type)	GRSS	-	800	1.57	-	2	78	-	4 (Both Ends)	14 (Both Ends)	5
	GRLS			12		15 (deg/s)	600 (deg/s)		1.8 (Both Ends)	6.4 (Both Ends)	5 (deg/s)
	GRS			1		2	33		9 (Both Ends)	21 (Both Ends)	5
	GRM			1.1		2	36		23 (Both Ends)	80 (Both Ends)	5
	GR3SS			2.5		4	40		7 (Both Ends)	22 (Both Ends)	5
	GR3SM			3		4	50		30 (Both Ends)	102 (Both Ends)	5
RCP2 RCP2CR RCP2W (Rotary type)	RTBS RTBSL RTCS RTCSL	-	800	12deg (Gear ratio: 1/30)	-	15 (deg/s)	400 (deg/s)	-	-	-	-
				8deg (Gear ratio: 1/45)		10 (deg/s)	266 (deg/s)				
Standard type / Cleanroom type / Dust and drip proof type	RTB RTBL RTC RTCL RTBB RTBBL RTCB RTCBL	-	800	18deg (Gear ratio: 1/20)	-	23 (deg/s)	600 (deg/s)	-	-	-	-
				12deg (Gear ratio: 1/30)		15 (deg/s)	400 (deg/s)				

Specifications for 24V AC Servo Motor Type Actuator

RCA2 Series

Actuator series	Type	Feed screw	Motor output [W]	No. of encoder pulses	Lead [mm]	Mounting direction	Minimum speed [mm/s]	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCA2 (Slider type)	SA3C SA3R	Ball screw	10	800	6	Horizontal	8	300	0.3	-	-	-
						Vertical			0.2			
					4	Horizontal	5	200	0.3			
						Vertical			0.2			
					2	Horizontal /vertical	3	100	0.2			
	SA4C SA4R	Ball screw	20	800	10	Horizontal	13	500	0.3	-	-	-
						Vertical			0.2			
					5	Horizontal	7	250	0.3			
						Vertical			0.2			
					2.5	Horizontal /vertical	4	125	0.2			
	SA5C SA5R	Ball screw	20	800	20 (Only for SA5C)	Horizontal	25	1000 (at 50 to 600st) 910 (at 650st) 790 (at 700st) 690 (at 750st) 610 (at 800st)	0.3	-	-	-
						Vertical		800 (at 50 to 650st) 790 (at 700st) 690 (at 750st) 610 (at 800st)	0.2			
					12	Horizontal	15	600 (at 50 to 550st) 570 (at 600st) 490 (at 650st) 425 (at 700st) 370 (at 750st) 330 (at 800st)	0.3			
						Vertical			0.2			
					6	Horizontal	8	300 (at 50 to 550st) 285 (at 600st) 245 (at 650st) 210 (at 700st) 185 (at 750st) 165 (at 800st)	0.3			
						Vertical			0.2			
					3	Horizontal /vertical	4	150 (at 50 to 550st) 140 (at 600st) 120 (at 650st) 105 (at 700st) 90 (at 750st) 80 (at 800st)	0.2			
	SA6C SA6R	Ball screw	30	800	20 (Only for SA6C)	Horizontal	25	1000 (at 50 to 600st) 910 (at 650st) 790 (at 700st) 690 (at 750st) 610 (at 800st)	0.3	-	-	-
						Vertical		800 (at 50 to 650st) 790 (at 700st) 690 (at 750st) 610 (at 800st)	0.2			
					12	Horizontal	15	600 (at 50 to 550st) 570 (at 600st) 490 (at 650st) 425 (at 700st) 370 (at 750st) 330 (at 800st)	0.3			
						Vertical			0.2			

RCA2 Series

Actuator series	Type	Feed screw	Motor output [W]	No. of encoder pulses	Lead [mm]	Mounting direction	Minimum speed [mm/s]	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCA2 (Slider type)	SA6C SA6R	Ball screw	30	800	6	Horizontal	8	300 (at 50 to 550st) 285 (at 600st) 245 (at 650st) 210 (at 700st) 185 (at 750st) 165 (at 800st)	0.3	-	-	-
						Vertical			0.2			
					3	Horizontal /vertical	4	150 (at 50 to 550st) 140 (at 600st) 120 (at 650st) 105 (at 700st) 90 (at 750st) 80 (at 800st)	0.2			
RCA2 RCA2CR RCA2W (Rod type) Standard type / Cleanroom type / Dust and drip proof type	[Standard] RN3NA RP3NA GS3NA GD3NA SD3NA [Cleanroom] [Dust and drip proof] RN3NB RP3NB GS3NB GD3NB SD3NB	Ball screw	10	1048	4	Horizontal	4	200	0.3	-	-	-
						Vertical			0.2			
					2	Horizontal	2	100	0.3			
						Vertical			0.2			
					1	Horizontal	1	50	0.2			
						Vertical						
		Lead screw (Available to Select Only in Standard Type)			4	Horizontal /vertical	4	200	0.2			
					2		2	100				
					1		1	50				
	[Standard] RN4NA RP4NA GS4NA GD4NA [Cleanroom] [Dust and drip proof] RN4NB RP4NB GS4NB GD4NB	Ball screw	20	1048	6	Horizontal	6	270 (at 30st) 300 (at 50st)	0.3	-	-	-
						Vertical		220 (at 30st) 300 (at 50st)	0.2			
					4	Horizontal	4	200	0.3			
						Vertical			0.2			
					2	Horizontal /vertical	2	100	0.2			
		Lead screw (Available to Select Only in Standard Type)			6	Horizontal /vertical	6	220 (at 30st) 300 (at 50st)	0.2			
					4	Horizontal	4	200				
						Vertical						
					2	Horizontal /vertical	2	100				
	[Standard] SD4NA [Cleanroom] [Dust and drip proof] SD4NB	Ball screw	20	1048	6	Horizontal	6	240 (at 25st) 300 (at 50 to 75st)	0.3	-	-	-
						Vertical		200 (at 25st) 300 (at 50 to 75st)	0.2			
					4	Horizontal	4	200	0.3			
						Vertical			0.2			
					2	Horizontal /vertical	2	100	0.2			
		Lead screw (Available to Select Only in Standard Type)			6	Horizontal/ vertical	6	200 (at 25st) 300 (at 50 to 75st)	0.2			
					4		4	200				
					2		2	100				

RCA2 Series

Actuator series	Type	Feed screw	Motor output [W]	No. of encoder pulses	Lead [mm]	Mounting direction	Minimum speed [mm/s]	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCA2 (Table type)	TCA3NA TWA3NA TFA3NA	Ball screw	10	1048	4	Horizontal	4	200	0.3	-	-	-
						Vertical			0.2			
					2	Horizontal	2	100	0.3			
						Vertical			0.2			
					1	Horizontal /vertical	1	50	0.2			
		Lead screw			4	Horizontal /vertical	4	200	0.2			
					2		2	100				
					1		1	50				
	TCA4NA TWA4NA TFA4NA	Ball screw	20	1048	6	Horizontal	6	270 (at 30st) 300 (at 50st)	0.3	-	-	-
						Vertical		220 (at 30st) 300 (at 50st)	0.2			
					4	Horizontal	4	200	0.3			
						Vertical			0.2			
					2	Horizontal /vertical	2	100	0.2			
		Lead screw			6	Horizontal /vertical	6	220 (at 30st) 300 (at 50st)	0.2			
					4		4	200				
					2		2	100				
	TA4C TA4R	Ball screw	10	800	6	Horizontal	8	300	0.3	-	-	-
						Vertical			0.2			
					4	Horizontal	5	200	0.3			
						Vertical			0.2			
					2	Horizontal /vertical	3	100	0.2			
	TA5C TA5R	Ball screw	20	800	10	Horizontal	13	465	0.3	-	-	-
						Vertical		400	0.2			
					5	Horizontal	7	250	0.3			
						Vertical			0.2			
					2.5	Horizontal /vertical	4	125	0.2			
	TA6C TA6R	Ball screw	20	800	12	Horizontal	15	560	0.3	-	-	-
						Vertical		500	0.2			
					6	Horizontal	8	300	0.3			
						Vertical			0.2			
					3	Horizontal /vertical	4	150	0.2			
	TA7C TA7R	Ball screw	30	800	12	Horizontal	15	600	0.3	-	-	-
						Vertical		580	0.2			
					6	Horizontal	8	300	0.3			
						Vertical			0.2			
					3	Horizontal /vertical	4	150	0.2			

RCA Series

Actuator series	Type	Feed screw	Motor output [W]	No. of encoder pulses	Lead [mm]	Mounting direction	Minimum speed [mm/s]	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCA RCACR (Slider type) Standard type / Cleanroom type	[Standard] [Cleanroom] SA4C	Ball screw	20	Incremental 800 Battery-less Absolute 16384	10	Horizontal /vertical	13 (Note 1)	665	0.3 / 1.0 (Note 2)	-	-	-
					5		7 (Note 1)	330	0.3 / 1.0 (Note 2)			
					2.5		4 (Note1)	165	0.2			
	[Standard] SA4D	Ball screw	20	Incremental 800 (Note 3)	10	Horizontal /vertical	13	665	0.3	-	-	-
					5		7	330	0.3			
					2.5		4	165	0.2			
	[Standard] SA4R	Ball screw	20	Incremental 800 Battery-less Absolute 16384	10	Horizontal /vertical	13 (Note 1)	665	0.3	-	-	-
					5		7 (Note 1)	330	0.3			
					2.5		4 (Note 1)	165	0.2			
	[Standard] [Cleanroom] SA5C	Ball screw	20	Incremental 800 Battery-less Absolute 16384	20	Horizontal	25 (Note 1)	1300	0.3 / 0.8 (Note 2)	-	-	-
						Vertical		800	0.2			
					12	Horizontal /vertical	15 (Note 1)	800 (at 50 to 450st) 760 (at 500st)	0.3 / 0.8 (Note 2)			
					6		8 (Note 1)	400 (at 50 to 450st) 380 (at 500st)	0.3 / 0.8 (Note 2)			
					3		4 (Note 1)	200 (at 50 to 450st) 190 (at 500st)	0.2			
	[Standard] SA5D	Ball screw	20	Incremental 800 (Note 3)	12	Horizontal /vertical	15	800 (at 50 to 450st) 760 (at 500st)	0.3	-	-	-
					6		8	400 (at 50 to 450st) 380 (at 500st)	0.3			
					3		4	200 (at 50 to 450st) 190 (at 500st)	0.2			
	[Standard] SA5R	Ball screw	20	Incremental 800 Battery-less Absolute 16384	12	Horizontal /vertical	15 (Note 1)	800 (at 50 to 450st) 760 (at 500st)	0.3	-	-	-
					6		8 (Note 1)	400 (at 50 to 450st) 380 (at 500st)	0.3			
					3		4 (Note 1)	200 (at 50 to 450st) 190 (at 500st)	0.2			
	[Standard] [Cleanroom] SA6C	Ball screw	30	Incremental 800 Battery-less Absolute 16384	20	Horizontal	25 (Note 1)	1300 (at 50 to 500st) 1160 (at 550st) 990 (at 600st)	0.3 / 1.0 (Note 2)	-	-	-
						Vertical		800	0.2			
					12	Horizontal /vertical	15 (Note 1)	800 (at 50 to 450st) 760 (at 500st) 640 (at 550st) 540 (at 600st)	0.3 / 1.0 (Note 2)			
					6		8 (Note 1)	400 (at 50 to 450st) 380 (at 500st) 320 (at 550st) 270 (at 600st)	0.3 / 1.0 (Note 2)			
					3		4 (Note 1)	200 (at 50 to 450st) 190 (at 500st) 160 (at 550st) 135 (at 600st)	0.2			

The models with the type column shaded are applicable for offboard tuning function. (However, high-acceleration/deceleration type, power-saving type, cleanroom type, dust and drip proof type and slider-roller type are not applicable for offboard tuning.)

For offboard tuning function, refer to the instruction manual of PC software.

Note 1 It is the velocity with the incremental encoder.

Note 2 It is the maximum acceleration/deceleration when the option "High Acceleration/Deceleration Application (Model code: HA)" which is available to select only in the standard type is added.

Note 3 Connection is available only with Incremental Type.

RCA Series

Actuator series	Type	Feed screw	Motor output [W]	No. of encoder pulses	Lead [mm]	Mounting direction	Minimum speed [mm/s]	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCA RCACR (Slider type) Standard type / Cleanroom type	[Standard] [Cleanroom] SA6D	Ball screw	30	Incremental 800 (Note 3)	12	Horizontal /vertical	15	800 (at 50 to 450st) 760 (at 500st) 640 (at 550st) 540 (at 600st)	0.3	-	-	-
					6		8	400 (at 50 to 450st) 380 (at 500st) 320 (at 550st) 270 (at 600st)	0.3			
					3		4	200 (at 50 to 450st) 190 (at 500st) 160 (at 550st) 135 (at 600st)	0.2			
	[Standard] SA6R	Ball screw	30	Incremental 800 Battery-less Absolute 16384	12	Horizontal /vertical	15 (注 1)	800 (at 50 to 450st) 760 (at 500st) 640 (at 550st) 540 (at 600st)	0.3	-	-	-
					6		8 (注 1)	400 (at 50 to 450st) 380 (at 500st) 320 (at 550st) 270 (at 600st)	0.3			
					3		4 (注 1)	200 (at 50 to 450st) 190 (at 500st) 160 (at 550st) 135 (at 600st)	0.2			
RCA RCAW (Rod type) Standard type / Dust and drip proof type	[Standard] [Dust and drip proof] RA3C	Ball screw	20	800	10	Horizontal /vertical	13	500	0.3 / 1.0 (Note 2)	-	-	-
					5		7	250	0.3 / 1.0 (Note 2)			
					2.5		4	125	0.2			
	[Standard] RGS3C RGD3C	Ball screw	20	800	10	Horizontal /vertical	13	500	0.3 / 1.0 (Note 2)	-	-	-
					5		7	250	0.3 / 1.0 (Note 2)			
					2.5		4	125	0.2			
	[Standard] [Dust and drip proof] RA3D RA3R [Standard] RGS3D RGD3D RGD3R	Ball screw	20	800	10	Horizontal /vertical	13	500	0.3	-	-	-
					5		7	250	0.3			
					2.5		4	125	0.2			
	[Standard] [Dust and drip proof] RA4C	Ball screw	20 30	Incremental 800 (Note 3)	12	Horizontal /vertical	15	600	0.3 / 1.0 (Note 2)	-	-	-
					6		8	300	0.3 / 1.0 (Note 2)			
					3		4	150	0.2			
	[Standard] RGS4C RGD4C	Ball screw	20 30	Incremental 800 (Note 3)	12	Horizontal /vertical	15	600	0.3 / 1.0 (Note 2)	-	-	-
					6		8	300	0.3 / 1.0 (Note 2)			
					3		4	150	0.2			
	[Standard] [Dust and drip proof] RA4D RA4R [Standard] RGS4D RGD4D RGD4R	Ball screw	20 30	Incremental 800 (Note 3)	12	Horizontal /vertical	15	600	0.3	-	-	-
					6		8	300	0.3			
					3		4	150	0.2			

The models with the type column shaded are applicable for offboard tuning function. (However, high-acceleration/deceleration type, power-saving type, cleanroom type, dust and drip proof type and slider-roller type are not applicable for offboard tuning.)

For offboard tuning function, refer to the instruction manual of PC software.

Note 1 It is the velocity with the incremental encoder.

Note 2 It is the maximum acceleration/deceleration when the option "High Acceleration/Deceleration Application (Model code: HA)" which is available to select only in the standard type is added.

Note 3 Connection is available only with Incremental Type.

RCA Series

Actuator series	Type	Feed screw	Motor output [W]	No. of encoder pulses	Lead [mm]	Mounting direction	Minimum speed [mm/s]	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCA (Rod type)	SRA4R SRGS4R SRGD4R	Ball screw	20	800	5	Horizontal	7	250	0.3	-	-	-
						Vertical			0.2			
					2.5	Horizontal /vertical	4	125	0.2			
RCA (Arm type) (Note 3)	A4R	Ball screw	20	800	10	Horizontal /vertical	13	330	0.2	-	-	-
					5		7	165				
	A5R	Ball screw	20	800	12	Horizontal /vertical	15	400	0.2	-	-	-
					6		8	200				
	A6R	Ball screw	30	800	12	Horizontal /vertical	15	400	0.2	-	-	-
					6		8	200				

Note 3 Connection is available only with Incremental Type.

RCL Series

Actuator series	Type	Feed screw	Motor output [W]	No. of encoder pulses	Lead [mm]	Mounting direction	Minimum speed [mm/s]	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCL	RA1L	Linear	-	715	-	Horizontal /vertical	42	300	Horizontal: 2G Vertical: 1G	0.75	2	20
	RA2L			855				340		1.5	4	
	RA3L			1145				450		3	8	
	SA1L			715		Horizontal		420	2	-	-	-
	SA2L			855				460				
	SA3L			1145				600				
	SA4L SM4L			715				1200				
	SA5L SM5L			855				1400				
	SA6L SM6L			1145				1600				

Specifications for Brushless DC Electric Motor Actuator

RCD Series

Actuator series	Type	Feed screw	Motor output [W]	No. of encoder pulses	Lead [mm]	Mounting direction	Minimum speed [mm/s]	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCD	RA1DA	Lead screw	3	480	2	Horizontal /vertical	5	300	1	0.41	2.6	5
	GRSNA			480		Horizontal /vertical		67		2.1	10 (Both Ends)	

Specifications for 200V AC Servo Motor Type Actuator

Shown below is a list of the actuator specifications connectable to the 200V driver unit.
Refer to the instruction manual of SCON-CB Controller for the actuator specifications connectable to SCON-CB Controller (RCON connection type).

Note In case of the following 200V servomotor actuators and the case that the maximum wattage exceeds the following, it is not available to establish connectivity to 200V driver unit.

(1) Motor types other than those from 60W to 750W
(2) Encoder types other than battery-less absolute, incremental, spurious absolute or index absolute type
(3) For 3-Phase 200V ········· Combination that exceeds 2400W for total wattage of actuators connected to 200V driver unit
(4) For Single-Phase 200V ·· Combination that exceeds 1600W for total wattage of actuators connected to 200V driver unit
(5) Servo press type
(6) SCARA robot
(7) CT4 series
(8) ZR series

When (1) to (4), use SCON extension unit and SCON-CB (RCON connection specifications).
Also, DD/DDA and LSA-W21S are not applicable for the single-phase 200V.

RCS4 Series

Actuator series	Type	Motor output [W]	No. of encoder pulses	Lead [mm]	Mounting direction	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCS4 (Slider type)	SA4C SA4R	60	16384	16	Horizontal/ Vertical	960 (at 50 to 450st) 875 (at 500st)	SA4C:1.2 SA4R:1	–	–	–
				10		600 (at 50 to 450st) 555 (at 500st)	SA4C:1.2 SA4R:1			
				5		300 (at 50 to 450st) 275 (at 500st)	1			
				2.5		150 (at 50 to 450st) 135 (at 500st)	0.7			
	SA6C SA6R	100	16384	30	Horizontal/ Vertical	1600 (at 50 to 550st) 1450 (at 600st) 1260 (at 650st) 1100 (at 700st) 970 (at 750st) 860 (at 800st)	SA6C:1.2 SA6R:1	–	–	–
				20		1200 (at 50 to 500st) 1130 (at 550st) 970 (at 600st) 840 (at 650st) 735 (at 700st) 650 (at 750st) 575 (at 800st)	SA6C:1.2 SA6R:1	–	–	–
				12		720 (at 50 to 500st) 620 (at 550st) 535 (at 600st) 460 (at 650st) 405 (at 700st) 355 (at 750st) 315 (at 800st)	SA6C:1.2 SA6R:1	–	–	–
				6		360 (at 50 to 500st) 305 (at 550st) 265 (at 600st) 230 (at 650st) 200 (at 700st) 175 (at 750st) 155 (at 800st)	1	–	–	–
				3		180 (at 50 to 500st) 150 (at 550st) 130 (at 600st) 115 (at 650st) 100 (at 700st) 85 (at 750st) 75 (at 800st)	0.7	–	–	–

(Note) The models with the type shaded are applicable for the offboard tuning feature. (Except, if there is a setting applicable for the high acceleration, it is to be excluded.)
For the offboard tuning feature, refer to the instruction manual Of the PC teaching software.

RCS4 Series

Actuator series	Type	Motor output [W]	No. of encoder pulses	Lead [mm]	Mounting direction	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCS4 (Slider type)	SA7C SA7R	200	16384	36	Horizontal/ Vertical	1800 (at 50 to 600st) 1620 (at 650st) 1420 (at 700st) 1260 (at 750st) 1120 (at 800st)	SA7C:1.2 SA7R:1	–	–	–
				24		1500 (at 50 to 500st) 1440 (at 550st) 1240 (at 600st) 1095 (at 650st) 965 (at 700st) 850 (at 750st) 760 (at 800st)	SA7C:1.2 SA7R:1	–	–	–
				16		1000 (at 50 to 500st) 965 (at 550st) 830 (at 600st) 720 (at 650st) 635 (at 700st) 560 (at 750st) 500 (at 800st)	SA7C:1.2 SA7R:1	–	–	–
				8		500 (at 50 to 500st) 475 (at 550st) 410 (at 600st) 355 (at 650st) 315 (at 700st) 275 (at 750st) 245 (at 800st)	1	–	–	–
				4		240 (at 50 to 500st) 235 (at 550st) 205 (at 600st) 175 (at 650st) 155 (at 700st) 135 (at 750st) 120 (at 800st)	0.7	–	–	–
	SA8C	400	16384	48	Horizontal	2200 (at 50 to 700st) 2180 (at 750st) 1950 (at 800st) 1760 (at 850st) 1590 (at 900st) 1450 (at 950st) 1320 (at 1000st) 1210 (at 1050st) 1110 (at 1100st)	1.2	–	–	–
				30	Horizontal/ Vertical	1800 (at 50 to 600st) 1640 (at 650st) 1440 (at 700st) 1280 (at 750st) 1155 (at 800st) 1040 (at 850st) 940 (at 900st) 855 (at 950st) 780 (at 1000st) 715 (at 1050st) 660 (at 1100st)	1.2	–	–	–

(Note) The models with the type shaded are applicable for the offboard tuning feature. (Except, if there is a setting applicable for the high acceleration, it is to be excluded.)
For the offboard tuning feature, refer to the instruction manual Of the PC teaching software.

RCS4 Series

Actuator series	Type	Motor output [W]	No. of encoder pulses	Lead [mm]	Mounting direction	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCS4 (Slider type)	SA8C	400	16384	20	Horizontal/ Vertical	1200 (at 50 to 600st) 1090 (at 650st) 960 (at 700st) 860 (at 750st) 770 (at 800st) 695 (at 850st) 630 (at 900st) 570 (at 950st) 520 (at 1000st) 480 (at 1050st) 440 (at 1100st)	1.2	–	–	–
				10		600 (at 50 to 600st) 540 (at 650st) 480 (at 700st) 430 (at 750st) 385 (at 800st) 345 (at 850st) 310 (at 900st) 285 (at 950st) 260 (at 1000st) 235 (at 1050st) 220 (at 1100st)	1	–	–	–
				5		300 (at 50 to 600st) 270 (at 650st) 240 (at 700st) 215 (at 750st) 190 (at 800st) 175 (at 850st) 155 (at 900st) 140 (at 950st) 130 (at 1000st) 120 (at 1050st) 110 (at 1100st)	0.7	–	–	–
	SA8R	400	16384	48	Horizontal	2100 (at 50 to 750st) 1950 (at 800st) 1760 (at 850st) 1590 (at 900st) 1450 (at 950st) 1320 (at 1000st) 1210 (at 1050st) 1110 (at 1100st)	1	–	–	–
				30	Horizontal/ Vertical	1800 (at 50 to 600st) 1640 (at 650st) 1440 (at 700st) 1280 (at 750st) 1155 (at 800st) 1040 (at 850st) 940 (at 900st) 855 (at 950st) 780 (at 1000st) 715 (at 1050st) 660 (at 1100st)	1	–	–	–

(Note) The models with the type shaded are applicable for the offboard tuning feature. (Except, if there is a setting applicable for the high acceleration, it is to be excluded.)
For the offboard tuning feature, refer to the instruction manual Of the PC teaching software.

RCS4 Series

Actuator series	Type	Motor output [W]	No. of encoder pulses	Lead [mm]	Mounting direction	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCS4 (Slider type)	SA8R	400	16384	20	Horizontal/ Vertical	1200 (at 50 to 600st) 1090 (at 650st) 960 (at 700st) 860 (at 750st) 770 (at 800st) 695 (at 850st) 630 (at 900st) 570 (at 950st) 520 (at 1000st) 480 (at 1050st) 440 (at 1100st)	1	–	–	–
				10		600 (at 50 to 600st) 540 (at 650st) 480 (at 700st) 430 (at 750st) 385 (at 800st) 345 (at 850st) 310 (at 900st) 285 (at 950st) 260 (at 1000st) 235 (at 1050st) 220 (at 1100st)	1	–	–	–
				5		300 (at 50 to 600st) 270 (at 650st) 240 (at 700st) 215 (at 750st) 190 (at 800st) 175 (at 850st) 155 (at 900st) 140 (at 950st) 130 (at 1000st) 120 (at 1050st) 110 (at 1100st)	0.7	–	–	–
[Cleanroom type] RCS4CR (Slider type)	SA4C	60	16384	16	Horizontal/ Vertical	960 (at 50 to 450st) 875 (at 500st)	1.2	–	–	–
				10		600 (at 50 to 450st) 555 (at 500st)	1.2			
				5		300 (at 50 to 450st) 275 (at 500st)	1			
				2.5		150 (at 50 to 450st) 135 (at 500st)	0.7			
	SA6C	100	16384	20	Horizontal/ Vertical	1200 (at 50 to 500st) 1130 (at 550st) 970 (at 600st) 840 (at 650st) 735 (at 700st) 650 (at 750st) 575 (at 800st)	1.2	–	–	–
				12		720 (at 50 to 500st) 620 (at 550st) 535 (at 600st) 460 (at 650st) 405 (at 700st) 355 (at 750st) 315 (at 800st)	1.2	–	–	–

(Note) The models with the type shaded are applicable for the offboard tuning feature. (Except, if there is a setting applicable for the high acceleration, it is to be excluded.)
For the offboard tuning feature, refer to the instruction manual Of the PC teaching software.

RCS4 Series

Actuator series	Type	Motor output [W]	No. of encoder pulses	Lead [mm]	Mounting direction	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
[Cleanroom type] RCS4CR (Slider type)	SA6C	100	16384	6	Horizontal/ Vertical	360 (at 50 to 500st) 305 (at 550st) 265 (at 600st) 230 (at 650st) 200 (at 700st) 175 (at 750st) 155 (at 800st)	1	–	–	–
				3		180 (at 50 to 500st) 150 (at 550st) 130 (at 600st) 115 (at 650st) 100 (at 700st) 85 (at 750st) 75 (at 800st)	0.7	–	–	–
	SA7C	200	16384	24	Horizontal/ Vertical	1500 (at 50 to 500st) 1440 (at 550st) 1240 (at 600st) 1095 (at 650st) 965 (at 700st) 850 (at 750st) 760 (at 800st)	1.2	–	–	–
				16		1000 (at 50 to 500st) 965 (at 550st) 830 (at 600st) 720 (at 650st) 635 (at 700st) 560 (at 750st) 500 (at 800st)	1.2	–	–	–
				8		500 (at 50 to 500st) 475 (at 550st) 410 (at 600st) 355 (at 650st) 315 (at 700st) 275 (at 750st) 245 (at 800st)	1	–	–	–
				4		240 (at 50 to 500st) 235 (at 550st) 205 (at 600st) 175 (at 650st) 155 (at 700st) 135 (at 750st) 120 (at 800st)	0.7	–	–	–
	SA8C	400	16384	20	Horizontal/ Vertical	1200 (at 50 to 600st) 1090 (at 650st) 960 (at 700st) 860 (at 750st) 770 (at 800st) 695 (at 850st) 630 (at 900st) 570 (at 950st) 520 (at 1000st) 480 (at 1050st) 440 (at 1100st)	1.2	–	–	–

RCS4 Series

Actuator series	Type	Motor output [W]	No. of encoder pulses	Lead [mm]	Mounting direction	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
[Cleanroom type] RCS4CR (Slider type)	SA8C	400	16384	10	Horizontal/ Vertical	600 (at 50 to 600st) 540 (at 650st) 480 (at 700st) 430 (at 750st) 385 (at 800st) 345 (at 850st) 310 (at 900st) 285 (at 950st) 260 (at 1000st) 235 (at 1050st) 220 (at 1100st)	1	–	–	–
				5		300 (at 50 to 600st) 270 (at 650st) 240 (at 700st) 215 (at 750st) 190 (at 800st) 175 (at 850st) 155 (at 900st) 140 (at 950st) 130 (at 1000st) 120 (at 1050st) 110 (at 1100st)	0.7	–	–	–
RCS4 (Wide slider type)	WSA10C WSA10R	60	16384	16	Horizontal	960 (at 50 to 350st) 930 (at 400st) 775 (at 450st) 660 (at 500st)	WSA10C:1.2 WSA10R:1	–	–	–
				10	Horizontal/ Vertical	600 (at 50 to 350st) 590 (at 400st) 490 (at 450st) 415 (at 500st)	WSA10C:1.2 WSA10R:1	–	–	–
				5		300 (at 50 to 350st) 290 (at 400st) 245 (at 450st) 205 (at 500st)	1	–	–	–
				2.5		150 (at 50 to 350st) 145 (at 400st) 120 (at 450st) 100 (at 500st)	0.7	–	–	–
	WSA12C WSA12R	100	16384	30	Horizontal	1600 (at 50 to 500st) 1450 (at 550st) 1260 (at 600st) 1100 (at 650st) 970 (at 700st) 860 (at 750st) 770 (at 800st)	WSA12C:1.2 WSA12R:1	–	–	–
				20	Horizontal/ Vertical	1200 (at 50 to 450st) 1130 (at 500st) 970 (at 550st) 840 (at 600st) 740 (at 650st) 650 (at 700st) 580 (at 750st) 520 (at 800st)	WSA12C:1.2 WSA12R:1	–	–	–

(Note) The models with the type shaded are applicable for the offboard tuning feature. (Except, if there is a setting applicable for the high acceleration, it is to be excluded.)
For the offboard tuning feature, refer to the instruction manual Of the PC teaching software.

RCS4 Series

Actuator series	Type	Motor output [W]	No. of encoder pulses	Lead [mm]	Mounting direction	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCS4 (Wide slider type)	WSA12C WSA12R	100	16384	12	Horizontal/ Vertical	720 (at 50 to 450st) 610 (at 500st) 535 (at 550st) 465 (at 600st) 405 (at 650st) 355 (at 700st) 315 (at 750st) 285 (at 800st)	WSA12C:1.2 WSA12R:1	–	–	–
				6		360 (at 50 to 450st) 310 (at 500st) 265 (at 550st) 230 (at 600st) 200 (at 650st) 175 (at 700st) 155 (at 750st) 140 (at 800st)	1	–	–	–
				3		180 (at 50 to 450st) 150 (at 500st) 130 (at 550st) 115 (at 600st) 100 (at 650st) 85 (at 700st) 75 (at 750st) 70 (at 800st)	0.7	–	–	–
	WSA14C WSA14R	200	16384	36	Horizontal	WSA14C: 1800 (at 50 to 550st) 1590 (at 600st) 1400 (at 650st) 1240 (at 700st) 1110 (at 750st) 990 (at 800st)	WSA14C:1.2 WSA14R:1	–	–	–
						WSA14R: 1710 (at 50 to 550st) 1590 (at 600st) 1400 (at 650st) 1240 (at 700st) 1110 (at 750st) 990 (at 800st)		–	–	–
				24	Horizontal/ Vertical	1440 (at 50 to 450st) 1420 (at 500st) 1220 (at 550st) 1060 (at 600st) 930 (at 650st) 830 (at 700st) 740 (at 750st) 665 (at 800st)	WSA14C:1.2 WSA14R:1	–	–	–
				16		960 (at 50 to 450st) 920 (at 500st) 790 (at 550st) 690 (at 600st) 610 (at 650st) 550 (at 700st) 490 (at 750st) 440 (at 800st)	WSA14C:1.2 WSA14R:1	–	–	–

(Note) The models with the type shaded are applicable for the offboard tuning feature. (Except, if there is a setting applicable for the high acceleration, it is to be excluded.)
For the offboard tuning feature, refer to the instruction manual Of the PC teaching software.

RCS4 Series

Actuator series	Type	Motor output [W]	No. of encoder pulses	Lead [mm]	Mounting direction	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCS4 (Wide slider type)	WSA14C WSA14R	200	16384	8	Horizontal/ Vertical	480 (at 50 to 450st) 460 (at 500st) 400 (at 550st) 350 (at 600st) 305 (at 650st) 270 (at 700st) 240 (at 750st) 215 (at 800st)	1	–	–	–
				4		240 (at 50 to 450st) 230 (at 500st) 200 (at 550st) 170 (at 600st) 150 (at 650st) 135 (at 700st) 120 (at 750st) 105 (at 800st)	0.7	–	–	–
	WSA16C WSA16R	400	16384	30	Horizontal/ Vertical	1800 (at 50 to 550st) 1680 (at 600st) 1480 (at 650st) 1320 (at 700st) 1180 (at 750st) 1060 (at 800st) 960 (at 850st) 870 (at 900st) 790 (at 950st) 730 (at 1000st) 670 (at 1050st) 620 (at 1100st)	WSA16C:1.2 WSA16R:1	–	–	–
				20		1200 (at 50 to 550st) 1120 (at 600st) 990 (at 650st) 880 (at 700st) 780 (at 750st) 715 (at 800st) 645 (at 850st) 590 (at 900st) 535 (at 950st) 490 (at 1000st) 450 (at 1050st) 415 (at 1100st)	WSA16C:1.2 WSA16R:1	–	–	–
				10		600 (at 50 to 550st) 560 (at 600st) 490 (at 650st) 440 (at 700st) 395 (at 750st) 355 (at 800st) 320 (at 850st) 290 (at 900st) 265 (at 950st) 240 (at 1000st) 225 (at 1050st) 205 (at 1100st)	1	–	–	–

(Note) The models with the type shaded are applicable for the offboard tuning feature. (Except, if there is a setting applicable for the high acceleration, it is to be excluded.)
For the offboard tuning feature, refer to the instruction manual Of the PC teaching software.

RCS4 Series

Actuator series	Type	Motor output [W]	No. of encoder pulses	Lead [mm]	Mounting direction	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCS4 (Wide slider type)	WSA16C WSA16R	400	16384	5	Horizontal/ Vertical	300 (at 50 to 550st) 280 (at 600st) 240 (at 650st) 220 (at 700st) 195 (at 750st) 175 (at 800st) 160 (at 850st) 145 (at 900st) 130 (at 950st) 120 (at 1000st) 110 (at 1050st) 100 (at 1100st)	0.7	–	–	–
[Cleanroom type] RCS4CR (Wide slider type)	WSA10C	60	16384	16	Horizontal	960 (at 50 to 350st) 930 (at 400st) 775 (at 450st) 660 (at 500st)	1.2	–	–	–
				10	Horizontal/ Vertical	600 (at 50 to 350st) 590 (at 400st) 490 (at 450st) 415 (at 500st)	1.2	–	–	–
				5		300 (at 50 to 350st) 290 (at 400st) 245 (at 450st) 205 (at 500st)	1	–	–	–
				2.5		150 (at 50 to 350st) 145 (at 400st) 120 (at 450st) 100 (at 500st)	0.7	–	–	–
	WSA12C	100	16384	20	Horizontal/ Vertical	1200 (at 50 to 450st) 1130 (at 500st) 970 (at 550st) 840 (at 600st) 740 (at 650st) 650 (at 700st) 580 (at 750st) 520 (at 800st)	1.2	–	–	–
				12		720 (at 50 to 450st) 610 (at 500st) 535 (at 550st) 465 (at 600st) 405 (at 650st) 355 (at 700st) 315 (at 750st) 285 (at 800st)	1.2	–	–	–
				6		360 (at 50 to 450st) 310 (at 500st) 265 (at 550st) 230 (at 600st) 200 (at 650st) 175 (at 700st) 155 (at 750st) 140 (at 800st)	1	–	–	–
				3		180 (at 50 to 450st) 150 (at 500st) 130 (at 550st) 115 (at 600st) 100 (at 650st) 85 (at 700st) 75 (at 750st) 70 (at 800st)	0.7	–	–	–

(Note) The models with the type shaded are applicable for the offboard tuning feature. (Except, if there is a setting applicable for the high acceleration, it is to be excluded.)
For the offboard tuning feature, refer to the instruction manual Of the PC teaching software.

RCS4 Series

Actuator series	Type	Motor output [W]	No. of encoder pulses	Lead [mm]	Mounting direction	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
[Cleanroom type] RCS4CR (Wide slider type)	WSA14C	200	16384	24	Horizontal/ Vertical	1440 (at 50 to 450st) 1420 (at 500st) 1220 (at 550st) 1060 (at 600st) 930 (at 650st) 830 (at 700st) 740 (at 750st) 665 (at 800st)	1.2	–	–	–
				16		960 (at 50 to 450st) 920 (at 500st) 790 (at 550st) 690 (at 600st) 610 (at 650st) 550 (at 700st) 490 (at 750st) 440 (at 800st)	1.2	–	–	–
				8		480 (at 50 to 450st) 460 (at 500st) 400 (at 550st) 350 (at 600st) 305 (at 650st) 270 (at 700st) 240 (at 750st) 215 (at 800st)	1	–	–	–
				4		240 (at 50 to 450st) 230 (at 500st) 200 (at 550st) 170 (at 600st) 150 (at 650st) 135 (at 700st) 120 (at 750st) 105 (at 800st)	0.7	–	–	–
	WSA16C	400	16384	20	Horizontal/ Vertical	1200 (at 50 to 550st) 1120 (at 600st) 990 (at 650st) 880 (at 700st) 780 (at 750st) 715 (at 800st) 645 (at 850st) 590 (at 900st) 535 (at 950st) 490 (at 1000st) 450 (at 1050st) 415 (at 1100st)	1.2	–	–	–
				10		600 (at 50 to 550st) 560 (at 600st) 490 (at 650st) 440 (at 700st) 395 (at 750st) 355 (at 800st) 320 (at 850st) 290 (at 900st) 265 (at 950st) 240 (at 1000st) 225 (at 1050st) 205 (at 1100st)	1	–	–	–

RCS4 Series

Actuator series	Type	Motor output [W]	No. of encoder pulses	Lead [mm]	Mounting direction	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
[Cleanroom type] RCS4CR (Wide slider type)	WSA16C	400	16384	5	Horizontal/ Vertical	300 (at 50 to 550st) 280 (at 600st) 240 (at 650st) 220 (at 700st) 195 (at 750st) 175 (at 800st) 160 (at 850st) 145 (at 900st) 130 (at 950st) 120 (at 1000st) 110 (at 1050st) 100 (at 1100st)	0.7	–	–	–
RCS4 (Rod type)	RA4C RA4R	60	16384	16	Horizontal/ Vertical	800	RA4C:1.2 RA4R:1	–	–	–
				10		500	RA4C:1.2 RA4R:1			
				5		250	1			
				2.5		125	0.7			
	RA6C RA6R	100	16384	20	Horizontal/ Vertical	1000	RA6C:1.2 RA6R:1	–	–	–
				12		600	RA6C:1.2 RA6R:1			
				6		300	1			
				3		150	0.7			
	RA7C RA7R	200	16384	24	Horizontal/ Vertical	1200	RA7C:1.2 RA7R:1	–	–	–
				16		800	RA7C:1.2 RA7R:1			
				8		400	1			
				4		200	0.7			
	RA8C RA8R	400	16384	20	Horizontal/ Vertical	1000	RA8C:1.2 RA8R:1	–	–	–
				10		500	1			
				5		250	0.7			
RCS4 (Radial cylinder)	RRA4C RRA4R	60	16384	16	Horizontal/ Vertical	960	RRA4C:1.2 RRA4R:1	–	–	–
				10		600	RRA4C:1.2 RRA4R:1			
				5		300	1			
				2.5		150	0.7			
	RRA6C RRA6R	100	16384	20	Horizontal/ Vertical	1200	RRA6C:1.2 RRA6R:1	–	–	–
				12		720	RRA6C:1.2 RRA6R:1			
				6		360	1			
				3		180	0.7			
	RRA7C RRA7R	200	16384	24	Horizontal/ Vertical	1440	RRA7C:1.2 RRA7R:1	–	–	–
				16		960	RRA7C:1.2 RRA7R:1			
				8		480	1			
				4		240	0.7			

RCS4 Series

Actuator series	Type	Motor output [W]	No. of encoder pulses	Lead [mm]	Mounting direction	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCS4 (Radial cylinder)	RRA8C	400	16384	30	Horizontal/ Vertical	1500 (at 50 to 300st) 1230 (at 350st) 970 (at 400st) 790 (at 450st) 650 (at 500st) 540 (at 550st) 460 (at 600st) 400 (at 650st) 350 (at 700st)	1.2	–	–	–
				20		1100 (at 50 to 250st) 1070 (at 300st) 820 (at 350st) 650 (at 400st) 520 (at 450st) 430 (at 500st) 360 (at 550st) 310 (at 600st) 260 (at 650st) 230 (at 700st)	1.2	–	–	–
				10		550 (at 50 to 250st) 520 (at 300st) 400 (at 350st) 310 (at 400st) 250 (at 450st) 210 (at 500st) 180 (at 550st) 150 (at 600st) 130 (at 650st) 110 (at 700st)	1	–	–	–
				5		275 (at 50 to 250st) 250 (at 300st) 190 (at 350st) 150 (at 400st) 120 (at 450st) 100 (at 500st) 80 (at 550st) 70 (at 600st) 60 (at 650st) 55 (at 700st)	0.7	–	–	–
	RRA8R	400	16384	30	Horizontal/ Vertical	1300 (at 50 to 300st) 1230 (at 350st) 970 (at 400st) 790 (at 450st) 650 (at 500st) 540 (at 550st) 460 (at 600st) 400 (at 650st) 350 (at 700st)	1	–	–	–
				20		1000 (at 50 to 300st) 820 (at 350st) 650 (at 400st) 520 (at 450st) 430 (at 500st) 360 (at 550st) 310 (at 600st) 260 (at 650st) 230 (at 700st)	1	–	–	–

RCS4 Series

Actuator series	Type	Motor output [W]	No. of encoder pulses	Lead [mm]	Mounting direction	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCS4 (Radial cylinder)	RRA8R	400	16384	10	Horizontal/ Vertical	550 (at 50 to 250st) 520 (at 300st) 400 (at 350st) 310 (at 400st) 250 (at 450st) 210 (at 500st) 180 (at 550st) 150 (at 600st) 130 (at 650st) 110 (at 700st)	1	–	–	–
				5		275 (at 50 to 250st) 250 (at 300st) 190 (at 350st) 150 (at 400st) 120 (at 450st) 100 (at 500st) 80 (at 550st) 70 (at 600st) 60 (at 650st) 55 (at 700st)	0.7	–	–	–
RCS4 (Wide radial cylinder)	WRA10C WRA10R	60	16384	16	Horizontal	800 (at 50 to 450st) 770 (at 500st)	WRA10C:1.2 WRA10R:1	–	–	–
				10	Horizontal/ Vertical	600 (at 50 to 400st) 580 (at 450st) 490 (at 500st)	WRA10C:1.2 WRA10R:1	–	–	–
				5		300 (at 50 to 400st) 290 (at 450st) 240 (at 500st)	1	–	–	–
				2.5		150 (at 50 to 400st) 145 (at 450st) 120 (at 500st)	0.7	–	–	–
	WRA12C WRA12R	100	16384	20	Horizontal/ Vertical	1000	WRA12C:1.2 WRA12R:1	–	–	–
				12		720	WRA12C:1.2 WRA12R:1			
				6		360	1			
				3		180	0.7			
	WRA14C WRA14R	200	16384	24	Horizontal/ Vertical	1200	WRA14C:1.2 WRA14R:1	–	–	–
				16		800	WRA14C:1.2 WRA14R:1			
				8		480 (at 50 to 500st) 450 (at 550st) 390 (at 600st)	1			
				4		240 (at 50 to 500st) 220 (at 550st) 190 (at 600st)	0.7			
	WRA16C WRA16R	400	16384	30	Horizontal/ Vertical	1300 (at 50 to 300st) 1050 (at 350st) 860 (at 400st) 710 (at 450st) 600 (at 500st) 510 (at 550st) 440 (at 600st) 390 (at 650st) 340 (at 700st) 300 (at 750st) 270 (at 800st)	WRA16C:1.2 WRA16R:1	–	–	–

RCS4 Series

Actuator series	Type	Motor output [W]	No. of encoder pulses	Lead [mm]	Mounting direction	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCS4 (Wide radial cylinder)	WRA16C WRA16R	400	16384	20	Horizontal/ Vertical	1000 (at 50 to 250st) 880 (at 300st) 700 (at 350st) 570 (at 400st) 470 (at 450st) 400 (at 500st) 340 (at 550st) 295 (at 600st) 260 (at 650st) 225 (at 700st) 200 (at 750st) 180 (at 800st)	WRA16C:1.2 WRA16R:1	–	–	–
				10		500 (at 50 to 250st) 430 (at 300st) 340 (at 350st) 280 (at 400st) 230 (at 450st) 195 (at 500st) 165 (at 550st) 145 (at 600st) 125 (at 650st) 110 (at 700st) 100 (at 750st) 90 (at 800st)	1	–	–	–
				5		250 (at 50 to 250st) 210 (at 300st) 170 (at 350st) 130 (at 400st) 115 (at 450st) 95 (at 500st) 80 (at 550st) 70 (at 600st) 60 (at 650st) 55 (at 700st) 50 (at 750st) 45 (at 800st)	0.7	–	–	–
RCS4 (Table type)	TA4C (Single Block Type)	60	16384	16	Horizontal/ Vertical	900	1.2	–	–	–
				10		600	1.2			
				5		300	1			
				2.5		150	0.7			
	TA4C (Double Block Type)	60	16384	10	Horizontal/ Vertical	600	1.2	–	–	–
				5		300	1			
				2.5		150	0.7			
	TA6C (Single Block Type)	100	16384	20	Horizontal/ Vertical	1100	1.2	–	–	–
				12		720	1.2			
				6		360	1			
				3		180	0.7			
	TA6C (Double Block Type)	100	16384	12	Horizontal/ Vertical	720 (at 45 to 270st) 575 (at 320st)	1.2	–	–	–
				6		360 (at 45 to 270st) 285 (at 320st)	1			
				3		180 (at 45 to 270st) 140 (at 320st)	0.7			
	TA7C (Single Block Type)	200	16384	24	Horizontal/ Vertical	1300	1.2	–	–	–
				16		960	1.2			
				8		480	1			
				4		240	0.7			

RCS4 Series

Actuator series	Type	Motor output [W]	No. of encoder pulses	Lead [mm]	Mounting direction	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCS4 (Table type)	TA7C (Double Block Type)	200	16384	16	Horizontal/ Vertical	960 (at 40 to 290st) 730 (at 340st) 600 (at 390st)	1.2	–	–	–
				8		480 (at 40 to 290st) 365 (at 340st) 300 (at 390st)	1			
				4		240 (at 40 to 290st) 180 (at 340st) 150 (at 390st)	0.7			
	TA4R (Single Block Type)	60	16384	16	Horizontal/ Vertical	800	1	–	–	–
				10		600	1			
				5		300	1			
				2.5		150	0.7			
	TA4R (Double Block Type)	60	16384	10	Horizontal/ Vertical	600	1	–	–	–
				5		300	1			
				2.5		150	0.7			
	TA6R (Single Block Type)	100	16384	20	Horizontal/ Vertical	1000	1	–	–	–
				12		720	1			
				6		360	1			
				3		180	0.7			
	TA6R (Double Block Type)	100	16384	12	Horizontal/ Vertical	720 (at 45 to 270st) 575 (at 320st)	1	–	–	–
				6		360 (at 45 to 270st) 285 (at 320st)	1			
				3		180 (at 45 to 270st) 140 (at 320st)	0.7			
	TA7R (Single Block Type)	200	16384	24	Horizontal/ Vertical	1200	1	–	–	–
				16		960	1			
				8		480	1			
				4		240	0.7			
	TA7R (Double Block Type)	200	16384	16	Horizontal/ Vertical	960 (at 40 to 290st) 730 (at 340st) 600 (at 390st)	1	–	–	–
				8		480 (at 40 to 290st) 365 (at 340st) 300 (at 390st)	1			
				4		240 (at 40 to 290st) 180 (at 340st) 150 (at 390st)	0.7			

RCS3 Series

Actuator series	Type	Motor output [W]	No. of encoder pulses	Lead [mm]	Mounting direction	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCS3/ RCS3P (Slider type)	SA8C SA8R (Note)	100 150	16384	30	Horizontal/ Vertical	1800 (at 50 to 650st) 1610 (at 700st) 1420 (at 750st) 1260 (at 800st) 1120 (at 850st) 1010 (at 900st) 910 (at 950st) 830 (at 1000st) 760 (at 1050st) 690 (at 1100st)	Horizontal:1 Vertical:0.7	–	–	–
				20		1200 (at 50 to 650st) 1070 (at 700st) 940 (at 750st) 840 (at 800st) 750 (at 850st) 670 (at 900st) 610 (at 950st) 550 (at 1000st) 500 (at 1050st) 460 (at 1100st)	0.7	–	–	–
				10		600 (at 50 to 650st) 530 (at 700st) 470 (at 750st) 410 (at 800st) 370 (at 850st) 340 (at 900st) 310 (at 950st) 270 (at 1000st) 250 (at 1050st) 230 (at 1100st)	0.5	–	–	–
				5 (Only for 100W)		300 (at 50 to 650st) 260 (at 700st) 230 (at 750st) 200 (at 800st) 180 (at 850st) 170 (at 900st) 150 (at 950st) 135 (at 1000st) 120 (at 1050st) 110 (at 1100st)	0.3	–	–	–
	SS8C SS8R (Note)	100 150	16384	30	Horizontal/ Vertical	1800 (at 50 to 600st) 1660 (at 650st) 1460 (at 700st) 1295 (at 750st) 1155 (at 800st) 1035 (at 850st) 935 (at 900st) 850 (at 950st) 775 (at 1000st)	Horizontal:1 Vertical:0.7	–	–	–

(Note) *The models with the type column shaded are applicable for offboard tuning function. (However, if there is a setting that high-acceleration/deceleratio application, it is excluded.)*
For offboard tuning function, refer to the instruction manual of PC software.

RCS3 Series

Actuator series	Type	Motor output [W]	No. of encoder pulses	Lead [mm]	Mounting direction	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCS3/ RCS3P (Slider type)	SS8C SS8R (Note)	100 150	16384	20	Horizontal/ Vertical	1200 (at 50 to 600st) 1105 (at 650st) 970 (at 700st) 860 (at 750st) 770 (at 800st) 690 (at 850st) 625 (at 900st) 565 (at 950st) 515 (at 1000st)	0.7	–	–	–
				10		600 (at 50 to 600st) 550 (at 650st) 485 (at 700st) 430 (at 750st) 385 (at 800st) 345 (at 850st) 310 (at 900st) 280 (at 950st) 255 (at 1000st)	0.5	–	–	–
				5 (Only for 100W)		300 (at 50 to 600st) 275 (at 650st) 240 (at 700st) 215 (at 750st) 190 (at 800st) 170 (at 850st) 150 (at 900st) 140 (at 950st) 125 (at 1000st)	0.3	–	–	–
[Cleanroom type] RCS3CR/ RCS3PCR (Slider type)	SA8C (Note)	100 150	16384	30	Horizontal/ Vertical	1800 (at 50 to 650st) 1510 (at 700st) 1340 (at 750st) 1190 (at 800st) 1070 (at 850st) 960 (at 900st) 870 (at 950st) 790 (at 1000st) 720 (at 1050st) 660 (at 1100st)	Horizontal:1 Vertical:0.7	–	–	–
				20		1200 (at 50 to 650st) 1010 (at 700st) 890 (at 750st) 790 (at 800st) 710 (at 850st) 640 (at 900st) 580 (at 950st) 530 (at 1000st) 480 (at 1050st) 440 (at 1100st)	0.7	–	–	–
				10		600 (at 50 to 650st) 500 (at 700st) 440 (at 750st) 390 (at 800st) 350 (at 850st) 320 (at 900st) 290 (at 950st) 260 (at 1000st) 240 (at 1050st) 220 (at 1100st)	0.5	–	–	–

(Note) *The models with the type column shaded are applicable for offboard tuning function. (However, if there is a setting that high-acceleration/deceleratio application, it is excluded.)*
For offboard tuning function, refer to the instruction manual of PC software.

