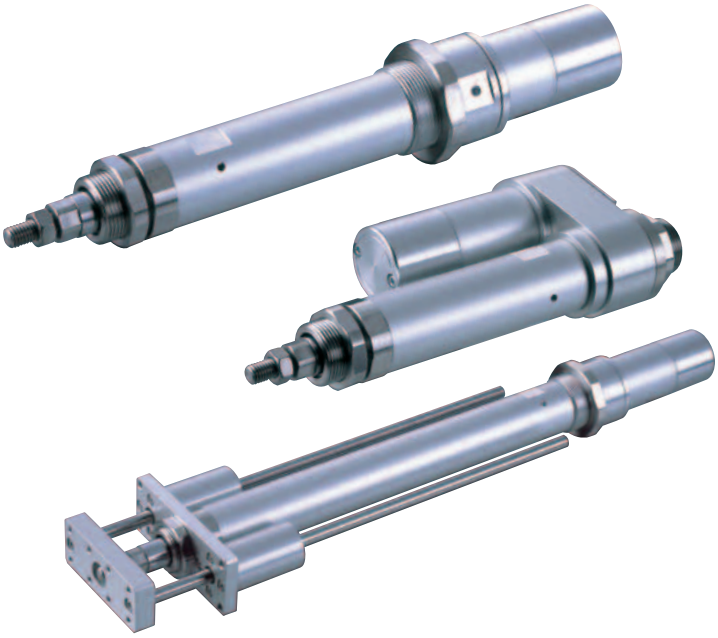
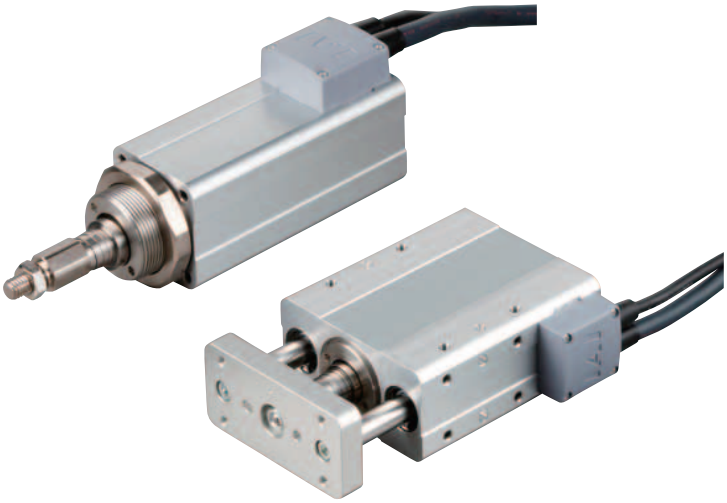
IAI

ROBO CYLINDER



RCS2 series Rod	Standard Type	Miniature Type	46mm width	RCS2-RN5N	234-1
			46mm width	RCS2-RP5N	234-3
			46mm width	RCS2-GS5N	234-5
			46mm width	RCS2-GD5N	234-7
			94mm width	RCS2-SD5N	234-9
		Coupling Type	ø37mm	RCS2-RA4C	235
			55mm width	RCS2-RA5C	237
		Built-In Type	ø37mm	RCS2-RA4D	239
		Short-Length Type	75mm width	RCS2-SRA7BD	241
		Side-Mounted Motor Type	ø37mm	RCS2-RA4R	243
			55mm width	RCS2-RA5R	245
			130mm width	RCS2-RA13R	247
	Single-Guide Type	Coupling Type	ø37mm	RCS2-RGS4C	249
			55mm width	RCS2-RGS5C	251
		Built-In Type	ø37mm	RCS2-RGS4D	253
		Short-Length Type	75mm width	RCS2-SRGS7BD	255
	Double-Guide Type	Coupling Type	ø37mm	RCS2-RGD4C	257
			55mm width	RCS2-RGD5C	259
		Built-In Type	ø37mm	RCS2-RGD4D	261
		Short-Length Type	75mm width	RCS2-SRGD7BD	263
		Side-Mounted Motor Type	ø37mm	RCS2-RGD4R	265
RCS2W series Damp room	Rod Type	Coupled	ø37mm	RCS2W-RA4C	
		Built-in	ø37mm	RCS2W-RA4D	459
		Motor Side-mounted	ø37mm	RCS2W-RA4R	

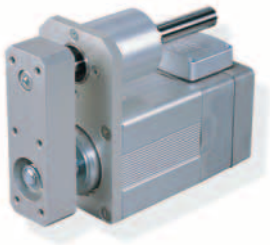


230 VAC Servo Motor

RCS2

with dedicated controllers SCON, SSEL and XSEL

Rod Type



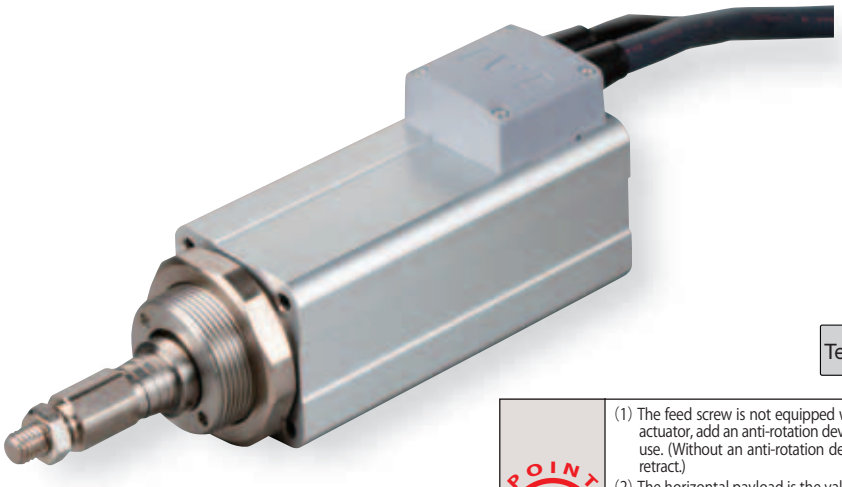
RCS2-RN5N

RoboCylinder Mini Rod Type Short-Length Nut-Mounting Type
46mm Width 230 V Servo Motor Ball Screw

■ Configuration: **RCS2** — **RN5N** — **I** — **60** — ☐ — ☐ — ☐ — **T2** — ☐ — ☐

Series	Type	Encoder	Motor type	Lead	Stroke	Compatible Controllers	Cable Length	Option
		I : Incremental	60 : 60W Servo Motor	10 : 10mm 5 : 5mm 2.5 : 2.5mm	50 : 50mm 75 : 75mm	T2 : SCON SSEL XSEL-P/Q	N : None P : 1m S : 3m M : 5m X☐☐ : Custom R☐☐ : Robot Cable	K1 : Cable exit direction left K2 : Cable exit direction front K3 : Cable exit direction right

* See page Pre-35 for an explanation of the naming convention.



Technical References P. A-5

POINT Notes on Selection

(1) The feed screw is not equipped with an anti-rotation device. Therefore, when using the actuator, add an anti-rotation device such as a guide to the end of the feed screw prior to use. (Without an anti-rotation device, the feed screw will rotate, and will not extend or retract.)
(2) The horizontal payload is the value when used in combination with an external guide.
(3) The load capacity is based on operation at an acceleration of 0.3G (or 0.2G for the 2.5mm-lead model, or when used vertically). This is the upper limit of the acceleration.
(4) Do not apply any external force on the rod from any direction other than the direction of the rod's motion.
(5) If the actuator is used vertically, pay attention to rod contact because the rod will come down when the power is turned off.

Actuator Specifications

■ Lead and Load Capacity

Model	Motor Output (W)	Feed Screw	Lead (mm)	Max. Load Capacity Horizontal (kg)	Max. Load Capacity Vertical (kg)	Rated Thrust (N)	Positioning Repeatability (mm)	Stroke (mm)
RCS2-RN5N-I-60-10-①-T2-②-③	60	Ball Screw	10	5	1.5	89	± 0.02	50 75
RCS2-RN5N-I-60-5-①-T2-②-③			5	10	3	178		
RCS2-RN5N-I-60-2.5-①-T2-②-③			2.5	20	6	356		

Legend ① Compatible controller ② Cable length ③ Options

■ Stroke and Maximum Speed

Lead \ Stroke	50 (mm)	75 (mm)
10	280 〈230〉	380 〈330〉
5	250 〈230〉	250
2.5	125	

* The value enclosed in 〈〉 apply for vertical usage. (Unit: mm/s)

Cable List

Type	Cable Symbol	
Standard	**P** (1m)	
	S (3m)	
	M (5m)	
Special Lengths	**X06** (6m) ~ **X10** (10m)	
	X11 (11m) ~ **X15** (15m)	
	X16 (16m) ~ **X20** (20m)	
Robot Cable	**R01** (1m) ~ **R03** (3m)	
	R04 (4m) ~ **R05** (5m)	
	R06 (6m) ~ **R10** (10m)	
	R11 (11m) ~ **R15** (15m)	
	R16 (16m) ~ **R20** (20m)	

* See page A-39 for cables for maintenance.

Actuator Specifications

Item	Description
Drive System	Ball Screw Ø8mm C10 grade
Lost Motion	0.1mm or less (initial value)
Frame	Material: Aluminum (white alumite treated)
Ambient Operating Temp./Humidity	0 ~ 40°C, 85% RH or less (non condensing)
Service Life	5000km or 50million cycles

Option List

Name	Option Code	See Page	
Cable exit from left	**K1**	A-32	
Cable exit from front	**K2**	A-32	
Cable exit from right	**K3**	A-32	

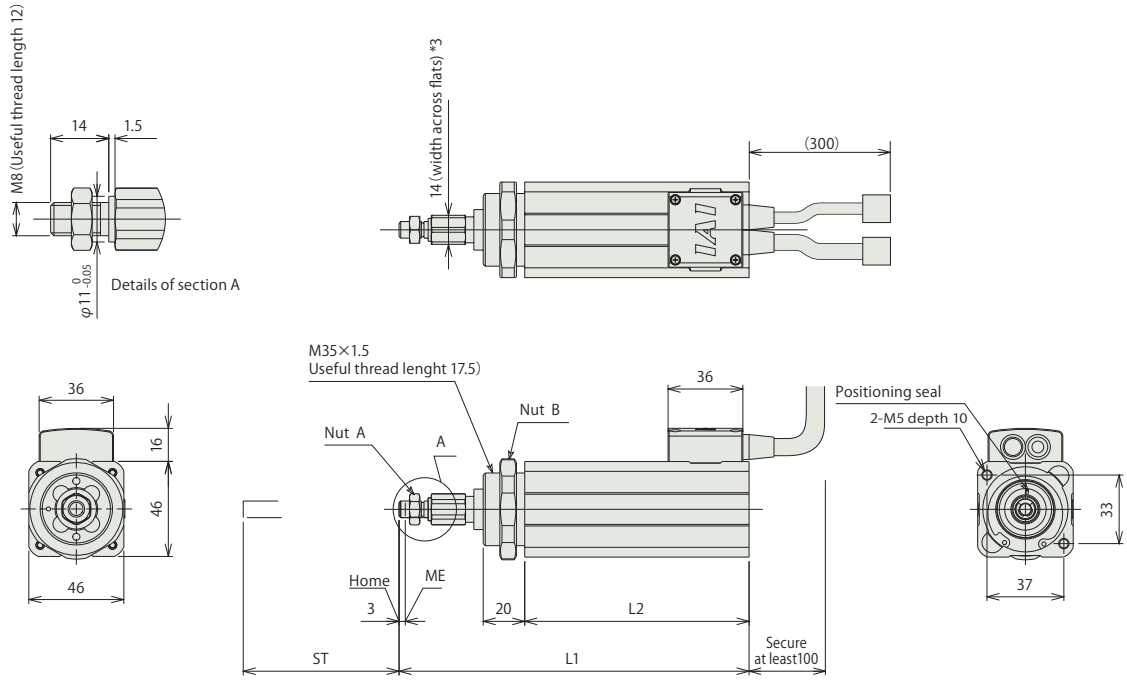
Dimensions

CAD drawings can be downloaded from IAI website. www.robocylinder.de

For Special Orders P. A-9

2/3D CAD

*1 A motor-encoder cable is connected here. See page A-39 for details on cables.
*2 When homing, the rod moves to the mechanical end; therefore, please watch for any interference with the surrounding objects.
ME : Mechanical end SE : Stroke end
*3 The orientation of the bolt will vary depending on the product.



Dimensions/Weight by Stroke

Stroke	50	75
L1	168.5	193.5
L2	108	133
Weight (kg)	1.0	1.1

Compatible Controllers

The RCS2 series actuators can operate with the controllers below. Select the controller according to your usage.

Name	External view	Model	Desciption	Max. Positioning points	Input Voltage	Power Supply Capacity		See Page
Positioner Mode		SCON-C-60 I -NP-2-①	Positioning is possible for up to 512 points	512 points	Single-Phase AC 115V Single-Phase AC 230V 3-Phase AC 230V (XSEL-P/Q only)	218VA max. * The power supply capacity vary depending on the controller (refer to the manual).		→ P547
Solenoid Valve Mode			Operable with the same controls as the solenoid valve	7 points				
Serial Communication Type			Dedicated to serial communication	(—)				
Pulse Train Input Control Type			Dedicated to pulse train input	768 points				
Program Control 1-2 Axes Type		SSEL-C-1-60 I -NP-2-①	Programmed operation is possible Operation is possible on up to 2 axes	20000 points				→ P577
Program Control 1-6 Axes Type		XSEL-②-1-60 I -N1-EEE-2-③	Programmed operation is possible Operation is possible on up to 6 axes	20000 points				→ P578

* For SSEL and XSEL, only applicable to the single-axis model.
① is a placeholder for the power supply voltage (1: 115V, 2: single-phase 230V).
② is a placeholder for the XSEL type name ("P" or "Q").
③ is a placeholder for the power supply voltage (1: 115V, 2: single-phase 230V, or 3: three-phase 230V).

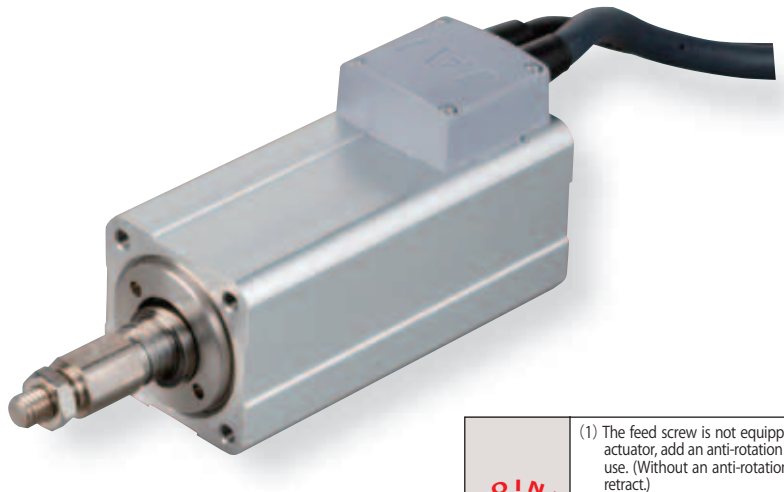
RCS2-RP5N

RoboCylinder Mini Rod Type Short-Length Tapped-Hole Mounting Type
46mm Width 230 V Servo Motor Ball Screw

■ Configuration: **RCS2** — **RP5N** — **I** — **60** — ☐ — ☐ — ☐ — **T2** — ☐ — ☐

Series	Type	Encoder	Motor type	Lead	Stroke	Compatible Controllers	Cable Length	Option
		I : Incremental	60 : 60W Servo Motor	10 : 10mm 5 : 5mm 2.5 : 2.5mm	50 : 50mm 75 : 75mm	T2 : SCON SSEL XSEL-P/Q	N : None P : 1m S : 3m M : 5m X☐☐ : Custom R☐☐ : Robot Cable	K1 : Cable exit direction left K2 : Cable exit direction front K3 : Cable exit direction right

* See page Pre-35 for an explanation of the naming convention.



Technical References P. A-5

POINT Notes on Selection

(1) The feed screw is not equipped with an anti-rotation device. Therefore, when using the actuator, add an anti-rotation device such as a guide to the end of the feed screw prior to use. (Without an anti-rotation device, the feed screw will rotate, and will not extend or retract.)
(2) The horizontal payload is the value when used in combination with an external guide.
(3) The load capacity is based on operation at an acceleration of 0.3G (or 0.2G for the 2.5mm-lead model, or when used vertically). This is the upper limit of the acceleration.
(4) Do not apply any external force on the rod from any direction other than the direction of the rod's motion.
(5) If the actuator is used vertically, pay attention to rod contact because the rod will come down when the power is turned off.

Actuator Specifications

■ Lead and Load Capacity

Model	Motor Output (W)	Feed Screw	Lead (mm)	Max. Load Capacity Horizontal (kg)	Max. Load Capacity Vertical (kg)	Rated Thrust (N)	Positioning Repeatability (mm)	Stroke (mm)
RCS2-RP5N-I-60-10-①-T2-②-③	60	Ball Screw	10	5	1.5	89	± 0.02	50 75
RCS2-RP5N-I-60-5-①-T2-②-③			5	10	3	178		
RCS2-RP5N-I-60-2.5-①-T2-②-③			2.5	20	6	356		

Legend ① Compatible controller ② Cable length ③ Options

■ Stroke and Maximum Speed

Lead \ Stroke	50 (mm)	75 (mm)
10	280 〈230〉	380 〈330〉
5	250 〈230〉	250
2.5	125	

* The value enclosed in 〈〉 apply for vertical usage. (Unit: mm/s)

Cable List

Type	Cable Symbol	
Standard	**P** (1m)	
	S (3m)	
	M (5m)	
Special Lengths	**X06** (6m) ~ **X10** (10m)	
	X11 (11m) ~ **X15** (15m)	
	X16 (16m) ~ **X20** (20m)	
Robot Cable	**R01** (1m) ~ **R03** (3m)	
	R04 (4m) ~ **R05** (5m)	
	R06 (6m) ~ **R10** (10m)	
	R11 (11m) ~ **R15** (15m)	
	R16 (16m) ~ **R20** (20m)	

* See page A-39 for cables for maintenance.

Actuator Specifications

Item	Description
Drive System	Ball Screw Ø8mm C10 grade
Lost Motion	0.1mm or less (initial value)
Frame	Material: Aluminum (white alumite treated)
Ambient Operating Temp./Humidity	0 ~ 40°C, 85% RH or less (non condensing)
Service Life	5000km or 50million cycles

Option List

Name	Option Code	See Page	
Cable exit from left	**K1**	A-32	
Cable exit from front	**K2**	A-32	
Cable exit from right	**K3**	A-32	

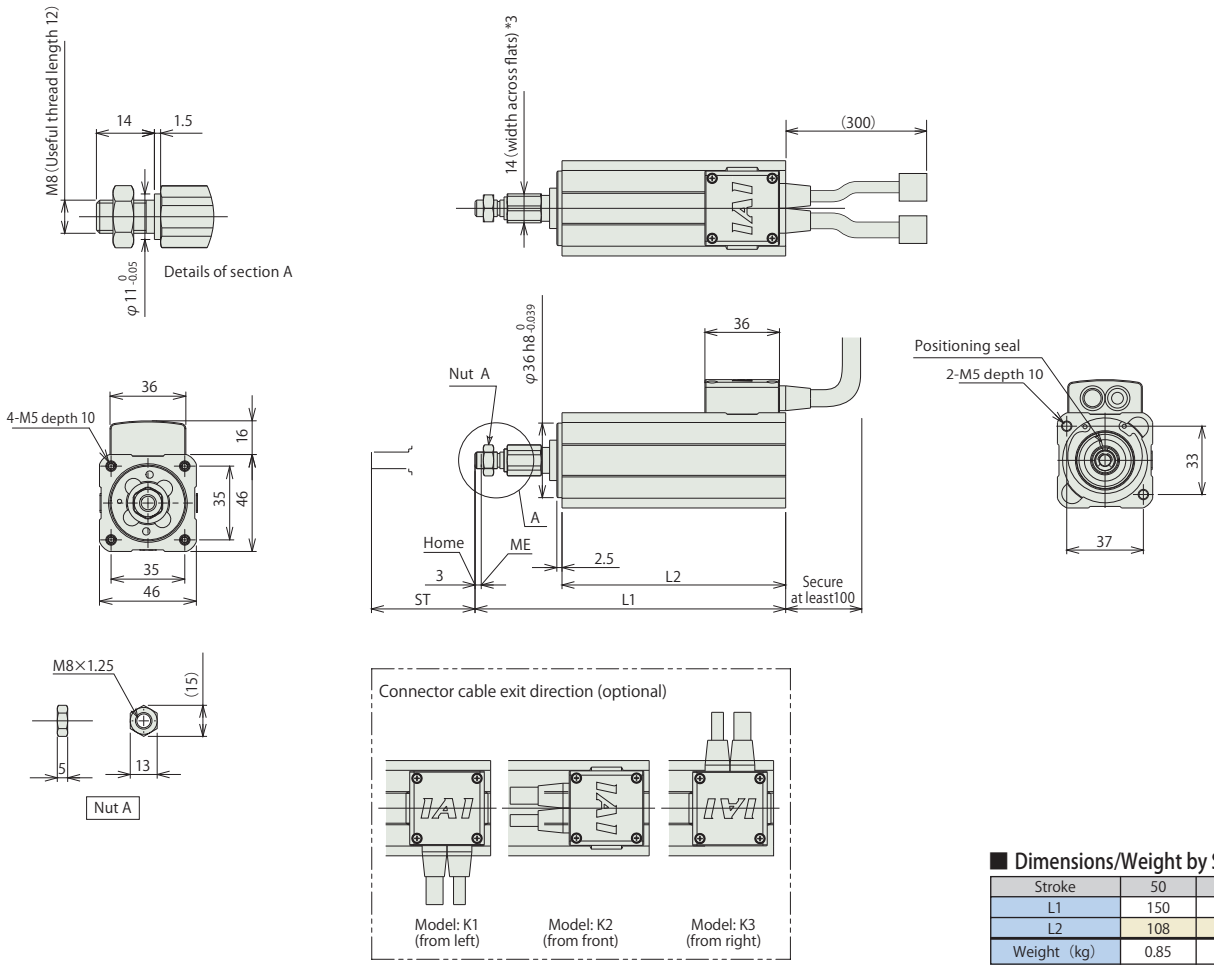
Dimensions

CAD drawings can be downloaded from IAI website. www.robocylinder.de

For Special Orders P. A-9

2/3D CAD

*1 A motor-encoder cable is connected here. See page A-39 for details on cables.
*2 When homing, the rod moves to the mechanical end; therefore, please watch for any interference with the surrounding objects.
ME : Mechanical end SE : Stroke end
*3 The orientation of the bolt will vary depending on the product.



Dimensions/Weight by Stroke

Stroke	50	75
L1	150	175
L2	108	133
Weight (kg)	0.85	1.0

Compatible Controllers

The RCS2 series actuators can operate with the controllers below. Select the controller according to your usage.

Name	External view	Model	Desciption	Max. Positioning points	Input Voltage	Power Supply Capacity		See Page
Positioner Mode		SCON-C-60 I -NP-2-①	Positioning is possible for up to 512 points	512 points	Single-Phase AC 115V Single-Phase AC 230V 3-Phase AC 230V (XSEL-P/Q only)	218VA max. * The power supply capacity vary depending on the controller (refer to the manual).		→ P547
Solenoid Valve Mode			Operable with the same controls as the solenoid valve	7 points				
Serial Communication Type			Dedicated to serial communication	(—)				
Pulse Train Input Control Type			Dedicated to pulse train input	768 points				
Program Control 1-2 Axes Type		SSEL-C-1-60 I -NP-2-①	Programmed operation is possible Operation is possible on up to 2 axes	20000 points				→ P577
Program Control 1-6 Axes Type		XSEL-②-1-60 I -N1-EEE-2-③	Programmed operation is possible Operation is possible on up to 6 axes	20000 points				→ P578

* For SSEL and XSEL, only applicable to the single-axis model.
① is a placeholder for the power supply voltage (1: 115V, 2: single-phase 230V).
② is a placeholder for the XSEL type name ("P" or "Q").
③ is a placeholder for the power supply voltage (1: 115V, 2: single-phase 230V, or 3: three-phase 230V).

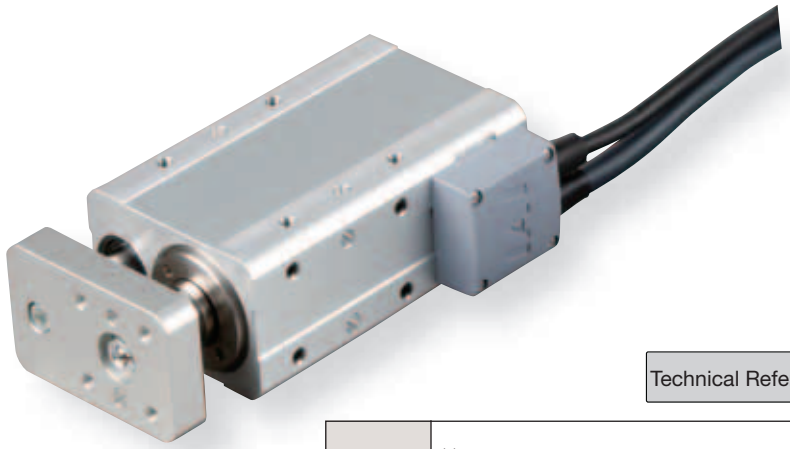
RCS2-GS5N

RoboCylinder Mini Rod Type Short-Length Free Mounting Type with Single Guide
46mm Width 230 V Servo Motor Ball Screw

■ Configuration: **RCS2 — GS5N — I — 60 — ☐ — ☐ — T2 — ☐ — ☐**

Series	Type	Encoder	Motor type	Lead	Stroke	Compatible Controllers	Cable Length	Option
		I : Incremental	60 : 60W Servo Motor	10 : 10mm 5 : 5mm 2.5 : 2.5mm	50 : 50mm 75 : 75mm	T2 : SCON SSEL XSEL-P/Q	N : None P : 1m S : 3m M : 5m X☐☐ : Custom R☐☐ : Robot Cable	K1 : Cable exit direction left K2 : Cable exit direction front K3 : Cable exit direction right

* See page Pre-35 for an explanation of the naming convention.



Technical References P. A-5

POINT Notes on Selection

(1) The horizontal load capacity is based on the use of a guide to prevent any radial and/or moment load on the rod.
If no guide will be installed, see the Tip Load vs. Service Life graph (see page A-81).
(2) The load capacity is based on operation at an acceleration of 0.3G (or 0.2G for the 2.5mm-lead model, or when used vertically). This is the upper limit of the acceleration.
(3) If the actuator is used vertically, pay attention to rod contact because the rod will come down when the power is turned off.

Actuator Specifications

■ Lead and Load Capacity

Model	Motor Output (W)	Feed Screw	Lead (mm)	Max. Load Capacity Horizontal (kg)	Max. Load Capacity Vertical (kg)	Rated Thrust (N)	Positioning Repeatability (mm)	Stroke (mm)
RCS2-GS5N-I-60-10-①-T2-②-③	60	Ball Screw	10	5	1.5	89	± 0.02	50 75
RCS2-GS5N-I-60-5-①-T2-②-③			5	10	3	178		
RCS2-GS5N-I-60-2.5-①-T2-②-③			2.5	20	6	356		

Legend ① Compatible controller ② Cable length ③ Options

■ Stroke and Maximum Speed

Lead \ Stroke	50 (mm)	75 (mm)
10	280 〈230〉	380 〈330〉
5	250 〈230〉	250
2.5	125	

* The value enclosed in 〈〉 apply for vertical usage. (Unit: mm/s)

Cable List

Type	Cable Symbol	
Standard	**P** (1m)	
	S (3m)	
	M (5m)	
Special Lengths	**X06** (6m) ~ **X10** (10m)	
	X11 (11m) ~ **X15** (15m)	
	X16 (16m) ~ **X20** (20m)	
Robot Cable	**R01** (1m) ~ **R03** (3m)	
	R04 (4m) ~ **R05** (5m)	
	R06 (6m) ~ **R10** (10m)	
	R11 (11m) ~ **R15** (15m)	
	R16 (16m) ~ **R20** (20m)	

* See page A-39 for cables for maintenance.

Actuator Specifications

Item	Description
Drive System	Ball Screw Ø8mm C10 grade
Lost Motion	0.1mm or less (initial value)
Frame	Material: Aluminum (white alumite treated)
Ambient Operating Temp./Humidity	0 ~ 40°C, 85% RH or less (non condensing)
Service Life	5000km or 50million cycles

Option List

Name	Option Code	See Page	
Cable exit from left	**K1**	A-32	
Cable exit from front	**K2**	A-32	
Cable exit from right	**K3**	A-32	

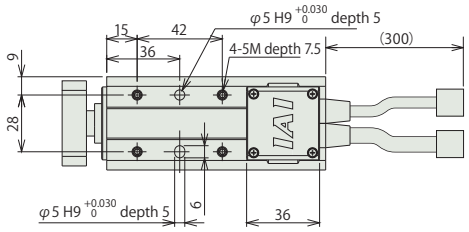
Dimensions

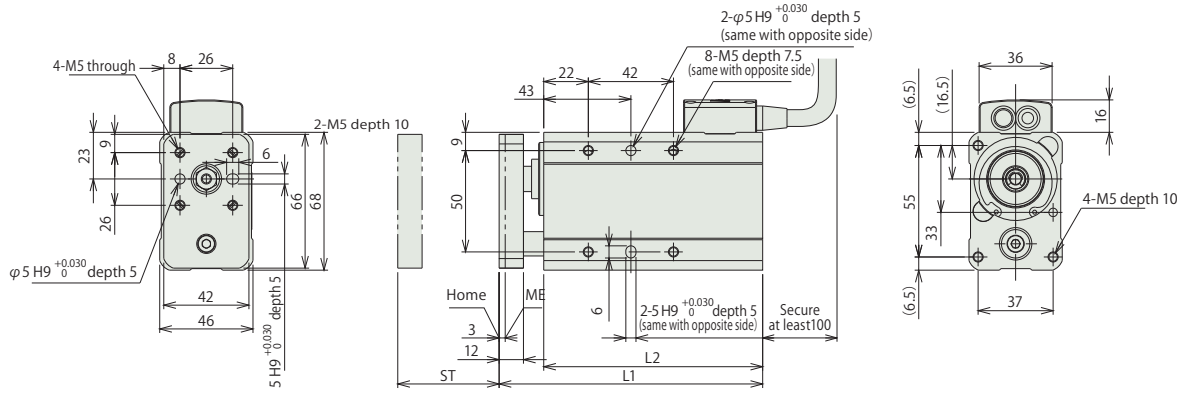
CAD drawings can be downloaded from IAI website. www.robocylinder.de

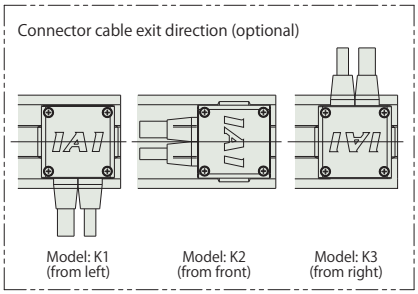
For Special Orders P. A-9

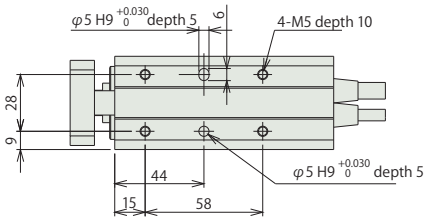
2/3D CAD

*1 A motor-encoder cable is connected here. See page A-39 for details on cables.
*2 When homing, the rod moves to the mechanical end; therefore, please watch for any interference with the surrounding objects.
ME : Mechanical end SE : Stroke end









Dimensions/Weight by Stroke

Stroke	50	75
L1	130	155
L2	108	133
Weight (kg)	1.3	1.4

Compatible Controllers

The RCS2 series actuators can operate with the controllers below. Select the controller according to your usage.

Name	External view	Model	Desciption	Max. Positioning points	Input Voltage	Power Supply Capacity		See Page
Positioner Mode		SCON-C-60 I -NP-2-①	Positioning is possible for up to 512 points	512 points	Single-Phase AC 115V Single-Phase AC 230V 3-Phase AC 230V (XSEL-P/Q only)	218VA max. * The power supply capacity vary depending on the controller (refer to the manual).		→ P547
Solenoid Valve Mode			Operable with the same controls as the solenoid valve	7 points				
Serial Communication Type			Dedicated to serial communication	(—)				
Pulse Train Input Control Type			Dedicated to pulse train input	768 points				
Program Control 1-2 Axes Type		SSEL-C-1-60 I -NP-2-①	Programmed operation is possible Operation is possible on up to 2 axes	20000 points				→ P577
Program Control 1-6 Axes Type		XSEL-②-1-60 I -N1-EEE-2-③	Programmed operation is possible Operation is possible on up to 6 axes	20000 points				→ P578

* For SSEL and XSEL, only applicable to the single-axis model.
① is a placeholder for the power supply voltage (1: 115V, 2: single-phase 230V).
② is a placeholder for the XSEL type name ("P" or "Q").
③ is a placeholder for the power supply voltage (1: 115V, 2: single-phase 230V, or 3: three-phase 230V).

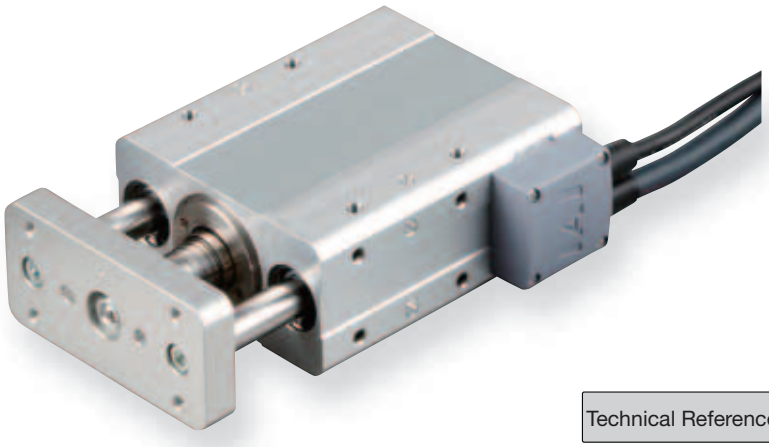
RCS2-GD5N

RoboCylinder Mini Rod Type Short-Length Free Mounting Type with Double Guide
46mm Width 230 V Servo Motor Ball Screw

■ Configuration: RCS2 — GD5N — I — 60 — ☐ — ☐ — T2 — ☐ — ☐

Series	Type	Encoder	Motor type	Lead	Stroke	Compatible Controllers	Cable Length	Option
		I : Incremental	60 : 60W Servo Motor	10 : 10mm 5 : 5mm 2.5 : 2.5mm	50 : 50mm 75 : 75mm	T2 : SCON SSEL XSEL-P/Q	N : None P : 1m S : 3m M : 5m X☐☐ : Custom R☐☐ : Robot Cable	K1 : Cable exit direction left K2 : Cable exit direction front K3 : Cable exit direction right

* See page Pre-35 for an explanation of the naming convention.



Technical References P. A-5

POINT Notes on Selection

(1) The horizontal load capacity is based on the use of a guide to prevent any radial and/or moment load on the rod.
If no guide will be installed, see the Tip Load vs. Service Life graph (see page A-82).
(2) The load capacity is based on operation at an acceleration of 0.3G (or 0.2G for the 2.5mm-lead model, or when used vertically). This is the upper limit of the acceleration.
(3) If the actuator is used vertically, pay attention to rod contact because the rod will come down when the power is turned off.

Actuator Specifications

■ Lead and Load Capacity

Model	Motor Output (W)	Feed Screw	Lead (mm)	Max. Load Capacity Horizontal (kg)	Max. Load Capacity Vertical (kg)	Rated Thrust (N)	Positioning Repeatability (mm)	Stroke (mm)
RCS2-GD5N-I-60-10-①-T2-②-③	60	Ball Screw	10	5	1.5	89	± 0.02	50 75
RCS2-GD5N-I-60-5-①-T2-②-③			5	10	3	178		
RCS2-GD5N-I-60-2.5-①-T2-②-③			2.5	20	6	356		

Legend ① Compatible controller ② Cable length ③ Options

■ Stroke and Maximum Speed

Lead \ Stroke	50 (mm)	75 (mm)
10	280 〈230〉	380 〈330〉
5	250 〈230〉	250
2.5	125	

* The value enclosed in 〈〉 apply for vertical usage. (Unit: mm/s)

Cable List

Type	Cable Symbol	
Standard	**P** (1m)	
	S (3m)	
	M (5m)	
Special Lengths	**X06** (6m) ~ **X10** (10m)	
	X11 (11m) ~ **X15** (15m)	
	X16 (16m) ~ **X20** (20m)	
Robot Cable	**R01** (1m) ~ **R03** (3m)	
	R04 (4m) ~ **R05** (5m)	
	R06 (6m) ~ **R10** (10m)	
	R11 (11m) ~ **R15** (15m)	
	R16 (16m) ~ **R20** (20m)	

* See page A-39 for cables for maintenance.

Actuator Specifications

Item	Description
Drive System	Ball Screw Ø8mm C10 grade
Lost Motion	0.1mm or less (initial value)
Frame	Material: Aluminum (white alumite treated)
Ambient Operating Temp./Humidity	0 ~ 40°C, 85% RH or less (non condensing)
Service Life	5000km or 50million cycles

Option List

Name	Option Code	See Page	
Cable exit from left	**K1**	A-32	
Cable exit from front	**K2**	A-32	
Cable exit from right	**K3**	A-32	

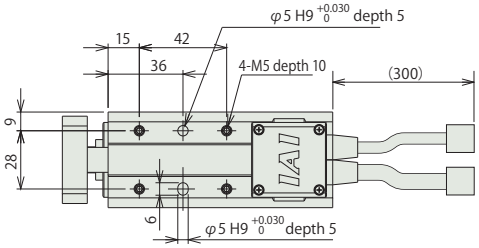
Dimensions

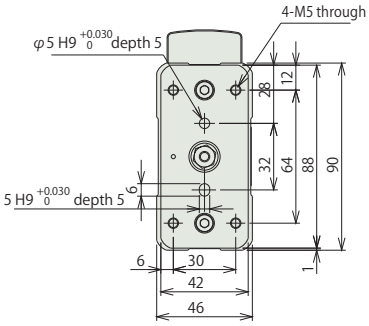
CAD drawings can be downloaded from IAI website. www.robocylinder.de

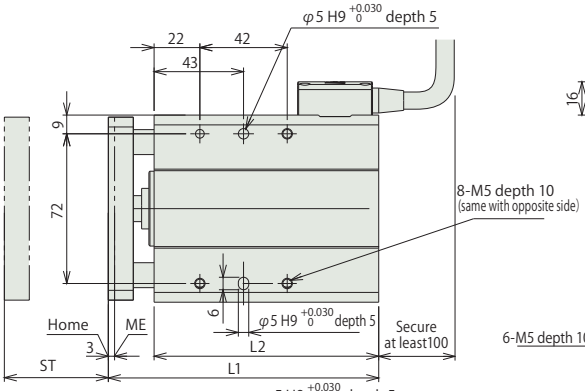
For Special Orders P. A-9

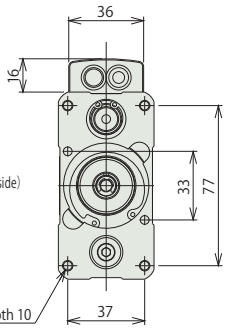
2/3D CAD

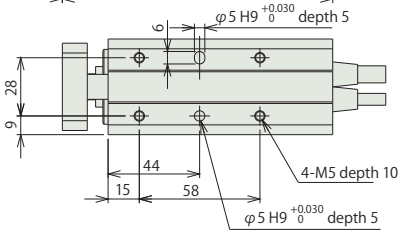
*1 A motor-encoder cable is connected here. See page A-39 for details on cables.
*2 When homing, the rod moves to the mechanical end; therefore, please watch for any interference with the surrounding objects.
ME : Mechanical end SE : Stroke end

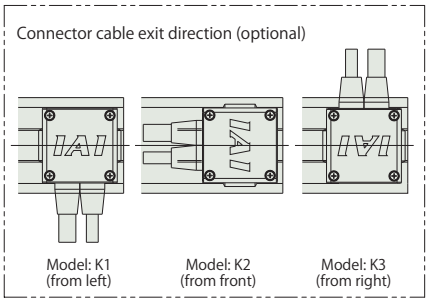












Dimensions/Weight by Stroke

Stroke	50	75
L1	130	155
L2	108	133
Weight (kg)	1.6	1.9

Compatible Controllers

The RCS2 series actuators can operate with the controllers below. Select the controller according to your usage.

Name	External view	Model	Desciption	Max. Positioning points	Input Voltage	Power Supply Capacity		See Page
Positioner Mode		SCON-C-60 I -NP-2-①	Positioning is possible for up to 512 points	512 points	Single-Phase AC 115V Single-Phase AC 230V 3-Phase AC 230V (XSEL-P/Q only)	218VA max. * The power supply capacity vary depending on the controller (refer to the manual).		→ P547
Solenoid Valve Mode			Operable with the same controls as the solenoid valve	7 points				
Serial Communication Type			Dedicated to serial communication	(—)				
Pulse Train Input Control Type			Dedicated to pulse train input	768 points				
Program Control 1-2 Axes Type		SSEL-C-1-60 I -NP-2-①	Programmed operation is possible Operation is possible on up to 2 axes	20000 points				→ P577
Program Control 1-6 Axes Type		XSEL-②-1-60 I -N1-EEE-2-③	Programmed operation is possible Operation is possible on up to 6 axes	20000 points				→ P578

* For SSEL and XSEL, only applicable to the single-axis model.
① is a placeholder for the power supply voltage (1: 115V, 2: single-phase 230V).
② is a placeholder for the XSEL type name ("P" or "Q").
③ is a placeholder for the power supply voltage (1: 115V, 2: single-phase 230V, or 3: three-phase 230V).

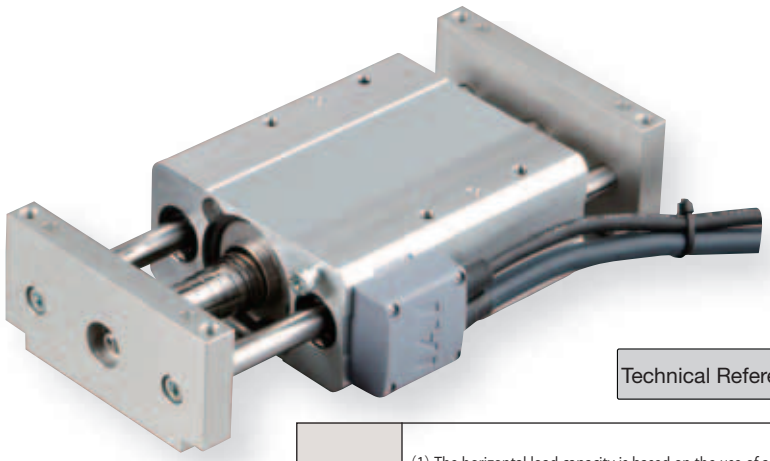
RCS2-SD5N

RoboCylinder Mini Rod Type Short-Length Mounting Slide Unit Type with Double Guide
94mm Width 230 V Servo Motor Ball Screw

■ Configuration: RCS2 — SD5N — I — 60 — ☐ — ☐ — T2 — ☐ — ☐

Series	Type	Encoder	Motor type	Lead	Stroke	Compatible Controllers	Cable Length	Option
		I : Incremental	60 : 60W Servo Motor	10 : 10mm 5 : 5mm 2.5 : 2.5mm	50 : 50mm 75 : 75mm	T2 : SCON SSEL XSEL-P/Q	N : None P : 1m S : 3m M : 5m X ☐☐ : Custom R ☐☐ : Robot Cable	K1 : Cable exit direction left K3 : Cable exit direction right

* See page Pre-35 for an explanation of the naming convention.



Technical References P. A-5

POINT Notes on Selection

(1) The horizontal load capacity is based on the use of a guide to prevent any radial and/or moment load on the rod.
If no guide will be installed, see the Tip Load vs. Service Life graph (see page A-82).
(2) The load capacity is based on operation at an acceleration of 0.3G (or 0.2G for the 2.5mm-lead model, or when used vertically). This is the upper limit of the acceleration.
(3) The values for the vertical load capacity are based on a setup in which the actuator is secured and the side bracket is moved. Please note that moving the actuator against the secured side bracket is not possible.
(4) If the actuator is used vertically, pay attention to rod contact because the rod will come down when the power is turned off.

Actuator Specifications

■ Lead and Load Capacity

Model	Motor Output (W)	Feed Screw	Lead (mm)	Max. Load Capacity Horizontal (kg)	Max. Load Capacity Vertical (kg)	Rated Thrust (N)	Positioning Repeatability (mm)	Stroke (mm)
RCS2-SD5N-I-60-10-①-T2-②-③	60	Ball Screw	10	5	1.5	89	± 0.02	50 75
RCS2-SD5N-I-60-5-①-T2-②-③			5	10	3	178		
RCS2-SD5N-I-60-2.5-①-T2-②-③			2.5	20	6	356		

Legend ① Compatible controller ② Cable length ③ Options

■ Stroke and Maximum Speed

Lead \ Stroke	50 (mm)	75 (mm)
10	280 〈230〉	380 〈330〉
5	250 〈230〉	250
2.5	125	

* The value enclosed in 〈〉 apply for vertical usage. (Unit: mm/s)

Cable List

Type	Cable Symbol	
Standard	**P** (1m)	
	S (3m)	
	M (5m)	
Special Lengths	**X06** (6m) ~ **X10** (10m)	
	X11 (11m) ~ **X15** (15m)	
	X16 (16m) ~ **X20** (20m)	
Robot Cable	**R01** (1m) ~ **R03** (3m)	
	R04 (4m) ~ **R05** (5m)	
	R06 (6m) ~ **R10** (10m)	
	R11 (11m) ~ **R15** (15m)	
	R16 (16m) ~ **R20** (20m)	

* See page A-39 for cables for maintenance.

Actuator Specifications

Item	Description
Drive System	Ball Screw Ø8mm C10 grade
Lost Motion	0.1mm or less (initial value)
Frame	Material: Aluminum (white alumite treated)
Ambient Operating Temp./Humidity	0 ~ 40°C, 85% RH or less (non condensing)
Service Life	5000km or 50million cycles

Option List

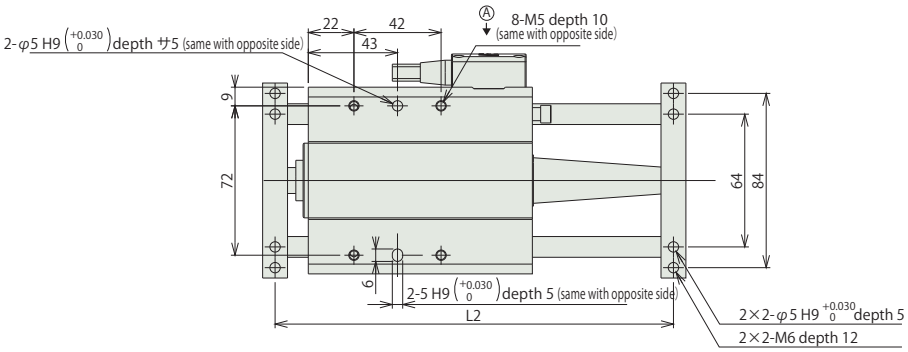
Name	Option Code	See Page	
Cable exit from left	**K1**	A-32	
Cable exit from right	**K3**	A-32	

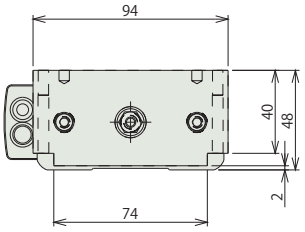
Dimensions

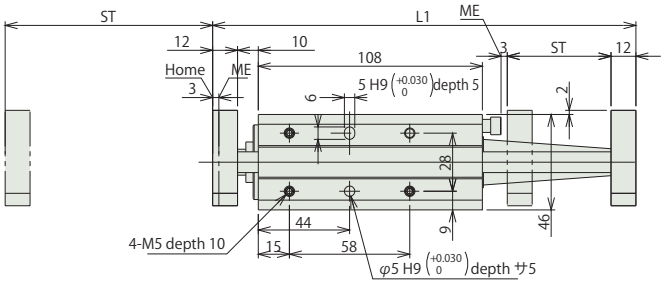
CAD drawings can be downloaded from IAI website. www.robocylinder.de

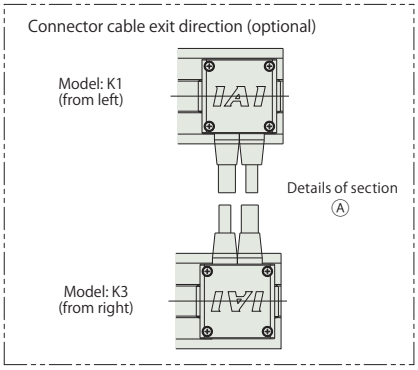
For Special Orders P. A-9

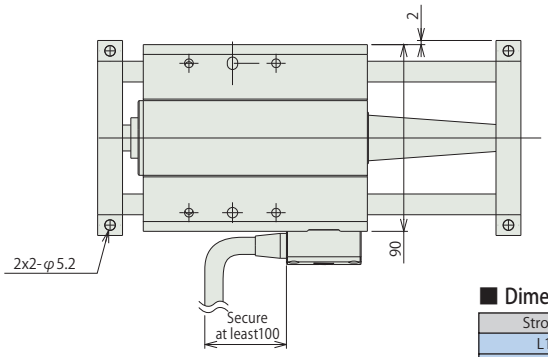
2/3D CAD











Dimensions/Weight by Stroke

Stroke	50	75
L1	204	229
L2	192	217
Weight (kg)	1.9	1.94

Compatible Controllers

The RCS2 series actuators can operate with the controllers below. Select the controller according to your usage.

Name	External view	Model	Desciption	Max. Positioning points	Input Voltage	Power Supply Capacity		See Page
Positioner Mode		SCON-C-60 I -NP-2-①	Positioning is possible for up to 512 points	512 points	Single-Phase AC 115V Single-Phase AC 230V 3-Phase AC 230V (XSEL-P/Q only)	218VA max. * The power supply capacity vary depending on the controller (refer to the manual).		→ P547
Solenoid Valve Mode			Operable with the same controls as the solenoid valve	7 points				
Serial Communication Type			Dedicated to serial communication	(—)				
Pulse Train Input Control Type			Dedicated to pulse train input	768 points				
Program Control 1-2 Axes Type		SSEL-C-1-60 I -NP-2-①	Programmed operation is possible Operation is possible on up to 2 axes	20000 points				→ P577
Program Control 1-6 Axes Type		XSEL-②-1-60 I -N1-EEE-2-③	Programmed operation is possible Operation is possible on up to 6 axes	20000 points				→ P578

* For SSEL and XSEL, only applicable to the single-axis model.
① is a placeholder for the power supply voltage (1: 115V, 2: single-phase 230V).
② is a placeholder for the XSEL type name ("P" or "Q").
③ is a placeholder for the power supply voltage (1: 115V, 2: single-phase 230V, or 3: three-phase 230V).

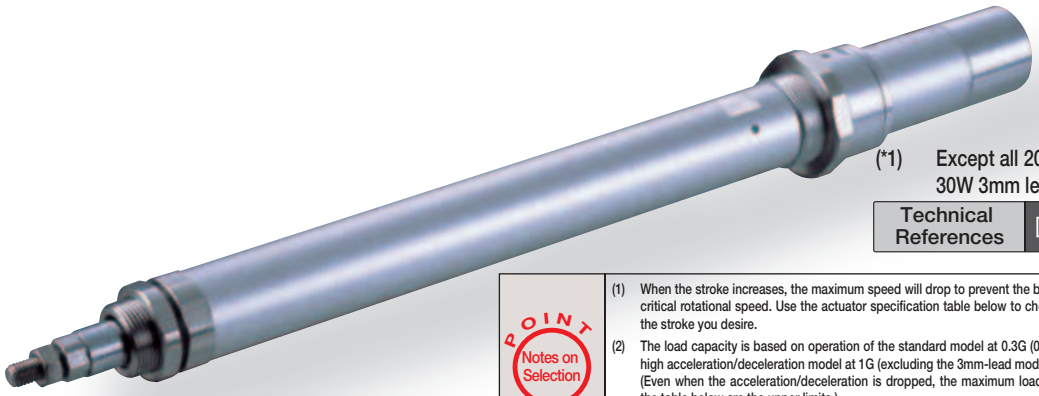
RCS2-RA4C RoboCylinder Rod Type ø37mm Diameter 230V Servo Motor Coupled

■ Configuration: RCS2 — RA4C — □ — □ — □ — □ — □ — □ — □ — □

Series	Type	Encoder	Motor	Lead	Stroke	Compatible Controllers	Cable Length	Option
RCS2	RA4C	I : Incremental A: Absloute	20 : 20W Servo Motor 30 : 30W Servo Motor	12 : 12mm 6 : 6mm 3 : 3mm	50 : 50mm 〉 300 : 300mm (50mm pitch increments)	T1 : XSEL-KE/KET T2 : SCON SSEL XSEL-P/Q	N : None P : 1m S : 3m M : 5m X□□ : Custom R□□ : Robot cable	See Options below

* See page Pre-35 for an explanation of the naming convention.

For High Acceleration/Deceleration (*1)



(*1) Except all 20W models and 30W 3mm lead models

Technical References P. A-5

POINT Notes on Selection

(1) When the stroke increases, the maximum speed will drop to prevent the ball screw from reaching the critical rotational speed. Use the actuator specification table below to check the maximum speed at the stroke you desire.

(2) The load capacity is based on operation of the standard model at 0.3G (0.2G for 3mm-lead), and the high acceleration/deceleration model at 1G (excluding the 3mm-lead model).
(Even when the acceleration/deceleration is dropped, the maximum load capacity values shown in the table below are the upper limits.)

(3) The values for the horizontal load capacity assume the use of an external guide, so that there is no external force from any direction other than the forward/backward direction of the rod.

Actuator Specifications

■ Lead and Load Capacity

Model	Motor Output (W)	Lead (mm)	Max. Load Capacity Horizontal (kg)	Max. Load Capacity Vertical (kg)	Rated Thrust (N)	Stroke (mm)
RCS2-RA4C-①-20-12-②-③-④-⑤	20	12	3.0	1.0	18.9	50 ～ 300 (50mm increments)
RCS2-RA4C-①-20-6-②-③-④-⑤		6	6.0	2.0	37.7	
RCS2-RA4C-①-20-3-②-③-④-⑤		3	12.0	4.0	75.4	
RCS2-RA4C-①-30-12-②-③-④-⑤	30	12	4.0	1.5	28.3	
RCS2-RA4C-①-30-6-②-③-④-⑤		6	9.0	3.0	56.6	
RCS2-RA4C-①-30-3-②-③-④-⑤		3	18.0	6.5	113.1	

Legend: ① Encoder ② Stroke ③ Compatible controller ④ Cable length ⑤ Options

■ Stroke and Maximum Speed

Lead \ Stroke	50 ～ 300 (50mm increments)
12	600
6	300
3	150

(Unit: mm/s)

Cable List

Type	Cable Symbol	
Standard	P (1m)	
	S (3m)	
	M (5m)	
Special Lengths	X06 (6m) ～ X10 (10m)	
	X11 (11m) ～ X15 (15m)	
	X16 (16m) ～ X20 (20m)	
Robot Cable	R01 (1m) ～ R03 (3m)	
	R04 (4m) ～ R05 (5m)	
	R06 (6m) ～ R10 (10m)	
	R11 (11m) ～ R15 (15m)	
	R16 (16m) ～ R20 (20m)	

* See page A-39 for cables for maintenance.

Actuator Specifications

Item	Description
Drive System	Ball screw ø10mm C10 grade
Positioning Repeatability	±0.02mm
Lost Motion	0.1mm or less
Base	Material: Aluminum (white alumite treated)
Rod Diameter	ø20mm
Non-rotating accuracy of rod	±1.0 deg
Ambient Operating Temp./Humidity	0 ～ 40°C, 85% RH or less (non-condensing)

Option List

Name	Option Code	See Page	
Brake	B	→ A-25	
Foot bracket	FT	→ A-29	
Flange bracket (front)	FL	→ A-27	
Flange bracket (back)	FLR	→ A-28	
High-acceleration/deceleration (*1)	HA	→ A-32	
Home sensor (*2)	HS	→ A-32	
Knuckle joint	NJ	→ A-34	
Reversed-home	NM	→ A-33	
Trunnion bracket (front)	TRF	→ A-38	
Trunnion bracket (back)	TRR	→ A-38	

Dimensions

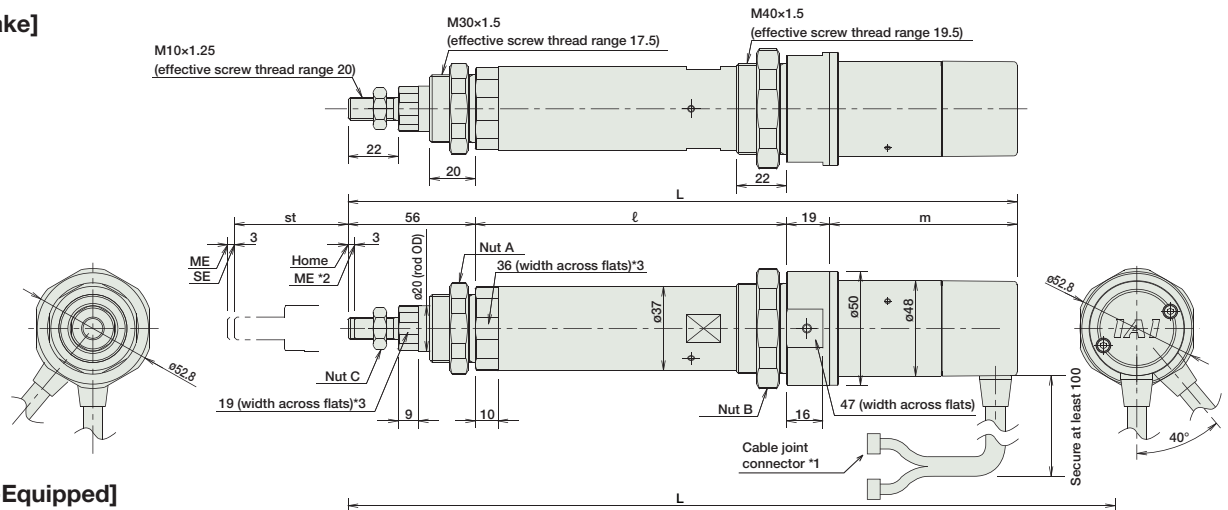
CAD drawings can be downloaded from IAI website. www.robocylinder.de

For Special Orders P. A-9

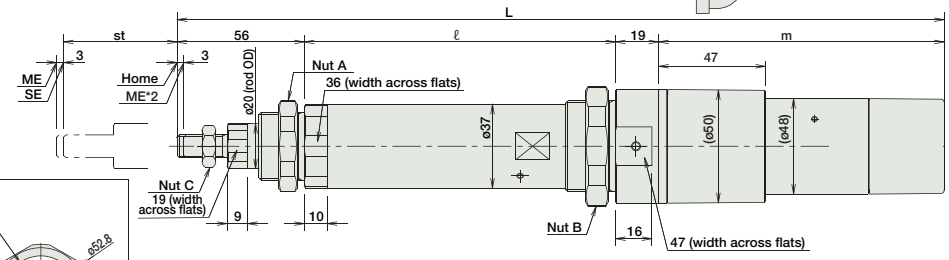
2/3D CAD

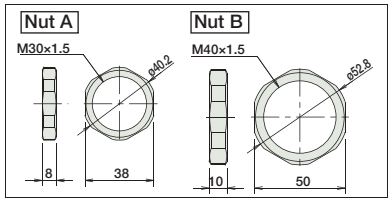
*1. The motor-encoder cable is connected here. See page A-39 for details on cables.
*2. When homing, the rod moves to the ME; therefore, please watch for any interference with the surrounding objects.
ME: Mechanical end SE: Stroke end
*3. The orientation of the bolt will vary depending on the product.

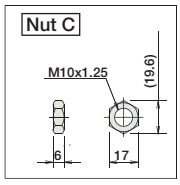
[No Brake]



[Brake-Equipped]







■ Dimensions/Weight by Stroke

RCS2-RA4C (without brake)

Stroke		50	100	150	200	250	300
L	20W	292.5	342.5	392.5	442.5	492.5	542.5
	30W	307.5	357.5	407.5	457.5	507.5	557.5
ℓ		137	187	237	287	337	487
m	20W	80.5					
	30W	95.5					
Weight (kg)		1.1	1.2	1.4	1.5	1.7	1.8

RCS2-RA4C (with brake)

Stroke		50	100	150	200	250	300
L	20W	335.5	385.5	435.5	485.5	535.5	585.5
	30W	350.5	400.5	450.5	500.5	550.5	600.5
ℓ		137	187	237	287	337	487
m	20W	123.5					
	30W	138.5					
Weight (kg)		1.3	1.5	1.6	1.7	1.9	2.0

Compatible Controllers

The RCS2 series actuators can operate with the controllers below. Select the controller according to your usage.

Name	External View	Model	Description	Max. Positioning Points	Input Voltage	Power Supply Capacity		See Page
Positioner Mode		SCON-C-20①②-NP-2-③ SCON-C-30D①②-NP-2-③	Positioning is possible for up to 512 points	512 points	Single-Phase AC 115V Single-Phase AC 230V 3-Phase AC 230V (XSEL-P/Q only)	360VA max. * When operating a 150W single-Axes model		→ P547
Solenoid Valve Mode			Operable with same controls as solenoid valve.	7 points				
Serial Communication Type			Dedicated to serial communication	64 points				
Pulse Train Input Control Type			Dedicated for Pulse Train Input	(–)				
Program Control 1-2 Axes Type		SSEL-C-1-20①-NP-2-③ SSEL-C-1-30D①②-NP-2-③	Programmed operation is possible Operation is possible on up to 2 axes	20000 points				→ P577
Program Control 1-6 Axes Type		XSEL-④-1-20①-N1-EEE-2-⑤ XSEL-④-1-30D①②-N1-EEE-2-⑤	Programmed operation is possible Operation is possible on up to 6 axes	20000 points				→ P587

* For SSEL and XSEL, only applicable to the single-Axes model.
* ① is a placeholder for the encoder type (I: incremental, A: absolute).
* ② is a placeholder for the code "HA" when the high acceleration/deceleration option is specified.
* ③ is a placeholder for the power supply voltage (1: single-phase 115V, 2: single phase 230V).
* ④ is a placeholder for the XSEL type name (KE, KET, P, Q).
* ⑤ is a placeholder for the power supply voltage type (1: 115V, 2: single-phase 230V, 3: 3-phase 230V).

RCS2-RA5C RoboCylinder Rod Type 55mm Width 230V Servo Motor Coupled

■ Configuration: RCS2 — RA5C — □ — □ — □ — □ — □ — □ — □ — □

Series	Type	Encoder	Motor	Lead	Stroke	Compatible Controllers	Cable Length	Option
RCS2	RA5C	I : Incremental A: Absloute	60 : 60W Servo Motor 100 : 100W Servo Motor	16 : 16mm 8 : 8mm 4 : 4mm	50 : 50mm 〜 300 : 300mm (50mm pitch increments)	T1 : XSEL-KE/KET T2 : SCON SSEL XSEL-P/Q	N : None P : 1m S : 3m M : 5m X□□ : Custom R□□ : Robot cable	See Options below

* See page Pre-35 for an explanation of the naming convention.

For High Acceleration/Deceleration

(*1)

(*1) Except all 60W models and 100W 4mm lead models

Technical References P. A-5

POINT Notes on Selection

(1) When the stroke increases, the maximum speed will drop to prevent the ball screw from reaching the critical rotational speed. Use the actuator specification table below to check the maximum speed at the stroke you desire.

(2) The load capacity values are based on 0.3G acceleration for the standard model (0.2G for 4mm-lead), and 1G acceleration for the high-acceleration/deceleration models (0.2G for 4mm-lead). (Even when the acceleration/deceleration is dropped, the maximum load capacity values shown in the table below are the upper limits.)

(3) The values for the horizontal load capacity assume the use of an external guide, so that there is no external force from any direction other than the forward/backward direction of the rod.

Actuator Specifications

■ Lead and Load Capacity

Model	Motor Output (W)	Lead (mm)	Max. Load Capacity Horizontal (kg)	Max. Load Capacity Vertical (kg)	Rated Thrust (N)	Stroke (mm)
RCS2-RA5C-①-60-16-②-③-④-⑤	60	16	12.0	2.0	63.8	50 〜 300 (50mm increments)
RCS2-RA5C-①-60-8-②-③-④-⑤		8	25.0	5.0	127.5	
RCS2-RA5C-①-60-4-②-③-④-⑤		4	50.0	11.5	255.1	
RCS2-RA5C-①-100-16-②-③-④-⑤	100	16	15.0	3.5	105.8	
RCS2-RA5C-①-100-8-②-③-④-⑤		8	30.0	9.0	212.7	
RCS2-RA5C-①-100-4-②-③-④-⑤		4	60.0	18.0	424.3	

Legend: ① Encoder ② Stroke ③ Compatible controller ④ Cable length ⑤ Options

■ Stroke and Maximum Speed

Lead \ Stroke	50 〜 250 (50mm increments)	300 (mm)
16	800	755
8	400	377
4	200	188

(Unit: mm/s)

Cable List

Type	Cable Symbol	
Standard	P (1m)	
	S (3m)	
	M (5m)	
Special Lengths	X06 (6m) 〜 X10 (10m)	
	X11 (11m) 〜 X15 (15m)	
	X16 (16m) 〜 X20 (20m)	
Robot Cable	R01 (1m) 〜 R03 (3m)	
	R04 (4m) 〜 R05 (5m)	
	R06 (6m) 〜 R10 (10m)	
	R11 (11m) 〜 R15 (15m)	
	R16 (16m) 〜 R20 (20m)	

* See page A-39 for cables for maintenance.

Actuator Specifications

Item	Description
Drive System	Ball screw ø12mm C10 grade
Positioning Repeatability	±0.02mm
Lost Motion	0.1mm or less
Base	Material: Aluminum (white alumite treated)
Rod Diameter	ø30mm
Non-rotating accuracy of rod	±0.7 deg
Ambient Operating Temp./Humidity	0 〜 40°C, 85% RH or less (non-condensing)

Option List

Name	Option Code	See Page	
Connector cable exit direction	A2	→ A-25	
Brake	B	→ A-25	
Flange	FL	→ A-27	
Foot bracket	FT	→ A-29	
High-acceleration/deceleration (*1)	HA	→ A-32	

(*1) The high-acceleration/deceleration option is not available for all 60W models and 100W model with 4mm lead.

Dimensions

CAD drawings can be downloaded from IAI website. www.robocylinder.de

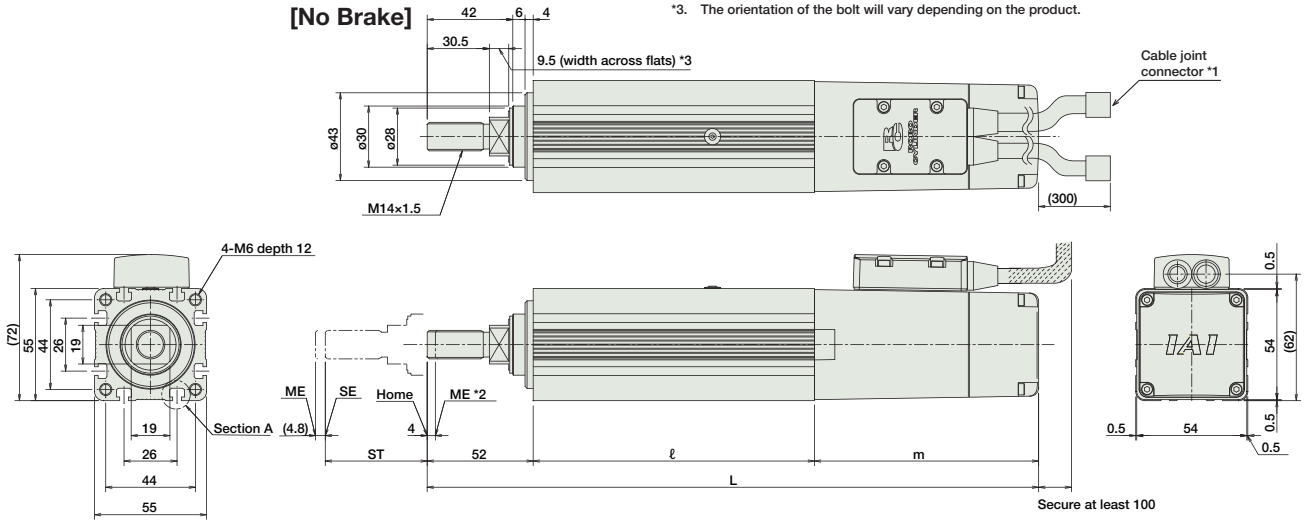
For Special Orders P. A-9

2/3D CAD

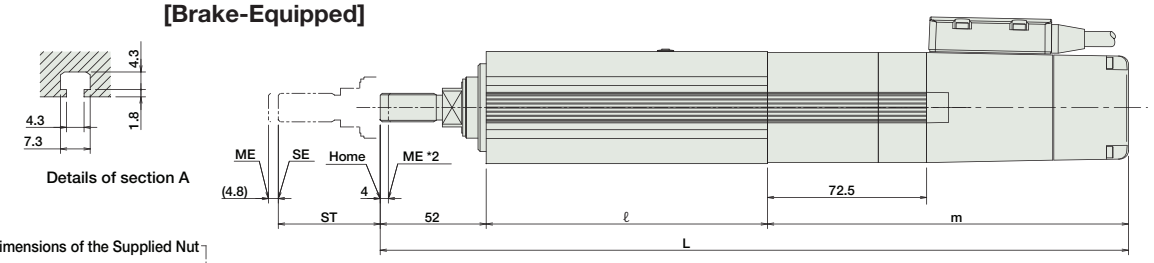
* The RA5C is not available in reversed-home configuration, due to its construction.

*1. The motor-encoder cable is connected here. See page A-39 for details on cables.
*2. When homing, the rod moves to the ME; therefore, please watch for any interference with the surrounding objects.
ME: Mechanical end SE: Stroke end
*3. The orientation of the bolt will vary depending on the product.

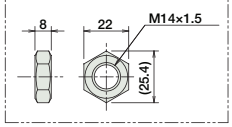
[No Brake]



[Brake-Equipped]



Dimensions of the Supplied Nut



■ Dimensions/Weight by Stroke

RCS2-RA5C (brake)

Stroke		50	100	150	200	250	300
L	60W	282	332	382	432	482	532
	100W	300	350	400	450	500	550
ℓ		138	188	238	288	338	388
m	60W	92					
	100W	110					
Weight (kg)		1.9	2.2	2.5	2.8	3.1	3.4

RCS2-RA5C (with brake)

Stroke		50	100	150	200	250	300
L	60W	354.5	404.5	454.5	504.5	554.5	604.5
	100W	372.5	422.5	472.5	522.5	572.5	622.5
ℓ		138	188	238	288	338	388
m	60W	164.5					
	100W	182.5					
Weight (kg)		2.2	2.5	2.8	3.1	3.4	3.7

Compatible Controllers

The RCS2 series actuators can operate with the controllers below. Select the controller according to your usage.

Name	External View	Model	Description	Max. Positioning Points	Input Voltage	Power Supply Capacity		See Page
Positioner Mode		SCON-C-60①-NP-2-③ SCON-C-100①②-NP-2-③	Positioning is possible for up to 512 points	512 points	Single-Phase AC 115V Single-Phase AC 230V 3-Phase AC 230V (XSEL-P/Q only)	360VA max. * When operating a 150W single-Axes model		→ P547
Solenoid Valve Mode			Operable with same controls as solenoid valve.	7 points				
Serial Communication Type			Dedicated to serial communication	64 points				
Pulse Train Input Control Type			Dedicated to Pulse Train Input	(–)				
Program Control 1-2 Axes Type		SSEL-C-1-60①-NP-2-③ SSEL-C-1-100 ①②-NP-2-③	Programmed operation is possible Operation is possible on up to 2 axes	20000 points				→ P577
Program Control 1-6 Axes Type		XSEL-④-1-60 ①-N1-EEE-2-⑤ XSEL-④-1-100 ①②-N1-EEE-2-⑤	Programmed operation is possible Operation is possible on up to 6 axes	20000 points				→ P587

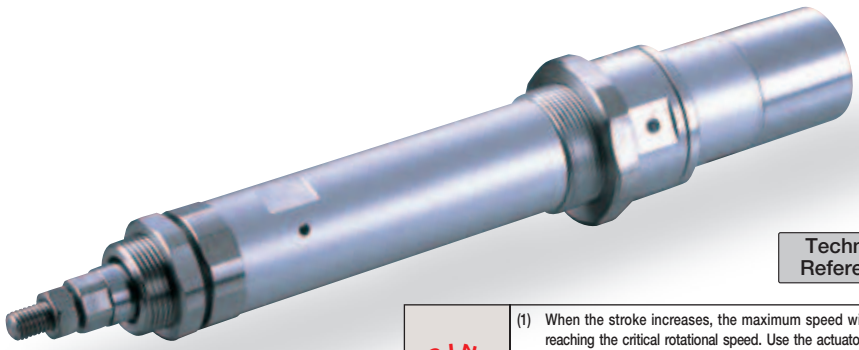
* For SSEL and XSEL, only applicable to the single-Axes model.
* ① is a placeholder for the encoder type (I: incremental, A: absolute).
* ② is a placeholder for the code "HA" when the high acceleration/deceleration option is specified.
* ③ is a placeholder for the power supply voltage (1: single-phase 115V, 2: single phase 230V).
* ④ is a placeholder for the XSEL type name (KE, KET, P, Q).
* ⑤ is a placeholder for the power supply voltage type (1: 115V, 2: single-phase 230V, 3: 3-phase 230V).

RCS2-RA4D RoboCylinder Rod Type ø37mm Diameter 230V Servo Motor Built-In (Direct-Coupled) Motor

■ Configuration: RCS2 — RA4D — [ ] — [ ] — [ ] — [ ] — [ ] — [ ] — [ ]

Series	Type	Encoder	Motor	Lead	Stroke	Compatible Controllers	Cable Length	Option
RCS2	RA4D	I : Incremental A: Absloute	20 : 20W Servo Motor 30 : 30W Servo Motor	12 : 12mm 6 : 6mm 3 : 3mm	50 : 50mm 〜 300 : 300mm (50mm pitch increments)	T1 : XSEL-KE/KET T2 : SCON SSEL XSEL-P/Q	N : None P : 1m S : 3m M : 5m X□□ : Custom R□□ : Robot cable	See Options below

* See page Pre-35 for an explanation of the naming convention.



Technical References P. A-5

POINT Notes on Selection

(1) When the stroke increases, the maximum speed will drop to prevent the ball screw from reaching the critical rotational speed. Use the actuator specification table below to check the maximum speed at the stroke you desire.

(2) The load capacity is based on operation at an acceleration of 0.3G (0.2G for the 3mm-lead model).
This is the upper limit of the acceleration.

(3) The values for the horizontal load capacity assume the use of an external guide, so that there is no external force from any direction other than the forward/backward direction of the rod.

Actuator Specifications

■ Lead and Load Capacity

Model	Motor Output (W)	Lead (mm)	Max. Load Capacity Horizontal (kg)	Max. Load Capacity Vertical (kg)	Rated Thrust (N)	Stroke (mm)
RCS2-RA4D-①-20-12-②-③-④-⑤	20	12	3.0	1.0	18.9	50 〜 300 (50mm increments)
RCS2-RA4D-①-20-6-②-③-④-⑤		6	6.0	2.0	37.7	
RCS2-RA4D-①-20-3-②-③-④-⑤		3	12.0	4.0	75.4	
RCS2-RA4D-①-30-12-②-③-④-⑤	30	12	4.0	1.5	28.3	
RCS2-RA4D-①-30-6-②-③-④-⑤		6	9.0	3.0	56.6	
RCS2-RA4D-①-30-3-②-③-④-⑤		3	18.0	6.5	113.1	

Legend: ① Encoder ② Stroke ③ Compatible controller ④ Cable length ⑤ Options

■ Stroke and Maximum Speed

Lead \ Stroke	50 〜 300 (50mm increments)
12	600
6	300
3	150

(Unit: mm/s)

Cable List

Type	Cable Symbol	
Standard	P (1m)	
	S (3m)	
	M (5m)	
Special Lengths	X06 (6m) 〜 X10 (10m)	
	X11 (11m) 〜 X15 (15m)	
	X16 (16m) 〜 X20 (20m)	
Robot Cable	R01 (1m) 〜 R03 (3m)	
	R04 (4m) 〜 R05 (5m)	
	R06 (6m) 〜 R10 (10m)	
	R11 (11m) 〜 R15 (15m)	
	R16 (16m) 〜 R20 (20m)	

* See page A-39 for cables for maintenance.

Actuator Specifications

Item	Description
Drive System	Ball screw ø10mm C10 grade
Positioning Repeatability	±0.02mm
Lost Motion	0.1mm or less
Base	Material: Aluminum (white alumite treated)
Rod Diameter	ø20mm
Non-rotating accuracy of rod	±1.0 deg
Ambient Operating Temp./Humidity	0 〜 40°C, 85% RH or less (non-condensing)

Option List

Name	Option Code	See Page	
Foot bracket	FT	→ A-29	
Flange bracket (front)	FL	→ A-27	
Flange bracket (back)	FLR	→ A-28	
Home sensor	HS	→ A-32	
Knuckle joint	NJ	→ A-34	
Reversed-home	NM	→ A-33	
Trunnion bracket (front)	TRF	→ A-38	
Trunnion bracket (back)	TRR	→ A-38	

* The home sensor (HS) cannot be used on the reversed-home models.

Dimensions

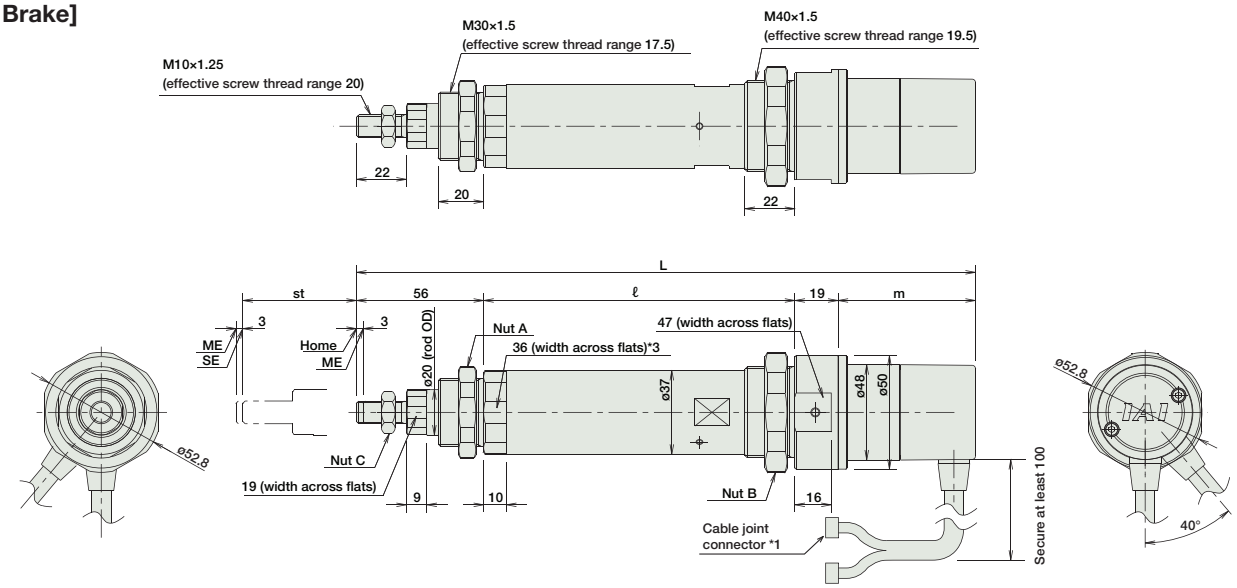
CAD drawings can be downloaded from IAI website. www.robocylinder.de

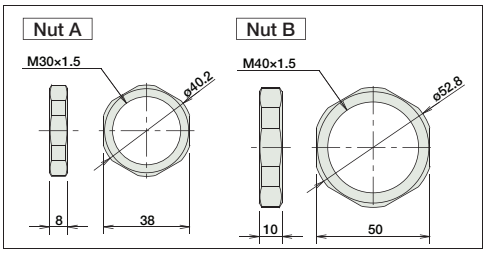
For Special Orders P. A-9

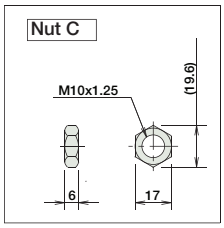
2/3D CAD

*1. The motor-encoder cable is connected here. See page A-39 for details on cables.
*2. When homing, the rod moves to the ME; therefore, please watch for any interference with the surrounding objects.
ME: Mechanical end SE: Stroke end
*3. The orientation of the bolt will vary depending on the product.

[No Brake]







Dimensions/Weight by Stroke

RCS2-RA4D (without brake)

Stroke		50	100	150	200	250	300
L	20W	270.5	320.5	370.5	420.5	470.5	520.5
	30W	285.5	335.5	385.5	435.5	485.5	535.5
ℓ		137	187	237	287	337	487
m	20W	58.5					
	30W	73.5					
Weight (kg)		1.0	1.2	1.3	1.5	1.6	1.8

Brake-equipped configuration is not available with the RCS2-RA4D.

Compatible Controllers

The RCS2 series actuators can operate with the controllers below. Select the controller according to your usage.

Name	External View	Model	Description	Max. Positioning Points	Input Voltage	Power Supply Capacity		See Page
Positioner Mode		SCON-C-20 ①-NP-2-② SCON-C-30D ①-NP-2-②	Positioning is possible for up to 512 points	512 points	Single-Phase AC 115V Single-Phase AC 230V 3-Phase AC 230V (XSEL-P/Q only)	360VA max. * When operating a 150W single-Axes model		→ P547
Solenoid Valve Mode			Operable with same controls as solenoid valve.	7 points				
Serial Communication Type			Dedicated to serial communication	64 points				
Pulse Train Input Control Type			Dedicated to Pulse Train Input	(–)				
Program Control 1-2 Axes Type		SSEL-C-1-20 ①-NP-2-② SSEL-C-1-30D ①-NP-2-②	Programmed operation is possible Operation is possible on up to 2 axes	20000 points				→ P577
Program Control 1-6 Axes Type		XSEL-③-1-20 ①-N1-EEE-2-④ XSEL-③-1-30D ①-N1-EEE-2-①	Programmed operation is possible Operation is possible on up to 6 axes	20000 points				→ P587

* For SSEL and XSEL, only applicable to the single-axis model.
* ① is a placeholder for the encoder type (I: incremental / A: absolute).
* ② is a placeholder for the power supply voltage (1: 115V, 2: single-phase 230V).
* ③ is a placeholder for the XSEL type name ("KE", "KET", "P", or "Q").
* ④ is a placeholder for the power supply voltage (1: 115V, 2: single-phase 230V, or 3: three-phase 230V).

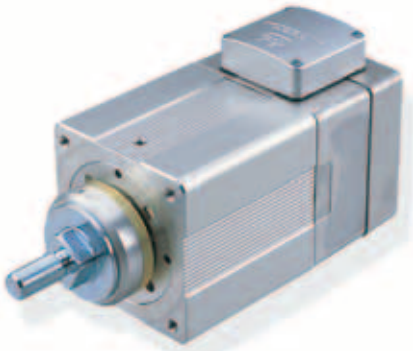
RCS2-SRA7BD

RoboCylinder Rod Type 75mm Width 230V Servo Motor
Short-Length Type

■ Configuration: RCS2 – SRA7BD – □ – □ – □ – □ – □ – □ – □ – □

Series	Type	Encoder	Motor	Lead	Stroke	Compatible Controllers	Cable Length	Option
		I : Incremental	60 : 60W Servo Motor 100 : 100W Servo Motor 150 : 150W Servo Motor	16 : 16mm 8 : 8mm 4 : 4mm	50 : 50mm 〜 300 : 300mm (50mm pitch increments)	T1 : XSEL-KE/KET T2 : SCON SSEL XSEL-P/Q	N : None P : 1m S : 3m M : 5m X□□ : Custom R□□ : Robot cable	See Options below

* See page Pre-35 for an explanation of the naming convention.



Technical References P. A-5

POINT Notes on Selection

(1) When operated at the rated acceleration, the maximum load capacity is the load capacity at the rated acceleration.
(2) When operated at the maximum acceleration, the maximum load capacity is the load capacity at the maximum acceleration.
(3) If positioning repeatability and/or lost motion is required, the rotation of the rod must be restricted. In this case, select a model with a guide, or add a separate guide.
(4) The standard model may exhibit vibration of the rod at long strokes. If this is an issue, select a model with a guide, or add a separate guide.

Actuator Specifications

■ Lead and Load Capacity

Model	Motor Output (W)	Lead (mm)	Rated Acceleration (G)	Load Capacity at Rated Acceleration Horizontal (kg)	Load Capacity at Rated Acceleration Vertical (kg)	Maximum Acceleration (G)	Load Capacity at Max. Acceleration Horizontal (kg)	Load Capacity at Max. Acceleration Vertical (kg)	Rated Thrust (N)	Stroke (mm)
RCS2-SRA7BD-I-60-16-①-②-③-④	60	16	0.25	5	2	0.35	2.5	1	63	50〜300 (50mm increments)
RCS2-SRA7BD-I-60-8-①-②-③-④		8	0.15	10	5	0.25	5	2.5	127	
RCS2-SRA7BD-I-60-4-①-②-③-④		4	0.05	20	10	0.15	10	5	254	
RCS2-SRA7BD-I-100-16-①-②-③-④	100	16	0.3	10	3.5	0.4	5	1.5	103	
RCS2-SRA7BD-I-100-8-①-②-③-④		8	0.2	22	9	0.3	10	4.5	207	
RCS2-SRA7BD-I-100-4-①-②-③-④		4	0.1	40	19.5	0.2	20	9	414	
RCS2-SRA7BD-I-150-16-①-②-③-④	150	16	0.3	15	6.5	0.4	7.5	3	157	
RCS2-SRA7BD-I-150-8-①-②-③-④		8	0.2	35	14.5	0.3	17.5	7	314	
RCS2-SRA7BD-I-150-4-①-②-③-④		4	0.1	55	22.5	0.2	27.5	11	628	

Legend ① Stroke ② Compatible controller ③ Cable length ④ Options

■ Stroke and Maximum Speed

Lead \ Stroke	50 〜 300 (50mm increments)
16	800
8	400
4	200

(Unit: mm/s)

Cable List

Type	Cable Symbol	
Standard	**P** (1m)	
	S (3m)	
	M (5m)	
Special Lengths	**X06** (6m) 〜 **X10** (10m)	
	X11 (11m) 〜 **X15** (15m)	
	X16 (16m) 〜 **X20** (20m)	
Robot Cable	**R01** (1m) 〜 **R03** (3m)	
	R04 (4m) 〜 **R05** (5m)	
	R06 (6m) 〜 **R10** (10m)	
	R11 (11m) 〜 **R15** (15m)	
	R16 (16m) 〜 **R20** (20m)	

* See page A-39 for cables for maintenance.

Actuator Specifications

Item	Description
Drive System	Ball screw ø12mm C10 grade
Positioning Repeatability	±0.02mm
Lost Motion	0.1mm or less
Base	Material: Aluminum (white alumite treated)
Rod Diameter	ø35mm
Non-rotating accuracy of rod	–
Ambient Operating Temp./Humidity	0 〜 40°C, 85% RH or less (non-condensing)

Option List

Name	Option Code	See Page	
Connector cable exit direction	**A1** 〜 **A3**	→ A-25	
Brake	**B**	→ A-25	
Flange	**FL**	→ A-27	
Foot bracket	**FT**	→ A-29	
Extended rod tip	**RE**	→ A-35	

Dimensions

CAD drawings can be downloaded from IAI website. www.robocylinder.de

2/3D CAD

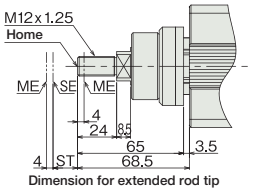
* The SRA7BD is not available in reversed-home configuration, due to its construction.

For Special Orders P. A-9

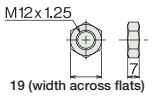
*1. The motor-encoder cable is connected here.
See page A-39 for details on cables.

*2. When homing, the rod moves to the mechanical end position; therefore, please watch for any interference with the surrounding objects.
ST: Stroke
SE: Stroke end
ME: Mechanical end

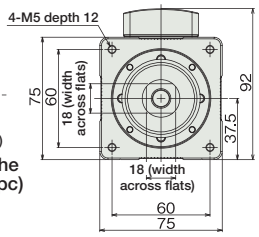
*3. The orientation of the bolt will vary depending on the product.

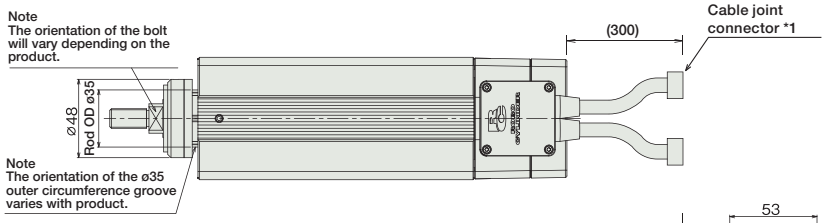


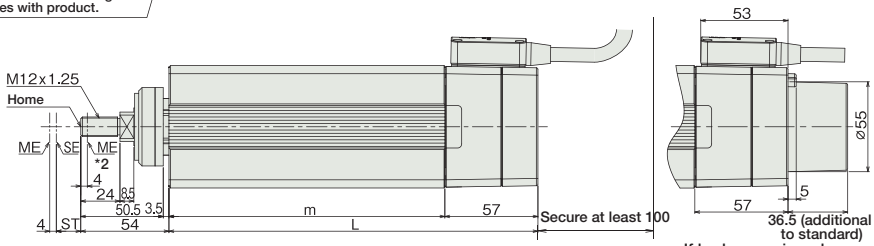
Dimension for extended rod tip

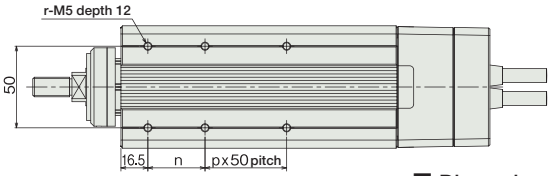


Dimensions of the Supplied Nut (1pc)









Note:
Do not apply any external force on the rod from any direction other than the direction of the rod's motion. If a force is exerted on the rod in a perpendicular or rotational direction, the detent may become damaged.

Note:
A slit is provided in the side of the actuator body to prevent pauses due to forward/backward operation. Please make a separate request for a dustproof/splash-proof model.

Dimensions/Weight by Stroke

Stroke		50	100	150	200	250	300
L	60W	126	176	226	276	326	376
	100W	133	176	226	276	326	376
	150W	145	176	226	276	326	376
m	60W	69	119	169	219	269	319
	100W	76	119	169	219	269	319
	150W	88	119	169	219	269	319
n		25	35	35	35	35	35
p		0	0	1	2	3	4
r		4	4	6	8	10	12
Weight (kg)	60W	2.4	2.9	3.5	4.1	4.6	5.2
	100W	2.6	3.1	3.7	4.2	4.8	5.4
	150W	2.9	3.3	3.9	4.4	5	5.6

Compatible Controllers

The RCS2 series actuators can operate with the controllers below. Select the controller according to your usage.

Name	External View	Model	Description	Max. Positioning Points	Input Voltage	Power Supply Capacity		See Page
Positioner Mode		SCON-C-①I-NP-2-②	Positioning is possible for up to 512 points	512 points	Single-Phase AC 115V Single-Phase AC 230V 3-Phase AC 230V (XSEL-P/Q only)	360VA max. * When operating a 150W single-axis model		→ P547
Solenoid Valve Mode			Operable with same controls as solenoid valve.	7 points				
Serial Communication Type			Dedicated to serial communication	64 points				
Pulse Train Input Control Type			Dedicated to Pulse Train Input	(–)				
Program Control 1-2 Axes Type		SSEL-C-1-①I-NP-2-②	Programmed operation is possible Operation is possible on up to 2 axes	20000 points				→ P577
Program Control 1-6 Axes Type		XSEL-③-1-①I-N1-EEE-2-④	Programmed operation is possible Operation is possible on up to 6 axes	20000 points				→ P587

Note: The SRA7BD type actuator cannot be connected to the 5th and 6th axis of the XSEL-P/Q controller.

* For SSEL and XSEL, only applicable to the single-axis model.
* ① is a place holder for the motor output (W) (60, 100, 150).
* ② is a placeholder for the power supply voltage (1: 115V, 2: single-phase 230V).
* ③ is a placeholder for the XSEL type name ("KE", "KET", "P", or "Q").
* ④ is a placeholder for the power supply voltage (1: 115V, 2: single-phase 230V, or 3: three-phase 230V).

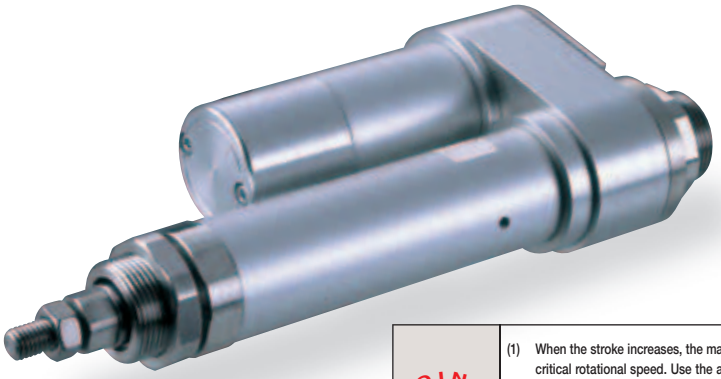
RCS2-RA4R

RoboCylinder Rod Type ø37mm Diameter 230V Servo Motor
Side-Mounted Motor

■ Configuration: RCS2 — RA4R — □ — □ — □ — □ — □ — □ — □ — □

Series	Type	Encoder	Motor	Lead	Stroke	Compatible Controllers	Cable Length	Option
RCS2	RA4R	I : Incremental A : Absolute	20 : 20W Servo Motor 30 : 30W Servo Motor	12 : 12mm 6 : 6mm 3 : 3mm	50 : 50mm 〜 300 : 300mm (50mm pitch increments)	T1 : XSEL-KE/KET T2 : SCON SSEL XSEL-P/Q	N : None P : 1m S : 3m M : 5m X□□ : Custom R□□ : Robot cable	See Options below

* See page Pre-35 for an explanation of the naming convention.



Technical References P. A-5

POINT Notes on Selection

(1) When the stroke increases, the maximum speed will drop to prevent the ball screw from reaching the critical rotational speed. Use the actuator specification table below to check the maximum speed at the stroke you desire.

(2) The load capacity is based on operation at an acceleration of 0.3G (0.2G for the 3mm-lead model). This is the upper limit of the acceleration.

(3) The values for the horizontal load capacity assume the use of an external guide, so that there is no external force from any direction other than the forward/backward direction of the rod.

Actuator Specifications

■ Lead and Load Capacity

Model	Motor Output (W)	Lead (mm)	Max. Load Capacity Horizontal (kg)	Max. Load Capacity Vertical (kg)	Rated Thrust (N)	Stroke (mm)
RCS2-RA4R-①-20-12-②-③-④-⑤	20	12	3.0	1.0	18.9	50 〜 300 (50mm increments)
RCS2-RA4R-①-20-6-②-③-④-⑤		6	6.0	2.0	37.7	
RCS2-RA4R-①-20-3-②-③-④-⑤		3	12.0	4.0	75.4	
RCS2-RA4R-①-30-12-②-③-④-⑤	30	12	4.0	1.5	28.3	
RCS2-RA4R-①-30-6-②-③-④-⑤		6	9.0	3.0	56.6	
RCS2-RA4R-①-30-3-②-③-④-⑤		3	18.0	6.5	113.1	

Legend: ① Encoder ② Stroke ③ Compatible controller ④ Cable length ⑤ Options

■ Stroke and Maximum Speed

Lead \ Stroke	50 〜 300 (50mm increments)
12	600
6	300
3	150

(Unit: mm/s)

Cable List

Type	Cable Symbol	
Standard	P (1m)	
	S (3m)	
	M (5m)	
Special Lengths	X06 (6m) 〜 X10 (10m)	
	X11 (11m) 〜 X15 (15m)	
	X16 (16m) 〜 X20 (20m)	
Robot Cable	R01 (1m) 〜 R03 (3m)	
	R04 (4m) 〜 R05 (5m)	
	R06 (6m) 〜 R10 (10m)	
	R11 (11m) 〜 R15 (15m)	
	R16 (16m) 〜 R20 (20m)	

* See page A-39 for cables for maintenance.

Actuator Specifications

Item	Description
Drive System	Ball screw ø10mm C10 grade
Positioning Repeatability	±0.02mm
Lost Motion	0.1mm or less
Base	Material: Aluminum (white alumite treated)
Rod Diameter	ø20mm
Non-rotating accuracy of rod	±1.0 deg
Ambient Operating Temp./Humidity	0 〜 40°C, 85% RH or less (non-condensing)

Option List

Name	Option Code	See Page	
Brake	B	→ A-25	
Foot bracket	FT	→ A-29	
Flange bracket (front)	FL	→ A-27	
Flange bracket (back)	FLR	→ A-28	
Home sensor	HS	→ A-32	
Knuckle joint	NJ	→ A-34	
Reversed-home	NM	→ A-33	
Clevis Bracket	QR	→ A-34	
Back-mounting plate	RP	→ A-35	
Trunnion bracket (front)	TRF	→ A-38	

* The home sensor (HS) cannot be used on the reversed-home models.

Dimensions

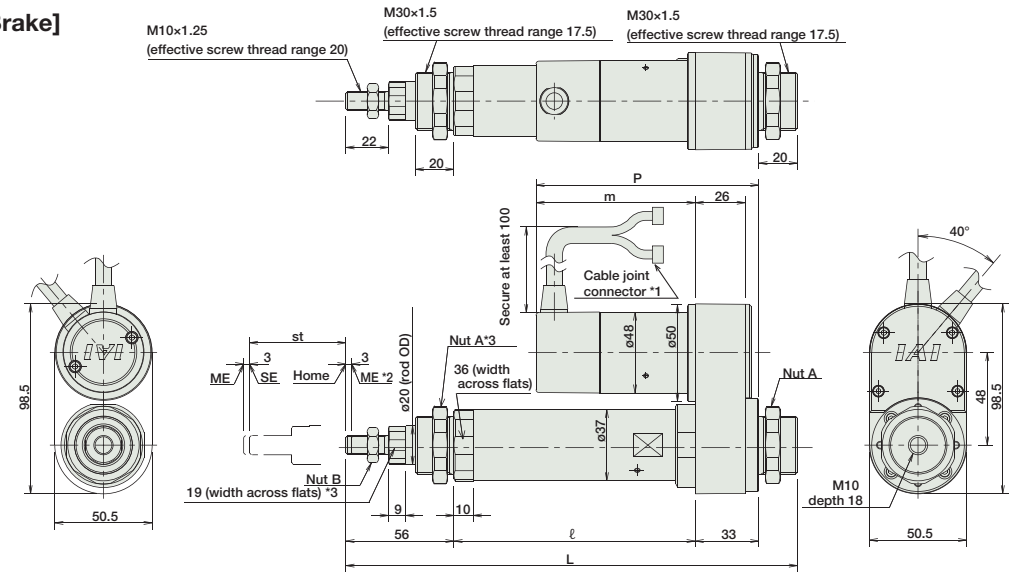
CAD drawings can be downloaded from IAI website. www.robocylinder.de

For Special Orders P. A-9

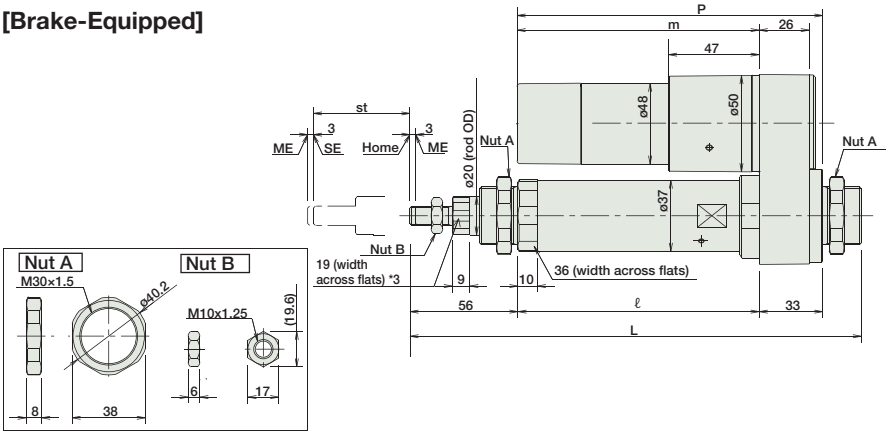
2/3D CAD

*1. The motor-encoder cable is connected here. See page A-39 for details on cables.
*2. When homing, the rod moves to the ME; therefore, please watch for any interference with the surrounding objects.
ME: Mechanical end SE: Stroke end
*3. The orientation of the bolt will vary depending on the product.

[No Brake]



[Brake-Equipped]



■ Dimensions/Weight by Stroke

RCS2-RA4R (without brake)

Stroke		50	100	150	200	250	300
L	20W	234	284	334	384	434	484
	30W	234	284	334	384	434	484
ℓ		125	175	225	275	325	375
m	20W	80.5					
	30W	95.5					
P	20W	113.5					
	30W	128.5					
Weight (kg)		1.2	1.4	1.5	1.7	1.8	2.0

RCS2-RA4R (with brake)

Stroke		50	100	150	200	250	300
L	20W	234	284	334	384	434	484
	30W	234	284	334	384	434	484
ℓ		125	175	225	275	325	375
m	20W	123.5					
	30W	138.5					
P	20W	156.5					
	30W	171.5					
Weight (kg)		1.4	1.6	1.7	1.9	2.0	2.2

Compatible Controllers

The RCS2 series actuators can operate with the controllers below. Select the controller according to your usage.

Name	External View	Model	Description	Max. Positioning Points	Input Voltage	Power Supply Capacity		See Page
Positioner Mode		SCON-C-20 ①-NP-2-② SCON-C-30D①-NP-2-②	Positioning is possible for up to 512 points	512 points	Single-Phase AC 115V Single-Phase AC 230V 3-Phase AC 230V (XSEL-P/Q only)	360VA max. * When operating a 150W single-axis model		→ P547
Solenoid Valve Mode			Operable with same controls as solenoid valve.	7 points				
Serial Communication Type			Dedicated to serial communication	64 points				
Pulse Train Input Control Type			Dedicated to Pulse Train Input	(–)				
Program Control 1-2 Axes Type		SSEL-C-1-20①-NP-2-② SSEL-C-1-30D①-NP-2-②	Programmed operation is possible Operation is possible on up to 2 axes	20000 points				→ P577
Program Control 1-6 Axes Type		XSEL-③-1-20①-N1-EEE-2-④ XSEL-③-1-30D①-N1-EEE-2-④	Programmed operation is possible Operation is possible on up to 6 axes	20000 points				→ P587

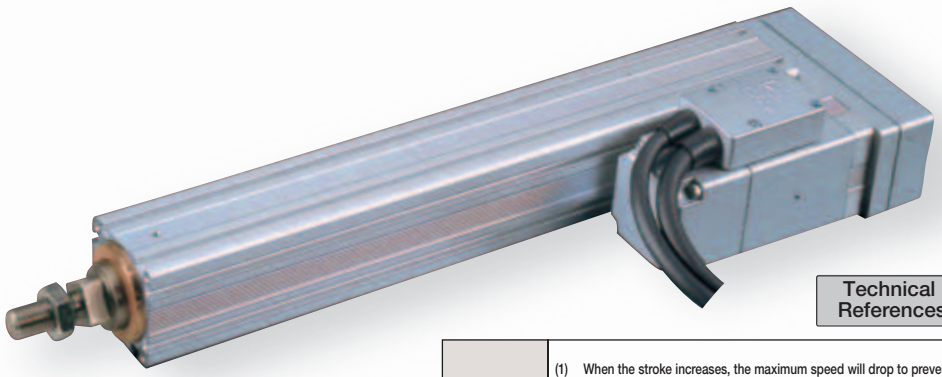
* For SSEL and XSEL, only applicable to the single-axis model.
* ① is a placeholder for the encoder type (I: incremental / A: absolute).
* ② is a placeholder for the power supply voltage (1: 115V, 2: single-phase 230V).
* ③ is a placeholder for the XSEL type name ("KE", "KET", "P", or "Q").
* ④ is a placeholder for the power supply voltage (1: 115V, 2: single-phase 230V, or 3: three-phase 230V).

RCS2-RA5R RoboCylinder Rod Type 55mm Width 230V Servo Motor Side-Mounted Motor

■ Configuration: RCS2 — RA5R — □ — 60 — □ — □ — □ — □ — □ — □

Series	Type	Encoder	Motor	Lead	Stroke	Compatible Controllers	Cable Length	Option
RCS2	RA5R	I : Incremental A : Absolute	60 : 60W Servo Motor	16 : 16mm 8 : 8mm 4 : 4mm	50 : 50mm 〉 300 : 300mm (50mm pitch increments)	T1 : XSEL-KE/KET T2 : SCON SSEL XSEL-P/Q	N : None P : 1m S : 3m M : 5m X□□ : Custom R□□ : Robot cable	See Options below * Be sure to specify which side the motor is to be mounted (ML/MR).

* See page Pre-35 for an explanation of the naming convention.



Technical References P. A-5

POINT Notes on Selection

(1) When the stroke increases, the maximum speed will drop to prevent the ball screw from reaching the critical rotational speed. Use the actuator specification table below to check the maximum speed at the stroke you desire.

(2) The load capacity is based on operation at an acceleration of 0.3G (0.2G for the 4mm-lead model). This is the upper limit of the acceleration.

(3) The values for the horizontal load capacity assume the use of an external guide, so that there is no external force from any direction other than the forward/backward direction of the rod.

Actuator Specifications

■ Lead and Load Capacity

Model	Motor Output (W)	Lead (mm)	Max. Load Capacity Horizontal (kg)	Max. Load Capacity Vertical (kg)	Rated Thrust (N)	Stroke (mm)
RCS2-RA5R-①-60-16-②-③-④-⑤	60	16	12.0	2.0	63.8	50 ～ 300 (50mm increments)
RCS2-RA5R-①-60-8-②-③-④-⑤		8	25.0	5.0	127.5	
RCS2-RA5R-①-60-4-②-③-④-⑤		4	50.0	11.5	255.1	

Legend: ① Encoder ② Stroke ③ Compatible controller ④ Cable length ⑤ Options

■ Stroke and Maximum Speed

Lead \ Stroke	50 ～ 250 (50mm increments)	300 (mm)
16	800	755
8	400	377
4	200	188

(Unit: mm/s)

Cable List

Type	Cable Symbol	
Standard	P (1m)	
	S (3m)	
	M (5m)	
Special Lengths	X06 (6m) ～ X10 (10m)	
	X11 (11m) ～ X15 (15m)	
	X16 (16m) ～ X20 (20m)	
Robot Cable	R01 (1m) ～ R03 (3m)	
	R04 (4m) ～ R05 (5m)	
	R06 (6m) ～ R10 (10m)	
	R11 (11m) ～ R15 (15m)	
	R16 (16m) ～ R20 (20m)	

* See page A-39 for cables for maintenance.

Actuator Specifications

Item	Description
Drive System	Ball screw ø12mm C10 grade
Positioning Repeatability	±0.02mm
Lost Motion	0.1mm or less
Base	Material: Aluminum (white alumite treated)
Rod Diameter	ø30mm
Non-rotating accuracy of rod	±0.7 deg
Ambient Operating Temp./Humidity	0 ～ 40°C, 85% RH or less (non-condensing)

Option List

Name	Option Code	See Page	
Connector cable exit direction	A2	→ A-25	
Brake	B	→ A-25	
Flange	FL	→ A-27	
Foot bracket	FT	→ A-29	
Left-Mounted Motor (Standard)	ML	→ A-33	
Right-Mounted Motor	MR	→ A-33	

Dimensions

CAD drawings can be downloaded from IAI website. www.robocylinder.de

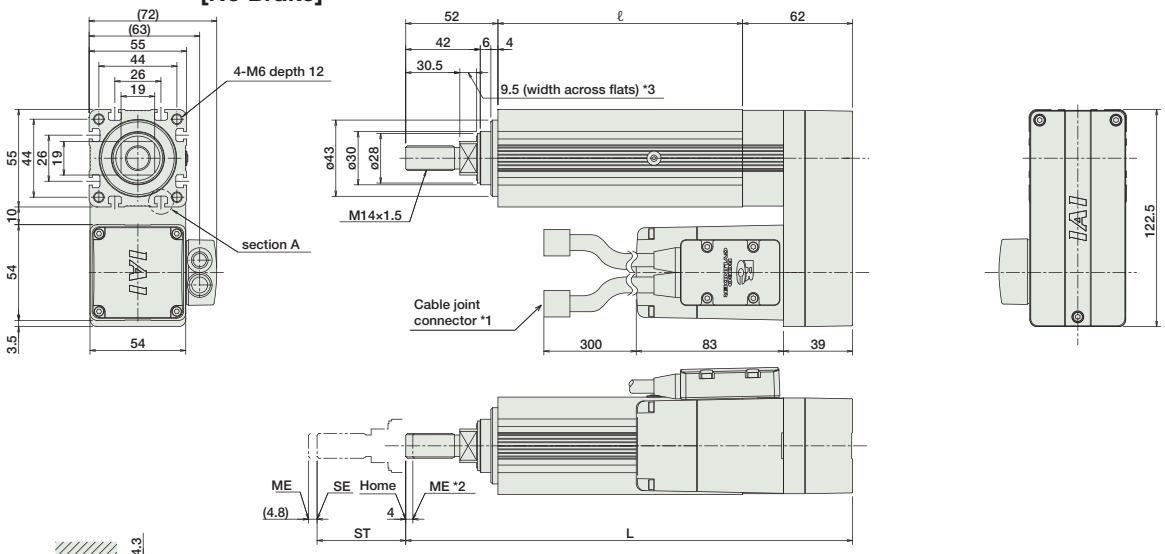
For Special Orders P. A-9

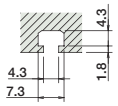
2/3D CAD

* The RA5R is not available in reversed-home configuration, due to its construction.

*1. The motor-encoder cable is connected here. See page A-39 for details on cables.
*2. When homing, the rod moves to the ME; therefore, please watch for any interference with the surrounding objects.
ME: Mechanical end SE: Stroke end
*3. The orientation of the bolt will vary depending on the product.

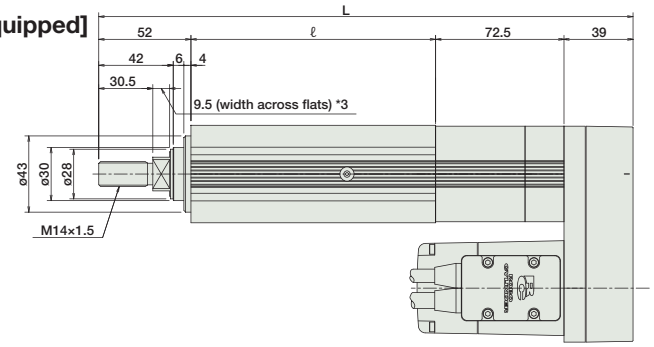
[No Brake]



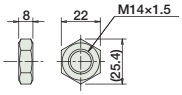


Details of section A

[Brake-Equipped]



Dimensions of the Supplied Nut



■ Dimensions/Weight by Stroke

RCS2-RA5R (without brake)

Stroke	50	100	150	200	250	300
L	252	302	352	402	452	502
ℓ	138	188	238	288	338	388
Weight (kg)	2.3	2.6	2.9	3.2	3.5	3.8

RCS2-RA5R (with brake)

Stroke	50	100	150	200	250	300
L	301.5	351.5	401.5	451.5	501.5	551.5
ℓ	138	188	238	288	338	388
Weight (kg)	2.6	2.9	3.2	3.5	3.8	4.1

Compatible Controllers

The RCS2 series actuators can operate with the controllers below. Select the controller according to your usage.

Name	External View	Model	Description	Max. Positioning Points	Input Voltage	Power Supply Capacity		See Page
Positioner Mode		SCON-C-60①-NP-2-②	Positioning is possible for up to 512 points	512 points	Single-Phase AC 115V Single-Phase AC 230V 3-Phase AC 230V (XSEL-P/Q only)	360VA max. * When operating a 150W single-axis model		→ P547
Solenoid Valve Mode			Operable with same controls as solenoid valve.	7 points				
Serial Communication Type			Dedicated to serial communication	64 points				
Pulse Train Input Control Type			Dedicated to Pulse Train Input	(–)				
Program Control 1-2 Axes Type		SSEL-C-1-60①-NP-2-②	Programmed operation is possible Operation is possible on up to 2 axes	20000 points				→ P577
Program Control 1-6 Axes Type		XSEL-③-1-60①-N1-EEE-2-④	Programmed operation is possible Operation is possible on up to 6 axes	20000 points				→ P587

* For SSEL and XSEL, only applicable to the single-axis model.
* ① is a placeholder for the encoder type (I: incremental / A: absolute).
* ② is a placeholder for the power supply voltage (1: 115V, 2: single-phase 230V).
* ③ is a placeholder for the XSEL type name ("KE", "KET", "P", or "Q").
* ④ is a placeholder for the power supply voltage (1: 115V, 2: single-phase 230V, or 3: three-phase 230V).

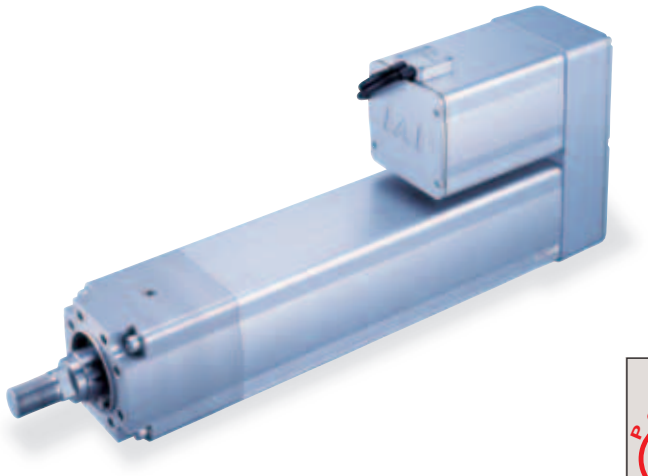
RCS2-RA13R

RoboCylinder Ultra High Thrust Rod Type 130mm Width 230V Servo Motor
Side-Mounted Motor

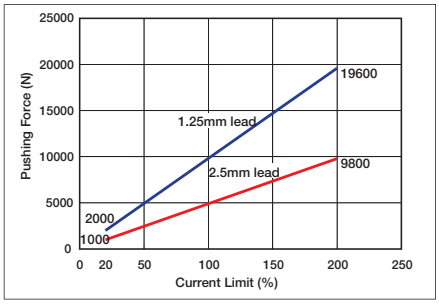
■ Configuration: RCS2 — RA13R — ☐ — 750 — ☐ — ☐ — T2 — ☐ — ☐

Series	Type	Encoder	Motor	Lead	Stroke	Compatible Controllers	Cable Length	Option
RCS2	RA13R	I : Incremental A : Absolute	750 : 750W Servo Motor	2.5 : 2.5mm 1.25 : 1.25mm	50 : 50mm 〜 200 : 200mm (50mm pitch increments)	T1 : XSEL-KE/KET T2 : SCON SSEL XSEL-P/Q	N : None P : 1m S : 3m M : 5m X☐☐ : Custom R☐☐ : Robot cable	See Options below * Please be sure to specify one of the codes for the motor mounting direction and the cable exit direction.

* See page Pre-35 for an explanation of the naming convention.



■ Pushing Force vs. Current Limit



Note:
- The correlation between the pushing force and the current limit are only rough guide values, and may deviate from the actual numbers.
- The pushing force may be inconsistent if the current limit is low. Therefore, please set it at 20% or higher.
- The travel speed while the pushing force is acting is fixed at 10mm/s. The graph shows pushing action at 10mm/s. Please note that the pushing force will decrease if the speed changes.
- Depending on operational conditions, the pushing force may decrease due to the rise in the temperature of the motor.

Technical References P. A-5

POINT Notes on Selection

(1) When performing pushing operation, duration of continuous use is preset for the set pushing force. In addition, the continuous thrust (with load and duty factored in) must be less than the rated thrust. For details, please see selection reference material (→A-71).
(2) The load capacity is based on operation at an acceleration of 0.02G for 2.5mm-lead, and 0.01 for 1.25-lead. This is the upper limit of the acceleration.
(3) The values for the horizontal load capacity assume the use of an external guide, so that there is no external force from any direction other than the forward/backward direction of the rod.
(4) The brake option requires, in addition to the actuator and the controller, a brake box (see accessories on P248).

Actuator Specifications

■ Lead and Load Capacity

Model	Motor Output (W)	Lead (mm)	Max. Acceleration (G)	Max. Load Capacity Horizontal (kg)	Max. Load Capacity Vertical (kg)	Rated Thrust (N)	Continuous Pushing Force (N)	Maximum Push Force (N)	Stroke (mm)
RCS2-RA13R-①-750-2.5-②-T2-③-④	750	2.5	0.02	400	200	5106	3567	9800	50〜200 (50mm increments)
RCS2-RA13R-①-750-1.25-②-T2-③-④		1.25	0.01	500	300	10211	7141	19600	

Legend: ① Encoder ② Stroke ③ Cable length ④ Options

■ Stroke and Maximum Speed

Lead (mm) \ Stroke (mm)	50	100	150	200
2.5	85	120	125	
1.25	62			

(Unit: mm/s)

Cable List

Type	Cable Symbol	
Standard	P (1m)	
	S (3m)	
	M (5m)	
Special Lengths	X06 (6m) 〜 X10 (10m)	
	X11 (11m) 〜 X15 (15m)	
	X16 (16m) 〜 X20 (20m)	
Robot Cable	R01 (1m) 〜 R03 (3m)	
	R04 (4m) 〜 R05 (5m)	
	R06 (6m) 〜 R10 (10m)	
	R11 (11m) 〜 R15 (15m)	
	R16 (16m) 〜 R20 (20m)	

* See page A-39 for cables for maintenance.

Actuator Specifications

Item	Description
Drive System	Ball screw ø32mm C10 grade
Positioning Repeatability	±0.01mm
Lost Motion	0.2mm or less
Rod Diameter	ø50mm (ball spline)
Allowable Load Moment of the Rod	120 N·m
Ambient Operating Temp./Humidity	0 〜 40°C, 85% RH or less (non-condensing)
Push Force Service Life	10 million pushes (*1)

(*1) The number of pushes are based on maximum pushing force and a distance of 1mm without load cell. With load cell this has to be replaced after 2 million pushes.

Option List

Name	Option Code	See Page	
Brake (with brake box)	B	→ P248	
Brake (without brake box)	BN	→ P248	
Top-mounted motor	MT1/MT2/MT3	→ P248	
Right-mounted motor	MR1/MR2	→ P248	
Left-mounted motor	ML1/ML3	→ P248	
Flange	FL	→ A-27	
Foot bracket	FT	→ A-29	
Load cell (with cable track)	LCT	-	
Load cell (without cable track)	LCN	-	

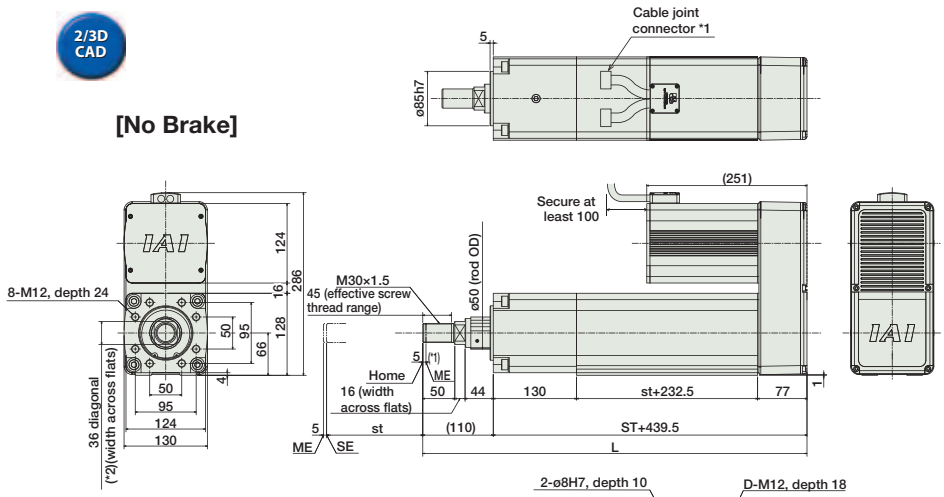
Dimensions

CAD drawings can be downloaded from IAI website. www.robocylinder.de

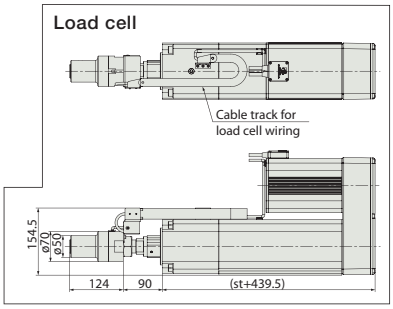
2/3D CAD

For Special Orders P. A-9

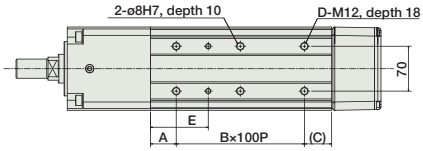
[No Brake]



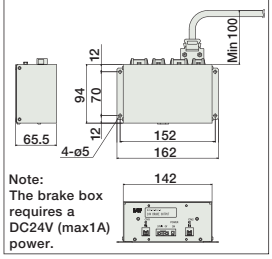
*1. The motor-encoder cable is connected here. See page A-39 for details on cables.
*2 When homing, the rod moves to the mechanical end; therefore, please watch for any interference with the surrounding objects.
*3. The orientation of the bolt will vary depending on the product.
SE: Stroke end
ME: Mechanical end



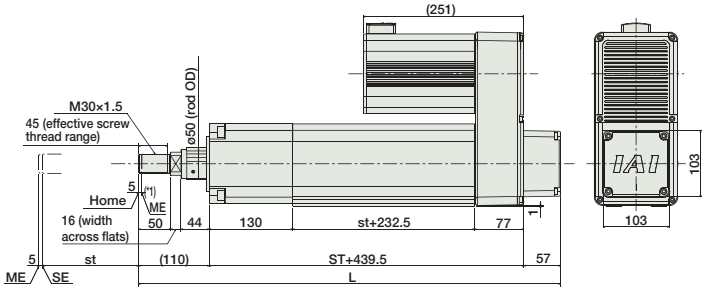
[Brake-Equipped]



Brake box (included)
(Included in the brake-equipped model)
Standalone model: RCB-110-RA13-0



Note:
The brake box requires a DC24V (max1A) power.



Note:
The brake-equipped model (option code: "-B") always comes with a brake box. If you want to order just the brake-equipped actuator, specify the option code "-BN".

■ Dimensions/Weight by Stroke

RCS2-RA13R (without brake)

Stroke	50	100	150	200
L	599.5	649.5	699.5	749.5
A	40	65	40	65
B	2	2	3	3
C	42.5	67.5	42.5	67.5
D	6	6	8	8
E	90	115	90	115
Weight (kg)	33	34	35	36

RCS2-RA13R (with brake)

Stroke	50	100	150	200
L	656.5	706.5	756.5	806.5
A	40	65	40	65
B	2	2	3	3
C	42.5	67.5	42.5	67.5
D	6	6	8	8
E	90	115	90	115
Weight (kg)	35	36	37	38

Motor-mounting direction / Cable exit direction (Options)

Note:
Please be sure to specify one of the codes for the motor mounting direction and the cable exit direction.

Option Code	MT1	MT2	MT3	MR1	ML1	MR2	ML3
Motor-mounting direction	Top (standard)	Top	Top	Right	Left	Right	Left
Cable exit direction	Top (standard)	Right	Left	Top	Top	Right	Left

Compatible Controllers

The RCS2 series actuators can operate with the controllers below. Select the controller according to your usage.

Name	External View	Model	Description	Max. Positioning Points	Input Voltage	Power Supply Capacity	See Page
Positioner Mode		SCON-C-750⑤①-NP-2-②	Positioning is possible for up to 512 points	512 points	Single-Phase AC 115V Single-Phase AC 230V Three-phase AC 230V (XSEL-P/Q only)	1569VA max. *When operating a 750W single-axis model	→ P547
Solenoid Valve Mode			Operable with same controls as solenoid valve.	7 points			
Serial Communication Type			Dedicated to serial communication	64 points			
Pulse Train Input Control Type			Dedicated to Pulse Train Input	(–)			
Program Control 1-2 Axes Type		SSEL-C-1-750⑤①-NP-2-②	Programmed operation is possible Operation is possible on up to 2 axes	20000 points			→ P577
Program Control 1-6 Axes Type		XSEL-③-1-750⑤①-N1-EEE-2-④	Programmed operation is possible Operation is possible on up to 6 axes	20000 points			→ P587

* For SSEL and XSEL, only applicable to the single-axis model. * ① is a placeholder for the encoder type (I: incremental / A: absolute). * ② is a placeholder for the power supply voltage (1: 115V, 2: single-phase 230V).
* ③ is a placeholder for the XSEL type name ("KE", "KET", "P", or "Q"). * ④ is a placeholder for the power supply voltage (1: 115V, 2: single-phase 230V, 3: 3-phase 230V). * ⑤ is a placeholder for the code "S", if the load cell option is specified.