RCS3 Series

Actuator series	Type	Motor output [W]	No. of encoder pulses	Lead [mm]	Mounting direction	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
[Cleanroom type] RCS3CR/ RCS3PCR (Slider type)	SA8C (Note)	100 150	16384	5 (Only for 100W)	Horizontal/ Vertical	300 (at 50 to 650st) 250 (at 700st) 220 (at 750st) 190 (at 800st) 170 (at 850st) 160 (at 900st) 140 (at 950st) 130 (at 1000st) 120 (at 1050st) 110 (at 1100st)	0.3	–	–	–
	SS8C (Note)	100 150	16384	30	Horizontal/ Vertical	1800 (at 50 to 600st) 1660 (at 650st) 1460 (at 700st) 1295 (at 750st) 1155 (at 800st) 1035 (at 850st) 935 (at 900st) 850 (at 950st) 775 (at 1000st)	Horizontal:1 Vertical:0.7	–	–	–
				20		1200 (at 50 to 600st) 1105 (at 650st) 970 (at 700st) 860 (at 750st) 770 (at 800st) 690 (at 850st) 625 (at 900st) 565 (at 950st) 515 (at 1000st)	0.7	–	–	–
				10		600 (at 50 to 600st) 550 (at 650st) 485 (at 700st) 430 (at 750st) 385 (at 800st) 345 (at 850st) 310 (at 900st) 280 (at 950st) 255 (at 1000st)	0.5	–	–	–
				5 (Only for 100W)		300 (at 50 to 600st) 275 (at 650st) 240 (at 700st) 215 (at 750st) 190 (at 800st) 170 (at 850st) 150 (at 900st) 140 (at 950st) 125 (at 1000st)	0.3	–	–	–
RCS3 (High-speed type)	CTZ5C	60	16384	10	Horizontal/ Vertical	833	3.2	–	–	–
	CT8C	400	16384	30	Horizontal	2500	3.2	–	–	–

(Note) *The models with the type column shaded are applicable for offboard tuning function. (However, if there is a setting that high-acceleration/deceleratio application, it is excluded.)*
For offboard tuning function, refer to the instruction manual of PC software.

RCS2 Series

Actuator series	**Type**	**Motor output [W]**	**No. of encoder pulses**	**Lead [mm]**	**Mounting direction**	**Maximum speed [mm/s]**	**Maximum acceleration /deceleration [G]**	**Minimum push force [N]**	**Maximum push force [N]**	**Rated push speed [mm/s]**
RCS2 (Slider type)	SA7C (Note)	60	16384	24	Horizontal/ Vertical	1200 (at 50 to 600st) 1150 (at 650st) 960 (at 700st) 890 (at 750st) 720 (at 800st)	0.3 High Acceleration/ Deceleration Application:0.8	–	–	–
				16		800 (at 50 to 600st) 745 (at 650st) 640 (at 700st) 575 (at 750st) 480 (at 800st)	0.3 High Acceleration/ Deceleration Application:1	–	–	–
				8		400 (at 50 to 600st) 370 (at 650st) 320 (at 700st) 285 (at 750st) 240 (at 800st)	0.3 High Acceleration/ Deceleration Application:0.8	–	–	–
				4		200 (at 50 to 600st) 185 (at 650st) 160 (at 700st) 140 (at 750st) 120 (at 800st)	0.2	–	–	–
	SA7R (Note)	60	16384	16	Horizontal/ Vertical	800 (at 50 to 600st) 745 (at 650st) 640 (at 700st) 575 (at 750st) 480 (at 800st)	0.3	–	–	–
				8		400 (at 50 to 600st) 370 (at 650st) 320 (at 700st) 285 (at 750st) 240 (at 800st)	0.3	–	–	–
				4		200 (at 50 to 600st) 185 (at 650st) 160 (at 700st) 140 (at 750st) 120 (at 800st)	0.2	–	–	–
	SS7C (Note)	60	16384	20	Horizontal/ Vertical	1000 (at 50 to 550st) 830 (at 600st)	0.3	–	–	–
				12		600 (at 50 to 500st) 580 (at 550st) 470 (at 600st)	0.3			
				6		300 (at 50 to 500st) 290 (at 550st) 230 (at 600st)	0.3			
	SS7R (Note)	60	16384	12	Horizontal/ Vertical	600 (at 50 to 500st) 580 (at 550st) 470 (at 600st)	0.3	–	–	–
				6		300 (at 50 to 500st) 290 (at 550st) 230 (at 600st)	0.3			

(Note) *The models with the type column shaded are applicable for offboard tuning function. (However, if there is a setting that high-acceleration/deceleratio application, it is excluded.)*
For offboard tuning function, refer to the instruction manual of PC software.

RCS2 Series

Actuator series	Type	Motor output [W]	No. of encoder pulses	Lead [mm]	Mounting direction	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCS2 (Slider type)	SS8C	100 150	16384	20	Horizontal/ Vertical	1000 (at 50 to 600st) 960 (at 700st) 765 (at 800st) 625 (at 900st) 515 (at 1000st)	0.3	–	–	–
				10		500 (at 50 to 600st) 480 (at 700st) 380 (at 800st) 310 (at 900st) 255 (at 1000st)	0.3			
	SS8R	100 150	16384	20	Horizontal/ Vertical	1000 (at 50 to 600st) 960 (at 700st) 765 (at 800st) 625 (at 900st) 515 (at 1000st)	0.3	–	–	–
				10		500 (at 50 to 600st) 480 (at 700st) 380 (at 800st) 310 (at 900st) 255 (at 1000st)	0.3			
RCS2 (Rod type)	RA5C (Note)	60	16384	16	Horizontal/ Vertical	800 (at 50 to 250st) 755 (at 300st)	0.3	–	–	–
				8		400 (at 50 to 250st) 377 (at 300st)	0.3			
				4		200 (at 50 to 250st) 188 (at 300st)	0.2			
		100		16		800 (at 50 to 250st) 755 (at 300st)	0.3 High Acceleration/ Deceleration Application:1	–	–	–
				8		400 (at 50 to 250st) 377 (at 300st)	0.3 High Acceleration/ Deceleration Application:1			
				4		200 (at 50 to 250st) 188 (at 300st)	0.2			
	RGS5C RGD5C	60	16384	16	Horizontal/ Vertical	800 (at 50 to 250st) 755 (at 300st)	0.3	–	–	–
				8		400 (at 50 to 250st) 377 (at 300st)	0.3			
				4		200 (at 50 to 250st) 188 (at 300st)	0.2			
		100		16		800 (at 50 to 250st) 755 (at 300st)	0.3 High Acceleration/ Deceleration Application:1	–	–	–
				8		400 (at 50 to 250st) 377 (at 300st)	0.3 High Acceleration/ Deceleration Application:1			
				4		200 (at 50 to 250st) 188 (at 300st)	0.2			
	RA5R	60	16384	16	Horizontal/ Vertical	800 (at 50 to 250st) 755 (at 300st)	0.3	–	–	–
				8		400 (at 50 to 250st) 377 (at 300st)	0.3			
				4		200 (at 50 to 250st) 188 (at 300st)	0.2			

(Note) The models with the type column shaded are applicable for offboard tuning function. (However, if there is a setting that high-acceleration/deceleratio application, it is excluded.)
For offboard tuning function, refer to the instruction manual of PC software.

RCS2 Series

Actuator series	Type	Motor output [W]	No. of encoder pulses	Lead [mm]	Mounting direction	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCS2 (Rod type)	RN5N RP5N GS5N GD5N	60	Incremental 1600	10	Horizontal	380 (at 75st) 280 (at 50st)	0.3	–	–	–
					Vertical	330 (at 75st) 230 (at 50st)	0.2			
				5	Horizontal	250	0.3			
					Vertical	250 (at 75st) 230 (at 50st)	0.2			
				2.5	Horizontal/ Vertical	125	0.2			
	SD5N	60	1600	10	Horizontal	380 (at 75st) 280 (at 50st)	0.3	–	–	–
					Vertical	330 (at 75st) 230 (at 50st)	0.2			
				5	Horizontal	250	0.3			
					Vertical	250 (at 75st) 230 (at 50st)	0.2			
				2.5	Horizontal/ Vertical	125	0.2			
	RA7AD RGS7AD RGD7AD	60	3072	12	Horizontal/ Vertical	600 (at 50 to 250st) 505 (at 300st)	0.15	–	–	–
				6		300 (at 50 to 250st) 250 (at 300st)	0.1			
				3		150 (at 50 to 250st) 125 (at 300st)	0.05			
		100		12		600 (at 50 to 250st) 505 (at 300st)	0.2			
				6		300 (at 50 to 250st) 250 (at 300st)	0.1			
	SRA7BD SRGS7BD SRGD7BD	60	3072	16	Horizontal/ Vertical	800	0.35	–	–	–
				8		400	0.25			
				4		200	0.15			
		100 150		16		800	0.4			
				8		400	0.3			
				4		200	0.2			
	RA13R	750	16384	2.5	Horizontal/ Vertical	85 (at 50st) 120 (at 100st) 125 (at 150 to 200st)	0.02	1000	9800	10
				1.25		62	0.01	2000	19600	10
[Cleanroom type] [Dust and drip proof type] RCS2CR/ RCS2W (Rod type)	RN5NB RP5NB GS5NB GD5NB SD5NB	60	Incremental 1600	10	Horizontal	380 (at 75st) 280 (at 50st)	0.3	–	–	–
					Vertical	330 (at 75st) 230 (at 50st)	0.2			
				5	Horizontal	250	0.3			
					Vertical	250 (at 75st) 230 (at 50st)	0.2			
				2.5	Horizontal/ Vertical	125	0.2			
RCS2 (Table type)	TCA5N TWA5N TFA5N	60	Incremental 1600	10	Horizontal	380 (at 75st) 280 (at 50st)	0.3	–	–	–
					Vertical	330 (at 75st) 230 (at 50st)	0.2			
				5	Horizontal	250	0.3			
					Vertical	250 (at 75st) 230 (at 50st)	0.2			
				2.5	Horizontal/ Vertical	125	0.2			

RCS2 Series

Actuator series	Type	Motor output [W]	No. of encoder pulses	Lead [mm]	Mounting direction	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
RCS2 (Gripper type)	GR8	60	16384	Deceleration ratio 1/5	–	400	0.3	–	–	–
RCS2 (Flat type)	F5D	60 100	16384	16	Horizontal/ Vertical	800	0.3	–	–	–
				8		400	0.3			
				4		200	0.2			
RCS2 (Rotary type)	RT6	60	16384	Deceleration ratio 1/18	–	500 deg/s	–	–	–	–
	RT6R	60	16384	Deceleration ratio 1/18	–	500 deg/s	–	–	–	–
	RT7R	60	16384	Deceleration ratio 1/4	–	500 deg/s	–	–	–	–
	RTC10L	60	16384	Deceleration ratio 1/15	–	1200 deg/s	0.3	–	–	–
				Deceleration ratio 1/24		750 deg/s				
	RTC12L	150	16384	Deceleration ratio 1/18	–	800 deg/s	0.3	–	–	–
				Deceleration ratio 1/30		600 deg/s				

ISB/ISPB Series

Actuator series	Type	Motor output [W]	No. of encoder pulses	Lead [mm]	Mounting direction	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
ISB/ISPB (Slider type)	SXM (Note)	60	Battery-less Absolute 131072 Incremental 16384	16	Horizontal/ Vertical	960 (at 100 to 600st) 655 (at 700st) 515 (at 800st) 415 (at 900st)	Horizontal:1.2 Vertical:0.8	–	–	–
				8		480 (at 100 to 600st) 330 (at 700st) 260 (at 800st) 210 (at 900st)	Horizontal:0.7 Vertical:0.6	–	–	–
				4		240 (at 100 to 600st) 165 (at 700st) 130 (at 800st) 100 (at 900st)	Horizontal:0.5 Vertical:0.4	–	–	–
		100 (Only for ISB)	131072	36		1100 (at 100st) 1425 (at 150st) 1700 (at 200st) 1925 (at 250st) 2075 (at 300st) 2125 (at 350st) 2160 (at 400 to 550st) 2000 (at 600st) 1740 (at 650st) 1520 (at 700st) 1340 (at 750st) 1190 (at 800st) 1065 (at 850st) 960 (at 900st) 865 (at 950st) 790 (at 1000st) 721 (at 1050st) 660 (at 1100st)	Horizontal:2 Vertical:1.6	–	–	–
	SXL (Note)	60	Battery-less Absolute 131072 Incremental 16384	16	Horizontal/ Vertical	960 (at 130 to 580st) 655 (at 680st) 515 (at 780st) 415 (at 880st)	1.2	–	–	–
				8		480 (at 130 to 580st) 330 (at 680st) 260 (at 780st) 210 (at 880st)	0.7	–	–	–
				4		240 (at 130 to 580st) 165 (at 680st) 130 (at 780st) 100 (at 880st)	0.5	–	–	–
		100 (Only for ISB)	131072	36		1425 (at 130st) 1700 (at 180st) 1925 (at 230st) 2075 (at 280st) 2125 (at 330st) 2160 (at 380 to 530st) 2000 (at 580st) 1740 (at 630st) 1520 (at 680st) 1340 (at 730st) 1190 (at 780st) 1065 (at 830st) 960 (at 880st) 865 (at 930st) 790 (at 980st) 721 (at 1030st) 660 (at 1080st)	Horizontal:2 Vertical:1.6	–	–	–

(Note) *The models with the type column shaded are applicable for offboard tuning function. (However, if there is a setting that high-acceleration/deceleratio application, it is excluded.)*
For offboard tuning function, refer to the instruction manual of PC software.

ISB/ISPB Series

Actuator series	Type	Motor output [W]	No. of encoder pulses	Lead [mm]	Mounting direction	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
ISB/ISPB (Slider type)	MXM (Note)	100 200	Battery-less Absolute 131072 Incremental 16384	30	Horizontal/ Vertical	1800 (at 100 to 700st) 1290 (at 800st) 1045 (at 900st) 860 (at 1000st) 690 (at 1100st)	1.2	–	–	–
				20		1200 (at 100 to 700st) 860 (at 800st) 695 (at 900st) 570 (at 1000st) 460 (at 1100st)	Horizontal:1.2 Vertical:1	–	–	–
				10		600 (at 100 to 700st) 430 (at 800st) 345 (at 900st) 280 (at 1000st) 230 (at 1100st)	Horizontal:0.7 Vertical:0.6	–	–	–
				5		300 (at 100 to 700st) 215 (at 800st) 170 (at 900st) 140 (at 1000st) 115 (at 1100st)	Horizontal:0.5 Vertical:0.4	–	–	–
		400 (Only for ISB)	131072	48		1025 (at 100st) 1325 (at 150st) 1575 (at 200st) 1825 (at 250st) 2025 (at 300st) 2200 (at 350st) 2350 (at 400st) 2400 (at 450st) 2500 (at 500 to 700st) 2270 (at 750st) 2030 (at 800st) 1825 (at 850st) 1645 (at 900st) 1495 (at 950st) 1365 (at 1000st) 1250 (at 1050st) 1150 (at 1100st) 1060 (at 1150st) 980 (at 1200st) 910 (at 1250st) 845 (at 1300st)	Horizontal:2 Vertical:1.6	–	–	–

(Note) The models with the type column shaded are applicable for offboard tuning function. (However, if there is a setting that high-acceleration/deceleratio application, it is excluded.)
For offboard tuning function, refer to the instruction manual of PC software.

ISB/ISPB Series

Actuator series	Type	Motor output [W]	No. of encoder pulses	Lead [mm]	Mounting direction	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
ISB/ISPB (Slider type)	MXL (Note)	100 200	Battery-less Absolute 131072 Incremental 16384	30	Horizontal/ Vertical	1800 (at 120 to 670st) 1290 (at 770st) 1045 (at 870st) 860 (at 970st) 690 (at 1070st)	1.2	–	–	–
				20		1200 (at 120 to 670st) 860 (at 770st) 695 (at 870st) 570 (at 970st) 460 (at 1070st)	Horizontal:1.2 Vertical:1	–	–	–
				10		600 (at 120 to 670st) 430 (at 770st) 345 (at 870st) 280 (at 970st) 230 (at 1070st)	Horizontal:0.7 Vertical:0.6	–	–	–
				5		300 (at 120 to 670st) 215 (at 770st) 170 (at 870st) 140 (at 970st) 115 (at 1070st)	Horizontal:0.5 Vertical:0.4	–	–	–
		400 (Only for ISB)	131072	48		1325 (at 120st) 1575 (at 170st) 1825 (at 220st) 2025 (at 270st) 2200 (at 320st) 2350 (at 370st) 2400 (at 420st) 2500 (at 470 to 670st) 2270 (at 720st) 2030 (at 770st) 1825 (at 820st) 1645 (at 870st) 1495 (at 920st) 1365 (at 970st) 1250 (at 1020st) 1150 (at 1070st) 1060 (at 1120st) 980 (at 1170st) 910 (at 1220st) 845 (at 1270st)	Horizontal:2 Vertical:1.6	–	–	–

(Note) The models with the type column shaded are applicable for offboard tuning function. (However, if there is a setting that high-acceleration/deceleratio application, it is excluded.)
For offboard tuning function, refer to the instruction manual of PC software.

ISB/ISPB Series

Actuator series	Type	Motor output [W]	No. of encoder pulses	Lead [mm]	Mounting direction	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
ISB/ISPB (Slider type)	MXMX	200	Battery-less Absolute 131072 Incremental 16384	30	Horizontal	1800 (at 800 to 1100st) 1650 (at 1150st) 1500 (at 1250st) 1425 (at 1350st) 1200 (at 1450st) 1050 (at 1550st) 900 (at 1650st) 825 (at 1750st) 750 (at 1850st) 675 (at 1950st)	0.4	–	–	–
				20		1200 (at 800 to 1100st) 1100 (at 1150st) 1000 (at 1250st) 950 (at 1350st) 800 (at 1450st) 700 (at 1550st) 600 (at 1650st) 550 (at 1750st) 500 (at 1850st) 450 (at 1950st)	0.4	–	–	–
		400 (Only for ISB)	131072	48		1700 (at 800st) 1750 (at 850st) 1800 (at 900st) 1850 (at 950st) 1900 (at 1000st) 1950 (at 1050st) 2000 (at 1100st) 2050 (at 1150st) 2100 (at 1200st) 2150 (at 1250st) 2200 (at 1300st) 2065 (at 1350st) 1925 (at 1400st) 1805 (at 1450st) 1690 (at 1500st) 1590 (at 1550st) 1495 (at 1600st) 1410 (at 1650st) 1335 (at 1700st) 1265 (at 1750st) 1195 (at 1800st) 1135 (at 1850st) 1080 (at 1900st) 1025 (at 1950st) 980 (at 2000st)	0.4	–	–	–

ISB/ISPB Series

Actuator series	Type	Motor output [W]	No. of encoder pulses	Lead [mm]	Mounting direction	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
ISB/ISPB (Slider type)	LXM (Note)	200 400	Battery-less Absolute 131072 Incremental 16384	40	Horizontal/ Vertical	2400 (at 100 to 800st) 1840 (at 900st) 1530 (at 1000st) 1290 (at 1100st) 1100 (at 1200st) 880 (at 1300st)	1.2	–	–	–
				20		1200 (at 100 to 800st) 920 (at 900st) 765 (at 1000st) 645 (at 1100st) 550 (at 1200st) 440 (at 1300st)	Horizontal:1.2 Vertical:1	–	–	–
				10		600 (at 100 to 800st) 460 (at 900st) 380 (at 1000st) 320 (at 1100st) 270 (at 1200st) 220 (at 1300st)	Horizontal:0.7 Vertical:0.6	–	–	–
	LXL (Note)	200 400	Battery-less Absolute 131072 Incremental 16384	40	Horizontal/ Vertical	2400 (at 120 to 770st) 1840 (at 870st) 1530 (at 970st) 1290 (at 1070st) 1100 (at 1170st) 880 (at 1270st)	1.2	–	–	–
				20		1200 (at 120 to 770st) 920 (at 870st) 765 (at 970st) 645 (at 1070st) 550 (at 1170st) 440 (at 1270st)	Horizontal:1.2 Vertical:1	–	–	–
				10		600 (at 120 to 770st) 460 (at 870st) 380 (at 970st) 320 (at 1070st) 270 (at 1170st) 220 (at 1270st)	Horizontal:0.7 Vertical:0.6	–	–	–

(Note) The models with the type column shaded are applicable for offboard tuning function. (However, if there is a setting that high-acceleration/deceleratio application, it is excluded.)
For offboard tuning function, refer to the instruction manual of PC software.

ISB/ISPB Series

Actuator series	Type	Motor output [W]	No. of encoder pulses	Lead [mm]	Mounting direction	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
ISB/ISPB (Slider type)	LXMX	400	Battery-less Absolute 131072 Incremental 16384	40	Horizontal	2400 (at 1000 to 1200st) 2300 (at 1300st) 2000 (at 1400st) 1900 (at 1500st) 1660 (at 1600st) 1480 (at 1700st) 1300 (at 1800st) 1180 (at 1900st) 1080 (at 2000st) 980 (at 2100st) 900 (at 2200st) 820 (at 2300st) 740 (at 2400st) 680 (at 2500st)	0.4	–	–	–
		200 400		20	Horizontal	1200 (at 1000 to 1200st) 1150 (at 1300st) 1000 (at 1400st) 950 (at 1500st) 830 (at 1600st) 740 (at 1700st) 650 (at 1800st) 590 (at 1900st) 540 (at 2000st) 490 (at 2100st) 460 (at 2200st) 410 (at 2300st) 370 (at 2400st) 340 (at 2500st)	0.4	–	–	–
	LXUWX	400	Battery-less Absolute 131072 Incremental 16384	40	Horizontal	2400 (at 1000 to 1200st) 2300 (at 1300st) 2000 (at 1400st) 1900 (at 1500st) 1660 (at 1600st) 1480 (at 1700st) 1300 (at 1800st) 1180 (at 1900st) 1080 (at 2000st) 980 (at 2100st) 880 (at 2200st) 840 (at 2300st) 740 (at 2400st) 680 (at 2500st)	0.4	–	–	–
		200 400		20	Horizontal	1200 (at 1000 to 1200st) 1150 (at 1300st) 1000 (at 1400st) 950 (at 1500st) 830 (at 1600st) 740 (at 1700st) 650 (at 1800st) 590 (at 1900st) 540 (at 2000st) 490 (at 2100st) 440 (at 2200st) 430 (at 2300st) 370 (at 2400st) 340 (at 2500st)	0.4	–	–	–

ISDB/ISPDB Series

Actuator series	Type	Motor output [W]	No. of encoder pulses	Lead [mm]	Mounting direction	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
ISDB(CR)/ ISPDB(CR) (Slider type) * Including cleanroom type	S (Note)	60	Battery-less Absolute 131072 Incremental 16384	16	Horizontal/ Vertical	960 (at 100 to 500st) 920 (at 550st) 795 (at 600st) 690 (at 650st) 610 (at 700st) 540 (at 750st) 480 (at 800st)	Horizontal:1 Vertical:0.8	–	–	–
				8		480 (at 100 to 500st) 460 (at 550st) 400 (at 600st) 345 (at 650st) 305 (at 700st) 270 (at 750st) 240 (at 800st)	Horizontal:0.7 Vertical:0.6	–	–	–
				4		240 (at 100 to 500st) 230 (at 550st) 200 (at 600st) 170 (at 650st) 150 (at 700st) 135 (at 750st) 120 (at 800st)	Horizontal:0.5 Vertical:0.4	–	–	–
	S (Note)	100 (Only for ISDB)	131072	36	Horizontal/ Vertical	1075 (at 100st) 1370 (at 150st) 1620 (at 200st) 1830 (at 250st) 1940 (at 300st) 1980 (at 350st) 2000 (at 400 to 550st) 1825 (at 600st) 1590 (at 650st) 1400 (at 700st) 1240 (at 750st) 1105 (at 800st)	Horizontal:2 Vertical:1.6	–	–	–

(Note) The models with the type column shaded are applicable for offboard tuning function. (However, if there is a setting that high-acceleration/deceleratio application, it is excluded.)
For offboard tuning function, refer to the instruction manual of PC software.

ISDB/ISPDB Series

Actuator series	Type	Motor output [W]	No. of encoder pulses	Lead [mm]	Mounting direction	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
ISDB(CR)/ ISPDB(CR) (Slider type) * Including cleanroom type	M (Note)	100 200	Battery-less Absolute 131072 Incremental 16384	30	Horizontal/ Vertical	1800 (at 100 to 600st) 1630 (at 650st) 1440 (at 700st) 1280 (at 750st) 1150 (at 800st) 1035 (at 850st) 935 (at 900st) 850 (at 950st) 780 (at 1000st) 715 (at 1050st) 660 (at 1100st)	1	–	–	–
				20		1200 (at 100 to 600st) 1085 (at 650st) 960 (at 700st) 855 (at 750st) 765 (at 800st) 690 (at 850st) 625 (at 900st) 570 (at 950st) 520 (at 1000st) 475 (at 1050st) 440 (at 1100st)	1	–	–	–
				10		600 (at 100 to 600st) 545 (at 650st) 480 (at 700st) 430 (at 750st) 380 (at 800st) 345 (at 850st) 310 (at 900st) 285 (at 950st) 260 (at 1000st) 240 (at 1050st) 220 (at 1100st)	Horizontal:0.7 Vertical:0.6	–	–	–
				5		300 (at 100 to 600st) 270 (at 650st) 240 (at 700st) 215 (at 750st) 190 (at 800st) 170 (at 850st) 155 (at 900st) 140 (at 950st) 130 (at 1000st) 120 (at 1050st) 110 (at 1100st)	Horizontal:0.5 Vertical:0.4	–	–	–

(Note) *The models with the type column shaded are applicable for offboard tuning function. (However, if there is a setting that high-acceleration/deceleratio application, it is excluded.)*
For offboard tuning function, refer to the instruction manual of PC software.

ISDB/ISPDB Series

Actuator series	Type	Motor output [W]	No. of encoder pulses	Lead [mm]	Mounting direction	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
ISDB(CR)/ ISPDB(CR) (Slider type) * Including cleanroom type	M (Note)	400 (Only for ISDB)	131072	48	Horizontal/ Vertical	980 (at 100st) 1270 (at 150st) 1520 (at 200st) 1740 (at 250st) 1930 (at 300st) 2050 (at 350st) 2125 (at 400st) 2200 (at 450 to 700st) 2145 (at 750st) 1920 (at 800st) 1730 (at 850st) 1570 (at 900st) 1430 (at 950st) 1305 (at 1000st) 1195 (at 1050st) 1105 (at 1100st)	Horizontal:1.8 Vertical:1.6	–	–	–
	MX	200	Battery-less Absolute 131072 Incremental 16384	30	Horizontal	1800 (at 800 to 1100st) 1650 (at 1200st) 1500 (at 1300st) 1425 (at 1400st) 1200 (at 1500st) 1050 (at 1600st) at 1650st to : cleanroom type only 900 (at 1700st) 825 (at 1800st) 750 (at 1900st) 675 (at 2000st)	0.4	–	–	–
				20		1200 (at 800 to 1100st) 1100 (at 1200st) 1000 (at 1300st) 950 (at 1400st) 800 (at 1500st) 700 (at 1600st) at 1650st to : cleanroom type only 600 (at 1700st) 550 (at 1800st) 500 (at 1900st) 450 (at 2000st)	0.4	–	–	–
	MX	400 (Only for ISDB)	131072	48	Horizontal	1700 (at 800st) 1750 (at 850st) 1800 (at 900st) 1850 (at 950st) 1900 (at 1000st) 1950 (at 1050st) 2000 (at 1100st) 2050 (at 1150st) 2100 (at 1200st) 2150 (at 1250st) 2200 (at 1300st) 1990 (at 1350st) 1860 (at 1400st) 1745 (at 1450st) 1640 (at 1500st) 1540 (at 1550st) 1450 (at 1600st)	0.4	–	–	–

(Note) *The models with the type column shaded are applicable for offboard tuning function. (However, if there is a setting that high-acceleration/deceleratio application, it is excluded.)*
For offboard tuning function, refer to the instruction manual of PC software.

ISDB/ISPDB Series

Actuator series	Type	Motor output [W]	No. of encoder pulses	Lead [mm]	Mounting direction	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
ISDB(CR)/ ISPDB(CR) (Slider type) * Including cleanroom type	L (Note)	200 400	Battery-less Absolute 131072 Incremental 16384	40	Horizontal/ Vertical	1800 (at 100 to 800st) 1700 (at 850st) 1540 (at 900st) 1410 (at 950st) 1290 (at 1000st) 1185 (at 1050st) 1095 (at 1100st) 1015 (at 1150st) 940 (at 1200st) 875 (at 1250st) 815 (at 1300st)	1	–	–	–
				20		1200 (at 100 to 650st) 1165 (at 700st) 1045 (at 750st) 940 (at 800st) 850 (at 850st) 770 (at 900st) 705 (at 950st) 645 (at 1000st) 595 (at 1050st) 545 (at 1100st) 505 (at 1150st) 470 (at 1200st) 440 (at 1250st) 410 (at 1300st)	1	–	–	–
				10		600 (at 100 to 650st) 585 (at 700st) 520 (at 750st) 470 (at 800st) 425 (at 850st) 385 (at 900st) 350 (at 950st) 320 (at 1000st) 295 (at 1050st) 275 (at 1100st) 255 (at 1150st) 235 (at 1200st) 220 (at 1250st) 205 (at 1300st)	Horizontal:0.7 Vertical:0.6	–	–	–

(Note) *The models with the type column shaded are applicable for offboard tuning function. (However, if there is a setting that high-acceleration/deceleratio application, it is excluded.)*
For offboard tuning function, refer to the instruction manual of PC software.

ISDB/ISPDB Series

Actuator series	Type	Motor output [W]	No. of encoder pulses	Lead [mm]	Mounting direction	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
ISDB(CR)/ ISPDB(CR) (Slider type) * Including cleanroom type	LX	200 400	Battery-less Absolute 131072 Incremental 16384	40	Horizontal	1800 (at 1000 to 1500st) 1660 (at 1600st) at 1650st to : cleanroom type only 1480 (at 1700st) 1300 (at 1800st) 1180 (at 1900st) 1080 (at 2000st) 980 (at 2100st) 880 (at 2200st) 820 (at 2300st) 740 (at 2400st) 680 (at 2500st)	0.4	–	–	–
				20		1200 (at 1000 to 1200st) 1150 (at 1300st) 1000 (at 1400st) 950 (at 1500st) 830 (at 1600st) at 1650st to : cleanroom type only 740 (at 1700st) 650 (at 1800st) 590 (at 1900st) 540 (at 2000st) 490 (at 2100st) 440 (at 2200st) 410 (at 2300st) 370 (at 2400st) 340 (at 2500st)	0.4	–	–	–

ISA/ISPA Series

Actuator series	Type	Motor output [W]	No. of encoder pulses	Lead [mm]	Mounting direction	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
ISA/ISPA (Slider type)	SXM SYM	60	16384	16	Horizontal/ Vertical	960	Horizontal:1 Vertical:0.7	–	–	–
				8		480	Horizontal:0.6 Vertical:0.5			
				4		240	Horizontal:0.5 Vertical:0.3			
	SZM	60	16384	8	Vertical	480	0.3	–	–	–
				4		240	0.3			
	MXM MYM	100	16384	30	Horizontal	1800 (at 100 to 700st) 1290 (at 800st) 1045 (at 900st) 860 (at 1000st)	1	–	–	–
				20	Horizontal/ Vertical	1200 (at 100 to 700st) 860 (at 800st) 695 (at 900st) 570 (at 1000st)	Horizontal:1 Vertical:0.8	–	–	–
				10		600 (at 100 to 700st) 430 (at 800st) 345 (at 900st) 280 (at 1000st)	Horizontal:0.6 Vertical:0.5	–	–	–
				5		300 (at 100 to 700st) 215 (at 800st) 170 (at 900st) 140 (at 1000st)	Horizontal:0.5 Vertical:0.3	–	–	–
		200	16384	30	Horizontal/ Vertical	1800 (at 100 to 700st) 1290 (at 800st) 1045 (at 900st) 860 (at 1000st)	1	–	–	–
				20		1200 (at 100 to 700st) 860 (at 800st) 695 (at 900st) 570 (at 1000st)	Horizontal:1 Vertical:0.8	–	–	–
				10		600 (at 100 to 700st) 430 (at 800st) 345 (at 900st) 280 (at 1000st)	Horizontal:0.6 Vertical:0.5	–	–	–
	MZM	100 200	16384	10	Vertical	600 (at 100 to 700st) 430 (at 800st) 345 (at 900st) 280 (at 1000st)	0.5	–	–	–
				5 (Only for 100W)		300 (at 100 to 700st) 215 (at 800st) 170 (at 900st) 140 (at 1000st)	0.3			

ISA/ISPA Series

Actuator series	Type	Motor output [W]	No. of encoder pulses	Lead [mm]	Mounting direction	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
ISA/ISPA (Slider type)	MXMX	200	16384	30	Horizontal	1800 (at 800 to 1100st) 1650 (at 1200st) 1500 (at 1300st) 1425 (at 1400st) 1200 (at 1500st) 1050 (at 1600st) 900 (at 1700st) 825 (at 1800st) 750 (at 1900st) 675 (at 2000st)	0.3	–	–	–
				20		1200 (at 800 to 1100st) 1100 (at 1200st) 1000 (at 1300st) 950 (at 1400st) 800 (at 1500st) 700 (at 1600st) 600 (at 1700st) 550 (at 1800st) 500 (at 1900st) 450 (at 2000st)	0.3	–	–	–
	LXM LYM	200	16384	20	Horizontal/ Vertical	1200 (at 100 to 800st) 920 (at 900st) 765 (at 1000st) 645 (at 1100st) 550 (at 1200st)	Horizontal:1 Vertical:0.8	–	–	–
				10		600 (at 100 to 800st) 460 (at 900st) 380 (at 1000st) 320 (at 1100st) 270 (at 1200st)	Horizontal:0.6 Vertical:0.5			
		400	16384	40	Horizontal/ Vertical	2400 (at 100 to 800st) 1840 (at 900st) 1530 (at 1000st) 1290 (at 1100st) 1100 (at 1200st)	1	–	–	–
				20		1200 (at 100 to 800st) 920 (at 900st) 765 (at 1000st) 645 (at 1100st) 550 (at 1200st)	Horizontal:1 Vertical:0.8			
	LZM	200 400	16384	10	Vertical	600 (at 100 to 800st) 460 (at 900st) 380 (at 1000st) 320 (at 1100st) 270 (at 1200st)	0.5	–	–	–

ISA/ISPA Series

Actuator series	Type	Motor output [W]	No. of encoder pulses	Lead [mm]	Mounting direction	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
ISA/ISPA (Slider type)	LXMX	200	16384	20	Horizontal	1200 (at 1000 to 1200st) 1150 (at 1300st) 1000 (at 1400st) 950 (at 1500st) 830 (at 1600st) 740 (at 1700st) 650 (at 1800st) 590 (at 1900st) 540 (at 2000st) 490 (at 2100st) 460 (at 2200st) 410 (at 2300st) 370 (at 2400st) 340 (at 2500st)	0.3	–	–	–
		400	16384	40	Horizontal	2400 (at 1000 to 1200st) 2300 (at 1300st) 2000 (at 1400st) 1900 (at 1500st) 1660 (at 1600st) 1480 (at 1700st) 1300 (at 1800st) 1180 (at 1900st) 1080 (at 2000st) 980 (at 2100st) 900 (at 2200st) 820 (at 2300st) 740 (at 2400st) 680 (at 2500st)	0.3	–	–	–
				20		1200 (at 1000 to 1200st) 1150 (at 1300st) 1000 (at 1400st) 950 (at 1500st) 830 (at 1600st) 740 (at 1700st) 650 (at 1800st) 590 (at 1900st) 540 (at 2000st) 490 (at 2100st) 460 (at 2200st) 410 (at 2300st) 370 (at 2400st) 340 (at 2500st)	0.3	–	–	–

ISA/ISPA Series

Actuator series	Type	Motor output [W]	No. of encoder pulses	Lead [mm]	Mounting direction	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
ISA/ISPA (Slider type)	LXUWX	200	16384	20	Horizontal	1200 (at 1000 to 1200st) 1150 (at 1300st) 1000 (at 1400st) 950 (at 1500st) 830 (at 1600st) 740 (at 1700st) 650 (at 1800st) 590 (at 1900st) 540 (at 2000st) 490 (at 2100st) 440 (at 2200st) 430 (at 2300st) 370 (at 2400st) 340 (at 2500st)	0.3	–	–	–
		400	16384	40	Horizontal	2400 (at 1000 to 1200st) 2300 (at 1300st) 2000 (at 1400st) 1900 (at 1500st) 1660 (at 1600st) 1480 (at 1700st) 1300 (at 1800st) 1180 (at 1900st) 1080 (at 2000st) 980 (at 2100st) 880 (at 2200st) 840 (at 2300st) 740 (at 2400st) 680 (at 2500st)	0.3	–	–	–
				20		1200 (at 1000 to 1200st) 1150 (at 1300st) 1000 (at 1400st) 950 (at 1500st) 830 (at 1600st) 740 (at 1700st) 650 (at 1800st) 590 (at 1900st) 540 (at 2000st) 490 (at 2100st) 440 (at 2200st) 430 (at 2300st) 370 (at 2400st) 340 (at 2500st)	0.3	–	–	–

ISA/ISPA Series

Actuator series	Type	Motor output [W]	No. of encoder pulses	Lead [mm]	Mounting direction	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
ISA/ISPA (Slider type)	WXM	600	16384	40	Horizontal/ Vertical	2400 (at 100 to 800st) 1840 (at 900st) 1530 (at 1000st) 1290 (at 1100st) 1100 (at 1200st) 950 (at 1300st)	1	–	–	–
				20		1200 (at 100 to 800st) 920 (at 900st) 765 (at 1000st) 645 (at 1100st) 550 (at 1200st) 475 (at 1300st)	Horizontal:1 Vertical:0.8	–	–	–
				10		600 (at 100 to 800st) 460 (at 900st) 380 (at 1000st) 320 (at 1100st) 270 (at 1200st) 235 (at 1300st)	Horizontal:0.6 Vertical:0.5	–	–	–
		750	16384	50	Horizontal/ Vertical	2000 (at 100 to 1000st) 1840 (at 1100st) 1570 (at 1200st) 1360 (at 1300st)	1	–	–	–
				25		1250 (at 100 to 900st) 1090 (at 1000st) 920 (at 1100st) 785 (at 1200st) 680 (at 1300st)	Horizontal:1 Vertical:0.8	–	–	–
	WXMX	600	16384	40	Horizontal	2400 (at 900 to 1200st) 2200 (at 1300st) 1965 (at 1400st) 1725 (at 1500st) 1530 (at 1600st) 1365 (at 1700st) 1225 (at 1800st) 1110 (at 1900st) 1005 (at 2000st) 915 (at 2100st) 840 (at 2200st) 770 (at 2300st) 710 (at 2400st) 695 (at 2500st)	0.3	–	–	–
				20		1200 (at 900 to 1200st) 1100 (at 1300st) 980 (at 1400st) 860 (at 1500st) 765 (at 1600st) 680 (at 1700st) 610 (at 1800st) 555 (at 1900st) 500 (at 2000st) 455 (at 2100st) 420 (at 2200st) 385 (at 2300st) 355 (at 2400st) 325 (at 2500st)	0.3	–	–	–

ISA/ISPA Series

Actuator series	Type	Motor output [W]	No. of encoder pulses	Lead [mm]	Mounting direction	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
ISA/ISPA (Slider type)	WXMX	750	16384	50	Horizontal	2000 (at 900 to 1700st) 1930 (at 1800st) 1740 (at 1900st) 1580 (at 2000st) 1440 (at 2100st) 1320 (at 2200st) 1210 (at 2300st) 1115 (at 2400st) 1035 (at 2500st)	0.3	–	–	–
				25		1250 (at 900 to 1500st) 1200 (at 1600st) 1075 (at 1700st) 965 (at 1800st) 870 (at 1900st) 790 (at 2000st) 720 (at 2100st) 660 (at 2200st) 605 (at 2300st) 555 (at 2400st) 515 (at 2500st)	0.3	–	–	–

ISDA/ISPDA Series

Actuator series	Type	Motor output [W]	No. of encoder pulses	Lead [mm]	Mounting direction	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
ISDA(CR)/ ISPDA(CR) (Slider type) * Including cleanroom type	S	60	16384	16	Horizontal/ Vertical	800 (at 100 to 500st) 760 (at 600st)	Horizontal:1 Vertical:0.7	–	–	–
				8		400 (at 100 to 500st) 380 (at 600st)	Horizontal:0.6 Vertical:0.5			
				4		200 (at 100 to 500st) 190 (at 600st)	Horizontal:0.5 Vertical:0.3			
	M	100	16384	20	Horizontal/ Vertical	1000 (at 100 to 600st) 915 (at 700st) 735 (at 800st) 600 (at 900st) 500 (at 1000st)	Horizontal:1 Vertical:0.8	–	–	–
				10		500 (at 100 to 600st) 455 (at 700st) 365 (at 800st) 300 (at 900st) 250 (at 1000st)	Horizontal:0.6 Vertical:0.5	–	–	–
				5		250 (at 100 to 600st) 225 (at 700st) 180 (at 800st) 150 (at 900st) 125 (at 1000st)	Horizontal:0.5 Vertical:0.3	–	–	–
		200	16384	20	Horizontal/ Vertical	1000 (at 100 to 600st) 915 (at 700st) 735 (at 800st) 600 (at 900st) 500 (at 1000st)	Horizontal:1 Vertical:0.8	–	–	–
				10		500 (at 100 to 600st) 455 (at 700st) 365 (at 800st) 300 (at 900st) 250 (at 1000st)	Horizontal:0.6 Vertical:0.5	–	–	–
	MX	200	16384	20	Horizontal	1000 (at 800 to 1300st) 950 (at 1400st) 800 (at 1500st) 700 (at 1600st)	0.3	–	–	–
	L	200	16384	20	Horizontal/ Vertical	1000 (at 100 to 700st) 930 (at 800st) 765 (at 900st) 640 (at 1000st) 545 (at 1100st) 465 (at 1200st)	Horizontal:1 Vertical:0.8	–	–	–
				10		500 (at 100 to 700st) 465 (at 800st) 380 (at 900st) 320 (at 1000st) 270 (at 1100st) 230 (at 1200st)	Horizontal:0.6 Vertical:0.5	–	–	–
		400	16384	20	Horizontal/ Vertical	1000 (at 100 to 700st) 930 (at 800st) 765 (at 900st) 640 (at 1000st) 545 (at 1100st) 465 (at 1200st)	Horizontal:1 Vertical:0.8	–	–	–
	LX	200 400	16384	20	Horizontal	1000 (at 1000 to 1400st) 950 (at 1500st) 830 (at 1600st)	0.3	–	–	–

ISDA/ISPDA Series

Actuator series	Type	Motor output [W]	No. of encoder pulses	Lead [mm]	Mounting direction	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
[Cleanroom type] ISDACR/ ISPDACR (Slider type)	W	600	16384	40	Horizontal/ Vertical	2000 (at 100 to 700st) 1965 (at 800st) 1605 (at 900st) 1335 (at 1000st) 1130 (at 1100st) 970 (at 1200st) 840 (at 1300st)	1	–	–	–
				20		1000 (at 100 to 700st) 980 (at 800st) 800 (at 900st) 665 (at 1000st) 565 (at 1100st) 485 (at 1200st) 420 (at 1300st)	Horizontal:1 Vertical:0.8	–	–	–
				10		500 (at 100 to 700st) 490 (at 800st) 400 (at 900st) 330 (at 1000st) 280 (at 1100st) 240 (at 1200st) 210 (at 1300st)	Horizontal:0.6 Vertical:0.5	–	–	–
		750	16384	50	Horizontal/ Vertical	2000 (at 100 to 1000st) 1780 (at 1100st) 1525 (at 1200st) 1320 (at 1300st)	1	–	–	–
				25		1250 (at 100 to 900st) 1050 (at 1000st) 890 (at 1100st) 760 (at 1200st) 660 (at 1300st)	Horizontal:1 Vertical:0.8	–	–	–
	WX	600	16384	40	Horizontal	2000 (at 900 to 1300st) 1965 (at 1400st) 1725 (at 1500st) 1530 (at 1600st) 1365 (at 1700st) 1225 (at 1800st) 1110 (at 1900st) 1005 (at 2000st) 915 (at 2100st) 840 (at 2200st) 770 (at 2300st) 710 (at 2400st) 655 (at 2500st)	0.3	–	–	–
				20		1000 (at 900 to 1300st) 980 (at 1400st) 860 (at 1500st) 765 (at 1600st) 680 (at 1700st) 610 (at 1800st) 555 (at 1900st) 500 (at 2000st) 455 (at 2100st) 420 (at 2200st) 385 (at 2300st) 355 (at 2400st) 325 (at 2500st)	0.3	–	–	–

ISDA/ISPDA Series

Actuator series	Type	Motor output [W]	No. of encoder pulses	Lead [mm]	Mounting direction	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
[Cleanroom type] ISDACR/ ISPDACR (Slider type)	WX	750	16384	50	Horizontal	2000 (at 900 to 1700st) 1930 (at 1800st) 1740 (at 1900st) 1580 (at 2000st) 1440 (at 2100st) 1320 (at 2200st) 1210 (at 2300st) 1115 (at 2400st) 1035 (at 2500st)	0.3	–	–	–
				25		1250 (at 900 to 1500st) 1200 (at 1600st) 1075 (at 1700st) 965 (at 1800st) 870 (at 1900st) 790 (at 2000st) 720 (at 2100st) 660 (at 2200st) 605 (at 2300st) 555 (at 2400st) 515 (at 2500st)	0.3	–	–	–

ISWA/ISPWA Series

Actuator series	Type	Motor output [W]	No. of encoder pulses	Lead [mm]	Mounting direction	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
[Dust and drip proof type] ISWA/ ISPWA (Slider type)	S	60	16384	16	Horizontal	800 (at 100 to 500st) 760 (at 600st)	0.3	–	–	–
				8		400 (at 100 to 500st) 380 (at 600st)	0.3			
				4		200 (at 100 to 500st) 190 (at 600st)	0.15			
	M	100	16384	10	Horizontal	500 (at 100 to 600st) 455 (at 700st) 365 (at 800st) 300 (at 900st) 250 (at 1000st)	0.3	–	–	–
				5		250 (at 100 to 600st) 225 (at 700st) 180 (at 800st) 150 (at 900st) 125 (at 1000st)	0.15	–	–	–
		200	16384	20	Horizontal	1000 (at 100 to 600st) 915 (at 700st) 735 (at 800st) 600 (at 900st) 500 (at 1000st)	0.3	–	–	–
				10		500 (at 100 to 600st) 455 (at 700st) 365 (at 800st) 300 (at 900st) 250 (at 1000st)	0.3	–	–	–
	L	200	16384	20	Horizontal	1000 (at 100 to 700st) 930 (at 800st) 765 (at 900st) 640 (at 1000st) 545 (at 1100st) 465 (at 1200st)	0.3	–	–	–
				10		500 (at 100 to 700st) 465 (at 800st) 380 (at 900st) 320 (at 1000st) 270 (at 1100st) 230 (at 1200st)	0.3	–	–	–
		400	16384	20	Horizontal	1000 (at 100 to 700st) 930 (at 800st) 765 (at 900st) 640 (at 1000st) 545 (at 1100st) 465 (at 1200st)	0.3	–	–	–

SSPA/SSPADACR/IF/FS/RS Series

Actuator series	Type	Motor output [W]	No. of encoder pulses	Lead [mm]	Mounting direction	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
SSPA (Slider type)	SXM (Note)	200	16384	30	Horizontal/ Vertical	1800 (at 100 to 600st) 1680 (at 650st) 1480 (at 700st) 1320 (at 750st) 1180 (at 800st) 1060 (at 850st) 960 (at 900st) 870 (at 950st) 790 (at 1000st) 730 (at 1050st) 670 (at 1100st)	1.2	–	–	–
				20		1200 (at 100 to 600st) 1120 (at 650st) 990 (at 700st) 880 (at 750st) 780 (at 800st) 710 (at 850st) 640 (at 900st) 580 (at 950st) 530 (at 1000st) 480 (at 1050st) 440 (at 1100st)	1	–	–	–
				10		600 (at 100 to 600st) 560 (at 650st) 490 (at 700st) 440 (at 750st) 390 (at 800st) 350 (at 850st) 320 (at 900st) 290 (at 950st) 260 (at 1000st) 240 (at 1050st) 220 (at 1100st)	Horizontal:0.7 Vertical:0.6	–	–	–

(Note) The models with the type column shaded are applicable for offboard tuning function. (However, if there is a setting that high-acceleration/deceleratio application, it is excluded.)
For offboard tuning function, refer to the instruction manual of PC software.

SSPA/SSPADACR/IF/FS/RS Series

Actuator series	Type	Motor output [W]	No. of encoder pulses	Lead [mm]	Mounting direction	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
SSPA (Slider type)	MXM (Note)	400	16384	40	Horizontal/ Vertical	2400 (at 100 to 700st) 2150 (at 750st) 1930 (at 800st) 1740 (at 850st) 1580 (at 900st) 1440 (at 950st) 1320 (at 1000st) 1210 (at 1050st) 1120 (at 1100st) 1030 (at 1150st) 960 (at 1200st) 890 (at 1250st) 830 (at 1300st)	1.2	–	–	–
				20		1200 (at 100 to 700st) 1070 (at 750st) 960 (at 800st) 870 (at 850st) 790 (at 900st) 720 (at 950st) 660 (at 1000st) 600 (at 1050st) 560 (at 1100st) 510 (at 1150st) 480 (at 1200st) 440 (at 1250st) 410 (at 1300st)	1	–	–	–
				10		600 (at 100 to 700st) 530 (at 750st) 480 (at 800st) 430 (at 850st) 390 (at 900st) 360 (at 950st) 330 (at 1000st) 300 (at 1050st) 280 (at 1100st) 250 (at 1150st) 240 (at 1200st) 220 (at 1250st) 200 (at 1300st)	Horizontal:0.7 Vertical:0.6	–	–	–
	LXM (Note)	750	16384	50	Horizontal/ Vertical	2500 (at 100 to 900st) 2320 (at 1000st) 1950 (at 1100st) 1660 (at 1200st) 1440 (at 1300st) 1250 (at 1400st) 1100 (at 1500st)	1.2	–	–	–
				25		1250 (at 100 to 900st) 1160 (at 1000st) 970 (at 1100st) 830 (at 1200st) 720 (at 1300st) 620 (at 1400st) 550 (at 1500st)	1.2	–	–	–

(Note) The models with the type column shaded are applicable for offboard tuning function. (However, if there is a setting that high-acceleration/deceleratio application, it is excluded.)
For offboard tuning function, refer to the instruction manual of PC software.

SSPA/SSPADACR/IF/FS/RS Series

Actuator series	Type	Motor output [W]	No. of encoder pulses	Lead [mm]	Mounting direction	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
[Cleanroom type] SSPDACR	S (Note)	200	16384	30	Horizontal/ Vertical	1600 (at 100 to 600st) 1450 (at 650st) 1290 (at 700st) 1160 (at 750st) 1040 (at 800st) 940 (at 850st) 860 (at 900st) 780 (at 950st) 720 (at 1000st) 660 (at 1050st) 610 (at 1100st)	1.2	–	–	–
				20		1100 (at 100 to 550st) 1090 (at 600st) 970 (at 650st) 860 (at 700st) 770 (at 750st) 690 (at 800st) 630 (at 850st) 570 (at 900st) 520 (at 950st) 480 (at 1000st) 440 (at 1050st) 400 (at 1100st)	1	–	–	–
				10		600 (at 100 to 550st) 540 (at 600st) 480 (at 650st) 430 (at 700st) 380 (at 750st) 340 (at 800st) 310 (at 850st) 280 (at 900st) 260 (at 950st) 240 (at 1000st) 220 (at 1050st) 200 (at 1100st)	Horizontal:0.7 Vertical:0.6	–	–	–

(Note) *The models with the type column shaded are applicable for offboard tuning function. (However, if there is a setting that high-acceleration/deceleratio application, it is excluded.)*
For offboard tuning function, refer to the instruction manual of PC software.

SSPA/SSPADACR/IF/FS/RS Series

Actuator series	Type	Motor output [W]	No. of encoder pulses	Lead [mm]	Mounting direction	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
[Cleanroom type] SSPDACR	M (Note)	400	16384	40	Horizontal/ Vertical	1600 (at 100 to 800st) 1540 (at 850st) 1410 (at 900st) 1290 (at 950st) 1180 (at 1000st) 1100 (at 1050st) 1010 (at 1100st) 940 (at 1150st) 880 (at 1200st) 820 (at 1250st) 760 (at 1300st)	1.2	–	–	–
				20		1100 (at 100 to 650st) 1040 (at 700st) 940 (at 750st) 850 (at 800st) 770 (at 850st) 700 (at 900st) 640 (at 950st) 590 (at 1000st) 550 (at 1050st) 500 (at 1100st) 470 (at 1150st) 440 (at 1200st) 410 (at 1250st) 380 (at 1300st)	1	–	–	–
				10		600 (at 100 to 600st) 580 (at 650st) 520 (at 700st) 470 (at 750st) 420 (at 800st) 380 (at 850st) 350 (at 900st) 320 (at 950st) 290 (at 1000st) 270 (at 1050st) 250 (at 1100st) 230 (at 1150st) 220 (at 1200st) 200 (at 1250st) 190 (at 1300st)	Horizontal:0.7 Vertical:0.6	–	–	–
	L (Note)	750	16384	50	Horizontal/ Vertical	1600 (at 100 to 1100st) 1550 (at 1200st) 1340 (at 1300st) 1170 (at 1400st) 1040 (at 1500st)	1.2	–	–	–
				25		1100 (at 100 to 900st) 1060 (at 1000st) 900 (at 1100st) 770 (at 1200st) 670 (at 1300st) 580 (at 1400st) 520 (at 1500st)	1.2	–	–	–

(Note) The models with the type column shaded are applicable for offboard tuning function. (However, if there is a setting that high-acceleration/deceleratio application, it is excluded.)
For offboard tuning function, refer to the instruction manual of PC software.