RCS2-RGS4C

RoboCylinder Rod Type with Single Guide ø37mm Diameter 230V Servo Motor Coupled

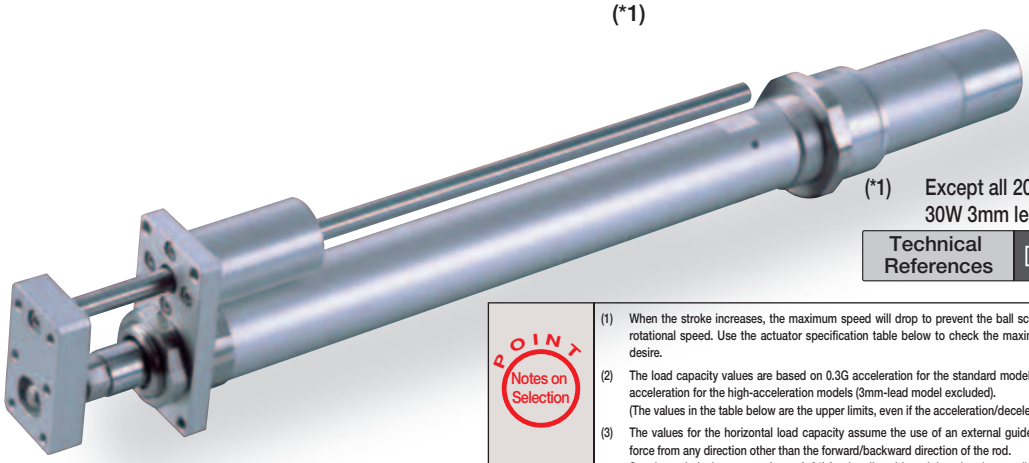
■ Configuration: RCS2 — RGS4C — [ ] — [ ] — [ ] — [ ] — [ ] — [ ] — [ ] — [ ]

Series	Type	Encoder	Motor	Lead	Stroke	Compatible Controllers	Cable Length	Option
RCS2	RGS4C	I : Incremental A : Absolute	20 : 20W Servo Motor 30 : 30W Servo Motor	12 : 12mm 6 : 6mm 3 : 3mm	50 : 50mm 〉 300 : 300mm (50mm pitch increments)	T1 : XSEL-KE/KET T2 : SCON SSEL XSEL-P/Q	N : None P : 1m S : 3m M : 5m X□□ : Custom R□□ : Robot cable	See Options below

* See page Pre-35 for an explanation of the naming convention.

For High Acceleration/Deceleration

(*1)



(*1) Except all 20W models and 30W 3mm lead models

Technical References P. A-5

POINT Notes on Selection

(1) When the stroke increases, the maximum speed will drop to prevent the ball screw from reaching the critical rotational speed. Use the actuator specification table below to check the maximum speed at the stroke you desire.

(2) The load capacity values are based on 0.3G acceleration for the standard model (0.2G for 3mm-lead), and 1G acceleration for the high-acceleration models (3mm-lead model excluded).
(The values in the table below are the upper limits, even if the acceleration/deceleration is decreased.)

(3) The values for the horizontal load capacity assume the use of an external guide, so that there is no external force from any direction other than the forward/backward direction of the rod.
See the technical resources (page A-81) for the allowable weight using the supplied guide alone.

Actuator Specifications

■ Lead and Load Capacity

Model	Motor Output (W)	Lead (mm)	Max. Load Capacity Horizontal (kg)	Max. Load Capacity Vertical (kg)	Rated Thrust (N)	Stroke (mm)
RCS2-RGS4C-①-20-12-②-③-④-⑤	20	12	3.0	0.5	18.9	50 ～ 300 (50mm increments)
RCS2-RGS4C-①-20-6-②-③-④-⑤		6	6.0	1.5	37.7	
RCS2-RGS4C-①-20-3-②-③-④-⑤		3	12.0	3.5	75.4	
RCS2-RGS4C-①-30-12-②-③-④-⑤	30	12	4.0	1.0	28.3	
RCS2-RGS4C-①-30-6-②-③-④-⑤		6	9.0	2.5	56.6	
RCS2-RGS4C-①-30-3-②-③-④-⑤		3	18.0	6.0	113.1	

Legend: ① Encoder ② Stroke ③ Compatible controller ④ Cable length ⑤ Options

■ Stroke and Maximum Speed

Lead \ Stroke	50 ～ 300 (50mm increments)
12	600
6	300
3	150

(Unit: mm/s)

Cable List

Type	Cable Symbol	
Standard	P (1m)	
	S (3m)	
	M (5m)	
Special Lengths	X06 (6m) ～ X10 (10m)	
	X11 (11m) ～ X15 (15m)	
	X16 (16m) ～ X20 (20m)	
Robot Cable	R01 (1m) ～ R03 (3m)	
	R04 (4m) ～ R05 (5m)	
	R06 (6m) ～ R10 (10m)	
	R11 (11m) ～ R15 (15m)	
	R16 (16m) ～ R20 (20m)	

* See page A-39 for cables for maintenance.

Actuator Specifications

Item	Description
Drive System	Ball screw ø10mm C10 grade
Positioning Repeatability	±0.02mm
Lost Motion	0.1mm or less
Guide	Single guide (guide rod diameter ø10mm, Ball bush type)
Rod Diameter	ø20mm
Non-rotating accuracy of rod	±0.05 deg
Ambient Operating Temp./Humidity	0 ～ 40°C, 85% RH or less (non-condensing)

Option List

Name	Option Code	See Page	
Brake	B	→ A-25	
Foot bracket	FT	→ A-29	
High-acceleration/deceleration (*1)	HA	→ A-32	
Home sensor (*2)	HS	→ A-32	
Reversed-home	NM	→ A-33	
Trunnion bracket (back)	TRR	→ A-38	

(*1) The high-acceleration/deceleration option is not available for all 20W models and 30W model with 3mm lead.

(*2) The home sensor (HS) cannot be used on the reversed-home models.

Dimensions

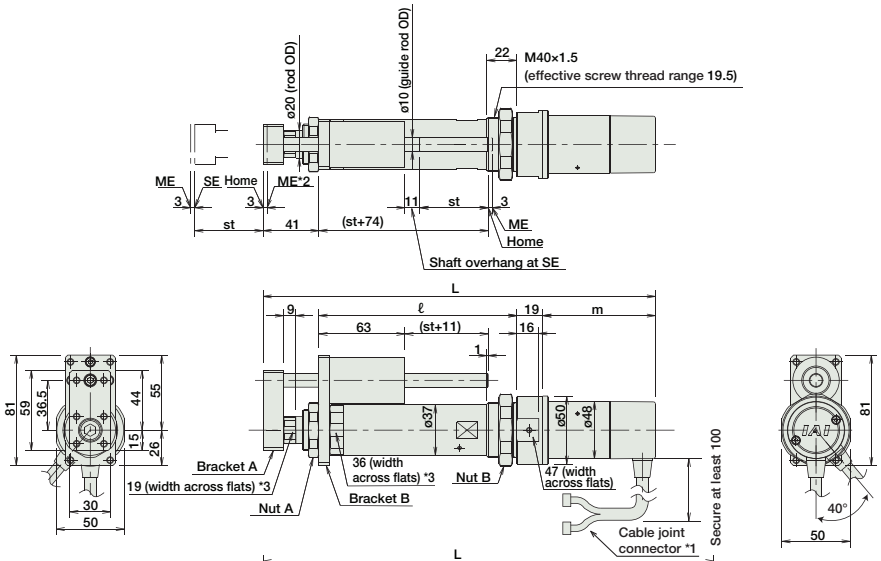
CAD drawings can be downloaded from IAI website. www.robocylinder.de

For Special Orders P. A-9

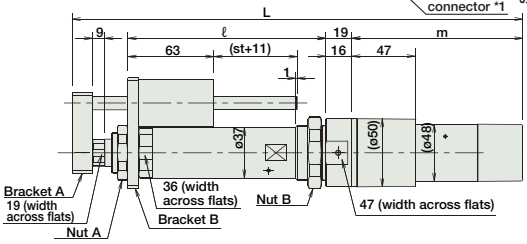
2/3D CAD

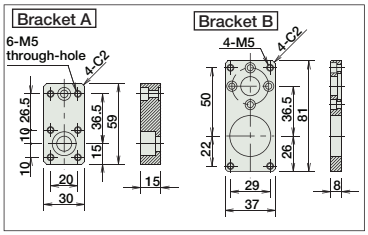
*1. The motor-encoder cable is connected here. See page A-39 for details on cables.
*2. When homing, the rod moves to the ME; therefore, please watch for any interference with the surrounding objects.
ME: Mechanical end SE: Stroke end
*3. The orientation of the bolt will vary depending on the product.

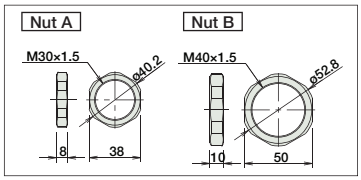
[No Brake]



[Brake-Equipped]







■ Dimensions/Weight by Stroke

RCS2-RGS4C (without brake)

Stroke		50	100	150	200	250	300
L	20W	285.5	335.5	385.5	435.5	485.5	535.5
	30W	300.5	350.5	400.5	450.5	500.5	550.5
ℓ		145	195	245	295	345	395
m	20W	80.5					
	30W	95.5					
Weight (kg)		1.5	1.6	1.8	2.0	2.2	2.4

RCS2-RGS4C (with brake)

Stroke		50	100	150	200	250	300
L	20W	328.5	378.5	428.5	478.5	528.5	578.5
	30W	343.5	393.5	443.5	493.5	543.5	593.5
ℓ		145	195	245	295	345	395
m	20W	123.5					
	30W	138.5					
Weight (kg)		1.7	1.8	2.0	2.2	2.4	2.6

Compatible Controllers

The RCS2 series actuators can operate with the controllers below. Select the controller according to your usage.

Name	External View	Model	Description	Max. Positioning Points	Input Voltage	Power Supply Capacity		See Page
Positioner Mode		SCON-C-20①-NP-2-③ SCON-C-30D①②-NP-2-③	Positioning is possible for up to 512 points	512 points	Single-Phase AC 115V Single-Phase AC 230V 3-Phase AC 230V (XSEL-P/Q only)	Maximum 360VA * Single-axis model operated at 150W		→ P547
Solenoid Valve Mode			Operable with the same controls as the solenoid valve.	7 points				
Serial Communication Type			Dedicated to serial communication	64 points				
Pulse Train Input Control Type			Dedicated to Pulse Train Input	(–)				
Program Control 1-2 Axes Type		SSEL-C-1-20①-NP-2-③ SSEL-C-1-30D①②-NP-2-③	Programmed operation is possible Operation is possible on up to 2 axes	20000 points				→ P577
Program Control 1-6 Axes Type		XSEL-④-1-20①-N1-EEE-2-⑤ XSEL-④-1-30D①②-N1-EEE-2-⑤	Programmed operation is possible Operation is possible on up to 6 axes	20000 points				→ P587

* For SSEL and XSEL, only applicable to the single-axis model.
* ① is a placeholder for the encoder type (I: incremental, A: absolute).
* ② is a placeholder for the code "HA" when the high acceleration/deceleration option is specified.
* ③ is a placeholder for the power supply voltage (1: single-phase 115V, 2: single phase 230V).
* ④ is a placeholder for the XSEL type name (KE, KET, P, Q).
* ⑤ is a placeholder for the power supply voltage type (1: 115V, 2: single-phase 230V, 3: 3-phase 230V).

RCS2-RGS5C

RoboCylinder Rod Type with Single Guide ø55mm Diameter 230V Servo Motor Coupled

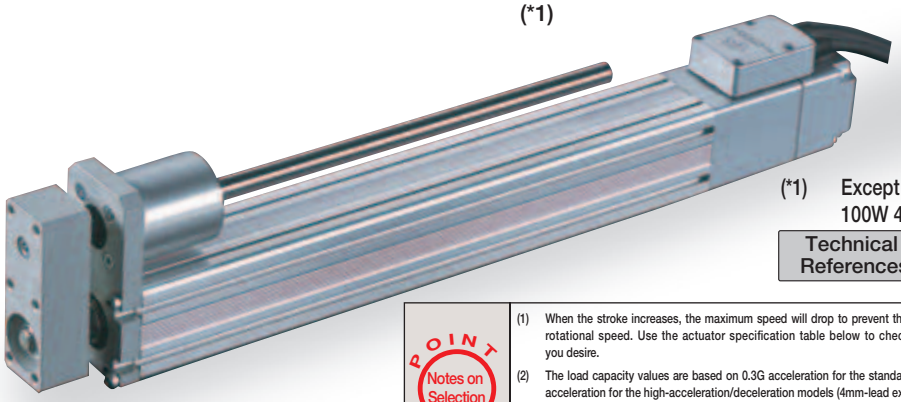
■ Configuration: RCS2 — RGS5C — □ — □ — □ — □ — □ — □ — □ — □

Series	Type	Encoder	Motor	Lead	Stroke	Compatible Controllers	Cable Length	Option
RCS2	RGS5C	I : Incremental A : Absolute	60 : 60W Servo Motor 100 : 100W Servo Motor	16 : 16mm 8 : 8mm 4 : 4mm	50 : 50mm 〜 300 : 300mm (50mm pitch increments)	T1 : XSEL-KE/KET T2 : SCON SSEL XSEL-P/Q	N : None P : 1m S : 3m M : 5m X□□ : Custom R□□ : Robot cable	See Options below

* See page Pre-35 for an explanation of the naming convention.

For High Acceleration/Deceleration

(*1)



(*1) Except all 60W models and 100W 4mm lead models

Technical References P. A-5

POINT Notes on Selection

(1) When the stroke increases, the maximum speed will drop to prevent the ball screw from reaching the critical rotational speed. Use the actuator specification table below to check the maximum speed at the stroke you desire.

(2) The load capacity values are based on 0.3G acceleration for the standard model (0.2G for 4mm-lead), and 1G acceleration for the high-acceleration/deceleration models (4mm-lead excluded).
(The values in the table below are the upper limits, even if the acceleration/deceleration is decreased.)

(3) The values for the horizontal load capacity assume the use of an external guide, so that there is no external force from any direction other than the forward/backward direction of the rod.
See the technical resources (page A-82) for the allowable weight using the supplied guide alone.

Actuator Specifications

■ Lead and Load Capacity

Model	Motor Output (W)	Lead (mm)	Max. Load Capacity Horizontal (kg)	Max. Load Capacity Vertical (kg)	Rated Thrust (N)	Stroke (mm)
RCS2-RGS5C-①-60-16-②-③-④-⑤	60	16	12.0	1.3	63.8	50 〜 300 (50mm increments)
RCS2-RGS5C-①-60-8-②-③-④-⑤		8	25.0	4.3	127.5	
RCS2-RGS5C-①-60-4-②-③-④-⑤		4	50.0	10.8	255.1	
RCS2-RGS5C-①-100-16-②-③-④-⑤	100	16	15.0	2.8	105.8	
RCS2-RGS5C-①-100-8-②-③-④-⑤		8	30.0	8.3	212.7	
RCS2-RGS5C-①-100-4-②-③-④-⑤		4	60.0	17.3	424.3	

Legend: ① Encoder ② Stroke ③ Compatible controller ④ Cable length ⑤ Options

■ Stroke and Maximum Speed

Lead \ Stroke	50 〜 250 (50mm increments)	300 (mm)
16	800	755
8	400	377
4	200	188

(Unit: mm/s)

Cable List

Type	Cable Symbol	
Standard	P (1m)	
	S (3m)	
	M (5m)	
Special Lengths	X06 (6m) 〜 X10 (10m)	
	X11 (11m) 〜 X15 (15m)	
	X16 (16m) 〜 X20 (20m)	
Robot Cable	R01 (1m) 〜 R03 (3m)	
	R04 (4m) 〜 R05 (5m)	
	R06 (6m) 〜 R10 (10m)	
	R11 (11m) 〜 R15 (15m)	
	R16 (16m) 〜 R20 (20m)	

* See page A-39 for cables for maintenance.

Actuator Specifications

Item	Description
Drive System	Ball screw ø12mm C10 grade
Positioning Repeatability	±0.02mm
Lost Motion	0.1mm or less
Guide	Single guide (guide rod diameter ø12mm, Ball bush type)
Rod Diameter	ø30mm
Non-rotating accuracy of rod	±0.1 deg
Ambient Operating Temp./Humidity	0 〜 40°C, 85% RH or less (non-condensing)

Option List

Name	Option Code	See Page	
Connector cable exit direction	A2	→ A-25	
Brake	B	→ A-25	
Foot bracket	FT	→ A-29	
Guide mounting direction	GS2 〜 GS4	→ P252	
High-acceleration/deceleration (*1)	HA	→ A-32	

(*1) The high-acceleration/deceleration option is not available for all 60W models and 100W model with 4mm lead.

Dimensions

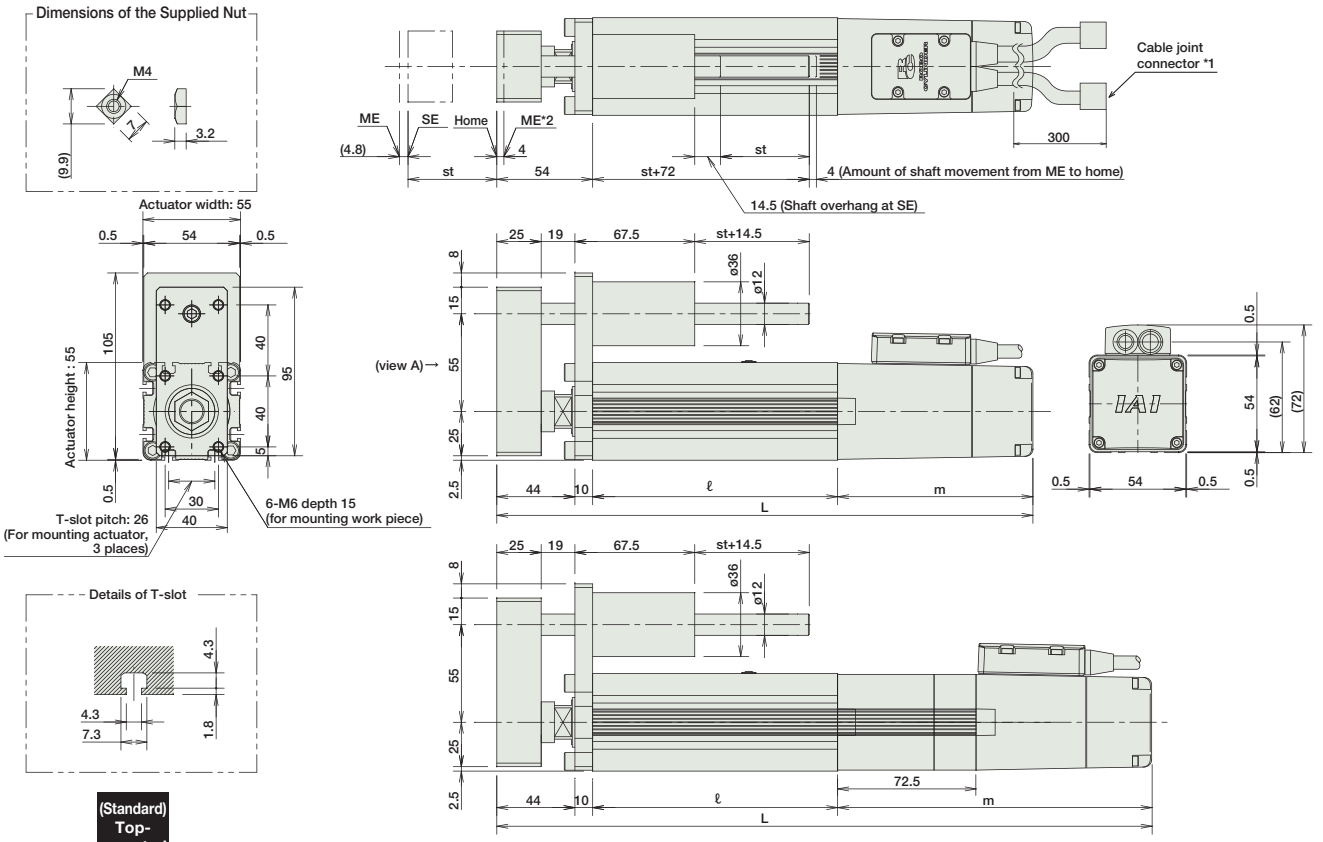
CAD drawings can be downloaded from IAI website. www.robocylinder.de

For Special Orders P. A-9

2/3D CAD

* The RGS5C is not available in reversed-home configuration, due to its construction.

*1. The motor-encoder cable is connected here. See page A-39 for details on cables.
*2. When homing, the rod moves to the ME; therefore, please watch for any interference with the surrounding objects.
ME: Mechanical end SE: Stroke end



(Standard) Top-mounted

GS4 Left-mounted | Actuator | GS2 Right-mounted

GS3 Bottom-mounted

Guide mounting direction (as viewed from view A)

Dimensions/Weight by Stroke

RCS2-RGS5C (without brake)

Stroke		50	100	150	200	250	300
L	60W	284	334	384	434	484	534
	100W	302	352	402	452	502	552
ℓ		138	188	238	288	338	388
m	60W	92					
	100W	110					
Weight (kg)		2.5	2.8	3.2	3.6	3.9	4.3

RCS2-RGS5C (with brake)

Stroke		50	100	150	200	250	300
L	60W	356.5	406.5	456.5	506.5	556.5	606.5
	100W	374.5	424.5	474.5	524.5	574.5	624.5
ℓ		138	188	238	288	338	388
m	60W	164.5					
	100W	182.5					
Weight (kg)		2.8	3.1	3.5	3.9	4.2	4.6

Compatible Controllers

The RCS2 series actuators can operate with the controllers below. Select the controller according to your usage.

Name	External View	Model	Description	Max. Positioning Points	Input Voltage	Power Supply Capacity		See Page
Positioner Mode		SCON-C-60①-NP-2-③ SCON-C-100①②-NP-2-③	Positioning is possible for up to 512 points	512 points	Single-Phase AC 115V Single-Phase AC 230V 3-Phase AC 230V (XSEL-P/Q only)	Maximum 360VA * Single-axis model operated at 150W		→ P547
Solenoid Valve Mode			Operable with the same controls as the solenoid valve.	7 points				
Serial Communication Type			Dedicated to serial communication	64 points				
Pulse Train Input Control Type			Dedicated to Pulse Train Input	(–)				
Program Control 1-2 Axes Type		SSEL-C-1-60①-NP-2-③ SSEL-C-1-100①②-NP-2-③	Programmed operation is possible Operation is possible on up to 2 axes	20000 points				→ P577
Program Control 1-6 Axes Type		XSEL-④-1-60①-N1-EEE-2-⑤ XSEL-④-1-100①②-N1-EEE-2-⑤	Programmed operation is possible Operation is possible on up to 6 axes	20000 points				→ P587

* For SSEL and XSEL, only applicable to the single-axis model.
* ① is a placeholder for the encoder type (I: incremental, A: absolute).
* ② is a placeholder for the code "HA" when the high acceleration/deceleration option is specified.
* ③ is a placeholder for the power supply voltage (1: single-phase 115V, 2: single phase 230V).
* ④ is a placeholder for the XSEL type name (KE, KET, P, Q).
* ⑤ is a placeholder for the power supply voltage type (1: 115V, 2: single-phase 230V, 3: 3-phase 230V).

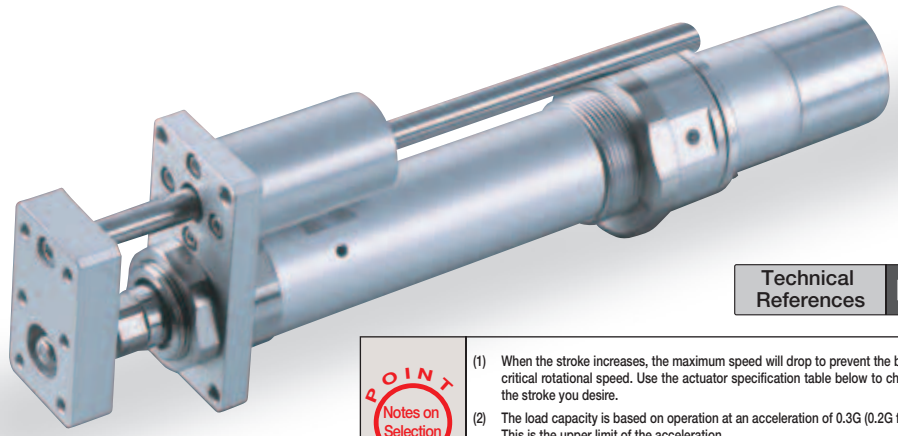
RCS2-RGS4D

RoboCylinder Rod Type with Single Guide ø37mm Diameter 230V Servo Motor
Built-In Model

■ Configuration: RCS2 — RGS4D — ☐ — ☐ — ☐ — ☐ — ☐ — ☐ — ☐

Series	Type	Encoder	Motor	Lead	Stroke	Compatible Controllers	Cable Length	Option
RCS2	RGS4D	I : Incremental A : Absolute	60 : 60W Servo Motor 30 : 30W Servo Motor	12 : 12mm 6 : 6mm 3 : 3mm	50 : 50mm 〜 300 : 300mm (50mm pitch increments)	T1 : XSEL-KE/KET T2 : SCON SSEL XSEL-P/Q	N : None P : 1m S : 3m M : 5m X☐☐ : Custom R☐☐ : Robot cable	See Options below

* See page Pre-35 for an explanation of the naming convention.



Technical References P. A-5

POINT Notes on Selection

(1) When the stroke increases, the maximum speed will drop to prevent the ball screw from reaching the critical rotational speed. Use the actuator specification table below to check the maximum speed at the stroke you desire.

(2) The load capacity is based on operation at an acceleration of 0.3G (0.2G for the 3mm-lead model). This is the upper limit of the acceleration.

(3) The values for the horizontal load capacity assume the use of an external guide, so that there is no external force from any direction other than the forward/backward direction of the rod. See the technical resources (page A-82) for the allowable weight using the supplied guide alone.

Actuator Specifications

■ Lead and Load Capacity

Model	Motor Output (W)	Lead (mm)	Max. Load Capacity Horizontal (kg)	Max. Load Capacity Vertical (kg)	Rated Thrust (N)	Stroke (mm)
RCS2-RGS4D-①-20-12-②-③-④-⑤	20	12	3.0	0.5	18.9	50 〜 300 (50mm increments)
RCS2-RGS4D-①-20-6-②-③-④-⑤		6	6.0	1.5	37.7	
RCS2-RGS4D-①-20-3-②-③-④-⑤		3	12.0	3.5	75.4	
RCS2-RGS4D-①-30-12-②-③-④-⑤	30	12	4.0	1.0	28.3	
RCS2-RGS4D-①-30-6-②-③-④-⑤		6	9.0	2.5	56.6	
RCS2-RGS4D-①-30-3-②-③-④-⑤		3	18.0	6.0	113.1	

Legend: ① Encoder ② Stroke ③ Compatible controller ④ Cable length ⑤ Options

■ Stroke and Maximum Speed

Lead \ Stroke	50 〜 300 (50mm increments)
12	600
6	300
3	150

(Unit: mm/s)

Cable List

Type	Cable Symbol	
Standard	**P** (1m)	
	S (3m)	
	M (5m)	
Special Lengths	**X06** (6m) 〜 **X10** (10m)	
	X11 (11m) 〜 **X15** (15m)	
	X16 (16m) 〜 **X20** (20m)	
Robot Cable	**R01** (1m) 〜 **R03** (3m)	
	R04 (4m) 〜 **R05** (5m)	
	R06 (6m) 〜 **R10** (10m)	
	R11 (11m) 〜 **R15** (15m)	
	R16 (16m) 〜 **R20** (20m)	

* See page A-39 for cables for maintenance.

Actuator Specifications

Item	Description
Drive System	Ball screw ø10mm C10 grade
Positioning Repeatability	±0.02mm
Lost Motion	0.1mm or less
Guide	Single guide (guide rod diameter ø10mm, Ball bush type)
Rod Diameter	ø20mm
Non-rotating accuracy of rod	±0.05 deg
Ambient Operating Temp./Humidity	0 〜 40°C, 85% RH or less (non-condensing)

Option List

Name	Option Code	See Page	
Foot bracket	FT	→ A-29	
Home sensor	HS	→ A-32	
Reversed-home	NM	→ A-33	
Trunnion bracket (back)	TRR	→ A-38	

* The home sensor (HS) cannot be used on the reversed-home models.

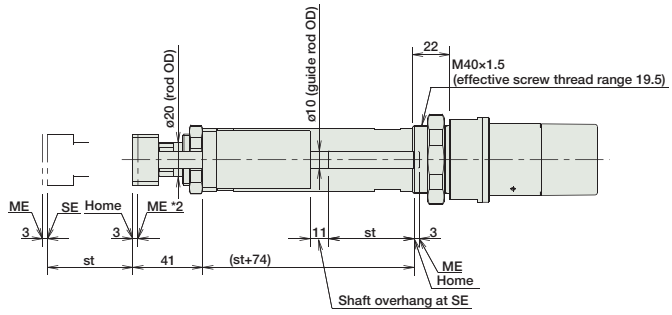
Dimensions

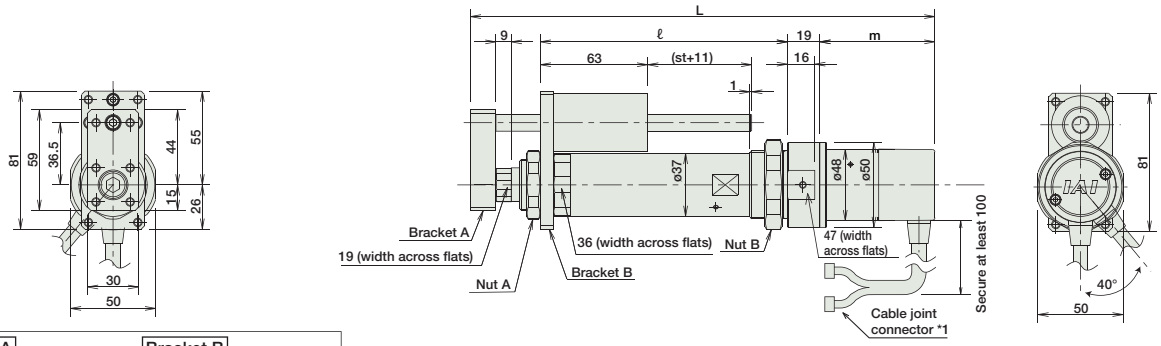
CAD drawings can be downloaded from IAI website. www.robocylinder.de

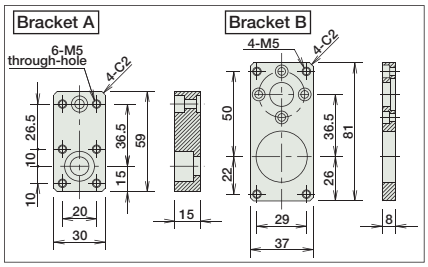
For Special Orders P. A-9

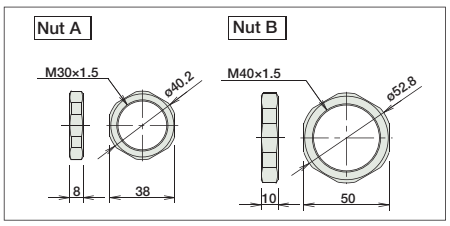
2/3D CAD

*1. The motor-encoder cable is connected here. See page A-39 for details on cables.
*2. When homing, the rod moves to the ME; therefore, please watch for any interference with the surrounding objects.
ME: Mechanical end SE: Stroke end









Dimensions/Weight by Stroke

RCS2-RGS4D (without brake)

Stroke		50	100	150	200	250	300
L	20W	263.5	313.5	363.5	413.5	463.5	513.5
	30W	278.5	328.5	378.5	428.5	478.5	528.5
ℓ		145	195	245	295	345	395
m	20W	58.5					
	30W	73.5					
Weight (kg)		1.3	1.5	1.7	1.9	2.1	2.3

RCS2-RGS4D does not come in a brake-equipped configuration.

Compatible Controllers

The RCS2 series actuators can operate with the controllers below. Select the controller according to your usage.

Name	External View	Model	Description	Max. Positioning Points	Input Voltage	Power Supply Capacity		See Page
Positioner Mode		SCON-C-20①-NP-2-② SCON-C-30D①-NP-2-②	Positioning is possible for up to 512 points	512 points	Single-Phase AC 115V Single-Phase AC 230V 3-Phase AC 230V (XSEL-P/Q only)	Maximum 360VA * Single-axis model operated at 150W		→ P547
Solenoid Valve Mode			Operable with the same controls as the solenoid valve.	7 points				
Serial Communication Type			Dedicated to serial communication	64 points				
Pulse Train Input Control Type			Dedicated to Pulse Train Input	(–)				
Program Control 1-2 Axes Type		SSEL-C-1-20①-NP-2-② SSEL-C-1-30D①-NP-2-②	Programmed operation is possible Operation is possible on up to 2 axes	20000 points				→ P577
Program Control 1-6 Axes Type		XSEL-③-1-20①-N1-EEE-2-④ XSEL-③-1-30D①-N1-EEE-2-④	Programmed operation is possible Operation is possible on up to 6 axes	20000 points				→ P587

* For SSEL and XSEL, only applicable to the single-axis model.
* ① is a placeholder for the encoder type (I: incremental / A: absolute).
* ② is a placeholder for the power supply voltage (1: 115V, 2: single-phase 230V).
* ③ is a placeholder for the XSEL type name ("KE", "KET", "P", or "Q").
* ④ is a placeholder for the power supply voltage (1: 115V, 2: single-phase 230V, or 3: three-phase 230V).

RCS2-SRGS7BD

RoboCylinder Rod Type with Single Guide ø75mm Width 230V Servo Motor
Short-Length Model

■ Configuration: RCS2 — SRGS7BD — I — □ — □ — □ — □ — □ — □ — □

Series	Type	Encoder	Motor	Lead	Stroke	Compatible Controllers	Cable Length	Option
		I : Incremental	60 : 60W Servo Motor 100 : 100W Servo Motor 150 : 150W Servo Motor	12 : 12mm 6 : 6mm 3 : 3mm	50 : 50mm 〜 300 : 300mm (50mm pitch increments)	T1 : XSEL-KE/KET T2 : SCON SSEL XSEL-P/Q	N : None P : 1m S : 3m M : 5m X □□ : Custom R □□ : Robot cable	See Options below

* See page Pre-35 for an explanation of the naming convention.

Technical References P. A-5

POINT Notes on Selection

(1) When operated at the rated acceleration, the maximum load capacity is the load capacity at the rated acceleration.
(2) When operated at the maximum acceleration, the maximum load capacity is the load capacity at the maximum acceleration.
(3) The values for the horizontal load capacity assume the use of an external guide, so that there is no external force from any direction other than the forward/backward direction of the rod. See the technical resources (page A-82) for the allowable weight using the supplied guide alone.

Actuator Specifications

■ Lead and Load Capacity

Model	Motor Output (W)	Lead (mm)	Rated Acceleration (G)	Load Capacity at Rated Acceleration Horizontal (kg)	Load Capacity at Rated Acceleration Vertical (kg)	Max. Acceleration (G)	Load Capacity at Max. Acceleration Horizontal (kg)	Load Capacity at Max. Acceleration Vertical (kg)	Rated Thrust (N)	Stroke (mm)
RCS2-SRGS7BD-I-60-16-①-②-③-④	60	16	0.25	5	1.5	0.35	2.5	0.5	63	50〜300 (50mm increments)
RCS2-SRGS7BD-I-60-8-①-②-③-④		8	0.15	10	4.5	0.25	5	2	127	
RCS2-SRGS7BD-I-60-4-①-②-③-④		4	0.05	20	9.5	0.15	10	4.5	254	
RCS2-SRGS7BD-I-100-16-①-②-③-④	100	16	0.3	10	3	0.4	5	1	103	
RCS2-SRGS7BD-I-100-8-①-②-③-④		8	0.2	22	8.5	0.3	10	4	207	
RCS2-SRGS7BD-I-100-4-①-②-③-④		4	0.1	40	19	0.2	20	8.5	414	
RCS2-SRGS7BD-I-150-16-①-②-③-④	150	16	0.3	15	6	0.4	7.5	2.5	157	
RCS2-SRGS7BD-I-150-8-①-②-③-④		8	0.2	35	14	0.3	17.5	6.5	314	
RCS2-SRGS7BD-I-150-4-①-②-③-④		4	0.1	55	22	0.2	27.5	10.5	628	

Legend ① Stroke ② Compatible controller ③ Cable length ④ Options

■ Stroke and Maximum Speed

Lead \ Stroke	50 〜 300 (50mm increments)
16	800
8	400
4	200

(Unit: mm/s)

Cable List

Type	Cable Symbol	
Standard	P (1m)	
	S (3m)	
	M (5m)	
Special Lengths	X06 (6m) 〜 X10 (10m)	
	X11 (11m) 〜 X15 (15m)	
	X16 (16m) 〜 X20 (20m)	
Robot Cable	R01 (1m) 〜 R03 (3m)	
	R04 (4m) 〜 R05 (5m)	
	R06 (6m) 〜 R10 (10m)	
	R11 (11m) 〜 R15 (15m)	
	R16 (16m) 〜 R20 (20m)	

* See page A-39 for cables for maintenance.

Actuator Specifications

Item	Description
Drive System	Ball screw ø12mm C10 grade
Positioning Repeatability	±0.02mm
Lost Motion	0.1mm or less
Guide	Single guide (guide rod diameter ø16, Ball bush type)
Rod Diameter	ø35mm
Non-rotating accuracy of rod	±0.1 deg
Ambient Operating Temp./Humidity	0 〜 40°C, 85% RH or less (non-condensing)

Option List

Name	Option Code	See Page	
Connector cable exit direction	A1 〜 A3	→ A-25	
Brake	B	→ A-25	
Foot bracket	FT	→ A-29	
Guide mounting direction	GS2 〜 GS4	→ P256	

Dimensions

CAD drawings can be downloaded from IAI website. www.robocylinder.de

2/3D CAD

*The SRGS7BD is not available in reversed-home configuration, due to its construction.

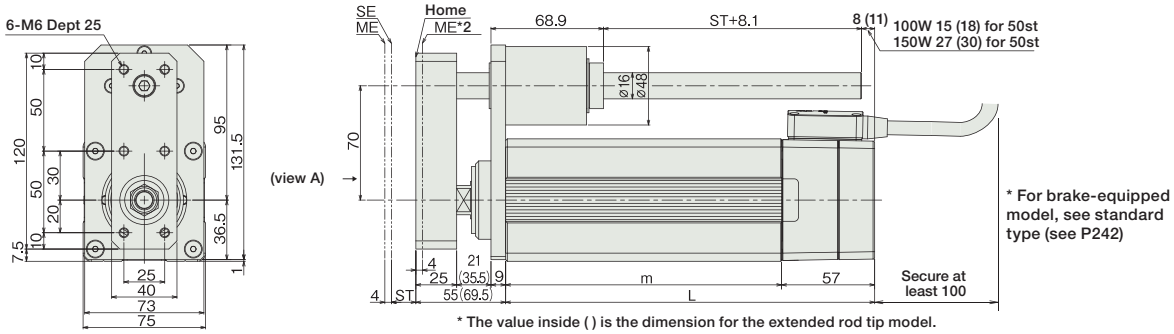
For Special Orders P. A-9

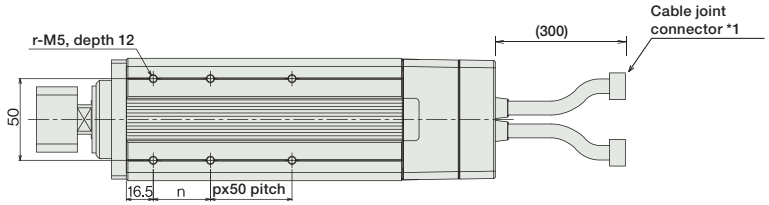
*1. The motor-encoder cable is connected here. See page A-39 for details on cables.

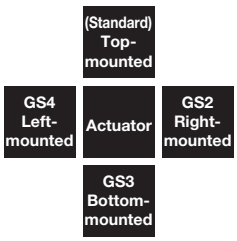
*2. When homing, the rod moves to the mechanical end position; therefore, please watch for any interference with the surrounding objects.

ST: Stroke
SE: Stroke end
ME: Mechanical end

Note:
A slit is provided in the side of the actuator body to prevent pauses due to forward/backward operation. Please make a separate request for a dustproof/splash-proof model.







Guide mounting direction (as viewed from view A)

Dimensions/Weight by Stroke

Stroke		50	100	150	200	250	300
L	60W	126	176	226	276	326	376
	100W	133	176	226	276	326	376
	150W	145	176	226	276	326	376
m	60W	69	119	169	219	269	319
	100W	76	119	169	219	269	319
	150W	88	119	169	219	269	319
n		25	35	35	35	35	35
p		0	0	1	2	3	4
r		4	4	6	8	10	12
Weight (kg)	60W	3.5	4.1	4.8	5.4	6.1	6.7
	100W	3.7	4.3	4.9	5.6	6.2	6.9
	150W	4	4.5	5.1	5.8	6.4	7.1

Compatible Controllers

The RCS2 series actuators can operate with the controllers below. Select the controller according to your usage.

Name	External View	Model	Description	Max. Positioning Points	Input Voltage	Power Supply Capacity		See Page
Positioner Mode		SCON-C-①I-NP-2-②	Positioning is possible for up to 512 points	512 points	Single-Phase AC 115V Single-Phase AC 230V 3-Phase AC 230V (XSEL-P/Q only)	Maximum 360VA * Single-axis model operated at 150W		→ P547
Solenoid Valve Mode			Operable with the same controls as the solenoid valve.	7 points				
Serial Communication Type			Dedicated to serial communication	64 points				
Pulse Train Input Control Type			Dedicated for Pulse Train Input	(–)				
Program Control 1-2 Axes Type		SSEL-C-1-①I-NP-2-②	Programmed operation is possible Operation is possible on up to 2 axes	20000 points				→ P577
Program Control 1-6 Axes Type		XSEL-③-1-①I-N1-EEE-2-④	Programmed operation is possible Operation is possible on up to 6 axes	20000 points				→ P587

Note: The SRGS7BD type actuator cannot be connected to the 5th and 6th axes of the XSEL-P/Q controller.

* For SSEL and XSEL, only applicable to the single-axis model.
* ① is a place holder for the motor output (W) (60, 100, 150).
* ② is a placeholder for the power supply voltage (1: 115V, 2: single-phase 230V).
* ③ is a placeholder for the XSEL type name ("KE", "KET", "P", or "Q").
* ④ is a placeholder for the power supply voltage (1: 115V, 2: single-phase 230V, or 3: three-phase 230V).

RCS2-RGD4C

RoboCylinder Rod Type with Double Guide ø37mm Diameter 230V Servo Motor Coupled

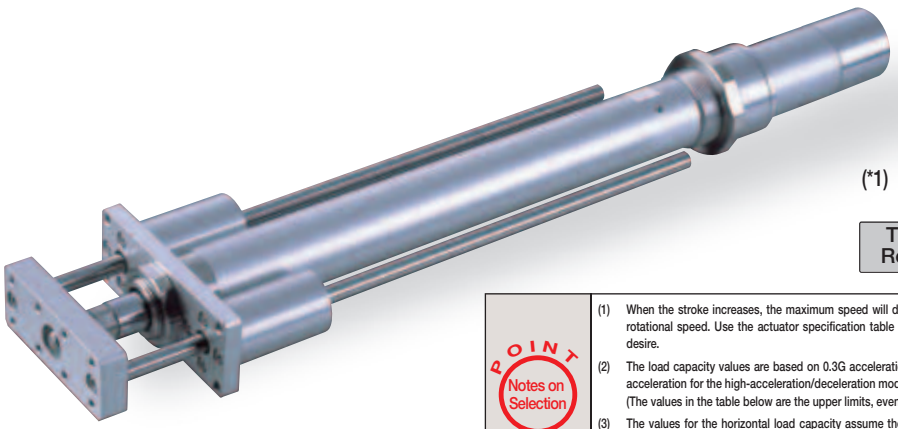
■ Configuration: RCS2 — RGD4C — ☐ — ☐ — ☐ — ☐ — ☐ — ☐ — ☐

Series	Type	Encoder	Motor	Lead	Stroke	Compatible Controllers	Cable Length	Option
RCS2	RGD4C	I : Incremental A : Absolute	20 : 20W Servo Motor 30 : 30W Servo Motor	12 : 12mm 6 : 6mm 3 : 3mm	50 : 50mm 〜 300 : 300mm (50mm pitch increments)	T1 : XSEL-KE/KET T2 : SCON SSEL XSEL-P/Q	N : None P : 1m S : 3m M : 5m X☐☐ : Custom R☐☐ : Robot cable	See Options below

* See page Pre-35 for an explanation of the naming convention.

For High Acceleration/Deceleration

(*1)



(*1) Except all 20W models and 30W 3mm lead models

Technical References P. A-5

POINT Notes on Selection

(1) When the stroke increases, the maximum speed will drop to prevent the ball screw from reaching the critical rotational speed. Use the actuator specification table below to check the maximum speed at the stroke you desire.

(2) The load capacity values are based on 0.3G acceleration for the standard model (0.2G for 3mm-lead), and 1G acceleration for the high-acceleration/deceleration model (3mm-lead excluded).
(The values in the table below are the upper limits, even if the acceleration/deceleration is decreased.)

(3) The values for the horizontal load capacity assume the use of an external guide, so that there is no external force from any direction other than the forward/backward direction of the rod.
See the technical resources (page A-83) for the allowable weight using the supplied guide alone.

Actuator Specifications

■ Lead and Load Capacity

Model	Motor Output (W)	Lead (mm)	Max. Load Capacity Horizontal (kg)	Max. Load Capacity Vertical (kg)	Rated Thrust (N)	Stroke (mm)
RCS2-RGD4C-①-20-12-②-③-④-⑤	20	12	3.0	0.5	18.9	50 〜 300 (50mm increments)
RCS2-RGD4C-①-20-6-②-③-④-⑤		6	6.0	1.5	37.7	
RCS2-RGD4C-①-20-3-②-③-④-⑤		3	12.0	3.5	75.4	
RCS2-RGD4C-①-30-12-②-③-④-⑤	30	12	4.0	1.0	28.3	
RCS2-RGD4C-①-30-6-②-③-④-⑤		6	9.0	2.5	56.6	
RCS2-RGD4C-①-30-3-②-③-④-⑤		3	18.0	6.0	113.1	

Legend: ① Encoder ② Stroke ③ Compatible controller ④ Cable length ⑤ Options

■ Stroke and Maximum Speed

Lead \ Stroke	50 〜 300 (50mm increments)
12	600
6	300
3	150

(Unit: mm/s)

Cable List

Type	Cable Symbol	
Standard	P (1m)	
	S (3m)	
	M (5m)	
Special Lengths	X06 (6m) 〜 X10 (10m)	
	X11 (11m) 〜 X15 (15m)	
	X16 (16m) 〜 X20 (20m)	
Robot Cable	R01 (1m) 〜 R03 (3m)	
	R04 (4m) 〜 R05 (5m)	
	R06 (6m) 〜 R10 (10m)	
	R11 (11m) 〜 R15 (15m)	
	R16 (16m) 〜 R20 (20m)	

* See page A-39 for cables for maintenance.

Actuator Specifications

Item	Description
Drive System	Ball screw ø10mm C10 grade
Positioning Repeatability	±0.02mm
Lost Motion	0.1mm or less
Guide	Double guide (guide rod diameter ø10, Ball bush type)
Rod Diameter	ø20mm
Non-rotating accuracy of rod	±0.05 deg
Ambient Operating Temp./Humidity	0 〜 40°C, 85% RH or less (non-condensing)

Option List

Name	Option Code	See Page	
Brake	B	→ A-25	
Foot bracket	FT	→ A-29	
High-acceleration/deceleration (*1)	HA	→ A-32	
Home sensor (*2)	HS	→ A-32	
Reversed-home	NM	→ A-33	
Trunnion bracket (back)	TRR	→ A-38	

(*1) The high-acceleration/deceleration option is not available for all 20W models and 30W model with 3mm lead.
(*2) The home sensor (HS) cannot be used on the reversed-home models.

Dimensions

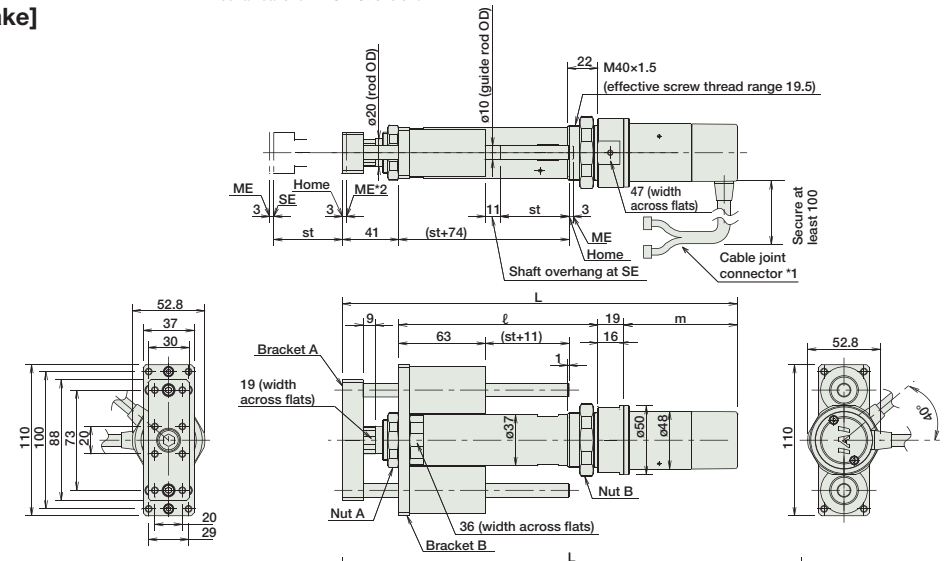
CAD drawings can be downloaded from IAI website. www.robocylinder.de

For Special Orders P. A-9

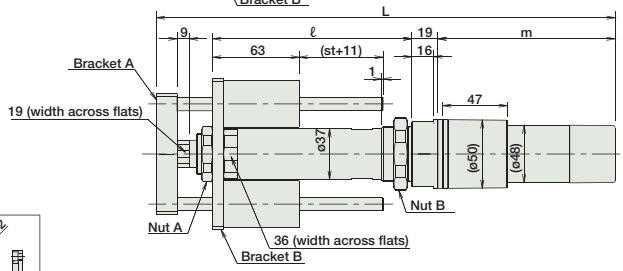
2/3D CAD

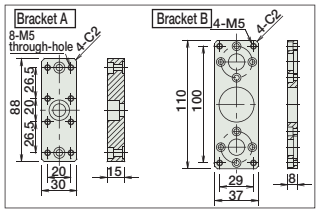
*1. The motor-encoder cable is connected here. See page A-39 for details on cables.
*2. When homing, the rod moves to the ME; therefore, please watch for any interference with the surrounding objects.
ME: Mechanical end SE: Stroke end

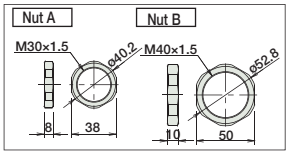
[No Brake]



[Brake-Equipped]







■ Dimensions/Weight by Stroke

RCS2-RGD4C (without brake)

Stroke		50	100	150	200	250	300
L	20W	285.5	335.5	385.5	435.5	485.5	535.5
	30W	300.5	350.5	400.5	450.5	500.5	550.5
ℓ		145	195	245	295	345	395
m	20W	80.5					
	30W	95.5					
Weight (kg)		1.8	2.0	2.2	2.4	2.6	2.8

RCS2-RGD4C (with brake)

Stroke		50	100	150	200	250	300
L	20W	328.5	378.5	428.5	478.5	528.5	578.5
	30W	343.5	393.5	443.5	493.5	543.5	593.5
ℓ		145	195	245	295	345	395
m	20W	123.5					
	30W	138.5					
Weight (kg)		2.0	2.2	2.4	2.6	2.8	3.0

Compatible Controllers

The RCS2 series actuators can operate with the controllers below. Select the controller according to your usage.

Name	External View	Model	Description	Max. Positioning Points	Input Voltage	Power Supply Capacity		See Page
Positioner Mode		SCON-C-20①-NP-2-③ SCON-C-30D①②-NP-2-③	Positioning is possible for up to 512 points	512 points	Single-Phase AC 115V Single-Phase AC 230V 3-Phase AC 230V (XSEL-P/Q only)	360VA max. * When operating a 150W single-axis model		→ P547
Solenoid Valve Mode			Operable with the same controls as the solenoid valve.	7 points				
Serial Communication Type			Dedicated to serial communication	64 points				
Pulse Train Input Control Type			Dedicated to Pulse Train Input	(–)				
Program Control 1-2 Axes Type		SSEL-C-1-20①-NP-2-③ SSEL-C-1-30D①②-NP-2-③	Programmed operation is possible Operation is possible on up to 2 axes	20000 points				→ P577
Program Control 1-6 Axes Type		XSEL-④-1-20①-N1-EEE-2-⑤ XSEL-④-1-30D①②-N1-EEE-2-⑤	Programmed operation is possible Operation is possible on up to 6 axes	20000 points				→ P587

* For SSEL and XSEL, only applicable to the single-axis model.
* ① is a placeholder for the encoder type (I: incremental, A: absolute).
* ② is a placeholder for the code "HA" when the high acceleration/deceleration option is specified.
* ③ is a placeholder for the power supply voltage (1: single-phase 115V, 2: single phase 230V).
* ④ is a placeholder for the XSEL type name (KE, KET, P, Q).
* ⑤ is a placeholder for the power supply voltage type (1: 115V, 2: single-phase 230V, 3: 3-phase 230V).

RCS2-RGD5C

RoboCylinder Rod Type with Single Guide ø37mm Diameter 230V Servo Motor Built-In Model

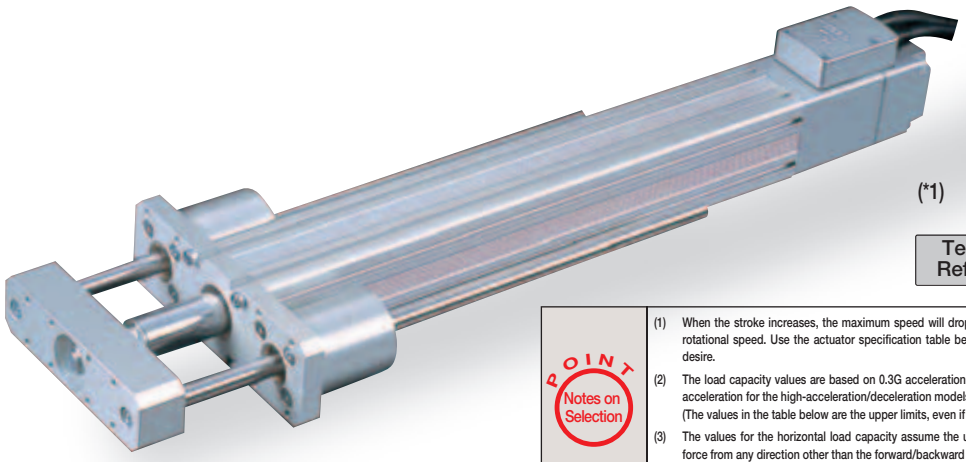
■ Configuration: RCS2 — RGD5C — □ — □ — □ — □ — □ — □ — □ — □

Series	Type	Encoder	Motor	Lead	Stroke	Compatible Controllers	Cable Length	Option
		I : Incremental A : Absolute	60 : 60W Servo Motor 100 : 100W Servo Motor	16 : 16mm 8 : 8mm 4 : 4mm	50 : 50mm 〜 300 : 300mm (50mm pitch increments)	T1 : XSEL-KE/KET T2 : SCON SSEL XSEL-P/Q	N : None P : 1m S : 3m M : 5m X□□ : Custom R□□ : Robot cable	See Options below

* See page Pre-35 for an explanation of the naming convention.

For High Acceleration/Deceleration

(*1)



(*1) Except all 60W models and 100W 4mm lead models

Technical References P. A-5

POINT Notes on Selection

(1) When the stroke increases, the maximum speed will drop to prevent the ball screw from reaching the critical rotational speed. Use the actuator specification table below to check the maximum speed at the stroke you desire.

(2) The load capacity values are based on 0.3G acceleration for the standard model (0.2G for 4mm-lead), and 1G acceleration for the high-acceleration/deceleration models (4mm-lead excluded).
(The values in the table below are the upper limits, even if the acceleration/deceleration is decreased.)

(3) The values for the horizontal load capacity assume the use of an external guide, so that there is no external force from any direction other than the forward/backward direction of the rod.
See the technical resources (page A-83) for the allowable weight using the supplied guide alone.

Actuator Specifications

■ Lead and Load Capacity

Model	Motor Output (W)	Lead (mm)	Max. Load Capacity Horizontal (kg)	Max. Load Capacity Vertical (kg)	Rated Thrust (N)	Stroke (mm)
RCS2-RGD5C-①-60-16-②-③-④-⑤	60	16	12.0	1.3	63.8	50 〜 300 (50mm increments)
RCS2-RGD5C-①-60-8-②-③-④-⑤		8	25.0	4.3	127.5	
RCS2-RGD5C-①-60-4-②-③-④-⑤		4	50.0	10.8	255.1	
RCS2-RGD5C-①-100-16-②-③-④-⑤	100	16	15.0	2.8	105.8	
RCS2-RGD5C-①-100-8-②-③-④-⑤		8	30.0	8.3	212.7	
RCS2-RGD5C-①-100-4-②-③-④-⑤		4	60.0	17.3	424.3	

Legend: ① Encoder ② Stroke ③ Compatible controller ④ Cable length ⑤ Options

■ Stroke and Maximum Speed

Lead \ Stroke	50 〜 250 (50mm increments)	300 (mm)
16	800	755
8	400	377
4	200	188

(Unit: mm/s)

Cable List

Type	Cable Symbol	
Standard	**P** (1m)	
	S (3m)	
	M (5m)	
Special Lengths	**X06** (6m) 〜 **X10** (10m)	
	X11 (11m) 〜 **X15** (15m)	
	X16 (16m) 〜 **X20** (20m)	
Robot Cable	**R01** (1m) 〜 **R03** (3m)	
	R04 (4m) 〜 **R05** (5m)	
	R06 (6m) 〜 **R10** (10m)	
	R11 (11m) 〜 **R15** (15m)	
	R16 (16m) 〜 **R20** (20m)	

* See page A-39 for cables for maintenance.

Actuator Specifications

Item	Description
Drive System	Ball screw ø12mm C10 grade
Positioning Repeatability	±0.02mm
Lost Motion	0.1mm or less
Guide	Double guide (guide rod diameter ø12, Ball bush type)
Rod Diameter	ø30mm
Non-rotating accuracy of rod	±0.08 deg
Ambient Operating Temp./Humidity	0 〜 40°C, 85% RH or less (non-condensing)

Option List

Name	Option Code	See Page	
Connector cable exit direction	A2	→ A-25	
Brake	B	→ A-25	
Foot bracket	FT	→ A-29	
High-acceleration/deceleration (*1)	HA	→ A-32	

(*1) The high-acceleration/deceleration option is not available for all 60W models and 100W model with 4mm lead.

Dimensions

CAD drawings can be downloaded from IAI website. www.robocylinder.de

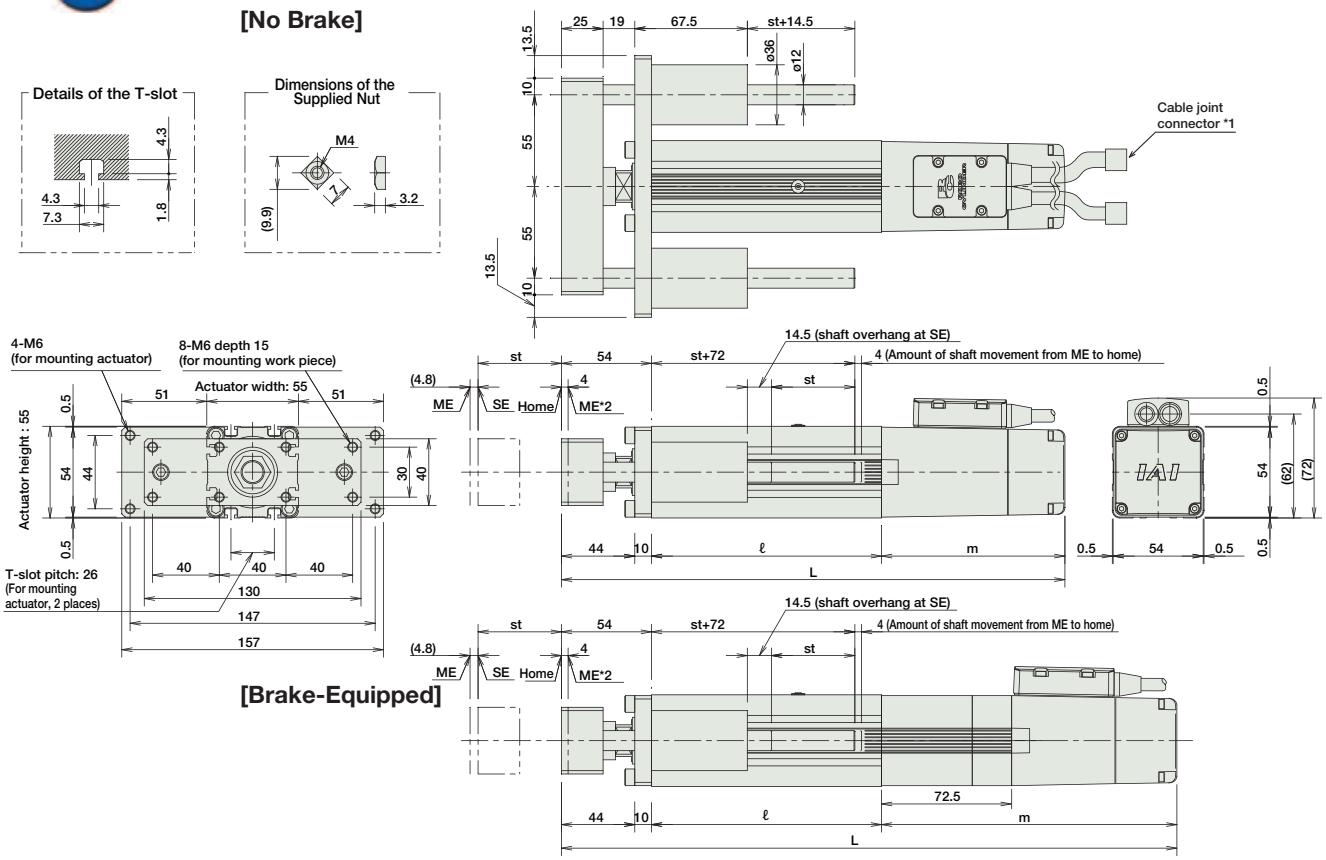
For Special Orders P. A-9

2/3D CAD

*The RGD5C is not available in reversed-home configuration, due to its construction.

*1 The motor-encoder cable is connected here. See page A-39 for details on cables.
*2. When homing, the rod moves to the ME; therefore, please watch for any interference with the surrounding objects.
ME: Mechanical end SE: Stroke end

[No Brake]



[Brake-Equipped]

■ Dimensions/Weight by Stroke

RCS2-RGD5C (without brake)

Stroke		50	100	150	200	250	300
L	60W	284	334	384	434	484	524
	100W	302	352	402	452	502	552
ℓ		138	188	238	288	338	388
m	60W	92					
	100W	110					
Weight (kg)		2.7	3.0	3.4	3.8	4.2	5.5

RCS2-RGD5C (with brake)

Stroke		50	100	150	200	250	300
L	60W	356.5	406.5	456.5	506.5	556.5	606.5
	100W	374.5	424.5	474.5	524.5	574.5	624.5
ℓ		138	188	238	288	338	388
m	60W	164.5					
	100W	182.5					
Weight (kg)		3.0	3.3	3.7	4.1	4.5	5.8

Compatible Controllers

The RCS2 series actuators can operate with the controllers below. Select the controller according to your usage.

Name	External View	Model	Description	Max. Positioning Points	Input Voltage	Power Supply Capacity		See Page
Positioner Mode		SCON-C-60①-NP-2-③ SCON-C-100①②-NP-2-③	Positioning is possible for up to 512 points	512 points	Single-Phase AC 115V Single-Phase AC 230V 3-Phase AC 230V (XSEL-P/Q only)	360VA max. * When operating a 150W single-axis model		→ P547
Solenoid Valve Mode			Operable with the same controls as the solenoid valve.	7 points				
Serial Communication Type			Dedicated to serial communication	64 points				
Pulse Train Input Control Type			Dedicated to Pulse Train Input	(–)				
Program Control 1-2 Axes Type		SSEL-C-1-60①-NP-2-③ SSEL-C-1-100①②-NP-2-③	Programmed operation is possible Operation is possible on up to 2 axes	20000 points				→ P577
Program Control 1-6 Axes Type		XSEL-④-1-60①-N1-EEE-2-⑤ XSEL-④-1-100①②-N1-EEE-2-⑤	Programmed operation is possible Operation is possible on up to 6 axes	20000 points				→ P587

* For SSEL and XSEL, only applicable to the single-axis model.
* ① is a placeholder for the encoder type (I: incremental, A: absolute).
* ② is a placeholder for the code "HA" when the high acceleration/deceleration option is specified.
* ③ is a placeholder for the power supply voltage (1: single-phase 115V, 2: single phase 230V).
* ④ is a placeholder for the XSEL type name (KE, KET, P, Q).
* ⑤ is a placeholder for the power supply voltage type (1: 115V, 2: single-phase 230V, 3: 3-phase 230V).

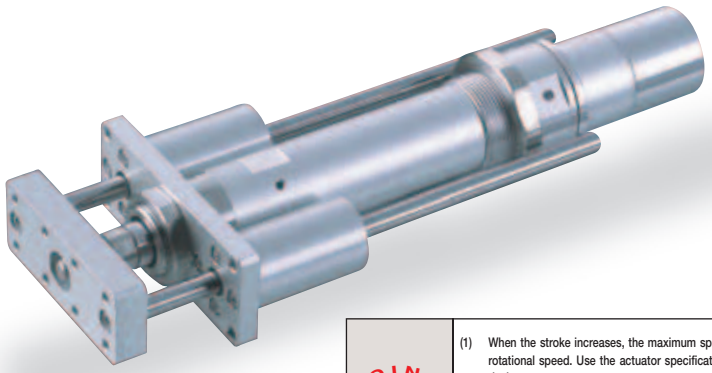
RCS2-RGD4D

RoboCylinder Rod Type with Double Guide ø37mm Diameter 230V Servo Motor Built-In Model

■ Configuration: RCS2 — RGD4D — □ — □ — □ — □ — □ — □ — □ — □

Series	Type	Encoder	Motor	Lead	Stroke	Compatible Controllers	Cable Length	Option
RCS2	RGD4D	I : Incremental A : Absolute	20 : 20W Servo Motor 30 : 30W Servo Motor	12 : 12mm 6 : 6mm 3 : 3mm	50 : 50mm 〜 300 : 300mm (50mm pitch increments)	T1 : XSEL-KE/KET T2 : SCON SSEL XSEL-P/Q	N : None P : 1m S : 3m M : 5m X□□ : Custom R□□ : Robot cable	See Options below

* See page Pre-35 for an explanation of the naming convention.



Technical References P. A-5

POINT Notes on Selection

(1) When the stroke increases, the maximum speed will drop to prevent the ball screw from reaching the critical rotational speed. Use the actuator specification table below to check the maximum speed at the stroke you desire.

(2) The load capacity is based on operation at an acceleration of 0.3G (0.2G for the 3mm-lead model). This is the upper limit of the acceleration.

(3) The values for the horizontal load capacity assume the use of an external guide, so that there is no external force from any direction other than the forward/backward direction of the rod. See the technical resources (page A-83) for the allowable weight using the supplied guide alone.

Actuator Specifications

■ Lead and Load Capacity

Model	Motor Output (W)	Lead (mm)	Max. Load Capacity Horizontal (kg)	Max. Load Capacity Vertical (kg)	Rated Thrust (N)	Stroke (mm)
RCS2-RGD4D-①-20-12-②-③-④-⑤	20	12	3.0	0.5	18.9	50 〜 300 (50mm increments)
RCS2-RGD4D-①-20-6-②-③-④-⑤		6	6.0	1.5	37.7	
RCS2-RGD4D-①-20-3-②-③-④-⑤		3	12.0	3.5	75.4	
RCS2-RGD4D-①-30-12-②-③-④-⑤	30	12	4.0	1.0	28.3	
RCS2-RGD4D-①-30-6-②-③-④-⑤		6	9.0	2.5	56.6	
RCS2-RGD4D-①-30-3-②-③-④-⑤		3	18.0	6.0	113.1	

■ Stroke and Maximum Speed

Lead \ Stroke	50 〜 300 (50mm increments)
12	600
6	300
3	150

(Unit: mm/s)

Legend: ① Encoder ② Stroke ③ Compatible controller ④ Cable length ⑤ Options

Cable List

Type	Cable Symbol	
Standard	P (1m)	
	S (3m)	
	M (5m)	
Special Lengths	X06 (6m) 〜 X10 (10m)	
	X11 (11m) 〜 X15 (15m)	
	X16 (16m) 〜 X20 (20m)	
Robot Cable	R01 (1m) 〜 R03 (3m)	
	R04 (4m) 〜 R05 (5m)	
	R06 (6m) 〜 R10 (10m)	
	R11 (11m) 〜 R15 (15m)	
	R16 (16m) 〜 R20 (20m)	

* See page A-39 for cables for maintenance.

Actuator Specifications

Item	Description
Drive System	Ball screw ø10mm C10 grade
Positioning Repeatability	±0.02mm
Lost Motion	0.1mm or less
Guide	Double guide (guide rod diameter ø10, Ball bush type)
Rod Diameter	ø20mm
Non-rotating accuracy of rod	±0.05 deg
Ambient Operating Temp./Humidity	0 〜 40°C, 85% RH or less (non-condensing)

Option List

Name	Option Code	See Page	
Foot bracket	FT	→ A-29	
Home sensor	HS	→ A-32	
Reversed-home	NM	→ A-33	
Trunnion bracket (back)	TRR	→ A-38	

* The home sensor (HS) cannot be used on the reversed-home models.

Dimensions

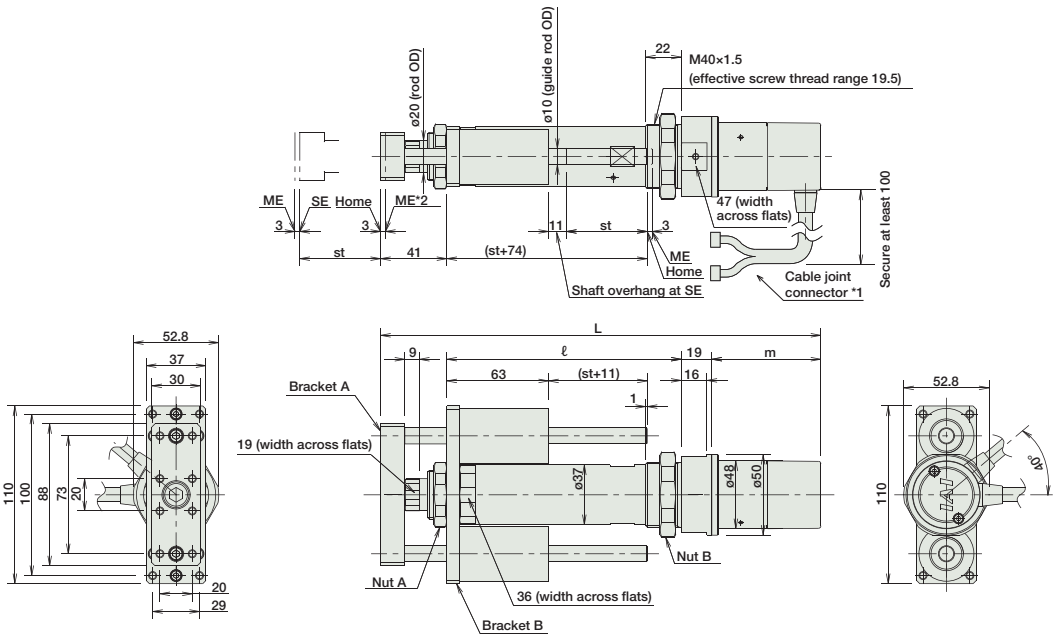
CAD drawings can be downloaded from IAI website. www.robocylinder.de

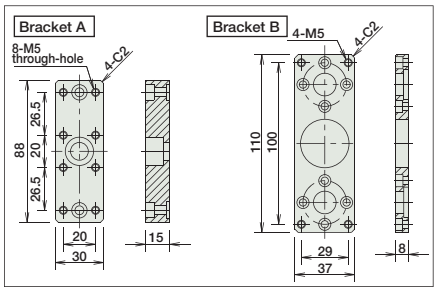
For Special Orders P. A-9

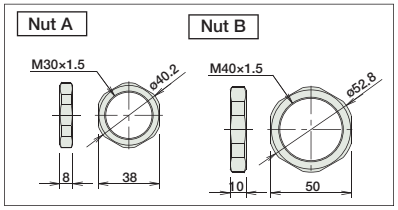
2/3D CAD

*1. The motor-encoder cable is connected here. See page A-39 for details on cables.
*2. When homing, the rod moves to the ME; therefore, please watch for any interference with the surrounding objects.
ME: Mechanical end SE: Stroke end

[No Brake]







Dimensions/Weight by Stroke

RCS2-RGD4D (without brake)

Stroke		50	100	150	200	250	300
L	20W	263.5	313.5	363.5	413.5	463.5	513.5
	30W	278.5	328.5	378.5	428.5	478.5	528.5
ℓ		145	195	245	295	345	395
m	20W	58.5					
	30W	73.5					
Weight (kg)		1.6	1.8	2.1	2.3	2.5	2.7

RCS2-RGD4D is not available in a brake-equipped configuration.

Compatible Controllers

The RCS2 series actuators can operate with the controllers below. Select the controller according to your usage.

Name	External View	Model	Description	Max. Positioning Points	Input Voltage	Power Supply Capacity		See Page
Positioner Mode		SCON-C-20①-NP-2-② SCON-C-30D①-NP-2-②	Positioning is possible for up to 512 points	512 points	Single-Phase AC 115V Single-Phase AC 230V 3-Phase AC 230V (XSEL-P/Q only)	360VA max. * When operating a 150W single-axis model		→ P547
Solenoid Valve Mode			Operable with the same controls as the solenoid valve.	7 points				
Serial Communication Type			Dedicated to serial communication	64 points				
Pulse Train Input Control Type			Dedicated to Pulse Train Input	(–)				
Program Control 1-2 Axes Type		SSEL-C-1-20①-NP-2-② SSEL-C-1-30D①-NP-2-②	Programmed operation is possible Operation is possible on up to 2 axes	20000 points				→ P577
Program Control 1-6 Axes Type		XSEL-③-1-20①-N1-EEE-2-④ XSEL-③-1-30D①-N1-EEE-2-④	Programmed operation is possible Operation is possible on up to 6 axes	20000 points				→ P587

* For SSEL and XSEL, only applicable to the single-axis model.
* ① is a placeholder for the encoder type (I: incremental / A: absolute).
* ② is a placeholder for the power supply voltage (1: 115V, 2: single-phase 230V).
* ③ is a placeholder for the XSEL type name ("KE", "KET", "P", or "Q").
* ④ is a placeholder for the power supply voltage (1: 115V, 2: single-phase 230V, or 3: three-phase 230V).

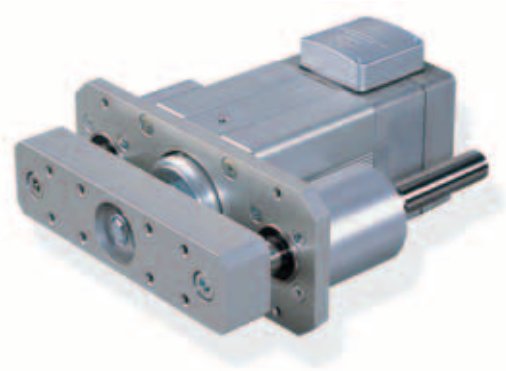
RCS2-SRGD7BD

RoboCylinder Rod Type with Double Guide 75mm Diameter 230V Servo Motor
Short-Length Model

■ Configuration: RCS2 — SRGD7BD — I — □ — □ — □ — □ — □ — □ — □

Series	Type	Encoder	Motor	Lead	Stroke	Compatible Controllers	Cable Length	Option
RCS2	SRGD7BD	I : Incremental	60 : 60W Servo Motor 100 : 100W Servo Motor 150 : 150W Servo Motor	16 : 16mm 8 : 8mm 4 : 4mm	50 : 50mm 〜 300 : 300mm (50mm pitch increments)	T1 : XSEL-KE/KET T2 : SCON SSEL XSEL-P/Q	N : None P : 1m S : 3m M : 5m X□□ : Custom R□□ : Robot cable	See Options below

* See page Pre-35 for an explanation of the naming convention.



Technical References P. A-5

POINT Notes on Selection

(1) When operated at the rated acceleration, the maximum load capacity is the load capacity at the rated acceleration.
(2) When operated at the maximum acceleration, the maximum load capacity is the load capacity at the maximum acceleration.
(3) The values for the horizontal load capacity assume the use of an external guide, so that there is no external force from any direction other than the forward/backward direction of the rod.
See the technical resources (page A-83) for the allowable weight using the supplied guide alone.

Actuator Specifications

■ Lead and Load Capacity

Model	Motor Output (W)	Lead (mm)	Rated Acceleration (G)	Load Capacity at Rated Acceleration Horizontal (kg)	Load Capacity at Rated Acceleration Vertical (kg)	Max. Acceleration (G)	Load Capacity at Max. Acceleration Horizontal (kg)	Load Capacity at Max. Acceleration Vertical (kg)	Rated Thrust (N)	Stroke (mm)
RCS2-SRGD7BD-I-60-16-①-②-③-④	60	16	0.25	5	1	0.35	2.5	(N/A)	63	50〜300 (50mm increments)
RCS2-SRGD7BD-I-60-8-①-②-③-④		8	0.15	10	4	0.25	5	1.5	127	
RCS2-SRGD7BD-I-60-4-①-②-③-④		4	0.05	20	9	0.15	10	4	254	
RCS2-SRGD7BD-I-100-16-①-②-③-④	100	16	0.3	10	2.5	0.4	5	0.5	103	
RCS2-SRGD7BD-I-100-8-①-②-③-④		8	0.2	22	8	0.3	10	3.5	207	
RCS2-SRGD7BD-I-100-4-①-②-③-④		4	0.1	40	18.5	0.2	20	8	414	
RCS2-SRGD7BD-I-150-16-①-②-③-④	150	16	0.3	15	5.5	0.4	7.5	2	157	
RCS2-SRGD7BD-I-150-8-①-②-③-④		8	0.2	35	13.5	0.3	17.5	6	314	
RCS2-SRGD7BD-I-150-4-①-②-③-④		4	0.1	55	21.5	0.2	27.5	10	628	

Legend ① Stroke ② Compatible controller ③ Cable length ④ Options

■ Stroke and Maximum Speed

Lead \ Stroke	50 〜 300 (50mm increments)
16	800
8	400
4	200

(Unit: mm/s)

Cable List

Type	Cable Symbol	
Standard	P (1m)	
	S (3m)	
	M (5m)	
Special Lengths	X06 (6m) 〜 X10 (10m)	
	X11 (11m) 〜 X15 (15m)	
	X16 (16m) 〜 X20 (20m)	
Robot Cable	R01 (1m) 〜 R03 (3m)	
	R04 (4m) 〜 R05 (5m)	
	R06 (6m) 〜 R10 (10m)	
	R11 (11m) 〜 R15 (15m)	
	R16 (16m) 〜 R20 (20m)	

* See page A-39 for cables for maintenance.

Actuator Specifications

Item	Description
Drive System	Ball screw ø12mm C10 grade
Positioning Repeatability	±0.02mm
Lost Motion	0.1mm or less
Guide	Double guide (guide rod diameter ø16, Ball bush type)
Rod Diameter	ø35mm
Non-rotating accuracy of rod	±0.08 deg
Ambient Operating Temp./Humidity	0 〜 40°C, 85% RH or less (non-condensing)

Option List

Name	Option Code	See Page	
Connector cable exit direction	A1 〜 A3	→ A-25	
Brake	B	→ A-25	
Foot bracket	FT	→ A-29	

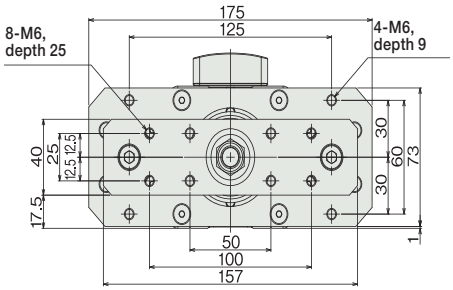
Dimensions

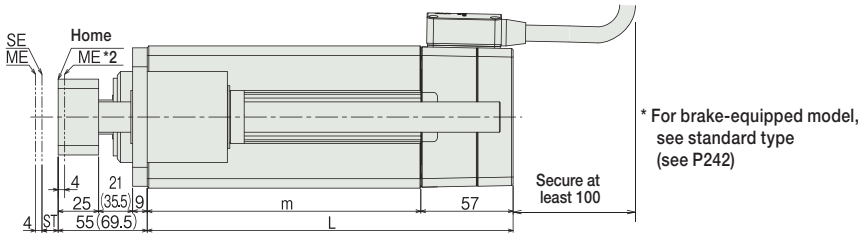
CAD drawings can be downloaded from IAI website. www.robocylinder.de

For Special Orders P. A-9

2/3D CAD

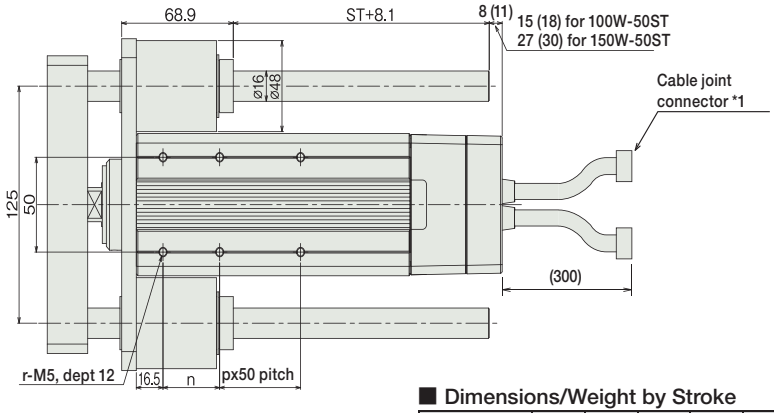
*The SRGD7BD is not available in reversed-home configuration, due to its construction.





* For brake-equipped model, see standard type (see P242)

* The value inside ( ) is the dimension for the extended rod tip model.



Note:
A slit is provided in the side of the actuator body to prevent pauses due to forward/backward operation.
Please make a separate request for a dustproof/splash-proof model.

*1: The motor-encoder cable is connected here. See page A-39 for details on cables.

*2 When homing, the rod moves to the mechanical end position; therefore, please watch for any interference with the surrounding objects.

ST: Stroke
SE: Stroke end
ME: Mechanical end

Dimensions/Weight by Stroke

Stroke		50	100	150	200	250	300
L	60W	126	176	226	276	326	376
	100W	133	176	226	276	326	376
	150W	145	176	226	276	326	376
m	60W	69	119	169	219	269	319
	100W	76	119	169	219	269	319
	150W	88	119	169	219	269	319
n		25	35	35	35	35	35
p		0	0	1	2	3	4
r		4	4	6	8	10	12
Weight (kg)	60W	4.3	5	5.7	6.4	7.2	7.9
	100W	4.5	5.1	5.9	6.6	7.3	8
	150W	4.8	5.3	6.1	6.8	7.5	8.2

Compatible Controllers

The RCS2 series actuators can operate with the controllers below. Select the controller according to your usage.

Name	External View	Model	Description	Max. Positioning Points	Input Voltage	Power Supply Capacity		See Page
Positioner Mode		SCON-C-①I-NP-2-②	Positioning is possible for up to 512 points	512 points	Single-Phase AC 115V Single-Phase AC 230V 3-Phase AC 230V (XSEL-P/Q only)	360VA max. * When operating a 150W single-axis model		→ P547
Solenoid Valve Mode			Operable with the same controls as the solenoid valve.	7 points				
Serial Communication Type			Dedicated to serial communication	64 points				
Pulse Train Input Control Type			Dedicated to Pulse Train Input	(–)				
Program Control 1-2 Axes Type		SSEL-C-1-①I-NP-2-②	Programmed operation is possible Operation is possible on up to 2 axes	20000 points				→ P577
Program Control 1-6 Axes Type		XSEL-③-1-①I-N1-EEE-2-④	Programmed operation is possible Operation is possible on up to 6 axes	20000 points				→ P587

Note: The SRGD7BD type actuator cannot be connected to the 5th and 6th axis of the XSEL-P/Q controller.

* For SSEL and XSEL, only applicable to the single-axis model.
* ① is a place holder for the motor output (W) (60, 100, 150).
* ② is a placeholder for the power supply voltage (1: 115V, 2: single-phase 230V).
* ③ is a placeholder for the XSEL type name ("KE", "KET", "P", or "Q").
* ④ is a placeholder for the power supply voltage (1: 115V, 2: single-phase 230V, or 3: three-phase 230V).

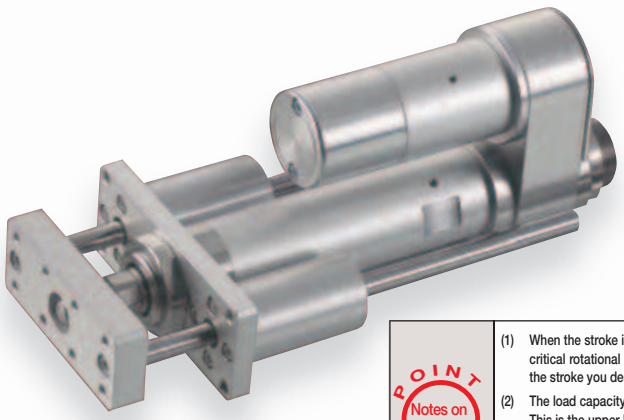
RCS2-RGD4R

RoboCylinder Rod Type with Double Guide ø37mm Diameter 230V Servo Motor
Side-Mounted Motor

■ Configuration: RCS2 — RGD4R — I — □ — □ — □ — □ — □ — □ — □

Series	Type	Encoder	Motor	Lead	Stroke	Compatible Controllers	Cable Length	Option
RCS2	RGD4R	I : Incremental A : Absolute	20 : 20W Servo Motor 30 : 30W Servo Motor	12 : 12mm 6 : 6mm 3 : 3mm	50 : 50mm 〜 300 : 300mm (50mm pitch increments)	T1 : XSEL-KE/KET T2 : SCON SSEL XSEL-P/Q	N : None P : 1m S : 3m M : 5m X□□ : Custom R□□ : Robot cable	See Options below

* See page Pre-35 for an explanation of the naming convention.



Technical References P. A-5

POINT Notes on Selection

(1) When the stroke increases, the maximum speed will drop to prevent the ball screw from reaching the critical rotational speed. Use the actuator specification table below to check the maximum speed at the stroke you desire.

(2) The load capacity is based on operation at an acceleration of 0.3G (0.2G for the 3mm-lead model). This is the upper limit of the acceleration.

(3) The values for the horizontal load capacity assume the use of an external guide, so that there is no external force from any direction other than the forward/backward direction of the rod. See the technical resources (page A-83) for the allowable weight using the supplied guide alone.

Actuator Specifications

■ Lead and Load Capacity

Model	Motor Output (W)	Lead (mm)	Max. Load Capacity Horizontal (kg)	Max. Load Capacity Vertical (kg)	Rated Thrust (N)	Stroke (mm)
RCS2-RGD4R-①-20-12-②-③-④-⑤	20	12	3.0	0.5	18.9	50〜300 (50mm increments)
RCS2-RGD4R-①-20-6-②-③-④-⑤		6	6.0	1.5	37.7	
RCS2-RGD4R-①-20-3-②-③-④-⑤		3	12.0	3.5	75.4	
RCS2-RGD4R-①-30-12-②-③-④-⑤	30	12	4.0	1.0	28.3	
RCS2-RGD4R-①-30-6-②-③-④-⑤		6	9.0	2.5	56.6	
RCS2-RGD4R-①-30-3-②-③-④-⑤		3	18.0	6.0	113.1	

Legend: ① Encoder ② Stroke ③ Compatible controller ④ Cable length ⑤ Options

■ Stroke and Maximum Speed

Lead \ Stroke	50 〜 300 (50mm increments)
12	600
6	300
3	150

(Unit: mm/s)

Cable List

Type	Cable Symbol	
Standard	P (1m)	
	S (3m)	
	M (5m)	
Special Lengths	X06 (6m) 〜 X10 (10m)	
	X11 (11m) 〜 X15 (15m)	
	X16 (16m) 〜 X20 (20m)	
Robot Cable	R01 (1m) 〜 R03 (3m)	
	R04 (4m) 〜 R05 (5m)	
	R06 (6m) 〜 R10 (10m)	
	R11 (11m) 〜 R15 (15m)	
	R16 (16m) 〜 R20 (20m)	

* See page A-39 for cables for maintenance.

Actuator Specifications

Item	Description
Drive System	Ball screw ø10mm C10 grade
Positioning Repeatability	±0.02mm
Lost Motion	0.1mm or less
Base	Material: Aluminum (white alumite treated)
Rod Diameter	ø20mm
Non-rotating accuracy of rod	±1.0 deg
Ambient Operating Temp./Humidity	0〜40°C, 85% RH or less (non-condensing)

Option List

Name	Option Code	See Page	
Brake	B	→ A-25	
Foot bracket	FT	→ A-29	
Flange bracket (back)	FLR	→ A-28	
Home sensor	HS	→ A-32	
Reversed-home	NM	→ A-33	
Clevis Bracket	QR	→ A-34	
Back-mounting plate	RP	→ A-35	

Dimensions

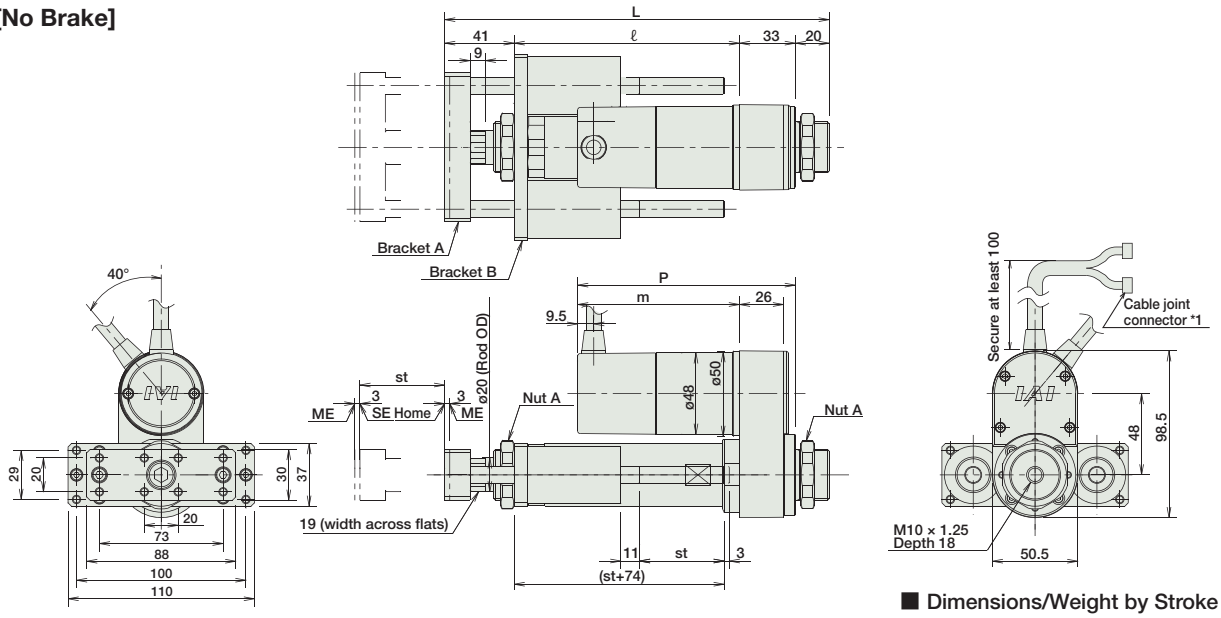
CAD drawings can be downloaded from IAI website. www.robocylinder.de

For Special Orders P. A-9

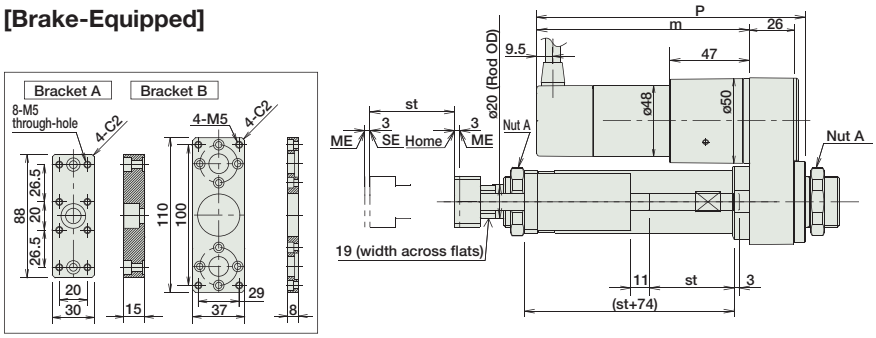
2/3D CAD

*1. The motor-encoder cable is connected here. See page A-39 for details on cables.
*2. When homing, the rod moves to the ME; therefore, please watch for any interference with the surrounding objects.
ME: Mechanical end SE: Stroke end
*3. The orientation of the bolt will vary depending on the product.

[No Brake]



[Brake-Equipped]



■ Dimensions/Weight by Stroke

RCS2-RGD4R (without brake)

Stroke		50	100	150	200	250	300
L	20W	227	277	327	377	427	477
	30W	227	277	327	377	427	477
ℓ		133	188	233	288	333	383
m	20W	80.5					
	30W	95.5					
P	20W	113.5					
	30W	128.5					
Weight (kg)		1.9	2.2	2.3	2.6	2.7	3.0

RCS2-RGD4R (with brake)

Stroke		50	100	150	200	250	300
L	20W	227	277	327	377	427	477
	30W	227	277	327	377	427	477
ℓ		133	188	233	288	333	383
m	20W	123.5					
	30W	138.5					
P	20W	156.5					
	30W	171.5					
Weight (kg)		2.1	2.4	2.5	2.8	2.9	3.2

Compatible Controllers

The RCS2 series actuators can operate with the controllers below. Select the controller according to your usage.

Name	External View	Model	Description	Max. Positioning Points	Input Voltage	Power Supply Capacity		See Page
Positioner Mode		SCON-C-20①-NP-2-② SCON-C-30D①-NP-2-②	Positioning is possible for up to 512 points	512 points	Single-Phase AC 115V Single-Phase AC 230V 3-Phase AC 230V (XSEL-P/Q only)	360VA max. *When operating a 150W single-axis model		→ P547
Solenoid Valve Mode			Operable with the same controls as the solenoid valve.	7 points				
Serial Communication Type			Dedicated to serial communication	64 points				
Pulse Train Input Control Type			Dedicated to Pulse Train Input	(–)				
Program Control 1-2 Axes Type		SSEL-C-1-20①-NP-2-② SSEL-C-1-30D①-NP-2-②	Programmed operation is possible Operation is possible on up to 2 axes	20000 points				→ P577
Program Control 1-6 Axes Type		XSEL-③-1-20①-N1-EEE-2-④ XSEL-③-1-30D①-N1-EEE-2-④	Programmed operation is possible Operation is possible on up to 6 axes	20000 points				→ P587

* For SSEL and XSEL, only applicable to the single-axis model.
* ① is a placeholder for the encoder type (I: incremental / A: absolute).
* ② is a placeholder for the power supply voltage (1: 115V, 2: single-phase 230V).
* ③ is a placeholder for the XSEL type name ("KE", "KET", "P", or "Q").
* ④ is a placeholder for the power supply voltage (1: 115V, 2: single-phase 230V, or 3: three-phase 230V).

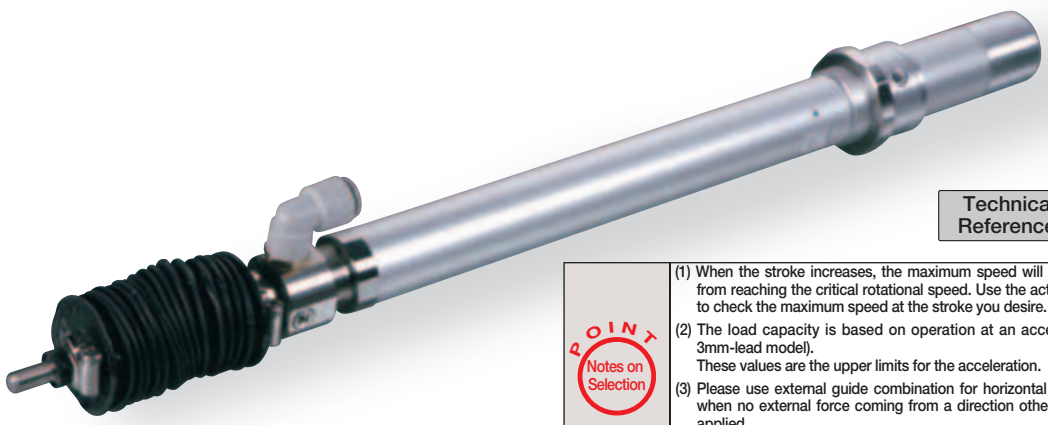
RCS2W-RA4C/RA4D/RA4R

RoboCylinder Splash-proof Rod Type
ø37mm Diameter 230V Servo Motor
Coupled/Built-in/Side-Mounted Motor Specification

■ Configuration: RCS2W—

Series	Type	Encoder	Motor	Lead	Stroke	Compatible Controllers	Cable Length	Option
	RA4C: Coupled type RA4D Built-in RA4R: Side-Mounted Motor	I : Incremental Type A : Absolute Type	20 : 20W servo motor 30 : 30W servo motor	12 : 12mm 6 : 6mm 3 : 3mm	50:50mm 〈 300:300mm (50mm pitch increments)	T1 : XSEL-KE/KET T2 : SCON SSEL XEL-P/Q	N : None P : 1m S : 3m M : 5m X□□ : Custom Length R□□ : Robot Cable	See Options below

* See page Pre-35 for explanation of each code that makes up the configuration name.



Technical References P. A-5

POINT Notes on Selection

(1) When the stroke increases, the maximum speed will drop to prevent the ball screw from reaching the critical rotational speed. Use the actuator specification table below to check the maximum speed at the stroke you desire.
(2) The load capacity is based on operation at an acceleration of 0.3G (0.2G for the 3mm-lead model).
These values are the upper limits for the acceleration.
(3) Please use external guide combination for horizontal load capacity; the value is for when no external force coming from a direction other than that of rod's advance is applied.
(4) The cable joint connector is not splash-proof; secure it in a place that is not prone to water spills.

Actuator Specifications

■ Lead and Load Capacity

Model	Motor Output (W)	Lead (mm)	Max. load capacity Horizontal(kg)	Max. load capacity Vertical(kg)	Rated thrust (N)	Stroke (mm)
RCS2W-①-②-20-12-③-④-⑤-⑥	20	12	3.0	1.0	18.9	50~300 (50mm increments)
RCS2W-①-②-20-6-③-④-⑤-⑥		6	6.0	2.0	37.7	
RCS2W-①-②-20-3-③-④-⑤-⑥		3	12.0	4.0	75.4	
RCS2W-①-②-30-12-③-④-⑤-⑥	30	12	4.0	1.5	28.3	
RCS2W-①-②-30-6-③-④-⑤-⑥		6	9.0	3.0	56.6	
RCS2W-①-②-30-3-③-④-⑤-⑥		3	18.0	6.5	113.1	

Legend ① Type ② Encoder ③ Stroke ④ Compatible controler ⑤ Cable lengh ⑥ Options

■ Stroke and Maximum Speed

Lead \ Stroke	50~300 (50mm increments)
12	600
6	300
3	150

(Unit: mm/s)

Cable List

Type	Cable Symbol	
Standard	P (1m)	
	S (3m)	
	M (5m)	
Special Lengths	X06 (6m) ~ X10 (10m)	
	X11 (11m) ~ X15 (15m)	
	X16 (16m) ~ X20 (20m)	
Robot Cable	R01 (1m) ~ R03 (3m)	
	R04 (4m) ~ R05 (5m)	
	R06 (6m) ~ R10 (10m)	
	R11 (11m) ~ R15 (15m)	
	R16 (16m) ~ R20 (20m)	

* See page A-39 for cables for maintenance.

Actuator Specifications

Item	Description
Drive System	Ball screw ø10mm C10 grade
Positioning Repeatability	±0.02mm
Lost Motion	0.1 mm or less
Base	Material: Aluminum (white alumite treated)
Rod diameter	ø20mm
Rod non-rotational accuracy	±1.0 degrees
Protection Structure	IP54
Ambient Operating Temp./Humidity	0~40°C, 85%RH or less (Non-condensing)

Option List

Name	Option Code	See Page	
Brake (*1)	B	→ A-25	
Flange bracket	FL	→ A-27	
Foot bracket	FT	→ A-29	
Home confirmation sensor (*2)	HS	→ A-32	
Knuckle Joint	NJ	→ A-34	
Reversed-home (*2)	NM	→ A-33	
Clevis Bracket (*3)	QR	→ A-34	
Rear mounting plate (*3)	RP	→ A-33	
Trunnion Bracket (Front) (*4)	TRF	→ A-38	
Trunnion Bracket (Back) (*4)	TRR	→ A-38	

(*1) No brake setting for RA4D.
(*2) Home sensor (HS) can't be used under reversed-home (NM).
(*3) Clevis bracket and rear mounting plate only available for RA4R.
(*4) Trunnion bracket only available for RA4C/RA4D.

Dimensions

CAD drawings can be downloaded from IAI website. www.robocylinder.de

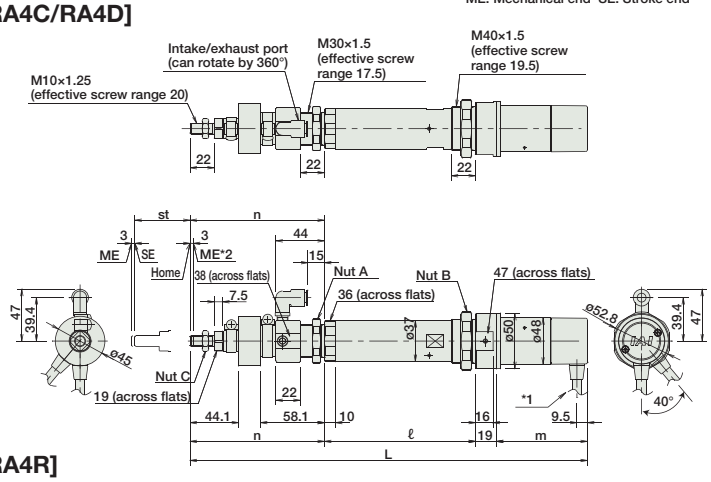
For Special Orders P. A-9

2/3D CAD

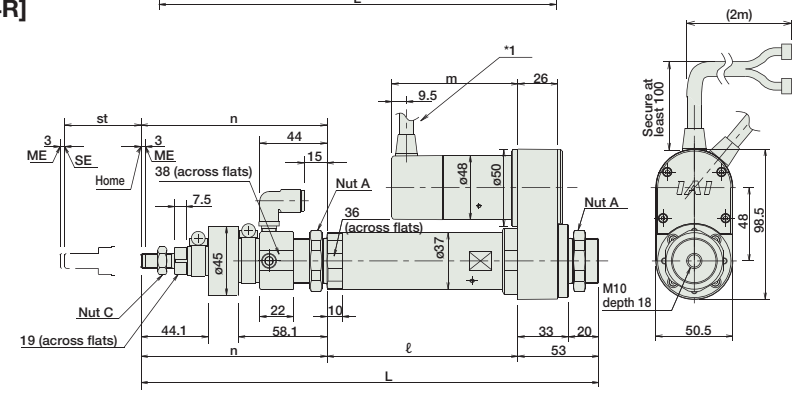
Note: No 3D CAD data for RA4D type.

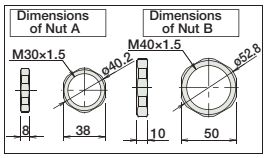
* 1 Cable joint connector and cable bending space are the same as for RCS2-RA4C. (See P236)
* 2 When homing, the slider moves to the ME; therefore, please watch for any interference with the surrounding objects.
ME: Mechanical end SE: Stroke end

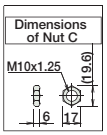
[RA4C/RA4D]



[RA4R]







Note:

Do not apply any external force on the rod from any direction other than the direction of the rod's motion. If a force is exerted on the rod in a perpendicular or rotational direction, the detent may become damaged.

Dimensions/Weight by Stroke

RCS2W-RA4C/RA4D/RA4R (without brake)

Stroke			50	100	150	200	250	300
L	RA4C	20W	358.4	418.4	478.4	538.4	599.4	660.4
		30W	373.4	433.4	493.4	553.4	614.4	675.4
	RA4D	20W	336.4	396.4	456.4	516.4	577.4	638.4
		30W	351.4	411.4	471.4	531.4	592.4	653.4
	RA4R	20W	299.9	359.9	419.9	479.9	540.9	601.9
		30W	299.9	359.9	419.9	479.9	540.9	601.9
r	RA4C	20W	137	187	237	287	337	387
		30W	137	187	237	287	337	387
	RA4D	20W	137	187	237	287	337	387
		30W	137	187	237	287	337	387
	RA4R	20W	125	175	225	275	325	375
		30W	125	175	225	275	325	375
m	RA4C	20W	80.5					
		30W	95.5					
	RA4D	20W	58.5					
		30W	73.5					
	RA4R	20W	80.5					
		30W	95.5					
n	RA4C	20W	121.9	131.9	141.9	151.9	162.9	173.9
		30W	121.9	131.9	141.9	151.9	162.9	173.9
	RA4D	20W	121.9	131.9	141.9	151.9	162.9	173.9
		30W	121.9	131.9	141.9	151.9	162.9	173.9
	RA4R	20W	121.9	131.9	141.9	151.9	162.9	173.9
		30W	121.9	131.9	141.9	151.9	162.9	173.9
Weight (kg)	RA4C	20W/30W	1.4	1.5	1.7	1.8	2.0	2.1
	RA4D	20W/30W	1.3	1.5	1.6	1.8	1.9	2.1
	RA4R	20W/30W	1.5	1.7	1.8	2.0	2.1	2.3

RCS2W-RA4C/RA4D/RA4R (with brake)

Stroke			50	100	150	200	250	300
L	RA4C	20W	401.4	461.4	521.4	581.4	642.4	703.4
		30W	416.4	476.4	536.4	596.4	657.4	718.4
	RA4D	20W	No brake-equipped model.					
		30W						
	RA4R	20W	299.9	359.9	419.9	479.9	540.9	601.9
		30W	299.9	359.9	419.9	479.9	540.9	601.9
ℓ	RA4C	20W	137	187	237	287	337	387
		30W	137	187	237	287	337	387
	RA4D	20W	No brake-equipped model.					
		30W						
	RA4R	20W	125	175	225	275	325	375
		30W	125	175	225	275	325	375
m	RA4C	20W	123.5					
		30W	138.5					
	RA4D	20W	No brake-equipped model.					
		30W						
	RA4R	20W	123.5					
		30W	138.5					
n	RA4C	20W	121.9	131.9	141.9	151.9	162.9	173.9
		30W	121.9	131.9	141.9	151.9	162.9	173.9
	RA4D	20W	No brake-equipped model.					
		30W						
	RA4R	20W	121.9	131.9	141.9	151.9	162.9	173.9
		30W	121.9	131.9	141.9	151.9	162.9	173.9
Weight (kg)	RA4C	20W/30W	1.6	1.7	1.9	2.0	2.2	2.3
	RA4D	20W/30W	–					
	RA4R	20W/30W	1.7	1.9	2.0	2.2	2.3	2.5

Compatible Controllers

The RCS2W series actuators can operate with the controllers below. Select the controller according to your usage.

Name	External View	Model	Description	Max. Positioning Points	Input Voltage	Power Supply Capacity		See Page
Positioner Mode		SCON-C-20 ①-NP-2-② SCON-C-30D①-NP-2-②	Positioning possible for up to 512 points	512 points	Single-Phase AC 115V Single-Phase AC 230V 3-Phase AC 230V (XSEL-P/Q only)	126 VA max. * It depends on the controller type. Please refer each controller manual in detail.		→ P547
Solenoid Valve Mode			Operation possible with the same controls as solenoid valve.	7 points				
Serial Communication Type			Dedicated to serial communication	64 points				
Pulse Train Input Control Type			Open Collector Pulse Train Input Type	(–)				
Program control 1-2 Axes type		SSEL-C-1-20①-NP-2-② SSEL-C-1-30D①-NP-2-②	Programmed operation is possible Can operate up to 2 axes	20000 points				→ P577
Program control 1-6 Axes type		XSEL-③-1-20①-N1-EEE-2-④ XSEL-③-1-30D①-N1-EEE-2-④	Programmed operation is possible Can operate up to 6 axes	20000 points				→ P587

* For SSEL and XSEL, only applicable to the single-axis model.
* ① is a placeholder for the encoder type (I: incremental / A: absolute).
* ② is a placeholder for the power supply voltage (1: 115V, or 2: single-phase 230V).
* ③ is a placeholder for the XSEL type name ("KE", "KET", "P", or "Q").
* ④ is a placeholder for the power supply voltage (1: 115V, 2: single-phase 230V, 3: 3-phase 230V).

SCON

■ Models C / CA

Position Controllers
For RCS2 series

C CA

List of models

There are 2 I/O types of SCON controllers: standard specifications in which operation is performed via PIO or pulse train input, and network specifications for operation via connection to a field network. Incremental specifications and absolute specifications are available for both types. However, only incremental specified operations are available when operating via the pulse train input.

Type	C / CA					CA					
I/O type	Standard specifications		Network connection specifications (optional)								
External View											
Description	Positioning mode, Teaching mode Solenoid valve mode, Force mode (*1)	Pulse train mode (*2)	DeviceNet	CC-Link	ProfiBus	ProfiNet	MechatroLink	CompoNet	EtherCAT	Ethernet/IP	Sercos III (3*)
Position points	Max. 512 points	(–)	Max. 512 points								
I/O type symbol	NP/PN		DV	CC	PR	PN	ML	CN	EC	EP	SC
Compatible encoder	Incremental / Absolute	Incremental	Incremental / Absolute								

*Always use a noise filter for power supplies. (See P548) (Caution) Note that with the network specifications, neither control via pulse train nor PIO is available.

(*1) Force mode is only supported by SCON-CA. (*2) If the controller is operated in pulse-train mode, only an incremental encoder can be used. (*3) Planned industrial ethernet interface.

Model

SCON – [Series] – [Type] – [Motor] – [Encoder] – [Option] – [I/O Type] – [I/O Cable Length] – [Power/Voltage]

Type

C	Standard Type
CA	High-function Type

Option

HA	High Accel./Decel.

Power/Voltage

1	Single-phase AC115V
2	Single-phase AC230V

Motor

12	12W motor
20	20W motor
30D	30W motor (for RCS2)
30R	30W motor (for RS)
60	60W motor
100	100W motor
150	150W motor
200	200W motor
300	300W motor
400	400W motor
600	600W motor
750	750W motor
750S	750W motor (for RCS2-RA13R-LC)

Encoder

I	Incremental
A	Absolute

I/O Type

NP	PIO NPN
PN	PIO PNP (standard)
DV	DeviceNet
CC	CC-Link
PR	ProfiBus
PN	ProfiNet
ML	MechatroLink
CN	CompoNet
EC	EtherCAT
EP	Ethernet/IP
SC	Sercos III (*)

* Planned industrial ethernet interface

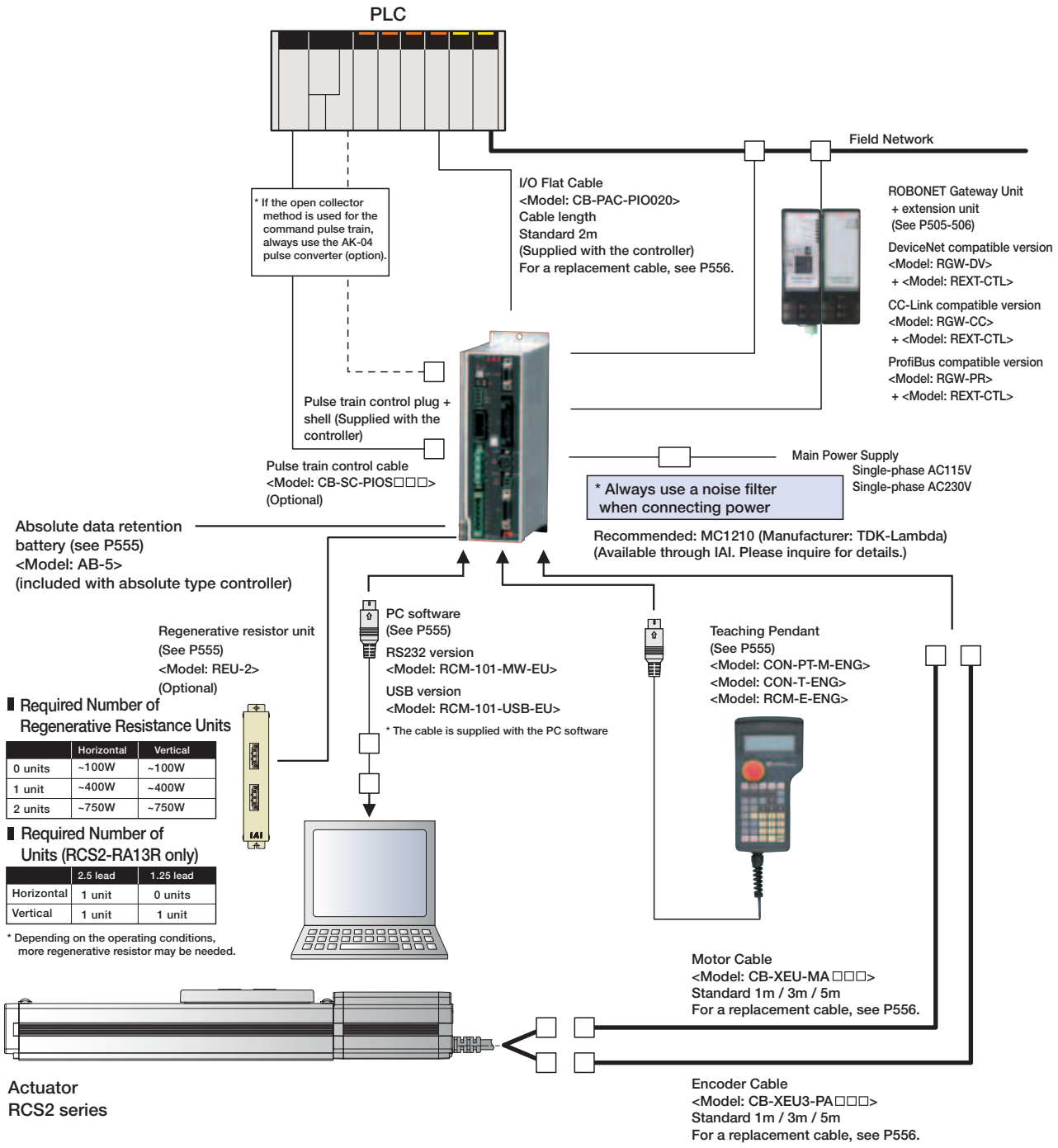
The network models PN, ML, CN, EC, SC, and EP support CA type only.

I/O Cable Length

0	No cable (*)
2	2m (standard)
3	3m
5	5m

* If DV, CC, PR, PN, ML, CN, EC, SC or EP is selected for the I/O type, specify "0" (no cable) for the I/O cable.

System configuration



Required Number of Regenerative Resistance Units

	Horizontal	Vertical
0 units	~100W	~100W
1 unit	~400W	~400W
2 units	~750W	~750W

Required Number of Units (RCS2-RA13R only)

	2.5 lead	1.25 lead
Horizontal	1 unit	0 units
Vertical	1 unit	1 unit

* Depending on the operating conditions, more regenerative resistor may be needed.

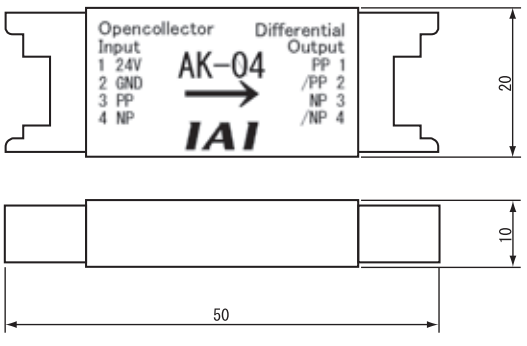
Pulse converter AK-04 (option)

Description: Pulse converter (model: AK-04) + I/O e-CON connector
Use this converter if output pulses from the host controller are of open collector specification.
This converter is used to convert the open-collector command output pulses from the host controller to differential pulses. Converting open collector pulses to differential pulses improves noise resistance.
Two phases of differential pulses equivalent to those from the line driver 26C31 are output.
The e-CON connector is used as an input/output connector to simplify the field wiring.

Basic Specifications

- Input power : DC24V±10% (Max. 50mA)
- Input pulse : Open collector (collector current Max. 12mA)
- Input frequency : 200 kHz or less
- Output pulse : 26C31 equivalent differential output (Max. 10mA)
- External dimensions : See the figure at right (cable connector not included)
- Weight : 10g or less (cable connector not included)
- Accessories : I/O e-CON connector 3M 37104-3122-000FL

(Applicable wire: AWG No. 24 to 26, 0.14 to less than 0.3mm² Outer diameter of finished wire 1.0 to 1.2mm)



I/O Specifications

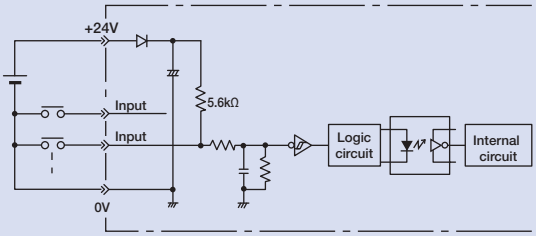
■ Input section External input specifications

Item	Specifications
Input voltage	DC24V ±10%
Input current	4mA / 1 point
ON/OFF power supply	ON voltage…Min DC18.0V (3.5mA) ON voltage…Max DC6.0V (1mA)
Isolation method	Photocoupler

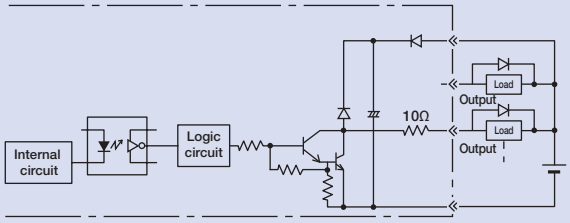
■ Output section External output specifications

Item	Specifications
Load Voltage	DC24V
Max. load current	100mA / 1 point 400mA / 8 points
Leak current	Max 0.1mA ／ 1 point
Isolation method	Photocoupler

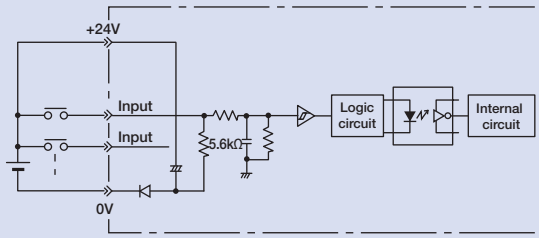
NPN Specifications



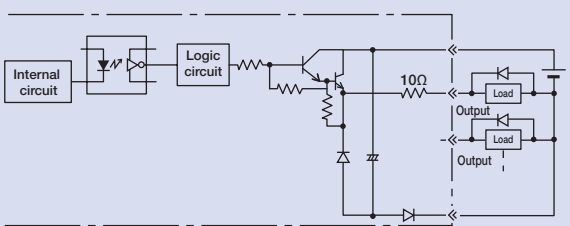
NPN Specifications



PNP Specifications



PNP Specifications



Explanation of I/O Signal Functions

SCON-C is compatible with all of the following control methods except the force mode (only applicable for SCON-CA).
Positioning is possible with up to 512 points in positioner mode and up to 7 points in solenoid valve mode.

■ Control Function by Operation Mode

Mode		Number of positioning points	Features
Positioner mode	Positioning mode	64 points	Standard factory-set mode. Specify externally a number corresponding to the position you want to move to, to operate the actuator.
	Teaching mode	64 points	In this mode, you can move the slider (rod) via an external signal and register the stopped position in the position data table.
	256-point mode	256 points	In this mode, the number of positioning points available in the positioning mode has been increased to 256 points.
	512-point mode	512 points	In this mode, the number of positioning points available in the positioning mode has been increased to 512 points.
	Solenoid value mode 1	7 points	In this mode, the actuator can be moved only by turning signals ON/OFF, just like you do with an air cylinder of solenoid valve type.
	Solenoid value mode 2	3 points	In this mode, the output signal is set to the same as the air cylinder auto switch in the solenoid valve mode.
	Force mode 1 (only SCON-CA)	32 points	In this mode, you can move to positions under force control in the positioning mode. (Up to 32 positioning points are available.)
	Force mode 2 (only SCON-CA)	5 points	In this mode, you can move to positions under force control in the solenoid valve mode. (Up to five positioning points are available.)
Pulse-train control mode		—	There is no need to enter position data in the controller, and the customer can operate the actuator freely based on custom control.

CAUTION

Note that for network compatible types with direct connection to a field network, these modes (PIO and pulse train communication) are not available.

Explanation of I/O Signal Functions

The table below explains the functions allocated to the controller's I/O signal.
Since the signals that can be used vary depending on the controller type and settings, check the signal table for each controller to confirm the available functions.

■ Signal Function Description

Classification	Signal abbreviations	Signal	Function description
Input	CSTR	Start signal	Input this signal to cause the actuator to start moving to the position set by the command position number signal.
	PC1 to PC256	Command position number signal	This signal is used to input a target position number (binary input).
	BKRL	Brake forced release signal	This signal forcibly releases the brake.
	RMOD	Running mode switching signal	Operations mode can be switched when the controller's MODE switch is set to AUTO. (AUTO if this signal is OFF, MANU if the signal is ON)
	* STP	Pause signal	Turning this signal OFF causes the moving actuator to decelerate to a stop. The actuator will resume the remaining movement if the signal is turned ON during the pause.
	RES	Reset signal	Turning this signal ON resets the alarms that are present. If this signal is turned ON while the actuator is paused (*STP is OFF), the remaining movement can be cancelled.
	SON	Servo ON signal	The servo remains on while this signal is ON, or off while the signal is OFF.
	HOME	Home return signal	Turning this signal ON preforms home-return operation.
	MODE	Teaching mode signal	Turning this signal ON switches the controller to the teaching mode (provided that CSTR, JOG+ and JOG- are all OFF and the actuator is not moving)
	JISL	JOG/INCHING switching signal	When the main signal is off, the JOG operation will be conducted for JOG+ and JOG-. When the signal is on, the unit will do the inching operation for JOG+ and JOG-.
	JOG+, JOG–	JOG signal	When the JISL signal is OFF and the JOG +/- signal turns ON, the unit will jog in the + (positive) direction when the JOG + turns on and the - (negative) direction when the JOG - turns on. During the JOG operation, the unit slows to a stop when the JOG +/- signal turns off.
	PWRT	Teaching signal	In the teaching mode, specify a desired position number and then turn this signal ON for at least 20ms to write the current position to the specified position number.
	ST0 to ST6	Start position command signal	Turning this signal ON in the solenoid valve mode causes the actuator to move to the specified position. (Start signal is not required)
	TL	Torque limit selection signal	While this signal is ON, torque is limited by the value set by a parameter. The TLM signal turns on if torque has reached the specified value.
	CSTP	Forced Stop Signal	Servo OFF is performed when this signal is ON for more than 10ms.
	DCLR	Deviation counter clear signal	When this signal is ON, the position deviation counter is cleared continuously.
Output	PEND/INP	In position signal	This signal turns ON when the actuator has entered the positioning band after movement. If the actuator has exceeded the positioning band, PEND does not turn OFF, but INP does. PEND and INP can be swapped using a parameter.
	PM1 to PM256	Positioning complete signal	This signal is used to output the position number achieved at completion of positioning (binary output)
	HEND	Home return completion signal	This signal turns ON upon completion of home return.
	ZONE1	Zone signal	Turns ON if the actuator's current position is within the range set by the parameter.
	PZONE	Position zone signal	This signal turns ON when the current actuator position has entered the range specified by position data during position movement. PZONE can be used together with ZONE1, but PZONE is valid only during movement to a specified position.
	RMDS	Running mode status signal	This outputs the operation mode status.
	* ALM	Controller alarm status signal	Turns ON when the controller is in normal condition, and turns OFF when an alarm occurs.
	MOVE	Moving signal	Turns ON while the actuator is moving (home return), including when there is push force.
	SV	Servo ON status signal	This signal turns ON when servo is ON.
	* EMGS	Emergency stop status signal	This signal remains ON while the controller is not in the emergency stop mode, and turns OFF once an emergency stop has been actuated.
	* BALM	Absolute battery voltage drop warning signal	With the absolute specifications for the controller, turns OFF when the absolute battery voltage drops.
	MODES	Mode status signal	The mode signal input turns it ON when it goes into teaching mode. It turns OFF when it goes into normal mode.
	WEND	Writing complete signal	This signal remains OFF after the controller has switched to the teaching mode. It turns ON upon completion of data write using the PWRT signal. If the PWRT signal is turned Off, this signal also turns OFF.
	PE0 to PE6	Current position number signal	This signal turns ON after the controller has completed moving to the target position in the solenoid valve mode.
	PWR	System Ready Signal	Turns ON when it starts up normally after turning ON the controller. (Dedicated pulse train type)
	TLR	Torque limiting signal	This signal turns ON once the motor torque has reached the specified value in a condition where torque is being limited by the TL signal. (Dedicated pulse train mode)
	ALM1 to ALM8	Alarm Code Output Signal	During a controller alarm, the alarm details are output in code. (Dedicated pulse train mode)
	LSO to LS2	Limit switch output signal	Each signal turns ON when the current actuator position has entered the positioning band before or after the target position. If the actuator has already completed home return, these signals are output even before a movement command is issued or while the servo is OFF.