SSPA/SSPADACR/IF/FS/RS Series

Actuator series	Type	Motor output [W]	No. of encoder pulses	Lead [mm]	Mounting direction	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
IF	SA	60 100	16384	35	Horizontal	1750	0.3	–	–	–
	MA	200 400	16384	35	Horizontal	1750	0.3			
FS	NM	60 100	16384	25	Horizontal	1250	0.3	–	–	–
	WM	100 200	16384	25	Horizontal	1250	0.3			
	LM	400	16384	25	Horizontal	1250	1			
	HM	400	16384	40	Horizontal	2000	0.3			
RS	60	60	16384	Deceleration ratio 1/50	Horizontal/ Vertical	360	0.2			
				Deceleration ratio 1/100		180				

NS/NSA Series

Actuator series	Type	Motor output [W]	No. of encoder pulses	Lead [mm]	Mounting direction	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
NS	SXMS SXMM	60	Incremental 2400	12	Horizontal	720	0.8	–	–	–
	SZMS SZMM	60	Incremental 2400	12	Vertical	600	0.7	–	–	–
	MXMS MXMM	200	16384	30	Horizontal	1800	1	–	–	–
				20		1200	0.8			
	MXMXS	200	16384	30	Horizontal	1800	0.3	–	–	–
				20		1200	0.3			
	MZMS MZMM	200	16384	20	Vertical	1000	0.5	–	–	–
	LXMS LXMM	400	16384	40	Horizontal	2400	1	–	–	–
				20		1300	1			
	LXMXS	400	16384	40	Horizontal	2400	0.3	–	–	–
				20		1300	0.3			
	LZMS LZMM	400	16384	20	Vertical	1000	0.8	–	–	–
NSA	MXMS MXMM	200	131072	30	Horizontal	1800	0.5	–	–	–
				20		1200	0.6			
	LXMS LXMM	400	131072	40	Horizontal	2400	0.8	–	–	–
				20		1300	0.9			
	WXMS WXMM	750	131072	50	Horizontal	2500	0.9	–	–	–
				25		1300	1			

LSA/LSAS Series

Actuator series	Type	Motor output [W]	No. of encoder pulses	Lead [mm]	Mounting direction	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
LSA	S6SS S6SM	100	48000	48	Horizontal	2500	3	–	–	–
	S8SS S8SM S8HS S8HM	100	60000	60	Horizontal	2500	3	–	–	–
	S10SS S10SM	200	90000	90	Horizontal	2500	3	–	–	–
	S10HS S10HM	200S	90000	90	Horizontal	2500	3	–	–	–
	H8SS H8SM H8HS H8HM	200	50000	50	Horizontal	2500	3	–	–	–
	N10SS N10SM	100S	50000	50	Horizontal	2500	3	–	–	–
	L15SS L15SM	200	50000	50	Horizontal	2500	3	–	–	–
	N15SS N15SM N15HS N15HM	200S	50000	50	Horizontal	2500	3	–	–	–
	N19SS N19SM	300S	72000	72	Horizontal	2500	3	–	–	–
	W21SS W21SM	400	45000	45	Horizontal	2500	3	–	–	–
LSAS	N10SS N10SM	100S	50000	50	Horizontal	2500	3	–	–	–
	N15SS N15SM N15HS N15HM	200S	50000	50	Horizontal	2500	3	–	–	–

DD/DDA Series

Actuator series	Type	Motor output [W]	No. of encoder pulses	Lead [mm]	Mounting direction	Maximum speed [mm/s]	Maximum acceleration /deceleration [G]	Minimum push force [N]	Maximum push force [N]	Rated push speed [mm/s]
DD(CR) * Including cleanroom type (Note)	LT18S LT18CS	200	131072	Deceleration ratio 1/1	Horizontal/ Vertical	1800 deg/s	–	–	–	–
	LT18P LT18CP	200	1048576	Deceleration ratio 1/1		1800 deg/s	–	–	–	–
	LH18S LH18CS	600	131072	Deceleration ratio 1/1		1440 deg/s	–	–	–	–
	LH18P LH18CP	600	1048576	Deceleration ratio 1/1		1440 deg/s	–	–	–	–
DDA(CR) * Including cleanroom type (Note)	LT18CS	200	131072	Deceleration ratio 1/1	Horizontal/ Vertical	1800 deg/s	9.99	–	–	–
	LT18CP		1048576							
	LH18CS	600	131072			1440 deg/s	9.99	–	–	–
	LH18CP		1048576							
[Dust and drip proof type] DDW (Note)	LH18CS	600	131072	Deceleration ratio 1/1	Horizontal/ Vertical	1440 deg/s	9.99	–	–	–
	LH18CP		1048576							

(Note) The 200V driver unit (RCON-SC) is applicable only to the index absolute type (encoder type: AI).

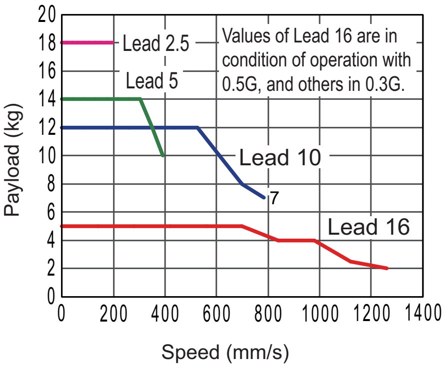
2.2 Correlation Diagrams of Speed and Payload

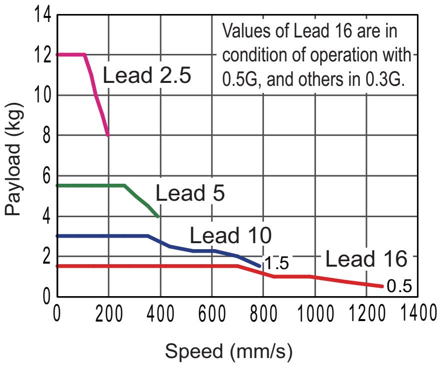
Correlation diagram of speed and payload for the RCP6 slider type (High output effective)

*** Characteristics should be the same for Cleanroom type.**

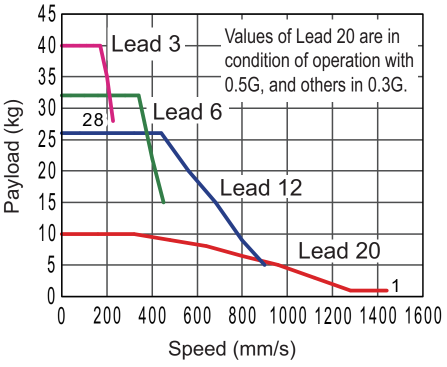
Horizontal installation | **Vertical installation**

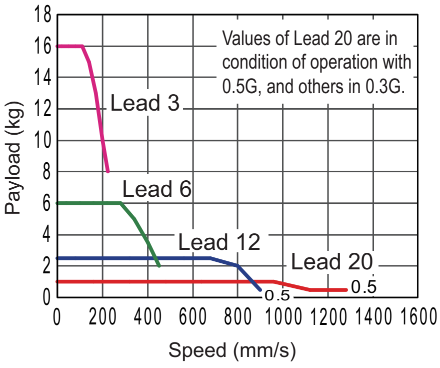
SA4C



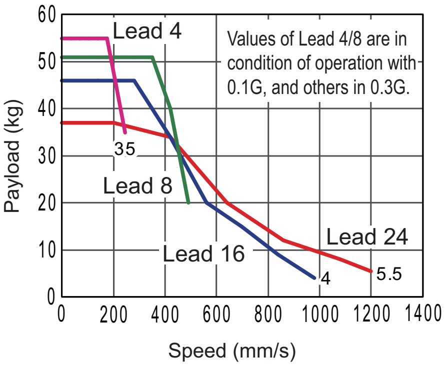


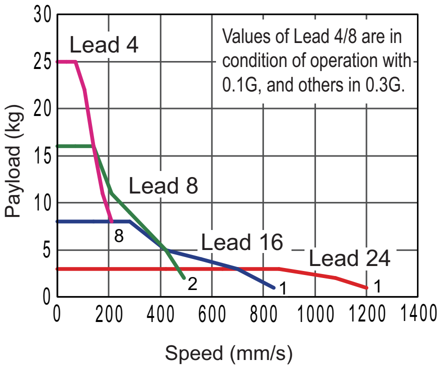
SA6C



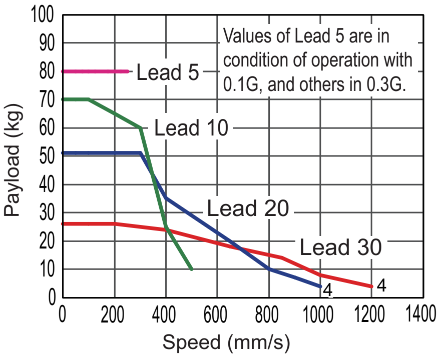


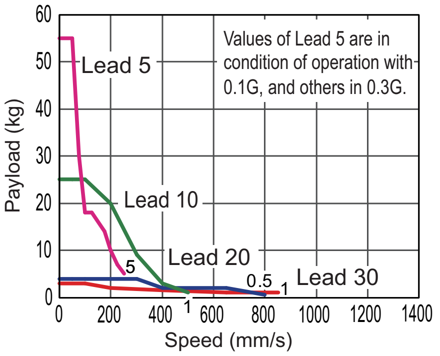
SA7C





SA8C

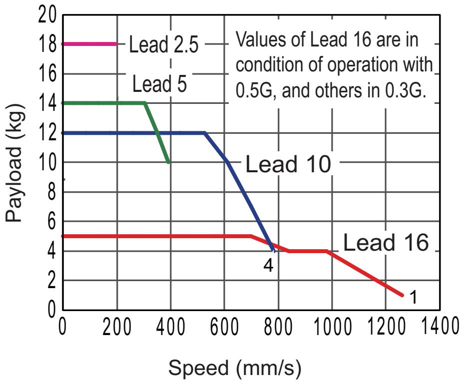


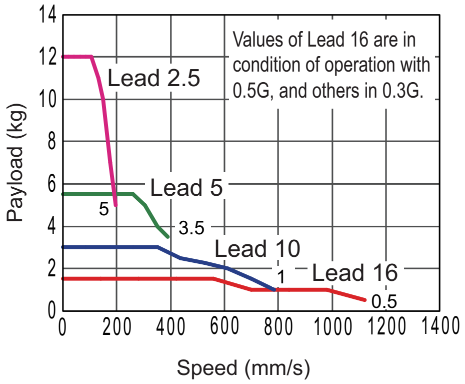


Correlation diagram of speed and payload for the RCP6 slider type (High output effective / Motor-reversing type)

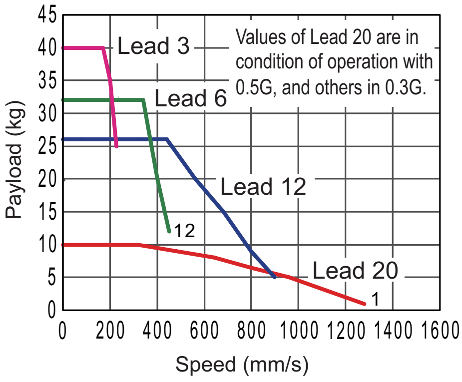
Horizontal installation | **Vertical installation**

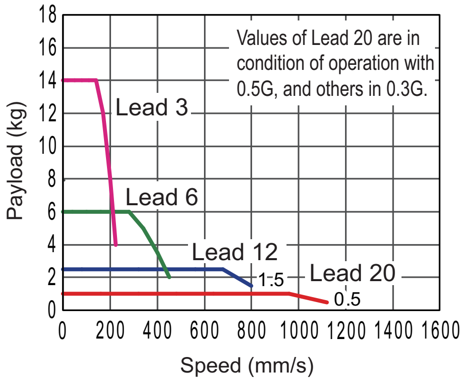
SA4R



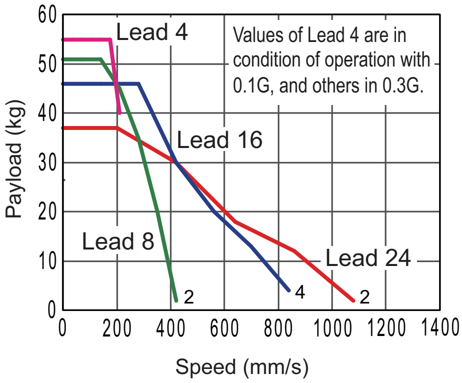


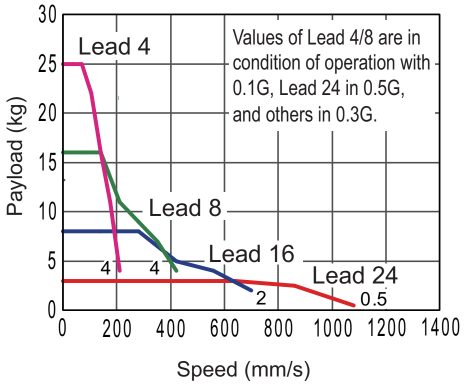
SA6R



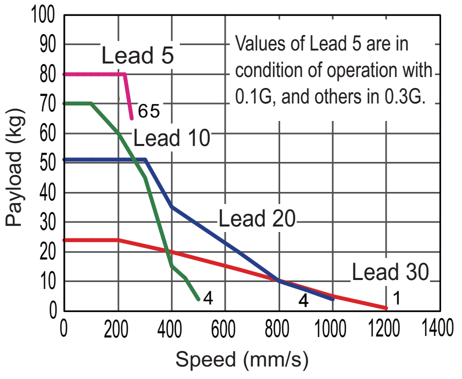


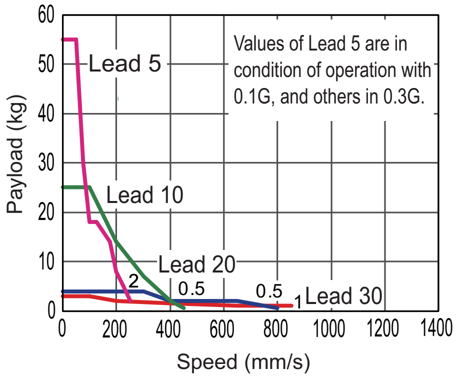
SA7R





SA8R



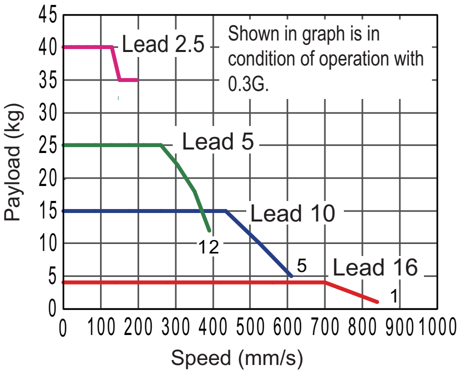


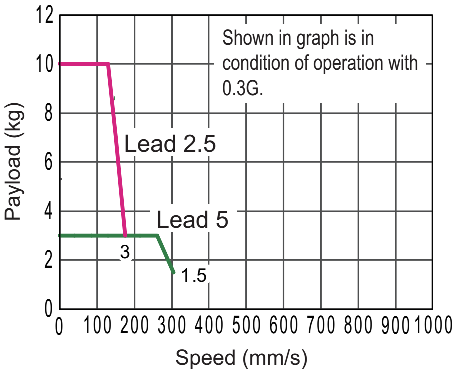
Correlation diagram of speed and payload for the RCP6 wide slider type (High output effective)

*** Characteristics should be the same for Cleanroom type.**

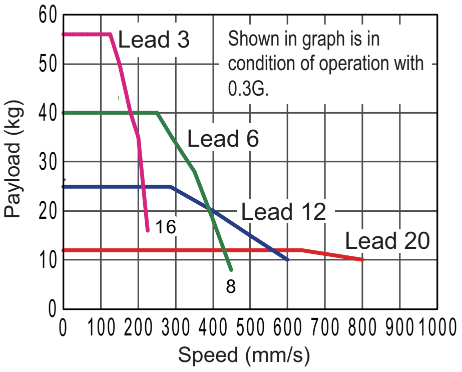
Horizontal installation	Vertical installation

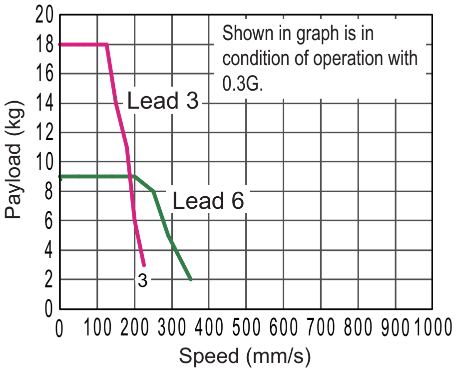
WSA10C



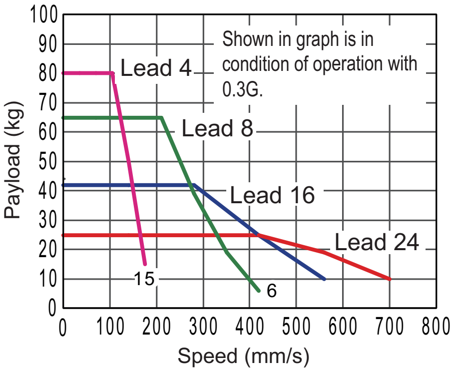


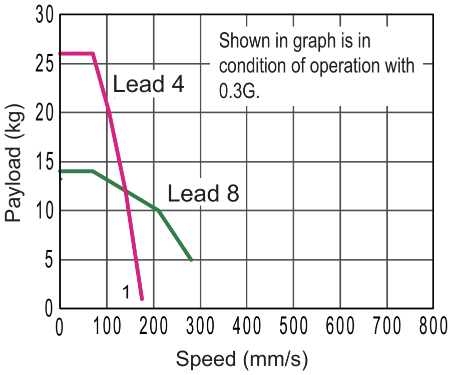
WSA12C



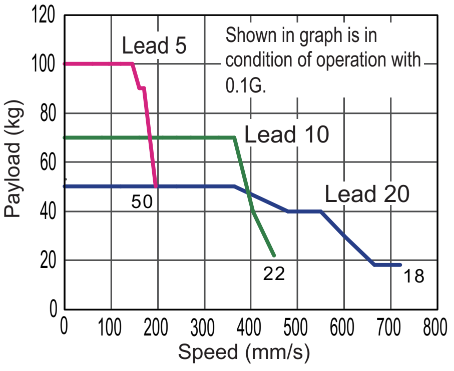


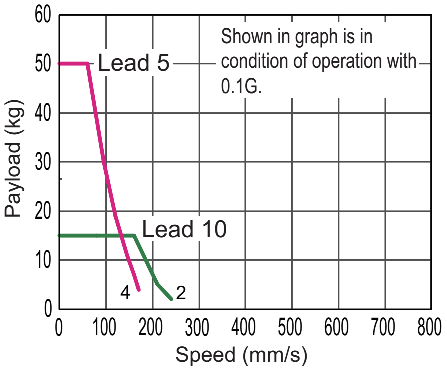
WSA14C





WSA16C



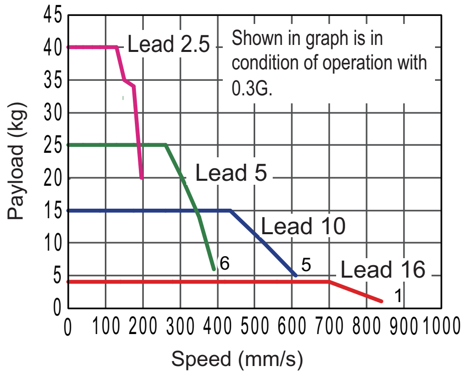


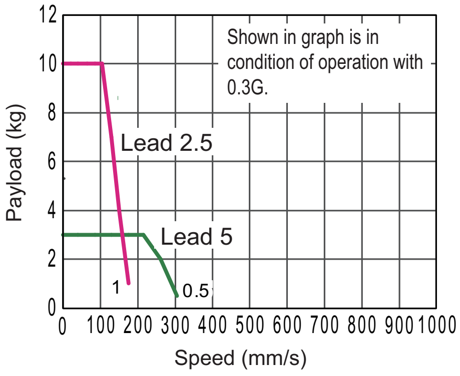
Correlation diagram of speed and payload for the RCP6 wide slider type (High output effective / Motor-reversing type)

Horizontal installation

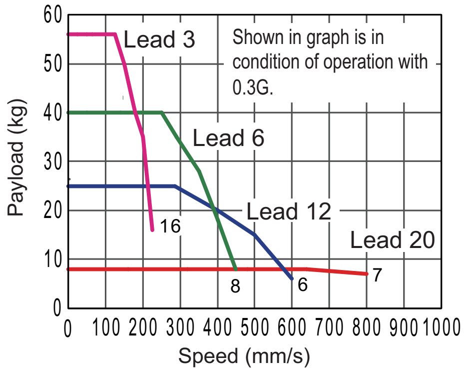
Vertical installation

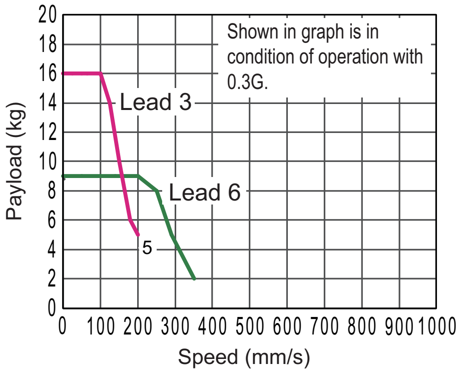
WSA10R



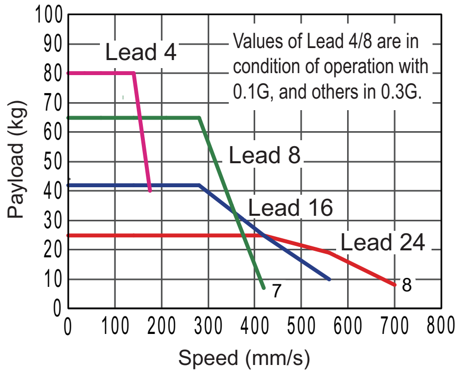


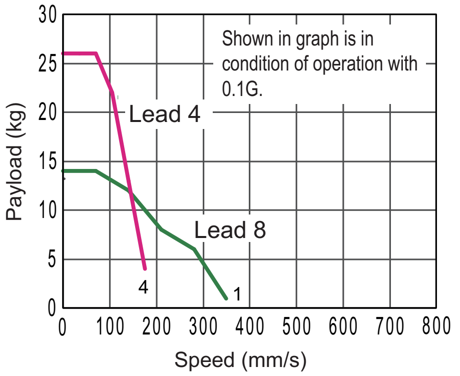
WSA12R



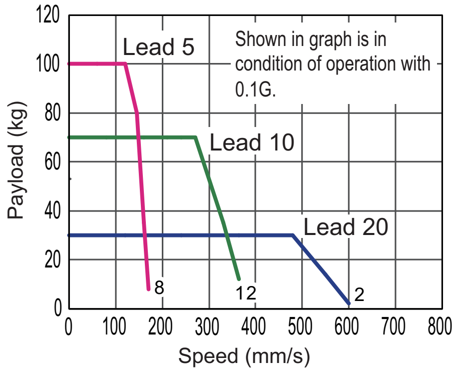


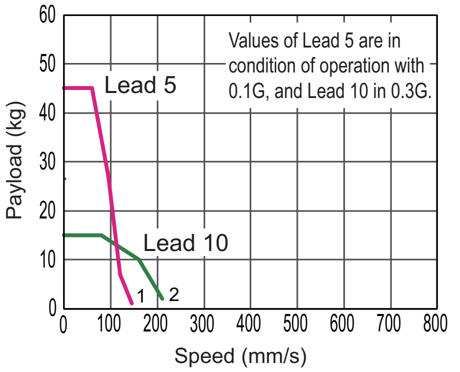
WSA14R





WSA16R



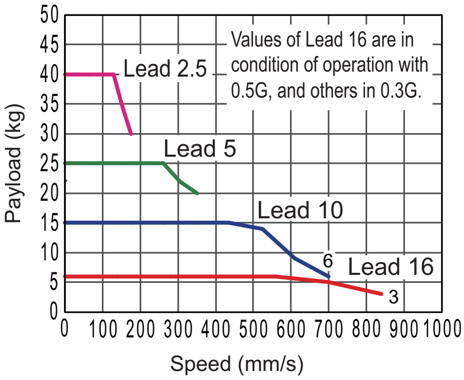


Correlation diagram of speed and payload for the RCP6 rod type (High output effective)

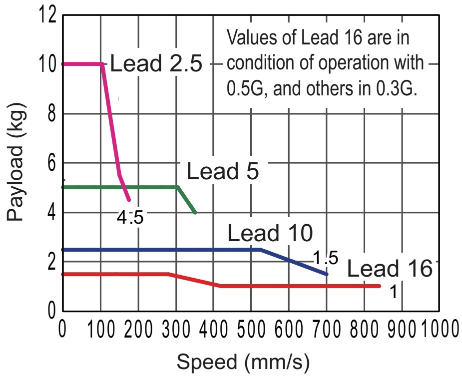
Horizontal installation

Vertical installation

RA4C

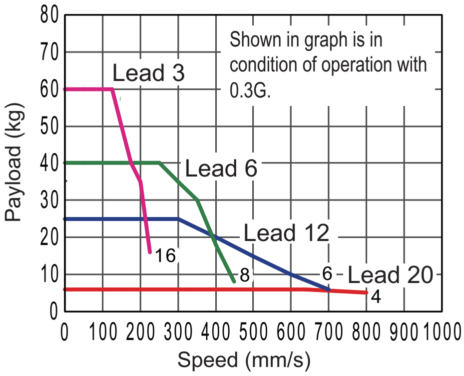


Values of Lead 16 are in condition of operation with 0.5G, and others in 0.3G.

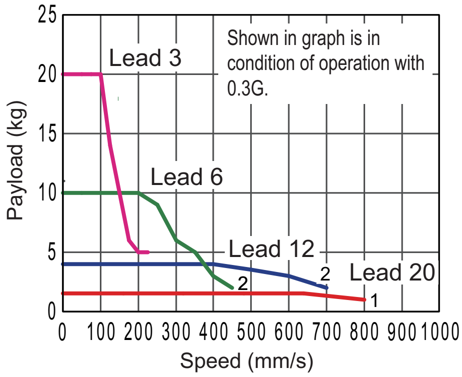


Values of Lead 16 are in condition of operation with 0.5G, and others in 0.3G.

RA6C

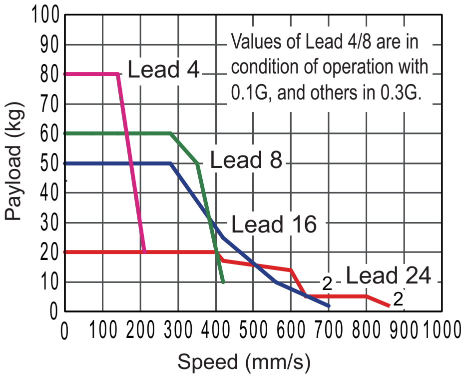


Shown in graph is in condition of operation with 0.3G.

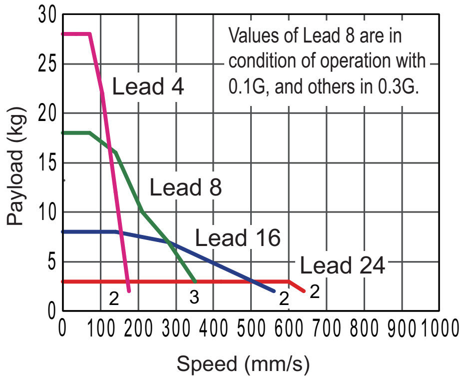


Shown in graph is in condition of operation with 0.3G.

RA7C

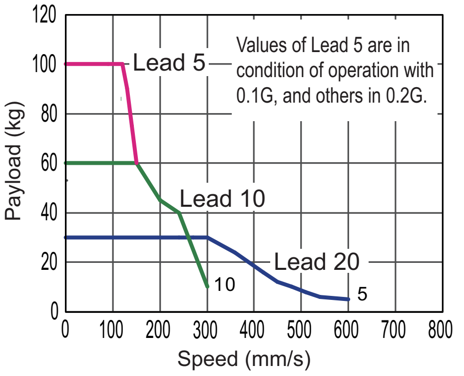


Values of Lead 4/8 are in condition of operation with 0.1G, and others in 0.3G.

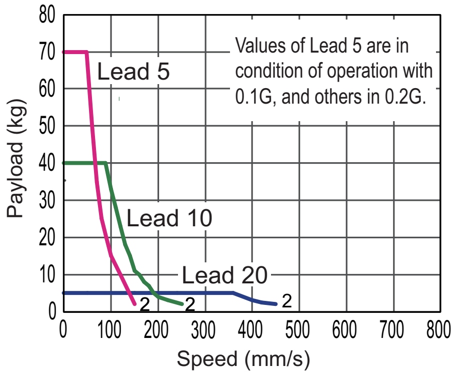


Values of Lead 8 are in condition of operation with 0.1G, and others in 0.3G.

RA8C



Values of Lead 5 are in condition of operation with 0.1G, and others in 0.2G.



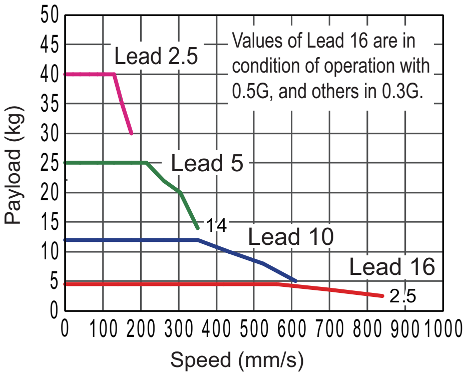
Values of Lead 5 are in condition of operation with 0.1G, and others in 0.2G.

Correlation diagram of speed and payload for the RCP6 rod type (High output effective / Motor-reversing type)

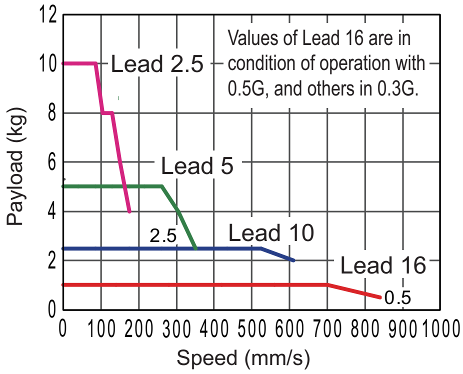
Horizontal installation

Vertical installation

RA4R

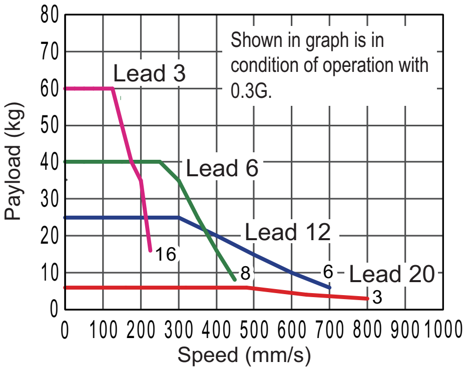


Values of Lead 16 are in condition of operation with 0.5G, and others in 0.3G.

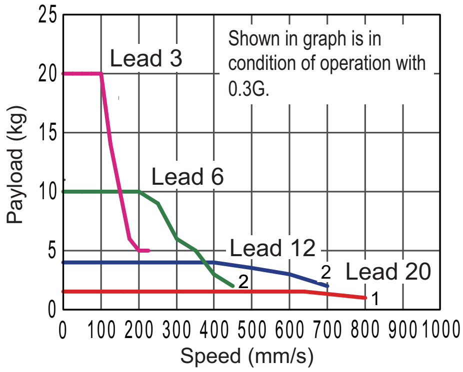


Values of Lead 16 are in condition of operation with 0.5G, and others in 0.3G.

RA6R

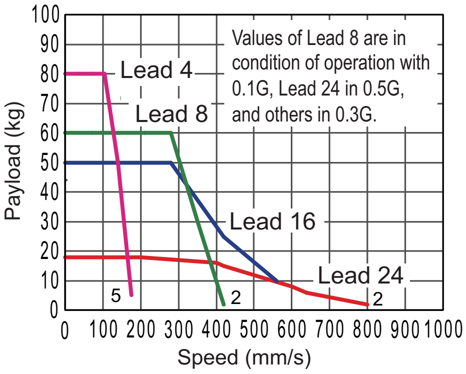


Shown in graph is in condition of operation with 0.3G.

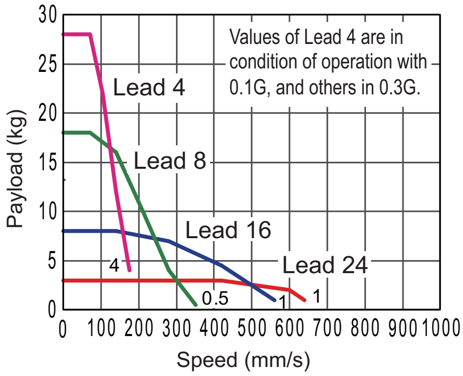


Shown in graph is in condition of operation with 0.3G.

RA7R

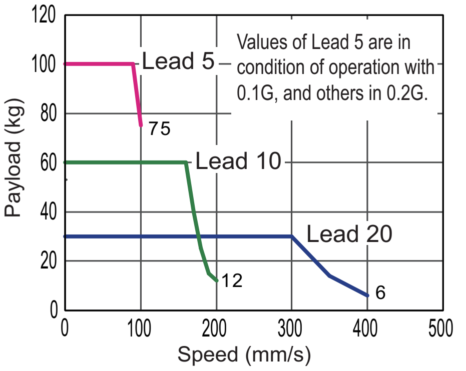


Values of Lead 8 are in condition of operation with 0.1G, Lead 24 in 0.5G, and others in 0.3G.

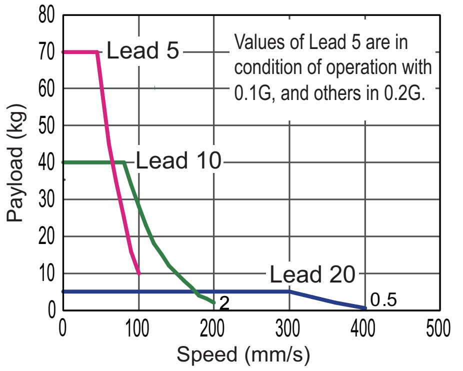


Values of Lead 4 are in condition of operation with 0.1G, and others in 0.3G.

RA8R



Values of Lead 5 are in condition of operation with 0.1G, and others in 0.2G.

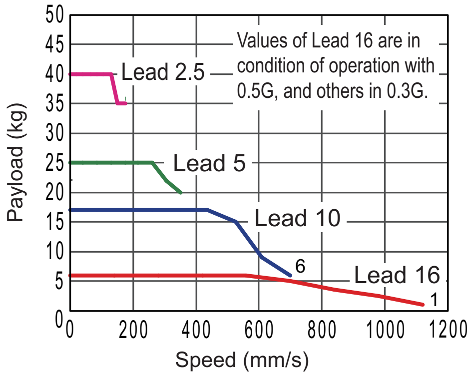


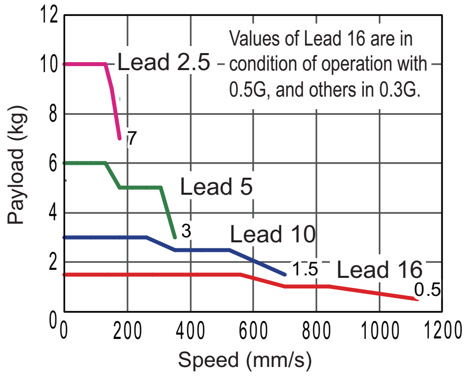
Values of Lead 5 are in condition of operation with 0.1G, and others in 0.2G.

Correlation diagram of speed and payload for the RCP6 radial cylinder type (High output effective)

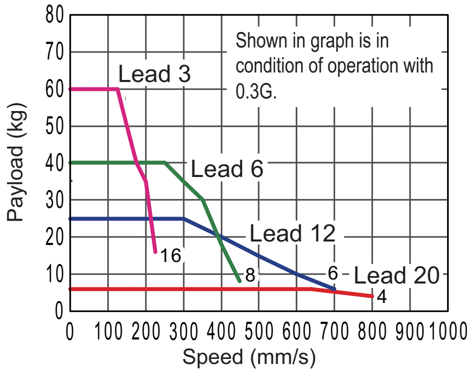
Horizontal installation | **Vertical installation**

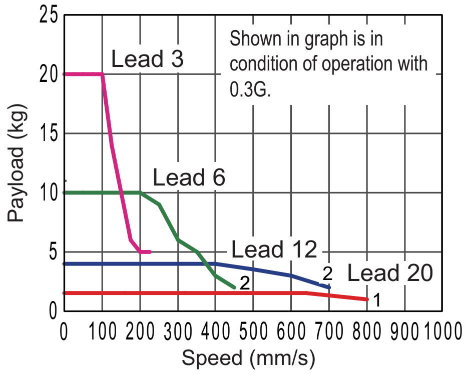
RRA4C


Values of Lead 16 are in condition of operation with 0.5G, and others in 0.3G.

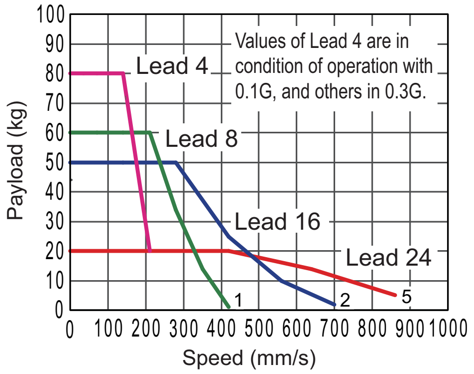

Values of Lead 16 are in condition of operation with 0.5G, and others in 0.3G.

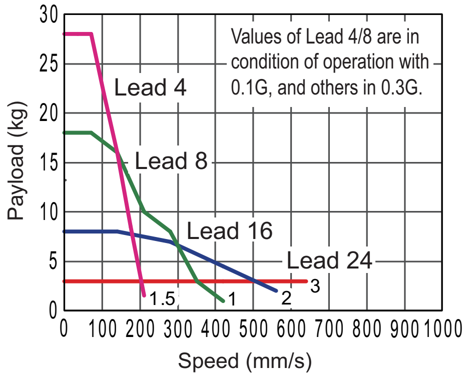
RRA6C


Shown in graph is in condition of operation with 0.3G.

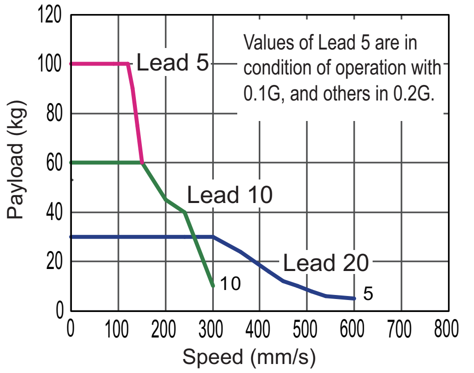

Shown in graph is in condition of operation with 0.3G.

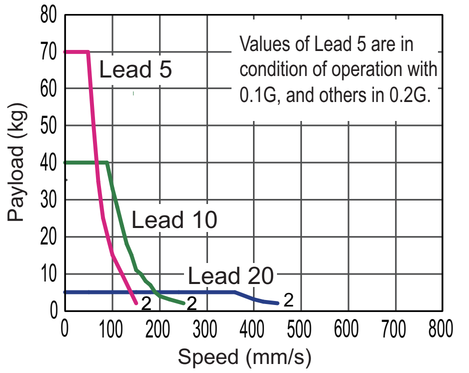
RRA7C


Values of Lead 4 are in condition of operation with 0.1G, and others in 0.3G.


Values of Lead 4/8 are in condition of operation with 0.1G, and others in 0.3G.

RRA8C

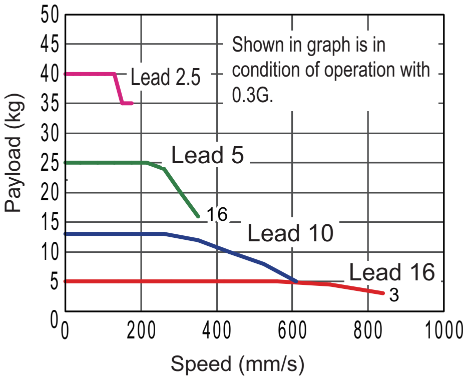

Values of Lead 5 are in condition of operation with 0.1G, and others in 0.2G.

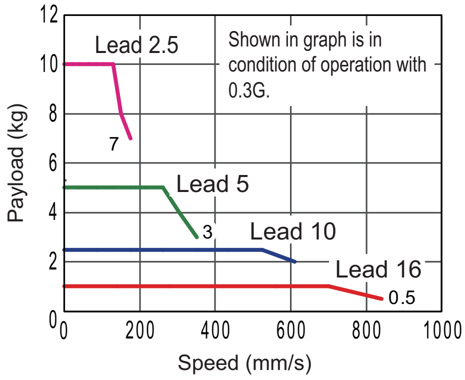

Values of Lead 5 are in condition of operation with 0.1G, and others in 0.2G.

Correlation diagram of speed and payload for the RCP6 radial cylinder type (High output effective / Motor-reversing type)

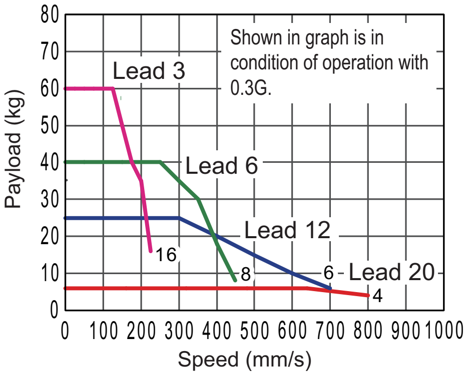
Horizontal installation | **Vertical installation**

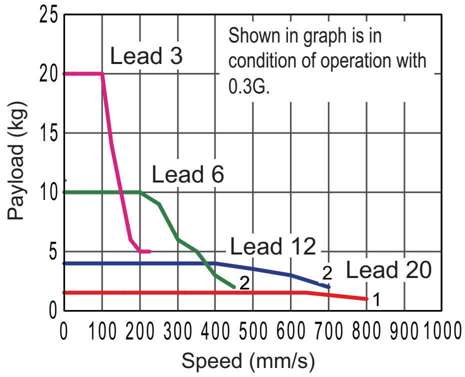
RRA4R



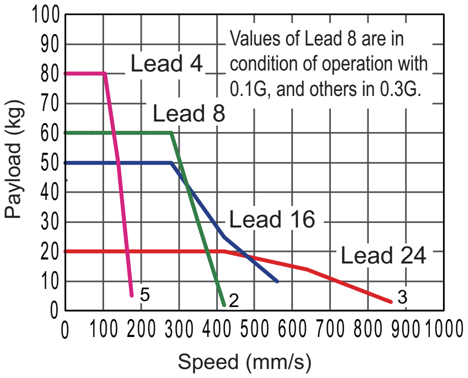


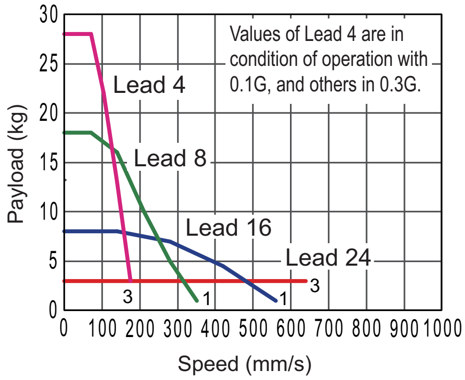
RRA6R



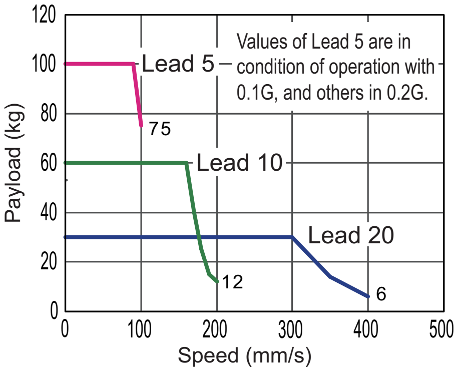


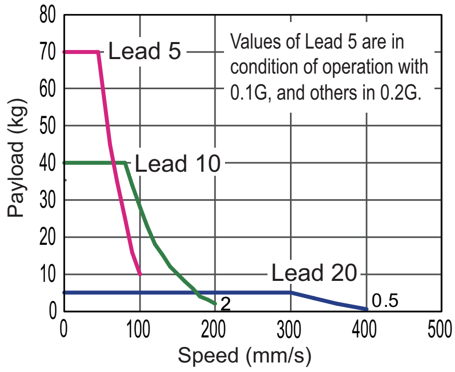
RRA7R





RRA8R

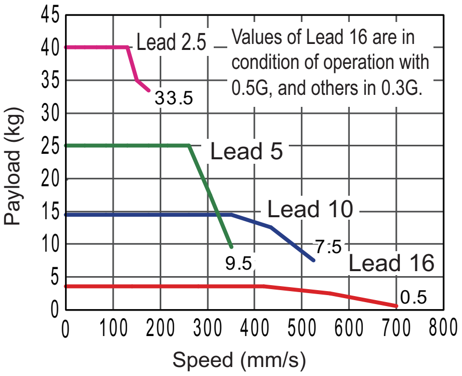


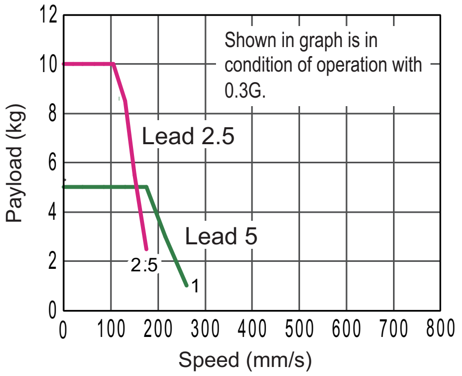


Correlation diagram of speed and payload for the RCP6 wide radial cylinder type (High output effective)

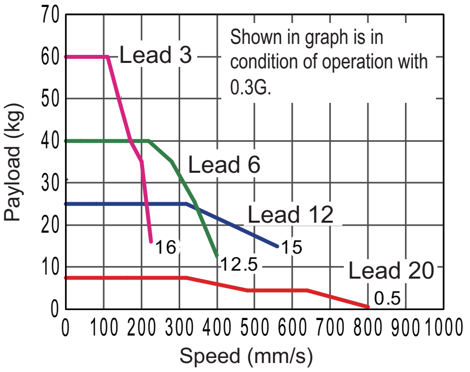
Horizontal installation | **Vertical installation**

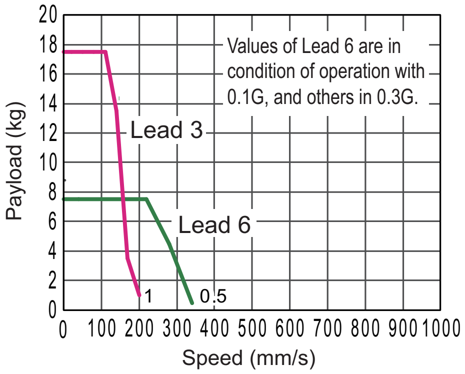
WRA10C



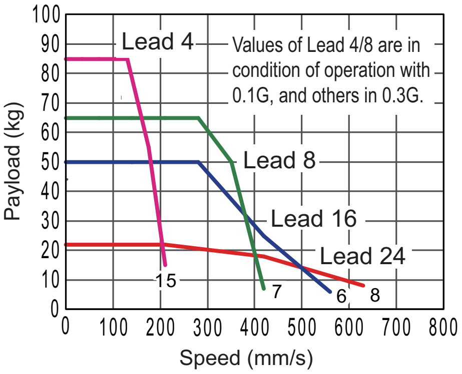


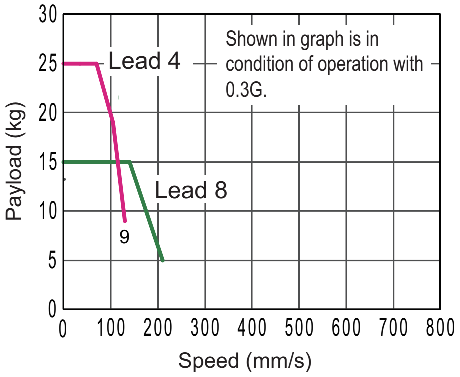
WRA12C



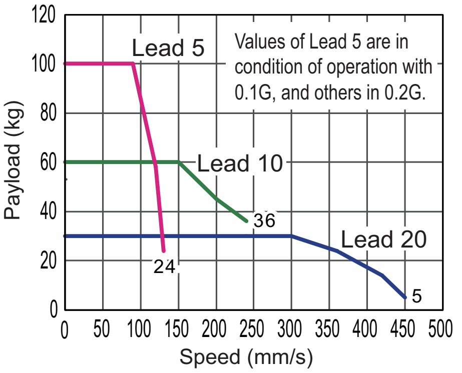


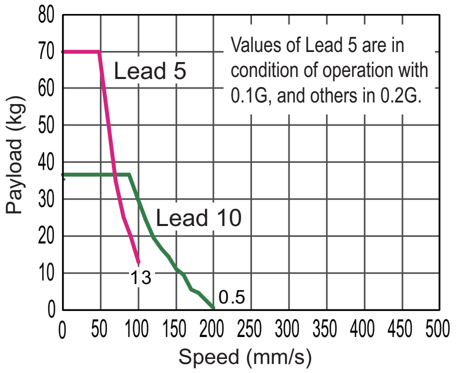
WRA14C





WRA16C



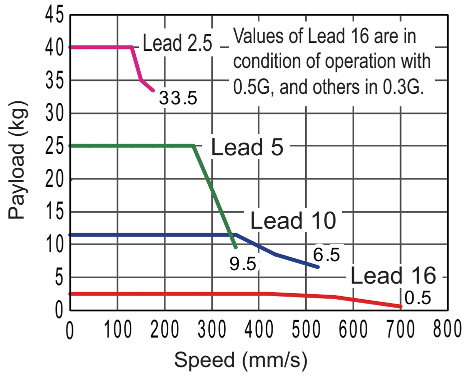


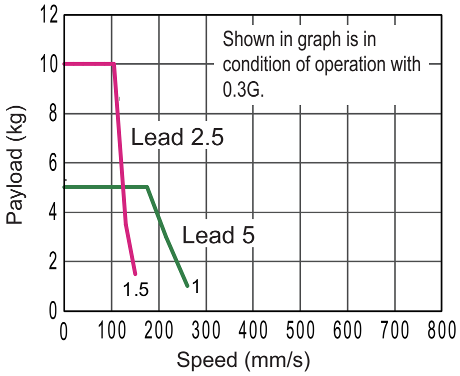
Correlation diagram of speed and payload for the RCP6 wide radial cylinder type (High output effective / Motor-reversing type)