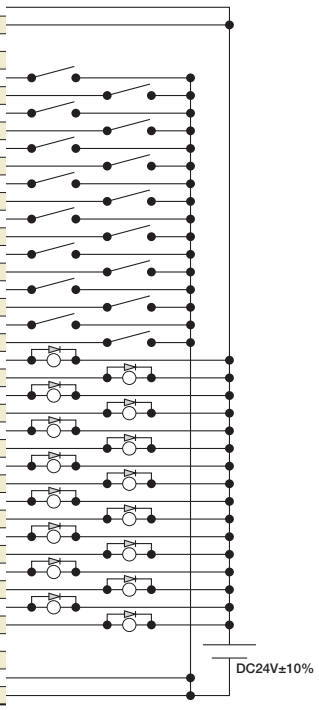
(Note) Signals with asterisks (*) are normally ON and OFF during operation.
(*1) A „pause" function is not available during S-curve motion.

I/O wiring drawing

Positioning mode / teaching mode / solenoid valve mode

PIO connector (NPN)

Pin Number	Classification	Signal
1A	Power Supply	24V
2A		24V
3A	—	Not used
4A	—	Not used
5A	Input	IN0
6A		IN1
7A		IN2
8A		IN3
9A		IN4
10A		IN5
11A		IN6
12A		IN7
13A		IN8
14A		IN9
15A		IN10
16A		IN11
17A		IN12
18A		IN13
19A		IN14
20A		IN15
1B	Output	OUT0
2B		OUT1
3B		OUT2
4B		OUT3
5B		OUT4
6B		OUT5
7B		OUT6
8B		OUT7
9B		OUT8
10B		OUT9
11B		OUT10
12B		OUT11
13B		OUT12
14B		OUT13
15B		OUT14
16B		OUT15
17B	—	Not used
18B	—	Not used
19B	Power Supply	0V
20B		0V

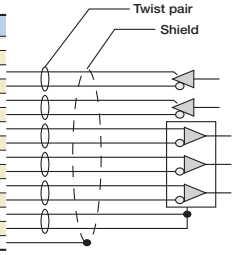


* Connect 24V between pins 1A and 2A, and 0V between pins 19B and 20B.

Pulse train mode (differential output)

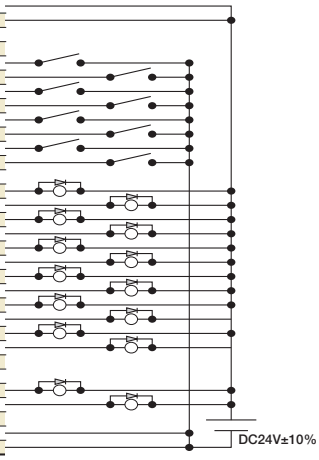
PULSE connector (NPN)

Pin Number	Classification	Signal
1		Not used
2		Not used
3	Input	PP
4		/PP
5		NP
6		/NP
7	Output	AFB
8		/AFB
9		BFB
10		/BFB
11		ZFB
12		/ZFB
13	Ground	GND
14		GND
Shell	Shield	Shield



PIO connector (NPN)

Pin Number	Classification	Signal
1A	Power Supply	24V
2A		24V
3A		Not used
4A		Not used
5A	Input	SON
6A		RES
7A		HOME
8A		TL
9A		CSTP
10A		DCLR
11A		BKRL
12A		RMOD
13A~20A	—	Not used
1B	Output	PWR
2B		SV
3B		INP
4B		HEND
5B		TLR
6B		*ALM
7B		*EMGS
8B		RMDS
9B		ALM1
10B		ALM2
11B		ALM4
12B		ALM8
13B		—
14B		—
15B		ZONE1
16B		ZONE2
17B~18B	—	Not used
19B	Power Supply	0V
20B		0V



* The shield on the twisted pair cable connected to the pulse connector must be connected to the shell. **Also, the cable length must not be longer than 10m.**
* Connect 24V between pins 1A and 2A, and 0V between pins 19B and 20B.

I/O Signal Table *Choose from 7 types (SCON-CA: from 9 types) of signal allocation.

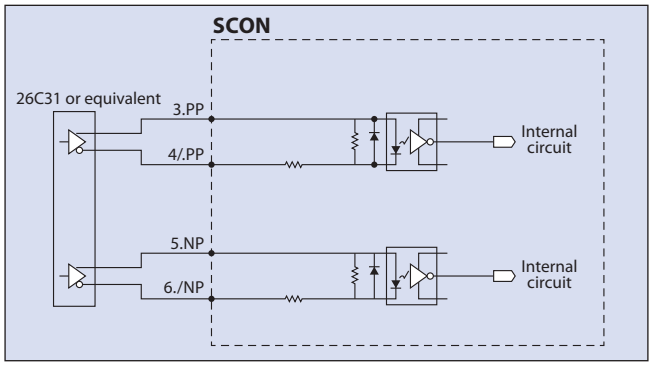
Pin No.	Category		Parameter (PIO pattern) selection								Pulse-train mode
			0	1	2	3	4	5	6	7	0
			Positioning mode	Teaching mode	256-point mode	512-point mode	Solenoid value mode 1	Solenoid value mode 2	Force mode 1 **	Force mode 2 **	Standard mode
		Positioning point	64 points	64 points	256 points	512 points	7 points	3 points	32 points	5 points	—
1A	24V		P24								P24
2A	24V		P24								P24
3A	—		NC								NC
4A	—		NC								NC
5A	Input	IN0	PC1	PC1	PC1	PC1	ST0	ST0	PC1	ST0	SON
6A		IN1	PC2	PC2	PC2	PC2	ST1	ST1(JOG+)	PC2	ST1	RES
7A		IN2	PC4	PC4	PC4	PC4	ST2	ST2(–)	PC4	ST2	HOME
8A		IN3	PC8	PC8	PC8	PC8	ST3	—	PC8	ST3	TL
9A		IN4	PC16	PC16	PC16	PC16	ST4	—	PC16	ST4	CSTP
10A		IN5	PC32	PC32	PC32	PC32	ST5	—	—	—	DCLR
11A		IN6	—	MODE	PC64	PC64	ST6	—	—	—	BKRL
12A		IN7	—	JISL	PC128	PC128	—	—	—	—	RMOD
13A		IN8	—	JOG+	—	PC256	—	—	CLBR	CLBR	—
14A		IN9	BKRL	JOG–	BKRL	BKRL	BKRL	BKRL	BKRL	BKRL	—
15A		IN10	RMOD	RMOD	RMOD	RMOD	RMOD	RMOD	RMOD	RMOD	—
16A		IN11	HOME	HOME	HOME	HOME	HOME	—	HOME	HOME	—
17A		IN12	*STP	*STP	*STP	*STP	*STP	—	*STP	*STP	—
18A		IN13	CSTR	CSTR/PWRT	CSTR	CSTR	—	—	CSTR	—	—
19A		IN14	RES	RES	RES	RES	RES	RES	RES	RES	—
20A		IN15	SON	SON	SON	SON	SON	SON	SON	SON	—
1B	Output	OUT0	PM1	PM1	PM1	PM1	PE0	LS0	PM1	PE0	PWR
2B		OUT1	PM2	PM2	PM2	PM2	PE1	LS1(TRQS)	PM2	PE1	SV
3B		OUT2	PM4	PM4	PM4	PM4	PE2	LS2(–)	PM4	PE2	INP
4B		OUT3	PM8	PM8	PM8	PM8	PE3	—	PM8	PE3	HEND
5B		OUT4	PM16	PM16	PM16	PM16	PE4	—	PM16	PE4	TLR
6B		OUT5	PM32	PM32	PM32	PM32	PE5	—	TRQS	TRQS	*ALM
7B		OUT6	MOVE	MOVE	PM64	PM64	PE6	—	LOAD	LOAD	*EMGS
8B		OUT7	ZONE1	MODES	PM128	PM128	ZONE1	ZONE1	CEND	CEND	RMDS
9B		OUT8	PZONE/ZONE2	PZONE/ZONE1	PZONE/ZONE1	PM256	PZONE/ZONE2	PZONE/ZONE2	PZONE/ZONE1	PZONE/ZONE1	ALM1
10B		OUT9	RMDS	RMDS	RMDS	RMDS	RMDS	RMDS	RMDS	RMDS	ALM2
11B		OUT10	HEND	HEND	HEND	HEND	HEND	HEND	HEND	HEND	ALM4
12B		OUT11	PEND	PEND/WEND	PEND	PEND	PEND	—	PEND	PEND	ALM8
13B		OUT12	SV	SV	SV	SV	SV	SV	SV	SV	*OVLW/*ALML
14B		OUT13	*EMGS	*EMGS	*EMGS	*EMGS	*EMGS	*EMGS	*EMGS	*EMGS	—
15B		OUT14	*ALM	*ALM	*ALM	*ALM	*ALM	*ALM	*ALM	*ALM	ZONE1
16B		OUT15	*BALM	*BALM	*BALM	*BALM	*BALM	*BALM	*BALM	*BALM	ZONE2
17B	—		—								—
18B	—		—								—
19B	0V		N								N
20B	0V		N								N

* In the above table, signals in ( ) represent functions available before the home return. Signals preceded by * are turned OFF while the actuator is operating.
** The force modes are only available for SCON-CA.

Pulse Train Type I/O Specifications (differential line driver specifications)

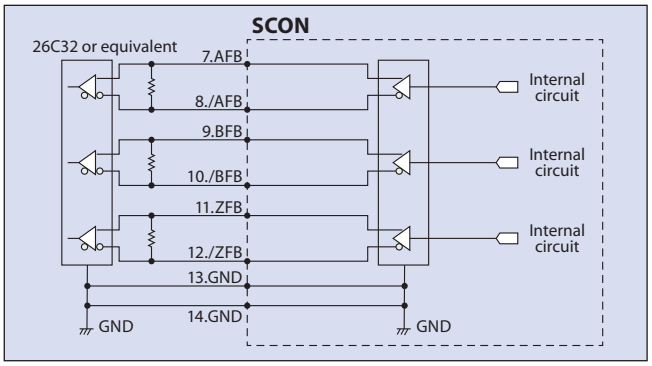
Input Section

Max. No. of input pulses: Line driver interface 0.5Mpps (SCON-CA: 2.5Mpps)
Isolation method : Photocoupler isolation



Output Section

Max. No. of output pulses: Line driver interface 0.5Mpps (SCON-CA: 2.5Mpps)
Isolation/non-isolation: Non-isolation

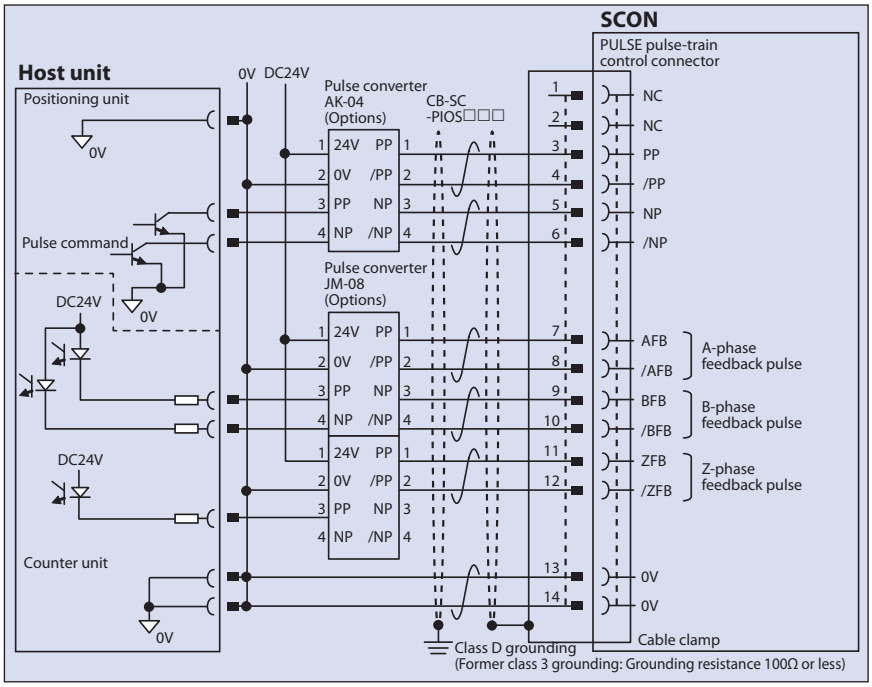


Pulse Train Type I/O Specifications (open collector specifications)

The AK-04 (options) is needed to input pulses. The JM-08 (options) is needed to output pulses.

Maximum number of input pulses:
200kpps (The AK-04 is needed.)
Maximum number of output pulses:
500kpps (The JM-08 is needed.)

* The 24-VDC power supply connected to the AK-4 must be shared with the PIO interface.
* Keep the length of the cable connecting the pulse output unit (PLC) and AK-04/JM-08 as short as possible.
Also keep the cable between the AK-04/JM-08 and PULSE connector to 2m or less.



Note

Use the same power supply for open collector input/output to/from the host and for the AK-04, JM-08.

Command Pulse Input State

Command Pulse Train Shapes		Input terminals	Forward	Reverse
Negative Logic	Forward pulse train	PP·/PP		
	Reverse pulse train	NP·/NP		
	The forward pulse train controls the amount of forward motor rotation; the reverse pulse train controls the same in reverse direction.			
	Pulse train	PP·/PP		
	Sign	NP·/NP	Low	High
	The command pulse controls the amount of motor rotation, and the command sign controls the direction of rotation.			
	A/B phase pulse train	PP·/PP		
		NP·/NP		
	A (frequency-quadrupled) A/B phase pulse with a 90° phase difference is used to control the amount and direction of rotation.			
Positive Logic	Forward pulse train	PP·/PP		
	Reverse pulse train	NP·/NP		
	Pulse train	PP·/PP		
	Sign	NP·/NP	High	Low
	A/B phase pulse train	PP·/PP		
		NP·/NP		

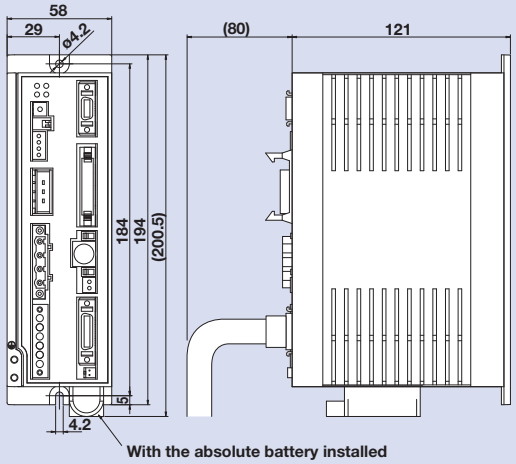
Table of specifications

Item	Specifications	
Motor Capacity	Less than 400W	400W or more
Connected actuator	RCS2 series actuator / single axis robot / linear motor	
Number of control axes	1-axis	
Operating method	Positioner type / pulse train type	
Positioning Points	512 points (PIO specification) / 768 (fieldbus specification)	
Backup memory	SCON-C: EEPROM / SCON-CA: FRAM (nonvolatile memory)	
I/O connector	40-pin connector	
Number of I/O	16 input points / 16 output points	
I/O power	External supply DC24V±10%	
Serial Communication	RS485 1ch	
Field Network	DeviceNet, CC-Link, ProfiBus (SCON-CA: additionaly CompuNet, Mechatrolink, ProfiNet, EtherCAT, Ethernet/IP, Sercos III *2)	
Peripheral device communication cable	CB-PAC-PIO □□□	
Command pulse train input method	Differential line driver method / open collector method (converted to differential with the pulse converter *1)	
Max. input pulse frequency	Differential line driver method: 500kpps (SCON-CA: 2500kpps) / Open collector method (using pulse converter): 200kpps	
Position detection method	Incremental encoder / Absolute encoder	
Emergency stop function	Available (integrated relay)	
Electromagnetic brake forced release	Brake release switch ON/OFF	
Input Voltage	Single-phase AC90V to AC126.5V Single-phase AC180V to AC253V	Single-phase AC180V to AC253V
Power Supply Capacity	20W ／ 74VA　30W ／ 94VA 60W ／ 186VA　100W ／ 282VA 150W ／ 376VA　200W ／ 469VA	400W ／ 844VA 600W ／ 1212VA 750W ／ 1569VA
Dielectric strength voltage	DC500V 100MΩ or more	
Vibration resistance	XYZ directions　10 to 57Hz, One side amplitude: 0.035mm (continuous), 0.075mm (intermittent) 58 to 150 Hz 4.9 m/s² (continuous), 9.8 m/s² (intermittent)	
Ambient operating temperature	0~40°C	
Ambient operating humidity	10 - 95% (non-condensing)	
Ambient operating atmosphere	Without corrosive gases	
Protection class	IP20	
Weight	Approximately 800g (plus 25g for the absolute specifications)	Approximately 1.1kg (plus 25g for absolute specifications)
External dimension	58mm(W)×194mm(H)×121mm(D)	72mm(W)×194mm(H)×121mm(D)

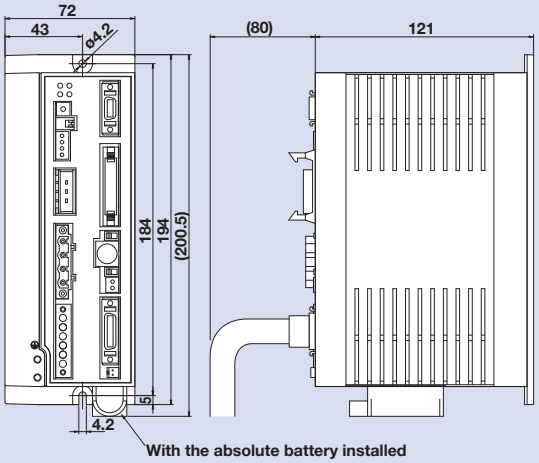
(Note 1) For the command-pulse input method, use the differential line driver method offering higher noise resistance.
If the open collector method must be used, convert the pulse to differential using the optional pulse converter (AK-04/JM-08).
(Note 2) Fieldbus network specification Sercos III is planned.

External dimensions

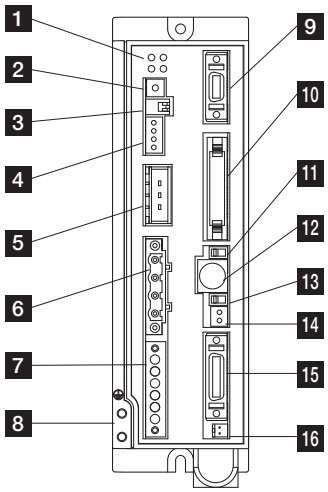
Less than 400W

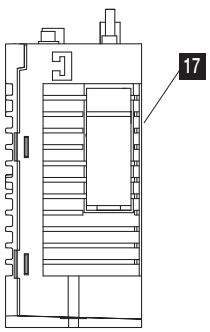


400W or more



Name of Each Part





1 LED display

These LED colors indicate the condition of the controller.

Name	Color	Explanation
PWR	Green	Lit when the system is ready (after power is ON, CPU normal functions)
SV	Green	Lit when servo is ON
ALM	Orange	Lit during an alarm
EMG	Red	Lit during an emergency stop

2 Rotary switch

This is the address setting switch for identifying each controller when they are linked.

3 Piano switch

Controller system switch.

Name	Explanation
1	Operating mode switch OFF: positioner mode ON: pulse train control mode *Enabled at power ON.
2	Remote update switch (normally set to OFF) OFF: normal operating mode ON: update mode *Enabled when power is ON or during soft reset.

4 System I/O connector

Connector for the emergency stop switch etc.

5 Regeneration unit connector

Connector for resistance unit that absorbs regeneration current produced when the actuator decelerates to a stop.

6 Motor connector (X-SEL, ECON, RCS compatible)

Actuator motor cable connector.

7 Power supply connector

AC power connector. Divided into the control power input and motor power input.

8 Grounding screw

Protective grounding screw. Always ground this screw.

9 Pulse train control connector

This connector is used during pulse train control mode operations. It is disconnected during operations in positioner mode.

10 PIO connector

Connector for the cable for parallel communications with the PLC and other peripheral devices.

11 Operating mode switch

Name	Explanation
MANU	Do not receive PIO commands
AUTO	Accept PIO commands

*The emergency stop switch on the teaching pendant becomes effective when the line is connected, regardless of whether this switch is set to AUTO or MANU. Take note that an emergency stop will be actuated momentarily when the teaching-pendant or SIO communication cable is disconnected. This is a normal phenomenon and does not indicate an error.

12 SIO connector

Connector for the teaching pendant or PC communications cable.

13 Brake release switch

This is the electromagnetic brake forced release switch, integrated with the actuator.

*It is necessary to connect the DC 24V power for the brake drive.

14 Brake power connector

Brake power DC 24V supply connector (only required when the brake equipped actuator is connected)

15 Encoder sensor connector (X-SEL-P/Q compatible)

Encoder sensor cable connector

16 Absolute battery connector

Connector for the absolute data backup battery. (Required only for absolute encoder specifications)

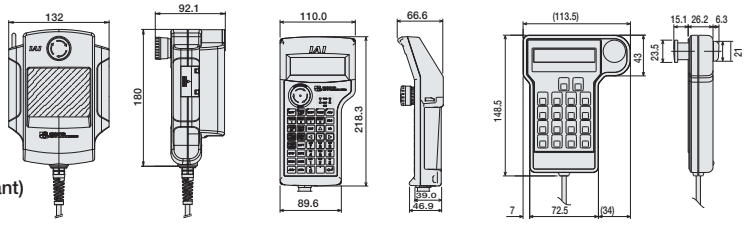
17 Absolute battery holder

Battery holder for installing the absolute data backup battery

Option

Teaching Pendant

CON-PT-M-ENG　CON-T-ENG　RCM-E-ENG

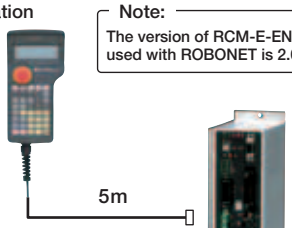


Features This is a teaching device that provides information on functions such as position input, test runs, and monitoring.

Model
CON-PT-M-ENG (Touch panel teaching pendant)
CON-T-ENG (Standard type)
RCM-E-ENG (Simple teaching pendant)

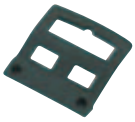
Configuration

Note:
The version of RCM-E-ENG that can be used with ROBONET is 2.08 or later.



CON-T-ENG Options

- Wall-mounting hook Model HK-1
- Strap Model STR-1



Specifications

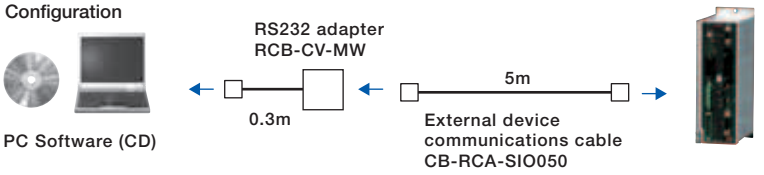
Item	CON-PT-M-ENG	CON-T-ENG	RCM-E-ENG
Data input	O	O	O
Actuator motion	O	O	O
Ambient operating temp/humidity	Temp: 0~40°C; Humidity: 85% RH or below		
Ambient operating atmosphere	No corrosive gases. Especially no dust.		
Protection class	IP40	IP54	–
Weight	Approx. 750g	Approx. 400g	Approx. 400g
Cable length	5m		
Display	3-color LED touch panel with backlight	20 char × 4 lines LCD .display	16 char. × 2 lines LCD display

PC Software (Windows Only)

Features A startup support software for inputting positions, performing test runs, and monitoring. With enhancements for adjustment functions, the startup time is shortened.

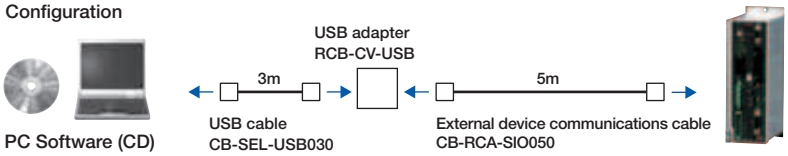
Model **RCM-101-MW-EU** (External device communications cable + RS232 conversion unit)

Configuration



Model **RCM-101-USB-EU** (External device communications cable + USB adapter + USB cable)

Configuration



Regenerative Resistance Unit

Features A unit that returns the regenerative current, generated during the acceleration/deceleration of the motor, into heat. In the tables below, check the total power output of the actuator to see if a regenerative resistor is needed.

Model **REU-2** (for SCON/SSEL)

Specifications

Actuator weight	0.9kg
Internal regenerative resistance	220Ω　80W
Actuator-Controller Connection Cable (included)	CB-SC-REU010 (for SSEL)

Required Number of Units

	Horizontal	Vertical
0 units	~100W	~100W
1 unit	~400W	~400W
2 units	~750W	~750W

* Depending on the operating conditions, more regenerative resistor may be needed.

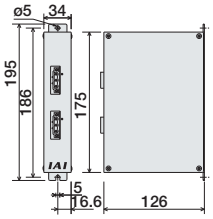
Required Number of Units (RCS2-RA13R only)

	2.5 lead	1.25 lead
Horizontal	1 unit	0 units
Vertical	1 unit	1 unit

* Depending on the operating conditions, more regenerative resistor may be needed.

* If two regenerative units are needed, acquire one REU-2 and one REU-1 (See P596).

Exterior Dimensions



Battery for retaining absolute data

Features Battery for saving absolute data, when operating an actuator with an absolute encoder.

Model **AB-5**

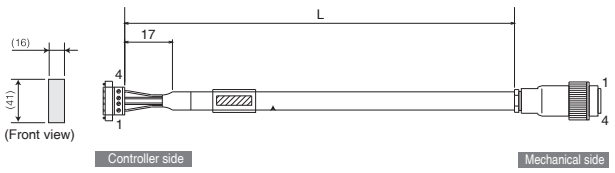
Spare parts

When you need spare parts after purchasing the product, such as when replacing a cable, refer to the list of models below.

Motor cable / EU motor robot cable

Model **CB-RCC-MA □□□ / CB-XEU-MA □□□**

* Enter the cable length (L) into □□□. Compatible to a maximum of 30 meters.
Ex.: 080 = 8 m



Min. bend radius r = 50 mm or larger (when movable type is used)
* Only the robot cable is to be used in a cable track

Wire	Color	Signal	No.
0.75sq	Green	PE	1
	Red	U	2
	White	V	3
	Black	W	4

No.	Signal	Color	Wire
1	U	Red	0.75sq (crimped)
2	V	White	
3	W	Black	
4	PE	Green	

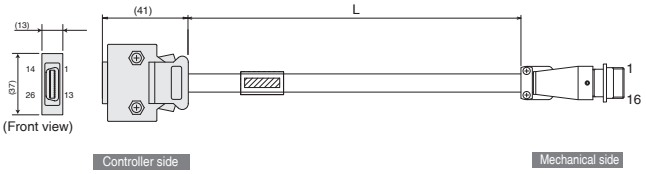
(Fig.: Motor robot cable CB-XEU-MA□□□, high-flexible, EU version with metal connector)

Encoder cable / EU encoder robot cable

Model **CB-RCS2-PA □□□ / CB-XEU3-PA □□□**

* Enter the cable length (L) into □□□. Compatible to a maximum of 30 meters.
Ex.: 080 = 8 m

Min. bend radius r = 50 mm or larger (when movable type is used)
* Only the robot cable is to be used in a cable track



(Fig.: Encoder robot cable CB-XEU3-PA□□□, high-flexible, EU version with metal connector)

Wire	Color	Signal	No.
AWG26 (soldered)	–	–	10
	–	–	11
	–	E24V	12
	Gray/White	0V	13
	Brown/White	LS	26
	–	CREEP	25
	–	OT	24
	–	RSV	23
	–	–	9
	–	–	18
	–	–	19
	Pink	A+	1
	Purple	A-	2
	White	B+	3
	Blue/Red	B-	4
	Orange/White	Z+	5
	Green/White	Z-	6
	Blue	SRD+	7
	Orange	SRD-	8
	Black	BAT+	14
	Yellow	BAT–	15
	Green	VCC	16
	Brown	GND	17
	Gray	BKR-	20
	Red	BKR+	21
	–	–	22

The shield is connected to the hood by a clamp.

Ground wire and shield braiding

No.	Signal	Color	Wire
1	A	Pink	AWG26 (crimped)
2	A	Green	
3	B	White	
4	B	Blue/Red	
5	Z	Orange/White	
6	Z	Green/White	
7	LS+	Brown/White	
8	SD	Blue	
9	SD	Orange	
10	BAT+	Black	
11	BAT–	Yellow	
12	VCC	Green	
13	GND	Brown	
14	LS–	Gray/White	
15	BK–	Gray	
16	BK+	Red	

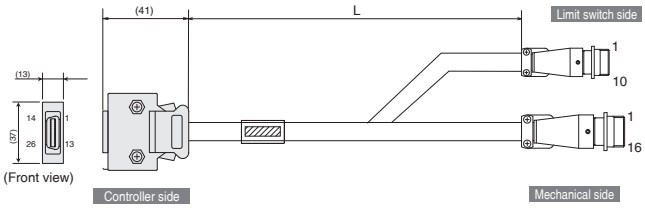
The shield is connected to the hood by a clamp.

Encoder cable / EU LS encoder robot cable RCS2-RT6/RT6R/RT7R/RTC8/RTC10/RTC12/RA13R

Model **CB-RCS2-PLA □□□ / CB-XEU2-PLA □□□**

* Enter the cable length (L) into □□□. Compatible to a maximum of 30 meters.
Ex.: 080 = 8 m

Min. bend radius r = 50 mm or larger (when movable type is used)
* Only the robot cable is to be used in a cable track



(Fig.: Limit switch encoder robot cable CB-XEU2-PLA□□□, high-flexible, EU version with metal connector)

Wire	Color	Signal	No.
AWG26 (soldered)	–	–	10
	–	–	11
	White/Orange	E24 V	12
	White/Green	0 V	13
	Brown/Blue	LS	26
	Brown/Yellow	CREEP	25
	Brown/Red	OT	24
	Brown/Black	RSV	23
	–	–	9
	–	–	18
	–	–	19
	White/Blue	A+	1
	White/Yellow	A–	2
	White/Red	B+	3
	White/Black	B–	4
	White/Purple	Z+	5
	White/Gray	Z–	6
	Orange	SRD+	7
	Green	SRD–	8
	Purple	BAT+	14
	Gray	BAT–	15
	Red	VCC	16
	Black	GND	17
	Blue	BKR–	20
	Yellow	BKR+	21
	–	–	22

The shield is connected to the hood by a clamp.

Ground wire and shield braiding

No.	Signal	Color	Wire
1	E24 V	White/Blue	AWG26 (crimped)
2	0 V	White/Yellow	
4	LS	White/Red	
5	CREEP	White/Black	
6	OT	White/Purple	
7	RSV	White/Gray	
(3/8/9/10)	–	–	

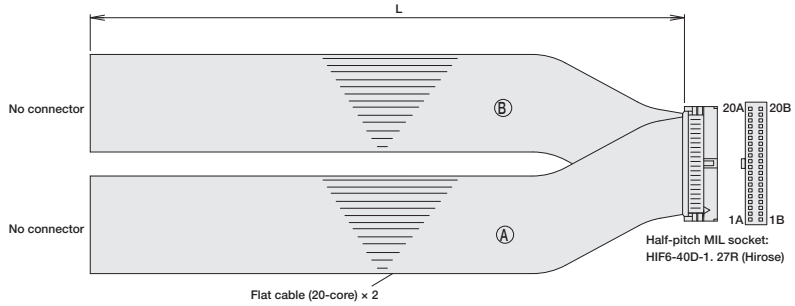
No.	Signal	Color	Wire
1	A	White/Blue	AWG26 (crimped)
2	A	White/Yellow	
3	B	White/Red	
4	B	White/Black	
5	Z	White/Purple	
6	Z	White/Gray	
7	–	–	
8			
9	SD	Orange	
10	SD	Green	
11	BAT+	Purple	
12	BAT–	Gray	
13	VCC	Red	
14	GND	Black	
15	BK–	Blue	
16	BK+	Yellow	

The shield is connected to the hood by a clamp.

I/O Flat Cable

Model **CB-PAC-PIO □□□**

* Enter the cable length (L) into □□□. Compatible to a maximum of 10 meters.
Ex.: 080 = 8 m



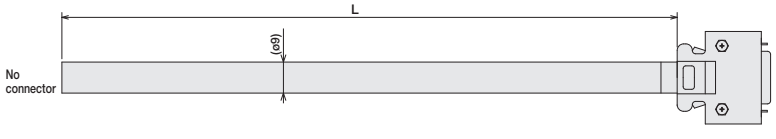
HIF6-40D-1. 27R

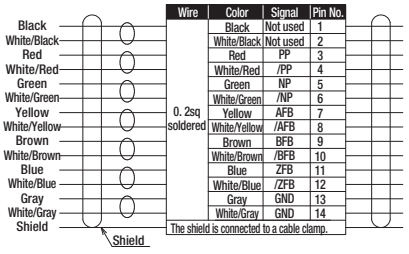
Pin No.	Signal	Color	Wire	Pin No.	Signal	Color	Wire
1A	24V	Brown-1	Flat cable Ⓐ (crimped)	1B	OUT0	Brown-3	Flat cable Ⓑ (crimped) AWG28
2A	24V	Red-1		2B	OUT1	Red-3	
3A	–	Orange-1		3B	OUT2	Orange-3	
4A	–	Yellow-1		4B	OUT3	Yellow-3	
5A	IN0	Green-1		5B	OUT4	Green-3	
6A	IN1	Blue-1		6B	OUT5	Blue-3	
7A	IN2	Purple-1		7B	OUT6	Purple-3	
8A	IN3	Gray-1		8B	OUT7	Gray-3	
9A	IN4	White-1		9B	OUT8	White-3	
10A	IN5	Black-1		10B	OUT9	Black-3	
11A	IN6	Brown-2		11B	OUT10	Brown-4	
12A	IN7	Red-2		12B	OUT11	Red-4	
13A	IN8	Orange-2		13B	OUT12	Orange-4	
14A	IN9	Yellow-2		14B	OUT13	Yellow-4	
15A	IN10	Green-2		15B	OUT14	Green-4	
16A	IN11	Blue-2		16B	OUT15	Blue-4	
17A	IN12	Purple-2		17B	–	Purple-4	
18A	IN13	Gray-2		18B	–	Gray-4	
19A	IN14	White-2		19B	0V	White-4	
20A	IN15	Black-2		20B	0V	Black-4	

SCON Pulse Train Control Cable

Model **CB-SC-PIOS □□□**

* Enter the cable length (L) into □□□. Compatible to a maximum of 10 meters.
Ex.: 080 = 8 m





Wire	Color	Signal	Pin No.
0. 2sq soldered	Black	Not used	1
	White/Black	Not used	2
	Red	PP	3
	White/Red	/PP	4
	Green	NP	5
	White/Green	/NP	6
	Yellow	AFB	7
	White/Yellow	/AFB	8
	Brown	BFB	9
	White/Brown	/BFB	10
	Blue	ZFB	11
	White/Blue	/ZFB	12
	Gray	GND	13
	White/Gray	GND	14

The shield is connected to a cable clamp.

SSEL

Program controller
For RCS2 series

List of models

Program controller for operating RCS2 series actuators. One unit can handle various controls.

Type	C	
Name	Program mode	Positioner Mode
External View		
Description	Both the actuator operation and communication with external equipment can be handled by a single controller. When two axes are connected, arc interpolation, path operations, and synchronization can be performed.	Up to 20000 positioning points are supported. Push-motion operation and teaching operation are also possible.
Position points	20000 points	
Number of control axes:	2 axes max.	

Model

* 2nd axis specs not applicable to the single-axis model.

SSEL - C - [ ] - [ ] [ ] [ ] - [ ] [ ] [ ] - [ ] - [ ] - [ ]

Series | Type | Number of Axes | (Specs for 1st axis) Motor / Encoder / Option | (Specs for 2nd axis) Motor / Encoder / Option | I/O Type | I/O Cable Length | Power Voltage

C	Standard Type

1	Single-axis model
2	2-axis model

B	Brake
C	Creep sensor
HA	High Accel./Decel.
L	Home sensor/ LS-compatible
M	Master axis spec

I	Incremental
A	Absolute

I	Incremental
A	Absolute

B	Brake
C	Creep sensor
HA	High Accel./Decel.
L	Home sensor/ LS-compatible
S	Slave axis spec

12	12W servo motor	150	150W servo motor
20	20W servo motor	200	200W servo motor
30D	30W servo motor for RCS2	300	300W servo motor
30R	30W servo motor for RS	400	400W servo motor
60	60W servo motor	600	600W servo motor
100	100W servo motor	750	750W servo motor

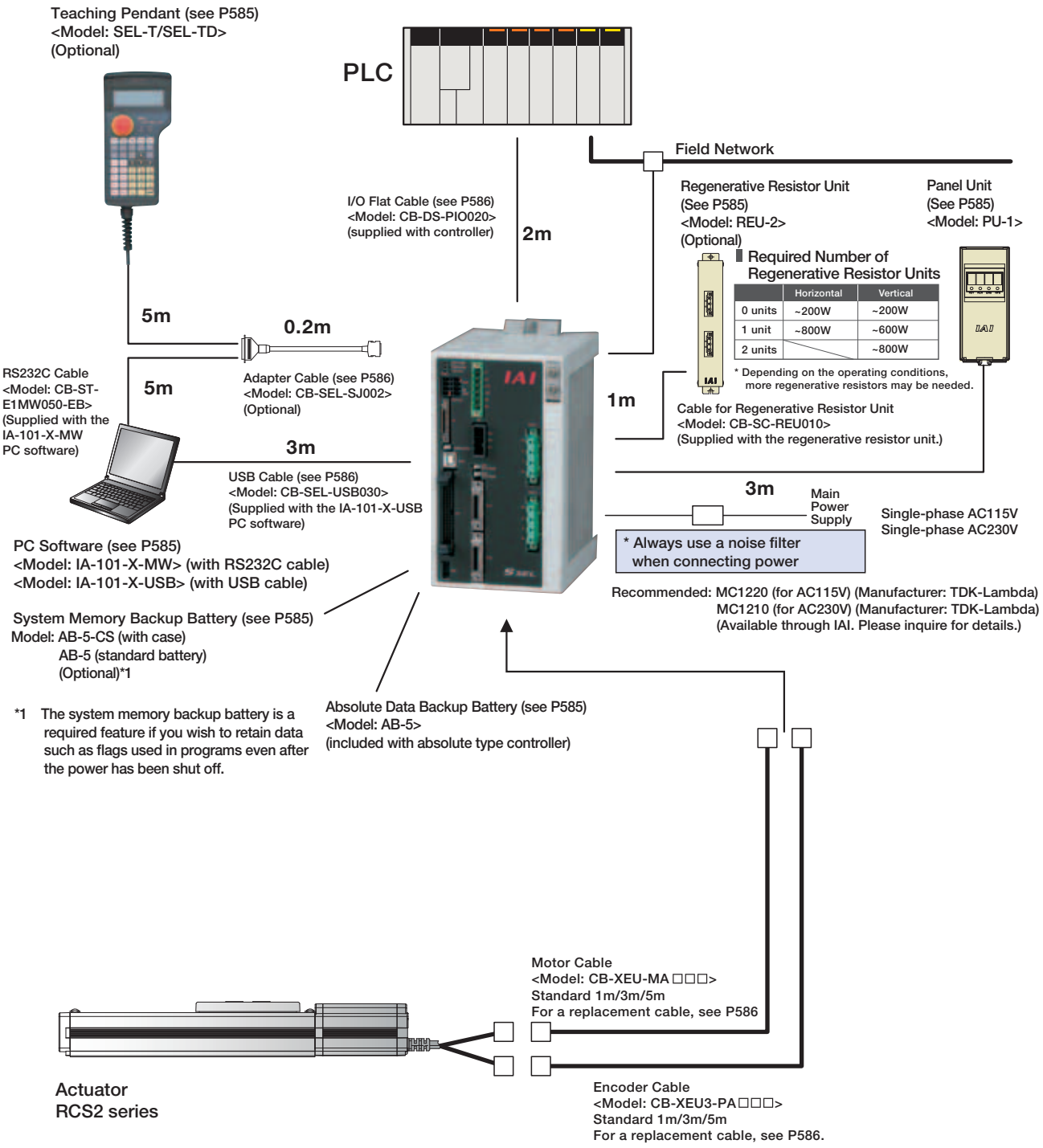
12	12W servo motor	150	150W servo motor
20	20W servo motor	200	200W servo motor
30D	30W servo motor for RCS2	300	300W servo motor
30R	30W servo motor for RS	400	400W servo motor
60	60W servo motor	600	600W servo motor
100	100W servo motor	750	750W servo motor

NP	PIO NPN
PN	PIO PNP (standard)
DV	DeviceNet
CC	CC-Link
PR	ProfiBus

0	No cable
2	2m
3	3m
5	5m

1	Single-phase AC115V
2	Single-phase AC230V

System configuration



I/O Specifications

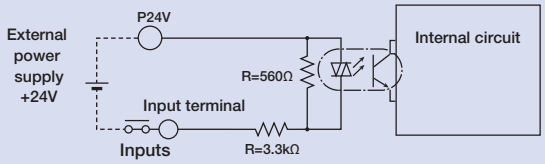
■ Input section External input specifications

Item	Specifications
Input voltage	DC24V ±10%
Input current	7mA / circuit
ON/OFF voltage	ON voltage (min.) NPN：DC16V ／ PNP：DC8V
	OFF voltage (max.) NPN：DC5V ／ PNP：DC19V
Isolation method	Photocoupler

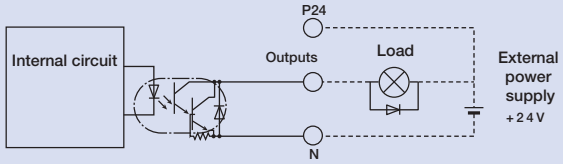
■ Output section External output specifications

Item	Specifications
Load Voltage	DC24V
Max. load current	100m A / 1point 400mA / 8 points in total
Residual voltage (Max.)	Max 0.1mA ／ 1 point
Isolation method	Photocoupler

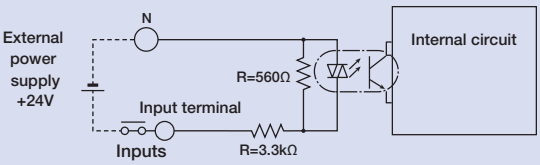
NPN Specifications



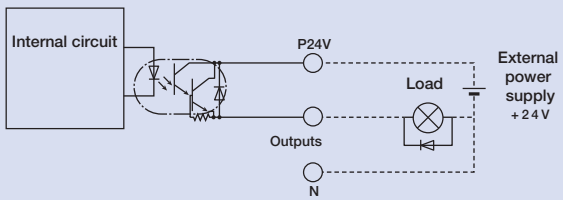
NPN Specifications



PNP Specifications



PNP Specifications



Explanation of I/O Signal Functions

Two modes can be selected for the SSEL controller: “Program Mode,” in which the actuator is operated by entering a program, and “Positioner Mode,” in which PLC signals are received and the actuator is moved to designated positions.
The Positioner Mode has the five input patterns listed below to enable various applications.

■ Control Function by Type

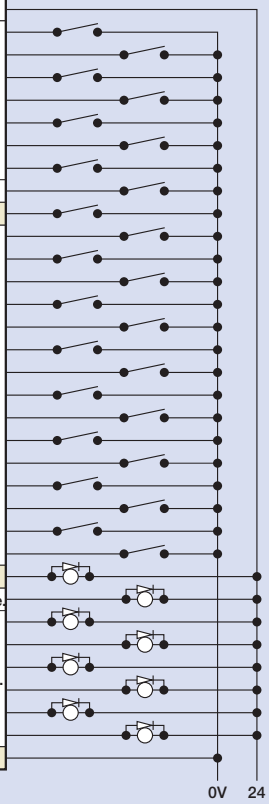
Operation mode		Features
Program mode		Various operations including linear/arc interpolation operation, path operation ideal for coating processes, etc., arch-motion operation and palletizing operation can be performed using the Super SEL language that lets you program complex control actions using simple commands.
Positioner mode	Standard mode	This is the basic mode from which operations can be conducted by designating position numbers and inputting the start signal. Push-motion operation and teaching operation are also possible.
	Product change mode	Multiple parts of the same shape with slightly different hole positions can be handled using movement commands to the same position numbers by simply changing the product type number.
	2-axis independent mode	With a 2-axis controller, each axis can be commanded and operated separately.
	Teaching mode	In this mode, the slider (rod) moves based on an external signal, when the actuator is stopped, the current position can be registered as position data.
	DS-S-C1 Compatible mode	If you were using a DS-S-C1 controller, you can replace it with a SSEL controller without having to change the host programs. *This mode does not ensure actuator compatibility.

Explanation of I/O Signal Functions

Program mode

Pin Number	Category	Port No.	Program Mode	Functions
1A	P24		24V input	Connect 24V.
1B	Input	016	Select Program No. 1	Selects the program number to start. (Input as BCD values to ports 016 to 022)
2A		017	Select Program No. 2	
2B		018	Select Program No. 4	
3A		019	Select Program No. 8	
3B		020	Select Program No. 10	
4A		021	Select Program No. 20	
4B		022	Select Program No. 40	
5A		023	CPU reset	Resets the system to the same state as when the power is turned on.
5B		000	Start	Starts the programs selected by ports 016 to 022.
6A		001	General-purpose input	Waits for external input via program instructions.
6B		002	General-purpose input	
7A		003	General-purpose input	
7B		004	General-purpose input	
8A		005	General-purpose input	
8B		006	General-purpose input	
9A		007	General-purpose input	
9B		008	General-purpose input	
10A		009	General-purpose input	
10B		010	General-purpose input	
11A		011	General-purpose input	
11B		012	General-purpose input	
12A		013	General-purpose input	
12B		014	General-purpose input	
13A		015	General-purpose input	
13B	Output	300	Alarm	Turns off when an alarm occurs. (Contact B)
14A		301	Ready	Turns on when the controller starts up normally and is in an operable state.
14B		302	General-purpose output	These outputs can be turned ON/OFF as desired via program instructions.
15A		303	General-purpose output	
15B		304	General-purpose output	
16A		305	General-purpose output	
16B		306	General-purpose output	
17A		307	General-purpose output	
17B	N		0V input	Connect 0V.

NPN* Wiring Diagram

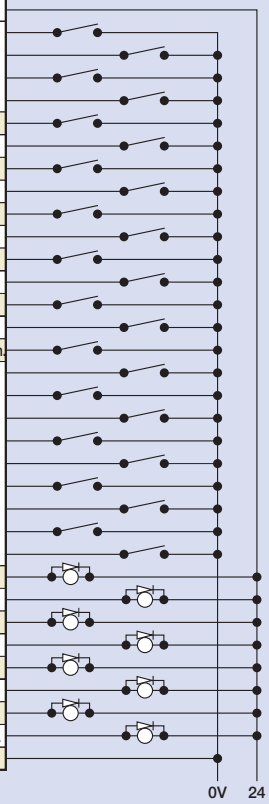


*Note: With regard to PNP wiring diagram, please refer to SSEL manual.

Positioner mode

Pin Number	Category	Port No.	Positioner Standard Mode	Functions
1A	P24		24V input	Connect 24V.
1B	Input	016	Position input 10	Specifies the position numbers to move to, using port number 007 to 019 The number can be specified either as BCD or binary.
2A		017	Position input 11	
2B		018	Position input 12	
3A		019	Position input 13	
3B		020	Position input 14	–
4A		021	Position input 15	–
4B		022	Position input 16	–
5A		023	Error reset	Resets minor errors. (Severe errors require a restart.)
5B		000	Start	Starts moving to selected position.
6A		001	Home Return	Performs home return.
6B		002	Servo ON	Switches between Servo ON and OFF.
7A		003	Push	Performs a push motion.
7B		004	Pause	Pauses the motion when turned OFF, and resumes motion when turned ON.
8A		005	Cancel	Stops the motion when turned OFF. The remaining motion is canceled.
8B		006	Interpolation setting	When this signal is turned ON for a 2-axis model, the actuator moves by linear interpolation.
9A		007	Position input 1	Specifies the position numbers to move to, using ports 007 to 019. The number can be specified either as BCD or binary.
9B		008	Position input 2	
10A		009	Position input 3	
10B		010	Position input 4	
11A		011	Position input 5	
11B		012	Position input 6	
12A		013	Position input 7	
12B		014	Position input 8	
13A		015	Position input 9	
13B	Output	300	Alarm	Turns off when an alarm occurs. (Contact B)
14A		301	Ready	Turns on when the controller starts up normally and is in an operable state.
14B		302	Positioning complete	Turns on when the movement to the destination is complete.
15A		303	Home Return complete	Turns on when the home return operation is complete.
15B		304	Servo ON output	Turns on when servo is ON.
16A		305	Pushing complete	Turns on when a push motion is complete.
16B		306	System battery error	Turns on when the system battery runs low (warning level).
17A		307	Absolute encoder battery error	Turns on when the battery for the absolute encoder runs low (warning level).
17B	N		0V input	Connect 0V.

NPN* Wiring Diagram



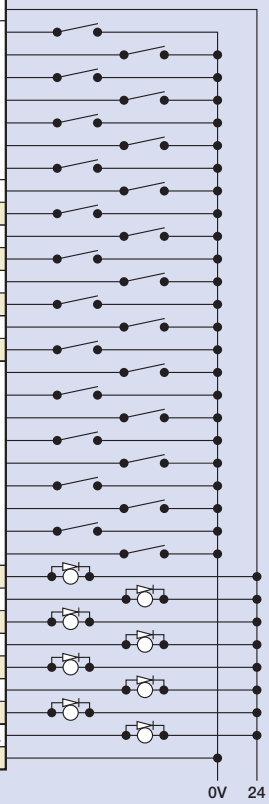
*Note: With regard to PNP wiring diagram, please refer to SSEL manual.

Explanation of I/O Signal Functions

Positioner, Product-Type Change Mode

Pin Number	Category	Port No.	Positioner Product Type Change Mode	Functions
1A	P24		24V input	Connect 24V.
1B	Input	016	Position/Product Type Input 10	Specifies the position numbers to move to, and the product type numbers, using ports 007 to 022. The position and product type numbers are assigned by parameter settings. The number can be specified either as BCD or binary.
2A		017	Position/Product Type Input 11	
2B		018	Position/Product Type Input 12	
3A		019	Position/Product Type Input 13	
3B		020	Position/Product Type Input 14	
4A		021	Position/Product Type Input 15	
4B		022	Position/Product Type Input 16	
5A		023	Error reset	Resets minor errors. (Severe errors require a restart.)
5B		000	Start	Starts moving to selected position.
6A		001	Home Return	Performs home return.
6B		002	Servo ON	Switches between Servo ON and OFF.
7A		003	Push	Performs a push motion.
7B		004	Pause	Pauses the motion when turned OFF, and resumes motion when turned ON.
8A		005	Cancel	Stops the motion when turned OFF. The remaining motion is canceled.
8B		006	Interpolation setting	When this signal is turned ON for a 2-axis model, the actuator moves by linear interpolation.
9A		007	Position/Product Type Input 1	Specifies the position numbers to move to, and the product type numbers, using ports 007 to 022. The position and product type numbers are assigned by parameter settings. The number can be specified either as BCD or binary.
9B		008	Position/Product Type Input 2	
10A		009	Position/Product Type Input 3	
10B		010	Position/Product Type Input 4	
11A		011	Position/Product Type Input 5	
11B		012	Position/Product Type Input 6	
12A		013	Position/Product Type Input 7	
12B		014	Position/Product Type Input 8	
13A		015	Position/Product Type Input 9	
13B	Output	300	Alarm	Turns off when an alarm occurs. (Contact B)
14A		301	Ready	Turns on when the controller starts up normally and is in an operable state.
14B		302	Positioning complete	Turns on when the movement to the destination is complete.
15A		303	Home Return complete	Turns on when the home return operation is complete.
15B		304	Servo ON output	Turns on when servo is ON.
16A		305	Pushing complete	Turns on when a push motion is complete.
16B		306	System battery error	Turns on when the system battery runs low (warning level).
17A		307	Absolute encoder battery error	Turns on when the battery for the absolute encoder runs low (warning level).
17B	N		0V input	Connect 0V.

NPN* Wiring Diagram

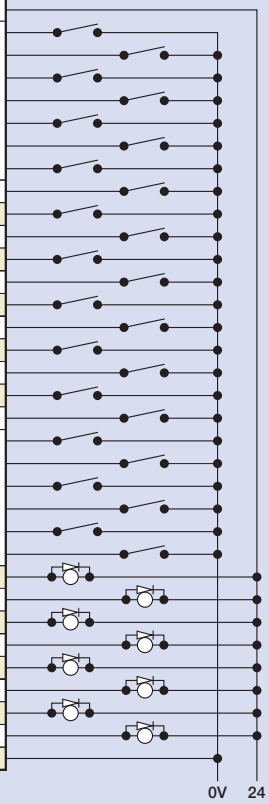


*Note: With regard to PNP wiring diagram, please refer to SSEL manual.

Positioner, 2-axis Independent Mode

Pin Number	Category	Port No.	Positioner Independent Mode	Functions
1A	P24		24V input	Connect 24V.
1B	Input	016	Position input 7	Specifies the position numbers to move to, using ports 010 to 022. The position numbers on the 1st and 2nd axes are assigned by parameter settings. The number can be specified either as BCD or binary.
2A		017	Position input 8	
2B		018	Position input 9	
3A		019	Position input 10	
3B		020	Position input 11	
4A		021	Position input 12	
4B		022	Position input 13	
5A		023	Error reset	Resets minor errors. (Severe errors require a restart.)
5B		000	Start 1	Starts the movement to the selected position number on the 1st axis.
6A		001	Home Return 1	Performs Home Return on the 1st axis.
6B		002	Servo ON 1	Switches between servo ON and OFF for the 1st axis.
7A		003	Pause 1	Pauses the motion on 1st axis when turned OFF, and resumes when turned ON.
7B		004	Cancel 1	Cancels the movement on the 1st axis.
8A		005	Start 2	Starts the movement to the selected position number on the 2nd axis.
8B		006	Home Return 2	Performs Home Return on the 2nd axis.
9A		007	Servo ON 2	Switches between servo ON and OFF for the 2nd axis.
9B		008	Pause 2	Pauses the motion on 2nd axis when turned OFF, and resumes when turned ON.
10A		009	Cancel 2	Cancels the movement on the 2nd axis.
10B		010	Position input 1	Specifies the position numbers to move to, using ports 010 to 022. The position numbers on the 1st and 2nd axes are assigned by parameter settings. The number can be specified either as BCD or binary.
11A		011	Position input 2	
11B		012	Position input 3	
12A		013	Position input 4	
12B		014	Position input 5	
13A		015	Position input 6	
13B	Output	300	Alarm	Turns off when an alarm occurs. (Contact B)
14A		301	Ready	Turns on when the controller starts up normally and is in an operable state.
14B		302	Positioning complete 1	Turns on when the movement to the specified position on the 1st axis is complete.
15A		303	Home Return complete 1	Turns on when home return on the 1st axis is complete.
15B		304	Servo ON output 1	Turns on when the 1st axis is in a servo ON state.
16A		305	Positioning complete 2	Turns on when the movement to the specified position on the 2nd axis is complete.
16B		306	Home Return complete 2	Turns on when home return on the 2nd axis is complete.
17A		307	Servo ON output 2	Turns on when the 2nd axis is in a servo ON state.
17B	N		0V input	Connect 0V.

NPN* Wiring Diagram



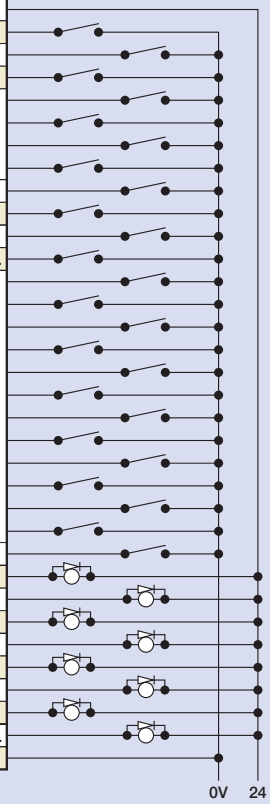
*Note: With regard to PNP wiring diagram, please refer to SSEL manual.

Explanation of I/O Signal Functions

Positioner, Teaching Mode

Pin Number	Category	Port No.	Positioner Teaching Mode	Functions
1A	P24		24V input	Connect 24V.
1B	Input	016	JOG– on 1st axis	While the signal is input, the 1st axis is moved in the - (negative) direction.
2A		017	JOG+ on 2nd axis	While the signal is input, the 2nd axis is moved in the + (positive) direction.
2B		018	JOG– on 2nd axis	While the signal is input, the 2nd axis is moved in the - (negative) direction.
3A		019	Specify inching (0.01mm)	Specifies how much to move during inching. (Total of the values specified for ports 019 to 022)
3B		020	Specify inching (0.1mm)	
4A		021	Specify inching (0.5mm)	
4B		022	Specify inching (1mm)	
5A		023	Error reset	Resets minor errors. (Severe errors require a restart.)
5B		000	Start	Starts moving to selected position.
6A		001	Servo ON	Switches between Servo ON and OFF.
6B		002	Pause	Pauses the motion when turned OFF, and resumes motion when turned ON.
7A		003	Position input 1	Ports 003 to 013 are used to specify the position number to move, and the position number for inputting the current position. When the teaching mode setting on port 014 is in the ON state, the current value is written to the specified position number.
7B		004	Position input 2	
8A		005	Position input 3	
8B		006	Position input 4	
9A		007	Position input 5	
9B		008	Position input 6	
10A		009	Position input 7	
10B		010	Position input 8	
11A		011	Position input 9	
11B		012	Position input 10	
12A		013	Position input 11	
12B		014	Teaching mode setting	
13A		015	JOG+ on 1st axis	While the signal is input, the 1st axis is moved in the plus direction.
13B	Output	300	Alarm	Turns off when an alarm occurs. (Contact B)
14A		301	Ready	Turns on when the controller starts up normally and is in an operable state.
14B		302	Positioning complete	Turns on when the movement to the destination is complete.
15A		303	Home Return complete	Turns on when the home return operation is complete.
15B		304	Servo ON output	Turns on when servo is ON.
16A		305	–	–
16B		306	System battery error	Turns on when the system battery runs low (warning level).
17A		307	Absolute encoder battery error	Turns on when the battery for the absolute encoder runs low (warning level).
17B	N		0V input	Connect 0V.

NPN* Wiring Diagram

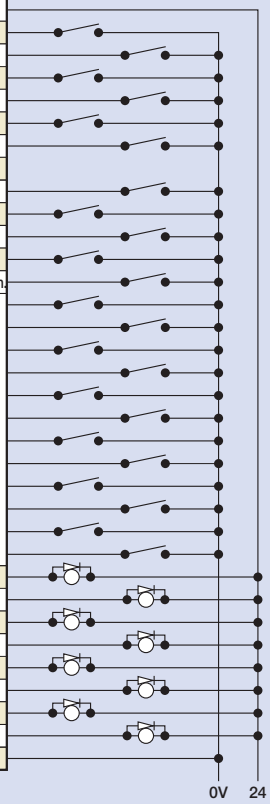


*Note: With regard to PNP wiring diagram, please refer to SSEL manual.

Positioner, DS-S-C1 Compatible Mode

Pin Number	Category	Port No.	Positioner DS-S-C1 Compatible Mode	Functions
1A	P24		24V input	Connect 24V.
1B	Input	016	Position No. 1000	(Same as ports 004 through 015)
2A		017	Position No. 2000	–
2B		018	Position No. 4000	–
3A		019	Position No. 8000	–
3B		020	Position No. 10000	–
4A		021	Position No. 20000	–
4B		022	NC (*1)	–
5A		023	CPU reset	Resets the system to the same state as when the power is turned on.
5B		000	Start	Starts moving to selected position.
6A		001	Hold (Pause)	Pauses the motion when turned ON, and resumes motion when turned OFF.
6B		002	Cancel	Stops the motion when turned ON. The remaining motion is canceled.
7A		003	Interpolation setting	When this signal is turned ON for a 2-axis model, the actuator moves by linear interpolation.
7B		004	Position No. 1	Ports 004 through 016 are used to specify the position number to move. The numbers are specified as BCD.
8A		005	Position No. 2	
8B		006	Position No. 4	
9A		007	Position No. 8	
9B		008	Position No. 10	
10A		009	Position No. 20	
10B		010	Position No. 40	
11A		011	Position No. 80	
11B		012	Position No. 100	
12A		013	Position No. 200	
12B		014	Position No. 400	
13A		015	Position No. 800	
13B	Output	300	Alarm	Turns off when an alarm occurs. (Contact A)
14A		301	Ready	Turns on when the controller starts up normally and is in an operable state.
14B		302	Positioning complete	Turns on when the movement to the destination is complete.
15A		303	–	–
15B		304	–	–
16A		305	–	–
16B		306	System battery error	Turns on when the system battery runs low (warning level).
17A		307	Absolute encoder battery error	Turns on when the battery for the absolute encoder runs low (warning level).
17B	N		0V input	Connect 0V.

NPN* Wiring Diagram



(*1) The input needs to be set to OFF. Be sure to leave this disconnected.

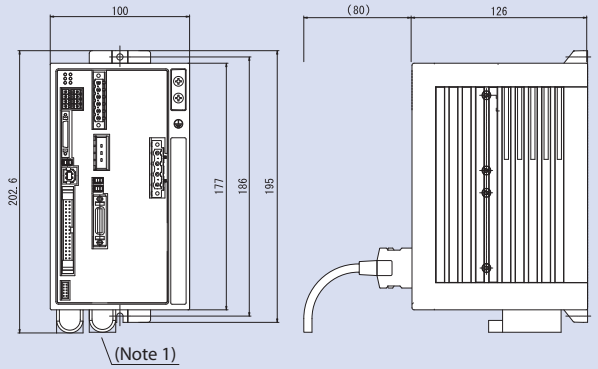
*Note: With regard to PNP wiring diagram, please refer to SSEL manual.