Horizontal installation

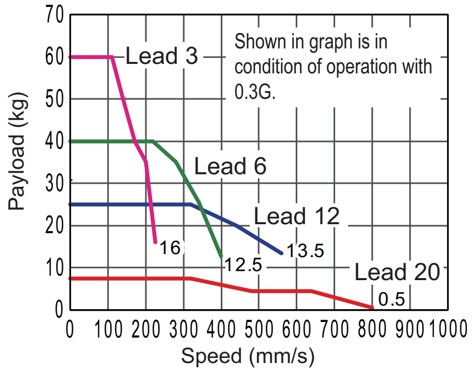
Vertical installation

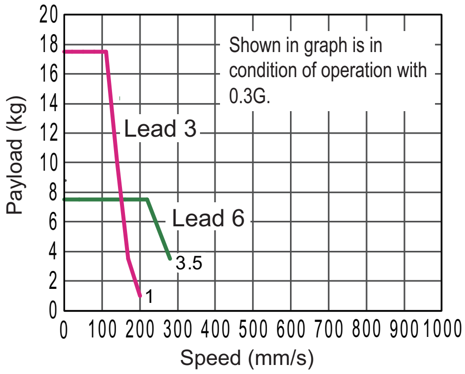
WRA10R



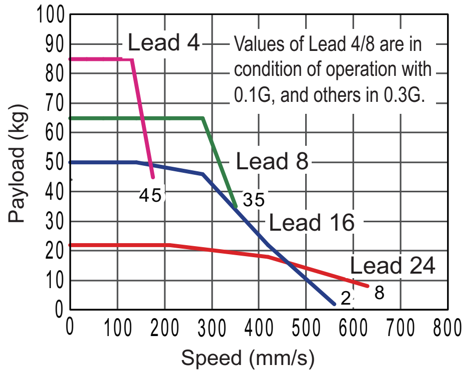


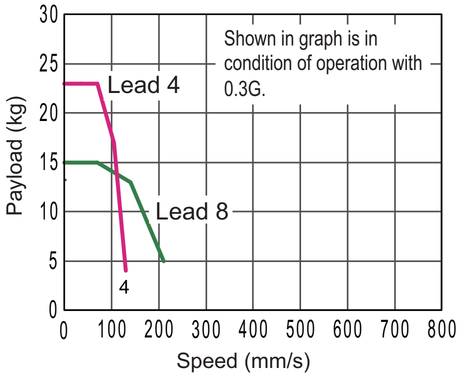
WRA12R



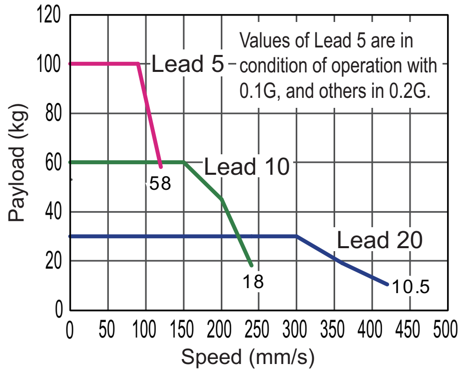


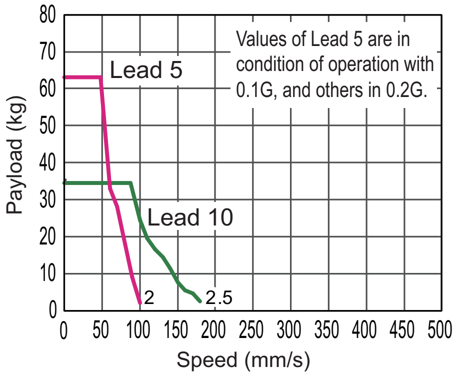
WRA14R





WRA16R



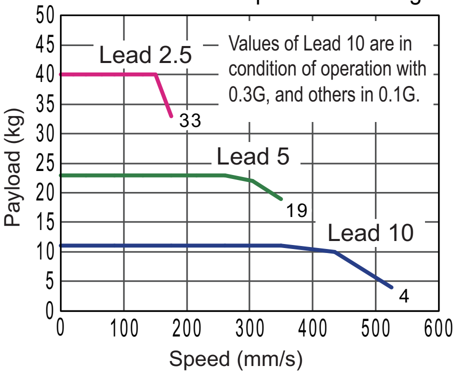


Correlation diagram of speed and payload for the RCP6W dust and drip proof rod type (High output effective)

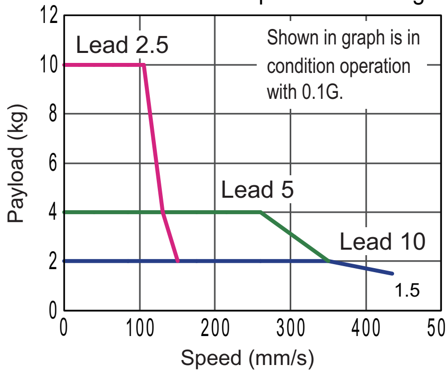
Horizontal installation | **Vertical installation**

RA4C

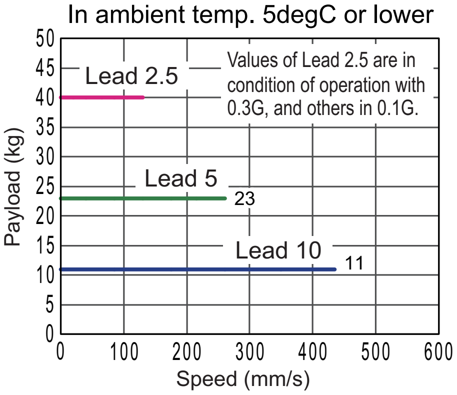
When ambient temp. exceeds 5degC



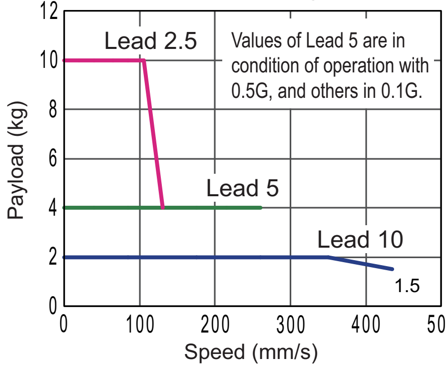
When ambient temp. exceeds 5degC



In ambient temp. 5degC or lower

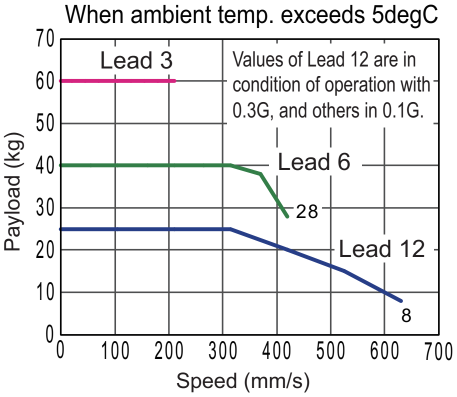


In ambient temp. 5degC or lower

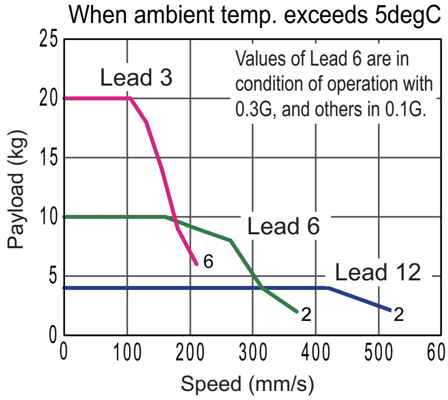


RA6C

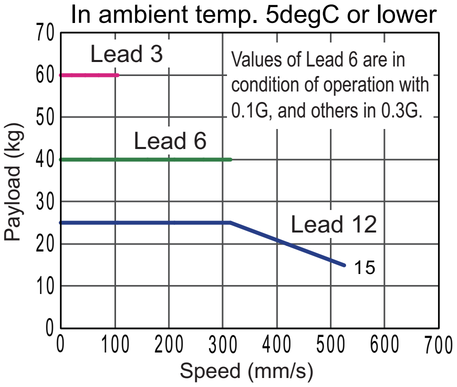
When ambient temp. exceeds 5degC



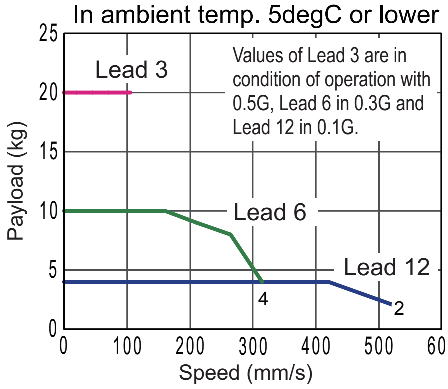
When ambient temp. exceeds 5degC



In ambient temp. 5degC or lower



In ambient temp. 5degC or lower

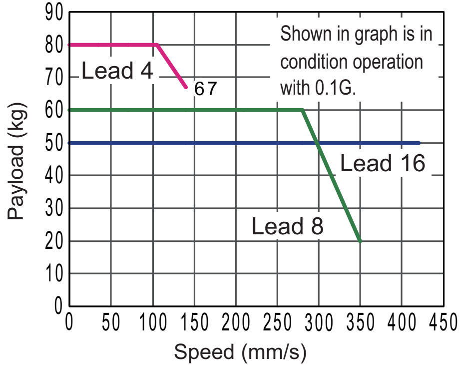


Correlation diagram of speed and payload for the RCP6W dust and drip proof rod type (High output effective)

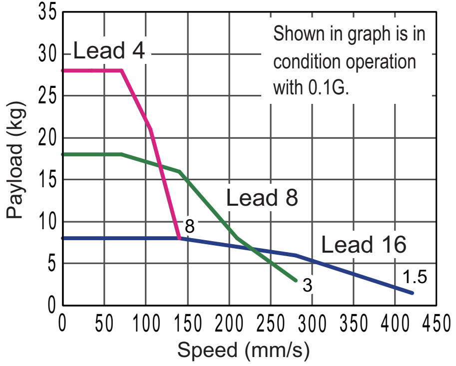
Horizontal installation | **Vertical installation**

RA7C

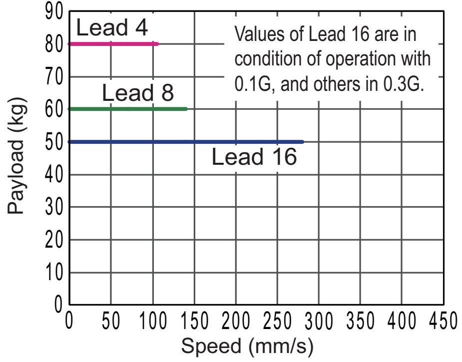
When ambient temp. exceeds 5degC



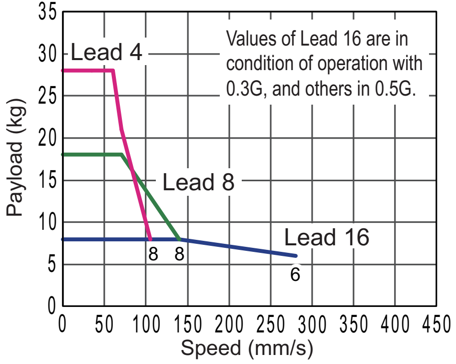
When ambient temp. exceeds 5degC



In ambient temp. 5degC or lower

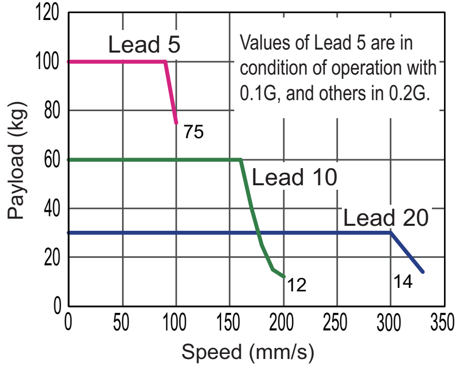


In ambient temp. 5degC or lower

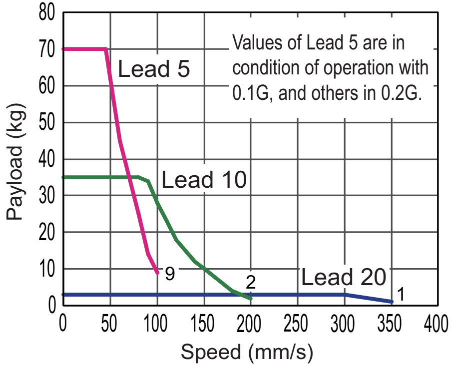


RA8C

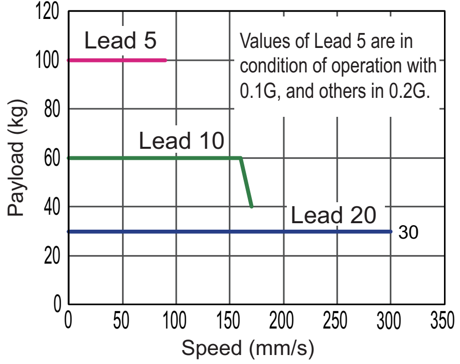
When ambient temp. exceeds 5degC



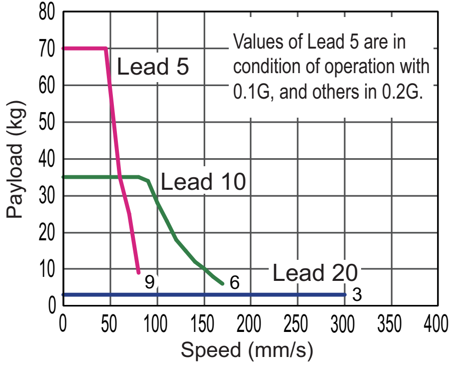
When ambient temp. exceeds 5degC



In ambient temp. 5degC or lower



In ambient temp. 5degC or lower

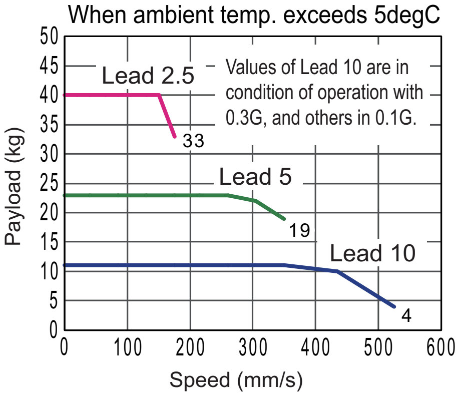


Correlation diagram of speed and payload for the RCP6W dust and drip proof rod type (High output effective / Motor-reversing type)

Horizontal installation	Vertical installation

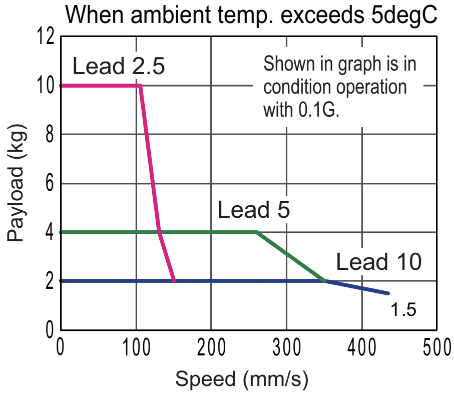
RA4R

When ambient temp. exceeds 5degC



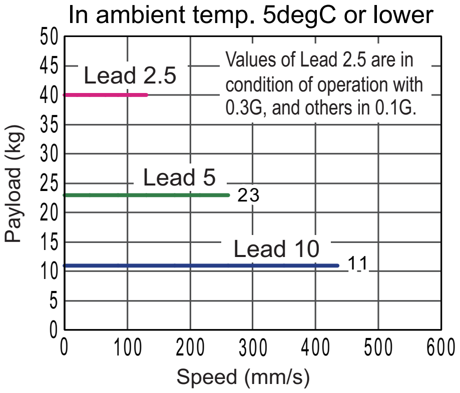
Values of Lead 10 are in condition of operation with 0.3G, and others in 0.1G.

When ambient temp. exceeds 5degC



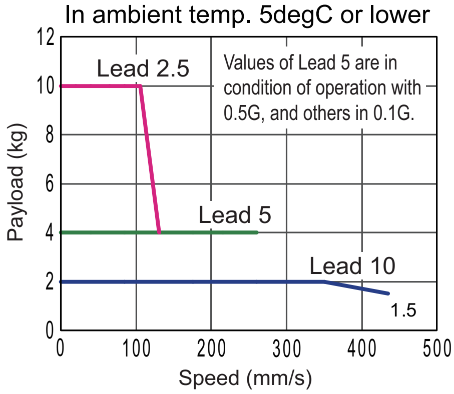
Shown in graph is in condition operation with 0.1G.

In ambient temp. 5degC or lower



Values of Lead 2.5 are in condition of operation with 0.3G, and others in 0.1G.

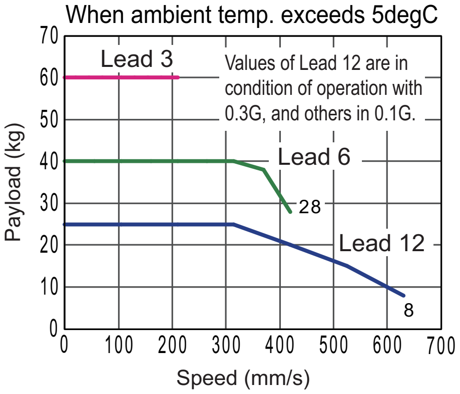
In ambient temp. 5degC or lower



Values of Lead 5 are in condition of operation with 0.5G, and others in 0.1G.

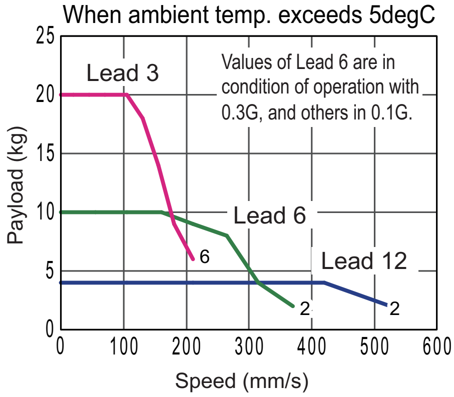
RA6R

When ambient temp. exceeds 5degC



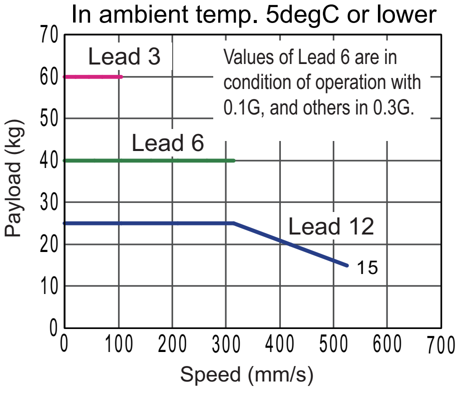
Values of Lead 12 are in condition of operation with 0.3G, and others in 0.1G.

When ambient temp. exceeds 5degC



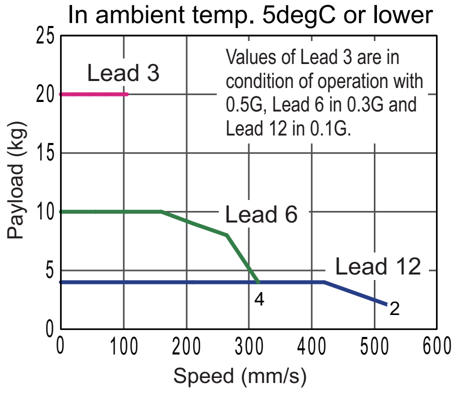
Values of Lead 6 are in condition of operation with 0.3G, and others in 0.1G.

In ambient temp. 5degC or lower



Values of Lead 6 are in condition of operation with 0.1G, and others in 0.3G.

In ambient temp. 5degC or lower



Values of Lead 3 are in condition of operation with 0.5G, Lead 6 in 0.3G and Lead 12 in 0.1G.

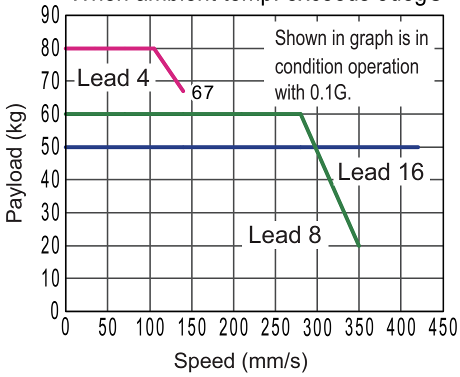
Correlation diagram of speed and payload for the RCP6W dust and drip proof rod type (High output effective / Motor-reversing type)

Horizontal installation

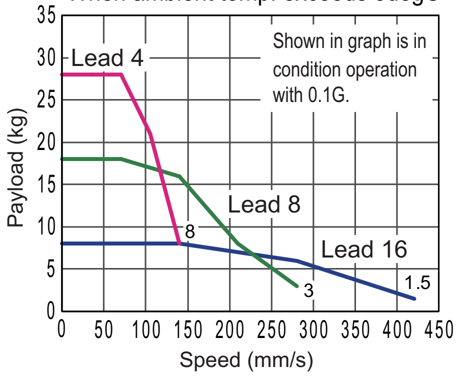
Vertical installation

RA7R

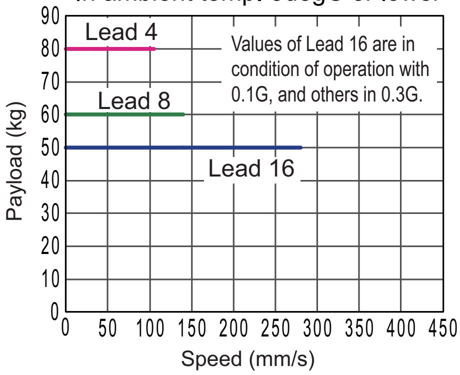
When ambient temp. exceeds 5degC



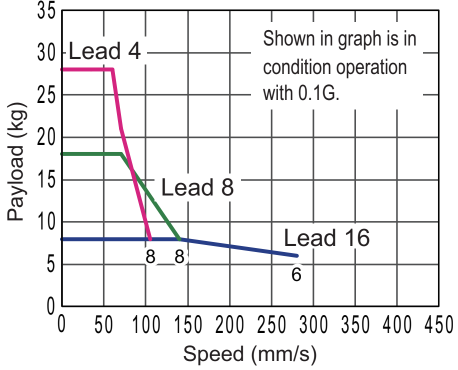
When ambient temp. exceeds 5degC



In ambient temp. 5degC or lower

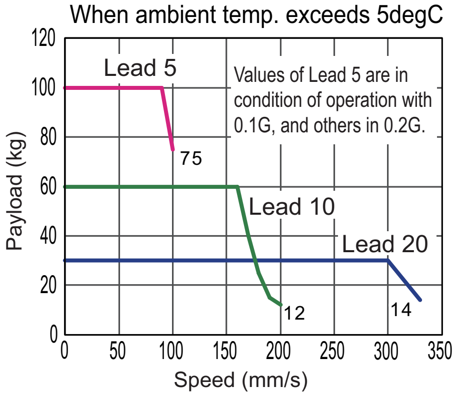


In ambient temp. 5degC or lower

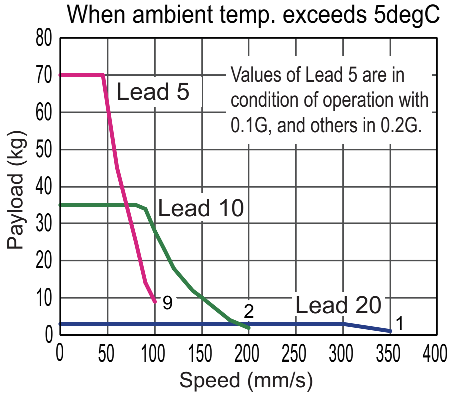


RA8R

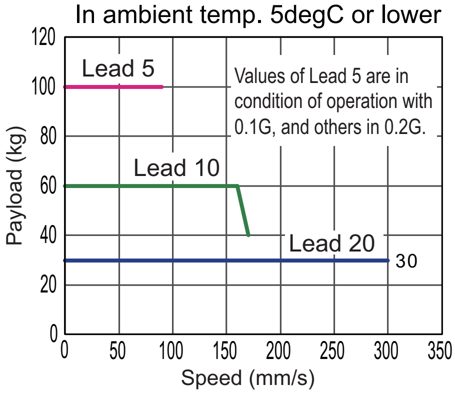
When ambient temp. exceeds 5degC



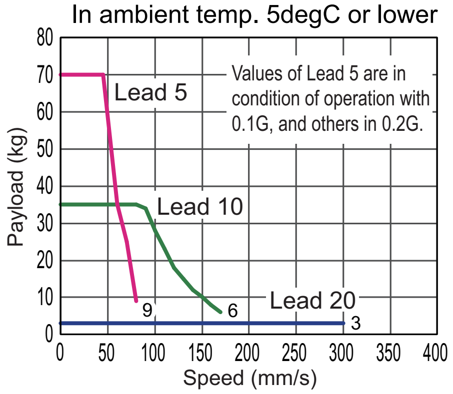
When ambient temp. exceeds 5degC



In ambient temp. 5degC or lower



In ambient temp. 5degC or lower

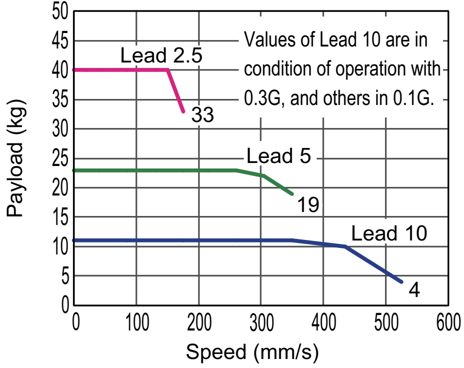


Correlation diagram of speed and payload for the RCP6W dust and drip proof radial cylinder type (High output effective)

Horizontal installation | **Vertical installation**

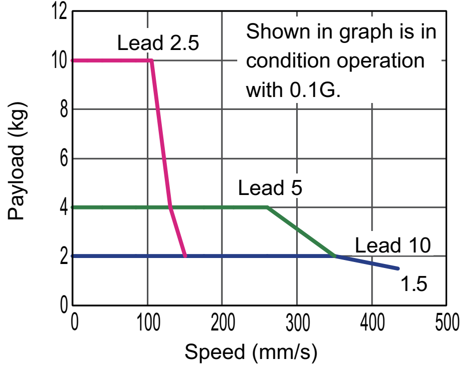
RRA4C

When ambient temp. exceeds 5degC



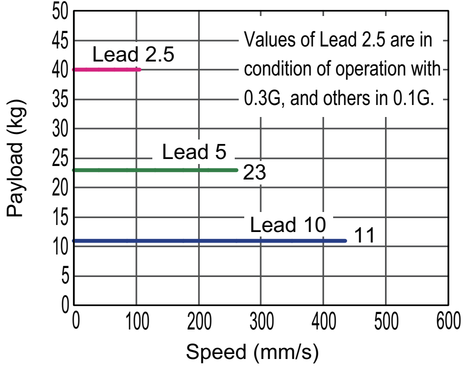
Values of Lead 10 are in condition of operation with 0.3G, and others in 0.1G.

When ambient temp. exceeds 5degC



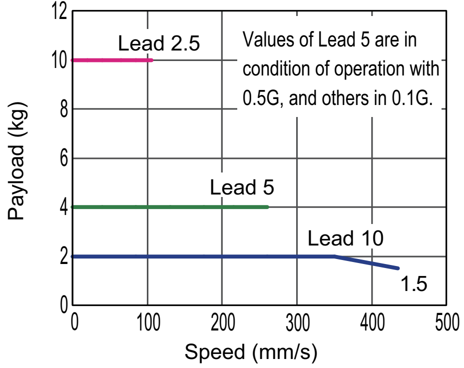
Shown in graph is in condition operation with 0.1G.

In ambient temp. 5degC or lower



Values of Lead 2.5 are in condition of operation with 0.3G, and others in 0.1G.

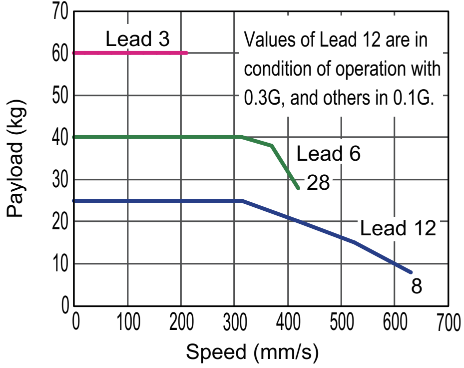
In ambient temp. 5degC or lower



Values of Lead 5 are in condition of operation with 0.5G, and others in 0.1G.

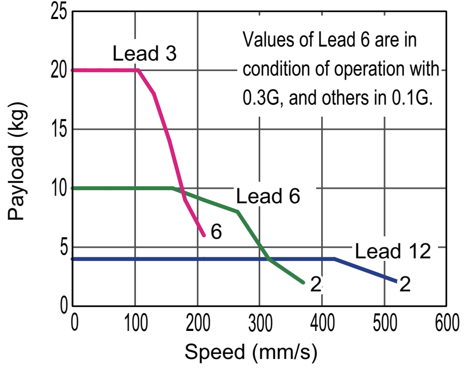
RRA6C

When ambient temp. exceeds 5degC



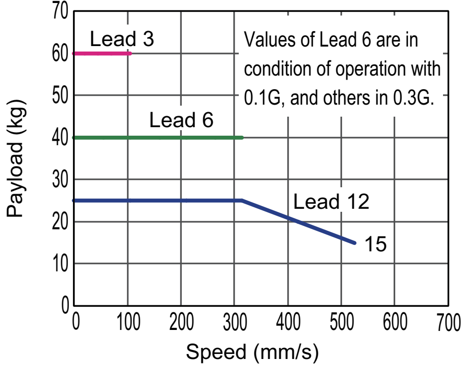
Values of Lead 12 are in condition of operation with 0.3G, and others in 0.1G.

When ambient temp. exceeds 5degC



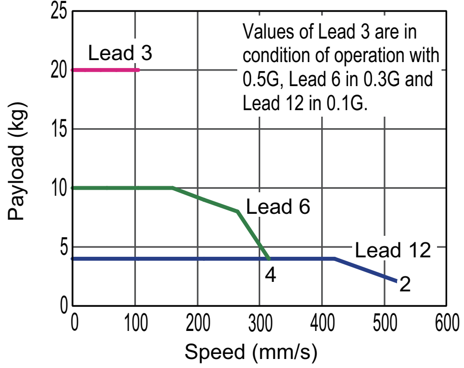
Values of Lead 6 are in condition of operation with 0.3G, and others in 0.1G.

In ambient temp. 5degC or lower



Values of Lead 6 are in condition of operation with 0.1G, and others in 0.3G.

In ambient temp. 5degC or lower

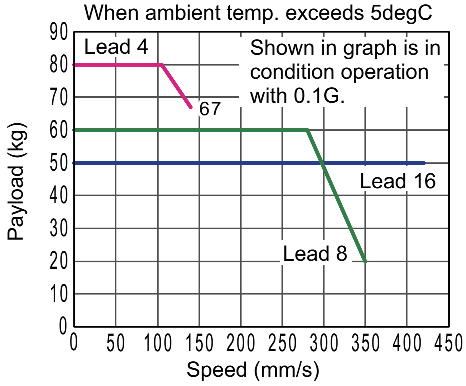


Values of Lead 3 are in condition of operation with 0.5G, Lead 6 in 0.3G and Lead 12 in 0.1G.

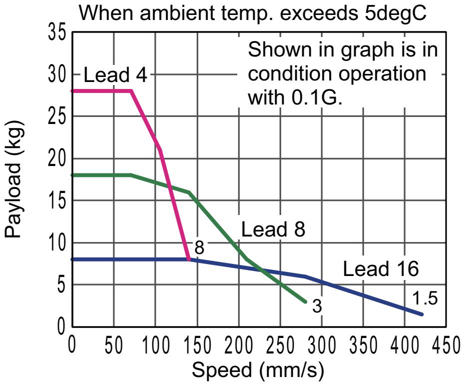
Correlation diagram of speed and payload for the RCP6W dust and drip proof radial cylinder type (High output effective)

Horizontal installation | **Vertical installation**

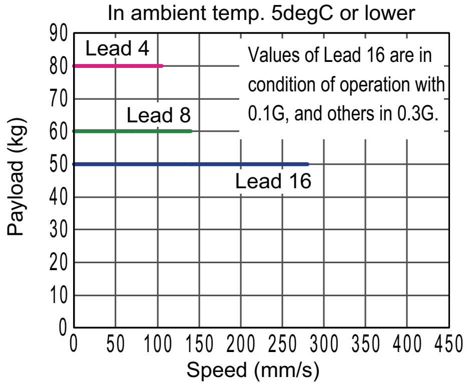
RRA7C


When ambient temp. exceeds 5degC

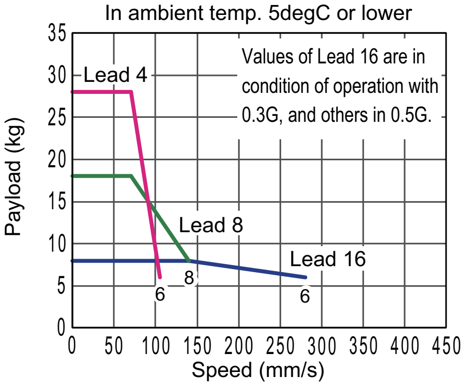
Shown in graph is in condition operation with 0.1G.


When ambient temp. exceeds 5degC

Shown in graph is in condition operation with 0.1G.

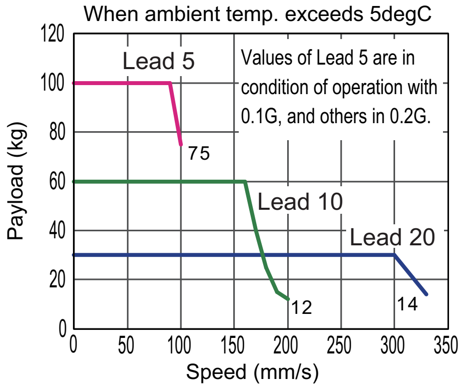

In ambient temp. 5degC or lower

Values of Lead 16 are in condition of operation with 0.1G, and others in 0.3G.

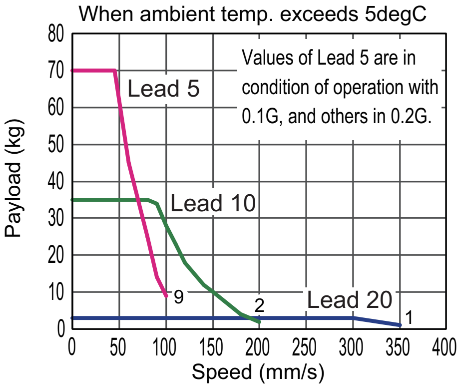

In ambient temp. 5degC or lower

Values of Lead 16 are in condition of operation with 0.3G, and others in 0.5G.

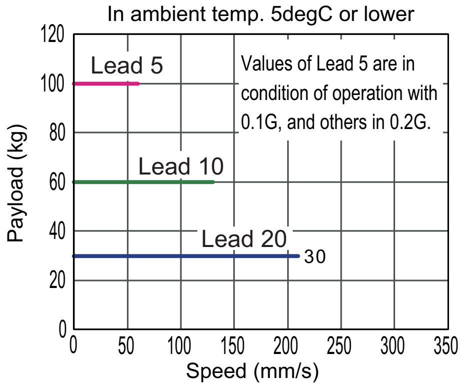
RRA8C


When ambient temp. exceeds 5degC

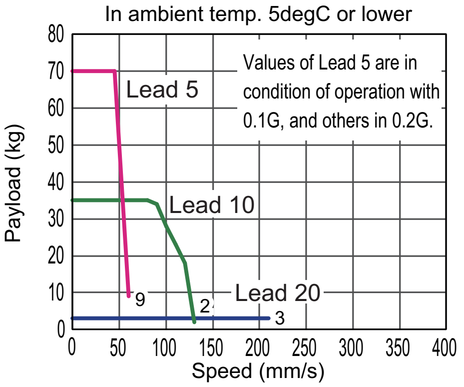
Values of Lead 5 are in condition of operation with 0.1G, and others in 0.2G.


When ambient temp. exceeds 5degC

Values of Lead 5 are in condition of operation with 0.1G, and others in 0.2G.


In ambient temp. 5degC or lower

Values of Lead 5 are in condition of operation with 0.1G, and others in 0.2G.


In ambient temp. 5degC or lower

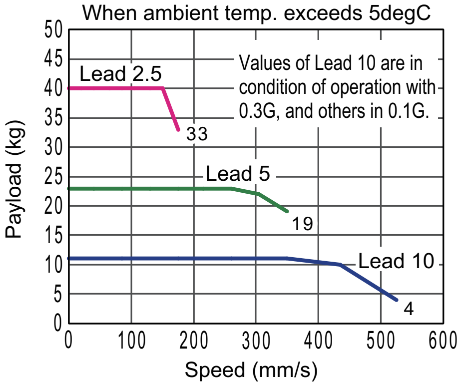
Values of Lead 5 are in condition of operation with 0.1G, and others in 0.2G.

Correlation diagram of speed and payload for the RCP6W dust and drip proof radial cylinder type (High output effective / Motor-reversing type)

Horizontal installation | **Vertical installation**

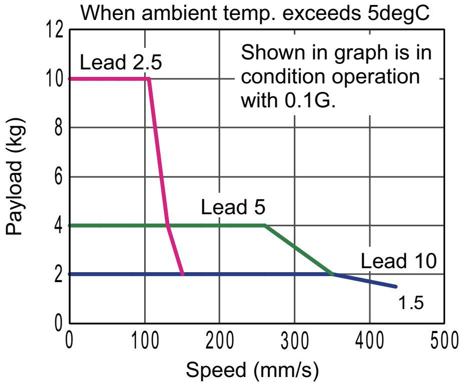
RRA4R

When ambient temp. exceeds 5degC



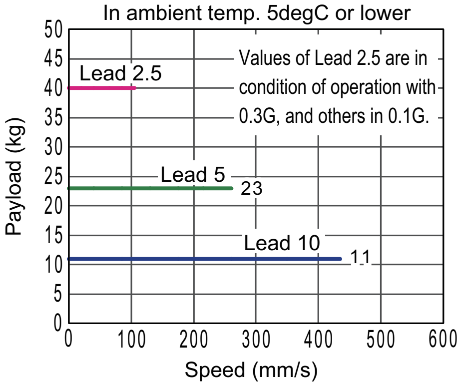
Values of Lead 10 are in condition of operation with 0.3G, and others in 0.1G.

When ambient temp. exceeds 5degC



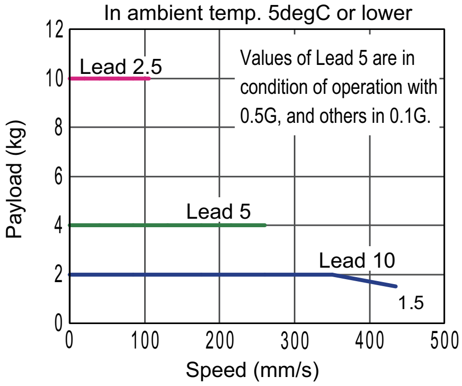
Shown in graph is in condition operation with 0.1G.

In ambient temp. 5degC or lower



Values of Lead 2.5 are in condition of operation with 0.3G, and others in 0.1G.

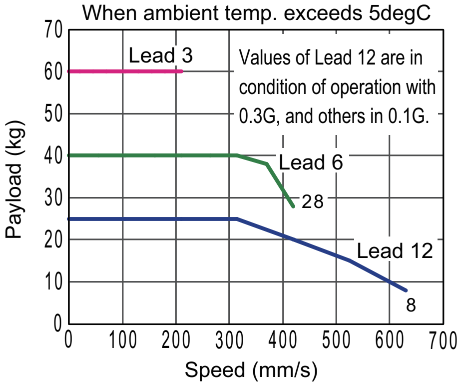
In ambient temp. 5degC or lower



Values of Lead 5 are in condition of operation with 0.5G, and others in 0.1G.

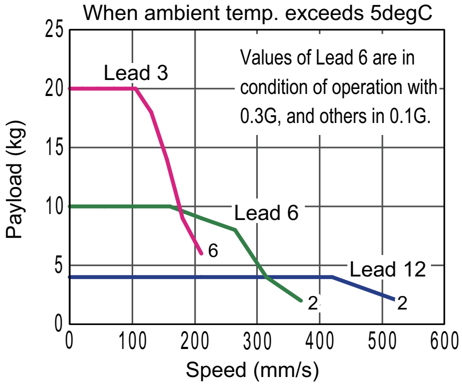
RRA6R

When ambient temp. exceeds 5degC



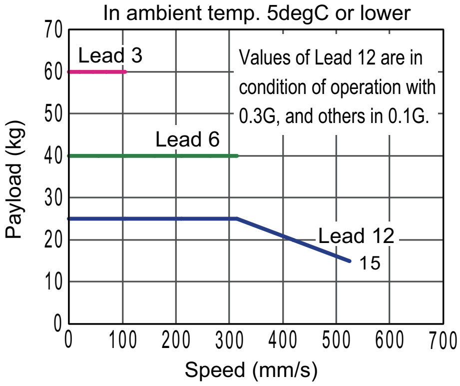
Values of Lead 12 are in condition of operation with 0.3G, and others in 0.1G.

When ambient temp. exceeds 5degC



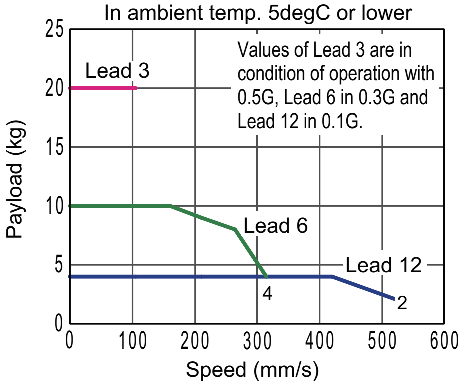
Values of Lead 6 are in condition of operation with 0.3G, and others in 0.1G.

In ambient temp. 5degC or lower



Values of Lead 12 are in condition of operation with 0.3G, and others in 0.1G.

In ambient temp. 5degC or lower



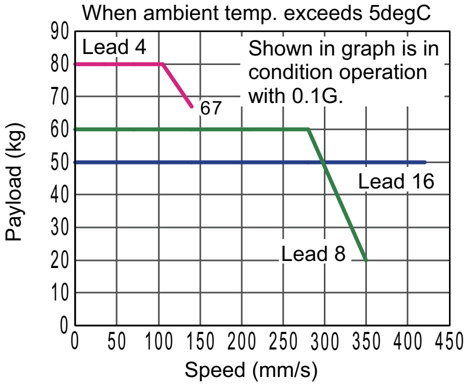
Values of Lead 3 are in condition of operation with 0.5G, Lead 6 in 0.3G and Lead 12 in 0.1G.

Correlation diagram of speed and payload for the RCP6W dust and drip proof radial cylinder type (High output effective / Motor-reversing type)

Horizontal installation | **Vertical installation**

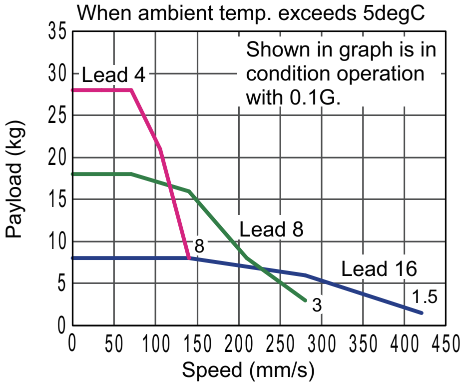
RRA7R

When ambient temp. exceeds 5degC



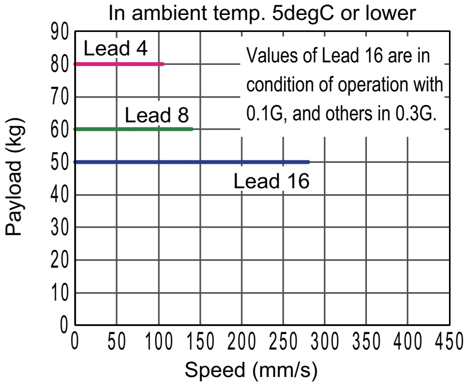
Shown in graph is in condition operation with 0.1G.

When ambient temp. exceeds 5degC



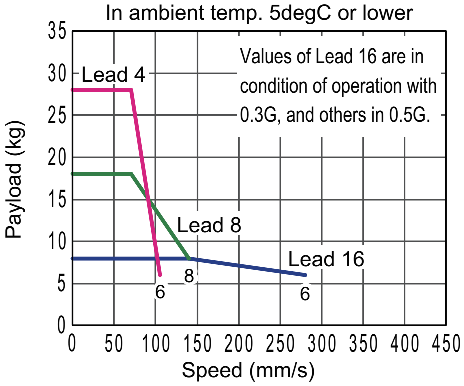
Shown in graph is in condition operation with 0.1G.

In ambient temp. 5degC or lower



Values of Lead 16 are in condition of operation with 0.1G, and others in 0.3G.

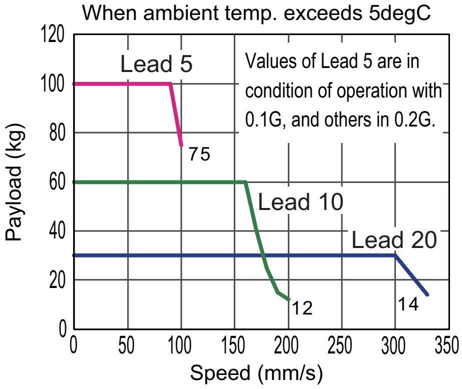
In ambient temp. 5degC or lower



Values of Lead 16 are in condition of operation with 0.3G, and others in 0.5G.

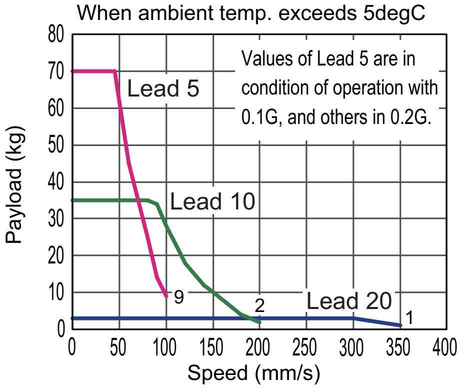
RRA8R

When ambient temp. exceeds 5degC



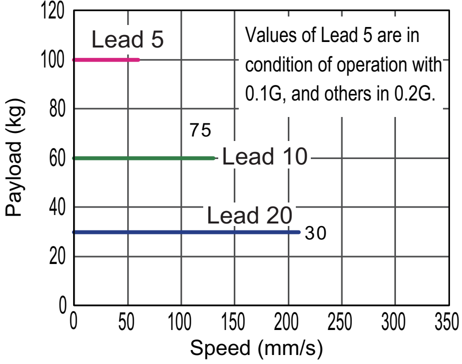
Values of Lead 5 are in condition of operation with 0.1G, and others in 0.2G.

When ambient temp. exceeds 5degC



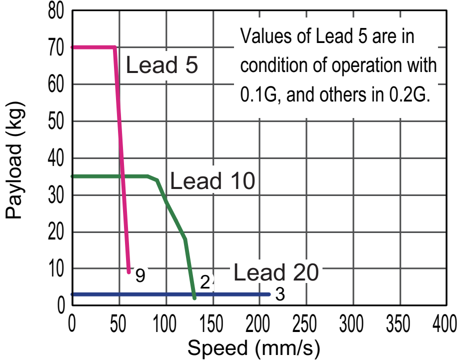
Values of Lead 5 are in condition of operation with 0.1G, and others in 0.2G.

In ambient temp. 5degC or lower



Values of Lead 5 are in condition of operation with 0.1G, and others in 0.2G.

In ambient temp. 5degC or lower

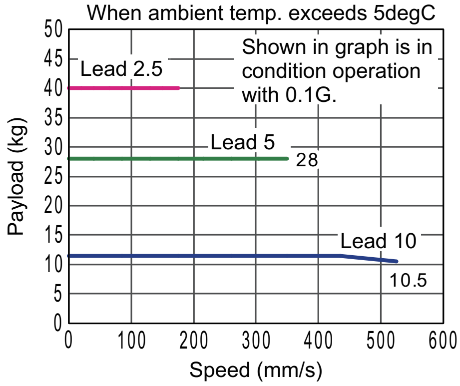


Values of Lead 5 are in condition of operation with 0.1G, and others in 0.2G.

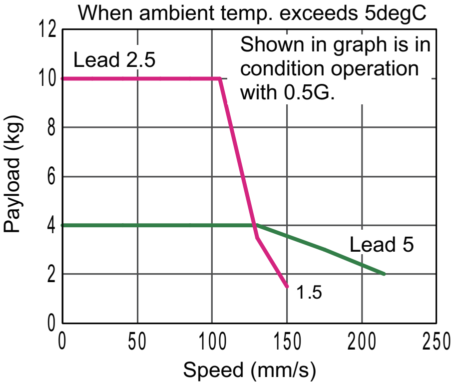
Correlation diagram of speed and payload for the RCP6W dust and drip proof wide radial cylinder type (High output effective)

Horizontal installation | **Vertical installation**

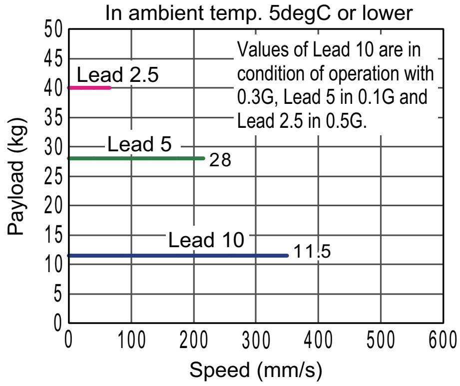
WRA10C


When ambient temp. exceeds 5degC

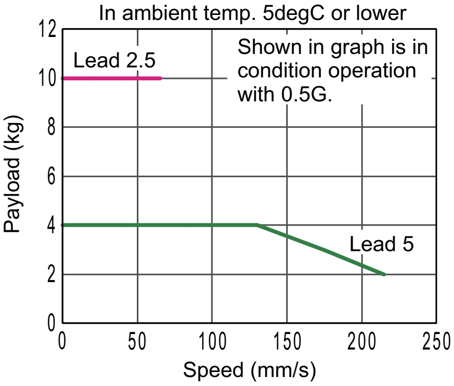
Shown in graph is in condition operation with 0.1G.


When ambient temp. exceeds 5degC

Shown in graph is in condition operation with 0.5G.

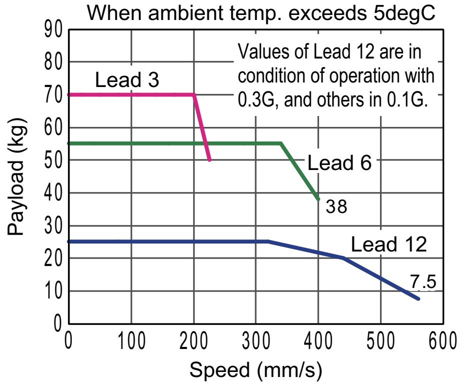

In ambient temp. 5degC or lower

Values of Lead 10 are in condition of operation with 0.3G, Lead 5 in 0.1G and Lead 2.5 in 0.5G.

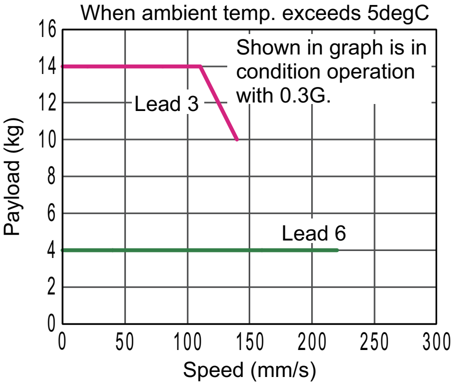

In ambient temp. 5degC or lower

Shown in graph is in condition operation with 0.5G.

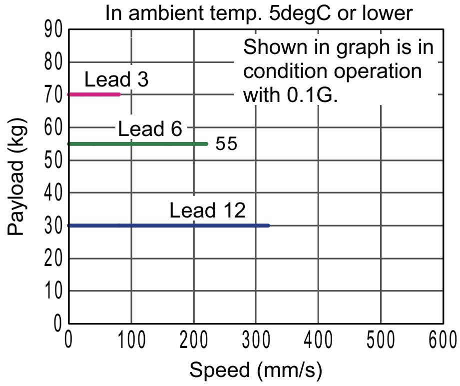
WRA12C


When ambient temp. exceeds 5degC

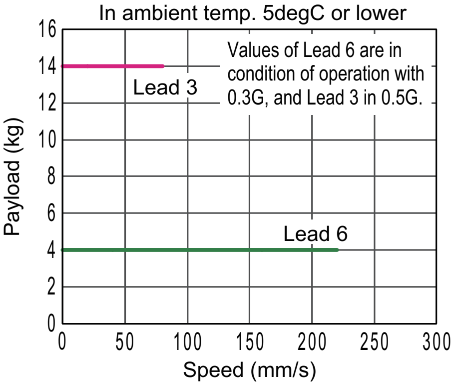
Values of Lead 12 are in condition of operation with 0.3G, and others in 0.1G.


When ambient temp. exceeds 5degC

Shown in graph is in condition operation with 0.3G.


In ambient temp. 5degC or lower

Shown in graph is in condition operation with 0.1G.


In ambient temp. 5degC or lower

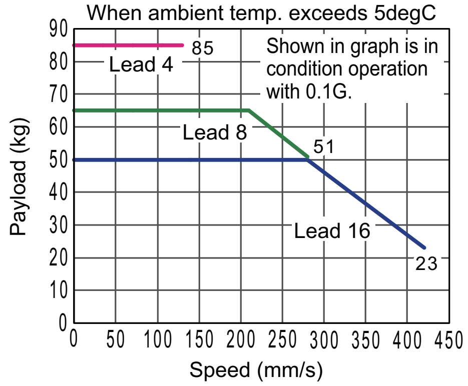
Values of Lead 6 are in condition of operation with 0.3G, and Lead 3 in 0.5G.

Correlation diagram of speed and payload for the RCP6W dust and drip proof wide radial cylinder type (High output effective)

WRA14C

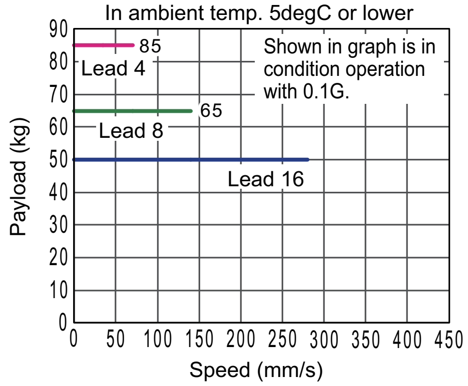
Horizontal installation

When ambient temp. exceeds 5degC



Shown in graph is in condition operation with 0.1G.

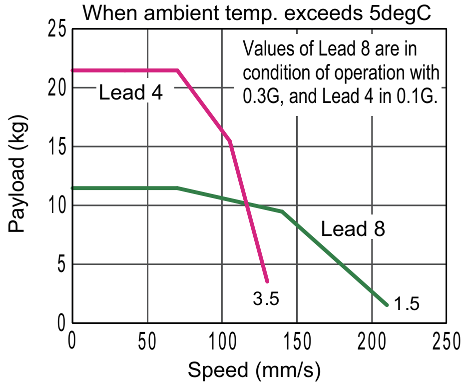
In ambient temp. 5degC or lower



Shown in graph is in condition operation with 0.1G.

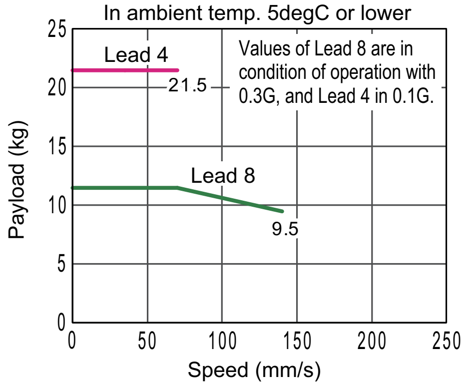
Vertical installation

When ambient temp. exceeds 5degC



Values of Lead 8 are in condition of operation with 0.3G, and Lead 4 in 0.1G.

In ambient temp. 5degC or lower

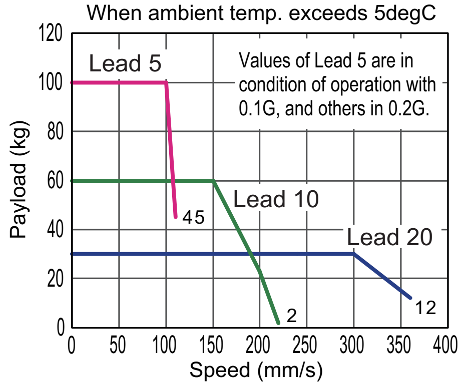


Values of Lead 8 are in condition of operation with 0.3G, and Lead 4 in 0.1G.

WRA16C

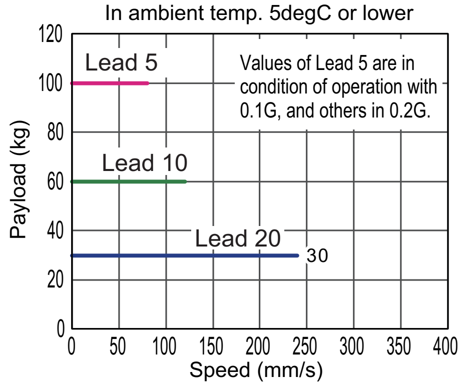
Horizontal installation

When ambient temp. exceeds 5degC



Values of Lead 5 are in condition of operation with 0.1G, and others in 0.2G.

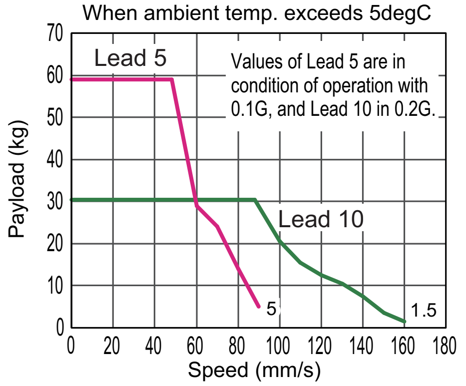
In ambient temp. 5degC or lower



Values of Lead 5 are in condition of operation with 0.1G, and others in 0.2G.

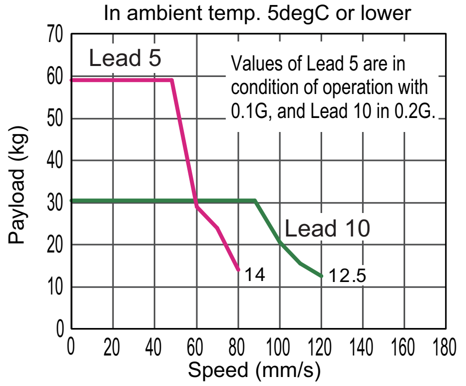
Vertical installation

When ambient temp. exceeds 5degC



Values of Lead 5 are in condition of operation with 0.1G, and Lead 10 in 0.2G.

In ambient temp. 5degC or lower



Values of Lead 5 are in condition of operation with 0.1G, and Lead 10 in 0.2G.

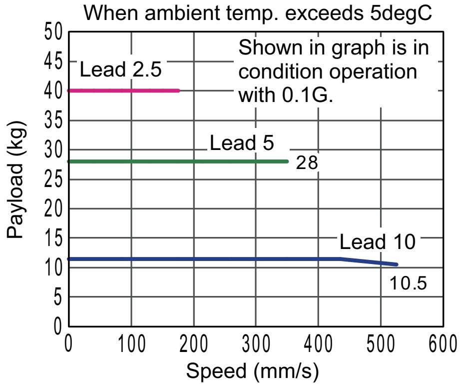
Correlation diagram of speed and payload for the RCP6W dust and drip proof wide radial cylinder type (High output effective / Motor-reversing type)

Horizontal installation

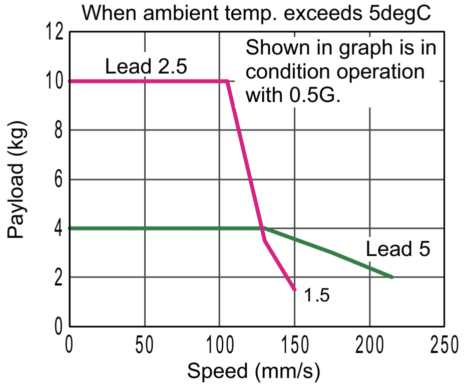
Vertical installation

WRA10R

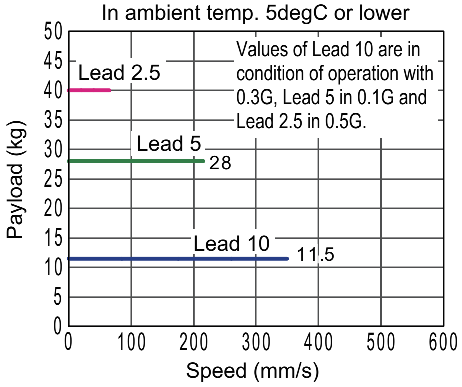
When ambient temp. exceeds 5degC



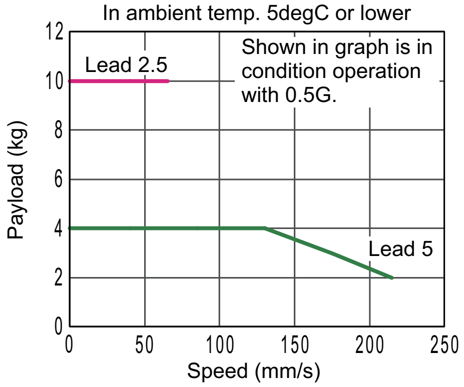
When ambient temp. exceeds 5degC



In ambient temp. 5degC or lower

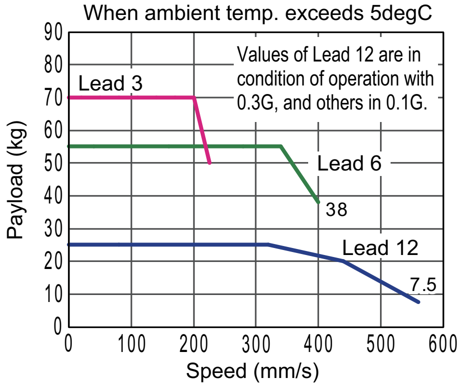


In ambient temp. 5degC or lower

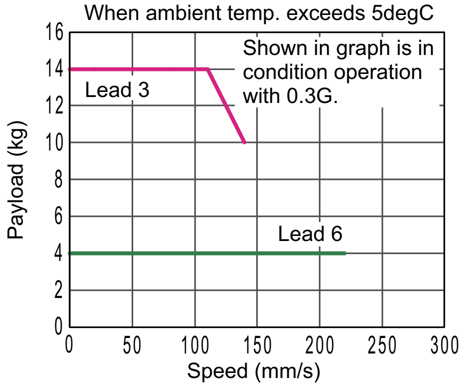


WRA12R

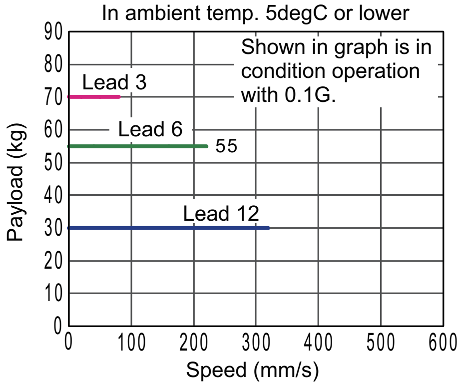
When ambient temp. exceeds 5degC



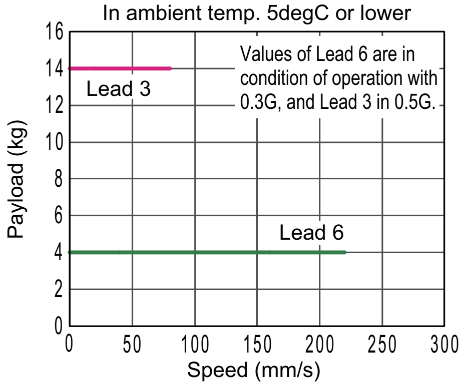
When ambient temp. exceeds 5degC



In ambient temp. 5degC or lower



In ambient temp. 5degC or lower



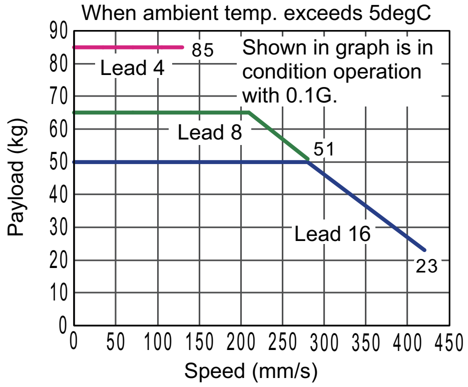
Correlation diagram of speed and payload for the RCP6W dust and drip proof wide radial cylinder type (High output effective / Motor-reversing type)

Horizontal installation

Vertical installation

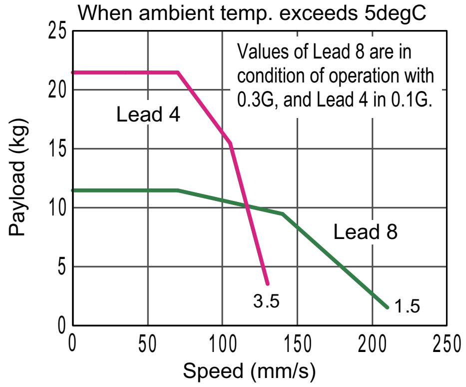
WRA14R

When ambient temp. exceeds 5degC



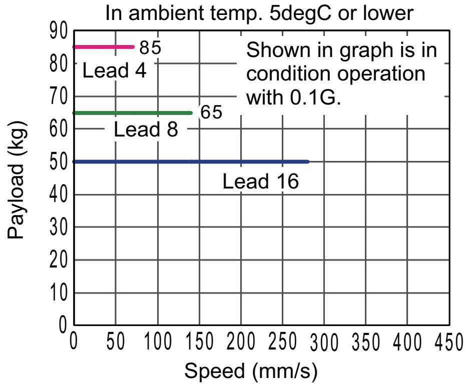
Shown in graph is in condition operation with 0.1G.

When ambient temp. exceeds 5degC



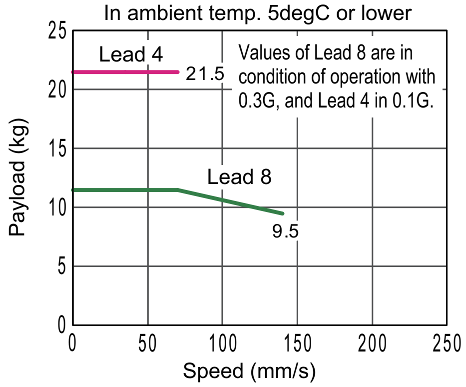
Values of Lead 8 are in condition of operation with 0.3G, and Lead 4 in 0.1G.

In ambient temp. 5degC or lower



Shown in graph is in condition operation with 0.1G.

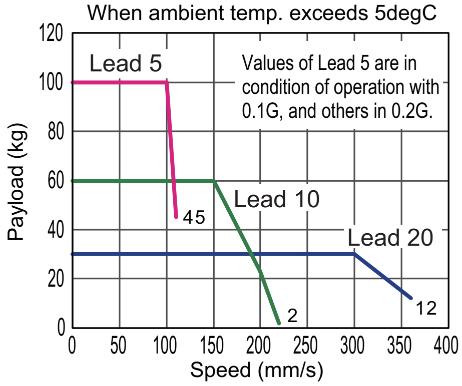
In ambient temp. 5degC or lower



Values of Lead 8 are in condition of operation with 0.3G, and Lead 4 in 0.1G.

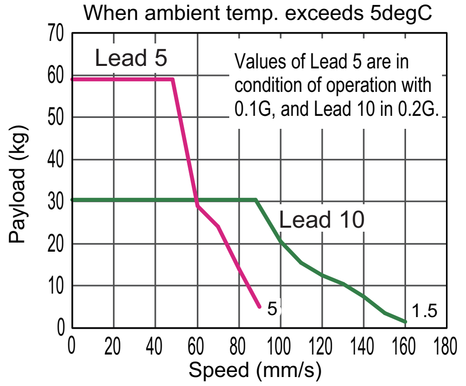
WRA16R

When ambient temp. exceeds 5degC



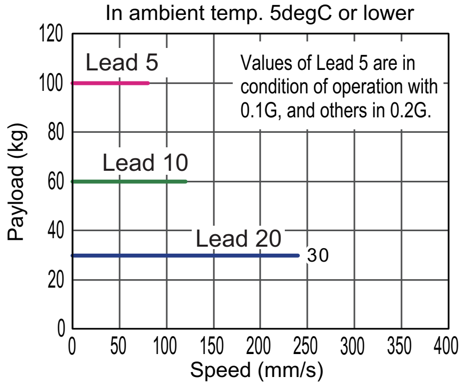
Values of Lead 5 are in condition of operation with 0.1G, and others in 0.2G.

When ambient temp. exceeds 5degC



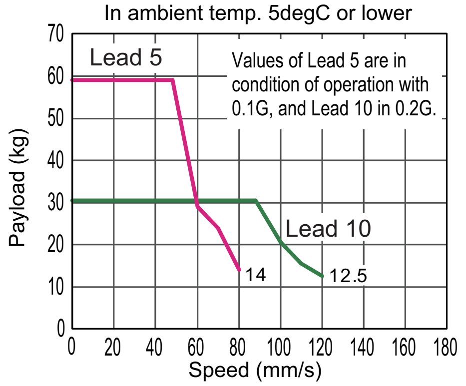
Values of Lead 5 are in condition of operation with 0.1G, and Lead 10 in 0.2G.

In ambient temp. 5degC or lower



Values of Lead 5 are in condition of operation with 0.1G, and others in 0.2G.

In ambient temp. 5degC or lower

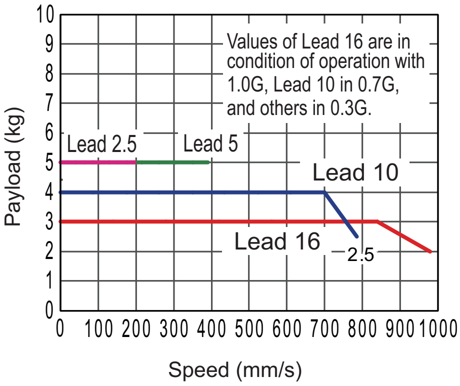


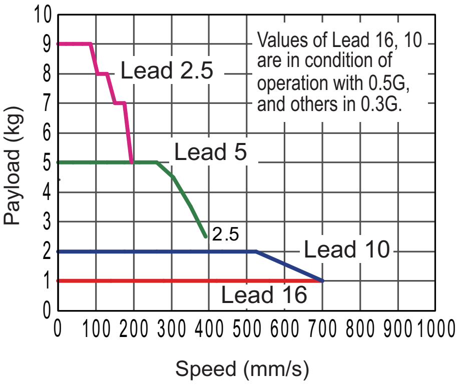
Values of Lead 5 are in condition of operation with 0.1G, and Lead 10 in 0.2G.

Correlation diagram of speed and payload for the RCP6 table type (High output effective)

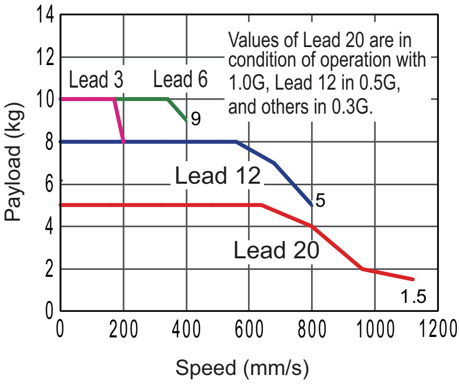
Horizontal installation | **Vertical installation**

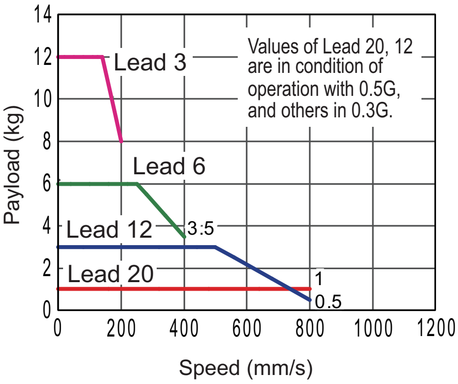
TA4C (Single block type)



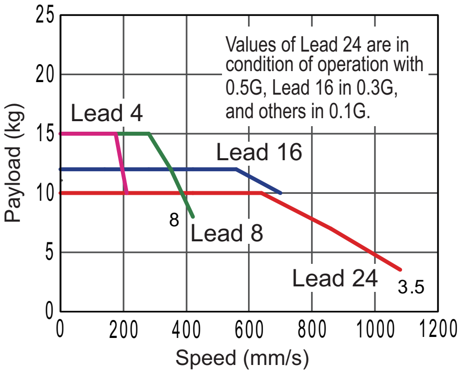


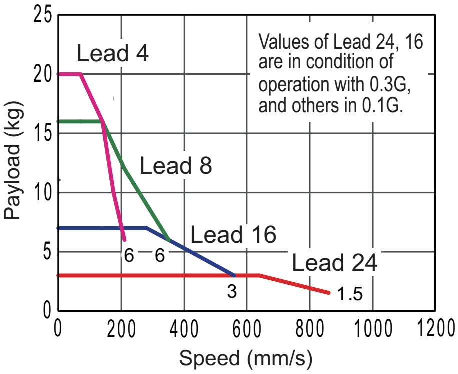
TA6C (Single block type)





TA7C (Single block type)

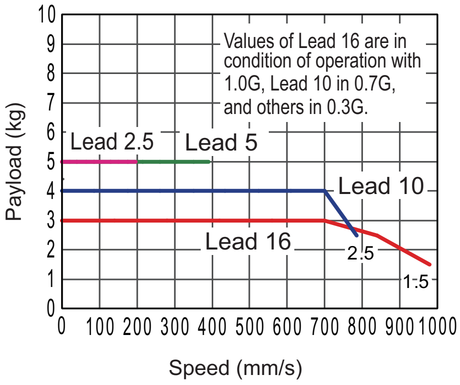


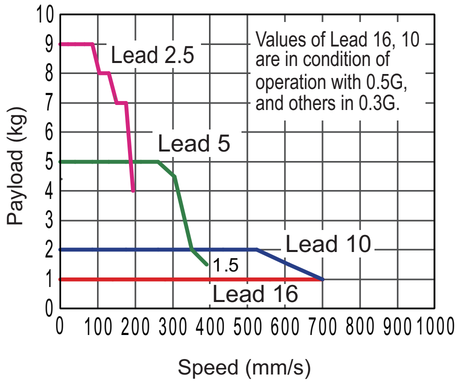


Correlation diagram of speed and payload for the RCP6 table type (High output effective / Motor-reversing type)

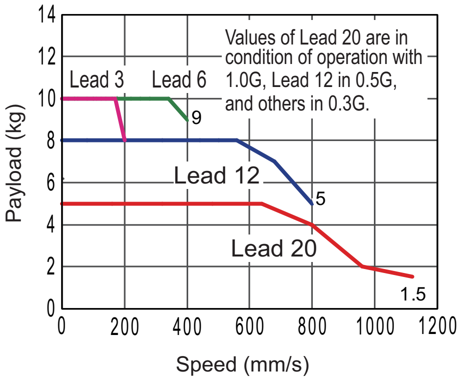
Horizontal installation | **Vertical installation**

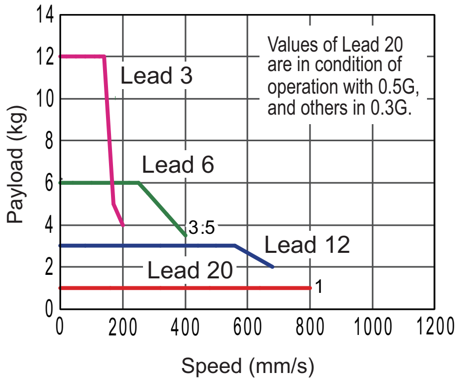
TA4R (Single block type)


Values of Lead 16 are in condition of operation with 1.0G, Lead 10 in 0.7G, and others in 0.3G.

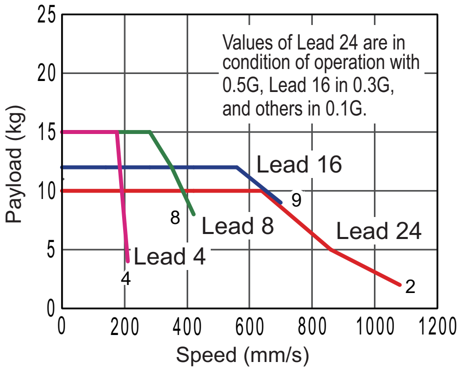

Values of Lead 16, 10 are in condition of operation with 0.5G, and others in 0.3G.

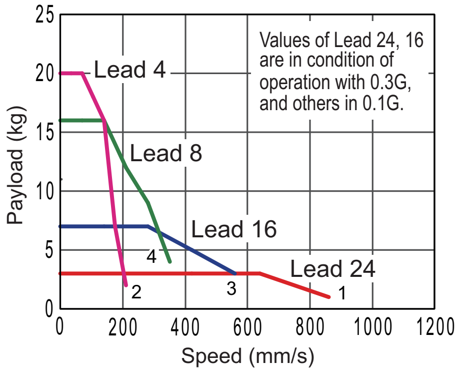
TA6R (Single block type)


Values of Lead 20 are in condition of operation with 1.0G, Lead 12 in 0.5G, and others in 0.3G.


Values of Lead 20 are in condition of operation with 0.5G, and others in 0.3G.

TA7R (Single block type)

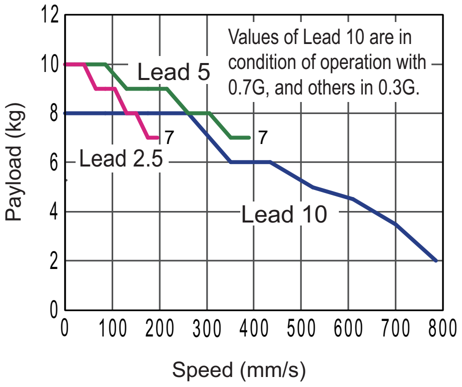

Values of Lead 24 are in condition of operation with 0.5G, Lead 16 in 0.3G, and others in 0.1G.

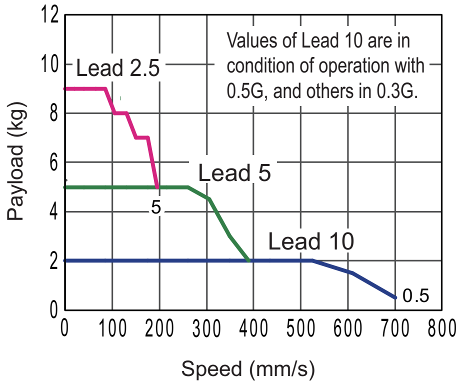

Values of Lead 24, 16 are in condition of operation with 0.3G, and others in 0.1G.

Correlation diagram of speed and payload for the RCP6 table type (High output effective)

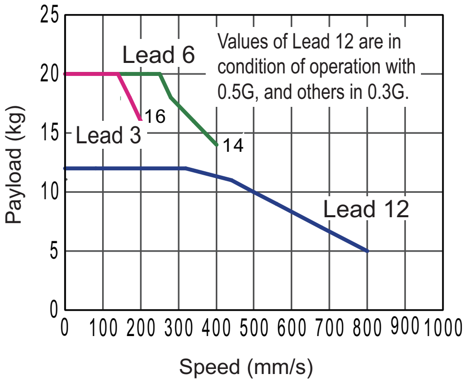
Horizontal installation | **Vertical installation**

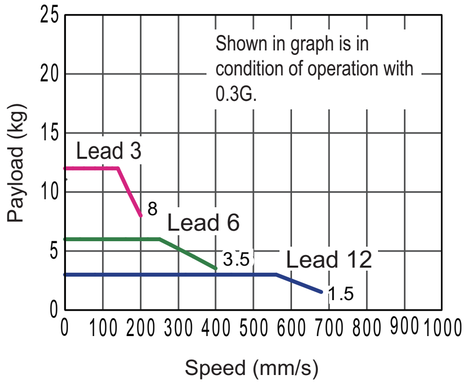
TA4C (Double block type)



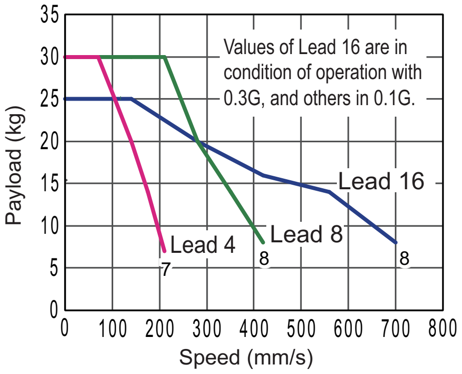


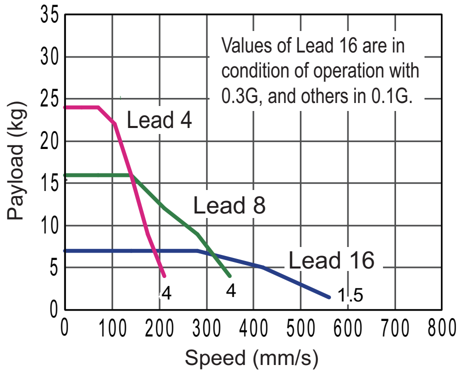
TA6C (Double block type)





TA7C (Double block type)

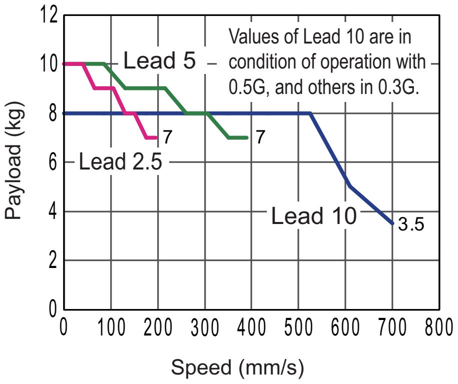


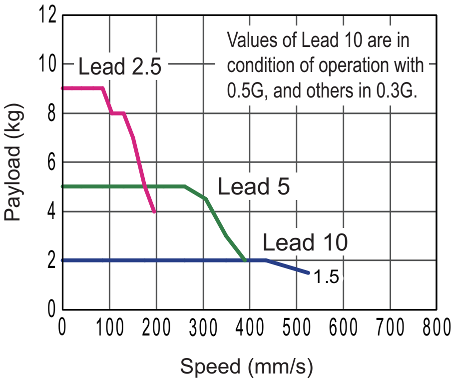


Correlation diagram of speed and payload for the RCP6 table type (High output effective / Motor-reversing type)

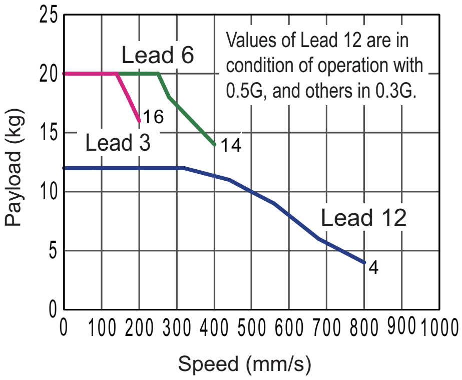
Horizontal installation | **Vertical installation**

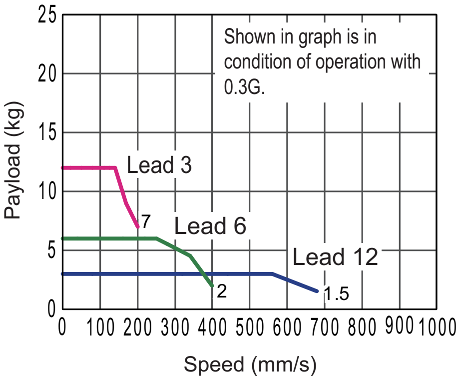
TA4R (Double block type)


Values of Lead 10 are in condition of operation with 0.5G, and others in 0.3G.

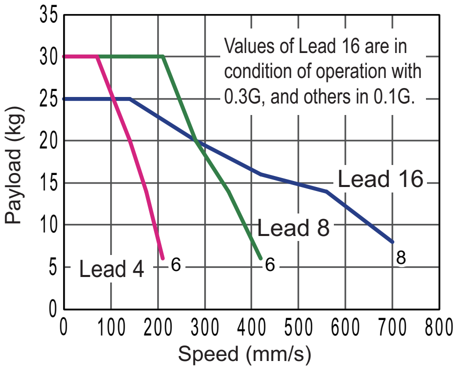

Values of Lead 10 are in condition of operation with 0.5G, and others in 0.3G.

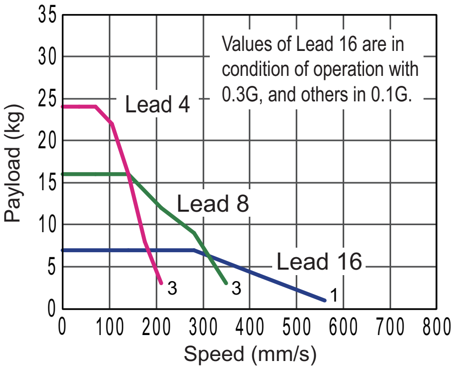
TA6R (Double block type)


Values of Lead 12 are in condition of operation with 0.5G, and others in 0.3G.


Shown in graph is in condition of operation with 0.3G.

TA7R (Double block type)


Values of Lead 16 are in condition of operation with 0.3G, and others in 0.1G.

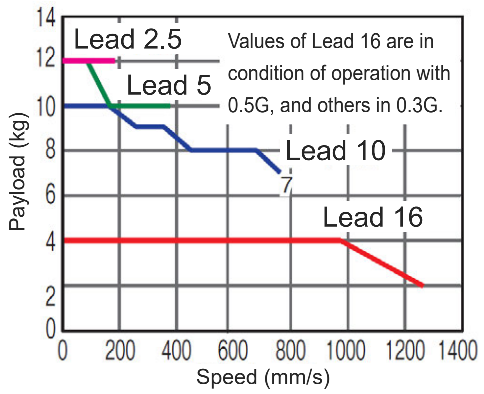

Values of Lead 16 are in condition of operation with 0.3G, and others in 0.1G.

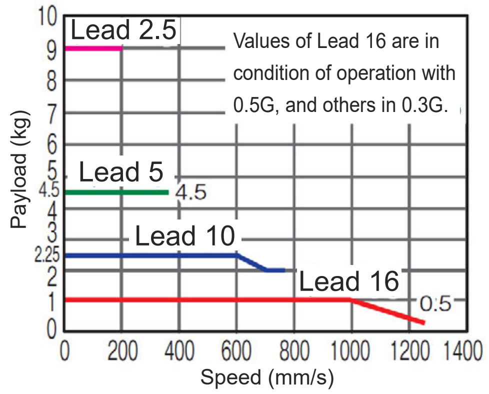
Correlation diagram of speed and payload for the RCP5 slider type (High output effective)

*** Characteristics should be the same for Cleanroom type.**

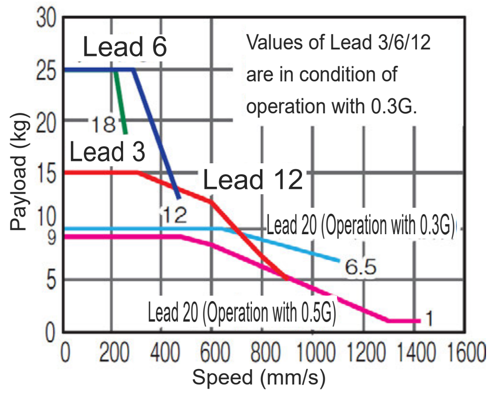
Horizontal installation | **Vertical installation**

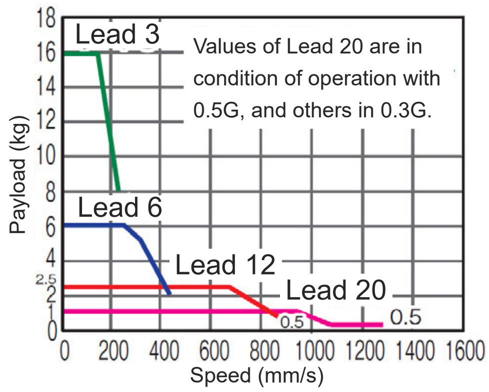
SA4C


Values of Lead 16 are in condition of operation with 0.5G, and others in 0.3G.

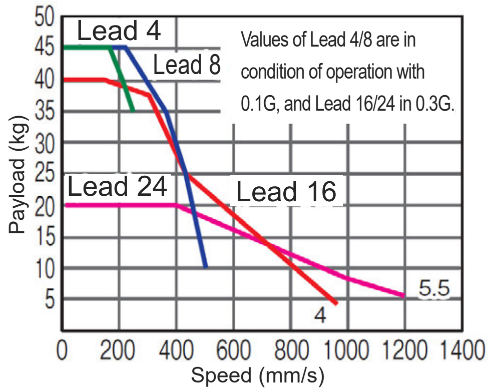

Values of Lead 16 are in condition of operation with 0.5G, and others in 0.3G.

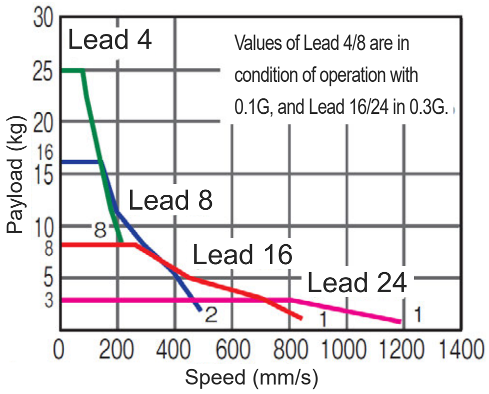
SA6C


Values of Lead 3/6/12 are in condition of operation with 0.3G.


Values of Lead 20 are in condition of operation with 0.5G, and others in 0.3G.

SA7C


Values of Lead 4/8 are in condition of operation with 0.1G, and Lead 16/24 in 0.3G.

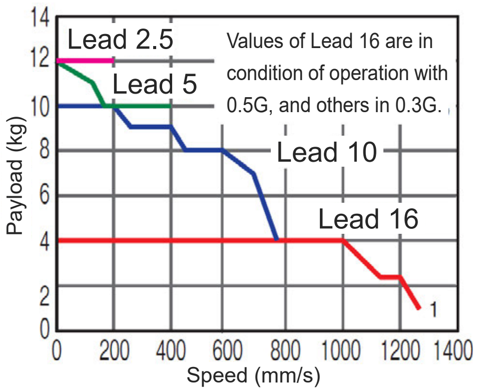

Values of Lead 4/8 are in condition of operation with 0.1G, and Lead 16/24 in 0.3G.

Correlation diagram of speed and payload for the RCP5 slider type (High output effective / Motor-reversing type)

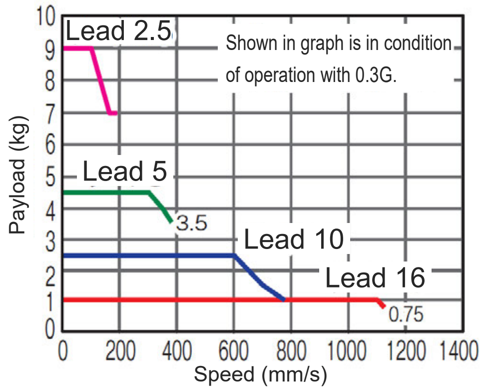
Horizontal installation

Vertical installation

SA4R

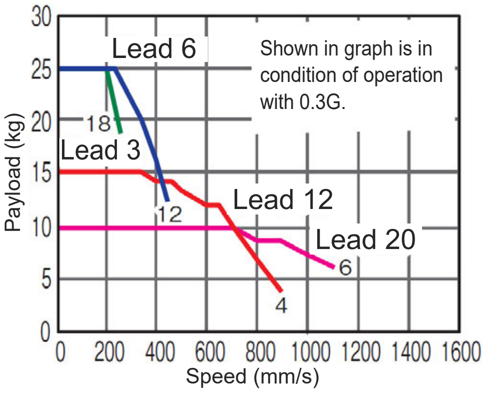


Values of Lead 16 are in condition of operation with 0.5G, and others in 0.3G.

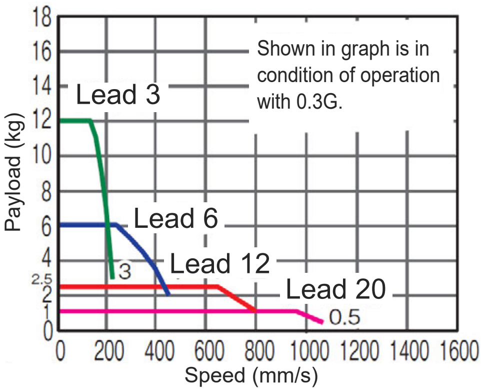


Shown in graph is in condition of operation with 0.3G.

SA6R

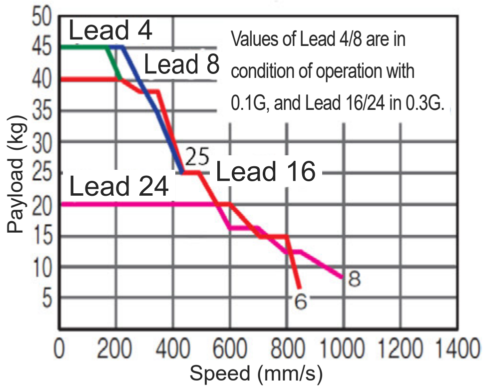


Shown in graph is in condition of operation with 0.3G.

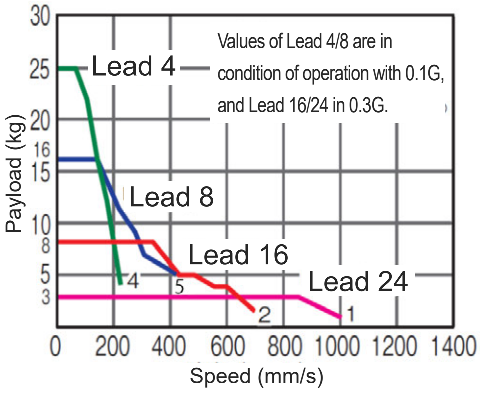


Shown in graph is in condition of operation with 0.3G.

SA7R



Values of Lead 4/8 are in condition of operation with 0.1G, and Lead 16/24 in 0.3G.

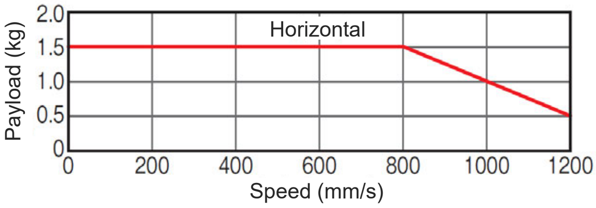


Values of Lead 4/8 are in condition of operation with 0.1G, and Lead 16/24 in 0.3G.

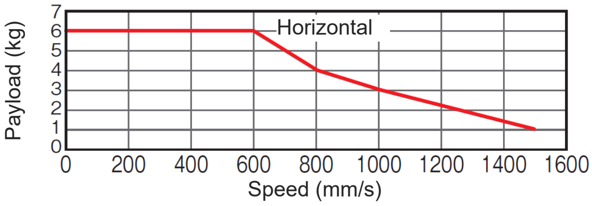
Correlation diagram of speed and payload for the RCP5 belt type (High output effective)

Horizontal installation (* Not Available for Vertical Installation)

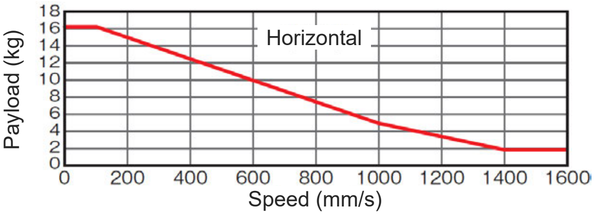
BA4(U)



BA6(U)



BA7(U)

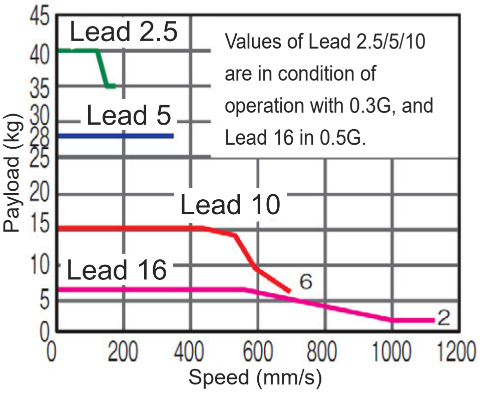


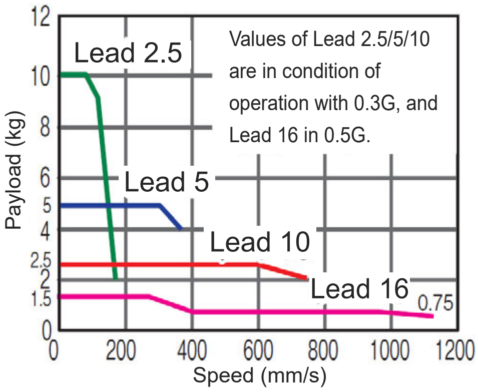
Correlation diagram of speed and payload for the RCP5 rod type (High output effective)

Horizontal installation

Vertical installation

RA4C



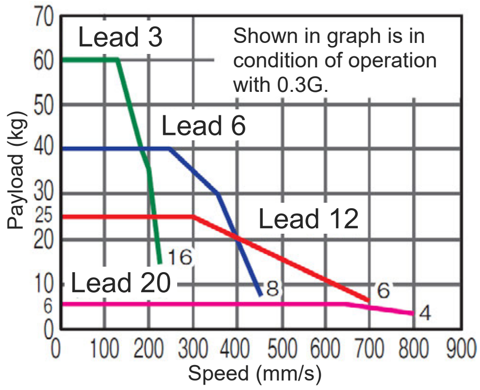


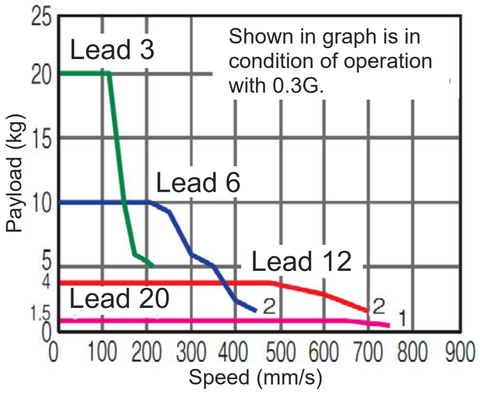
Correlation diagram of speed and payload for the RCP5 rod type (High output effective)

Horizontal installation

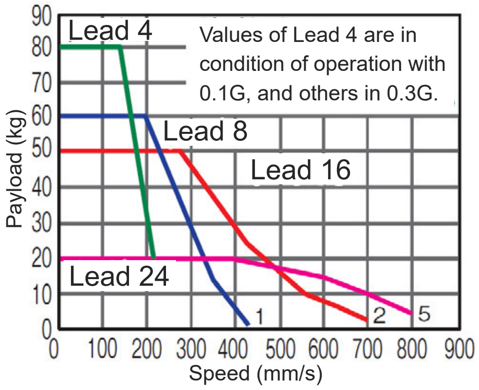
Vertical installation

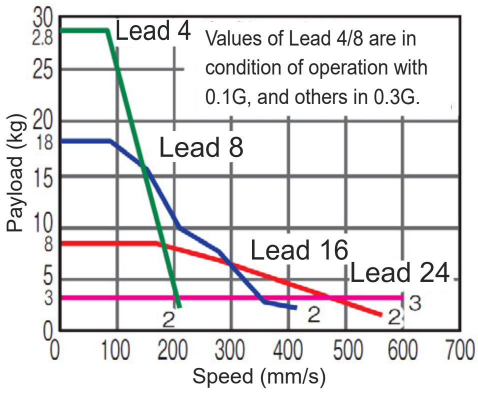
RA6C





RA7C



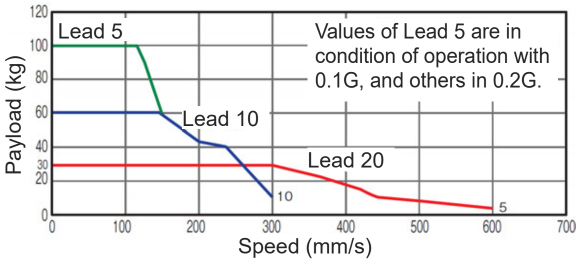


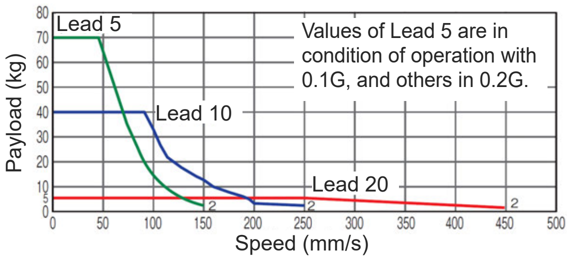
Correlation diagram of speed and payload for the RCP5 rod type

Horizontal installation

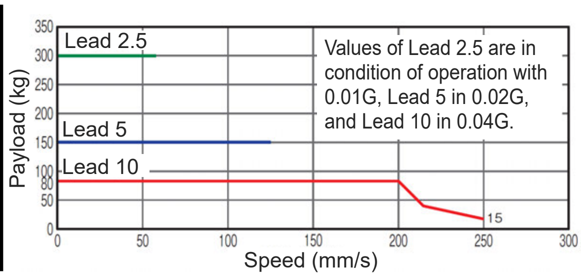
Vertical installation

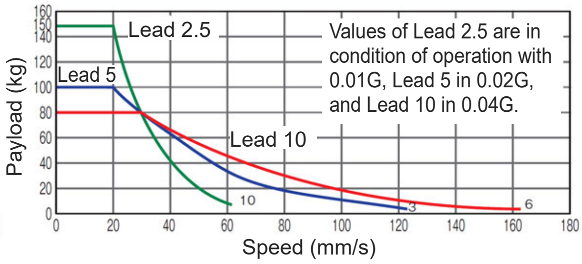
RA8C





RA10C

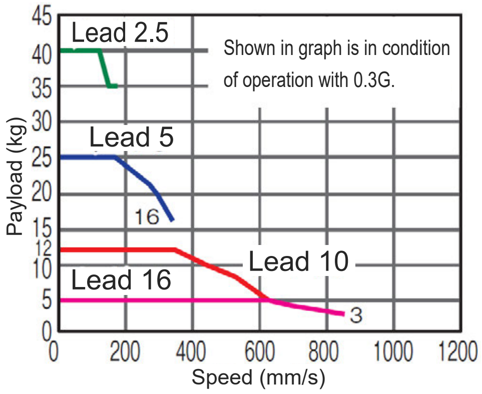




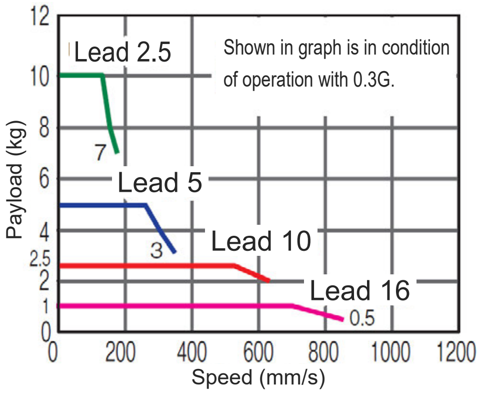
Correlation diagram of speed and payload for the RCP5 rod type (High output effective / Motor-reversing type)

Horizontal installation | **Vertical installation**

RA4R

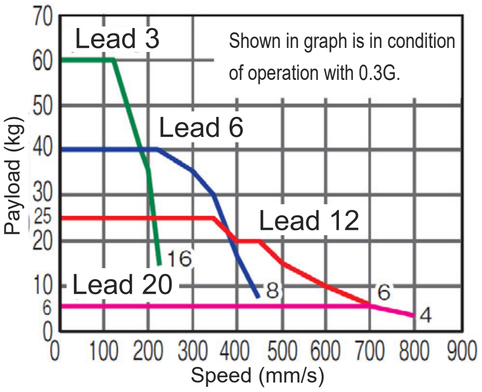


Shown in graph is in condition of operation with 0.3G.

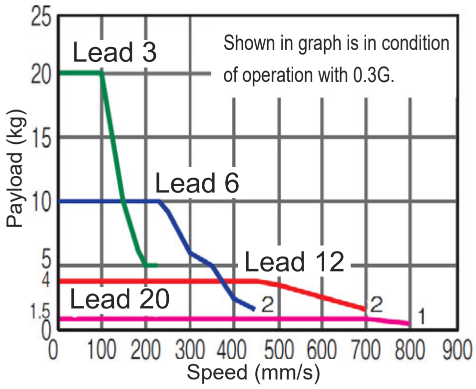


Shown in graph is in condition of operation with 0.3G.

RA6R

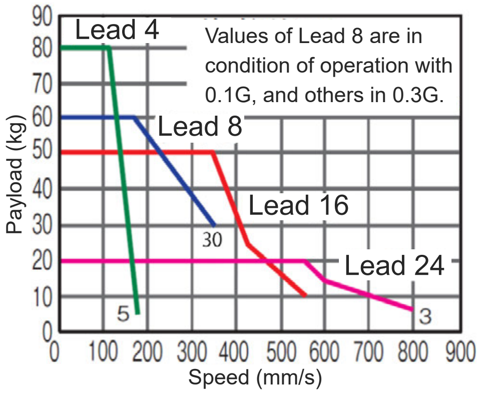


Shown in graph is in condition of operation with 0.3G.

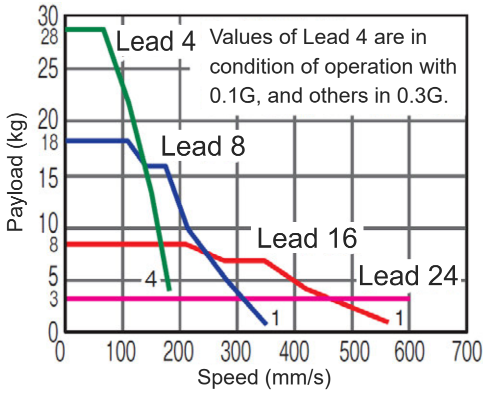


Shown in graph is in condition of operation with 0.3G.

RA7R



Values of Lead 8 are in condition of operation with 0.1G, and others in 0.3G.



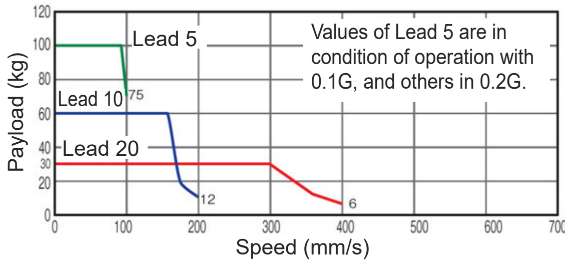
Values of Lead 4 are in condition of operation with 0.1G, and others in 0.3G.