Table of specifications

	Item	Specifications	
Basic Specifications	Connected actuator	RCS2 series actuator / single axis robot / linear motor	
	Input Voltage	Single-phase AC90V to AC126.5V	Single-phase AC180V to AC253V
	Power Supply Capacity	Max. 1660VA (for 400W, 2-axis operation)	
	Dielectric strength voltage	DC500V 10MΩ or higher	
	Withstand voltage	AC500V 1 min.	
	Rush current	Control Power 15A / Motor Power 37.5A	Control Power 30A / Motor Power 75A
	Vibration resistance	XYZ directions 10 to 57Hz, One side amplitude: 0.035mm (continuous), 0.075mm (intermittent) 58 to 150 Hz 4.9 m/s² (continuous), 9.8 m/s² (intermittent)	
Control specification	Number of control axes	1 axis / 2 axis	
	Maximum total output of connected axis	400W	800W
	Position detection method	Incremental encoder / Absolute encoder	
	Speed setting	1mm/sec and up, the maximum depends on actuator specifications	
	Acceleration setting	0.01G and up, the maximum depends on the actuator	
	Operating method	Program operation / Positioner operation (switchable)	
Program	Programming language	Super SEL language	
	Number of programs	128 programs	
	Number of program steps	9999 steps	
	Number of multi-tasking programs	8 programs	
	Positioning Points	20000 points	
	Data memory device	FLASHROM (A system-memory backup battery can be added as an option)	
	Data input method	Teaching pendant or PC software	
Communication	Number of I/O	24 input points / 8 output points (NPN or PNP selectable)	
	I/O power	Externally supplied 24VDC ± 10%	
	PIO cable	CB-DS-PIO □□□ (supplied with the controller)	
	Serial communications function	RS232C (D-Sub Half-pitch connector) / USB connector	
	Field Network	DeviceNet, CC-Link, ProfiBus	
	Motor Cable	CB-XEU-MA □□□ (Max. 20m)	
	Encoder cable	CB-XEU3-PA □□□ (Max. 20m)	
General specifications	Protection function	Motor overcurrent, Motor driver temperature check, Overload check, Encoder open-circuit check Soft limit over, system error, battery error, etc.	
	Ambient operating humidity and temperature	0 to 40°C 10 to 95% (non-condensing)	
	Ambient atmosphere	Free from corrosive gases. In particular, there shall be no significant dust.	
	Protection class	IP20	
	Weight	1.4kg	
	External dimensions	100mm (W) x 202.6mm (H) x 126mm (D)	

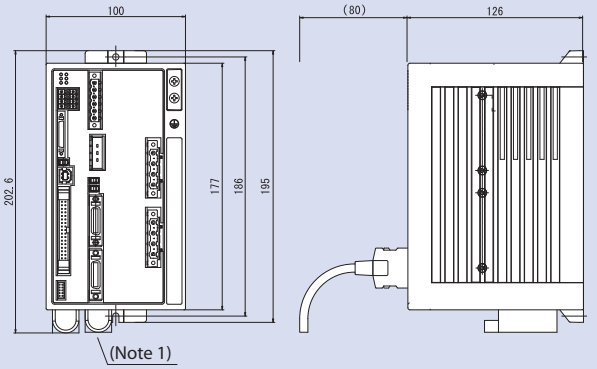
External Dimensions

SSEL 1-axis controller



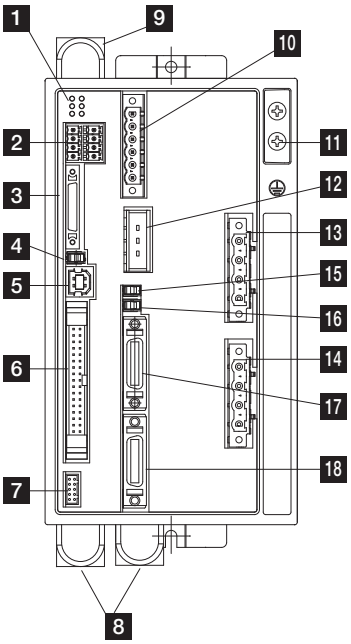
(Note 1) Absolute data back-up battery. Not installed with incremental specification.

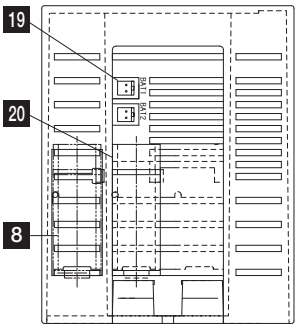
SSEL 2-axis controller

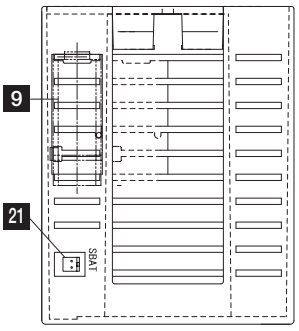


(Note 1) Absolute data back-up battery. Not installed with incremental specification.

Name of Each Part







1 Status indicator LEDs

These LEDs are used to indicate the operating condition of the controller.

The LED status indicators are as follows:

PWR	:	Power is input to controller.
RDY	:	The controller is ready to perform program operation.
ALM	:	The controller is abnormal.
EMG	:	An emergency stop is actuated and the drive source is cut off.
SV1	:	The axis 1 actuator servo is on.
SV2	:	The axis 2 actuator servo is on.

2 System I/O connector

Connector for emergency stop / enable input / brake power input, etc.

3 Teaching pendant connector

A half-pitch I/O 26-pin connector that connects a teaching pendant when the running mode is MANU. A special conversion cable is needed to connect a conventional Dsub, 25-pin connector.

4 Mode switch

This switch is used to specify the running mode of the controller. The left position indicates the MANU (manual operation) mode, while the right position indicates the AUTO (automatic operation) mode. Teaching can only be performed as manual operation, and automatic operation using external I/Os is not possible in the MANU mode.

5 USB connector

A connector for PC connection via USB. If the USB connector is connected, the TP connector is disabled and all communication inputs to the TP connector are cut off.

6 I/O Connector

A connector for interface I/Os.

34-pin flat cable connector for DIO (24IN/8OUT) interface.

I/O power is also supplied to the controller via this connector (Pin No. 1 and No. 34).

7 Panel unit connector

A connector for the panel unit (optional) that displays the controller status and error numbers.

8 Absolute data backup battery

When an absolute-type axis is operated, this battery retains position data even after the power is cut off.

9 System memory backup battery (Option)

This battery is needed if you wish to retain various data recorded in the SRAM of the controller even after the power is cut off.
This battery is optional. Specify it if necessary.

10 Power supply connector

AC power connector. Divided into the control power input and motor power input.

11 Grounding screw

Protective grounding screw. Always ground this screw.

12 External regenerative resistor connector

A connector for the regenerative resistor that must be connected when the built-in regenerative resistor alone does not offer sufficient capacity in high-acceleration/high-load operation, etc.

Whether or not an external regenerative resistor is necessary depends on the conditions of your specific application such as the axis configuration.

13 Motor connector for axis 1

Connects the motor cable of the axis 1 actuator.

14 Motor connector for axis 2

Connects the motor cable of the axis 2 actuator.

15 Brake switch for axis 1

This switch is used to release the axis brake. Setting it to the left position (RLS side) forcibly releases the brake, while setting it to the right position (NOM side) causes the controller to automatically control the brake.

16 Brake switch for axis 2

This switch is used to release the axis brake. Setting it to the left position (RLS side) forcibly releases the brake, while setting it to the right position (NOM side) causes the controller to automatically control the brake.

17 Encoder connector for axis 1

Connect the encoder cable of the axis 1 actuator.

18 Encoder connector for axis 2

Connect the encoder cable of the axis 2 actuator.

19 Absolute-data backup battery connector for axis 1

A connector for the battery that backs up absolute data for axis 1 when the actuator uses an absolute encoder.

20 Absolute-data backup battery connector for axis 2

A connector for the battery that backs up absolute data for axis 2 when the actuator uses an absolute encoder.

21 System-memory backup battery connector

A connector for the system-memory backup battery.

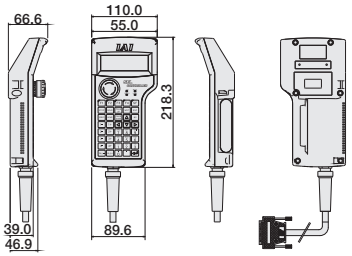
Option

Teaching Pendant

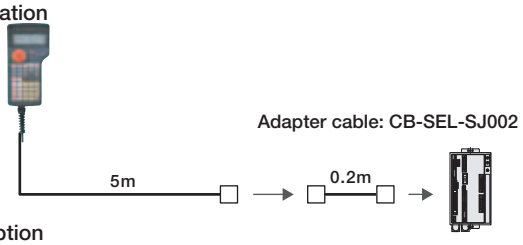
Features A teaching device for entering programs and positions, test runs, and monitoring.

Model/Price

Model	Description
SEL-T-J	Standard type with adapter cable
SEL-TD-J	Deadman's switch type and adapter cable

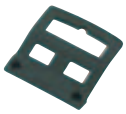


Configuration



SEL-T option

- Wall-mounting hook Model HK-1



- Strap Model STR-1

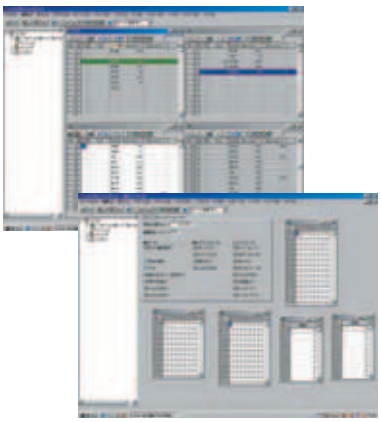
Specifications

Item	SEL-T-J	SEL-TD-J
3-position Enable Switch	No	Yes
ANSI/UL standards	Non-compliant	Compliant
CE mark	Compliant	
Display	20 char. × 4 lines	
Ambient Operating Temp./Humidity	0~40°C 10~90% RH (non-condensing)	
Protective structure	IP54	
Weight	Approx. 0.4kg (not incl. cable)	

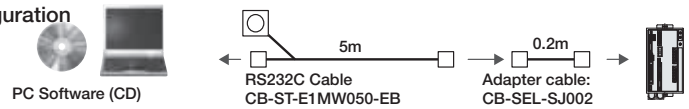
PC Software (Windows Only)

Features A startup support software for entering programs/positions, performing test runs, and monitoring. More functions have been added for debugging, and improvements have been made to shorten the start-up time.

Model **IA-101-X-MW-J** (with RS232C cable + adapter cable)
IA-101-X-MW (with RS232C cable)

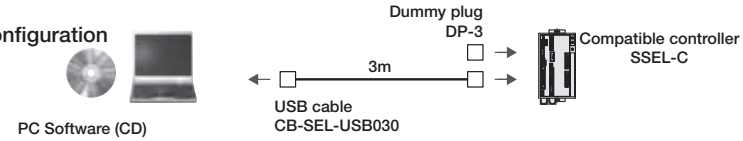


Configuration



Model **IA-101-X-USB** (with USB cable)

Configuration



Note:
Only versions 6.0.0.0 and later can be used with the SSEL controller.

Regenerative Resistor Unit

Features A unit that converts the regenerative current, generated during the acceleration/deceleration of the of the motor, into heat.
In the table on the right, check the total power output of the actuator to see if a regenerative resistor is needed.

Model **REU-2** (for SCON/SSEL)

Specifications

Weight of main unit	0.9kg
Internal regenerative resistance	220Ω 80W
Main unit-Controller Connection Cable (included)	CB-SC-REU010 (for SSEL)

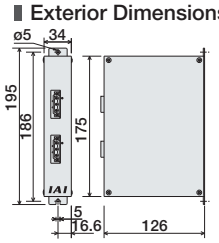
Required Number of Units

	Horizontal	Vertical
0 units	~200W	~200W
1 unit	~800W	~600W
2 units		~800W

* Depending on the operating conditions, more regenerative resistors may be needed.

* If 2 regenerative units are needed, acquire one REU-2 and one REU-1 (See P596).

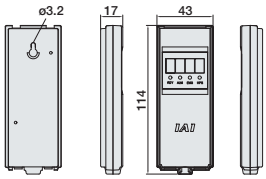
Exterior Dimensions



Panel Unit

Features Display device that shows the error code from the controller or the currently running program number.

Model **PU-1** (Cable length: 3m)



Absolute Data Backup Battery

Features Battery for saving absolute data, when operating an actuator with an absolute encoder. Same as the battery used for system memory backup.

Model **AB-5**

System Memory Backup Battery

Features This battery is required, for example, when you are using global flags in the program and you want to retain your data even after the power has been turned OFF.

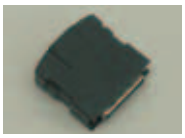
Model **AB-5-CS** (with case)
AB-5 (Standalone battery)

Option

Dummy Plug

Features When connecting the SSEL controller to a computer with a USB cable, this plug is inserted in the teaching port to shut off the enable circuit.
(Supplied with the PC software IA-101-X-USB)

Model **DP-3**



USB Cable

Features A cable for connecting the controller to the USB port to a computer.
A controller with no USB port (e.g. XSEL) can be connected to the USB port of a computer by connecting an RS232C cable to the USB cable via a USB adapter.
(See PC software IA-101-X-USBMW)

Model **CB-SEL-USB030** (Cable length: 3m)

Adapter Cable

Features An adapter cable to connect the D-sub 25-pin connector from the teaching pendant or a PC to the teaching connector (half-pitch) of the SSEL controller.

Model **CB-SEL-SJ002** (Cable length: 0.2m)

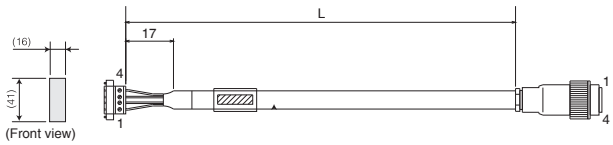
Spare parts

When you need spare parts after purchasing the product, such as when replacing a cable, refer to the list of models below.

Motor cable / EU motor robot cable

Model CB-RCC-MA □□□ / CB-XEU-MA □□□

* Enter the cable length (L) into □□□. Compatible to a maximum of 30 meters.
Ex.: 080 = 8 m



(Fig.: Motor robot cable CB-XEU-MA□□□, high-flexible, EU version with metal connector)

Min. bend radius r = 50 mm or larger (when movable type is used)
* Only the robot cable is to be used in a cable track

Wire	Color	Signal	No.
0.75sq	Green	PE	1
	Red	U	2
	White	V	3
	Black	W	4

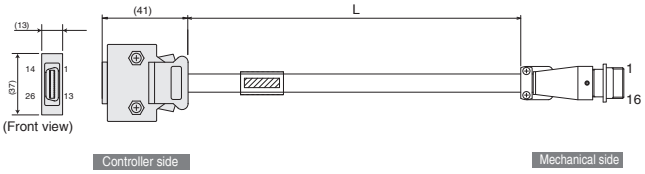
No.	Signal	Color	Wire
1	U	Red	0.75sq (crimped)
2	V	White	
3	W	Black	
4	PE	Green	

Encoder cable / EU encoder robot cable

Model CB-RCS2-PA □□□ / CB-XEU3-PA □□□

* Enter the cable length (L) into □□□. Compatible to a maximum of 30 meters.
Ex.: 080 = 8 m

Min. bend radius r = 50 mm or larger (when movable type is used)
* Only the robot cable is to be used in a cable track



(Fig.: Encoder robot cable CB-XEU3-PA□□□, high-flexible, EU version with metal connector)

Wire	Color	Signal	No.
AWG26 (soldered)	–	–	10
	–	–	11
	–	E24V	12
	Gray/White	0V	13
	Brown/White	LS	26
	–	CLEEP	25
	–	OT	24
	–	RSV	23
	–	–	9
	–	–	18
	–	–	19
	Pink	A+	1
	Purple	A-	2
	White	B+	3
	Blue/Red	B-	4
	Orange/White	Z+	5
	Green/White	Z-	6
	Blue	SRD+	7
	Orange	SRD-	8
	Black	BAT+	14
	Yellow	BAT-	15
	Green	VCC	16
	Brown	GND	17
	Gray	BKR-	20
	Red	BKR+	21
	–	–	22

The shield is connected to the hood by a clamp.

Ground wire and shield braiding

No.	Signal	Color	Wire
1	A	Pink	AWG26 (crimped)
2	Ā	Green	
3	B	White	
4	B̄	Blue/Red	
5	Z	Orange/White	
6	Z̄	Green/White	
7	LS+	Brown/White	
8	SD	Blue	
9	SD	Orange	
10	BAT+	Black	
11	BAT–	Yellow	
12	VCC	Green	
13	GND	Brown	
14	LS–	Gray/White	
15	BK–	Gray	
16	BK+	Red	

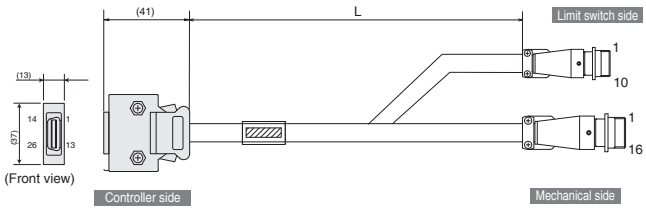
The shield is connected to the hood by a clamp.

LS encoder cable / EU LS encoder robot cable for RCS2-RT6/RT6R/RT7R/RTC8/RTC10/RTC12/RA13R

Model CB-RCS2-PLA □□□ / CB-XEU2-PLA □□□

* Enter the cable length (L) into □□□. Compatible to a maximum of 30 meters.
Ex.: 080 = 8 m

Min. bend radius r = 50 mm or larger (when movable type is used)
* Only the robot cable is to be used in a cable track



(Fig.: Limit switch encoder robot cable CB-XEU2-PLA□□□, high-flexible, EU version with metal connector)

Wire	Color	Signal	No.
AWG26 (soldered)	–	–	10
	–	–	11
	White/Orange	E24 V	12
	White/Green	0 V	13
	Brown/Blue	LS	26
	Brown/Yellow	CLEEP	25
	Brown/Red	OT	24
	Brown/Black	RSV	23
	–	–	9
	–	–	18
	–	–	19
	White/Blue	A+	1
	White/Yellow	A–	2
	White/Red	B+	3
	White/Black	B–	4
	White/Purple	Z+	5
	White/Gray	Z–	6
	Orange	SRD+	7
	Green	SRD–	8
	Purple	BAT+	14
	Gray	BAT–	15
	Red	VCC	16
	Black	GND	17
	Blue	BKR–	20
	Yellow	BKR+	21
	–	–	22

The shield is connected to the hood by a clamp.

Ground wire and shield braiding

No.	Signal	Color	Wire
1	E24 V	White/Blue	AWG26 (crimped)
2	0 V	White/Yellow	
4	LS	White/Red	
5	CLEEP	White/Black	
6	OT	White/Purple	
7	RSV	White/Gray	
(3/8/9/10)	–	–	

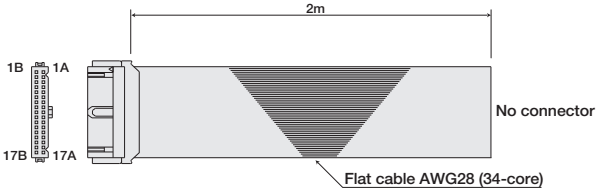
No.	Signal	Color	Wire
1	A	White/Blue	AWG26 (crimped)
2	Ā	White/Yellow	
3	B	White/Red	
4	B̄	White/Black	
5	Z	White/Purple	
6	Z̄	White/Gray	
7	–	–	
8	–	–	
9	SD	Orange	
10	SD	Green	
11	BAT+	Purple	
12	BAT–	Gray	
13	VCC	Red	
14	GND	Black	
15	BK–	Blue	
16	BK+	Yellow	

The shield is connected to the hood by a clamp.

I/O Flat Cable

Model CB-DS-PIO □□□

* Enter the cable length (L) into □□□. Compatible to a maximum of 10 meters.
Ex.: 080 = 8 m



Pin No.	Color	Wire	Pin No.	Color	Wire
1A	Brown 1	Flat cable crimped	9B	Gray 2	Flat cable crimped
1B	Red 1		10A	White 2	
2A	Orange 1		10B	Black 2	
2B	Yellow 1		11A	Brown-3	
3A	Green 1		11B	Red 3	
3B	Blue1		12A	Orange 3	
4A	Purple 1		12B	Yellow 3	
4B	Gray 1		13A	Green 3	
5A	White 1		13B	Blue 3	
5B	Black 1		14A	Purple 3	
6A	Brown-2		14B	Gray 3	
6B	Red 2		15A	White 3	
7A	Orange 2		15B	Black 3	
7B	Yellow 2		16A	Brown-4	
8A	Green 2		16B	Red 4	
8B	Blue 2		17A	Orange 4	
9A	Purple 2		17B	Yellow 4	

X-SEL

Program controller
For RCS2 series

List of models

Multiaxial program controller for operating RCS2 series actuators. Up to 6 axes can be simultaneously controlled.

Type	KE	KET	P	Q
Name	General Purpose Standard Type	General Purpose Global Type	Large-Capacity Standard Type	Large-Capacity Global Type
External View				
Description	Standard type offering excellent expandability	Global type conforming to safety category 4	Large-capacity standard type capable of controlling up to six axes or 2400W	Large-capacity global type conforming to safety category 4
Maximum number of control axes	4-axis		6-axis	
Number of positions	3000 positions		20000 positions	
Total Number of Connectable W	800/1600W	800/1600W	1600/2400W	
Power Supply	Single-phase AC115V/Single-phase AC230V		Single-phase AC230V/3-phase A230V	
Safety Category	B	Category 4 compatible	B	Category 4 compatible
Safety Rating	CE	CE, ANSI	CE	CE, ANSI

(*1) The maximum output for 1 shaft during vertical operation is limited to 600W.
(*2) Axis 5 and axis 6 cannot control the RCS2-RA7/SRA7 series.

Model

[XSEL-KE/KET type]

*To specify multiple options, enter them in alphabetical order. (Example: Brake + Home sensor -> BL)

* Notation for 2 - 4 axes depends on the number of axes to be used.

XSEL - □ - □ - □ □ □ - (□ □ □) - □ - □ □ □ - □ - □

Series	Type
KE	General purpose type
KET	Safety-compliant, general purpose type

Number of Axes
1 Single-axis model
2 2-axis model
3 3-axis model
4 4-axis model

(Specs for 1st axis)

Motor
20 20W servo motor
30D 30W servo motor for RCS2
30R 30W servo motor for RS
60 60W servo motor
100 100W servo motor
150 150W servo motor
200 200W servo motor
300 300W servo motor
400 400W servo motor
600 600W servo motor
750 750W servo motor

Encoder
I Incremental
A Absolute

Option
B Brake
C Creep sensor
HA High Accel./Decel.
L Home sensor/ LS-compatible
M Master axis spec
S Slave axis spec

(Specs for axis 2 - 4)

Motor
20 20W servo motor
30D 30W servo motor for RCS2
30R 30W servo motor for RS
60 60W servo motor
100 100W servo motor
150 150W servo motor
200 200W servo motor
300 300W servo motor
400 400W servo motor
600 600W servo motor
750 750W servo motor

Encoder
I Incremental
A Absolute

Option
B Brake
C Creep sensor
HA High Accel./Decel.
L Home sensor/ LS-compatible
M Master axis spec
S Slave axis spec

(Slot 1) Standard I/O
N1 Input 32/ Output 16 (NPN)
P1 Input 32/ Output 16 (PNP)
DV DeviceNet board
CC CC-Link board
PR ProfiBus board
ET Ethernet board

* E (Not used) is for expansion I/O only.

(Slot 2) (Slot 3) (Slot 4) Expansion I/O
E Not used
N1 Input 32/ Output 16 (NPN)
N2 Input 16/ Output 32 (NPN)
P1 Input 32/ Output 16 (PNP)
P2 Input 16/ Output 32 (PNP)
SA Expansion SIO type A
SB Expansion SIO type B
SC Expansion SIO type C

I/O Cable Length
0 No cable
2 2m (standard)
3 3m
5 5m

* If you selected DV, CC, PR, or ET for standard and expansion I/O select 0 (no cable) for the I/O cable length.

Power/ Voltage
1 Single-phase AC115V
2 Single-phase AC230V

[XSEL-P/Q type]

* Notation for 2 - 6 axes depends on the number of axes to be used.

XSEL - □ - □ - □ □ □ - (□ □ □) - □ - □ - □ □ □ - □ - □

Series	Type
P	Large-capacity type
Q	Safety-compliant, large-capacity type

Number of Axes
1 Single-axis model
2 2-axis model
3 3-axis model
4 4-axis model
5 5-axis model
6 6-axis model

(Specs for 1st axis)

Motor
12 12W servo motor
20 20W servo motor
30D 30W servo motor for RCS2
30R 30W servo motor for RS
60 60W servo motor
100 100W servo motor
150 150W servo motor
200 200W servo motor
200S For LSA-S10/N15
300 300W servo motor
20S For LSA-N19
400 400W servo motor
600 600W servo motor
750 750W servo motor

Encoder
I Incremental
A Absolute

Option
B Brake
C Creep sensor
HA High Accel./Decel.
L Home sensor/ LS-compatible
M Master axis spec
S Slave axis spec

(Specs for axis 2 - 6)

Motor
12 12W servo motor
20 20W servo motor
30D 30W servo motor for RCS2
30R 30W servo motor for RS
60 60W servo motor
100 100W servo motor
150 150W servo motor
200 200W servo motor
200S For LSA-S10/N15
300 300W servo motor
20S For LSA-N19
400 400W servo motor
600 600W servo motor
750 750W servo motor
1000 For LSA-W21H (high-thrust type)

Encoder
I Incremental
A Absolute

Option
B Brake
C Creep sensor
HA High Accel./Decel.
L Home sensor/ LS-compatible
M Master axis spec
S Slave axis spec

Dedicated network slot
Blank Not used
DV DeviceNet board
CC CC-Link board
PR ProfiBus board
ET Ethernet board

(Slot 1) Standard I/O
E Not used
N1 Input 32/ Output 16 (NPN)
N2 Input 16/ Output 32 (NPN)
P1 Input 32/ Output 16 (PNP)
P2 Input 16/ Output 32 (PNP)
S With expansion I/O base

(Slot 2) (Slot 3) (Slot 4) Expansion I/O

* If expansion I/O will not be used, enter E (not used) for slots 2 to 4. If you are using expansion I/O, enter the expansion I/O code in the desired slot. If an expansion I/O is specified, the controller chassis will come with the expansion I/O base. (See P592-593) If you will not be using the expansion I/O initially but will be adding it later, specify the chassis with I/O expansion board, but specify S for slots 2 to 4.

I/O Cable Length
0 No cable
2 2m (standard)
3 3m
5 5m

* Enter 2L or 3L when operating a linear motor actuator. Otherwise, enter 2 or 3.

Power/ Voltage
2 Single-phase AC230V
3 Three-phase AC230V
2L Dedicated linear single-phase AC230V
3L Dedicated linear 3-phase AC230V

e.g. Expansion I/O on slot 2, remaining slots unused — XSEL-P-2-100A-100A-N1-N1EE-2-3

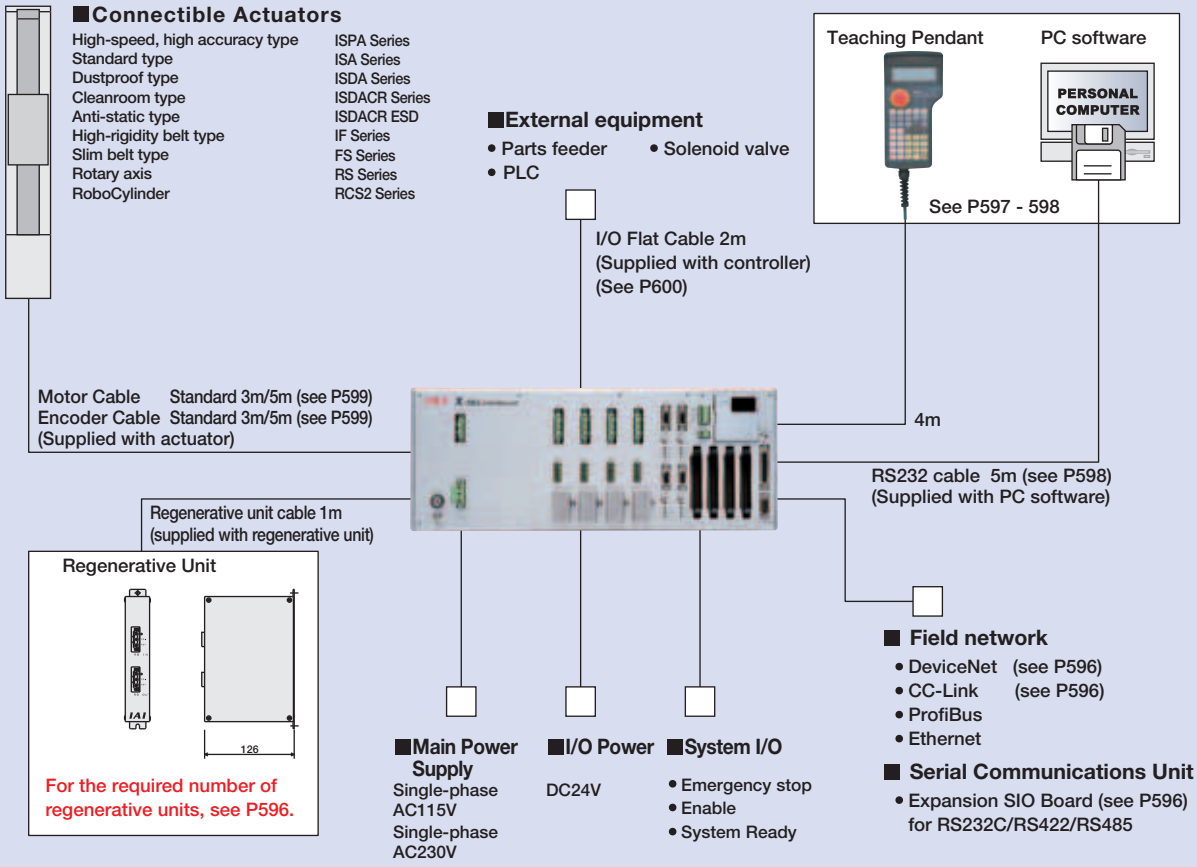
Expansion I/O base attached, but not the expansion I/O — XSEL-P-2-100A-100A-N1-SSS-2-3

Note:

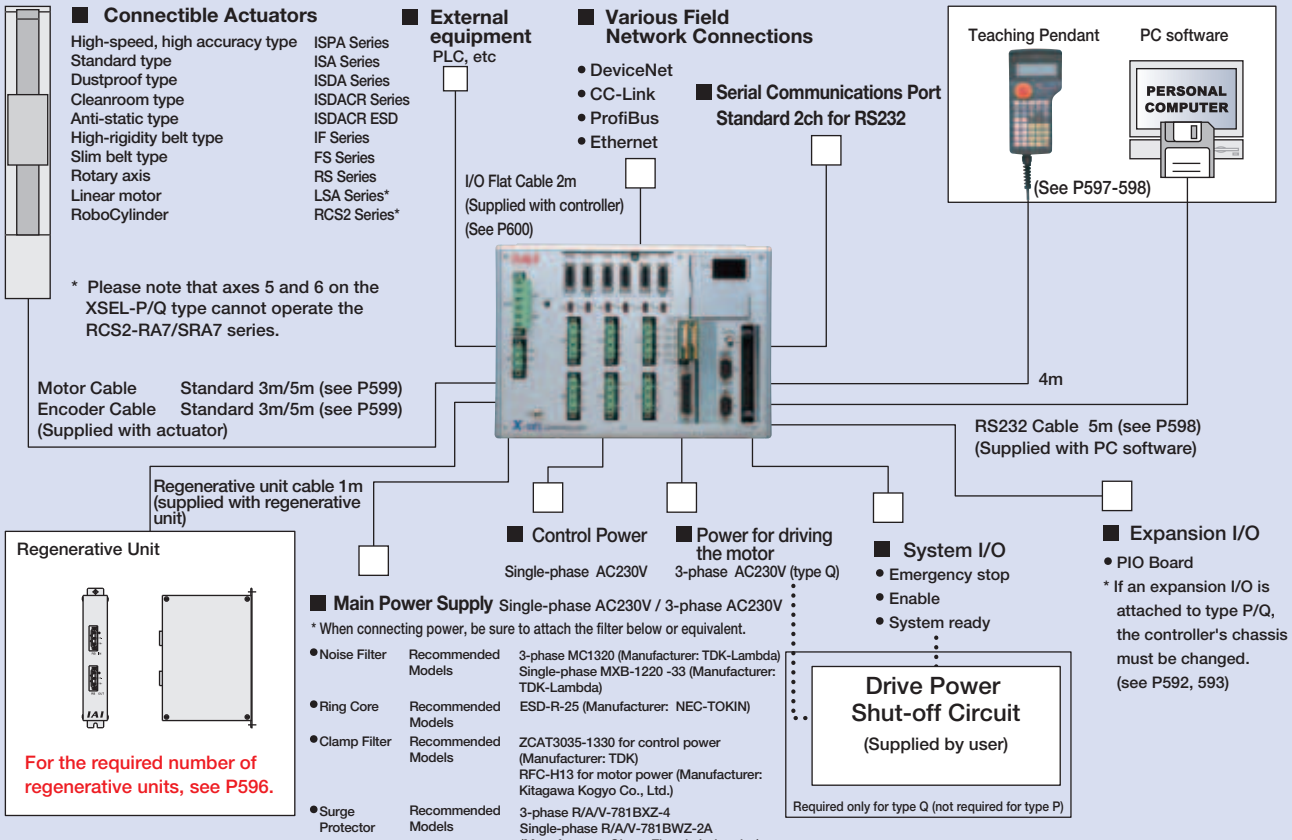
For axis 5 and 6 of XSEL-P/Q type, LSA series, and the RCS2-RA7 / SRA7 series actuators are unavailable.

System configuration

KE (standard type) / KET (global type)



P (large-capacity standard type) / Q (large-capacity global type)

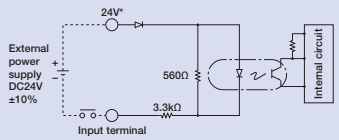


I/O wiring drawing

Input section External input specification (NPN specification)

Item	Specifications
Input voltage	DC24V ±10%
Input current	7mA / circuit
ON/OFF voltage	ON Voltage... Min DC16.0V / OFF Voltage... Max DC5.0V
Isolation method	Photocoupler
Externally Connected Equipment	(1) Non-Voltage Contact (Minimum load around DC5V, 1mA) (2) Photoelectric Proximity Sensor (NPN Type) (3) PLC Transistor Output (Open Collector Type) (4) PLC Contact Output (Minimum Load approx. DC5V, 1mA)

[Input Circuit]

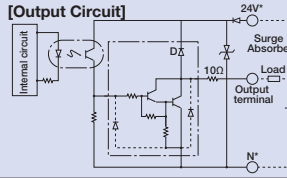


	K type	P/Q type
24V	IO24V Connector 24VIN	I/O Interface Pin No.1

Output section External input specification (NPN specification)

Item	Specifications	
Load Voltage	DC24V	TD62084 (or equivalent)
Max. load current	100mA / point 400 mA	
Leak current	Peak (Total Current)	
Isolation method	Max 0.1mA / point	
Externally Connected	Photocoupler	
Equipment	(1) Miniature Relay, (2) PLC Input Unit	

[Output Circuit]

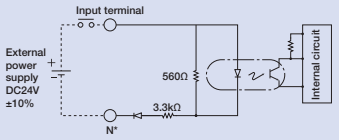


	K type	P/Q type
24V	IO24V Connector 24VIN	I/O Interface Pin No.1
N	IO24V Connector 0V	I/O Interface Pin No.50

Input section External input specification (PNP specification)

Item	Specifications
Input voltage	DC24V ±10%
Input current	7mA / circuit
ON/OFF voltage	ON Voltage... Min DC8V / OFF Voltage... Max DC19V
Isolation method	Photocoupler
Externally Connected Equipment	(1) Non-Voltage Contact (Minimum load around DC5V, 1mA) (2) Photoelectric Proximity Sensor (PNP Type) (3) PLC Transistor Output (Open Collector Type) (4) PLC Contact Output (Minimum Load approx. DC5V, 1mA)

[Input Circuit]



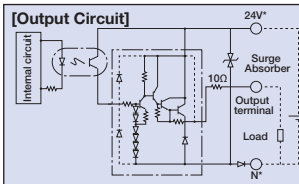
	K type	P/Q type
N	IO24V Connector 0V	I/O Interface Pin No.50

Output section External input specification (PNP specification)

Item	Specifications	
Load Voltage	DC24V	TD62784 (or equivalent)
Max. load current	100mA /1 point 400mA / 8 port (Note)	
Leak current	Max 0.1mA / point	
Isolation method	Photocoupler	
Externally Connected Equipment	(1) Miniature Relay, (2) PLC Input Unit	

(Note) 400mA is the maximum total load current for each set of the eight ports from output port No. 300. (The maximum total current output for output port No. 300+n to No. 300+n+7 must be 400mA, where n = 0 or a multiple of eight.)

[Output Circuit]



	K type	P/Q type
24V	IO24V Connector 24VIN	I/O Interface Pin No.1
N	IO24V Connector 0V	I/O Interface Pin No.50

I/O Signal table

Standard I/O Signal Table (when N1 or P1 is selected)

Pin No.	Classification	Port No.	Standard Settings
1		—	(P/Q type: 24V connection / K type: NC)
2		000	Program start
3		001	General Purpose Input
4		002	General Purpose Input
5		003	General Purpose Input
6		004	General Purpose Input
7		005	General Purpose Input
8		006	General Purpose Input
9		007	Program Specification (PRG No. 1)
10		008	Program Specification (PRG No. 2)
11		009	Program Specification (PRG No. 4)
12		010	Program Specification (PRG No. 8)
13		011	Program Specification (PRG No. 10)
14		012	Program Specification (PRG No. 20)
15		013	Program Specification (PRG No. 40)
16		014	General Purpose Input
17	Input	015	General Purpose Input
18		016	General Purpose Input
19		017	General Purpose Input
20		018	General Purpose Input
21		019	General Purpose Input
22		020	General Purpose Input
23		021	General Purpose Input
24		022	General Purpose Input
25		023	General Purpose Input
26		024	General Purpose Input
27		025	General Purpose Input
28		026	General Purpose Input
29		027	General Purpose Input
30		028	General Purpose Input
31		029	General Purpose Input
32		030	General Purpose Input
33		031	General Purpose Input
34		300	Alarm Output
35		301	Ready Output
36		302	Emergency Stop Output
37		303	General Purpose Output
38		304	General Purpose Output
39		305	General Purpose Output
40		306	General Purpose Output
41		307	General Purpose Output
42	Output	308	General Purpose Output
43		309	General Purpose Output
44		310	General Purpose Output
45		311	General Purpose Output
46		312	General Purpose Output
47		313	General Purpose Output
48		314	General Purpose Output
49		315	General Purpose Output
50		—	(P/Q type: 0V connection/K type: NC)

Extension I/O Signal Table (when N1 or P1 is selected)

Pin No.	Classification	Standard Settings
1		(P/Q type: 24V connection / K type: NC)
2		General Purpose Input
3		General Purpose Input
4		General Purpose Input
5		General Purpose Input
6		General Purpose Input
7		General Purpose Input
8		General Purpose Input
9		General Purpose Input
10		General Purpose Input
11		General Purpose Input
12		General Purpose Input
13		General Purpose Input
14		General Purpose Input
15		General Purpose Input
16		General Purpose Input
17	Input	General Purpose Input
18		General Purpose Input
19		General Purpose Input
20		General Purpose Input
21		General Purpose Input
22		General Purpose Input
23		General Purpose Input
24		General Purpose Input
25		General Purpose Input
26		General Purpose Input
27		General Purpose Input
28		General Purpose Input
29		General Purpose Input
30		General Purpose Input
31		General Purpose Input
32		General Purpose Input
33		General Purpose Input
34		General Purpose Output
35		General Purpose Output
36		General Purpose Output
37		General Purpose Output
38		General Purpose Output
39		General Purpose Output
40		General Purpose Output
41		General Purpose Output
42	Output	General Purpose Output
43		General Purpose Output
44		General Purpose Output
45		General Purpose Output
46		General Purpose Output
47		General Purpose Output
48		General Purpose Output
49		General Purpose Output
50		(P/Q type: 0V connection/K type: NC)

Extension I/O Signal Table (when N2 or P2 is selected)

Pin No.	Classification	Standard Settings
1		(P/Q type: 24V connection / K type: NC)
2		General Purpose Input
3		General Purpose Input
4		General Purpose Input
5		General Purpose Input
6		General Purpose Input
7		General Purpose Input
8		General Purpose Input
9	Input	General Purpose Input
10		General Purpose Input
11		General Purpose Input
12		General Purpose Input
13		General Purpose Input
14		General Purpose Input
15		General Purpose Input
16		General Purpose Input
17		General Purpose Input
18		General Purpose Output
19		General Purpose Output
20		General Purpose Output
21		General Purpose Output
22		General Purpose Output
23		General Purpose Output
24		General Purpose Output
25		General Purpose Output
26		General Purpose Output
27		General Purpose Output
28		General Purpose Output
29		General Purpose Output
30		General Purpose Output
31		General Purpose Output
32		General Purpose Output
33		General Purpose Output
34	Output	General Purpose Output
35		General Purpose Output
36		General Purpose Output
37		General Purpose Output
38		General Purpose Output
39		General Purpose Output
40		General Purpose Output
41		General Purpose Output
42		General Purpose Output
43		General Purpose Output
44		General Purpose Output
45		General Purpose Output
46		General Purpose Output
47		General Purpose Output
48		General Purpose Output
49		General Purpose Output
50		(P/Q type: 0V connection/K type: NC)

Table of specifications

■ KE (General Purpose Standard Type) / KET (General Purpose Global Type)

Item	Description							
Controller Series, Type	KE (Standard) Type				KET (Global) Type			
Connecting actuator	RCS2 / ISA / ISPA / ISP / ISDA / ISDACR / ISPDACR / IF / FS / RS							
Compatible Motor Output (W)	20 / 30 / 60 / 100 / 150 / 200 / 300 / 400 / 600 / 750							
Number of control axes	1-axis	2-axis	3-axis	4-axis	1-axis	2-axis	3-axis	4-axis
Maximum Connected Axes Output (W)	Max 800	Max. 1600 (When power supply voltage is 230V) Max. 800 (When power supply voltage is 115V)			Max 800	Max. 1600 (When power supply voltage is 230V) Max. 800 (When power supply voltage is 115V)		
Input Voltage	115V Specification: Single-phase AC100 to 115V 230V Specification: Single-phase AC200 to 230V							
Motor Power Input	±10%							
Power Supply Frequency	50Hz/60Hz							
Power Supply Capacity	Max 1670VA	Max 3120VA	Max 3220VA	Max 3310VA	Max 1670VA	Max 3120VA	Max 3220VA	Max 3310VA
Position detection method	Incremental Encoder (Serial encoder) Absolute encoder with a rotational data backup (Serial encoder)							
Speed setting	1mm/sec and up, the maximum depends on actuator specifications							
Acceleration setting	0.01G and up, the maximum depends on the actuator							
Programming language	Super SEL language							
Number of programs	64 Programs							
Number of program steps	6000 Steps (total)							
Number of multi-tasking programs	16 Programs							
Number of Positions	3000 positions							
Data memory device	FLASH ROM+SRAM Battery Backup							
Data input method	Teaching pendant or PC software							
Standard Input/Output	32 points (total of dedicated inputs + general-purpose inputs) / 16 points (total of dedicated outputs + general-purpose outputs)							
Expansion Input/Output	48 points per unit (3 more units can be installed)							
Serial communications function	Teaching Pendant+ Expansion SIO Board Installable (optional)							
Other Input/Output	System I/O (Emergency Stop Input, Enable Input, System Ready Output)							
Protection function	Motor overcurrent, Motor driver temperature check, Overload check, Encoder open-circuit check soft limit over, system error, battery error, etc.							
Ambient Operating Temp./Humidity	Temperature 0 to 40°C, Humidity 30 to 85%							
Ambient atmosphere	Free from corrosive gases. In particular, there shall be no significant dust.							
Weight	6.0kg		7.0kg		6.0kg		7.0kg	
Accessory	I/O Flat Cable							

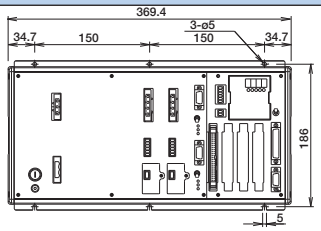
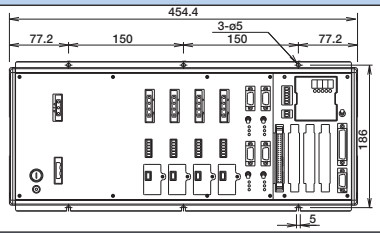
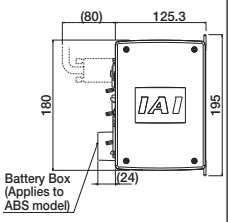
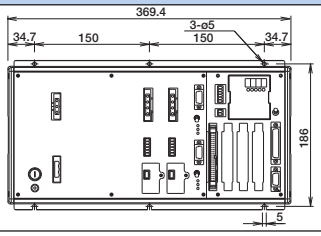
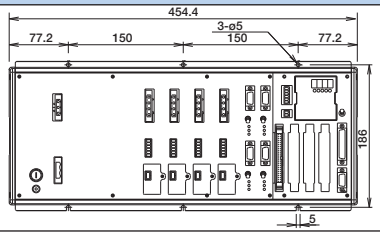
■ P (Large-Capacity Standard Type) / Q (Large-Capacity Global Type)

Item	Description											
Controller Series, Type	P (Standard) Type						Q (Global) Type					
Connecting actuator	RCS2 / ISA / ISPA / ISP / ISDA / ISDACR / ISPDACR / IF / FS / RS / LSA											
Compatible Motor Output	20 / 30 / 60 / 100 / 150 / 200 / 300 / 400 / 600 / 750											
Number of Controlled Axes	1-axis	2-axis	3-axis	4-axis	5-axis	6-axis	1-axis	2-axis	3-axis	4-axis	5-axis	6-axis
Maximum Connected Axes Output (W)	Max 2400W (The single-phase AC230V specification is 1600W)											
Control Power Input	Single-phase AC170V to AC253V						Single-phase AC170V to AC253V					
Motor Power Input	Single-phase/3-phase AC180V to AC253V						Single-phase/3-phase AC180V to AC253V					
Power Supply Frequency	50 / 60Hz											
Insulation Resistance	10MΩ or more (between the power-supply terminal and I/O terminals, and between all external terminals and case, at 500VDC)											
Withstand Voltage	AC1500V (1 minute)						AC1500V (1 minute)					
Power Supply Capacity (*1)	Max 1744VA	Max 3266VA	Max 4787VA	Max 4878VA	Max 4931VA	Max 4998VA	Max 1744VA	Max 3266VA	Max 4787VA	Max 4878VA	Max 4931VA	Max 4998VA
Position detection method	Incremental Encoder (Serial encoder) Absolute encoder with a rotational data backup (Serial encoder)											
Safety Circuit Configuration	Redundancy not supported						Double Redundant Enabled					
Drive Source Breaker System	Internal cutoff relay						External Safety Circuit					
Enable Input	B Contact Input (Internal Power Supply Model)						B Contact Input (External Power Supply Model, Double Redundant)					
Speed setting	1mm/sec and up, the maximum depends on actuator specifications											
Acceleration/Deceleration Setting	0.01G and up, the maximum depends on the actuator											
Programming language	Super SEL language											
Number of programs	128 Programs											
Number of program steps	9999 Steps (total)											
Number of multi-tasking programs	16 Programs											
Number of Positions	20000 Positions (Total)											
Data memory device	FLASH ROM+SRAM Battery Backup											
Data input method	Teaching pendant or PC software											
Standard Input/Output	48-point I/O PIO Board (NPN/PNP), 96-point I/O PIO Board (NPN/PNP), 1 board can be installed											
Expansion Input/Output	48-point I/O PIO Board (NPN/PNP), 96-point I/O PIO Board (NPN/PNP), Up to 3 boards can be installed											
Serial communications function	Teaching Pendant (25-pin D-sub) Port + 2ch RS232C Port (9-pin D-sub x 2)											
Protection function	Motor overcurrent, overload, motor driver temperature check, overload check encoder open-circuit check, soft limit over, system error, battery error, etc.											
Ambient Operating Temp. Humidity, Atmosphere	0 to 40°C, 10 to 95% (non-condensing). Free from corrosive gases. In particular, there shall be no significant dust.											
Weight (*2)	5.2kg			5.7kg			4.5kg			5kg		
Accessory	I/O Flat Cable											

*1 When the connected axes represent the maximum wattage.
*2 Including the absolute-data backup battery, brake mechanism and expansion I/O box.

External Dimensions

■ KE (General Purpose Standard Type) / KET (General Purpose Global Type)

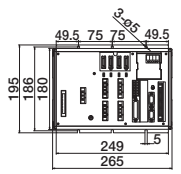
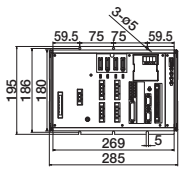
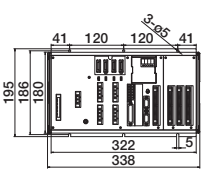
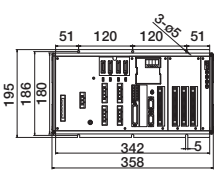
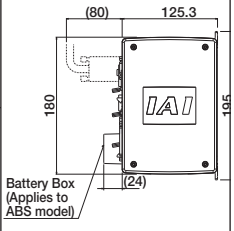
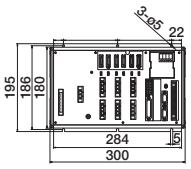
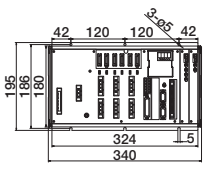
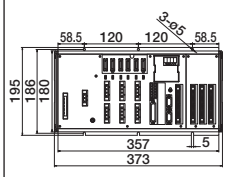
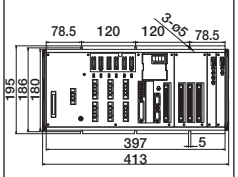
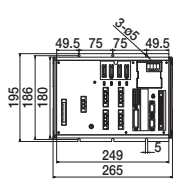
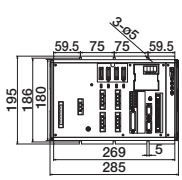
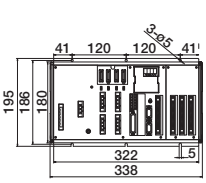
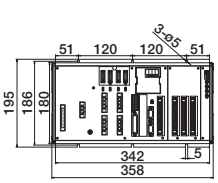
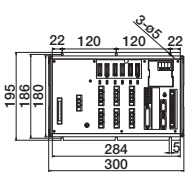
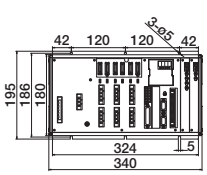
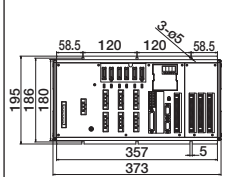
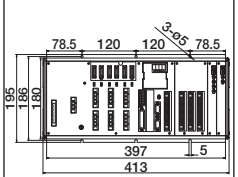
	1/2-axis specification	3/4-axis specification	Side View
KE type (standard)			
	1/2-axis specification	3/4-axis specification	
KET type (global)			

■ P (Large-capacity Standard Type) / Q (Large-capacity Global Type)

The XSEL-P/Q types have different shapes and dimensions in accordance with the controller specifications (encoder type, with/without brake, and with/without I/O expansion).
The 4 layouts below are available. Confirm dimensions to match the desired type and number of axes.

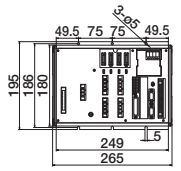
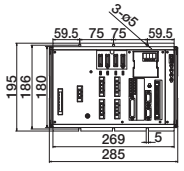
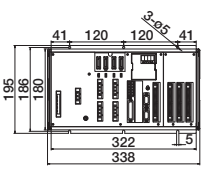
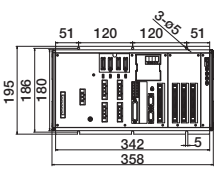
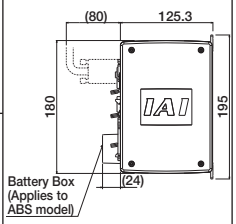
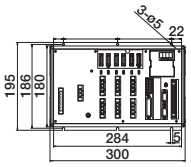
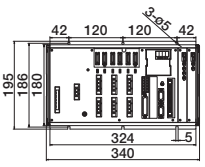
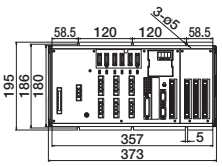
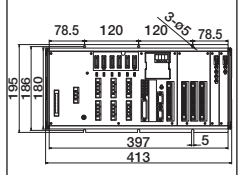
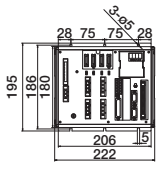
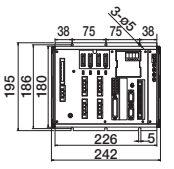
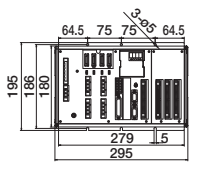
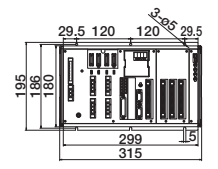
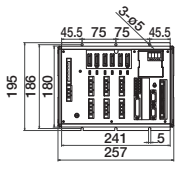
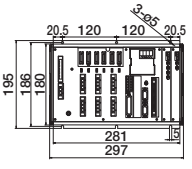
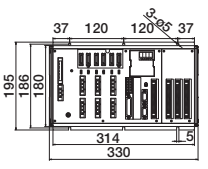
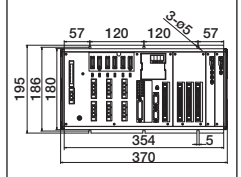
Caution
The specifications of the single phase 230V in Q type is the exterior dimension of P type.

[P Type]

		Basic Layout (Incremental Specification)	With brake/absolute unit	Basic Layout + I/O expansion base	With brake/absolute unit + I/O expansion base	Side View
Controllers Specifications	Encoder	Incremental	Absolute	Incremental	Absolute	
	Brake	None	Yes	None	Yes	
	I/O	Standard only	Standard only	Standard + Expansion	Standard + Expansion	
Single phase Specifications	1 to 4 axis Specifications					
	5 to 6 axis Specifications					
3 phases Specifications	1 to 4 axis Specifications					
	5 to 6 axis Specifications					

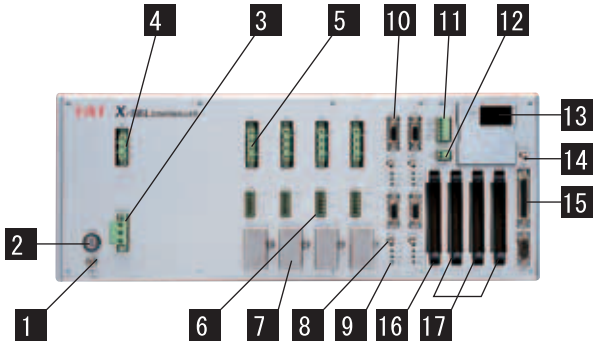
External dimensional drawing

[Q Type]

		Basic Layout (Incremental Specification)	With brake/absolute unit	Basic Layout + I/O expansion base	With brake/absolute unit + I/O expansion base	Side View
Controllers Specifications	Encoder	Incremental	Absolute	Incremental	Absolute	
	Brake	None	Yes	None	Yes	
	I/O	Standard only	Standard only	Standard + Expansion	Standard + Expansion	
Single phase Specifications	1 to 4 axis Specifications					
	5 to 6 axis Specifications					
3 phase Specifications	1 to 4 axis Specifications					
	5 to 6 axis Specifications					

Part Names

K type (General)



1 FG Connection Terminal

A terminal for connecting to the FG terminal on the enclosure. The PE of the AC input are connected to the enclosure inside the controller.

2 Fuse Holder

This is the single-pole fuse holder for overcurrent protection in the AC input.

3 Main Power Input Connector

This connector is for the AC230V single-phase input.

4 Regeneration Resistance Unit Connector

This connector is for the regenerative resistance unit (optional/REU-1) that is connected when there is insufficient capacity with the built-in regenerative resistor for high-acceleration/high-loads, etc.

5 Motor Cable Connector

A connector for the motor power-supply cable of the actuator.

6 Actuator Sensor Input Connector

A connector for axis sensors such as LS, CREEP and OT.

7 Absolute-data backup battery

This is the encoder backup battery unit when an absolute encoder is used. This battery is not connected for a non-absolute axis.

8 Brake Release Switch (Brake-equipped specification only)

Locking toggle switch for releasing the axis brake. Pull the switch forward and then tilt it up or down.
Set the switch to the top position (RLS) to forcibly release the brake, or to the bottom position (NOM) to have the brake automatically controlled by the controller.

9 Axis Driver Status LED

This LED is for monitoring the operating status of the driver CPU that controls the motor drive.
Features the following three LEDs.

Name	Color	Function description
ALM	Orange	Indicates when an error has been detected by the driver.
SVON	Green	Indicates that the servo is ON and the motor is driven.
BATT ALM	Orange	Indicates low absolute battery charge.

10 Encoder sensor cable connector

15-pin D-sub connector for the actuator encoder cable.

11 System I/O Connector

A connector for three input/output points including two inputs used to for the controller operation, and one system status output.

Name		
EMG	Emergency stop input	ON=operation enabled, OFF=emergency stop
ENB	Safety Gate Input	ON=operation enabled, OFF=servo OFF
RDY	System Ready Relay Output	This signal outputs the status of this controller. Cascade connection is supported. Short=ready, Open=not ready

12 I/O 24V Power Connector

16, 17 This connector is for supplying external I/O power to the insulator when DIs and DOs are installed in the I/O boards.

13 Panel Window

This window has a 4-digit, 7-segment LED and five LED lamps showing the system status.

14 Mode switch

This is a locking toggle switch for designating the controller operating mode. Pull the switch forward and then tilt it up or down.
The top position indicates the MANU (manual operation) mode, while the bottom position indicates the AUTO (automatic operation) mode.
Teaching can only be performed in manual operation, and automatic operation using external I/Os is not possible in the MANU mode.

15 Teaching Connector

This is a 25-pin D-sub connector for connecting a teaching pendant or PC cable to enter programmed positions.

16 Standard I/O Slot (Slot 1)

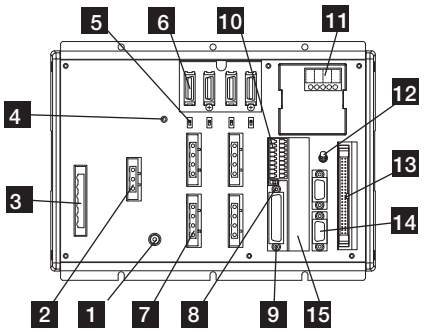
A 32-point input / 16-point output PIO board is installed as standard equipment.

17 Expansion I/O Slots (Slot 2, Slot 3, Slot 4)

Install an expansion I/O board. (Option)

Part Names

P type (4-axis)



1 FG Connection Terminal

A terminal for connecting to the FG terminal on the enclosure. The PE of the AC input are connected to the enclosure inside the controller.

2 External regeneration unit connector

A connector for the regenerative resistor that must be connected when the built-in regenerative resistor alone does not offer sufficient capacity in high-acceleration/ high-load operation, etc. Whether or not an external regenerative resistor is necessary depends on the conditions of your specific application such as the axis configuration.

3 AC Power Input Connector

AC230V 3-phase input connector. It consists of six terminals including motor power-supply, control power-supply and PE terminals.
Standard equipment only includes a terminal block.
Due to risk of electrical shock, do not touch this connector while power is supplied.

4 Control Power Monitor LED

A green light illuminates while the control power supply is properly generating internal controller power.

5 Enable/Disable Switch for Absolute Battery

This switch is for enabling/disabling the encoder backup using the absolute data backup battery. The encoder backup has been disabled prior to shipment. After connecting the encoder/axis-sensor cables, turn on the power, and then set this switch to the top position.

6 Encoder/Axis Sensor Connector

A connector for axis sensors such as LS, CREEP and OT.
* LS, CREEP, and OT are options.

7 Motor connector

A connector for driving the motor in the actuator.

8 Teaching Pendant Type Selection Switch

This switch is for selecting the type of teaching pendant to connect to the teaching connector. Switch between an IAI standard teaching pendant and the ANSI-compatible teaching pendant. Operate the switch on the front face of the board in accordance with the teaching pendant used.

9 Teaching Connector

The teaching interface is used for connecting the IAI teaching pendant or the software on a PC to operate and configure the system, etc.

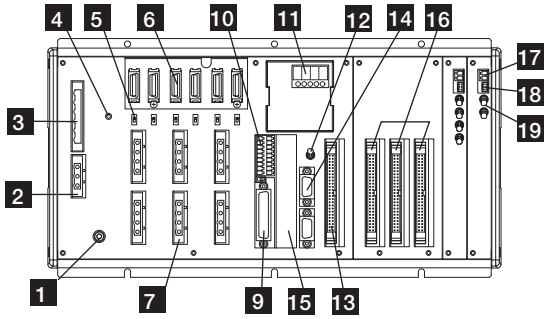
10 System I/O connector

A connector for managing the safety operation functions of the controllers. Controllers of the global specification let you configure a safety circuit conforming to safety categories of up to 4 using this connector and an external safety circuit.

11 Panel Window

This window consists of a 4-digit, 7-segment LED and five LED lamps showing the system status.

Q type (Absolute, brake unit + expansion base, 6-axis)



Description of five LEDs

Name	Status when LED is lit
RDY	CPU Ready (programs can be run)
ALM	CPU Power (System Down Level Error) CPU Hardware Problem
EMG	Emergency stop status, CPU hardware problem, or power system hardware problem
PSE	Power supply hardware problem
CLK	System clock problem

12 Mode switch

This is a locking toggle switch for designating the controller operating mode. Pull the switch forward and then tilt it up or down. The top position indicates the MANU (manual operation) mode, while the bottom position indicates the AUTO (automatic operation) mode. Teaching can only be performed in manual operation, and automatic operation using external I/Os is not possible in the MANU mode.

13 Standard I/O connector

50-pin flat connector structure, comprised of 32 input / 16 output DIOs.

Overview of Standard I/O Interface Specifications

Item	Details
Connector Name	I/O
Applicable connector	50-Pins, Flat Connector
Power Supply	Power is supplied through connector pins No. 1 and No. 50.
Input	32 points (including general-purpose and dedicated inputs)
Output	16 points (including general-purpose and dedicated inputs)
Connected to	External PLC, sensors, etc.

14 General-purpose RS232C Port Connector

This port is for connecting general-purpose RS232C equipment. (2-channels are available)

15 Field network board slot

A slot that accepts a fieldbus interface module.

16 Expansion I/O Board (optional)

Slots that accept optional expansion I/O boards.

17 Brake Power Input Connector

A power input connector for driving the actuator brake. DC 24V must be supplied externally. If this power supply is not provided, the actuator brake cannot be released. Be certain that power is supplied to the brake-equipped axis. Use a shielded cable for the brake power cable, and connect the shielding on the 24V power supply side.

18 Brake Release Switch Connector

A connector for the switch that releases the actuator brake externally to the controller. Shorting the COM terminal and BKMRL* terminal of this connector will release the brake. Use this method if you wish to manually operate the actuator after the controller has experienced a power failure or malfunction.

19 Brake Switch

Locking toggle switch for releasing the axis brake. Pull the switch forward and then tilt it up or down. Setting it to the top position (RLS side) forcibly releases the brake, while setting it to the bottom position (NOM side) causes the controller to automatically control the brake.

Option

Regenerative Resistance Unit

Model REU-1

Details

This unit converts to heat the regenerative current produced when the motor decelerates. Although the controller has a built-in regenerative resistor, its capacity may not be enough if the axis is positioned vertically and the load is large. In this case, one or more regenerative units will be required. (Refer to the table at right)

Specifications

Item	Specifications
Main Unit dimensions	W34mm × H195mm × D126mm
Main Unit Weight	900g
Built-in regenerative resistor	220Ω 80W
Accessory	Controller Connection Cable (Model No. CB-ST-REU010) 1m

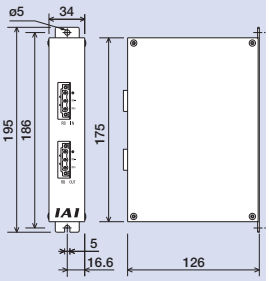
Installation Standards Determined by the total motor capacity of vertical axes connected.

Horizontal Application

Number of connecting units	P/Q Type	K Type
0 pc	to 100W	to 800W
1 pc	to 600W	to 1200W
2 pc	to 1200W	to 1600W
3 pc	to 1800W	–
4 pc	to 2400W	–

Vertical Application

Number of connecting units	P/Q Type	K Type
0 pc	to 100W	to 400W
1 pc	to 600W	to 800W
2 pc	to 1000W	to 1200W
3 pc	to 1400W	When exceeding 1200W, please contact IAI.
4 pc	to 2000W	
5 pc	to 2400W	



Absolute Data Retention Battery (for XSEL-KE/KET)

Model IA-XAB-BT

Features A battery that retains the data stored in an absolute type controller.
Replace when the controller battery alarm illuminates.

Packaging 1 Unit (One battery is required for each axis. Specify a quantity for the number of axes used.)

Absolute Data Retention Battery (for XSEL-P/Q)

Model AB-5

Features Absolute data retention battery for operating actuators under absolute specification.

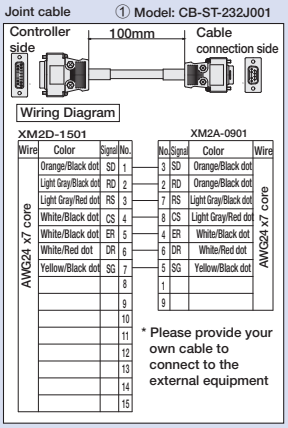
Expansion PIO Board

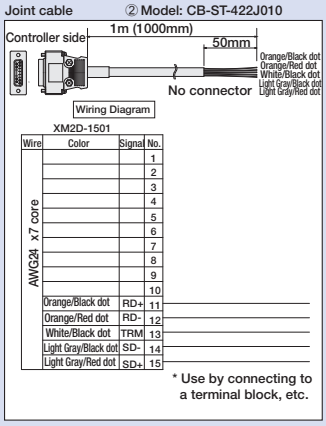
Details An optional board for adding I/O (input/output) points.
With the general-purpose and large-capacity types, up to three expansion PIO boards can be installed in the expansion slots.
(With the compact types, only one expansion PIO board can be installed in the expansion slot, provided that the controller is of 3 or 4-axis specification.)

Expansion SIO Board (for XSEL-KE/KET)

Model/Specifications IA-105-X-MW-A (for RS232C connection) (Board + joint cables (1), 2 included)
IA-105-X-MW-B (for RS422 connection) (Board + joint cables (2), 1 included)
IA-105-X-MW-C (for RS485 connection) (Board + joint cables (2), 1 included)

Details Board for serial communications with external equipment.
This board has two port channels and implements three communication modes using the supplied joint cable(s).





DeviceNet Connection Board

A board for connecting the XSEL controller to DeviceNet.

Item	Specifications			
Number of I/O Points	1 board, 256 input points / 256 output points *Only 1 can be installed			
Communication Standard	Interface module certified under DeviceNet 2.0 (certification to be obtained)			
	Group 2 Only Server			
	Insulated node operating on network power supply			
Communication specifications	Master-Slave connection	Bit strobe		
		Polling		
		Cyclic		
Communication Rate	500k/250k/125kbps (Selectable by DIP switch)			
Communication cable length	Communication Rate	Maximum network length	Maximum branch length	Total branch length
	500 kbps	100m	6m	39m
	250 kbps	250m		78m
	125 kbps	500m		156m
	(Note) When a large DeviceNet cable is used			
Communication Power Supply	24VDC (supplied from DeviceNet)			
Low Current Communication Power Supply	60mA or higher			
Number of Reserved Nodes	1 node			
Connector	MSTBA2.5/5-G.08AUM by Phoenix Contact (*1)			

(*1) The connector on the cable (SMSTB2.5/5-ST-5.08AU by Phoenix Contact) is a standard accessory.

CC-Link Connection Board

A board for connecting the XSEL controller to CC-Link.

Item	Specifications					
Number of I/O Points	1 board, 256 input points / 256 output points *Only 1 can be installed					
Communication Standard	CC-Link Ver1.10 (certified)					
Communication Rate	10M/5M/2.5M/625k/156kbps (switched using a rotary switch)					
Communication method	Broadcast polling method					
Asynchronous	Frame synchronization method					
Encoding Format	NRZI					
Transmission path type	Bus Format (EIA RS485 Compliant)					
Transmission Format	HDLC Compliant					
Error control method	CRC ($X^{16}+X^{12}+X^5+X1$)					
Number of Reserved Stations	1 to 3 Stations (Remote Device Stations)					
Communication cable length	Communication Rate (bps)	10M	5M	2.5M	625k	156k
	Communication cable length	100	160	400	900	1200
Connector (Controller-side)	MSTBA2.5/5-G.08AUM by Phoenix Contact (*1)					

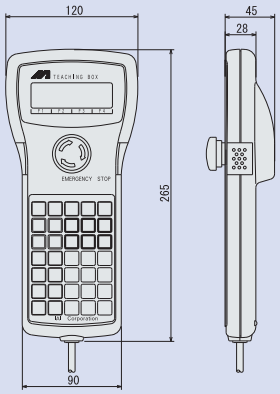
(*1) The connector on the cable (SMSTB2.5/5-ST-5.08AU by Phoenix Contact) is a standard accessory.

Part Names

Teaching Pendant

Model IA-T-X (standard)
IA-T-XD (with deadman switch)

Dimensions



Features
- A teaching device that has program/position input, test operation, monitoring function, etc.
- Interactive, easy to operate.
- For higher safety, a deadman switch version is also available.

Specifications

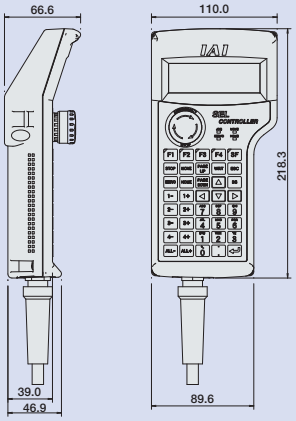
Item	Specifications
Ambient Operating Temp./Humidity	Temperature 0 to 40°C, Humidity: 85 %RH or lower
Ambient Operating atmosphere	Free from corrosive gases. In particular, there shall be no significant powder dust.
Weight	Approx. 650g
Cable Length	4m
Indication	20 characters x 4 lines LCD display

Note:
* Versions older than 1.13 cannot be used with XSEL-P/Q.
* Versions older than 1.08 cannot be used with SCARA.

ANSI standard / CE mark compatible teaching pendant (dedicated universal type)

Model SEL-T
SEL-TD (Corresponding to ANSI)
SEL-TG (Corresponding to ANSI and safety category)

Dimensions



Features Splash-proof type that corresponds to protection level IP54. Improved operationability with separate keys for different functions. In addition, SEL-TD / SEL-TG has a 3-position enable switch and corresponds to ANSI standard.

Specifications

Item	Specifications
Ambient Operating Temp./Humidity	Temperature: 0 to 40ºC Humidity: 30 to 85%RH or lower (non-condensing)
Protection mechanism	IP54 (Cable connector excluded)
Weight	400g or lower (Cable connector excluded)
Cable Length	5m
Indication	32 characters x 8 lines LCD display
Safety Rating	CE mark, ANSI standard (*)

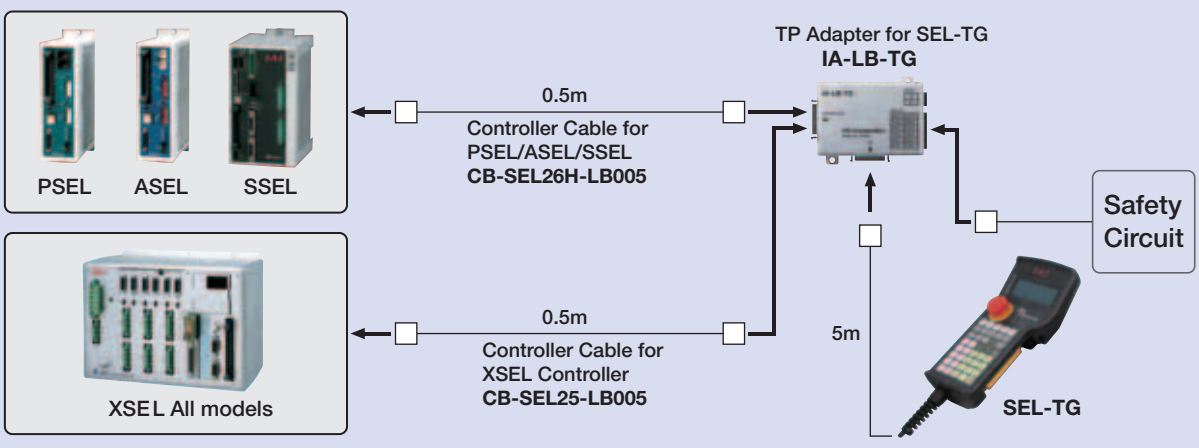
(*) only SEL-TD / SEL-TG corresponds to ANSI standard.

Teaching pendant controller correspondence table

		IA-T-X	IA-T-XD	SEL-T	SEL-TD	SEL-TG
		Standard	With a deadman switch	Standard	Safety Category Compliant	Safety Category Compliant
Program Controllers	PSEL/ASEL/SSEL	○ (Note 1)	○ (Note 1)	○ (Note 1)	○ (Note 1)	◎
	XSEL-P	○	○	○	○	◎
	XSEL-Q	-	-	○	◎	◎
	XSEL-KET	○	○	○	◎	◎
	XSEL-KE	○	○	○	○	○
	XSEL-KETX	○	○	○	○	○
	XSEL-PX	○	○	○	○	◎
	XSEL-QX	-	-	○	◎	◎

* ◎ correponds to safety category B to 4.
○ does not corresond to safety category, but connection is available.
(Note 1) To connect to PSEL/ASEL/SSEL, a conversion cable is necessary.

SEL-TG wiring drawing



PC software (Windows dedicated)

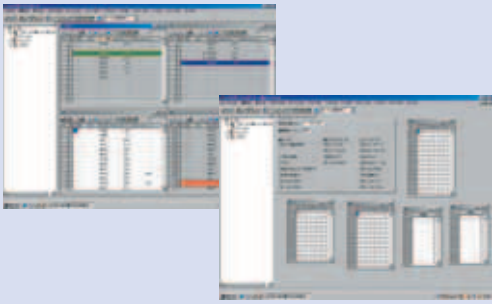
Model IA-101-X-MW(EB)*

*Set with emergency stop box: IA-101-X-MW-EB

Note:
* Versions older than 3.0.0 cannot be used with XSEL-P/Q.
* Versions older than 2.0.0 cannot be used with SCARA.
* Please use IA-101-**XA**-MW for safety category 4-compliant controller.

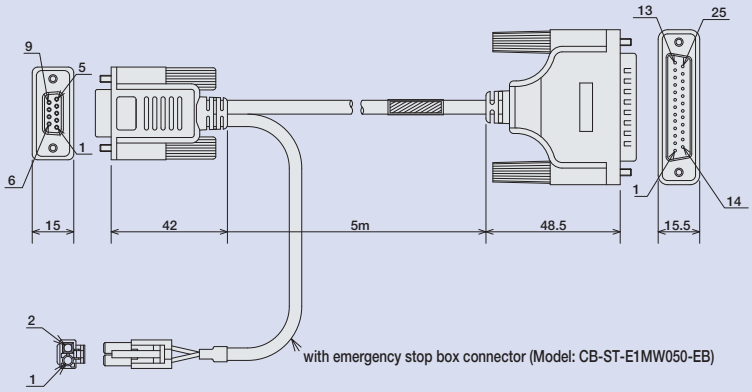
Features A startup support software program offering program/position input function, test operation function, monitoring function, and more.
The functions needed for debugging have been enhanced to help reduce the startup time.

Details Software (CD-ROM)
(Corresponding to Windows98, NT, 2000, ME, and XP)
PC connecting cable 5m, model: CB-ST-9-25 (with emergency stop box: CB-ST-E1MW050-EB)



PC connecting cable single unit (Model: CB-ST-9-25)

Note:
When ordering a PC connecting cable separately for maintenance purposes, specify model CB-ST-9-25 for only the cable. When ordering a PC connecting cable and an emergency stop box as a set, specify model CB-ST-E1MW050-EB.



D-Sub/9-pin socket		Wiring Diagram	D-Sub/25-pin plug	
Connector hood FG			Connector hood FG	
Brown	2		2	Brown
Brown/Black	3		3	Brown/Black
Orange	5		7	Orange
Orange/Black				Orange/Black
	4		4	
	6		5	
	7		6	
	8		20	
			18	
			19	
ELP-02V			13	Red
Red	1		12	Red/Black
Black	2		1	Shield FG

(Shield)

Safety Category 4-compatible PC Software

Model IA-101-XA-MW-EB*

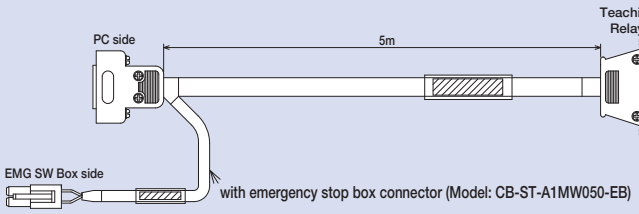
Features A startup support software program offering program/position input function, test operation function, monitoring function, and more.
The functions needed for debugging have been enhanced to help reduce the startup time.
PC connecting cable is compatible to safety category 4
by duplicating the emergency stop circuits.

Details (Accessory) Software (CD-ROM)
(Corresponding to Windows98, NT, 2000, ME, and XP)
PC connecting cable 5m, model: CB-ST-9-25-Q (with emergency stop box: CB-ST-A1MW050-EB)

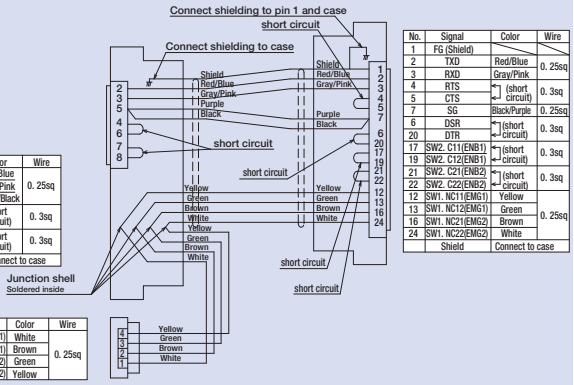
* Set with emergency stop box cannot be used with XSEL-KE/P/PX.

Note:
When ordering a PC connecting cable separately for maintenance purposes, specify model CB-ST-9-25-Q for only the cable. When ordering a PC connecting cable and an emergency stop box as a set, specify model CB-ST-A1MW050-EB.

Dimensions PC connecting cable single unit (Model: CB-ST-9-25-Q)



No.	Signal	Color	Wire
2	RXD	Red/Blue	0. 25sq
3	TXD	Gray/Pink	
5	SG	Purple/Black	
4	DTR	(short circuit)	0. 3sq
6	DSR	(short circuit)	
7	RTS	(short circuit)	0. 3sq
8	CTS	(short circuit)	
	Shield	Connect to case	



No.	Signal	Color	Wire
1	FG (Shield)		
2	TXD	Red/Blue	0. 25sq
3	RXD	Gray/Pink	
4	RTS	(short circuit)	0. 3sq
5	CTS	(short circuit)	
7	SG	Black/Purple	0. 25sq
6	DSR	(short circuit)	0. 3sq
20	DTR	(short circuit)	
17	SW2. C11(ENB1)	(short circuit)	0. 3sq
19	SW2. C12(ENB1)	(short circuit)	
21	SW2. C21(ENB2)	(short circuit)	0. 3sq
22	SW2. C22(ENB2)	(short circuit)	
12	SW1. NC11(EMG1)	Yellow	0. 25sq
13	SW1. NC12(EMG1)	Green	
16	SW1. NC21(EMG2)	Brown	
24	SW1. NC22(EMG2)	White	
	Shield	Connect to case	

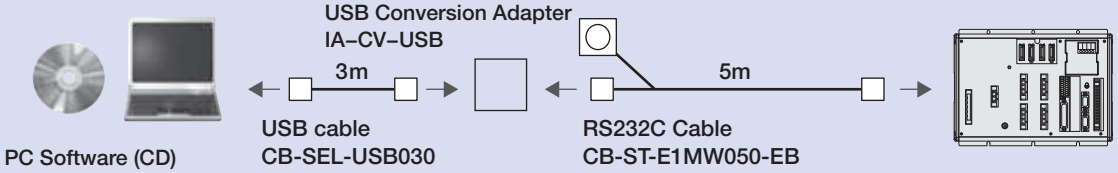
No.	Signal	Color	Wire
1	SW1. NC11(EMG1)	White	0. 25sq
2	SW1. NC12(EMG1)	Brown	
3	SW1. NC21(EMG2)	Green	
4	SW1. NC22(EMG2)	Yellow	

USB-compatible PC software

Model IA-101-X-USBMW

Features Software available by PC USB port by connecting a USB conversion adaptor to a RS232C cable.

Details Software (CD-ROM)
* Corresponding to Windows98, NT, 2000, ME, and XP
PC connecting cable 5m + Emergency stop box + USB conversion adaptor + USB cable 3m



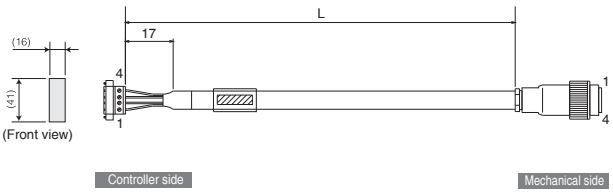
Spare Parts

When you need spare parts after purchasing the product, such as when replacing a cable, refer to the list of models below.

Motor cable / EU motor robot cable

Model **CB-RCC-MA □□□ / CB-XEU-MA □□□**

* Enter the cable length (L) into □□□. Compatible to a maximum of 20 meters.
Ex.: 080 = 8 m



Wire	Color	Signal	No.	No.	Signal	Color	Wire
0.75sq	Green	PE	1	1	U	Red	0.75sq (crimped)
	Red	U	2	2	V	White	
	White	V	3	3	W	Black	
	Black	W	4	4	PE	Green	

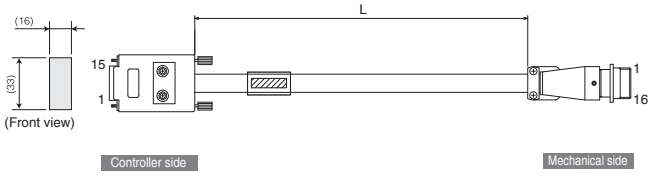
(Fig.: Motor robot cable CB-XEU-MA □□□, high-flexible, EU version with metal connector)

Min. bend radius r = 50 mm or larger (when movable type is used)
*** Only the robot cable is to be used in a cable track**

Encoder cable / EU encoder robot cable (for XSEL-KE/KET)

Model **CB-RCBC-PA □□□ / CB-XEU-PA □□□**

* Enter the cable length (L) into □□□. Compatible to a maximum of 15 meters.
Ex.: 080 = 8 m



Wire	Color	Signal	No.	No.	Signal	Color	Wire
0.15sq (crimped)	-	-	1	1	SD	Blue	0.15sq (soldered)
	-	-	2	2	$\overline{SD}$	Orange	
	-	-	3	3	-	-	
	-	-	4	4	-	-	
	-	-	5	5	-	-	
	-	-	6	6	-	-	
	Blue	SD	7	7	-	-	
	Orange	$\overline{SD}$	8	8	-	-	
	Black	BAT+	9	9	-	-	
	Yellow	BAT-	10	10	VCC	Green	
	Green	VCC	11	11	GND	Brown	
	Brown	GND	12	12	BAT+	Black	
	Gray	BK-	13	13	BAT-	Yellow	
	Red	BK+	14	14	-	-	
	-	-	15	15	BK-	Gray	
				16	BK+	Red	

The shield is connected to the hood by a clamp.
Ground wire and shield braiding
A shield is connected to shield soldered part.

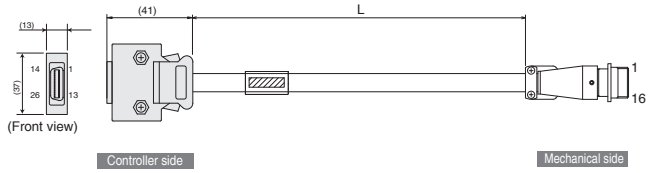
(Fig.: Encoder robot cable CB-XEU-PA □□□, high-flexible, EU version with metal connector)

Min. bend radius r = 50 mm or larger (when movable type is used)
*** Only the robot cable is to be used in a cable track**

Encoder cable / EU encoder robot cable (for XSEL-P/Q)

Model **CB-RCS2-PA □□□ / CB-XEU3-PA □□□**

* Enter the cable length (L) into □□□. Compatible to a maximum of 20 meters.
Ex.: 080 = 8 m



Wire	Color	Signal	No.	No.	Signal	Color	Wire
AWG26 (soldered)	–	–	10	1	A	Pink	AWG26 (crimped)
	–	–	11	2	$\overline{A}$	Green	
	–	E24V	12	3	B	White	
	Gray/White	0V	13	4	$\overline{B}$	Blue/Red	
	Brown/White	LS	26	5	Z	Orange/White	
	–	CLEEP	25	6	$\overline{Z}$	Green/White	
	–	OT	24	7	LS+	Brown/White	
	–	RSV	23	8	SD	Blue	
	–	–	9	9	$\overline{SD}$	Orange	
	–	–	18	10	BAT+	Black	
	–	–	19	11	BAT–	Yellow	
	Pink	A+	1	12	VCC	Green	
	Purple	A-	2	13	GND	Brown	
	White	B+	3	14	LS–	Gray/White	
	Blue/Red	B-	4	15	BK–	Gray	
	Orange/White	Z+	5	16	BK+	Red	
	Green/White	Z-	6				
	Blue	SRD+	7				
	Orange	SRD-	8				
	Black	BAT+	14				
	Yellow	BAT–	15				
	Green	VCC	16				
	Brown	GND	17				
	Gray	BKR-	20				
	Red	BKR+	21				
	–	–	22				

The shield is connected to the hood by a clamp.
Ground wire and shield braiding
The shield is connected to the hood by a clamp.

(Fig.: Encoder robot cable CB-XEU3-PA □□□, high-flexible, EU version with metal connector)

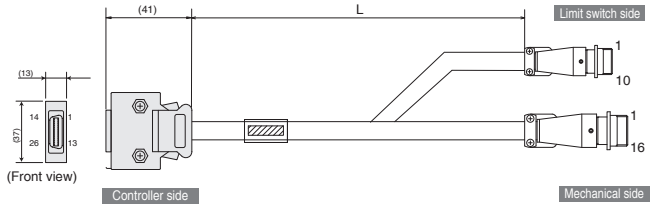
Min. bend radius r = 50 mm or larger (when movable type is used)
*** Only the robot cable is to be used in a cable track**

Spare Parts

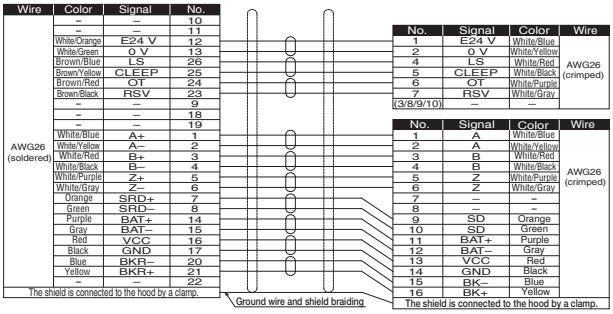
Rotary dedicated LS encoder cable / EU LS encoder robot cable for RCS2-RT6/RT6R/RT7R/RTC8/RTC10/RTC12/RA13R

Model **CB-RCS2-PLA □□□ / CB-XEU2-PLA □□□**

* Enter the cable length (L) into □□□. Compatible to a maximum of 30 meters.
Ex.: 080 = 8 m



(Fig.: Limit switch encoder robot cable CB-XEU2-PLA □□□, high-flexible, EU version with metal connector)

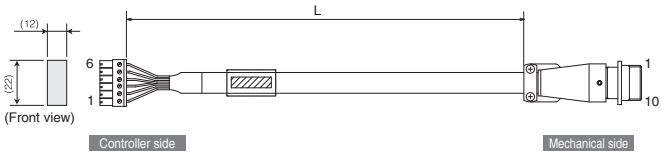


Min. bend radius r = 50 mm or larger (when movable type is used)
* Only the robot cable is to be used in a cable track

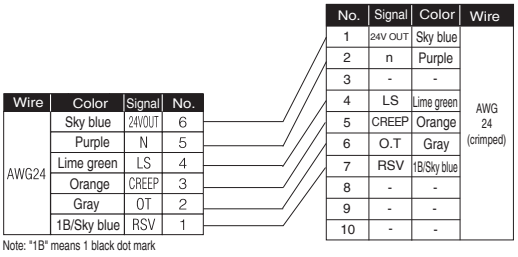
LS encoder cable / EU LS robot cable for XSEL-KE/KET when using a homing sensor

Model **CB-RCBC-PLA □□□ / CB-XEU-LC □□□**

* Enter the cable length (L) into □□□. Compatible to a maximum of 20 meters.
Ex.: 080 = 8 m



(Fig.: Limit switch robot cable CB-XEU-LC □□□, high-flexible, EU version with metal connector



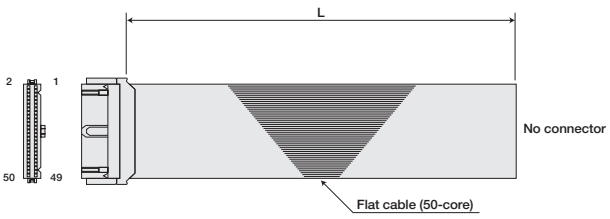
Note: "1B" means 1 black dot mark

Min. bend radius r = 50 mm or larger (when movable type is used)
* Only the robot cable is to be used in a cable track

I/O flat cable (for XSEL-KE/KET/P/Q)

Model **CB-X-PIO □□□**

* Enter the cable length (L) into □□□. Compatible to a maximum of 10 meters.
Ex.: 080 = 8 m



Number	Color	Wire	Number	Color	Wire	Number	Color	Wire
1	Brown 1	Flat cable crimped	18	Gray 2	Flat cable crimped	35	Green 4	Flat cable crimped
2	Red 1		19	White 2		36	Blue 4	
3	Orange 1		20	Black 2		37	Purple 4	
4	Yellow 1		21	Brown-3		38	Gray 4	
5	Green 1		22	Red 3		39	White 4	
6	Blue1		23	Orange 3		40	Black 4	
7	Purple 1		24	Yellow 3		41	Brown-5	
8	Gray 1		25	Green 3		42	Red 5	
9	White 1		26	Blue 3		43	Orange 5	
10	Black 1		27	Purple 3		44	Yellow 5	
11	Brown-2		28	Gray 3		45	Green 5	
12	Red 2		29	White 3		46	Blue 5	
13	Orange 2		30	Black 3		47	Purple 5	
14	Yellow 2		31	Brown-4		48	Gray 5	
15	Green 2		32	Red 4		49	White 5	
16	Blue 2		33	Orange 4		50	Black 5	
17	Purple 2		34	Yellow 4				

■ Notes on Specifications in this Catalog (All Models)

1. Speed

This refers to the set speed when moving the slider (or rod, arm, output axis) of the actuator.
The slider accelerates from rest to the specified speed, and continues to move at that speed until it decelerates to a stop at the specified target position.

<Note>

❶ For models equipped with a pulse motor (ERC2, RCP3, and RCP2), the maximum speed changes with the weight of the load being transported.
When selecting an actuator, refer to the "Speed vs. Load Capacity" (on each product page).

❷ If the axis has a short stroke, or if it has a long stroke but the travel distance is short, the specified speed may not be reached.

❸ As the stroke becomes longer, the maximum speed decreases, due to hazardous RPMs.
For details, see "■ Stroke vs. Maximum Speed" on each product page.

❹ For the RCP2 high-speed slider type (HS8C/HS8R) and belt type, vibration and/or resonance may occur when operated at low speeds. Therefore, use these models at 100mm/s or faster.

❺ For PMEC/AMEC controllers, a minimum speed is set for each actuator.
See the instructions manual for the PMEC/AMEC controllers.

❻ When calculating the time travelled, take into account the time taken to accelerate, decelerate, and converge, as opposed to only the time travelled at the specific speed.

2. Acceleration/Deceleration

Acceleration is the rate of change in speed from rest until a specified speed is reached.

Deceleration is the rate of change in speed from the specified speed to a state of rest.

Both are specified in "G" in programs (0.3G = 2940mm/sec^2).

* For rotary type, 0.3G = 2940 degrees/sec^2

<Note>

❶ Increasing the acceleration (deceleration) speeds up acceleration (deceleration), shortening the travel time.
However, caution should be exercised, as excessively high acceleration/deceleration may cause an error or a malfunction.

❷ The rated acceleration (deceleration) is 0.3G (2.0G, if the lead is 2.5, 3, or 4, or if used vertically)
With the exception of the high-acceleration/deceleration model, use the actuators at or below the rated acceleration.

❸ For models such as RCS2-SRA7 and RCS2-RA13R, use the actuator at or below the acceleration (deceleration) mentioned in "Notes on Selection" on the respective product page.

3. Duty

IAI's actuators should be used at a duty of 50% or below.

If used at over 50% duty, an excessive load error may occur depending on the load, speed, or acceleration.

4. Positioning Repeatability

A JIS B6192-compliant method for evaluating performance.

In this method, a positioning operation (stopping of the actuator at target point) is repeated seven times from the same direction, each time measuring the end position. Then the difference between the maximum and minimum values is calculated.

By using this measuring method for both end-points and the mid-point of the maximum stroke, the largest calculated value is multiplied by 1/2 and expressed with a ±.

5. Lead Screw

When using a lead screw type actuator, note the following:

<Note>

❶ This type is suited for applications with low frequency of use. (As a point of reference, one motion per 10 seconds, 24 hours per day, 240 days per year = approximately 5 years)

❷ This is suited for applications in which the load capacity and load requirements are low. (1kg or less)

❸ Use for applications that do not require a positioning repeatability smaller than ±0.05mm.

❹ Set up in a place that allows for easy maintenance.

6. Home Position

The home position is the reference point from which the actuator determines the target position.
Note that if the home position becomes misaligned, the target position also shifts by the same amount.

<Note>

❶ Actuators with an incremental encoder must be homed upon power-on.

❷ During homing operation, the slider (rod, table) moves to actuator's mechanical end, and then reverses. Therefore, watch for any interference with its surroundings.

❸ By default, the home position is on the motor-side (i.e. the open side on the gripper type, or the left side on the rotary type (looking down at the output shaft.)) Optionally, the home position can be moved to the opposite side (i.e. away from the motor). To change the home position after the actuator has been delivered, it must be sent back to IAI for adjustment.

❹ Models without the option code "NM" do not support reversed home position.

7. Encoder Type (Incremental/Absolute/Simple Absolute)

There are two types of encoders that can be used in an actuator, "incremental" and "absolute" encoders.

Incremental encoder .....When an incremental encoder is powered off, its coordinate data is erased. Therefore, homing is necessary each time it is powered back on.

Absolute encoder .....When an absolute encoder is powered off, it uses a battery to store its coordinate data. Therefore, homing is not necessary when it is powered back on. However, note that it cannot be operated once the battery for storing data runs out.

<Note>

In addition to the above two types of encoders, there is the "simple absolute" type, which is an incremental encoder with a dedicated simple absolute unit connected to the actuator's controller, for storing its coordinate data. This eliminates the need for homing upon power-on. Note that the simple absolute actuators (encoders) fall under the incremental type and not the absolute type.

8. Encoder Pulse Number

The pulse number of the encoder varies depending on the actuator. See the table below for the pulse number of each actuator.

Series	Type	Encoder Pulse Number
RCP3	All models	800
RCP2	All models	800
RCA2	RN□N/RP□N/GS□N/ GD□N/SD□N/TCA□N/ TWA□N/TFA□N	1048
	All other models	800

Series	Type	Encoder Pulse Number
RCA	All models	800
RCL	SA1L/RA1L	715
	SA2L/RA2L	855
	SA3L/RA3L	1145
RCS2	SRA7BD	3072
	All other models	16384

9. Motor

Different motors are used depending on the series.

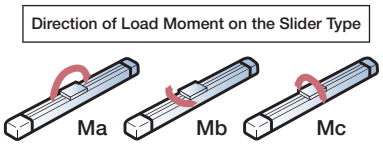
- ERC2/RCP2 (CR)/RCP3: Pulse motor
- RCA (CR)/RCA2: Servo motor (24V)
- RCS2 (CR): Servo motor (230V)

Pulse motors and 24V servo motors may exhibit slight vibration when the motor is excited while the servo is on.

■ Notes on Specifications in this Catalog (All Models)

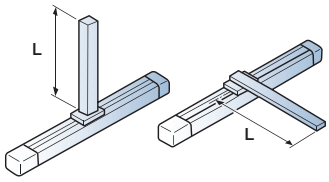
10. Allowable Load Moment (Ma, Mb, Mc)

Models with a built-in linear guide have static and dynamic allowable moments. Please note that using the guide with a load moment that exceeds specification will result in shorter service life of the guide.
(See page A-5 for details on load moment and its calculation method)



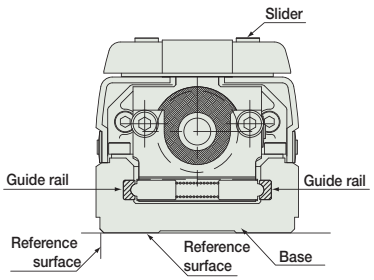
11. Overhang Load Length (L)

When mounting a workpiece or a bracket at an offset distance from the center of actuator/slider, the overhang load length indicates the maximum offset at which the actuator can operate smoothly.
Please make sure to keep the overhang load length within the allowable value, as exceeding the allowable value for for each model may cause vibration or shorten the service life .



12. Actuator Body Precision

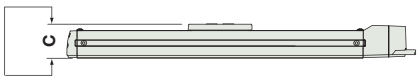
Below are the measures of precision for the body of the slider-type RoboCylinder. Moreover, the side and bottom surfaces of the actuator's base provide references for the run of the slider, and hence can be used as a guide to ensure parallel mounting of the actuator.



* Parallelism does not apply to RCP2W-SA16C, due to its sliding guide.

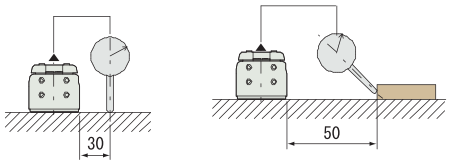
Parallelism: Base Underside & Load Surface (Top Side)

ERC2: ≤ ±0.1mm/m
RCP2/RCA/RCS2: ≤ ±0.05mm/m



Parallelism When Mounted onto a Frame (Fixed onto a Smooth Surface*1)

ERC2: ≤ ±0.1mm/m
RCP2/RCA/RCS2: ≤ ±0.05mm/m



Condition: The above values were measured at 20°C. *1: 0.05mm or less deviation from flatness.

13. Rod Type (Rod End vibration)

The standard rod-type actuators do not take into account any vibration or load resistance (The non-rotational accuracy values documented in the actuator specifications are initial values, and the backlash will increase with operation). If the rod vibrates or if the non-rotational accuracy fluctuates, or if a there is a force being applied from any direction other than the actuator's linear movement, use the guide-equipped actuator type, or use an external guide.

14. Vertical Setup and Use

When using the actuator in a vertical setup, add the optional brake to prevent the slider (or rod) from falling and breaking the machine when the power is turned off or an emergency stop is activated.
However, when mounting a brake-equipped RoboCylinder, be aware that the slider (or rod) will not move unless it is connected to the controller and the brake is released.

15. Moving the Slider Manually

For ball screws with a low (1, 2.5, 3, 4) lead, the actuator's slider cannot be moved by hand, even if the power and/or servo is off, due to high sliding resistance.
To move the slider on a low-lead actuator, use the teaching box or the JOG function of the computer software.

16. Actuator Cable

The actuator cable is the cable that extends from the rear of the actuator's motor.
Secure the actuator cable in place so that it does not move, as any force exerted on the actuator cable may cause a malfunction. If the cable must support bending motion, use a motor-encoder cable, designed for robots.

17. Motor-Encoder Cable

The motor-encoder cable is the cable that connects the actuator and the controller.
Depending on the actuator type, some models use a motor-encoder cable that is split into a separate motor cable and an encoder cable, and other models use an integrated motor-encoder cable.
Moreover, there are two different specifications of this cable: The standard cable specification and the robot cable specification, which has an outstanding flex resistance.
To use in a cable track, be sure to use the robot cable, using caution not to bend beyond the minimum bend radius R for the cable. (The minimum bend radius R is specified for each cable on the respective pages.)
To check the cable type for each model, see "Table of Actuator-Controller Connection Cable Types" on page A-39.

18. About the Splash-Proof Actuator Cable

Although the scope of protective construction of the splash-proof type includes the cable, the connector at the end of the actuator cable is not splash proof. Therefore, secure the end of the actuator cable in a place that is not prone to water spills. (For this reason, the actuator cable for a splash-proof model is 2m long)

19. Service Life

The service life of the actuator is directly related to the service life of the components that make up the actuator (guide, ball screw, motor, etc.).
Moreover, the service life for these components changes significantly depending on the usage requirements. For example, each guide has an allowable load moment (see page A-5). If the guide is hypothetically used at half the moment of the allowable moment, its service life is eight times more than the specified service life.
If used conservatively, it can be used for 10 years or more.
Therefore, when selecting a model, it is recommended that you select a model with more head room.

20. Warranty

The warranty period expires upon elapse of one of the following periods, whichever occurs first.

- 18 months after shipment from IAI factory in Japan
- 12 months after delivery to the location specified
- 2500 hours after start of operation

IAI will repair free of charge any actuator defects due to craftsmanship or material that may occur during the above warranty period despite use under appropriate conditions. Note, however, that defects resulting from handling or use in any condition or environment not specified in the catalog, operation manual are excluded from the scope of warranty. The warranty covers only the actuator delivered by IAI or by IAI authorized distributors, and any secondary losses arising from a failure of the delivered product is excluded from the scope of warranty.
The defective actuator must be sent in for repair.

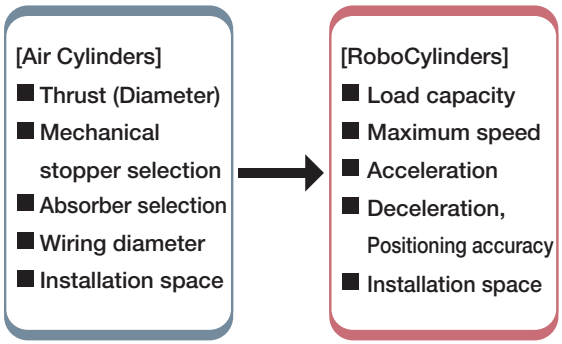
Considerations when Switching from Air Cylinders

Air Cylinder and RoboCylinder

Air cylinders are devices used to push and grasp objects by means of supplying and releasing compressed air. Air cylinders are used widely in all industries, mainly for transfer equipment, assembly systems, various automation systems, etc.
Air cylinders generally have diameters of between 4mm and 320mm, and their lengths (strokes) can also be set in fine steps. There are several tens to hundreds of thousands of different air cylinder products, which makes it easy to select optimal models for a variety of applications. However, since product lines are overly complex, many with identical specs, it can be difficult to select the best model for your specifications.
For this reason, there are many cases where air cylinders are selected largely out of past experience and familiarity. RoboCylinders are easy-to-use electric cylinders offering a variety of functions not achievable with air cylinders. The RoboCylinder product family makes it easy for you to select the model that best suits the needs of your application. However, the controls and configuration possibilities of RoboCylinders are completely different from air cylinders.
This section explains some of the key points to consider when switching from air cylinders to RoboCylinders.

Overview of Switching

The following explains the differences in the basic items to be checked when selecting RoboCylinders and air cylinders.
Since both are linear motion actuators, there are some common matters that must be taken into consideration. However, the different configurations and controls described above result in different designations for adjustments and check items between the two. A comparison of these various items is shown at right.



The above diagram shows that the two have different mechanical viewpoints to consider.

Installation Space

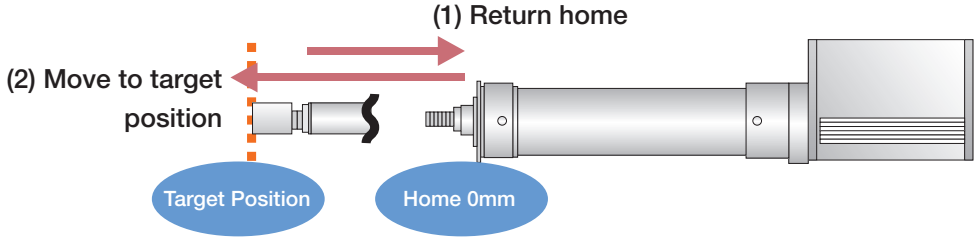
RoboCylinders are driven by a motor. Compared with air cylinders, simply from a size perspective, the RoboCylinder requires more attention paid to space requirements for installation.

Home Return

Unlike air cylinders, RoboCylinder operation is based on a “coordinates” concept. A home return operation is necessary at the beginning of operation because operations are controlled in movement quantities that are always referenced against a home point (0 point).

Specifically, in the case of incremental specifications, bear in mind that a pushing operation to the actuator stroke end will be performed as the initial operation when the power is turned ON.

- Incremental Specification: Return home operation after power is turned ON
- Absolute Specification : Absolute reset operation during initialization



Critical Rotating Speed

The ball screw inevitably deflects due to bending and its own deadweight. The RoboCylinder operates at high speeds causing the ball screw to rotate faster, and as the rotations increase the screw deflection also increases until the rotating axis is ultimately damaged. Hazardous rotational speeds that may damage the rotary axis are referred to as “critical speeds”, “whirling speeds” or “whipping speeds”.
Ball screw type RoboCylinders operate linearly as the ball screw is rotated with the end of the ball screw supported by a bearing. Although the maximum speed is specified for each RoboCylinder in accordance with the actuator type, some models with certain strokes have their maximum speed set in consideration of the aforementioned critical rotating speeds.

General Purpose (Types, Modes, Parameters)

RoboCylinders offer the “air-cylinder specification (or air cylinder mode)” that allows the RoboCylinder to be used just like an air cylinder. When using these, it is possible to operate the actuator by simple ON/OFF control by an external signal in exactly the same way as an air cylinder. This type or mode may be sufficient in the case of a simple swap-out, but a variety of types and parameters have been introduced for customers who desire higher value-added uses.
Feel free to contact IAI to discuss features to match your use conditions and needs when the equipment is actually installed.

Maintenance

The key maintenance points of air cylinders and RoboCylinders are compared.
Air cylinders require periodic maintenance performed according to the frequency and conditions of use. Although air cylinders offer a certain level of flexibility in that minor damage or malfunction can be ignored by means of increasing the source air pressure and moving the cylinder with a greater force, ignoring maintenance will inevitably shorten the service life of the air cylinder.
On the other hand, RoboCylinders have a more complex structure and use a greater number of parts and are therefore seen as requiring cumbersome maintenance work. This is wrong. RoboCylinders are clearly easier to use and offer longer life than air cylinders. Of course, RoboCylinders also require lubrication of sliding parts just as air cylinders do. However, RoboCylinders are equipped with a lubrication unit (AQ Seal) for ball screw and the sliding parts of the guides. This ensures a long maintenance-free period (5000 km of traveled distance, or three years). After 5000 km or travel or 3 years, greasing every 6 months to 1 year as instructed in the Operating Manual will vastly prolong the service life of the product.
In addition, absolute type controllers are currently equipped with a position retention battery. Since this is a consumable part, it must be periodically replaced (for periods that vary with the product).

[Primary Maintenance Tasks]

[Air Cylinders]
- Lubricating sliding parts
- Replacing gasket
- Draining
- Replacing absorber

[RoboCylinders]
- Lubricating ball screw and guide (after AQ seals have worn out)
- Replacing battery (absolute encoder types only)

Operation

Air cylinders are generally operated with the use of a direction control valve to determine the direction of reciprocating motion, as well as a flow control valve (speed controller) to determine the speed. Immediately after their system is started up, many users operate the air cylinder at low speed by restricting the flow control valve.

The same procedure is also recommended for RoboCylinders after the system is started up.
With RoboCylinders, “speed setting” replaces the flow control valve. Operate your RoboCylinder at speeds where safety is ensured, and then change to the desired speed after safety is confirmed.

Service Life and Moment

One of the main factors related to an actuator's service life is the "load rating".
There are two types of load rating: A static load is the weight of a load that leaves a small amount of indentation when the load is applied. A dynamic load is the weight of a load that maintains a constant survival probably of the guide when the load is applied while moving a constant distant.
Guide manufacturers rate dynamic load values to maintain a 90% survival rate at a travel distance of 50km. However, when taking account the speed of movement and work rate, the actual travel distance needs to be 5000 to 10000km.
While the life of a guide is sufficiently long for radial loads, it is actually the moment load that is offset from the guide center that is most problematic to its service life.
The service life for IAI actuators as documented in this catalog shows the allowable dynamic moment based on a 5000 or 10000km service life.

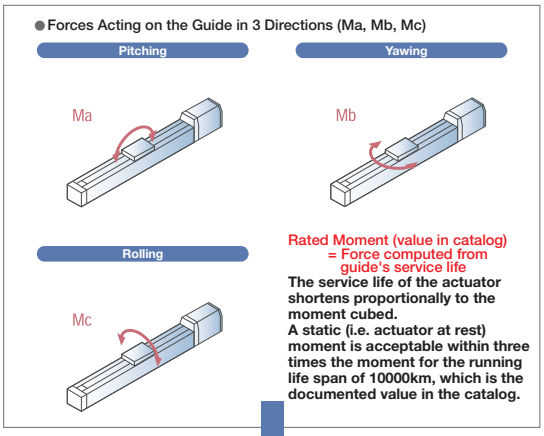
IAI uses the following equation calculate the service life: (for 10000km service life)

$$L_{10}=\left(\frac{C_{IA}}{P}\right)^{3}\cdot 10000\text{km}$$

L_{10} : Service life (90% Survival Probability)
C_{IA} : Allowable Dynamic Moment in IAI Catalog
P : Moment used

Allowable Dynamic Moment

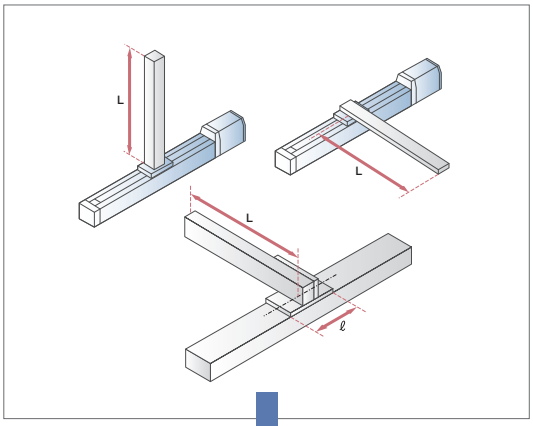
The allowable dynamic moment is the maximum offset load exerted on the slider, calculated from the guide service life. The direction in which force is exerted on the guide is categorized into 3 directions - Ma (pitch), Mb (yaw), Mc (roll) - the tolerance for each of which are set for each actuator. Applying a moment exceeding the allowable value will reduce the service life of the actuator. Use an auxiliary guide when working within or in excess of these tolerances.



The allowable dynamic moment is calculated from the service life of the guide.

Overhang load length

An overhang load length is specified for a slider-type actuator to indicate the length of overhang (offset) from the actuator.
When the length of an object mounted to the slider actuator exceeds this length, it will generate vibration and increase the settling time. So, pay attention to the allowable overhang length as well as the allowable dynamic moment.



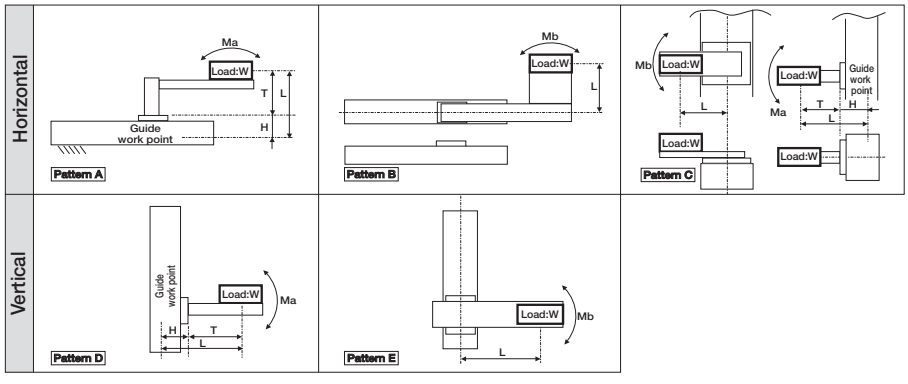
The allowable overhang load length is determined by the slider length.

An overhang that exceeds the allowable overhang length will generate vibration and increase settling time.

L/ℓ = 5 or less
* Between 3 to 4 for a camera-equipped measuring machine.
● For example:
L/ℓ=1.2 Mechanical machine
L/ℓ= 3 Measuring machine
L/ℓ= 5 Robot

How to calculate allowable dynamic moment

M2 (N•m) = W (kg) × L (mm) × a (G) × 9.8/1000



W : Load
L : Distance from work point to the center of gravity of payload (L=T+H)
T : Distance from top surface of slider to the center of gravity of payload
H : Distance from guide work point to the top surface of slider
a : Specified acceleration

Allowable Dynamic Moment and Allowable Static Moment

There are two types of moment that can be applied to the the guide: the allowable dynamic moment and the allowable static moment.
The allowable dynamic moment is calculated from the travel life (when flaking occurs) when moved with the moment load applied.
In contrast, the static moment is calculated from the load that causes permanent deformation to the steel ball or its rolling surface (i.e. rated static moment), taking into account the rigidity and deformity of the base.

[Allowable Dynamic Moment]

IAI's catalog contains the allowable dynamic moments based on a load coefficient of 1.2 and 10000km or 5000km.
This value is different from the so-called basic rated dynamic moment, which is based on a 50km travel life.
To calculate the basic rated dynamic moment for a 50km travel life, use the following equation.

$$M_{50}=f_w \times M_S \div \left(\frac{50}{S}\right)^{\frac{1}{3}} \quad \cdots\cdot \text{Equation 1}$$

- M_S : Allowable dynamic moment at an assumed travel distance (catalog value)
- S : IAI catalog assumed travel life (5000km or 10000km)
- f_w : Load coefficient (=1.2)
- M_{50} : Basic rated dynamic moment (50km travel life)

The allowable dynamic moments mentioned in the catalog (10000km or 5000km life) are based on a load coefficient fw=1.2. To calculate the service life of a guide with a different load coefficient, use Table 1 below to determine the load coefficient that matches your requirements.

Table 1: Load Coefficients

Operation and Load Requirements	Load Coefficient fw
Slow operation with light vibration/shock (1500mm/s or less, 0.3G or less)	1.0～1.5
Moderate vibration/shock, abrupt braking and accelerating (2500mm/s or less, 1.0G or less)	1.5～2.0
Operation with abrupt acceleration/deceleration with heavy vibration/shock (2500mm/s or faster, 1.0G or faster)	2.0～3.5

$$L_{10}=\left(\frac{C_{IA}}{P} \cdot \frac{1.2}{f_w}\right)^3 \times S \quad \cdots\cdot \text{Equation (2)}$$

- L_{10} : Service life (90% Survival Probability)
- C_{IA} : Allowable dynamic moment in IAI Catalog (5000km or 10000km)
- P : Moment used (≤ CIA)
- S : IAI catalog assumed travel life (5000km or 10000km)
- f_w : Load coefficient (from Table 1)

[Allowable Static Moment]

The maximum moment that can be applied to a slider at rest.
These values are calculated by taking the basic rated static moment of the slider and multiplying with the safety rate that takes into consideration any effects from the rigidity and deformity of the base.
Therefore, if a moment load is applied to the slider at rest, keep the moment within this allowable static moment. However, use caution to avoid adding any unexpected shock load from any inertia that reacts on the load.

[Basic Rated Static Moment]

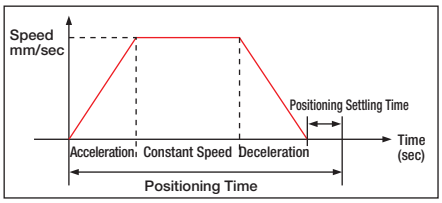
The basic rated static moment is the moment value at which the sum of the permanent deformation at the center of contact between the rolling body (steel ball) and the rolling surface (rail) is 0.0001 times the diameter of the rolling body.
These values are simply calculated strictly from the permanent deformation done to the steel ball and its rolling surface. However, the actual moment value is restricted by the rigidity and deformation of the base. Hence, the allowable static moment the actual moment that can be applied statically, taking into account those factors.

Technical Information

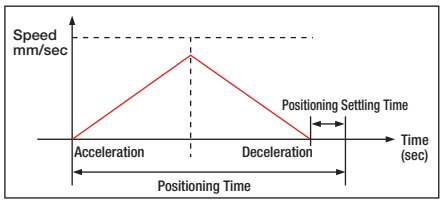
How to calculate positioning time

The actuator positioning time can be found from an equation.
Depending on the distance to be moved and the amount of acceleration/deceleration to be applied, the positioning operation can follow one of two patterns, shown below:

A Trapezoidal Pattern



B Triangular Pattern



First confirm the movement pattern as trapezoidal or triangular, then calculate the positioning time using the respective equation.

Confirming the Movement Pattern

Whether a movement pattern is trapezoidal or triangular can be determined by whether the peak speed reached after accelerating over a distance at a specified rate is greater than or less than the specified speed.

$$\text{Peak speed (Vmax)} = \sqrt{\text{Distance travelled S(mm)} \times \text{Specified acceleration}}$$

$$= \sqrt{\text{Smm} \times 9800\text{mm/sec}^2 \times \text{Acceleration setting (G)}}$$

If Vmax > V: Trapezoidal pattern

If Vmax < V: Triangular pattern, where Vmax is the peak speed reached and V is the speed that was specified.

Method of Calculating the Positioning Time

A Trapezoidal Pattern

$$\text{Positioning Time (T)} = \frac{\text{Distance (mm)}}{\text{Speed (mm/sec)}} + \frac{\text{Speed (mm/sec)}}{\text{Accel. (mm/sec}^2\text{)}} + \text{Positioning Settling Time}$$

B Triangular Pattern

$$\text{Positioning Time} = 2\sqrt{\frac{\text{Distance (mm)}}{\text{Accel. (mm/sec}^2\text{)}}} + \text{Positioning Settling Time}$$

$$\text{Accel. Time} = \frac{\text{Speed* (mm/sec)}}{\text{Accel. (mm/sec}^2\text{)}}$$

$$\text{Distance Accelerated} = \frac{\text{Accel. (mm/sec}^2\text{)} \times (\text{Accel. Time (sec)})^2}{2}$$

* Here, "Speed" refers to the specified speed in the trapezoid pattern, and the peak speed in the triangle pattern.

Note

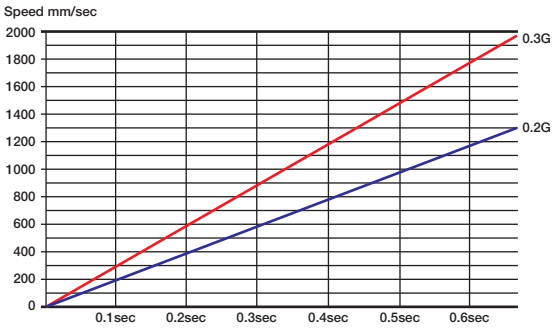
- The acceleration is calculated by the following: Acceleration setting in the controller (G)×9800mm/sec². If the acceleration setting in the controller is 0.3G, then 0.3×9800mm/sec² = 2940mm/sec².
- The positioning settling time is the time required to determine the completion of movement to the target position, typically around 0.15sec for ball screw types and 0.2sec for belt types.

Positioning time (sec)

Accel. Setting	Specified Speed (mm/sec)	Distance Moved (mm) 10	20	30	40	50	100	150	200	250	300	350	400	450	500	600	1000	1100	1300	1400
0.3G	100	0.13	0.23	0.33	0.43	0.53	1.03	1.53	2.03	2.53	3.03	3.53	4.03	4.53	5.03	6.03	10.03	11.03	13.03	14.03
	200	0.12	0.17	0.22	0.27	0.32	0.57	0.82	1.07	1.32	1.57	1.82	2.07	2.32	2.57	3.07	5.07	5.57	6.57	7.07
	300	0.12	0.16	0.2	0.24	0.27	0.44	0.6	0.77	0.94	1.1	1.27	1.44	1.6	1.77	2.1	3.44	3.77	4.44	4.77
	400	0.12	0.16	0.2	0.23	0.26	0.39	0.51	0.64	0.76	0.89	1.01	1.14	1.26	1.39	1.64	2.64	2.89	3.39	3.64
	500	0.12	0.16	0.2	0.23	0.26	0.37	0.47	0.57	0.67	0.77	0.87	0.97	1.07	1.17	1.37	2.17	2.37	2.77	2.97
	600	0.12	0.16	0.2	0.23	0.26	0.37	0.45	0.54	0.62	0.7	0.79	0.87	0.95	1.04	1.2	1.87	2.04	2.37	2.54
	700	0.12	0.16	0.2	0.23	0.26	0.37	0.45	0.52	0.6	0.67	0.74	0.81	0.88	0.95	1.1	1.67	1.81	2.1	2.24
	800	0.12	0.16	0.2	0.23	0.26	0.37	0.45	0.52	0.58	0.65	0.71	0.77	0.83	0.9	1.02	1.52	1.65	1.9	2.02
	900	0.12	0.16	0.2	0.23	0.26	0.37	0.45	0.52	0.58	0.64	0.7	0.75	0.81	0.86	0.97	1.42	1.53	1.75	1.86
	1000	0.12	0.16	0.2	0.23	0.26	0.37	0.45	0.52	0.58	0.64	0.69	0.74	0.79	0.84	0.94	1.34	1.44	1.64	1.74
	1750	0.12	0.16	0.2	0.23	0.26	0.37	0.45	0.52	0.58	0.64	0.69	0.74	0.78	0.82	0.9	1.17	1.37	1.56	1.65
	2000	0.12	0.16	0.2	0.23	0.26	0.37	0.45	0.52	0.58	0.64	0.69	0.74	0.78	0.82	0.9	1.17	1.22	1.33	1.48

Note: Does not include the positioning settling time (0.15sec for ball screw, and 0.2sec for belt). Triangular Pattern

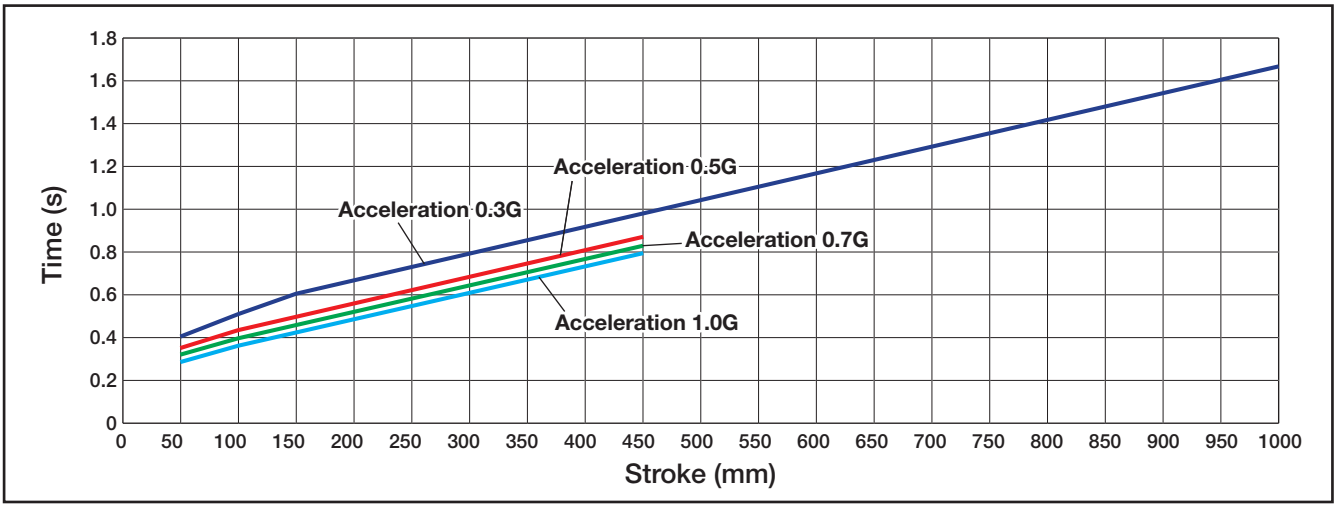
Acceleration time



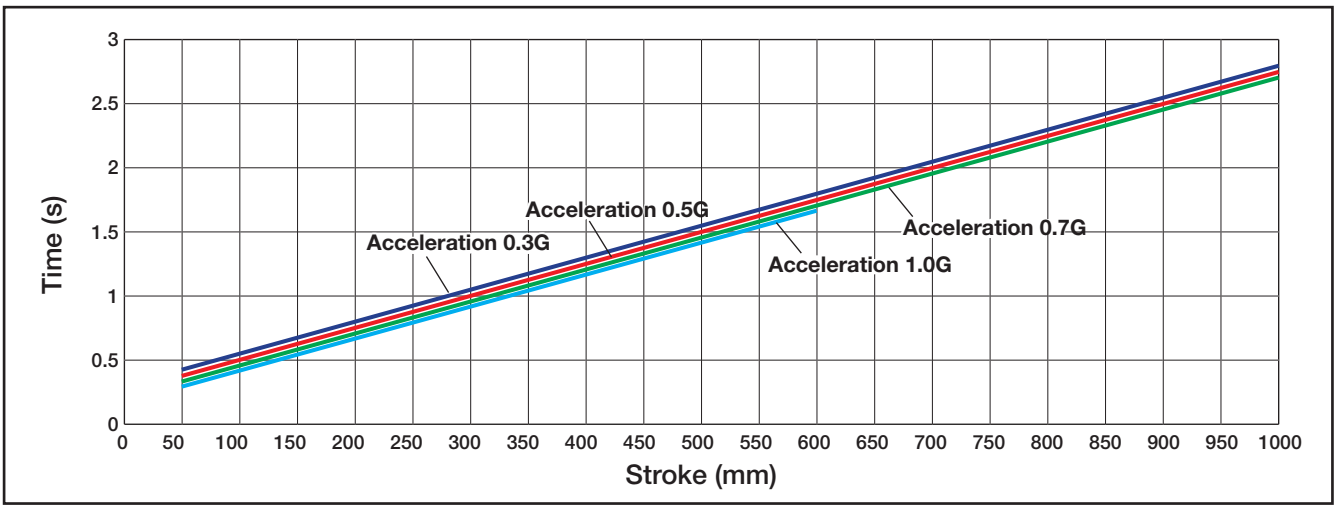
Reference Chart of Movement Time per Speed/Acceleration

The charts below show the estimated time required for the movement per speed/acceleration. Please use it as a reference for cycle time.
(Note) Stroke indicates the one-sided and unidirectional movement distance. For RCP2, RCP3 and ERC2, please note that the maximum speed varies depending on load capacity.