Correlation diagram of speed and payload for the RCP5 rod type (Motor-reversing type)

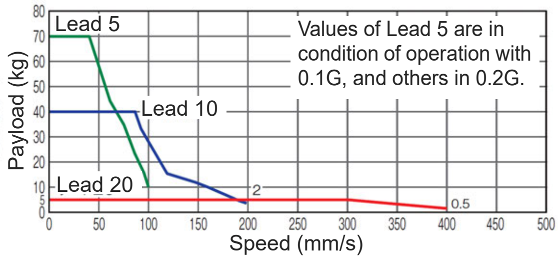
Horizontal installation

Vertical installation

RA8R

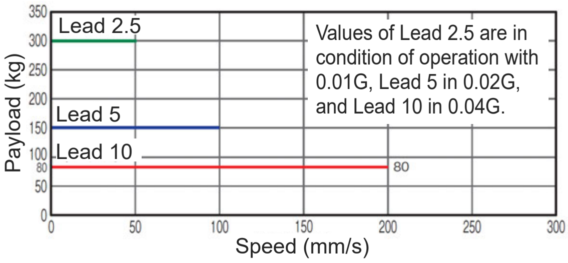


Values of Lead 5 are in condition of operation with 0.1G, and others in 0.2G.

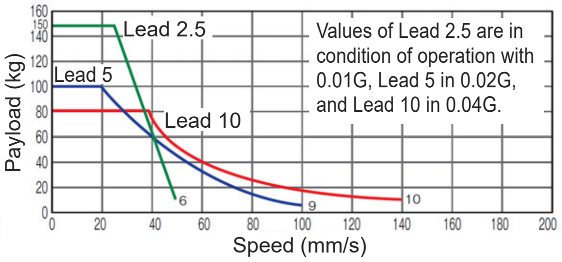


Values of Lead 5 are in condition of operation with 0.1G, and others in 0.2G.

RA10R



Values of Lead 2.5 are in condition of operation with 0.01G, Lead 5 in 0.02G, and Lead 10 in 0.04G.



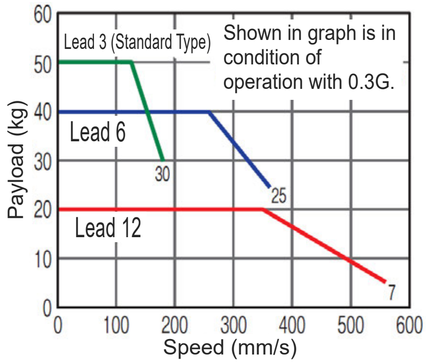
Values of Lead 2.5 are in condition of operation with 0.01G, Lead 5 in 0.02G, and Lead 10 in 0.04G.

Correlation diagram of speed and payload for the RCP5W dust and drip proof rod type (High output effective)

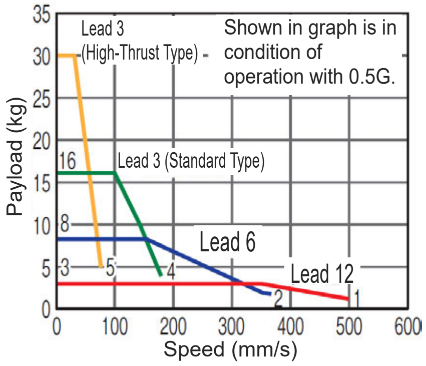
Horizontal installation

Vertical installation

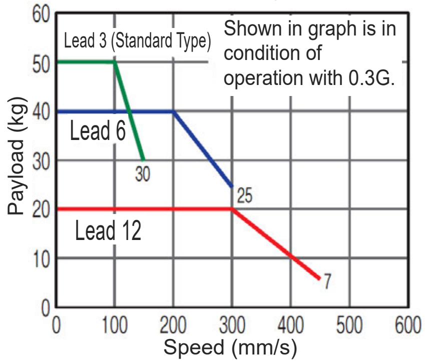
RA6C


When ambient temp. exceeds 5degC

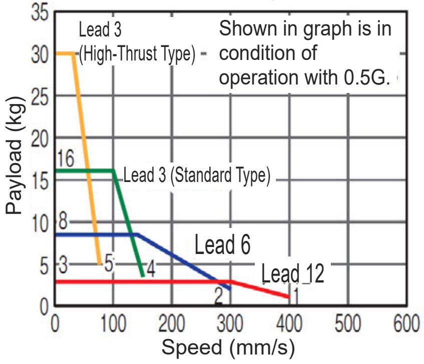
Shown in graph is in condition of operation with 0.3G.


When ambient temp. exceeds 5degC

Shown in graph is in condition of operation with 0.5G.


In ambient temp. 5degC or lower

Shown in graph is in condition of operation with 0.3G.


In ambient temp. 5degC or lower

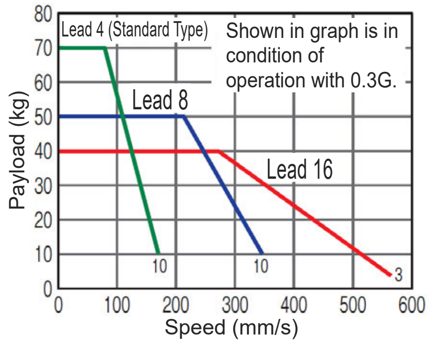
Shown in graph is in condition of operation with 0.5G.

Correlation diagram of speed and payload for the RCP5W dust and drip proof rod type (High output effective)

RA7C

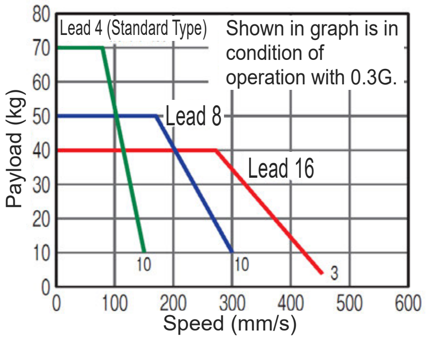
Horizontal installation

When ambient temp. exceeds 5degC



Shown in graph is in condition of operation with 0.3G.

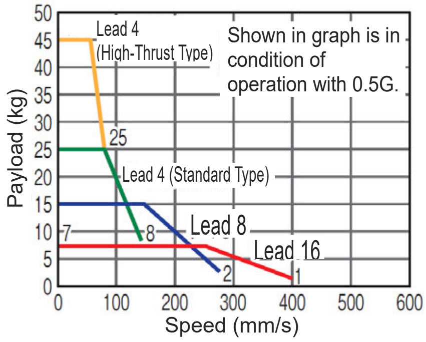
In ambient temp. 5degC or lower



Shown in graph is in condition of operation with 0.3G.

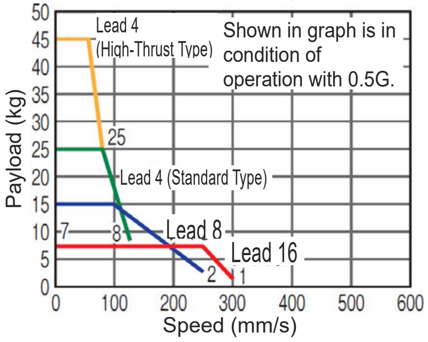
Vertical installation

When ambient temp. exceeds 5degC



Shown in graph is in condition of operation with 0.5G.

In ambient temp. 5degC or lower



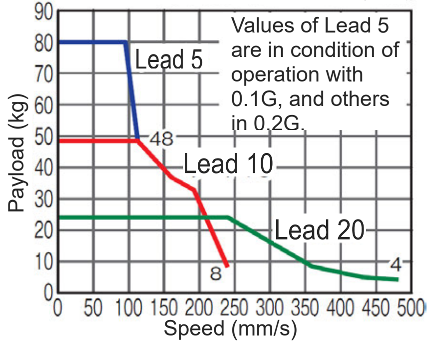
Shown in graph is in condition of operation with 0.5G.

Correlation diagram of speed and payload for the RCP5W dust and drip proof rod type

RA7C

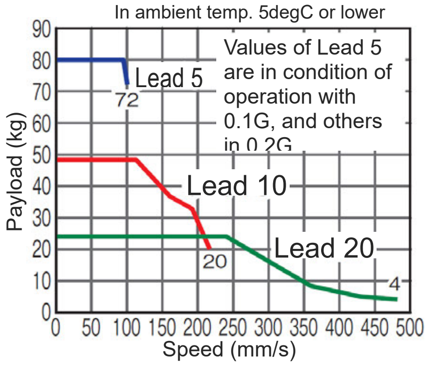
Horizontal installation

When ambient temp. exceeds 5degC



Values of Lead 5 are in condition of operation with 0.1G, and others in 0.2G.

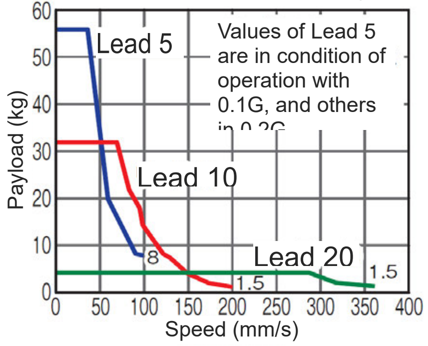
In ambient temp. 5degC or lower



Values of Lead 5 are in condition of operation with 0.1G, and others in 0.2G.

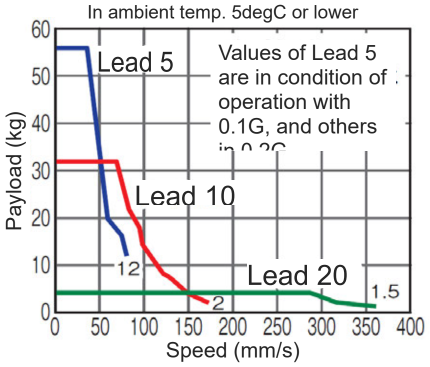
Vertical installation

When ambient temp. exceeds 5degC



Values of Lead 5 are in condition of operation with 0.1G, and others in 0.2G.

In ambient temp. 5degC or lower



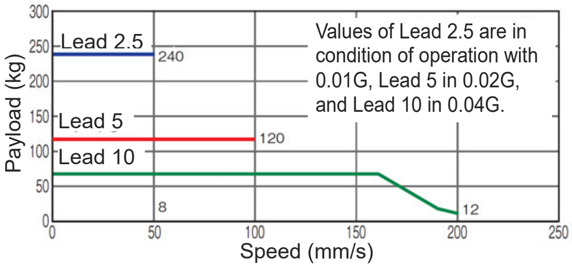
Values of Lead 5 are in condition of operation with 0.1G, and others in 0.2G.

Correlation diagram of speed and payload for the RCP5W dust and drip proof rod type

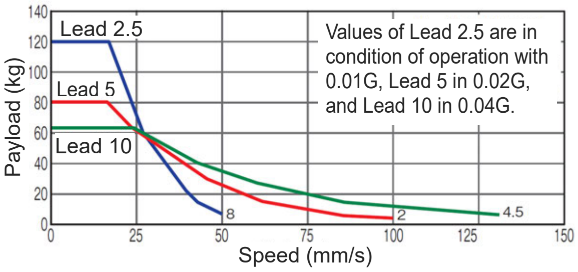
Horizontal installation

Vertical installation

RA10C



Values of Lead 2.5 are in condition of operation with 0.01G, Lead 5 in 0.02G, and Lead 10 in 0.04G.



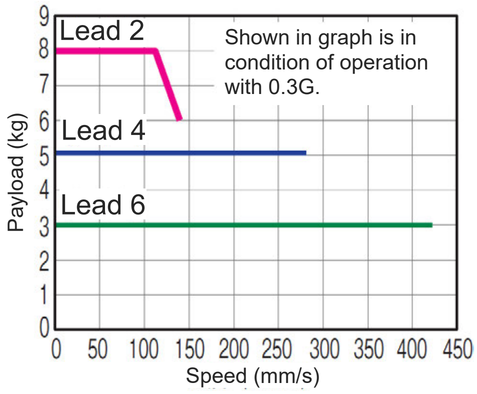
Values of Lead 2.5 are in condition of operation with 0.01G, Lead 5 in 0.02G, and Lead 10 in 0.04G.

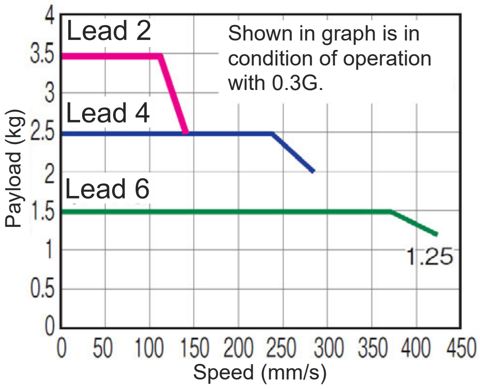
Correlation diagram of speed and payload for the RCP4 slider type (High output effective)

*** Characteristics should be the same for Cleanroom type.**

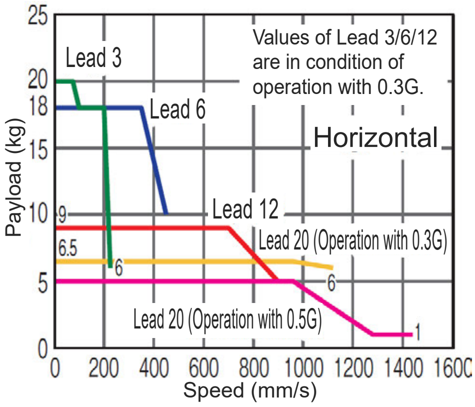
Horizontal installation | **Vertical installation**

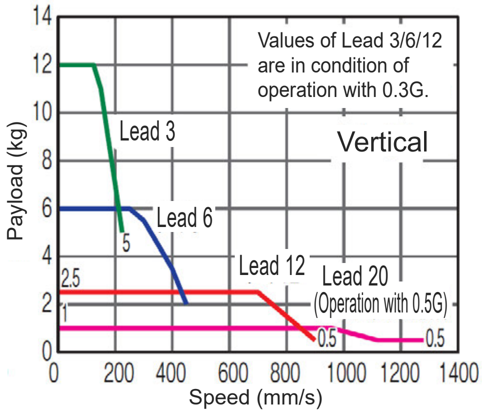
SA3C



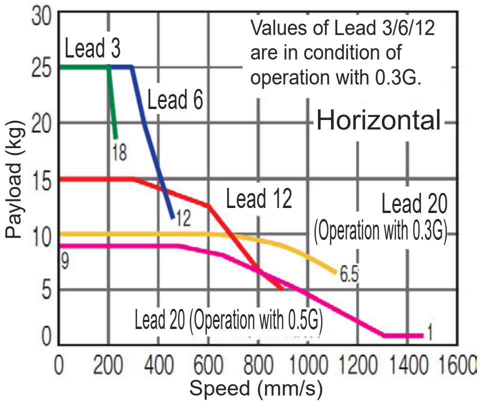


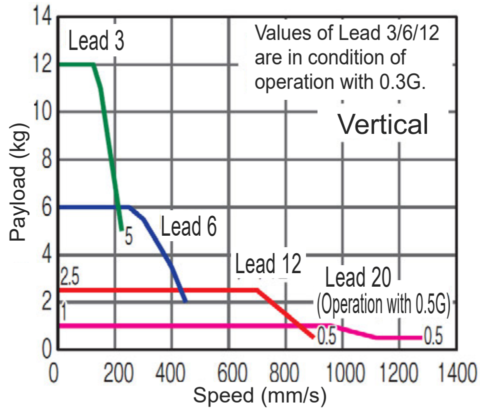
SA5C



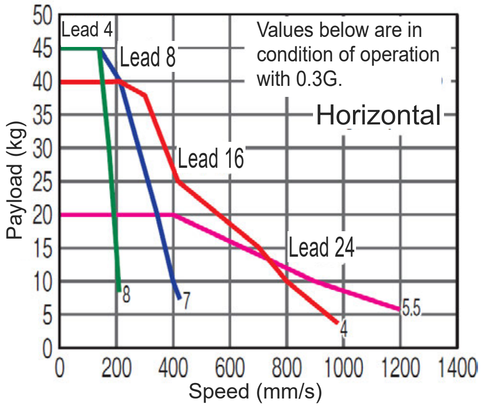


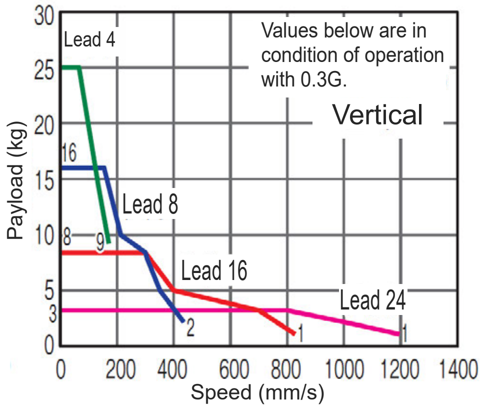
SA6C





SA7C

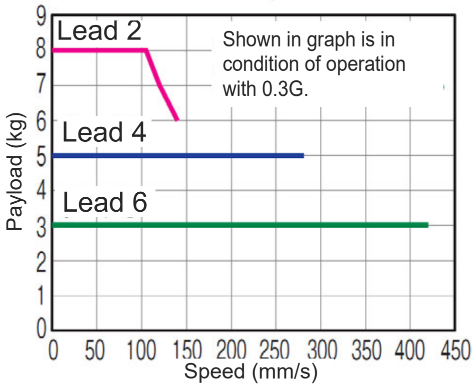




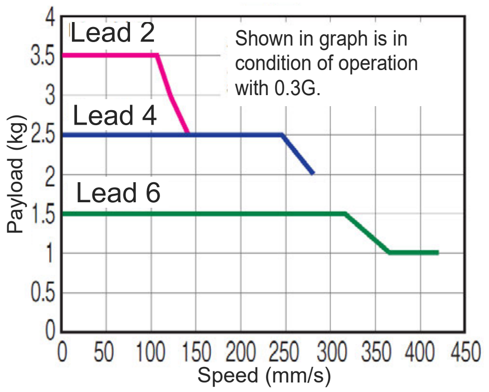
Correlation diagram of speed and payload for the RCP4 slider type (High output effective / Motor-reversing type)

Horizontal installation | **Vertical installation**

SA3R

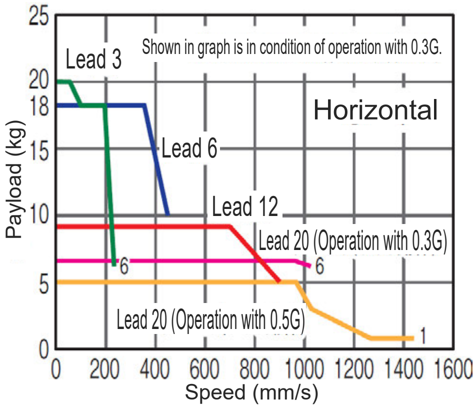


Shown in graph is in condition of operation with 0.3G.

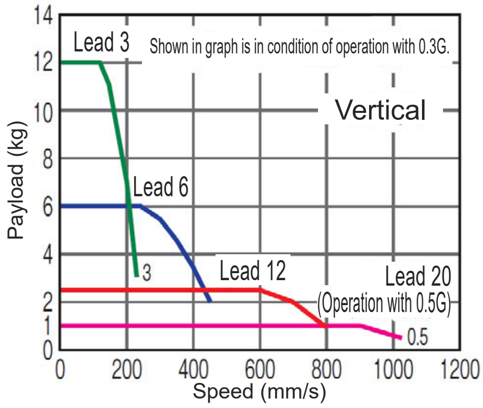


Shown in graph is in condition of operation with 0.3G.

SA5R

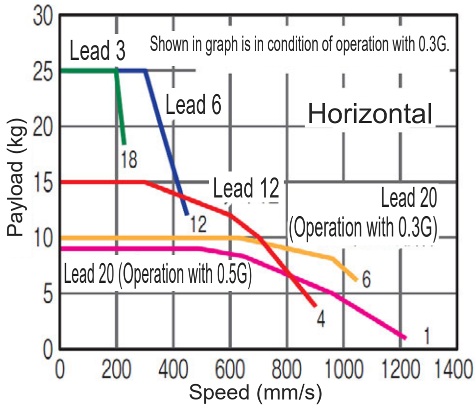


Shown in graph is in condition of operation with 0.3G.

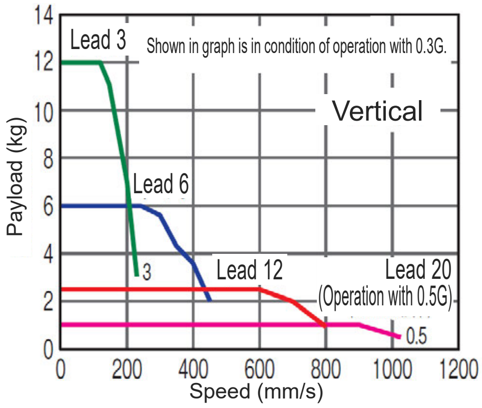


Shown in graph is in condition of operation with 0.3G.

SA6R

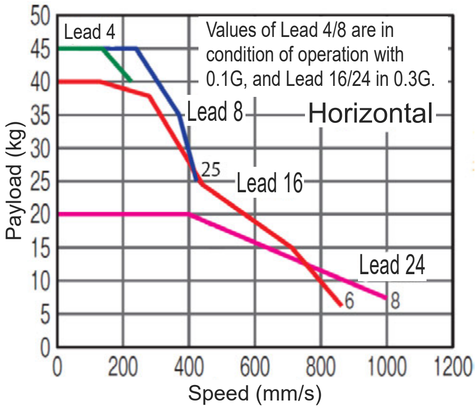


Shown in graph is in condition of operation with 0.3G.

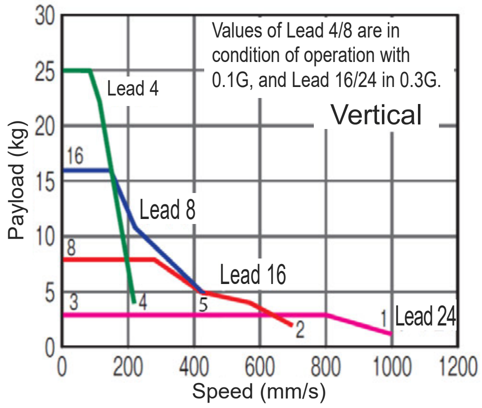


Shown in graph is in condition of operation with 0.3G.

SA7R



Values of Lead 4/8 are in condition of operation with 0.1G, and Lead 16/24 in 0.3G.



Values of Lead 4/8 are in condition of operation with 0.1G, and Lead 16/24 in 0.3G.

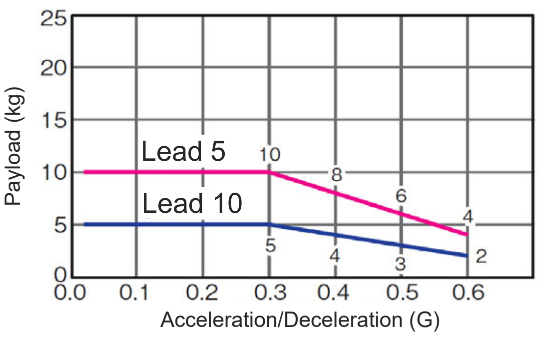
Correlation diagram of speed and payload for the RCP4W dust and drip proof slider type

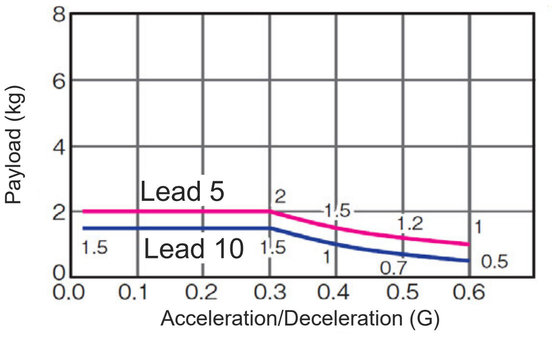
*** The payload of the slider type in RCP4W series should be constant even if the velocity gets increased.**
Note that, however, the payload decreases when acceleration gets increased.

Supported on Both Ends

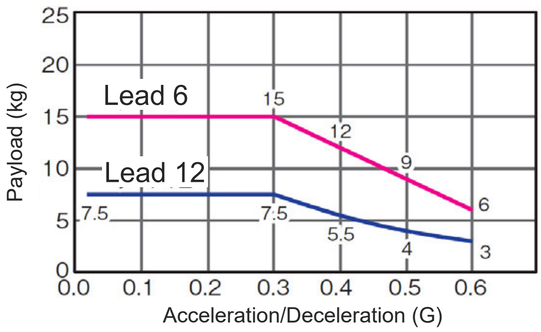
Supported on One End

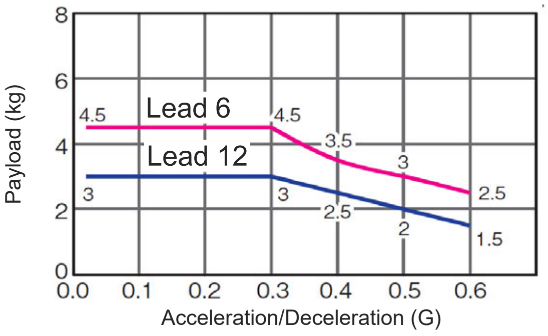
SA5C



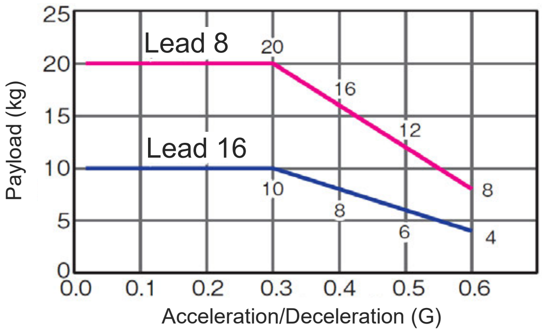


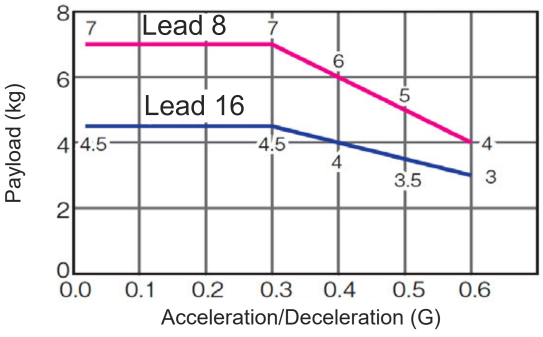
SA6C





SA7C

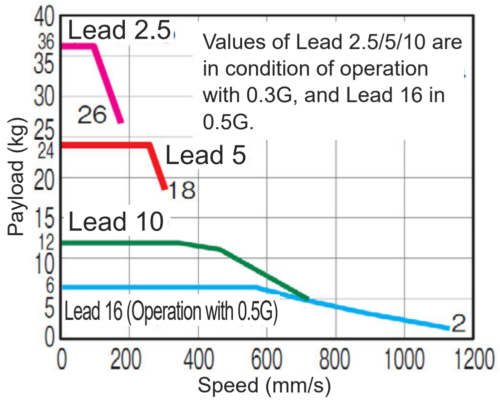


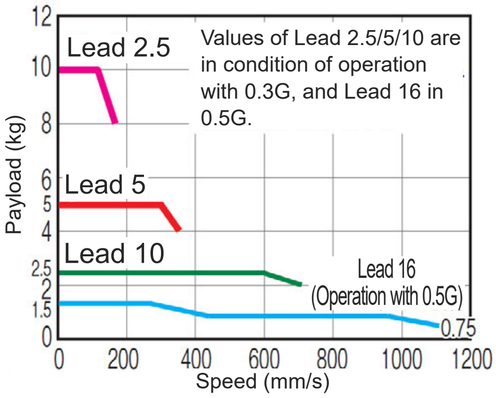


Correlation diagram of speed and payload for the RCP4 rod type (High output effective)

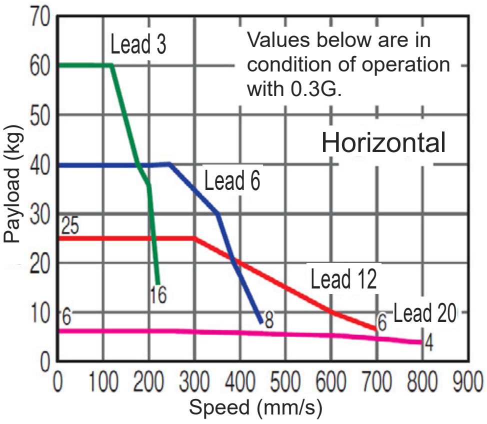
Horizontal installation | **Vertical installation**

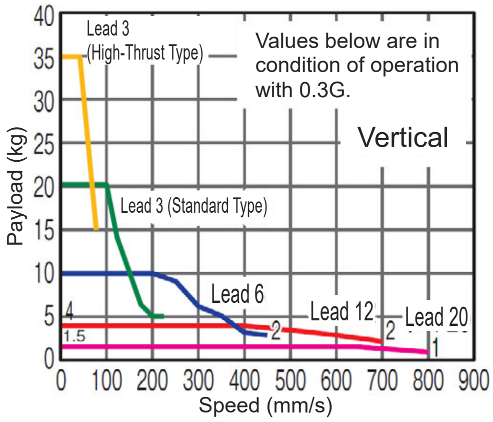
RA3C



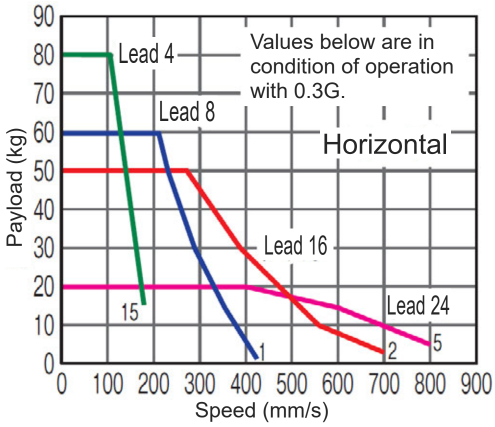


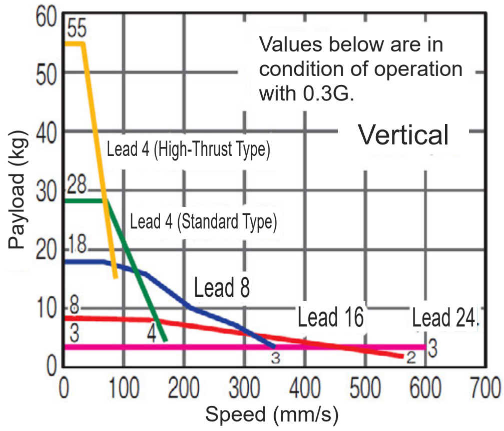
RA5C





RA6C

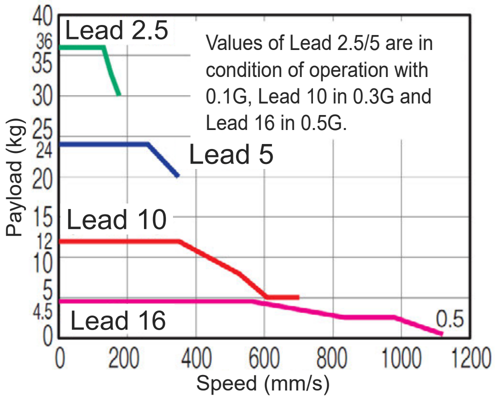


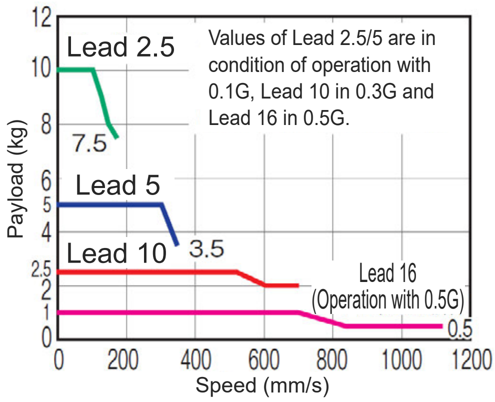


Correlation diagram of speed and payload for the RCP4 rod type (High output effective / Motor-reversing type)

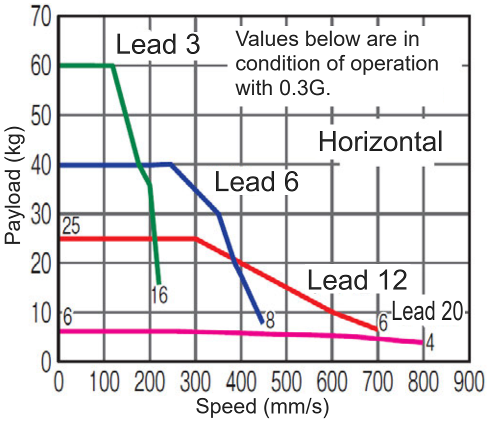
Horizontal installation | **Vertical installation**

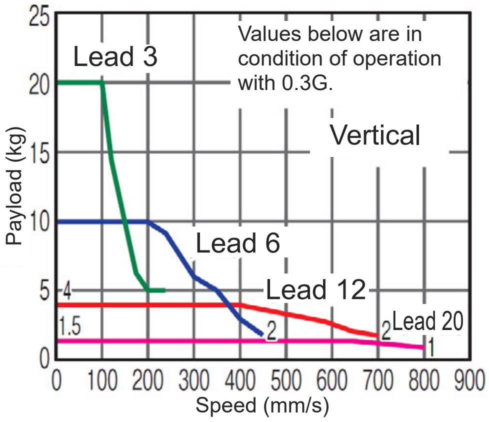
RA3R


Values of Lead 2.5/5 are in condition of operation with 0.1G, Lead 10 in 0.3G and Lead 16 in 0.5G.

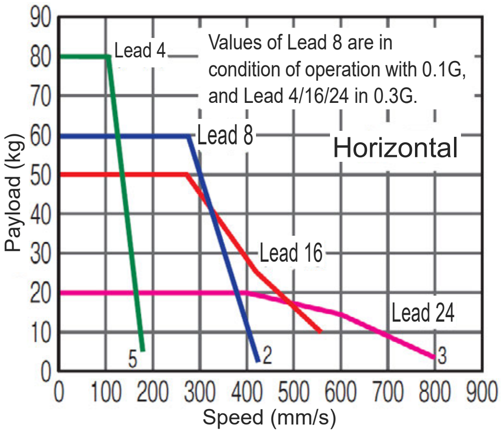

Values of Lead 2.5/5 are in condition of operation with 0.1G, Lead 10 in 0.3G and Lead 16 in 0.5G.

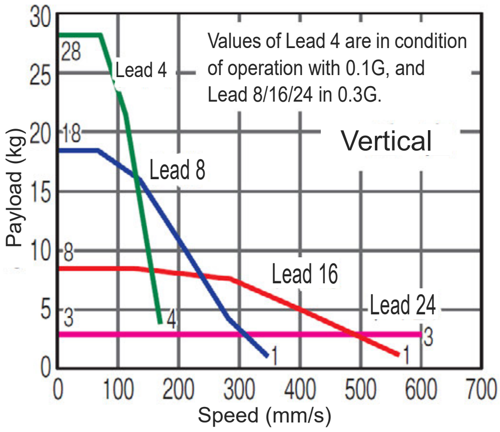
RA5R


Values below are in condition of operation with 0.3G.


Values below are in condition of operation with 0.3G.

RA6R


Values of Lead 8 are in condition of operation with 0.1G, and Lead 4/16/24 in 0.3G.


Values of Lead 4 are in condition of operation with 0.1G, and Lead 8/16/24 in 0.3G.

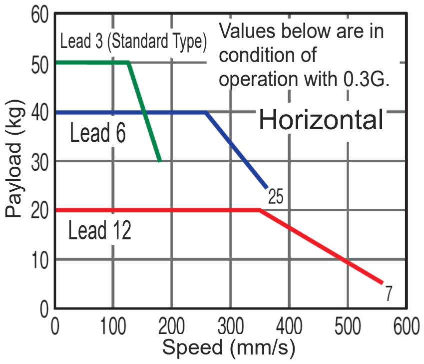
Correlation diagram of speed and payload for the RCP4W dust and drip proof rod type (High output effective)

Horizontal installation

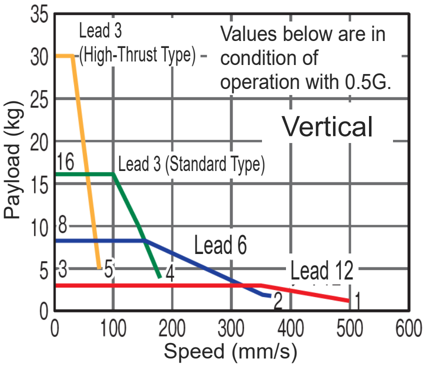
Vertical installation

RA6C

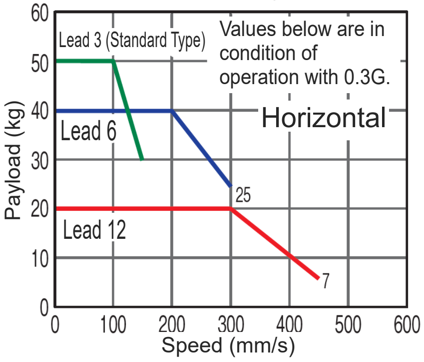
When ambient temp. exceeds 5degC



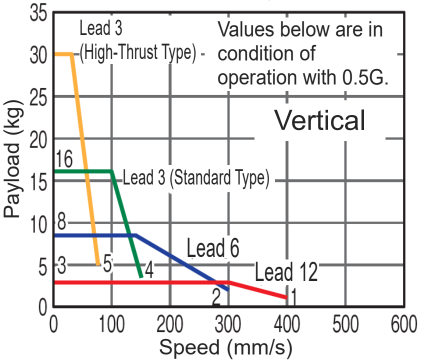
When ambient temp. exceeds 5degC



In ambient temp. 5degC or lower

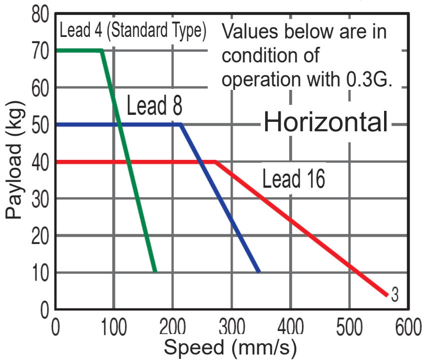


In ambient temp. 5degC or lower

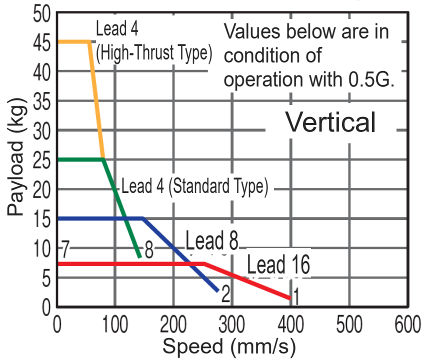


RA7C

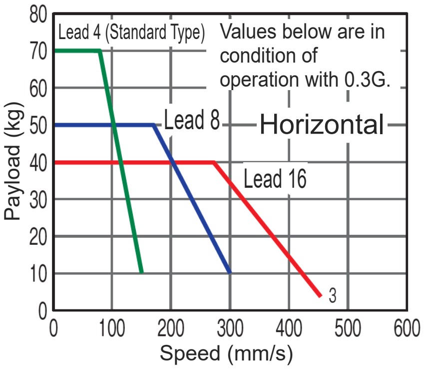
When ambient temp. exceeds 5degC



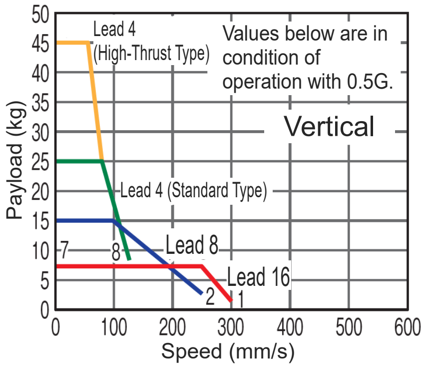
When ambient temp. exceeds 5degC



In ambient temp. 5degC or lower



In ambient temp. 5degC or lower



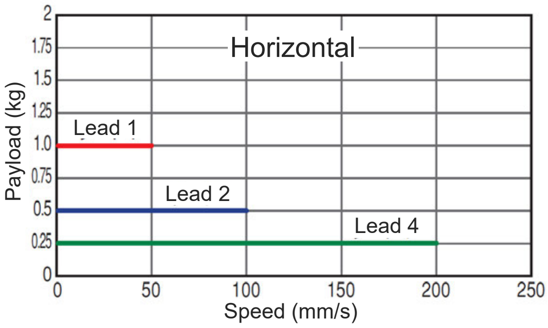
Correlation diagram of speed and payload for the RCP3 slider type

*** Characteristics should be the same for reversed type (SA2AR/SA2BR).**

Horizontal installation (* Not Available for Vertical Installation)

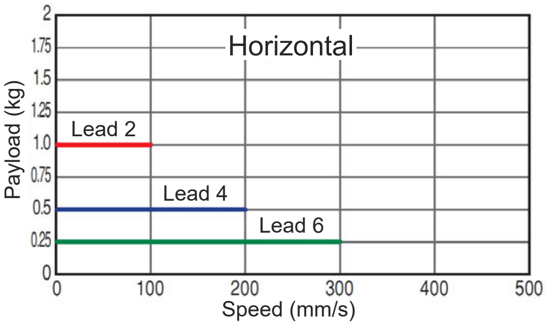
Vertical installation

SA2AC



Vertical Installation Unavailable

SA2BC

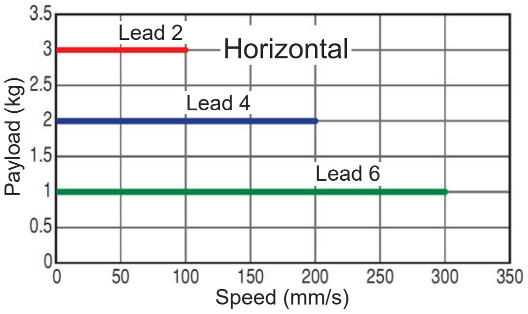


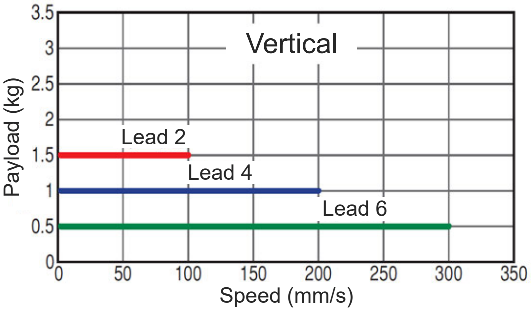
Vertical Installation Unavailable

Correlation diagram of speed and payload for the RCP3 slider type

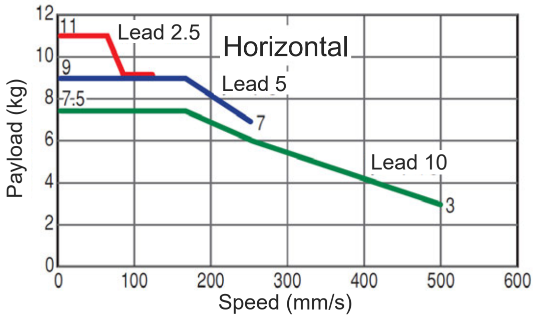
Horizontal installation	**Vertical installation**

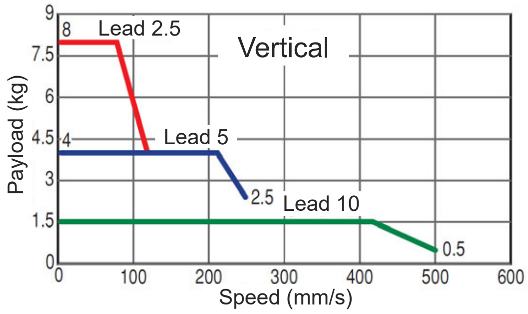
SA3C



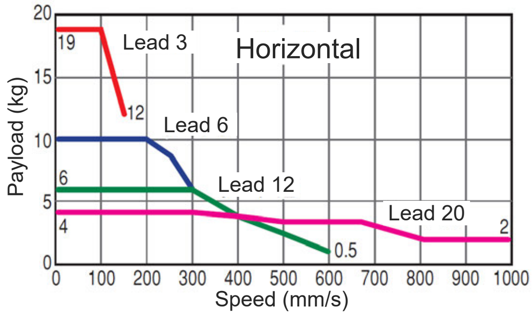


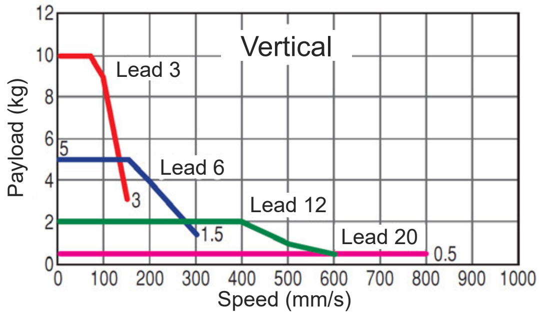
SA4C



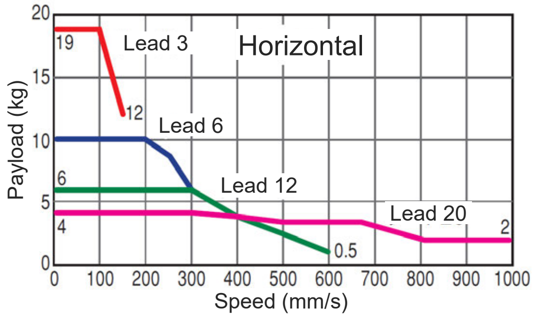


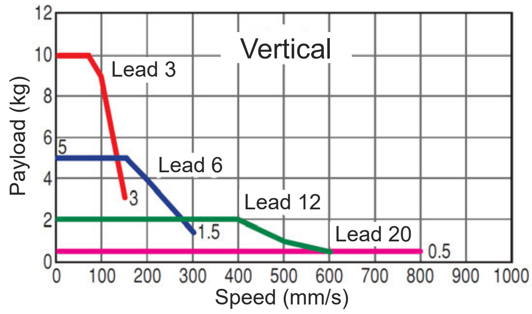
SA5C





SA6C

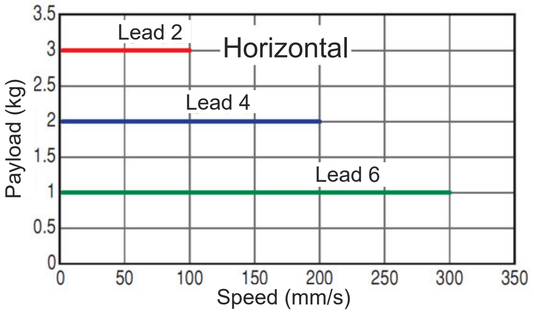


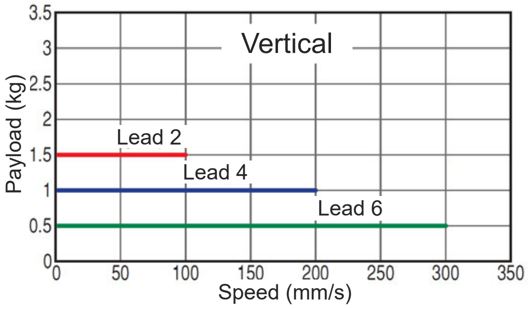


Correlation diagram of speed and payload for the RCP3 slider type (Motor-reversing type)

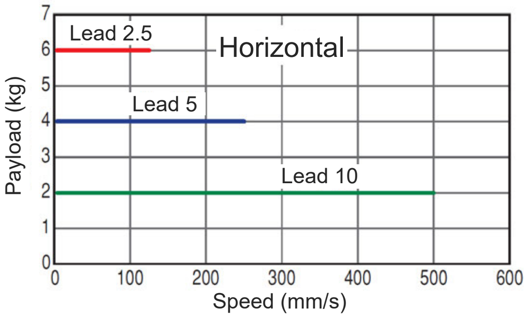
Horizontal installation | **Vertical installation**

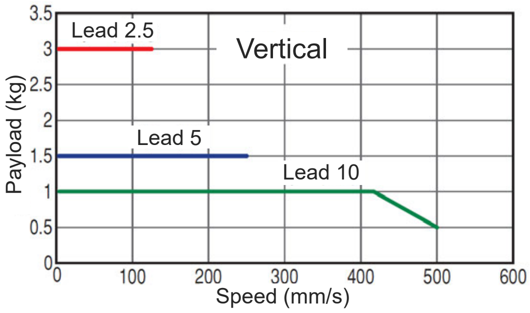
SA3R



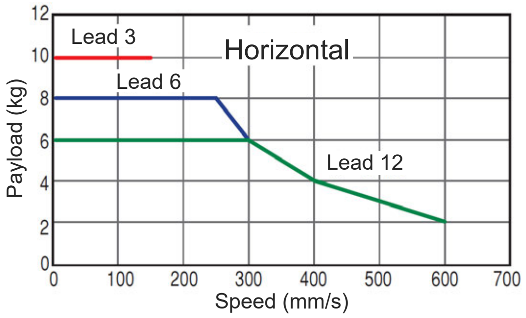


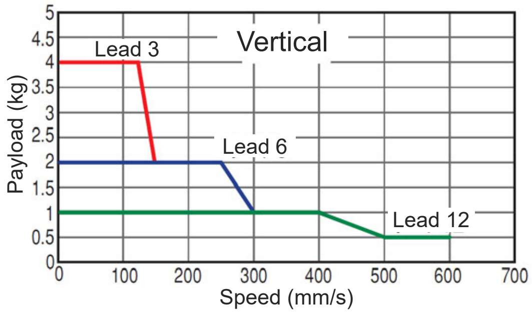
SA4R



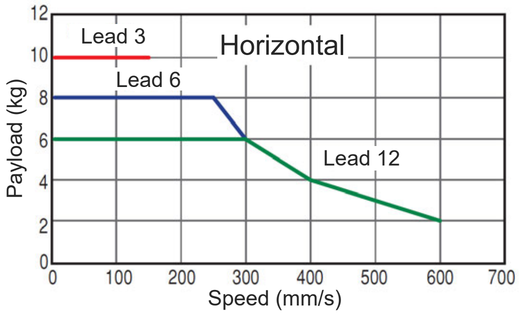


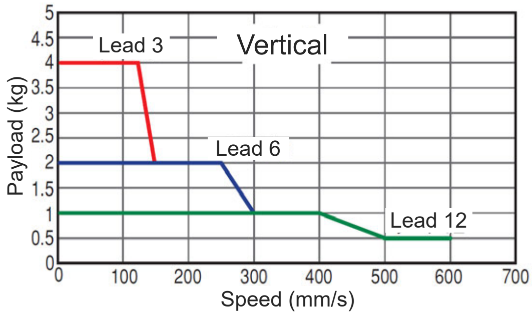
SA5R





SA6R

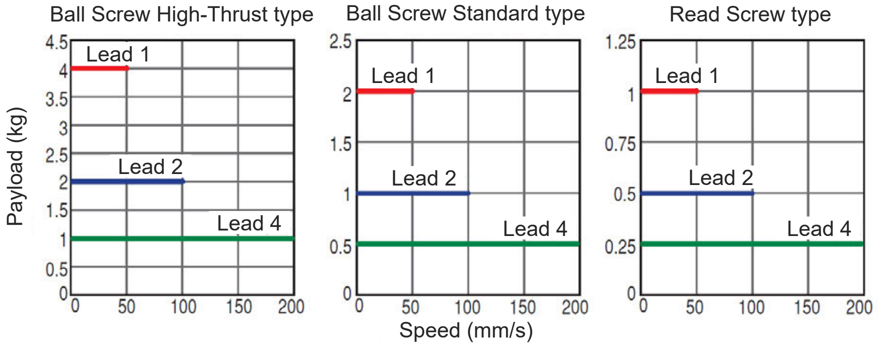




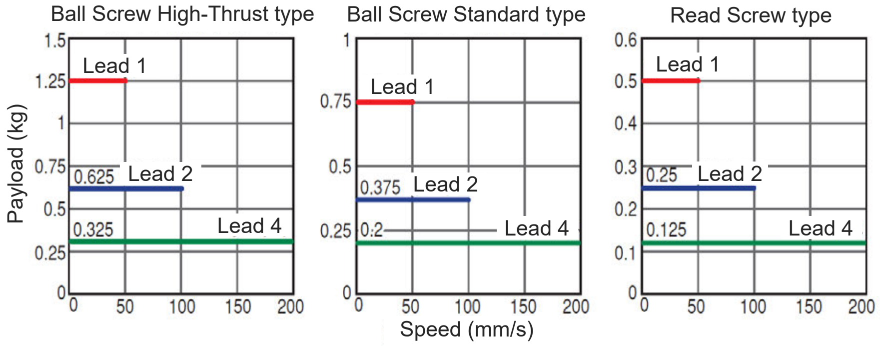
Correlation diagram of speed and payload for the RCP3 rod type

RA2AC／RA2AR

Horizontal installation

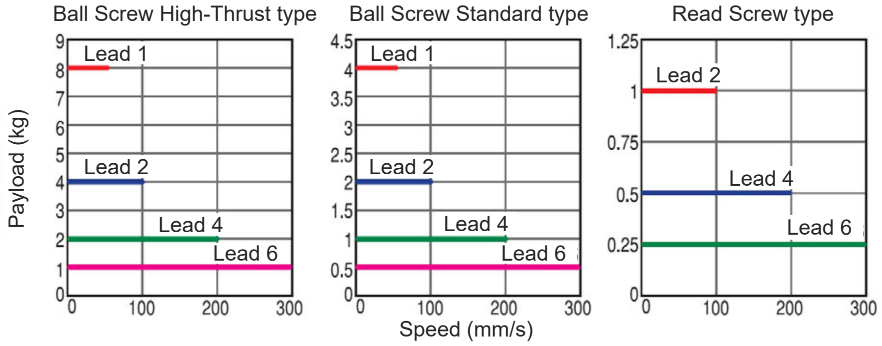


Vertical installation



RA2BC／RA2BR

Horizontal installation



Vertical installation

Appendix

Chapter 2 Connectable Actuators

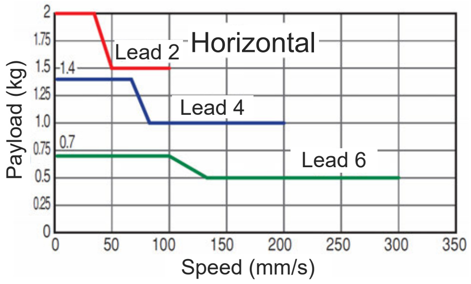
Correlation diagram of speed and payload for the RCP3 table type

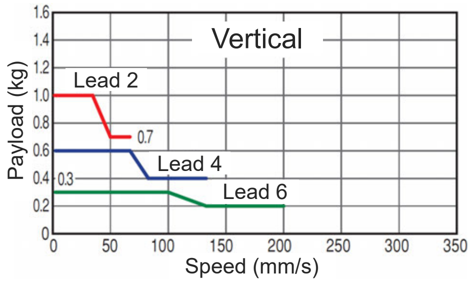
*** Characteristics should be the same for reversed type.**

Horizontal installation

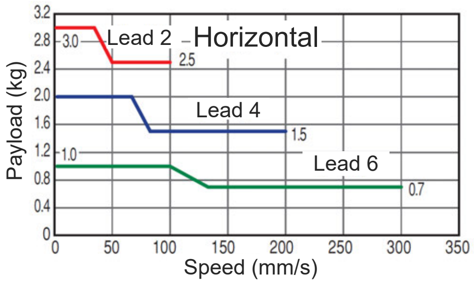
Vertical installation

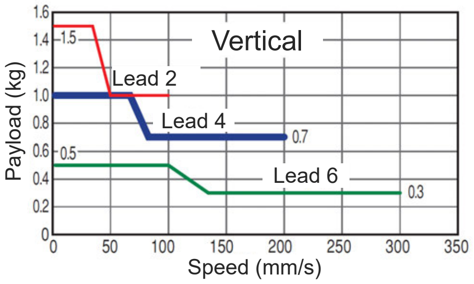
TA3C



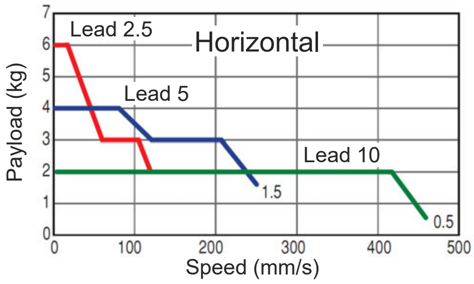


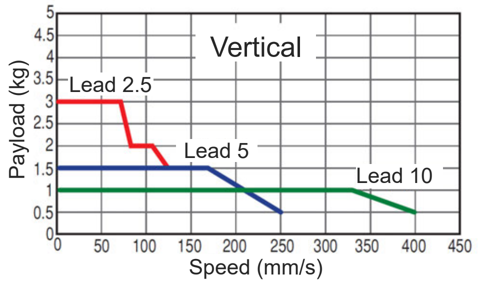
TA4C



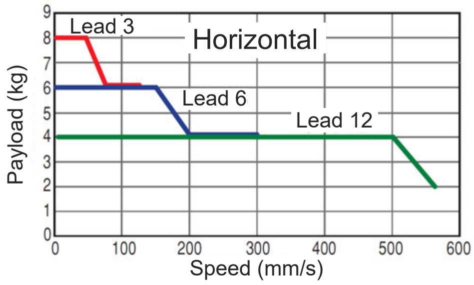


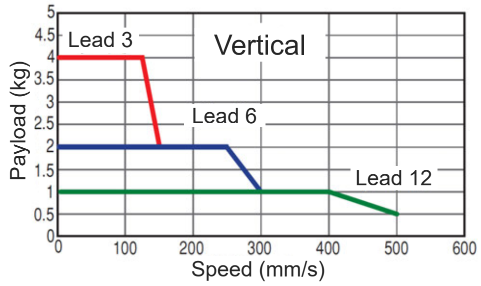
TA5C



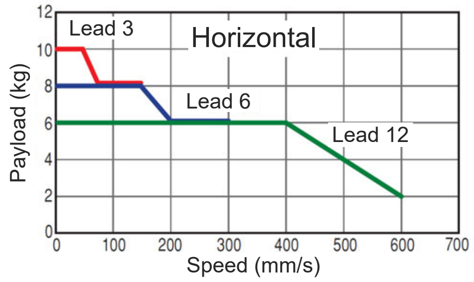


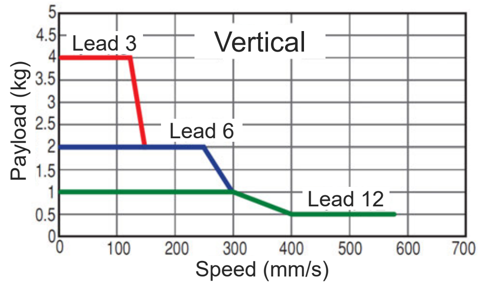
TA6C





TA7C





Appendix

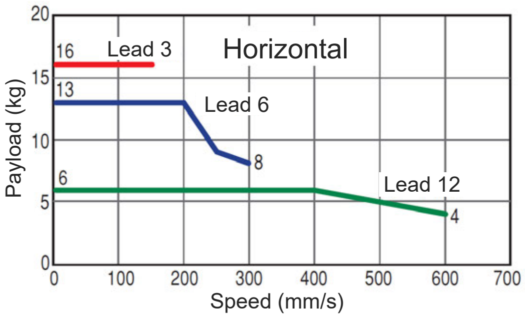
Chapter 2 Connectable Actuators

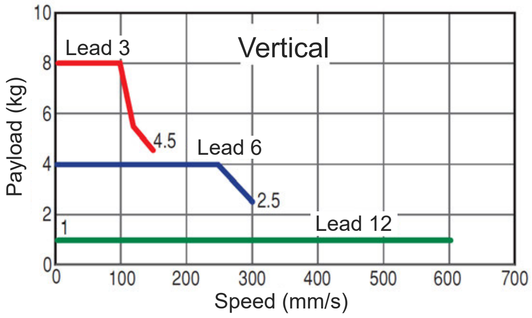
Correlation diagram of speed and payload for the RCP2 slider type

Horizontal installation

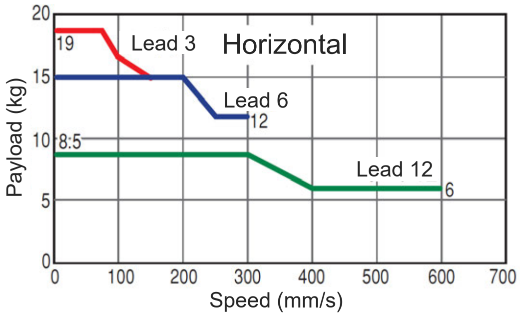
Vertical installation

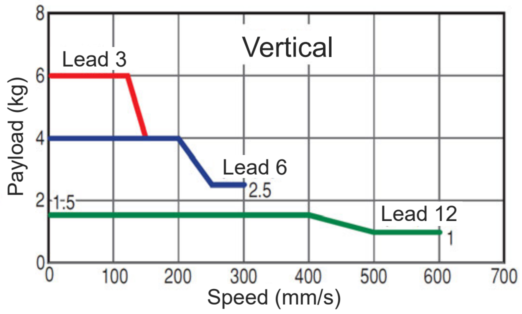
SA5C



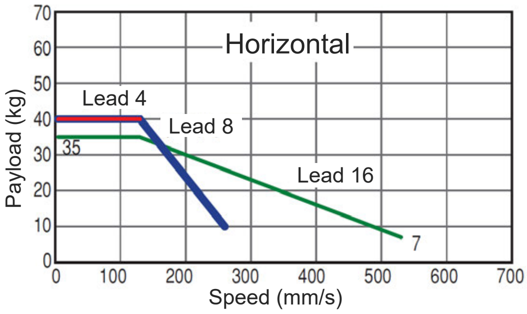


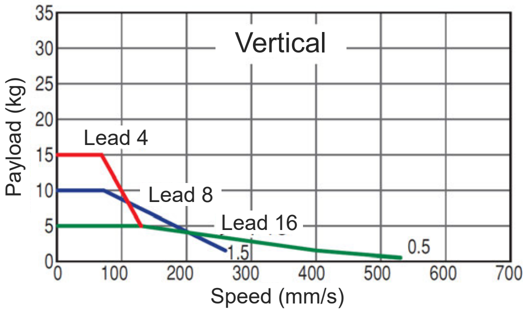
SA6C





SA7C

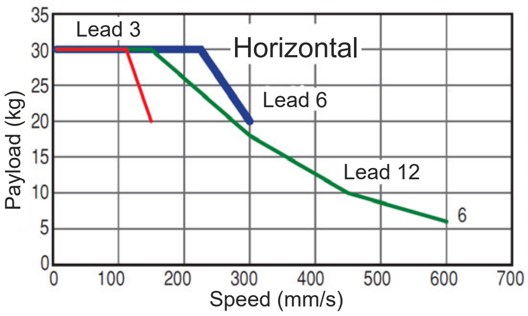


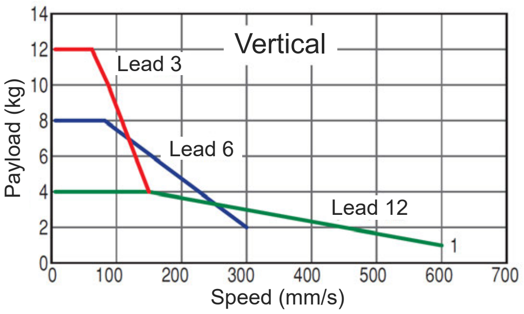


Correlation diagram of speed and payload for the RCP2 slider type

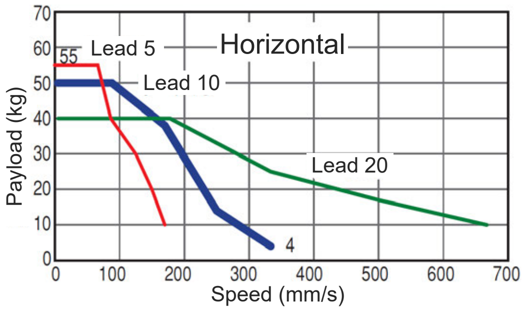
Horizontal installation | **Vertical installation**

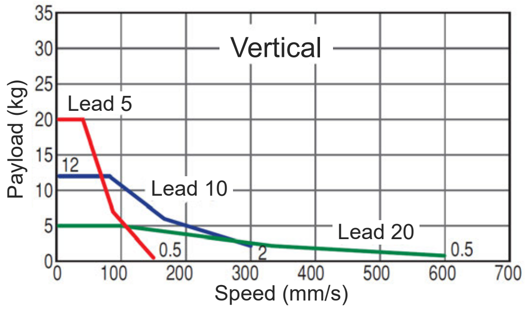
SS7C



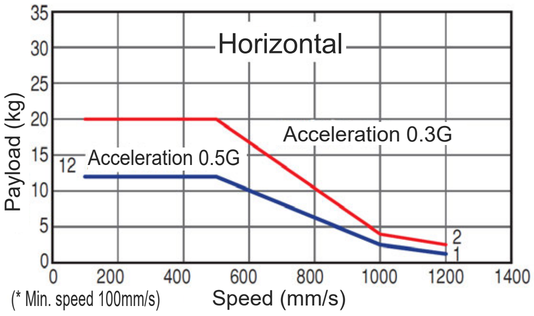


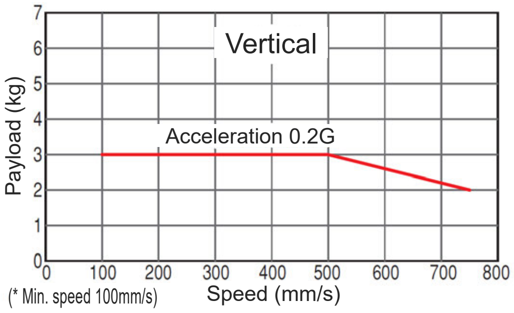
SS8C





HS8C

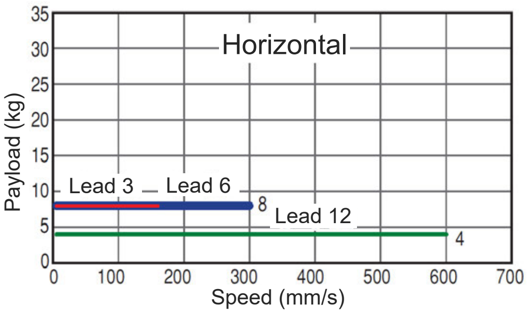


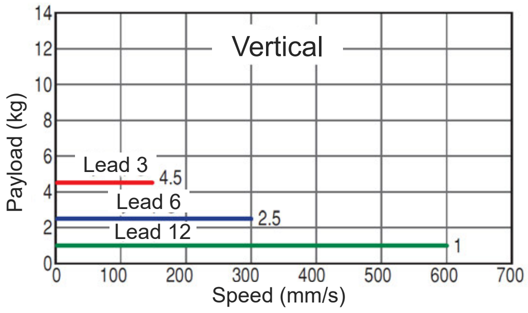


Correlation diagram of speed and payload for the RCP2 slider type (Motor-reversing type)

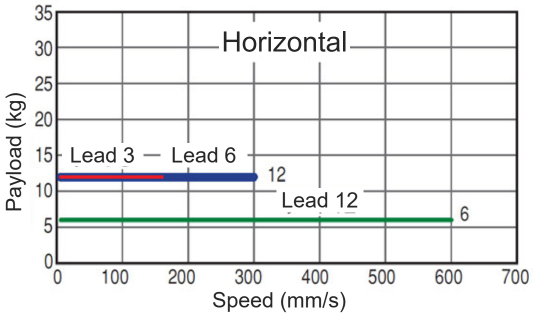
Horizontal installation | **Vertical installation**

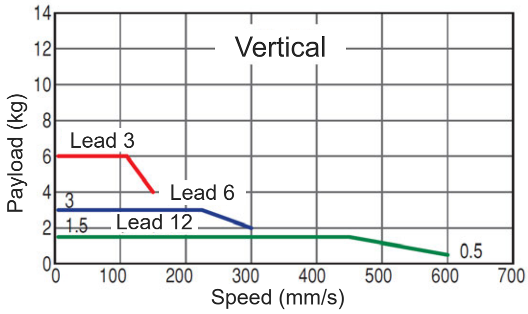
SA5R



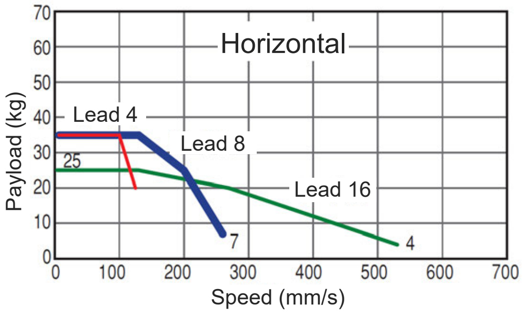


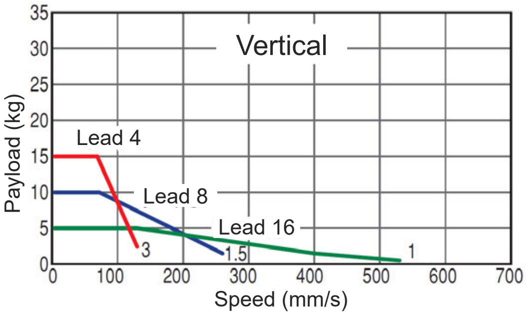
SA6R





SA7R

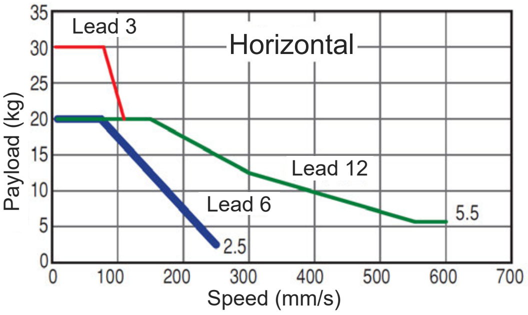


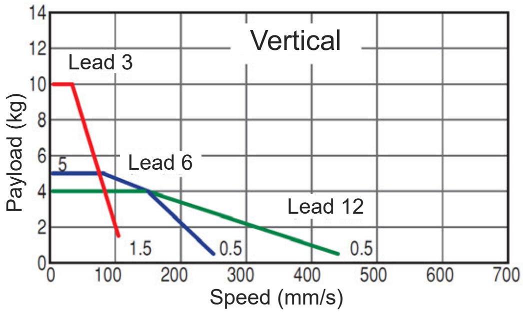


Correlation diagram of speed and payload for the RCP2 slider type (Motor-reversing type)

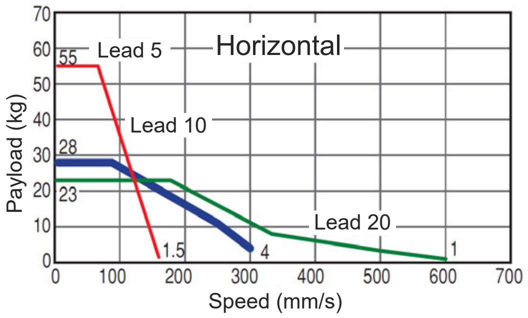
Horizontal installation | **Vertical installation**

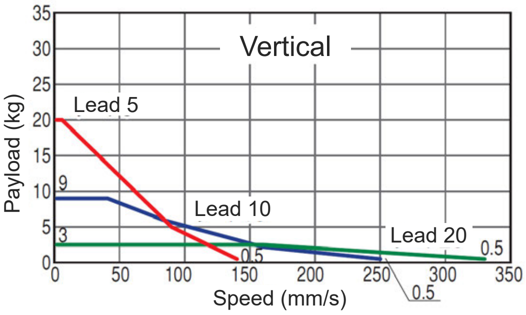
SS7R



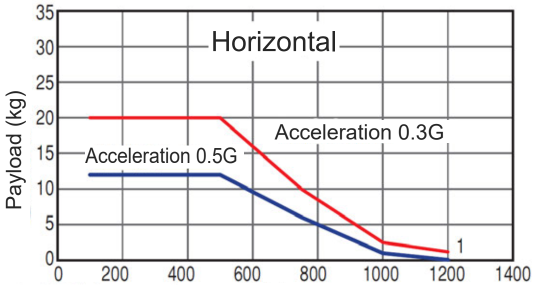


SS8R

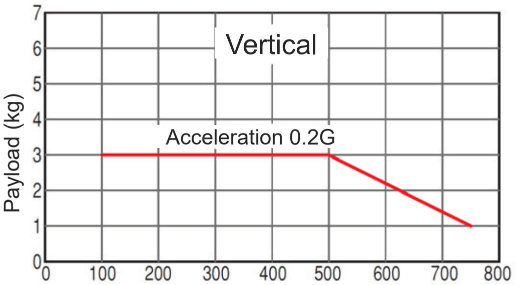




HS8R



(* Min. speed 100mm/s)

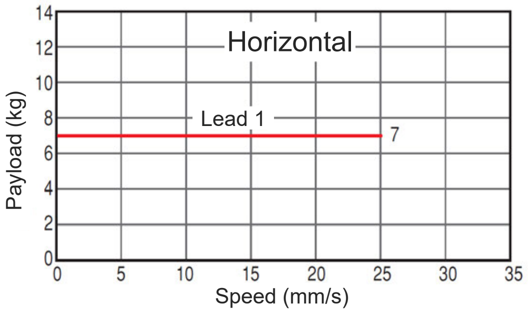


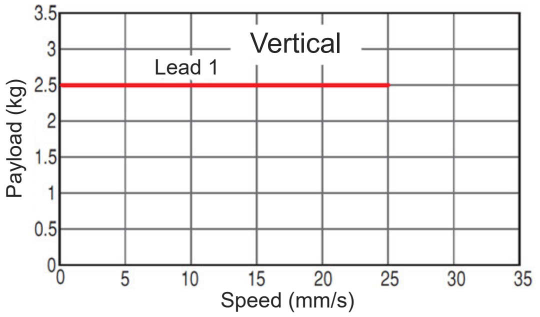
(* Min. speed 100mm/s)

Correlation diagram of speed and payload for the standard RCP2 rod type

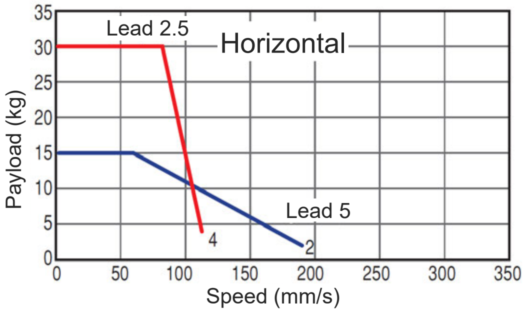
Horizontal installation	Vertical installation

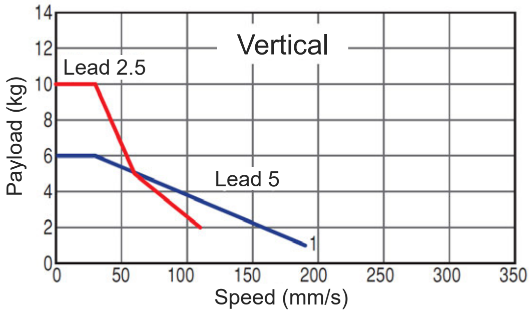
RA2C



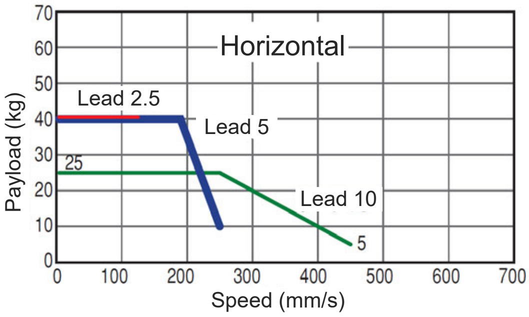


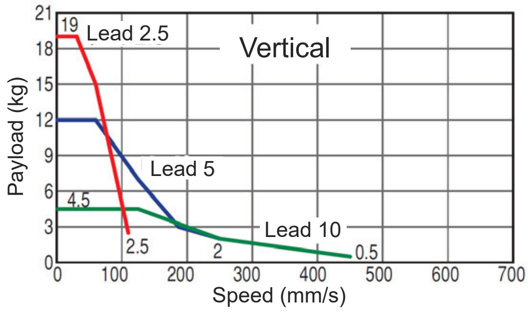
RA3C



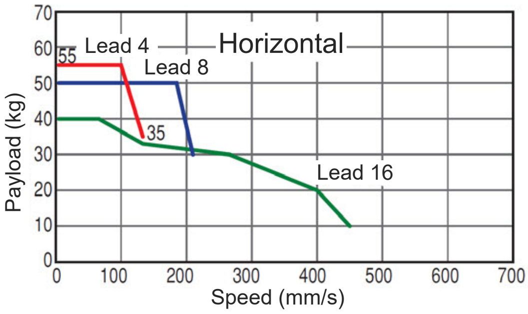


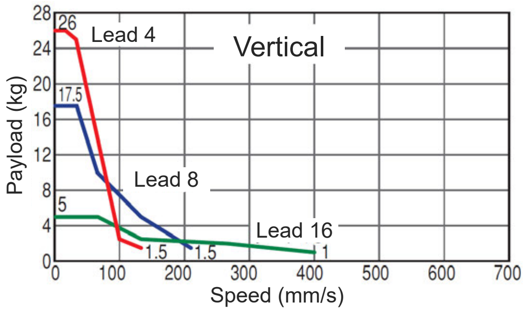
RA4C





RA6C

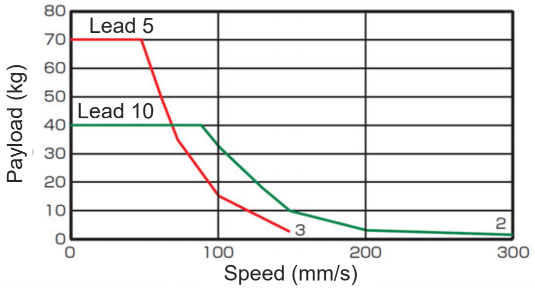




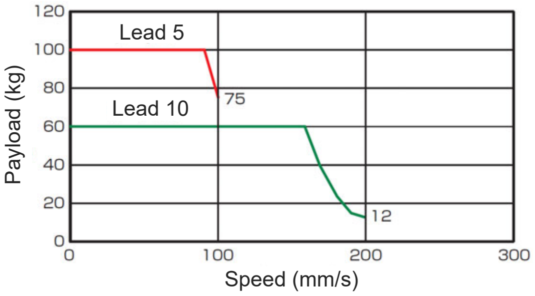
Correlation diagram of speed and payload for the standard RCP2 rod type

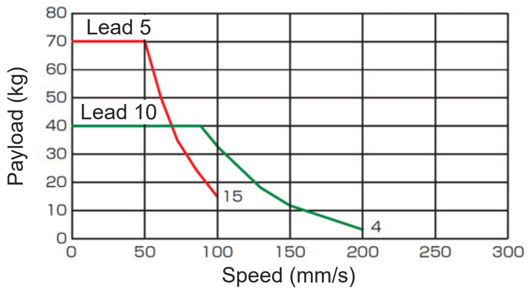
Horizontal installation | **Vertical installation**

RA8C

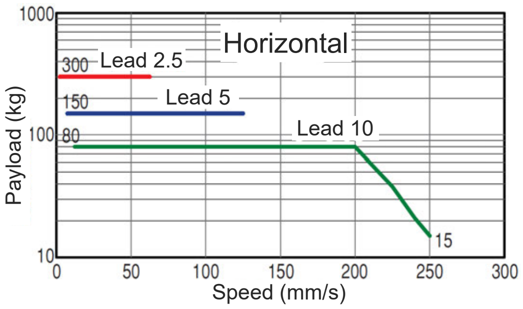


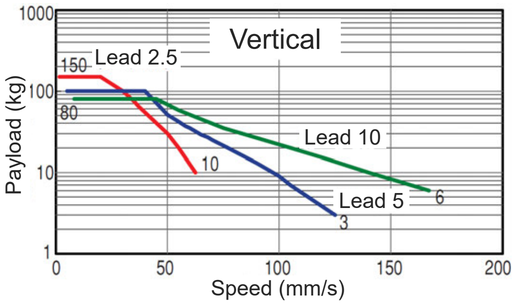
RA8R





RA10C

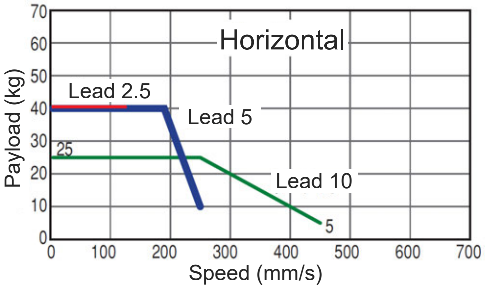


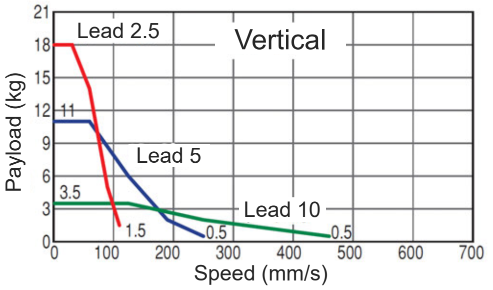


Correlation diagram of speed and payload for the RCP2 rod short type (Standard / Equipped with Guide)

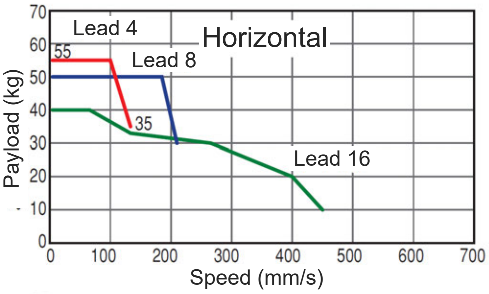
Horizontal installation	Vertical installation

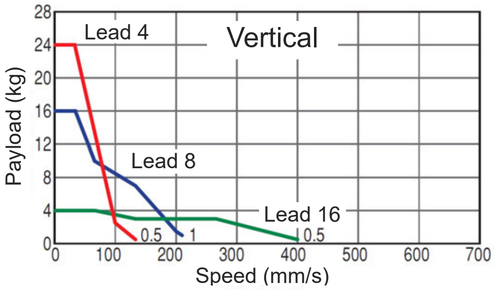
RGS4C



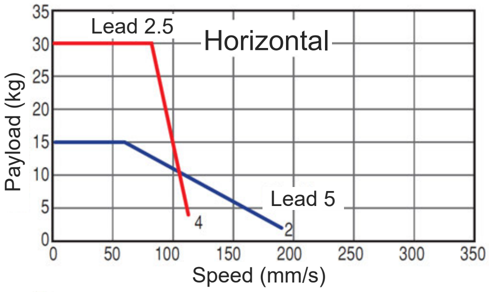


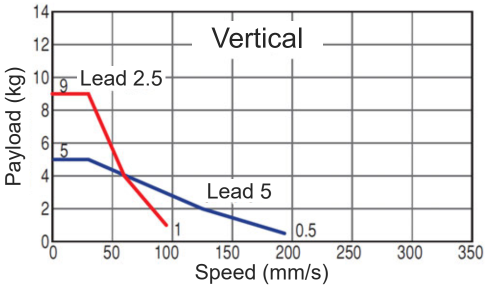
RGS6C



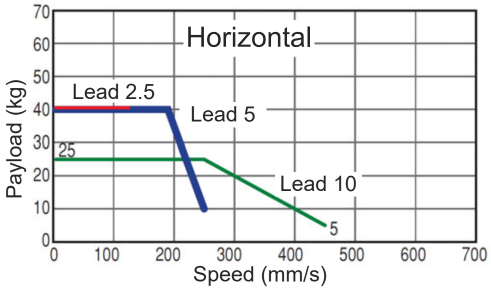


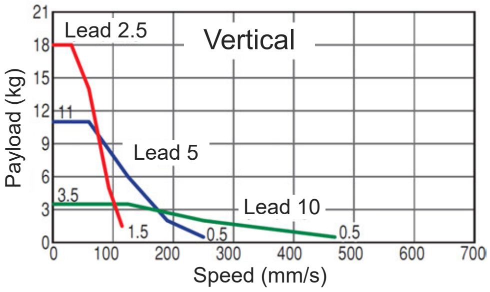
RGD3C



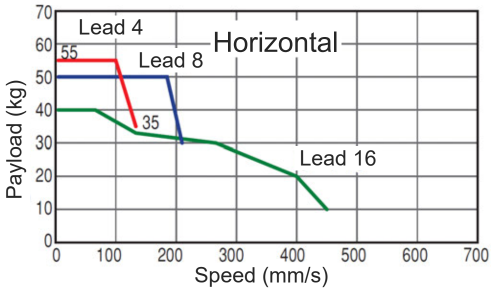


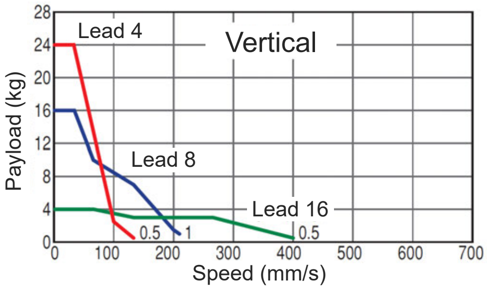
RGD4C





RGD6C



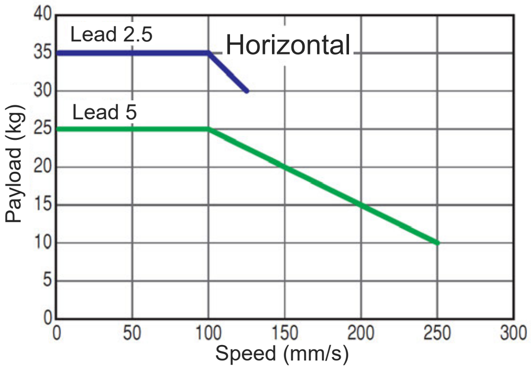


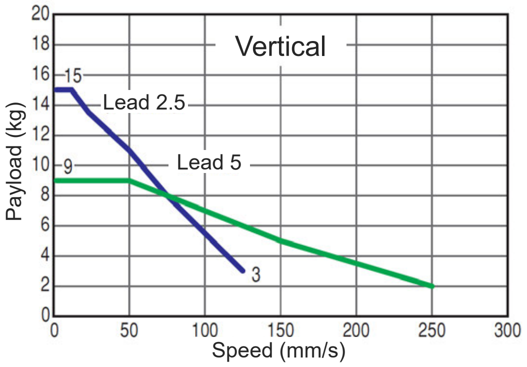
Correlation diagram of speed and payload for the RCP2 rod short type (Standard / Equipped with Guide)

Horizontal installation

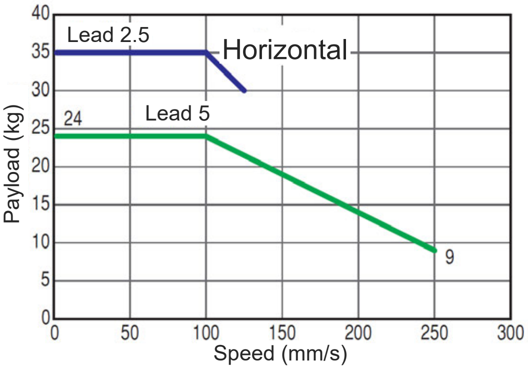
Vertical installation

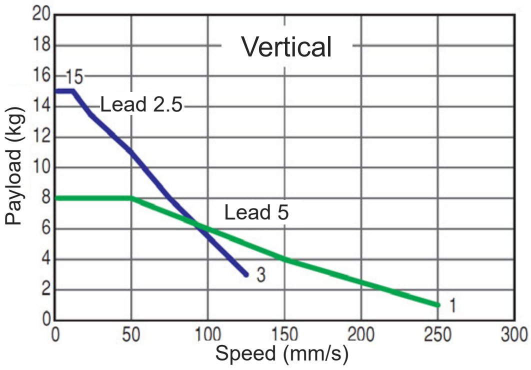
SRA4R



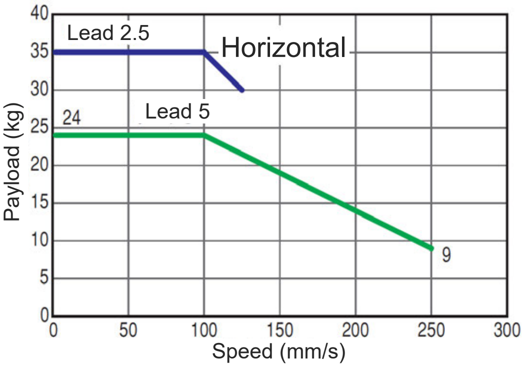


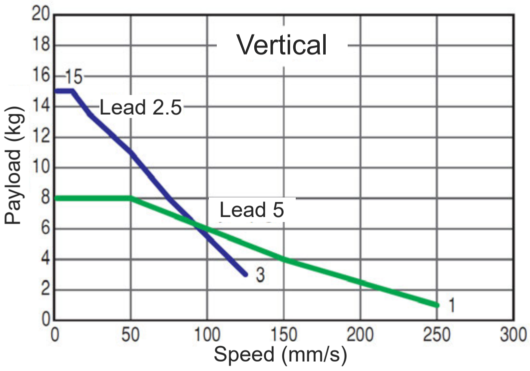
SRGS4R





SRGD4R





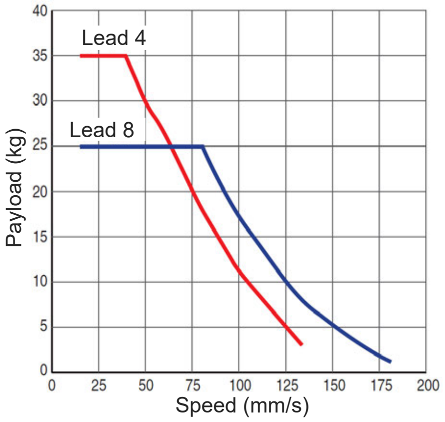
Correlation diagram of speed and payload for the RCP2W dust and drip proof type

*** RCP2W-SA16C is dedicated for installation in standard horizontal orientation only.**

Horizontal installation

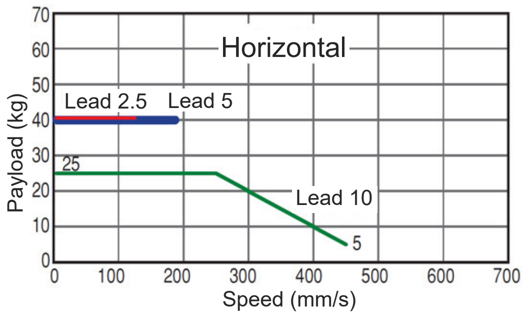
Vertical installation

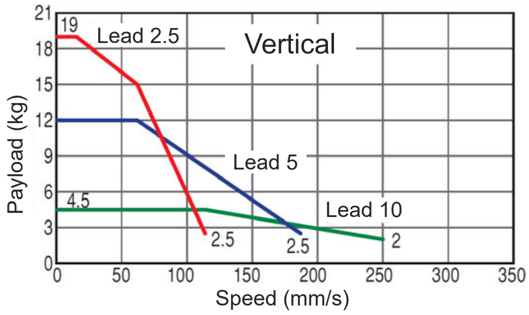
SA16C



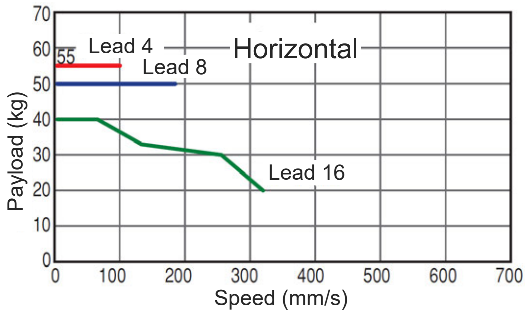
Vertical Installation Unavailable

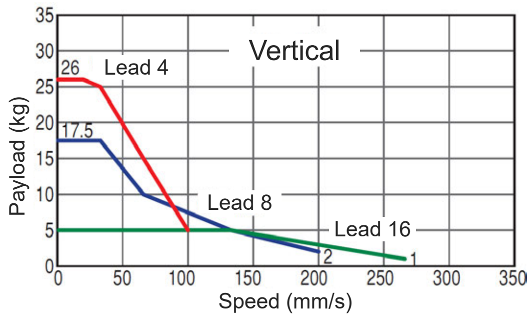
RA4C



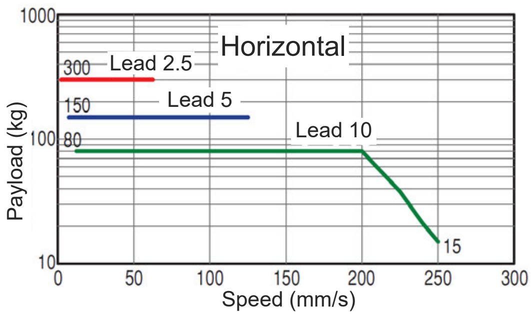


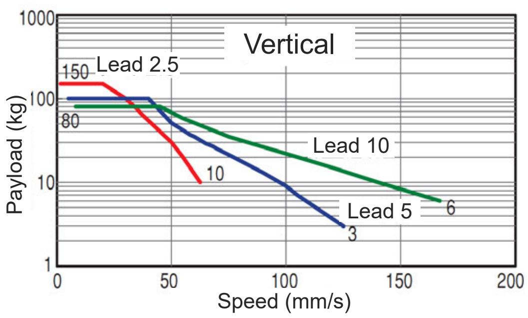
RA6C





RA10C





2.3 Push Force / Gripping Force and Current Limit Value

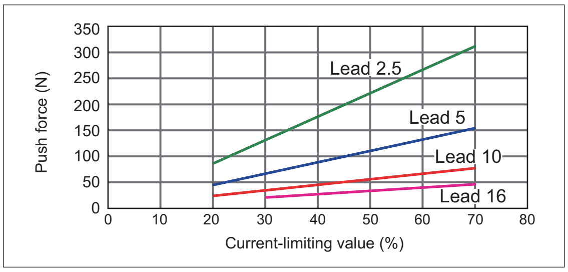
Caution

- The correlation of the push force and the current limit value is the rated push speed (in the setting at the delivery) and is a reference value.
- Use the actuator with the setting above the minimum push force value. The push force will be unstable if it is below the minimum push force value.
- If the positioning speed setting in the operation condition is made lower than the push speed, the push speed will follow that speed, thus cannot perform the expected push force.

RCP6 Series (Slider type / Rod type / Table type)

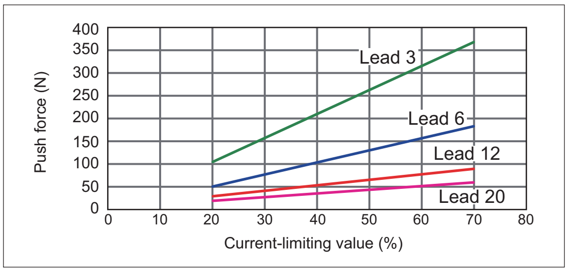
*** Characteristics should be the same for Cleanroom/Dust and drip proof type.**

SA4/RA4/RRA4/TA4 type



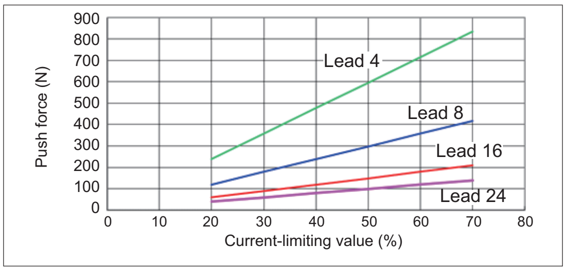
* RCP6W should start pressing at the current limit of 30% or more.

SA6/RA6/RRA6/TA6 type

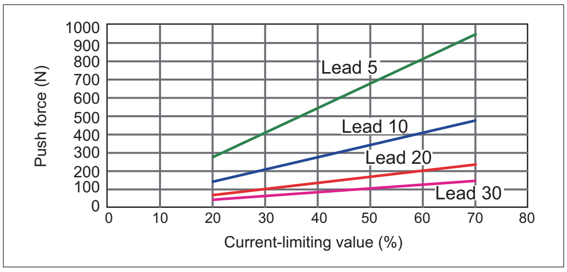


* RCP6W should start pressing at the current limit of 30% or more.

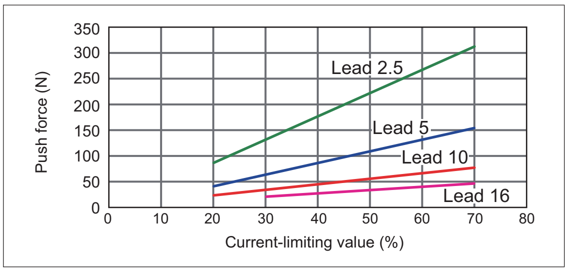
SA7/TA7/WSA14 type



SA8 type

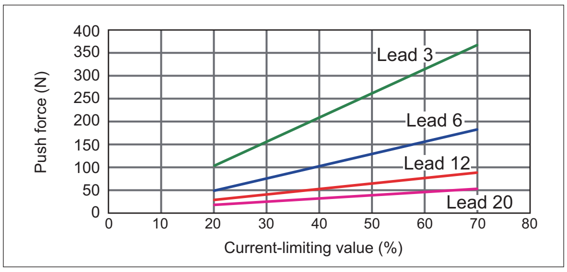


WSA10/WRA10 type



* RCP6W should start pressing at the current limit of 30% or more.

WSA12/WRA12 type

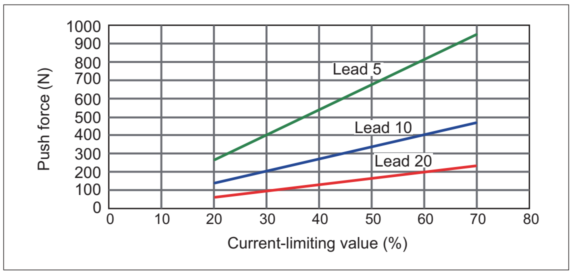


* RCP6W should start pressing at the current limit of 30% or more.

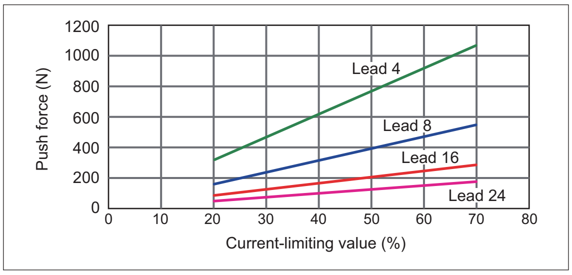
RCP6 Series (Slider type / Rod type / Table type)

*** Characteristics should be the same for Cleanroom/Dust and drip proof type.**

WSA16 type

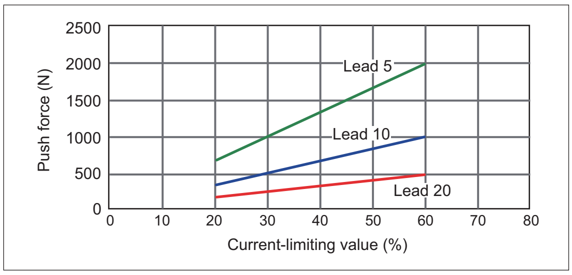


RA7/RRA7/WRA14 type



* RCP6W should start pressing at the current limit of 30% or more.

RA8/RRA8/WRA16 type

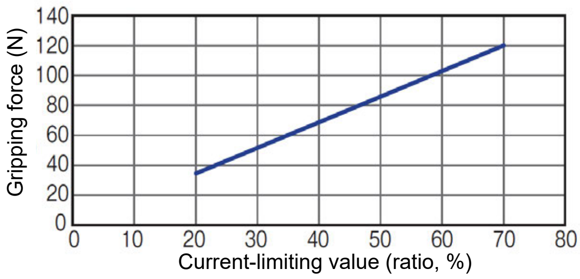


* RCP6W should start pressing at the current limit of 30% or more.

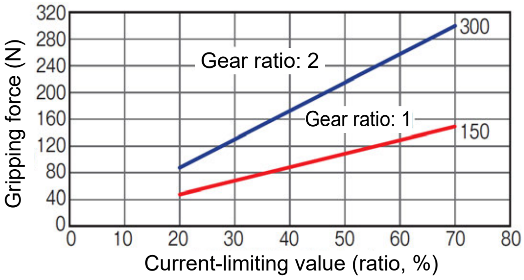
RCP6 Series (Gripper type)

*** The grip force shows the total amount of two fingers.**

GRT7A

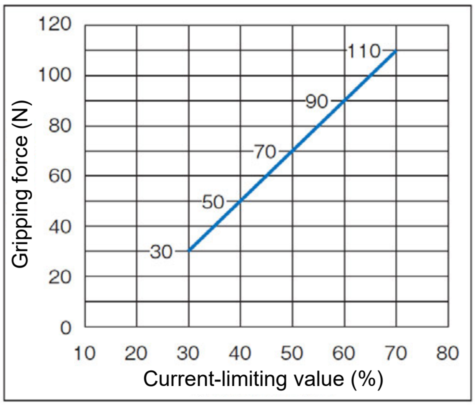


GRT7B

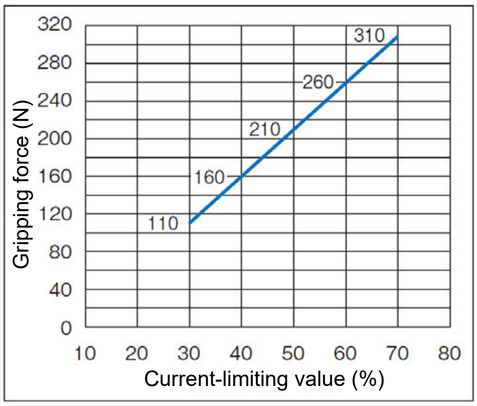


GRST6C/GRST6R

Lead 8



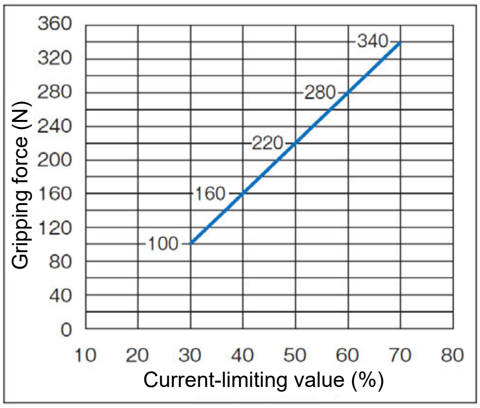
Lead 2



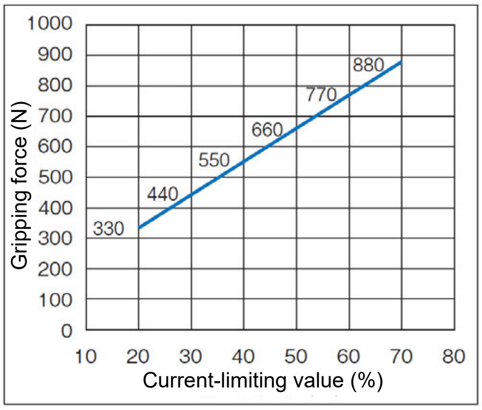
RCP6 Series (Gripper type)

GRST7C/GRST7R

Lead 8



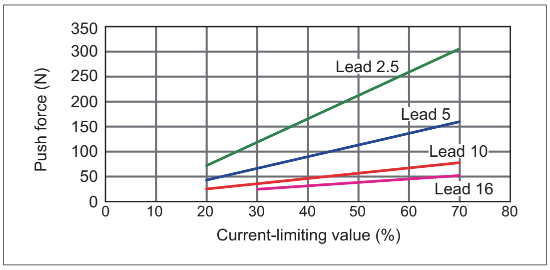
Lead 2



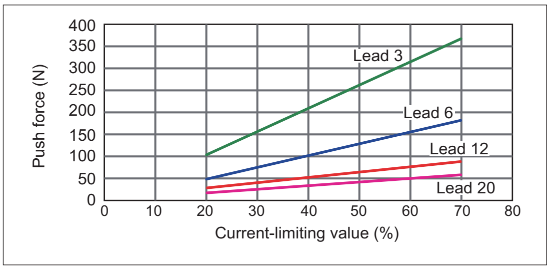
RCP5 Series (Slider type / Rod type)

● RCP5 * Characteristics should be the same for Cleanroom type.

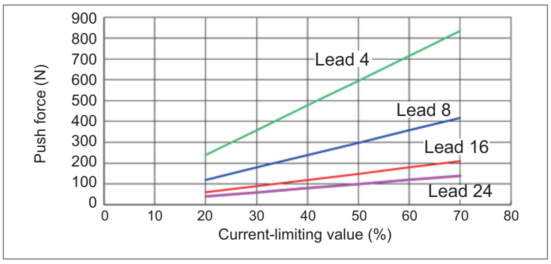
SA4/RA4 type



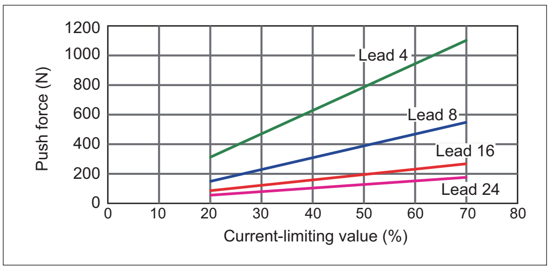
SA6/RA6 type



SA7 type

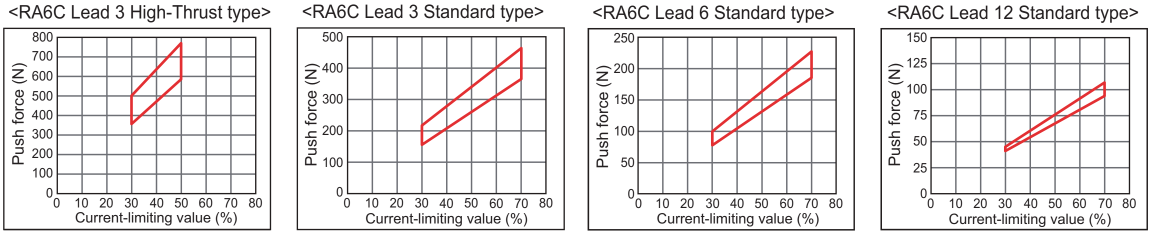


RA7 type



● RCP5W

RA6C type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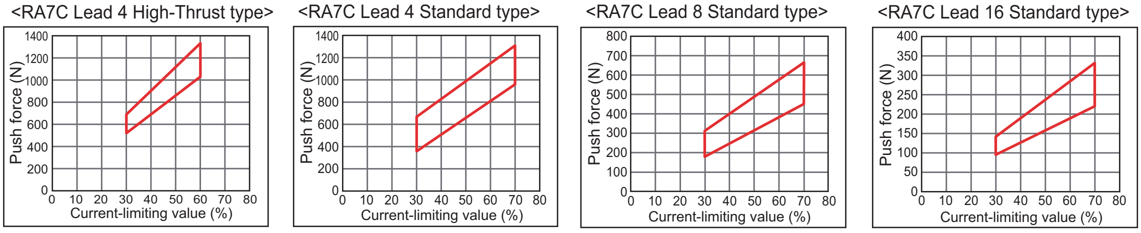
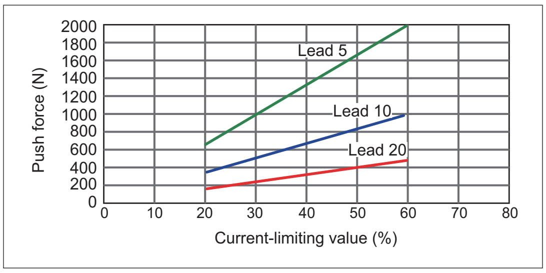
RA7C type

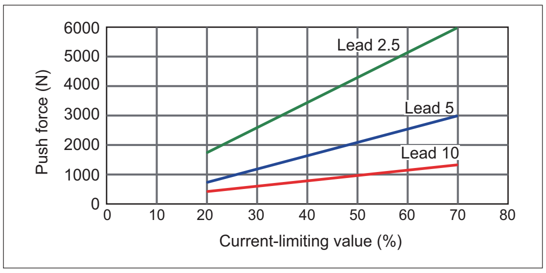

<RA7C Lead 4 High-Thrust type> <RA7C Lead 4 Standard type> <RA7C Lead 8 Standard type> <RA7C Lead 16 Standard type>

● RCP5/RCP5W

RA8 type



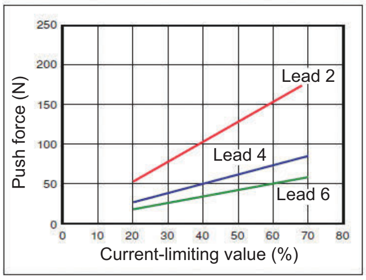
RA10 type



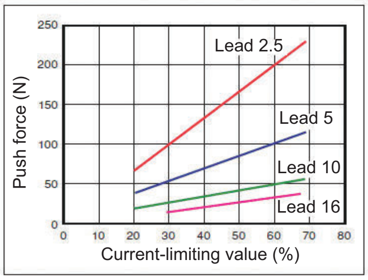
RCP4 Series (Slider type / Rod type)

*** Characteristics should be the same for Cleanroom type.**

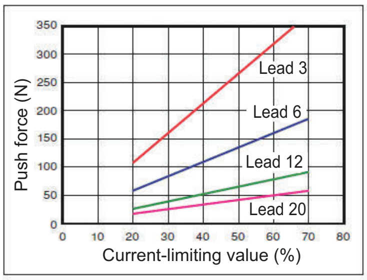
SA3 type



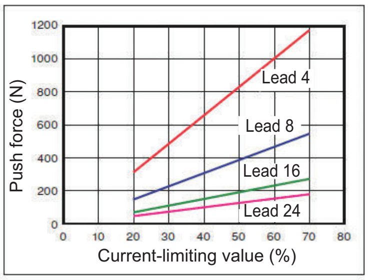
SA3 type



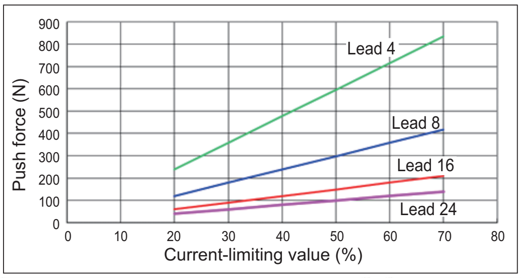
SA5/SA6/RA5 type



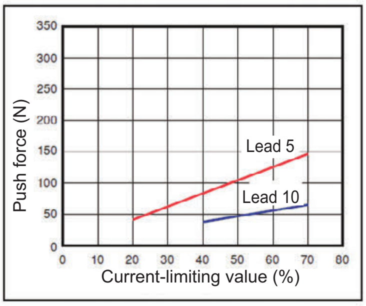
RA6 type



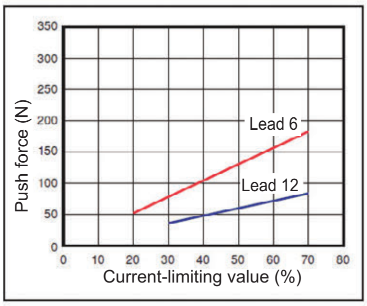
SA7 type



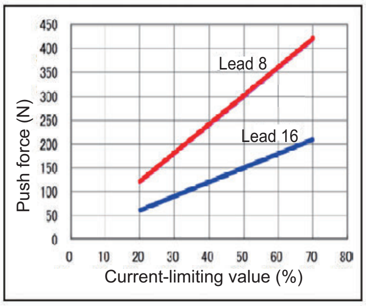
RCP4W-SA5C



RCP4W-SA6C

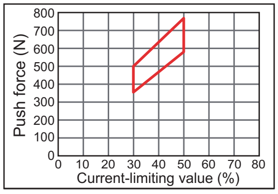


RCP4W-SA7C

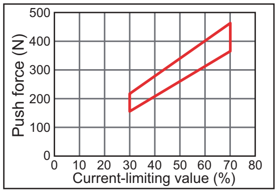


RCP4W-RA6C/RA7C type

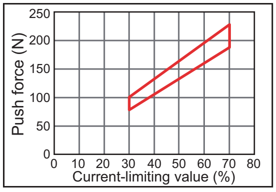
<RA6C Lead 3 High-Thrust type>



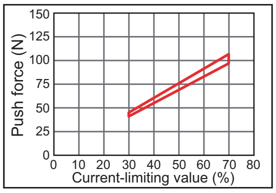
<RA6C Lead 3 Standard type>



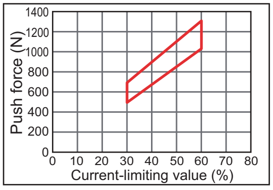
<RA6C Lead 6 Standard type>



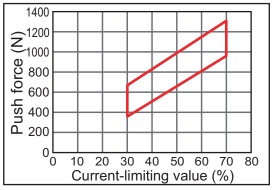
<RA6C Lead 12 Standard type>



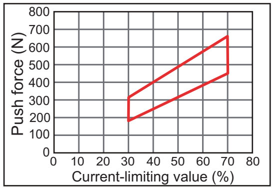
<RA7C Lead 4 High-Thrust type>



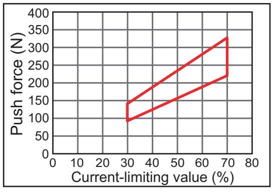
<RA7C Lead 4 Standard type>



<RA7C Lead 8 Standard type>

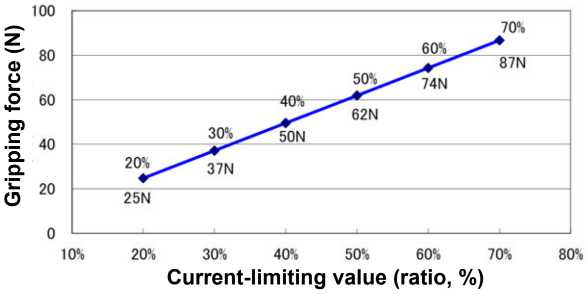


<RA7C Lead 16 Standard type>

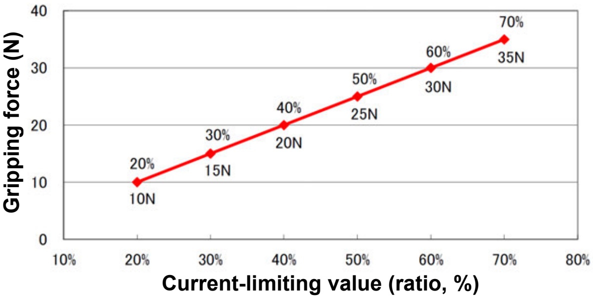


RCP4 Series (Gripper type)

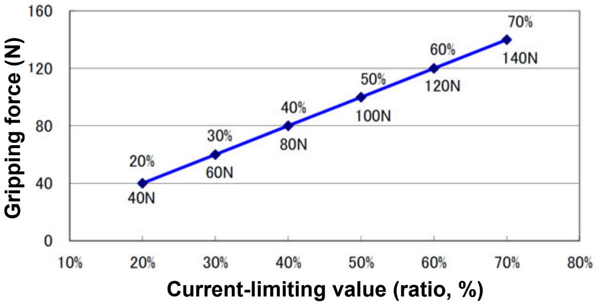
RCP4-GRSML (Slide type)



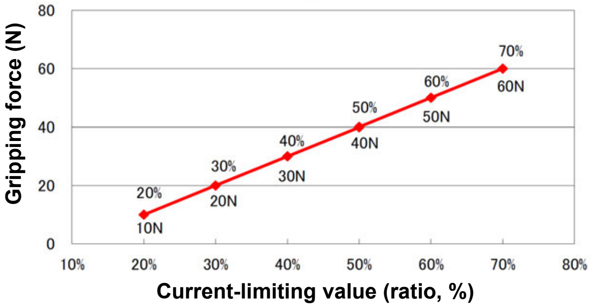
RCP4-GRLM (Lever type)



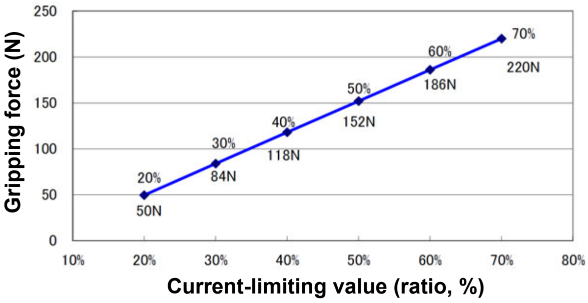
RCP4-GRSLL (Slide type)



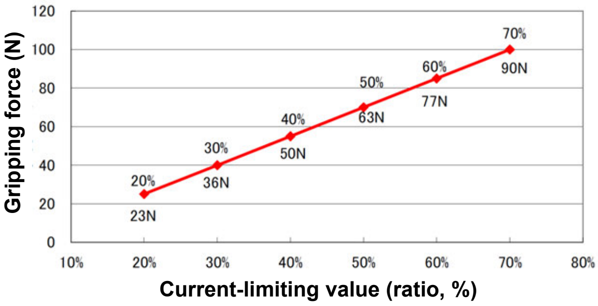
RCP4-GRLL (Lever type)



RCP4-GRSWL (Slide type)

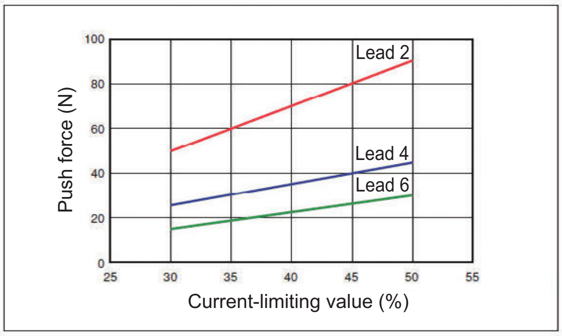


RCP4-GRLW (Lever type)

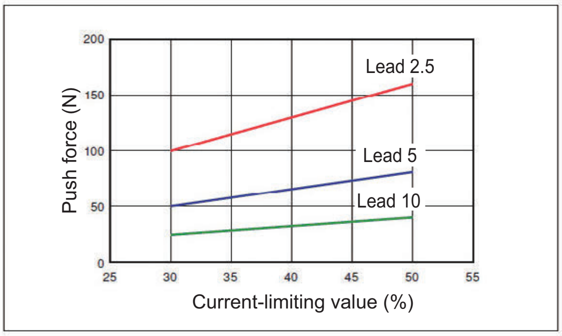


RCP3 Series (Slider type / Table type)

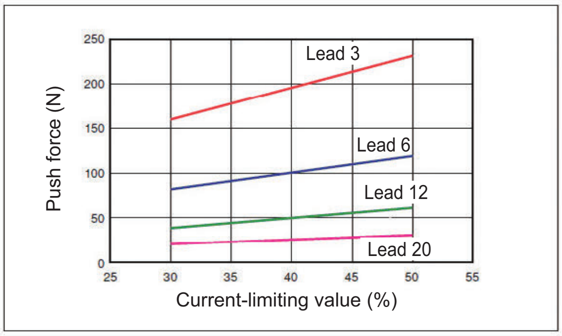
SA3 type



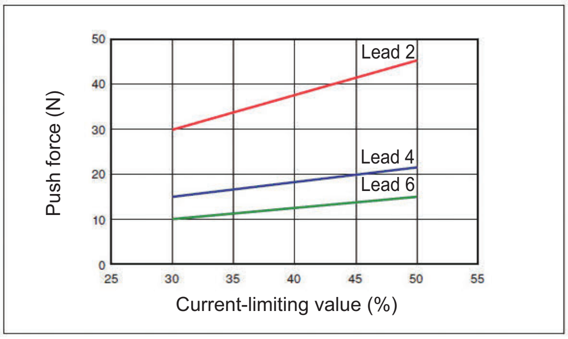
SA4 type



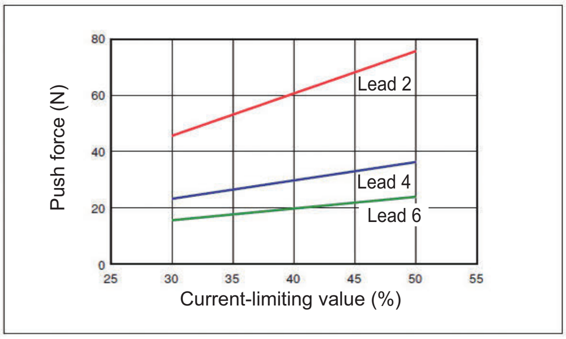
SA5/SA6 type



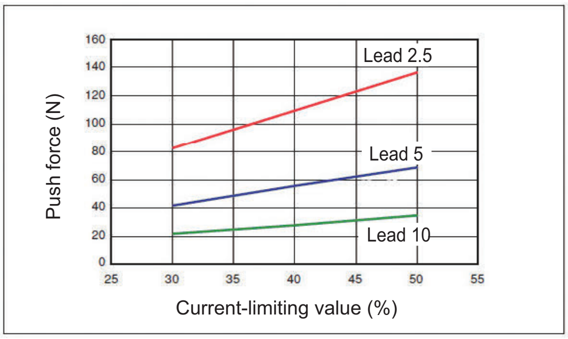
TA3 type



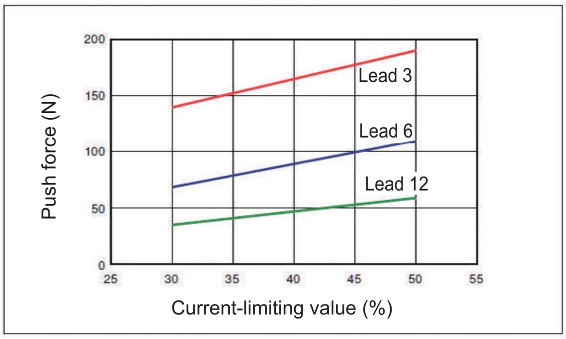
TA4 type



TA5 type

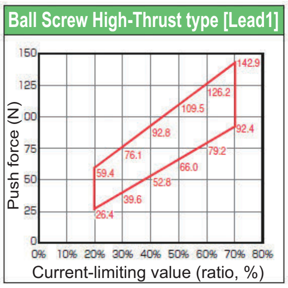


TA6/TA7 type

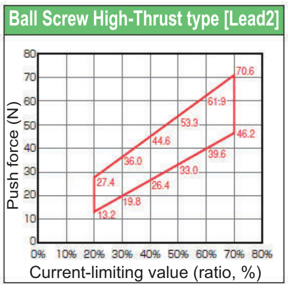


RCP3 Series (Slim, compact rod type) RA2AC/RA2BC/RA2AR/RA2BR

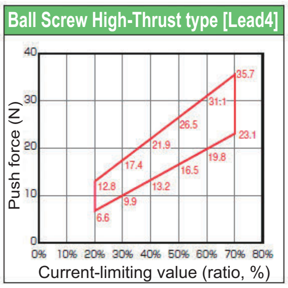
Ball Screw High-Thrust type [Lead1]



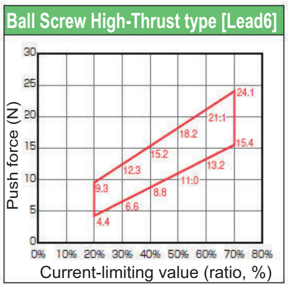
Ball Screw High-Thrust type [Lead2]



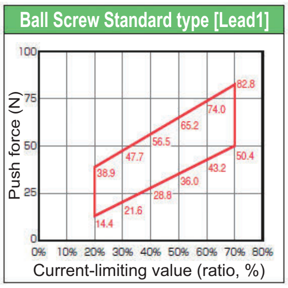
Ball Screw High-Thrust type [Lead4]



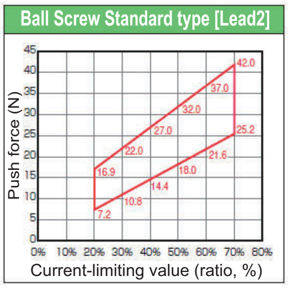
Ball Screw High-Thrust type [Lead6]



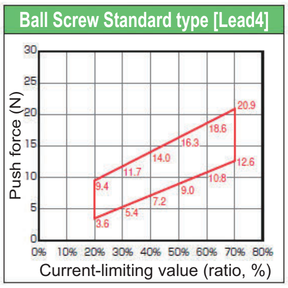
Ball Screw Standard type [Lead1]



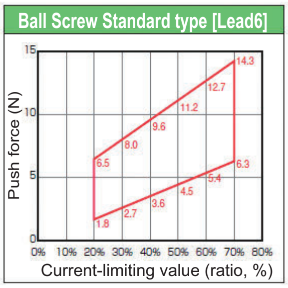
Ball Screw Standard type [Lead2]



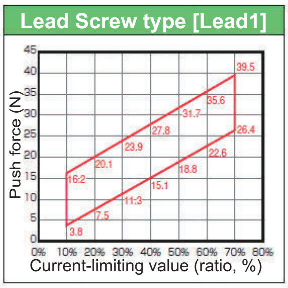
Ball Screw Standard type [Lead4]



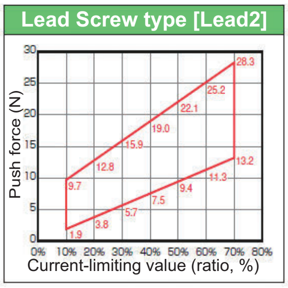
Ball Screw Standard type [Lead6]



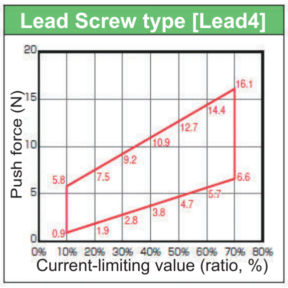
Lead Screw type [Lead1]



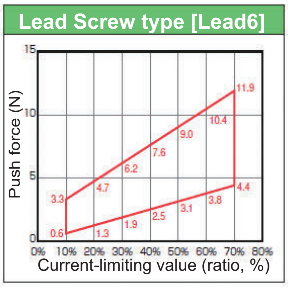
Lead Screw type [Lead2]



Lead Screw type [Lead4]

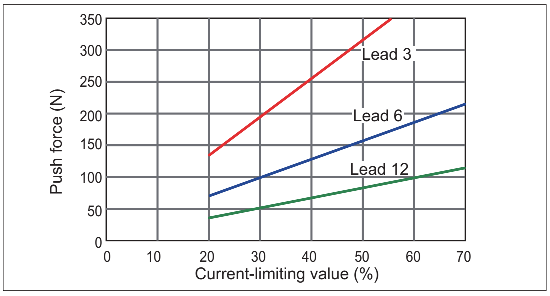


Lead Screw type [Lead6]

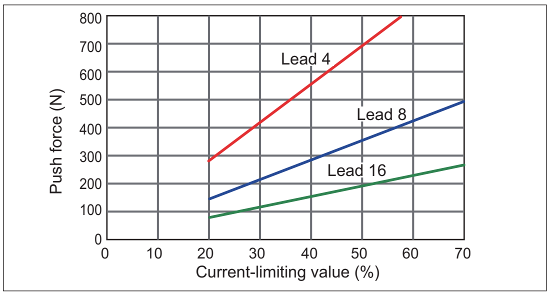


RCP2 Series (Slider type / Rod type)

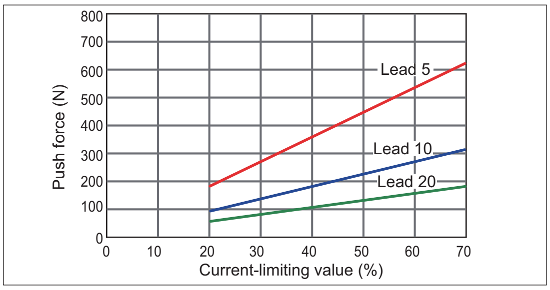
SA5C/SA6C/SS7C type



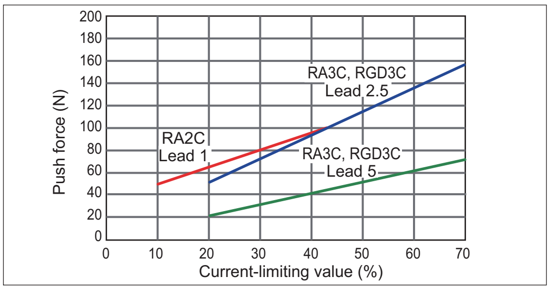
SA7C type



SS8C type



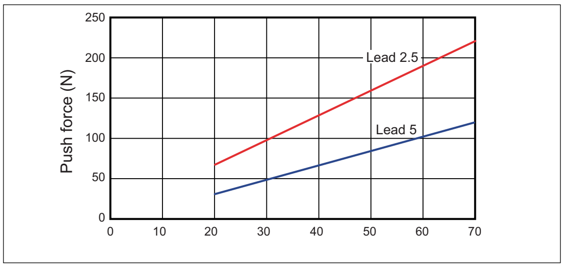
RA2C/RA3C/RGD3C type



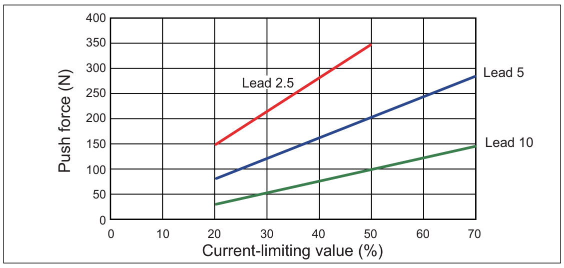
* There is the upper limit for the push force established for each stroke in RA2C.
25•50 Stroke: 100N, 75 Stroke: 70N, 100 Stroke: 55N

RCP2 Series (Slider type / Rod type)

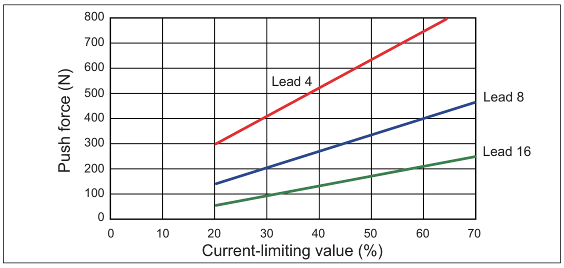
SRA4R/SRGS4R/SRGD4R type



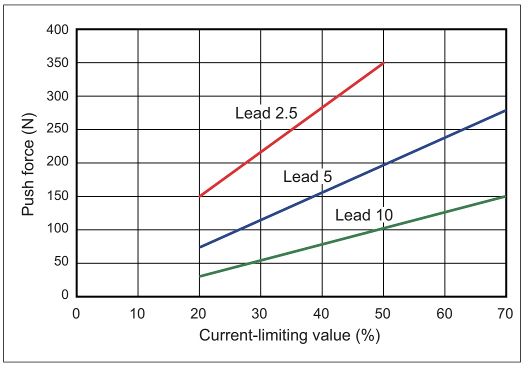
RA4C/RGS4C/RGD4C



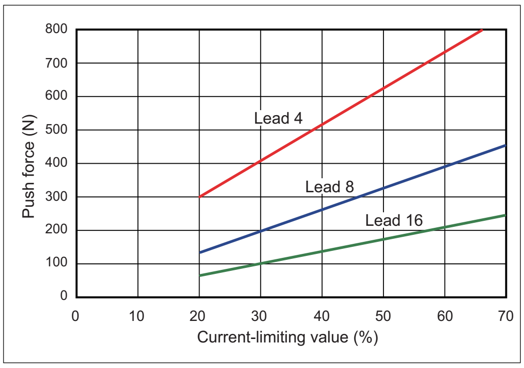
RA6C/RGS6C/RGD6C



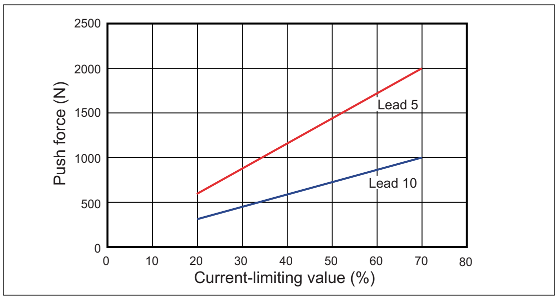
RCP2W-RA4C type



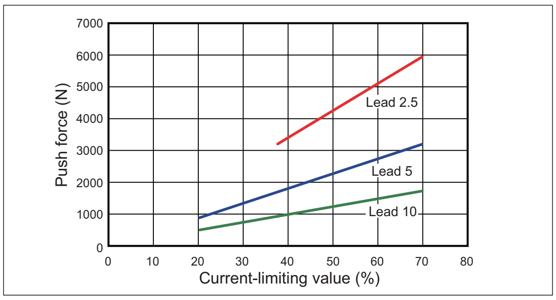
RCP2W-RA6C type



RA8 type



RA10 type

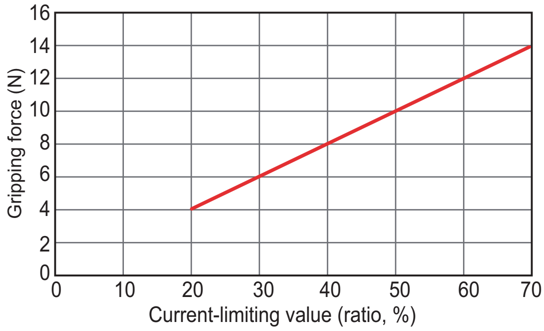


RCP2 Series (2-finger gripper type)

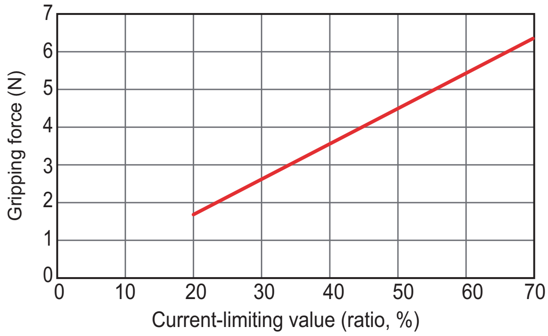
*** Characteristics should be the same for Cleanroom type / Dust and drip proof type.**

*** The grip force shows the total amount of two fingers.**

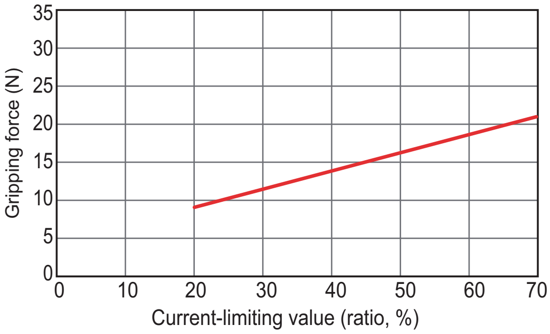
RCP2-GRSS



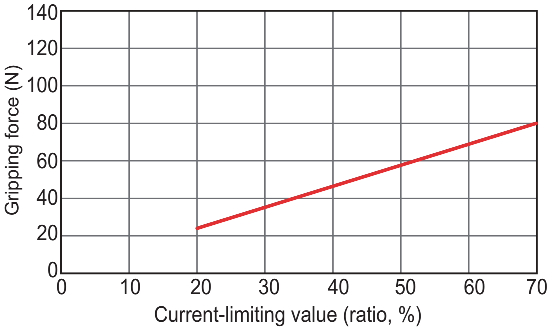
RCP2-GRLS



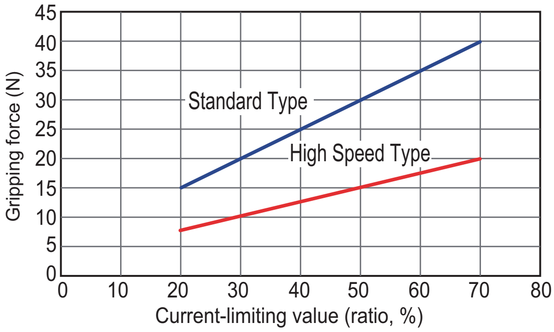
RCP2-GRS



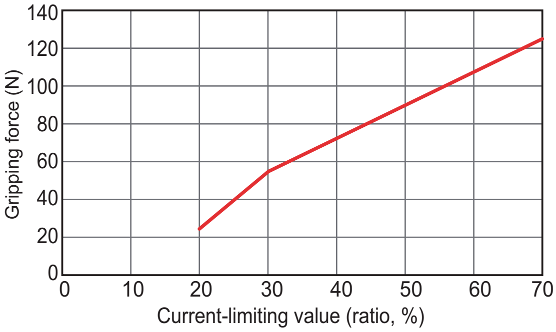
RCP2-GRM



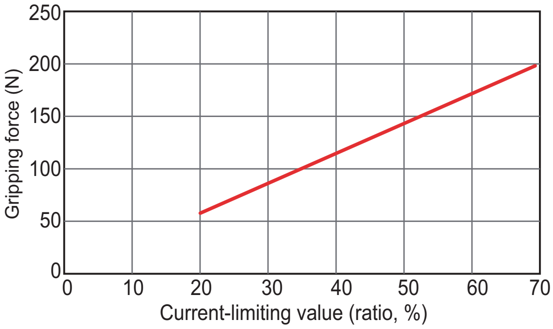
RCP2-GRST



RCP2-GRHM



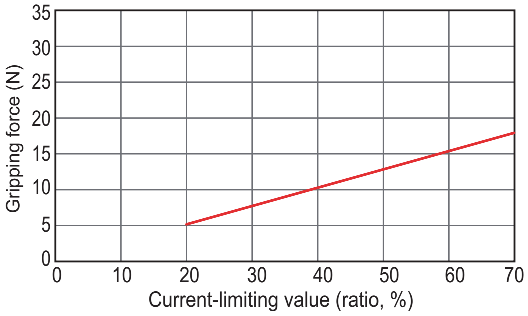
RCP2-GRHB



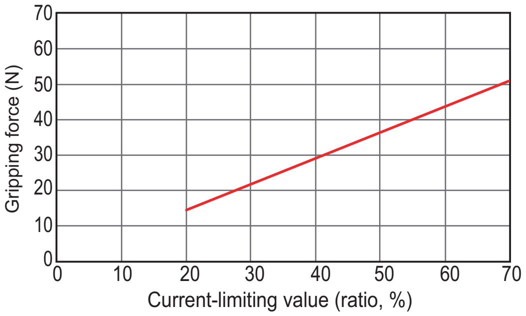
RCP2 Series (3-finger gripper type)

*** Characteristics should be the same for Cleanroom type / Dust and drip proof type.**
*** The grip force may differ depending on the distance to the gripping point.**
Refer to the instruction manual of each actuator for detail.

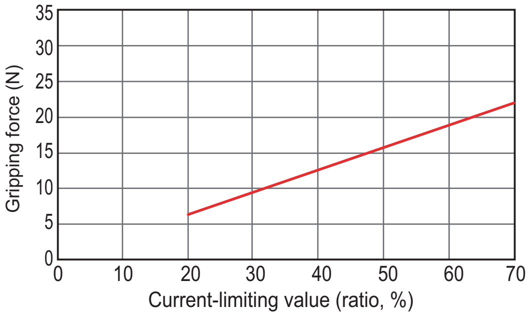
RCP2-GR3LS



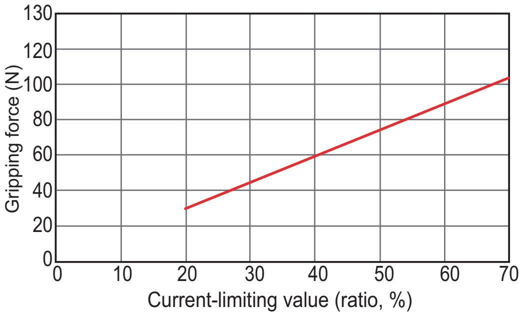
RCP2-GR3LM



RCP2-GR3SS

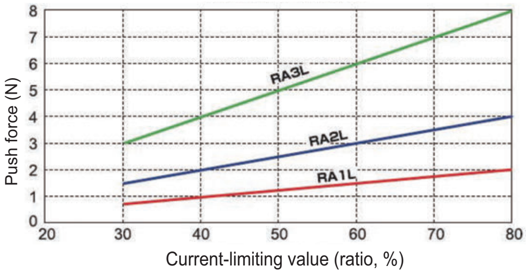


RCP2-GR3SM



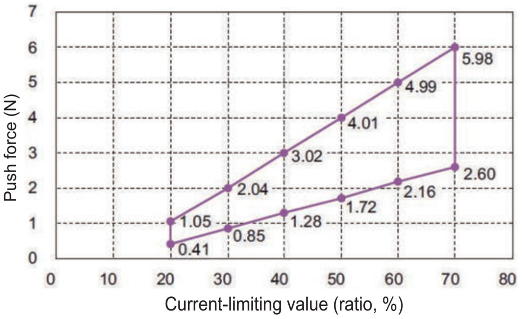
RCL Series

RA1L/RA2L/RA3L



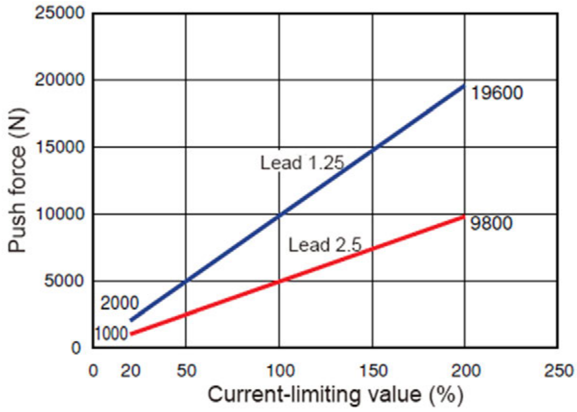
RCD Series

RCD-RA1DA



RCS2 Series

RCS2-RA13R



* Check the operating conditions and way to select described in RCS2-RA13R Instruction Manual to make sure it is used in the specification range.

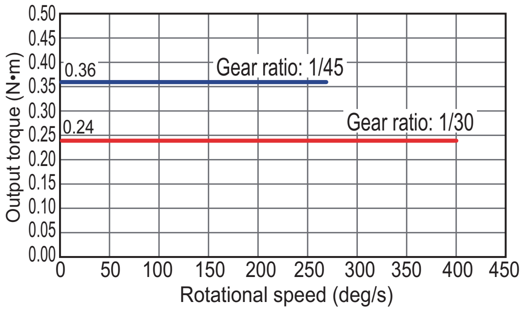
2.4 Rotational speed and Output torque / Allowable inertial moment

RCP2 Series (Rotary type)

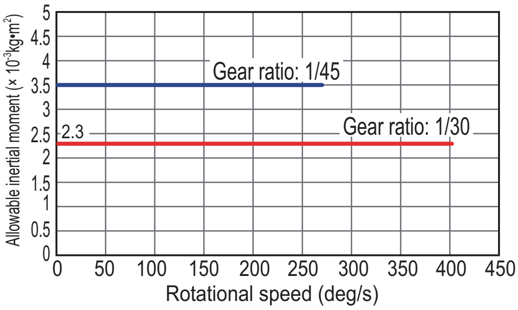
*** Characteristics should be the same for Cleanroom type.**

RCP2-RTBS/RTBSL

■ Correlation diagram of rotational speed and output torque

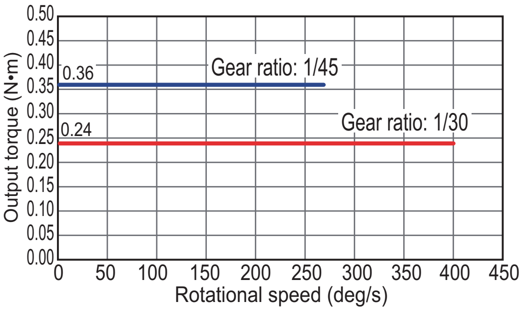


■ Correlation diagram of rotational speed and allowable inertial moment

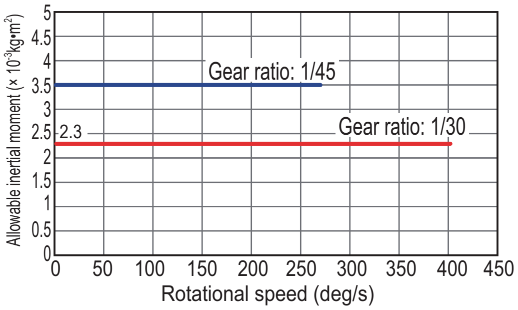


RCP2-RTCS/RTCSL

■ Correlation diagram of rotational speed and output torque

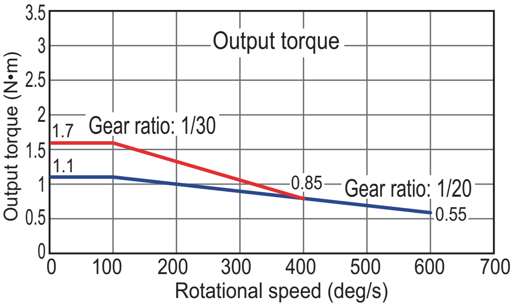


■ Correlation diagram of rotational speed and allowable inertial moment

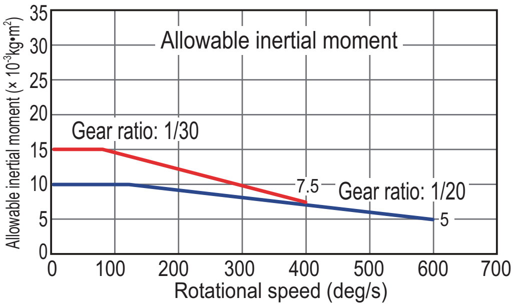


RCP2-RTB/RTBL

■ Correlation diagram of rotational speed and output torque

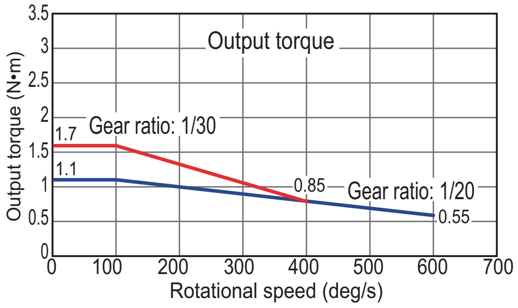


■ Correlation diagram of rotational speed and allowable inertial moment

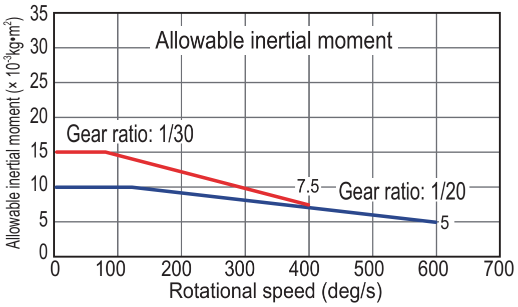


RCP2-RTC/RTCL

■ Correlation diagram of rotational speed and output torque



■ Correlation diagram of rotational speed and allowable inertial moment

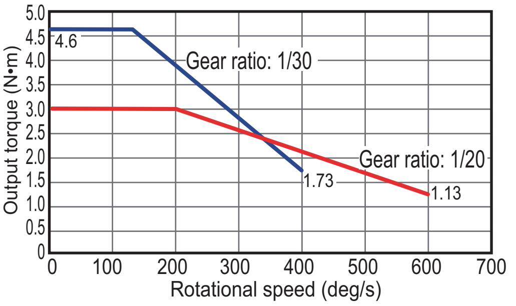


RCP2 Series (Rotary type)

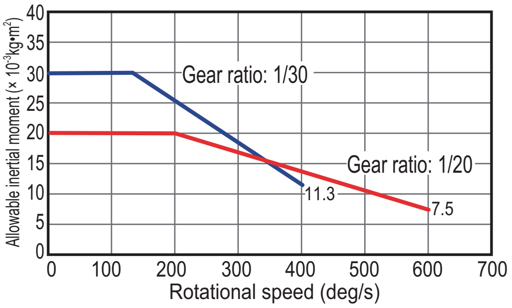
*** Characteristics should be the same for Cleanroom type.**

RCP2-RTBB/RTBBL

■ Correlation diagram of rotational speed and output torque

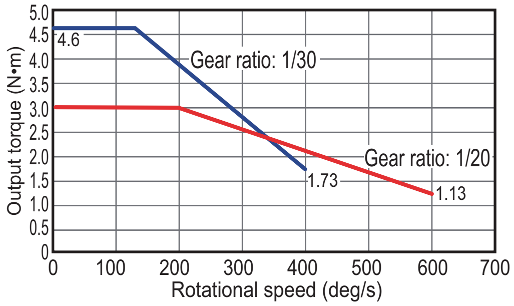


■ Correlation diagram of rotational speed and allowable inertial moment

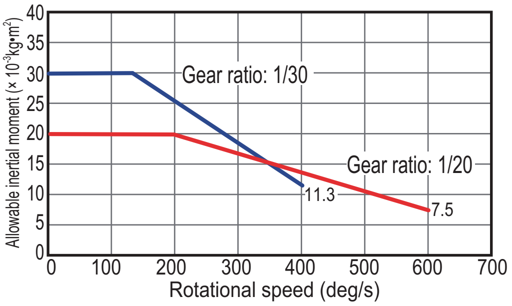


RCP2-RTCB/RTCBL

■ Correlation diagram of rotational speed and output torque



■ Correlation diagram of rotational speed and allowable inertial moment



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Revision history

Revision date	Revised content
2018.04	First Edition
2018.05	Edition 1B ・Drive source cutoff issues reviewed (Specifications Section 2-8, 3-11, 3-41; Startup Section 4-62) ・Actuator connection cable issues reviewed (Specifications Section 2-29 to 31, 5-2, 5-4; Startup Section 3-2, 3-4) ・Periodic inspection items changed (Maintenance Section 1-3) ・Errata corrected
2018.07	Edition 1C ・Added maximum number of connectable axes (Specification Section 1-1, 1-2, 1-6, 2-6, 2-20, 3-1, 3-62, 4-47) ・Described supported standards for CC-Link IE (Intro-12, Specification Section 1-1, 3-1, 3-2) ・Corrected errata (Intro-19; Specification Section 2-10, 3-40; Startup Section 4-61)
2018.09	Edition 1D ・Connectable actuators reviewed (Appendix Chapter 1)
2018.11	Edition 1E ・Text garbling corrected in Edit 1D
2019.01	Second Edition ・Complied with UL Certification (Intro-15; Specifications Section 1-6, 2-6, 3-3, 4-3, 5-3, 6-2) ・Correction made to time related to Timing of I/O Signals (Specifications Section 1-3, 3-81) ・Descriptions revised for current amperage (Specifications Section 2-10) ・Descriptions revised for points related to connection cable (Specifications Section 2-30, 2-31, 5-2; Startup Section 3-3, 3-4) ・Descriptions revised for sections of power supply unit monitor (Specifications Section 3-44, 3-132; Startup Section 4-65) ・Correction made to assignment for Positioner 1 Mode (Specifications Section 3-71) ・Descriptions revised for points related to fan unit (Specifications Section 4-15; Maintenance Section 2-19) ・Descriptions revised in Precautions for Rotary Type and Precautions for Gripper Type (Specifications Section 3-86, 3-87, 4-74 to 4-77) ・Correction made to parameter values, explanation revised, "Symbol" deleted from items in table (Specifications Section Chapter 2 to 4, 7; Startup Section Chapter 3, 5) ・Connectable actuators reviewed (Appendix Chapter 1) ・Terms unified (Specifications Section 2-2, 4-24, 4-25), correction made (Intro -18; Specifications Section 4-27, 4-32, 4-72)

Revision date	Revised content
2019.07	Edition 2B ・Note added for present current value (Specifications Section 1-2, 3-6; Startup Section 4-4) ・Examples of circuit revised and added for drive cutoff circuit (Specifications Section 2-7, 2-26 to 2-28) ・References added regarding Selection of Circuit Breaker (Specifications Section 2-9) ・RCON connection cable list added (Specifications Section 2-31 to 2-32; Startup Section 3-3 to 3-4) ・Correction made to CC-Link connector model codes (Specifications Section 2-35; Startup Section 1-1) ・Explanations revised in input and output signal list (Specifications Section 3-7) ・Explanations revised and added in section of “Threshold [%]” (Specifications Section 3-48) ・Explanations revised in emergency stop (EMGS) signal (Specifications Section 3-82) ・Explanations revised in load output judgment status (LOAD) signal (Specifications Section 3-104) ・Explanations added for Pressing Operation Command Torque Level Detection (Specifications Section 3-118) ・Explanation added for Axis Number Assignment / Unit Configuration Setting when SCON-CB connected (Specifications Section 3-143) ・How to Replace Fan Unit added (Specifications Section 4-16) ・Correction made to parameters and explanations revised (Specifications Section 4-5; Startup Section 5-2) ・How to Replace Absolute Battery added (Specifications Section 5-7 to 5-8) ・Items added in PSA-24 Status Data Monitor (Specifications Section 7-2 to 7-4) ・Items added in “Installing USB Connection Driver for RCON” (Startup Section 4-14 to 4-16) ・Alarm code :09B (Internal communication error) added (Maintenance Section 2-10, 2-18) ・Explanations revised and added for Alarm Codes: 09C, 0A3, 0A1, 0B4, 0E5 (Maintenance Section 2.4) ・Connectable actuators reviewed (Appendix Chapter 1) ・Terms unified, correction made
2019.08	Edition 2C ・Explanations revised in timing chart for I/O signals (Specifications Section 3-81, 3-108, 3-110, 3-112) ・Change made in caution note Electric wire diameter used for power supply wiring (Startup Section 2-8) ・Correction made

Revision date	Revised content
2019.09	Third Edition ・Conforming to Safety Category added (Appendix Chapter 1) ・Connectable Actuators moved (Appendix Chapter 2)
2020.02	Fourth Edition ・Structure of chapters revised ・200V driver unit, 200V power supply unit and EC connection unit added ・Expression of page numbers changed
2020.07	Edition 4B ・Added of Quick Start Guide ・Heat output of RCON-GW added (Specifications Section A2-7) ・Change made to ambient humidity for use to 5%RH to 85%RH (Specifications Section A2-7, A2-21, Startup Section B2-1) ・EtherNet port (option) added to SIO Interface (Specifications Section A2-9) ・Correction made to motor wattage for calculation for 200V system (Specifications Section A2-14) ・Correction made to AC power supply input diagram for 200V three-phase and single phase types (Specifications Section A2-23, Startup Section B2-3) ・Correction made to connector diagram for EtherNet/IP and PROFINET IO (Specifications Section A2-53, A3-23, A3-25) ・RTE added in 13 in Gateway Control Signal 0 (Specifications Section A3-32, A3-34) ・Contents related to actuator data control features deleted (Specifications Section A3-181 to 186, Startup Section B6-5, B6-53, Appendix D2-165 to 167) ・Change made to cable colors for CC-Link cables DB: Yellow → White, DG: White → Yellow (Startup Section B2-16) ・Parameter No. 75 Electromagnetic Brake Power Supply Monitor added (Startup Section B6-3, B6-30） ・Inspection describing only cable between simple absolute drivers delete from regular inspection section (Maintenance Section C1-2) ・200V power supply unit added in cause/countermeasure for Alarm Code 04C (Maintenance Section C2-13) ・Description added in Alarm Codes 04C and 0D6 stating detail code is 0002H when fan rotation in driver unit and 200V power supply unit are dropped (Maintenance Section C2-13, C2-20) ・Correction made partly to figures, tables, wrong descriptions, etc. ・Added Index

Revision date	Revised content
2020.12	Fifth Edition ・Added Configuration of manuals related to RCON system ・Safety Guide　14. Handling and Caution of Internal Drive Cutoff Solid-State Relay added ・Specifications Section 1.1, 1.3, 2.2, 2.5, 3.1, 3.2 Contents related to EtherCAT Motion, MECHATROLINK-III, SSCNET III/H added ・Specifications Section 2.5　Cable for Driver Stop Feature added ・Specifications Section 3.7　Address configuration revised and light malfunction maintenance feature added ・Specifications Section 5.4　Table for single-phase 200V PIN numbers added ・Startup Section 6.1　Parameter list, Parameter details No.195, No.196 added ・Maintenance Section 2.3　Gateway Unit Alarm added Alarm B9 ・Maintenance Section 2.4　Driver Unit/Simple Absolute Unit Alarm [Addition] Alarm 086, 096, 0A, 0AC [Delete] Alarm 096 Change made to [Causes and countermeasures] Alarm 048, 091, 0A2, 0B5, 0BE, 0C5, 0CE, 0D8, 0A8, 0B3 0C4, 0CD, 0D7, 0E6, 0EC, 0F0, 0F4, 0FC ・Appendix 1.1　Addition and change made to Appendix 1.1 Confirming to safety category ・Appendix 2.1　List of Actuator Specifications Application for RCS4 offboard tuning added ・Correction made partly to figures, tables, wrong descriptions
2020.12	Edition 5B ・Description added stating ELECYLINDER is available for operation only in double solenoid system ・Precautions for Handling 14. Handling of Built-in Drive Cutoff Relay and Cautions in Caution in Handling ・Specifications Section 1.2, 3,6 Field network operation mode Description added stating motion network is not applicable ・Contents revised for Specifications Section 2.2 Configuration Unit List - RCON configuration example (3) ・Correction made to control numbers in Specifications Section 2.5, 3.5 Motion Network Instruction Manual

Revision date	Revised content
2020.12	・Startup Section 4.4　Address configuration revised and light malfunction maintenance feature added ・Startup Section 6.1　No. 9 added in ELECYLINDER Parameter List ・Maintenance Section 1.4　Caution notes added for PSA-24 status data monitor ・Maintenance Section 2.3　Content of alarms (6D and FA) added for gateway unit ・Correction made
2021.02	Edition 5C ・Note added for Precautions for Handling, Specifications Section 3.7 Address Configuration MON signal ・Actuator Coordinate System　Change made to actuator illustration ・Specifications Section 2.3　Specifications　Addition and change made to ELECYLINDER Power supply capacity ・Specifications Section 2.5　Cable for Driver Stop Feature　Correction made to Cable type ・Specifications Section 3.7　Address Configuration　Contents changed for current velocity in direct numerical mode ・Specifications Section 3.7, Startup Section 1.2 Change made to description regarding items to refer to ・Startup Section 1.1　Checking the Product　SCON Extension Unit Connection cable correction made to remarks ・Startup Section 4.4　Descriptions revised in how to select power supply unit (PSA-24) monitored items ・Startup Section 6.1　Correction made to Parameter No. 26, 47, 52, 166 ・General　Contents added regarding IA-OS ・Terms unified
2021.07	Edition 5D ・Prelims: International Standard Compliance Contents in table changed in accordance with RCON-SC-1, RCON-PS2-3 and RCON-EC-4 complying with UL About UL/cUL of model nameplate and detail page added

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