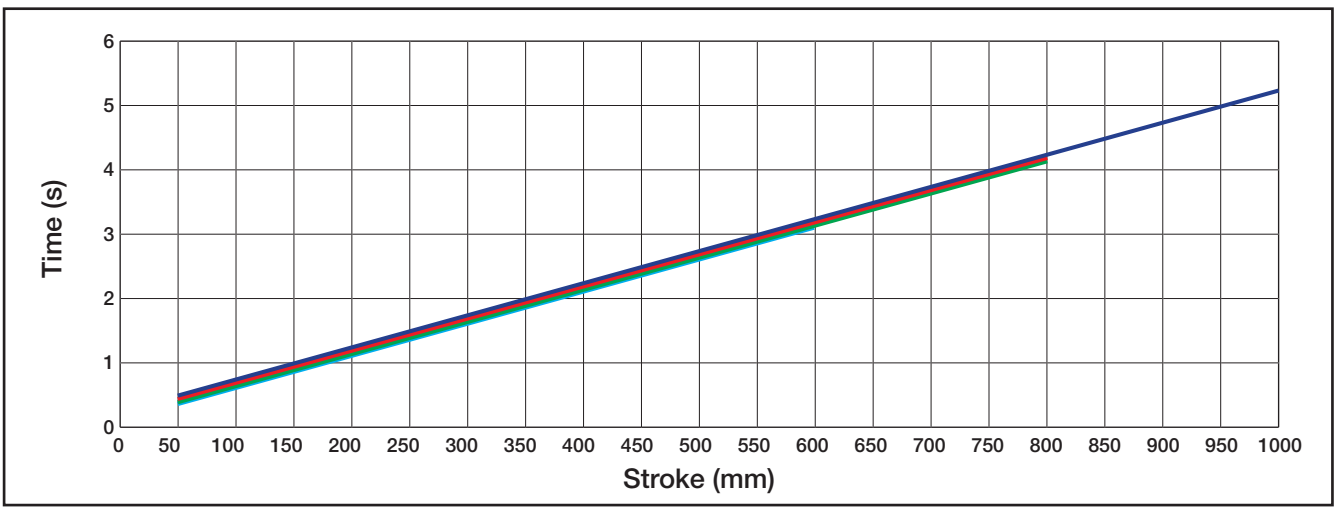
Speed 800mm/s



Speed 400mm/s

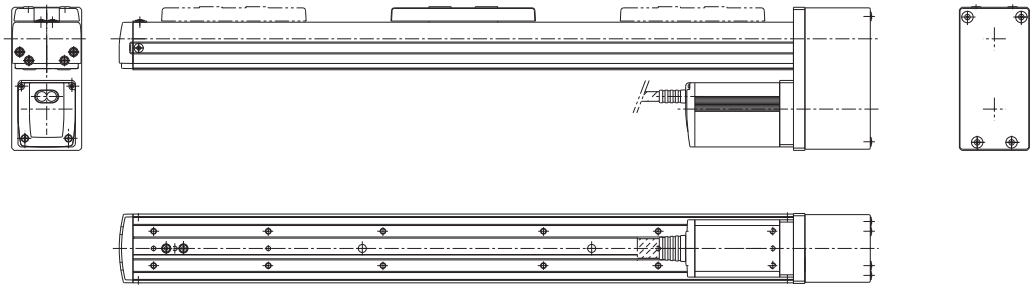


Speed 200mm/s



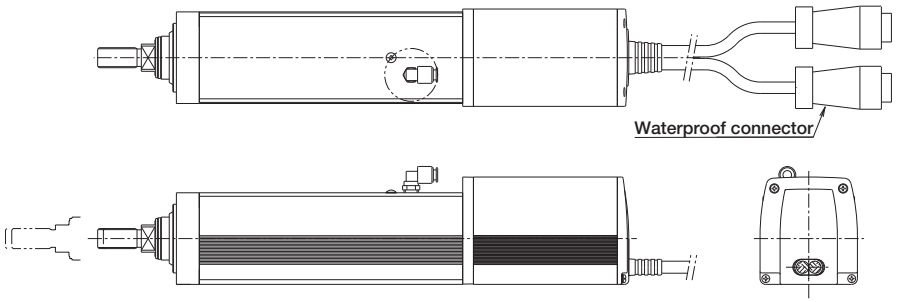
Side-Mount Motor Orientation

Ex.) Side-Mount Motor to the Bottom



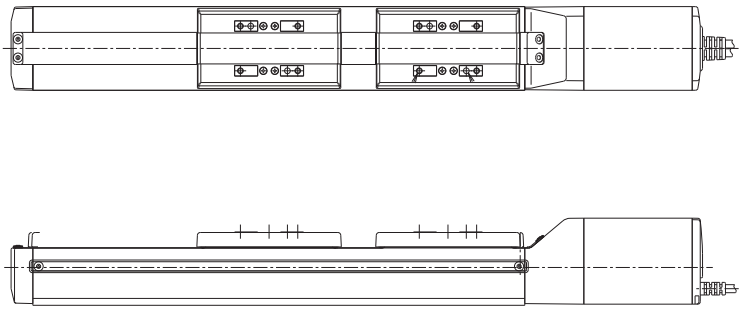
Special Connector

Ex.) Change motor-encoder connector to waterproof connector



Special Slider

Double Slider Specification (Add non-driven slider)



Explanation of Terms

(This terminology is related to IAI products, and so the definitions are more limited than usual.)

10,000km service life

Around 10000 hours are guaranteed for actual use in the field. When considering the speed, work ratio, etc, this translates to a distance of 5000 to 10000km. While the life of a guide is sufficiently long for radial loads, it is the uneven loads due to moment loads that are problematic to its service life.

For this reason, the 10000km service life is established by specifying the rated dynamic load moment that can guarantee 10000km of travel distance.

50km service life

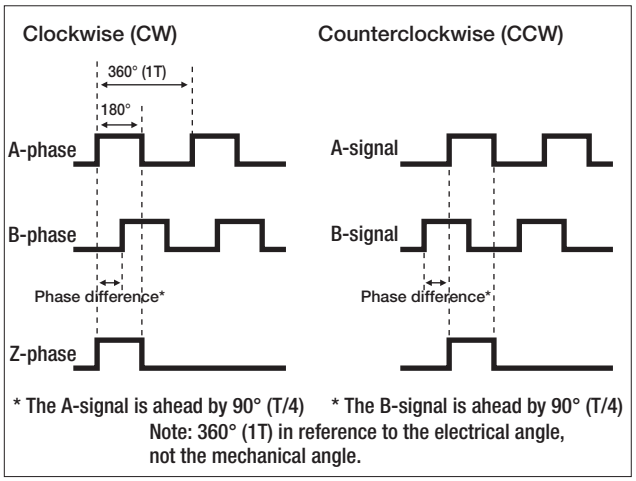
A way of expressing the allowable load capacity, submitted by the guide manufacturer. This is the value at which the probability of the guide not breaking (i.e. survival probability) when used with this allowable radial load (basic dynamic rated load) is 90%.

Calculating the actual distance of travel, considering the motion velocity and work rate, etc, an actual industrial equipment, it is necessary to ensure 5000km to 10000km of travel. From that viewpoint, this data is difficult to understand and difficult to utilize.

A-phase (signal) output / B-phase (signal) output

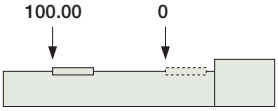
The direction of rotation (CW or CCW) of the axis is determined from the phase difference between the A-phase and the B-phase of the incremental encoder output, as shown in the diagram below. In a clockwise rotation, the A-phase is ahead of the B-phase.

■ Diagram of Output Modes

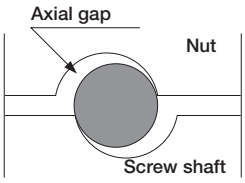


Absolute positioning accuracy

When positioning is performed to an arbitrary target point specified in coordinate values, the difference between the coordinate values and the actual measured values.



Backlash



As shown in the figure on the right, there is a gap between the nut and the ball (steel ball) and the screw shaft. Even if the screw shaft moves, the nut will not move the extent of the gap. The mechanical play in the direction of this slider movement is called the backlash. The measurement method used is to feed the slider, then use the reading for the slight amount of movement time shown on a test indicator as a standard. Also, in that condition, without using the feed device, move the slider in the same direction with a fixed load, then without the load. Then find the difference between the standard value and the time when the load was removed. This measurement is conducted at the midpoint of the distance of movement and at points nearly at the two ends. The maximum value obtained among the values is used as the measurement value.

Bellows

A cover to prevent the infiltration of dust or debris from outside.

Brake

Primarily used for the vertical axis to prevent the slider from dropping when the servo is turned off. The brake activates when the power is turned off.

C10

One of the grades of a ball screw. The lower the number, the higher the precision.

Grade C10 has a typical movement error of ±0.21mm for a 300mm stroke.

CCW (Counterclockwise rotation)

Abbreviation for counterclockwise rotation.

It describes a rotation to the left, as viewed from above, i.e. opposite of the rotation of a clock's hands.

Explanation of Terms

Cleanliness

Grade of cleanliness for cleanrooms according to ISO standard. ISO class 4 (equivalent to US FED STD class 10) indicates an environment in which there are fewer than 10 pieces of debris 0.5µm or smaller per cubic foot.

Coupling

A component used as a joint to join a shaft to another shaft.
e.g. The joint between the ball screw and the motor.

Creep sensor

An optional sensor to allow high-speed homing operation.

Critical speed

Ball screw resonation with slider speed (No. of ball screw rotations). The maximum physical speed limit that can be utilized.

CW (Clockwise rotation)

Abbreviation for clockwise rotation.
It describes a rotation to the right, as viewed from above, i.e. same as the rotation of a clock's hands.

Cycle time

The time taken by one process.

Dispenser

A device that controls the flow rate of a liquid. This is integrated into devices for applying adhesives, sealants, etc.

Duty

Indicates the work ratio in the equipment industry. (e.g. The time that the actuator operates in one cycle.)

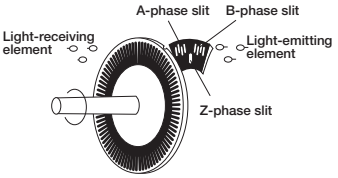
Dynamic brake

A brake that uses the motor's regenerative energy.

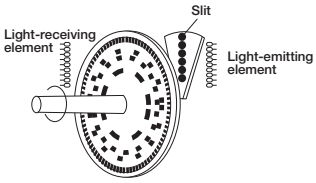
Encoder

A device for recognizing the RPM and the direction of a rotation by shining a light onto a disc with slits, and using a sensor to detect whether the light is ON or OFF as the disc is rotated. (i.e. a device that converts rotation into pulses.) The controller uses this signal from the encoder to determine the position and speed of the slider.

■ Incremental



■ Absolute



An incremental encoder
detects the rotational angle and the RPM of the axis from the number of output pulses. To detect the rotational angle and the RPM, a counter is needed to cumulatively add the number of output pulses. An incremental encoder allows you to electrically increase the resolution by using the rise and fall points on the pulse waveform to double or quadruple the pulse generation frequency.

An absolute encoder
detects the rotation angle of the axis from the state of the rotation slit, enabling you to know the absolute position at all times, even when the rotating slit is at rest. Consequently, the rotational position of the axis can always be checked even without a counter.
In addition, since the home position of the input rotation axis is determined at the time it is assembled into the machine, the number of rotations from home can always be accurately expressed, even when turning the power ON during startup or after a power outage or an emergency stop.

Excess voltage

Voltage applied to motor that exceeds regulation value when commanded speed is too fast.

External operation mode

This is the operation mode started by a start signal from an external device (PLC, etc.). This is also called automatic operation.

Flexible hose

Tube for SCARA Robot MPG cable that the user passes wiring through.

Gain

The numeric value of an adjustment of the controller's reaction (response) when controlling the servo motor. Generally, the higher the gain the faster the response, and the lower it is the slower the response.

Gantry

A type of two-axis (X and Y) assembly in which a support guide is mounted to support the Y-axis, so that heavier objects can be carried on the Y-axis.

Grease

High-viscosity oil applied to contact surfaces to make the guide and the ball screw move smoothly.

Greasing

Injection or application of grease to sliding parts.

Guide

A mechanism for guiding (supporting) the slider of the actuator. A bearing mechanism that supports linear motions.

Guide module

An axis in a two-shaft assembly that is used in parallel with the X-shaft to support the end of the Y-shaft when the Y-shaft overhang is long. Typical models include the FS-12WO and FS-12NO.

Home

Reference point for actuator operation. The pulse counts are determined and recorded for all positions the actuator moves to / from home.

Home accuracy

The amount of variation among the positions when home return is performed (if home varies, all positions vary).

Key slotted

A rotary shaft or mounting component is machined with a slot for key mounting.
(Key: One means of preventing positional slip in the rotation direction of the rotary axis and the mounting component)

Lead

The lead of the feed screw is the distance moved after the motor (hence the feed screw) has rotated one turn.

Understanding lead value

The lead value changes the actuator speed and thrust.

- Speed: With an AC230V servo motor, the rated rpm is 3000rpm. In other words, this is 50 revolutions per second. In this case, with a 20mm screw lead,
  the speed is 50 revolutions/s×20mm/revolution = 1000mm/s.
- Thrust: If the lead is large, then the thrust is small; and vice-versa.

Load capacity (Payload)

The weight of objects that can be moved by the actuator's slider or rod.

Lost Motion [mm]

First, for one position, run with positioning straight in front and then measure that position. Next, make a movement in the same direction by issuing a command. Then, issue the same command for movement in a negative direction from the position. Conduct positioning in the negative direction and measure that position. Again, issue a command for a movement in the negative direction, and issue the same command for a positioning movement straight ahead from that position. Then measure that position.
Using this method, repeat measurement in positive and negative directions, seven times each. Conduct positioning for each and obtain the deviation from the average value for each stop position. Determine the position for the center of the movements in these measurements and positions nearly at both ends. The measurement value will be the maximum value among those obtained. (Complies with JIS B6201)

Mechanical end

Position where actuator slider comes to mechanical stop. Mechanical stopper. (Example: Urethane rubber)

Offline

A state in which the PC software is started without the RS232 cable connected to the controller.

Explanation of Terms

Offset

To shift from a position.

Online mode

The state in which the PC software is started with the RS232 cable connected to the controller.

Open collector output

A system with no overload resistance in the voltage output circuit, that outputs signals by sinking the load current. Since this circuit can turn the load current ON/OFF regardless of voltage potential to which the current is connected, it is useful for switching an external load and is widely used as a relay or ramp circuit or the like for switching external loads, etc.

Open loop system

A type of control system. This system only outputs commands and does not take feedback.

A typical example of this is the stepping motor. Since it does not compare each actual value against the commanded value, even if a loss of synchronization (i.e signal error) occurs, the controller would not be able to correct it.

Operation

Operation.

Overhang

The state in which the object that is mounted onto the actuator extends out to the front/rear, left/right, or above/below the axis of movement.

Overload check

A check for overload. (One of the protection functions)

Override

A setting for the percentage with respect to the running speed. (e.g. If VEL is set to 100mm/sec, an override setting of 30 will yield 30mm/sec)

Pitch error [pitch deviation or lead deviation]

Due to problems in the manufacturing, such as the heat treatment process used, the deviations of the ball screws, which are a key mechanical element of the actuator, are not always small when inspected closely. A JIS rating is used to indicate the qualitative accuracy of these items.

These items made for the market must meet tolerance values set as Class C10.

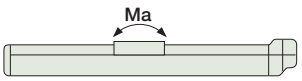
The accuracy required to meet the C10 standard is to be within a margin of error of ±0.21mm for every 300mm of length. Generally the screw pitch error deviation accumulates in a plus or minus direction. One method of improving these items is to grind them in a finishing process.

[e.g.] When positioning 300mm from home:

The machine accepts a set position of 300 ±0.21. Supposing that the actual stop position is 300.21, if this position is repeatable and maintained at 300.21 ± 0.02 using a JIS6201-compliant method, then the repeatability standard for accuracy is met.

Pitching

Forward-backward motion along the axis of the slider's movement. (Direction of Ma)



PLC

Abbreviation for Programmable Logic Controller.

(Also referred to as sequencers or programmable controllers).

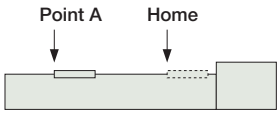
These are controllers that can be programmed to control production facilities and equipment.

Positioning band

The span within which a positioning operation is deemed as complete with respect to the target point. This is specified by a parameter. (PEND BAND)

Positioning repeatability

The variation in stop position accuracy for repeated positioning toward the same point.



Positioning settling time

The gap between the actual movement time and the ideal calculated value for movement. (Positioning operation time; processing time for internal controller operations.) The broader meaning includes the time for convergence of the mechanical swing.

Radial load

Load up to down in a direction 90° to horizontal slider.

Regenerative energy

Energy, generated by the motor's rotation. When the motor decelerates, this energy returns to the motor's driver (controller). This energy is called regenerative energy.

Regenerative resistance

The resistance that discharges the regenerative current.
The regenerative resistance required for IAI's controllers is noted in the respective page of each controller.

Rolling

An angular movement around the axis of the slider's movement. (Mc direction)

SCARA

SCARA is an acronym for Selective Compliance Assembly Robot Arm, and refers to a robot that maintains compliance (tracking) in a specific direction (horizontal) only, and is highly rigid in the vertical direction.

Screw type

The types of screws for converting rotary motion of a motor to linear motion are summarized on the right.
IAI's single-axis robots and electric cylinders use rolled ball screws as a standard feature.

		Characteristics
Ball screw	Polished	Screws are polished for good precision, but expensive
	Rolled	Since the screws are rolled, they can be mass produced
Lead screw		Cheap, but poor precision and short life. Also not suitable for high-speed operation.

SEL language

The name of IAI's proprietary programming language, derived from an acronym for SHIMIZUKIDEN ECOLOGY LANGUAGE.

Semi-closed loop system

A system for controlling the position information or velocity information sent from the encoder with constant feedback to the controller.

Servo-free (servo OFF)

The state in which the motor power is OFF. The slider can be moved freely.

Servo-lock (servo ON)

The state in which, opposite to the above, the motor power is turned ON. The slider is continually held at a determined position.

Slider mounting weight [kg]

The maximum mounting weight of the slider when operating normally, without major distortion in the velocity waveform or current waveform, when operated at the specified acceleration/deceleration factor (factory settings).

Software limit

A limit in the software beyond which a given set stroke will not advance.

Stainless sheet

A dust-proof sheet used in slider types.

Stepper motor (Pulse motor)

A motor that performs angular positioning in proportion to an input pulse signal by means of open loop control.

Thrust load

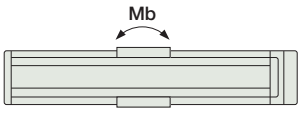
The load exerted in the axial direction.

Work rate

The ratio between the time during which the actuator is operating and the time during which it is stopped. This is also called duty.

Yawing

Motion at an angle in a left-right direction along slider movement axis. (Mb direction)



Along with pitching, laser angle measurement system is used for measurement, and the reading is the indication of maximum difference.

Z-phase

The phase (signal) that detects the incremental encoder reference point, used to detect the home position during homing operation.
Searching for the Z-phase signal for the reference during homing is called the "Z-phase search".

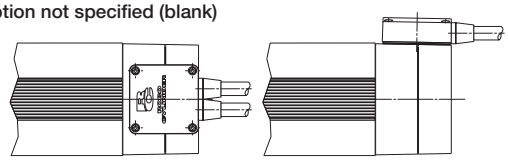
Cable exit direction

■ Models A1, A2, and A3

Applicable models	RCP2 / RCP2W-RA10C RCS2-RA5C / RA5R / SRA7BD
Description	Specify this option when you wish to change the direction from which the actuator cable is taken out.

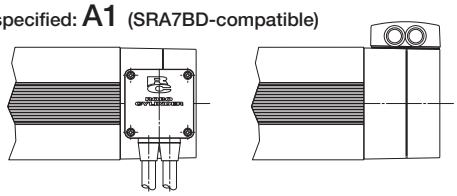
Actuator cable taken out from motor side (standard)

■ Option not specified (blank)



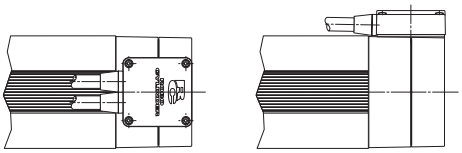
Actuator cable taken out from left

■ Option specified: **A1** (SRA7BD-compatible)



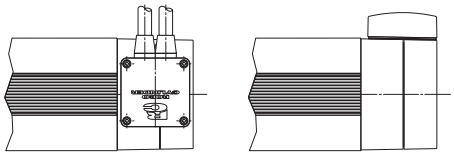
Actuator cable taken out from rod side

■ Option specified: **A2** (RA5C/RA5R/SRA7BD-compatible)



Actuator cable taken out from right

■ Option specified: **A3** (SRA7BD-compatible)



Brake

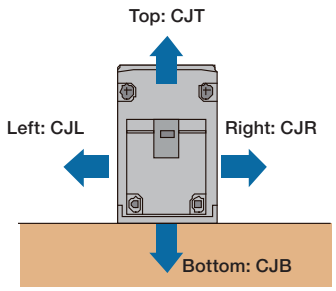
■ Models B, BE, BL and BR

Applicable models	All slider-type models (excluding RCP3-SA2A□ / SA2B□ and RCP2-BA6 / BA7) All rod-type models (excluding RCP2-RA2C / RA3C, RCA2-RN□N, RP□N, GS□N, GD□N, SD□N and RCA / RCS2 built-in types) All table-type models (excluding TCA□N, TWA□N and TFA□N) All arm-type and flat-type models (the arm type is a standard feature) Linear Motor Rod type All cleanroom type models Dust-proof / Splash-proof type (excluding RCP2W-SA16C, RCAW-RA3 / 4D and RCS2W-RA4D)
Description	A retention mechanism used on an actuator positioned vertically to prevent the slider from dropping and damaging the part, etc., when the power or servo is turned off.

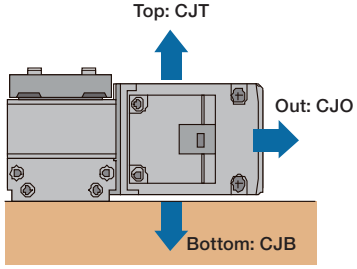
Cable exit direction

■ Models CJT, CJR, CJL, CJB and CJO

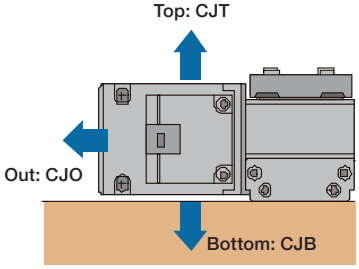
Applicable models	RCP3 (RCA2)-SA3C / SA4C / SA5C / SA6C / SA3R / SA4R / SA5R / SA6R RCP3 (RCA2)-TA4C / TA5C / TA6C / TA7C / TA4R / TA5R / TA6R / TA7R
Description	The direction of the motor-encoder cable mounted on the actuator can be changed vertically or horizontally.



Straight Type



Side-Mounted Motor Type
Mounted on left side (ML)



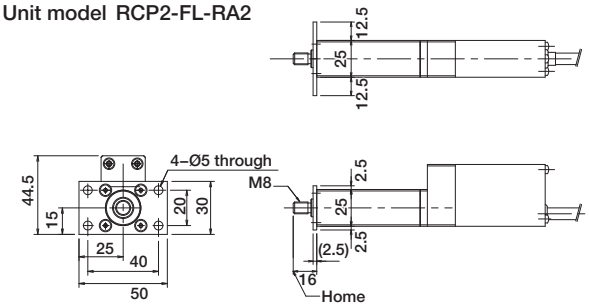
Side-Mounted Motor Type
Mounted on right side (MR)

Front flange

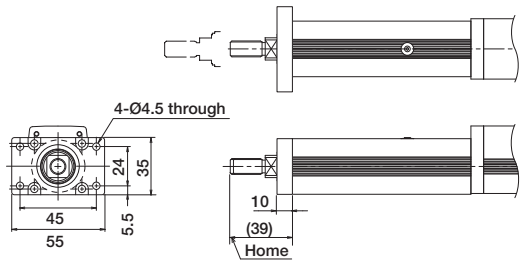
■ Models FL

Applicable models	All rod type models (excluding RCP3 and RCA2)
Description	A bracket for affixing the actuator using bolts from the actuator side.

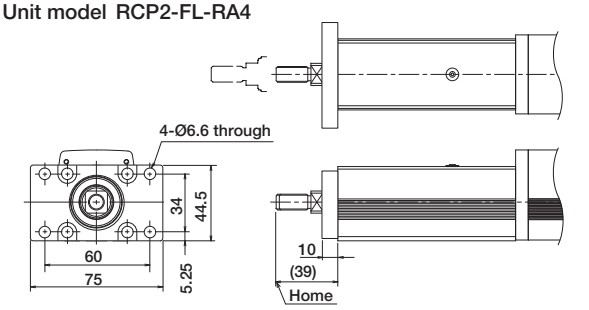
RCP2-RA2C
Unit model RCP2-FL-RA2



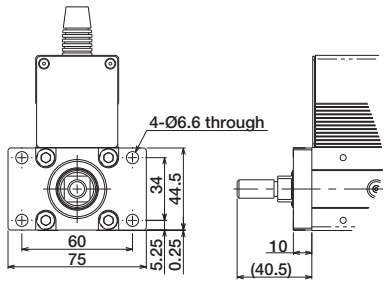
RCP2-RA3C
Unit model RCP2-FL-RA3



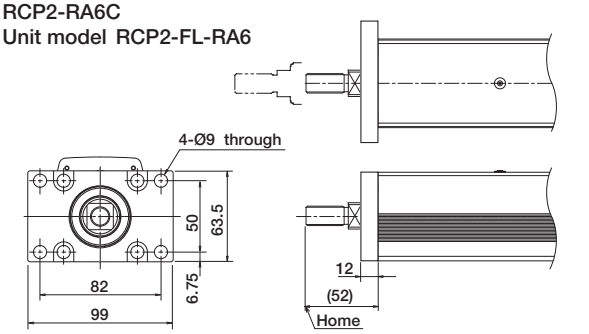
RCP2-RA4C
Unit model RCP2-FL-RA4



RCP2/RCA-SRA4R
Unit model RCP2-FL-SRA4

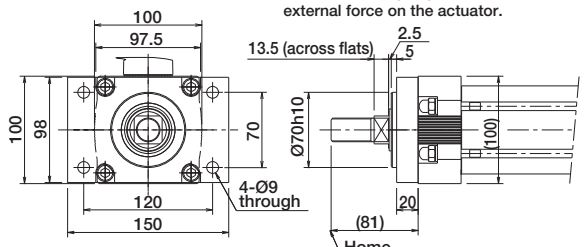


RCP2-RA6C
Unit model RCP2-FL-RA6



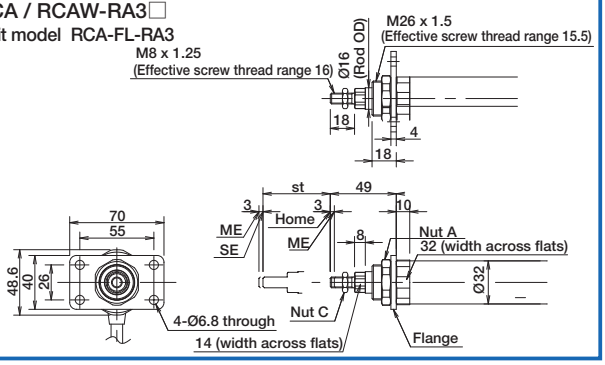
RCP2 / RCP2W-RA10C
Unit model RCP2-FL-RA10

* When using in horizontal setting, be careful not apply any excessive external force on the actuator.

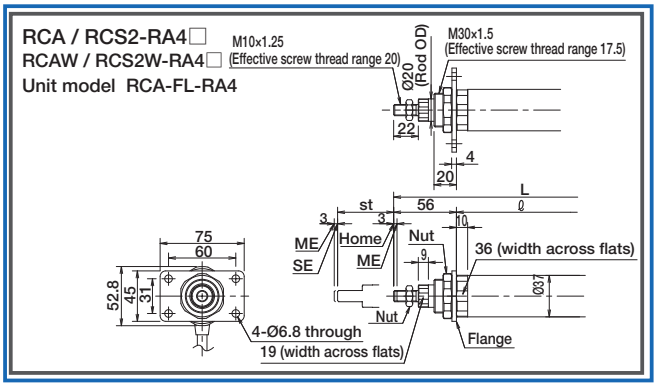


Mounting flange weight: Approx. 2kg

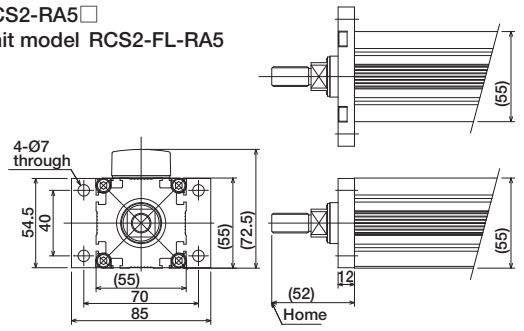
RCA / RCAW-RA3□
Unit model RCA-FL-RA3



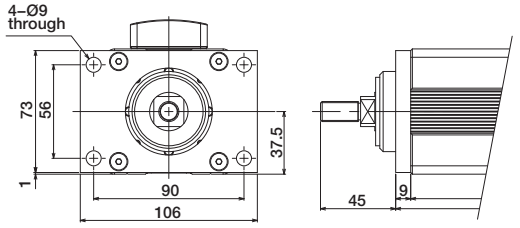
RCA / RCS2-RA4□
RCAW / RCS2W-RA4□
Unit model RCA-FL-RA4



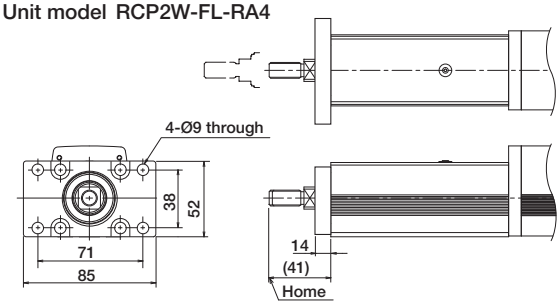
RCS2-RA5□
Unit model RCS2-FL-RA5



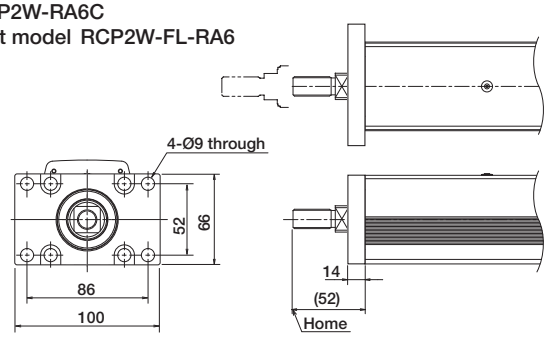
RCS2-SRA7BD
Unit model RCS2-FL-SRA7



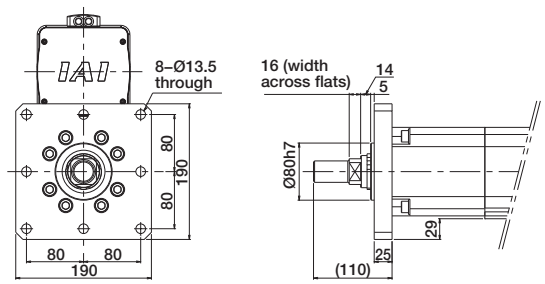
RCP2W-RA4C
Unit model RCP2W-FL-RA4



RCP2W-RA6C
Unit model RCP2W-FL-RA6



RCS2-RA13R
Unit model RCS2-FL-RA13

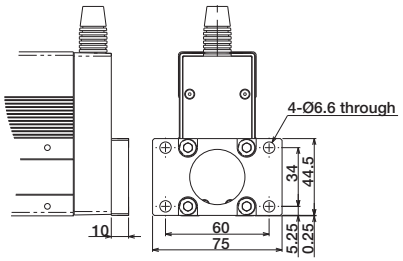


Rear flange

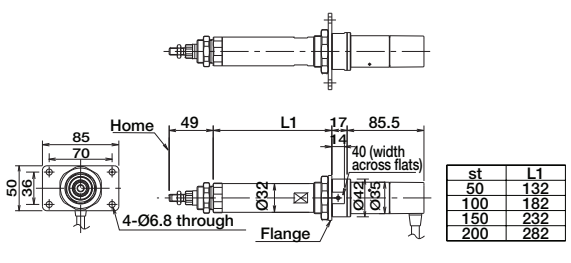
■ Models FLR

Applicable models	RCP2-SRA4R RCA (RCAW)-RA3C / RA3D / RA3R / RA4C / RA4D / RA4R / SRA4R RCS2 (RCS2W)-RA4C / RA4D / RA4R
Description	A bracket to fix a rod-type actuator on the rear (motor side).

RCP2/RCA-SRA4R
Unit model RCP2-FL-SRA4

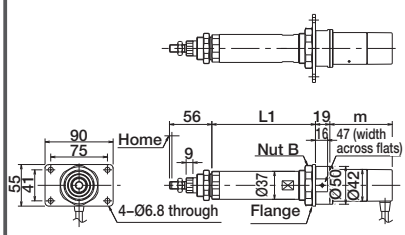


RCA / RCAW-RA3C and RA3D
Unit model RCA-FLR-RA3



st	L1
50	132
100	182
150	232
200	282

RCA / RCAW-RA4C and RA4D
RCS2 / RCS2W-RA4C / RA4D
Unit model RCA-FLR-RA4



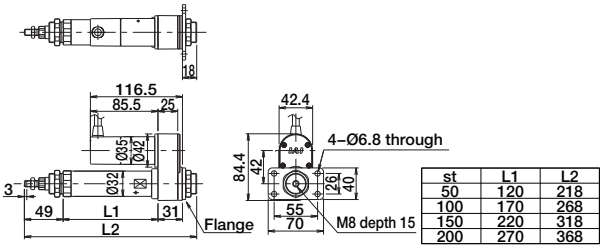
st	L1
50	137
100	187
150	237
200	287
250	337
300	487

m dimension

		m	
		20w	30w
RCA	Increm.	67.5	82.5
	Absol.	80.5	95.5
RCS2	Increm/Absol.	80.5	95.5

RCA / RCAW-RA3R
Unit model RCA-FL-RA3

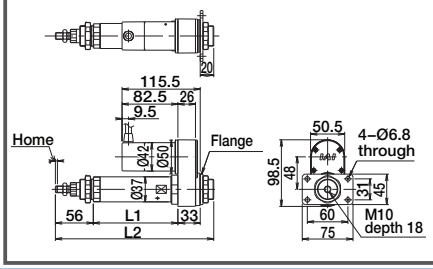
* On the side-mounted motor type, the same flanges can be used on the front and rear.



st	L1	L2
50	120	218
100	170	268
150	220	318
200	270	368

RCA / RCAW-RA4R
RCS2 / RCS2W-RA4R
Unit model RCA-FL-RA4

* On the side-mounted motor type, the same flanges can be used on the front and rear.



st	L1	L2
50	125	234
100	175	284
150	225	334
200	275	384
250	325	434
300	375	484

Foot

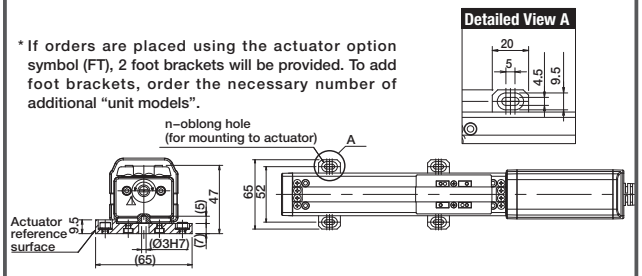
■ Models FT

*** See the mounting pitch dimensions on the actuator drawing for mounting pitch dimensions between foot brackets.**

Applicable models	Slider Type RCA (RCACR)-SA4C / SA5C / SA6C / SA4D / SA5D / SA6D RCS2 (RCS2CR)-SA4C / SA5C / SA6C All rod-type models (excluding RCA2-RN□N / RP□N / GS□N / GD□N / SD□N)
Description	A bracket for affixing the actuator using bolts from the top side. With a slider type subject to large moment load, install foot brackets at all mounting holes in the actuator. If the number of foot brackets is not sufficient, the actuator may deflect, resulting in a shorter service life.

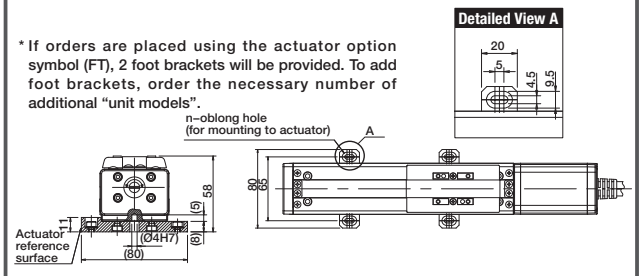
RCA / RCACR-SA4C RCS2 / RCS2CR-SA4C
Unit model RCA-FT-SA4

* If orders are placed using the actuator option symbol (FT), 2 foot brackets will be provided. To add foot brackets, order the necessary number of additional "unit models".



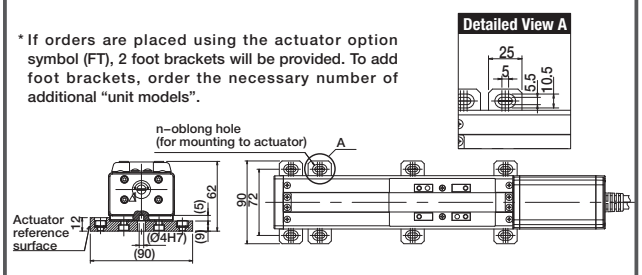
RCA / RCACR-SA5C RCS2 / RCS2CR-SA5C
Unit model RCA-FT-SA5

* If orders are placed using the actuator option symbol (FT), 2 foot brackets will be provided. To add foot brackets, order the necessary number of additional "unit models".

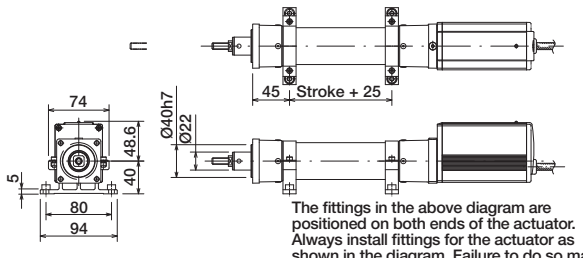


RCA / RCACR-SA6C RCS2 / RCS2CR-SA6C
Unit model RCA-FT-SA6

* If orders are placed using the actuator option symbol (FT), 2 foot brackets will be provided. To add foot brackets, order the necessary number of additional "unit models".



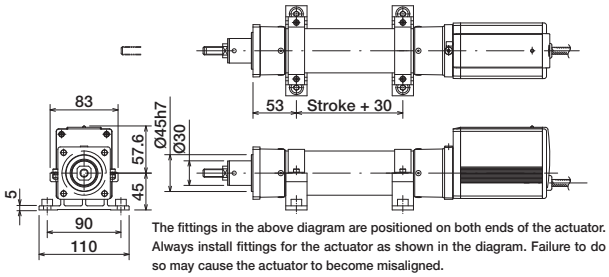
ERC2-RA6C / RGS6C / RGD6C
Unit model ERC2-FT-RA6



The fittings in the above diagram are positioned on both ends of the actuator. Always install fittings for the actuator as shown in the diagram. Failure to do so may cause the actuator to become misaligned.

* Mounting bolt (M6) is not provided.

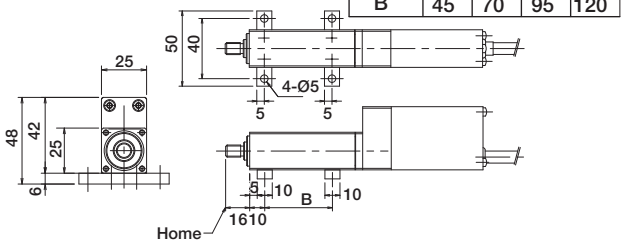
ERC2-RA7C / RGS7C / RGD7C
Unit model ERC2-FT-RA7



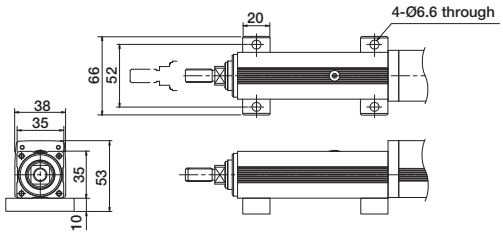
The fittings in the above diagram are positioned on both ends of the actuator. Always install fittings for the actuator as shown in the diagram. Failure to do so may cause the actuator to become misaligned.

RCP2-RA2C
Unit model RCP2-FT-RA2

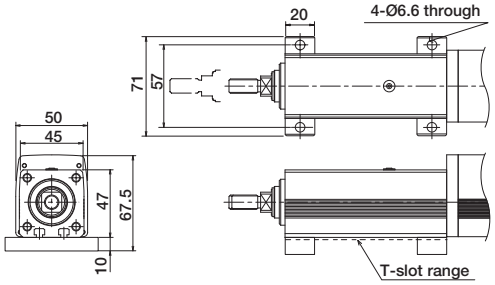
Length \ Stroke	25	50	75	100
B	45	70	95	120



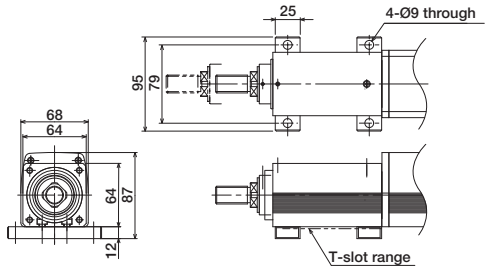
RCP2-RA3C / RGD3C
Unit model RCP2-FT-RA3



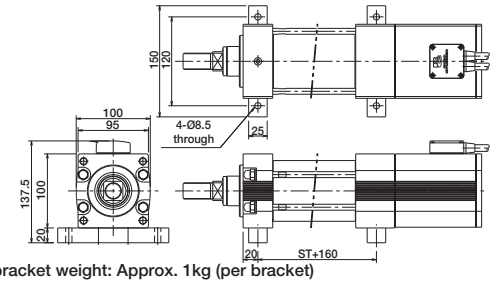
RCP2-RA4C / RGS4C / RGD4C / RCP2W-RA4C
Unit model RCP2-FT-RA4



RCP2-RA6C / RGS6C / RGD6C / RCP2W-RA6C
Unit model RCP2-FT-RA6

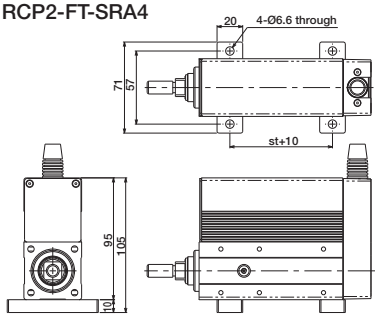


RCP2-RA10C / RCP2W-RA10C
Unit model RCP2-FT-RA10

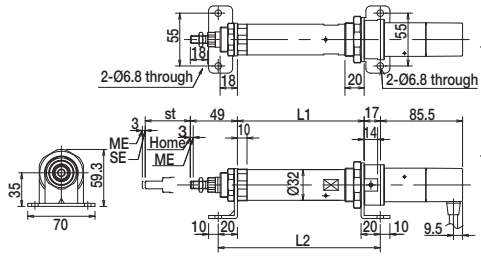


Foot bracket weight: Approx. 1kg (per bracket)

RCP2 / RCA-SRA4R
Unit model RCP2-FT-SRA4



RCA-RA3C / RGS3C / RGD3C
Unit model RCA-FT-RA3



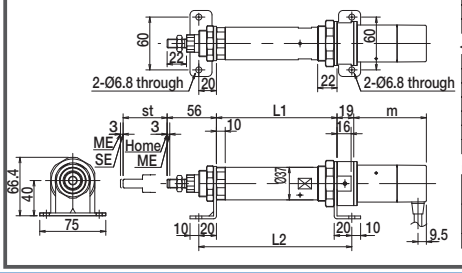
<RA3C>

st	L1	L2
50	132	168.8
100	182	218.8
150	232	268.8
200	282	318.8

<RGS3C/RGD3C>

st	L1	L2
50	140	176.8
100	190	226.8
150	240	276.8
200	290	326.8

RCA (RCS2)-RA4C / RGS4C / RGD4C
Unit model RCA-FT-RA4



<RA4C>

st	L1	L2
50	137	173.8
100	187	223.8
150	237	273.8
200	287	323.8
250	337	373.8
300	487	423.8

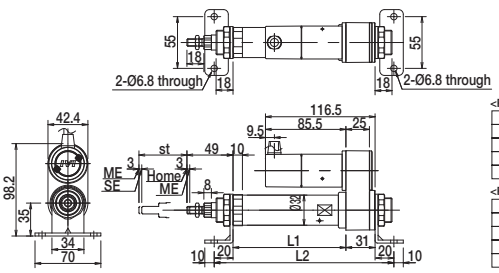
<RGS4C/RGD4C>

st	L1	L2
50	145	181.8
100	195	231.8
150	245	281.8
200	295	331.8
250	345	381.8
300	495	431.8

m dimension

		m	
		20w	30w
RCA	Incremental	67.5	82.5
	Absolute	80.5	95.5
RCS2	Incrt/Abst	80.5	95.5

RCA / RA3R / RGS3R / RGD3R
Unit model RCA-FT-RA3R



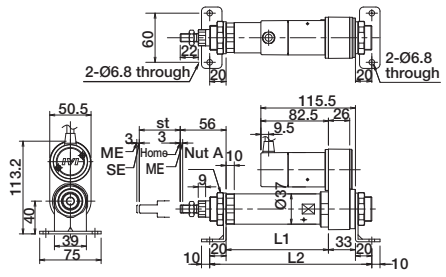
<RA3R>

st	L1	L2
50	120	191
100	170	241
150	220	291
200	270	341

<RGS3R/RGD3R>

st	L1	L2
50	128	199
100	178	249
150	228	299
200	278	349

RCA (RCS2)-RA4R / RGS4R / RGD4R
Unit model RCA-FT-RA4R



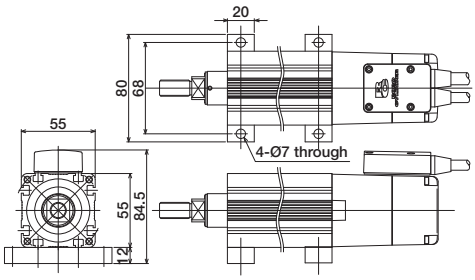
<RA4R>

st	L1	L2
50	125	198
100	175	248
150	225	298
200	275	348
250	325	398
300	375	448

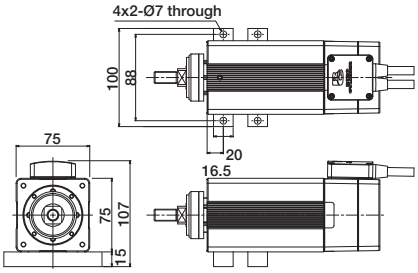
<RGS4R/RGD4R>

st	L1	L2
50	133	206
100	183	256
150	233	306
200	283	356
250	333	406
300	383	456

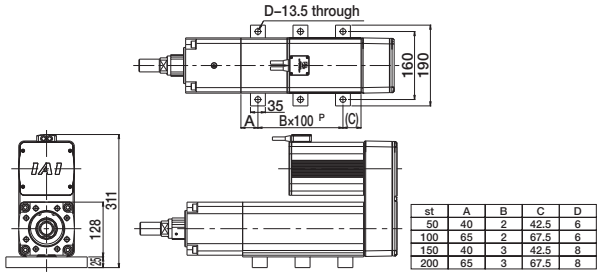
RCS2-RA5C / RA5R / RGS5C / RGD5C
Unit model RCS2-FT-RA5



RCS2-SRA7BD
Unit model RCS2-FT-SRA7



RCS2-RA13R
Unit model RCS2-FT-RA13



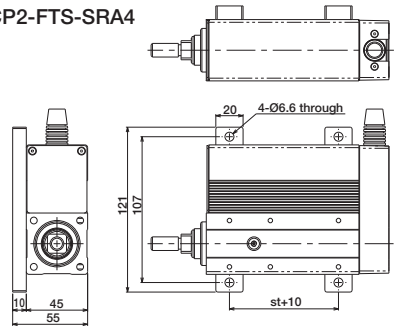
st	A	B	C	D
50	40	2	42.5	6
100	65	2	67.5	6
150	40	3	42.5	8
200	65	3	67.5	8

Foot (Mounted on right side face/left side face)

■Models FT2(Mounted on right side face)
FT4(Mounted on right side face)

Applicable models	RCP2 (RCA)-SRA4R
Description	A bracket for affixing the actuator using bolts from the top side. RCP2(RCA)-SRA4R can be mounted on the side face also.

RCP2 / RCA-SRA4R
Unit model RCP2-FTS-SRA4



Guide mounting direction (for single-guide type only)

■ Models GS2, GS3 and GS4

Applicable models	RCP2 (RCA)-SRGS4R RCS2-RGS5C / SRA7BD
Description	For the single-guide model, the mounting position of the rod can be selected from the right (GS2), bottom (GS3), or left side (GS4).

High acceleration/deceleration

■ Models HA

Applicable models	RCA-SA4C / SA5C / SA6C / RA3C / RA4C RCS2-SA4C / SA5C / SA6C / SA7C / RA4C / RA5C
Description	Option to increase to 1G the standard acceleration rate of 0.3G. An actuator with 1G of acceleration can be operated with the same load capacity as the 0.3G unit. The controller settings are different from the standard specification, so when operating with high acceleration, the controller also needs to be set to the high acceleration specification.

Home check sensor

■ Models HS

Applicable models	Slider Type	RCA (RCACR)-SA4C / SA5C / SA6C, RCS2 (RCS2CR)-SA4C / SA5C / SA6C RCA-SA4R / SA5R / SA6R and RCS2-SA4R / SA5R / SA6R
	Rod Type	RCA-RA3C / RA3D / RA3R / RA4C / RA4D / RA4R and RCS2-RA4C / RA4D / RA4R
Description	When an actuator is instructed to return home, this sensor checks to make sure that the slider moves to the home position. * This cannot be used with the reversed-home specification for rod types.	

Connector cable exit direction

■ Models K1, K2 and K3

Applicable models	RCA2-RN□NA / RP□NA / GS□NA / GD□NA / TCA□NA / TWA□NA / TFA□NA RCS2-RN5N / RP5N / GS5N / GD5N / SD5N /TCA5N / TWA5N / TFA5N
Description	Connector cable outlet direction can be changed to left (K1), from the front to the rear(K2) and to right (K3).

Limit switch

■ Models L

Applicable models	Rotary Type RCS2-RT6 / RT6R / RT7R
Description	When home return is performed, the home will be determined after the actuator reverses following contact with the mechanical end. This optional sensor is used to detect this reversing.(However, with the rotary type, all models will have the standard settings.)

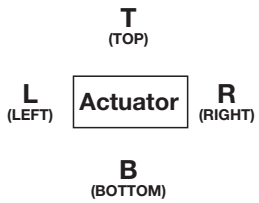
Low power compatible

■ Models LA

Applicable models	RCA / RCA2 / RCACR / RCA Series, all models
Description	This option decreases the power capacity of the controller. With the standard specification and high-speed acceleration specification, the maximum is 5.1A, but if the low-power specification is selected, the maximum decreases to 3.4A. (The maximum values differ for some models, so see the power capacities of the ACON/ASEL controllers for details.)

Side-Mounted Motor Orientation

■ Models MB, ML, MR and MT



Applicable models	All side-mounted motor type models
Description	These abbreviations specify the motor reversing direction of the motor reversing type. Viewed from the motor side, downward reversing is MB (arm type only), leftward reversing is ML (all models), rightward reversing is MR (all models), and upward reversing is MT (limited to RCS2-RA13R). The arm type is MB, but for other models, ML is standard. (MT has different criteria for RCS2-RA13R.)

No cover

■ Models NCO

Applicable models	RCP3 (RCA2)-SA3C / SA4C / SA5C / SA6C / SA3R / SA4R / SA5R / SA6R
Description	By removing the cover from the actuator, the cost reduction can be achieved and the maintainability can be enhanced.

Reversed-home specification

■ Models NM

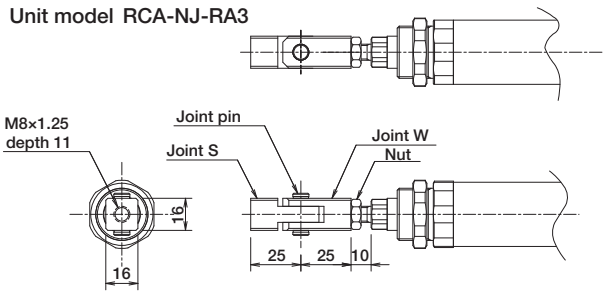
Applicable models	All slider-type models All rod-type, table-type, arm-type, and flat-type models (* excluding RCP2-RA2C / SRA4R / RA10C, RCA2-RN / RP / GS / GD / SD / TCA / TWA / TFA □N, RCA-SRA4R and RCS2-RA5C / RA5R / SRA7BD / RA13R)
Description	The normal home position is set by the slider and rod on the motor side, but there is the option for the home position to be on the other side to accomodate variations in device layout, etc. (Note: Home position settings are factory settings. Changes to these settings after the product is delivered will require shipping the product back to IAI for re-setting.)

Knuckle joint

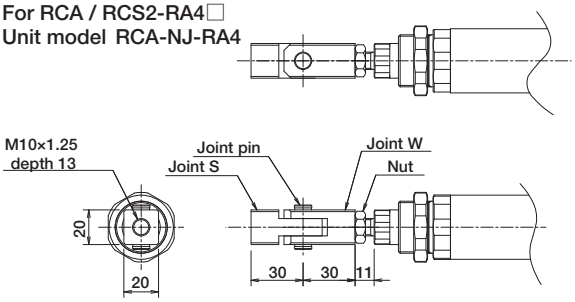
■ Models NJ

Applicable models	Rod Type	RCA-RA3C / RA3D / RA3R / RA4C / RA4D / RA4R RCS2-RA4C / RA4D / RA4R
Description	Clevis or trunnion fittings give rotational freedom of movement for the ends of the actuator rods.	

For RCA-RA3□
Unit model RCA-NJ-RA3



For RCA / RCS2-RA4□
Unit model RCA-NJ-RA4



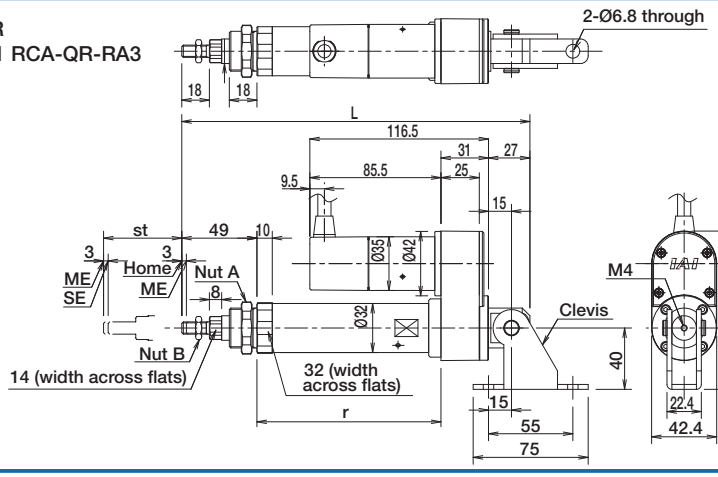
Clevis

■ Models QR

Applicable models	Rod Type	RCA-RA3R / RA4R RCS2-RA4R
Description	A bracket for aligning the cylinder movement when the load installed at the tip of the rod moves in a direction different from the rod.	

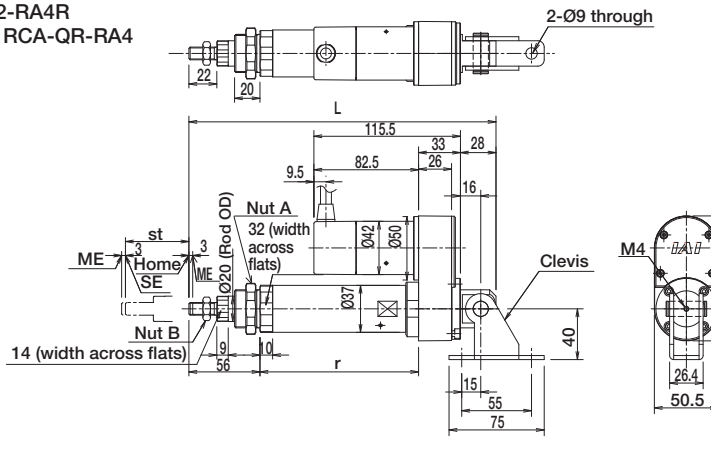
Caution If the rod is to be moved with a clevis bracket attached to it, use a guide type or install an external guide to prevent the rod from receiving any load other than from its moving direction.

RCA-RA3R
Unit model RCA-QR-RA3



st	ℓ	L
50	120	227
100	170	277
150	220	327
200	270	377

RCA / RCS2-RA4R
Unit model RCA-QR-RA4



st	ℓ	L
50	125	242
100	175	292
150	225	342
200	275	392
250	325	442
300	375	492

Rod end extension specification

■ Models RE

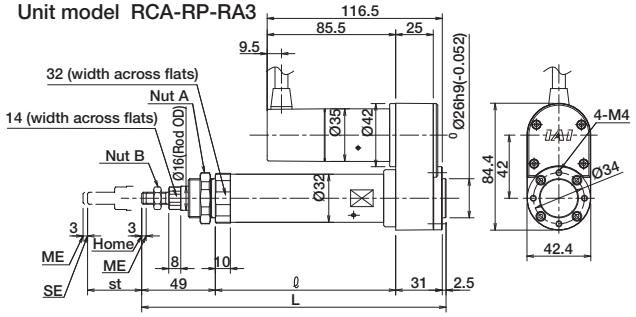
Applicable models	RCS2-SRA7BD
Description	An adapter for extending the rod end so that the distance between the mounting hole and the rod end can be the same as that of RCS2-RA7BD.

Rear mounting plate

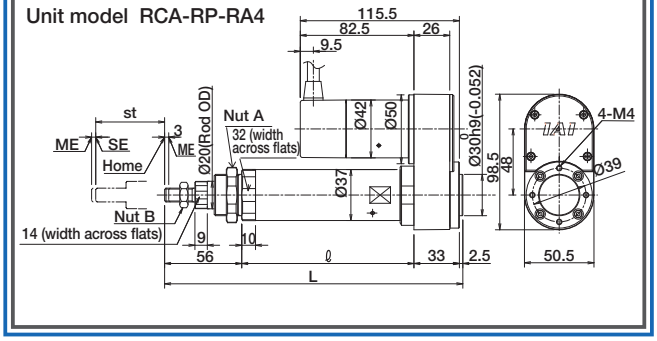
■ Models RP

Applicable models	Motor reversing rod types RCA-RA3R / RA4R and RCS2-RA4R
Description	A bracket (plate) for affixing the back of a motor-reversing rod type (RA3R/RA4R) to the system.

For RCA-RA3R
Unit model RCA-RP-RA3



For RCA / RCS2-RA4R
Unit model RCA-RP-RA4

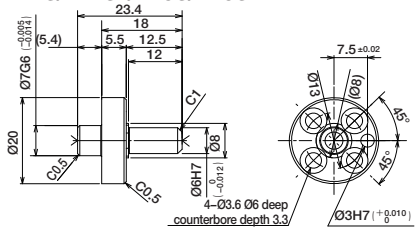


Shaft adapter

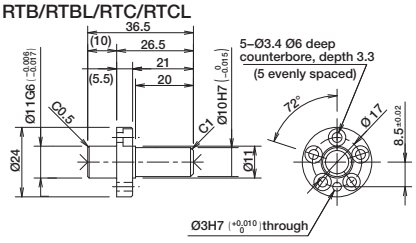
■ Models SA

Applicable models	All RCP2 rotary type models
Description	An adapter for installing a jig, etc., onto the rotating part of a rotary type.

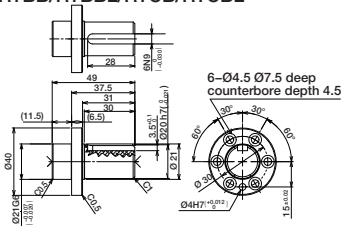
RTBS/RTBSL/RTCS/RTCSL



RTB/RTBL/RTC/RTCL

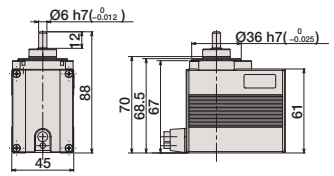


RTBB/RTBBL/RTCB/RTCBL



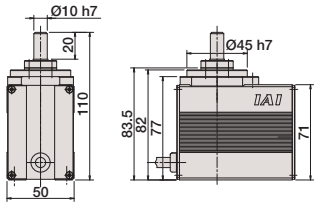
Combined w/ RCP2-RTBS/RTBSL

Configuration: RCP2-SA-RTS
(Weight: 0.02kg)



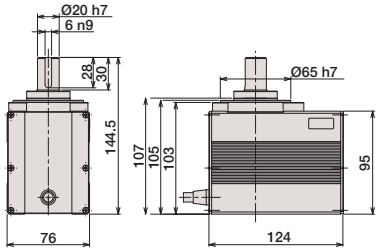
Combined w/ RCP2-RTB/RTBL

Configuration: RCP2-SA-RT
(Weight: 0.04kg)



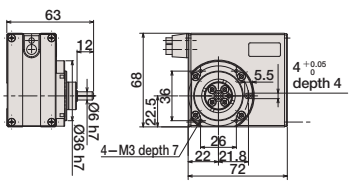
Combined w/ RCP2-RTB/RTBBL

Configuration: RCP2-SA-RTB (Weight: 0.2kg)



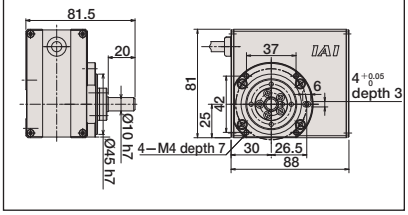
Combined w/ RCP2-RTCS/RTCSL

Configuration: RCP2-SA-RTS
(Weight: 0.02kg)



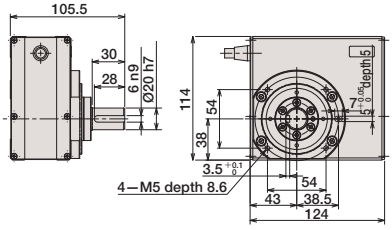
Combined w/ RCP2-RTC/RTCL

Configuration: RCP2-SA-RT
(Weight: 0.04kg)



Combined w/ RCP2-RTCB/RTCBL

Configuration: RCP2-SA-RTB
(Weight: 0.2kg)



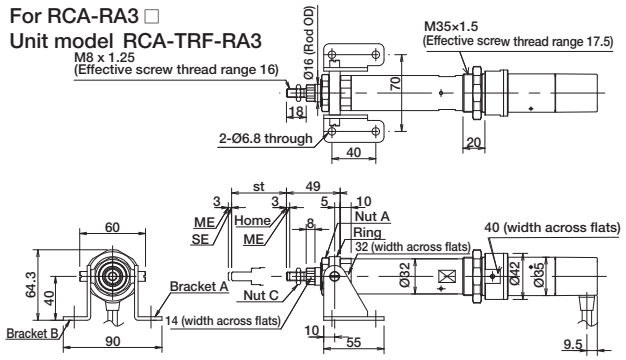
Front trunnion

■ Models TRF

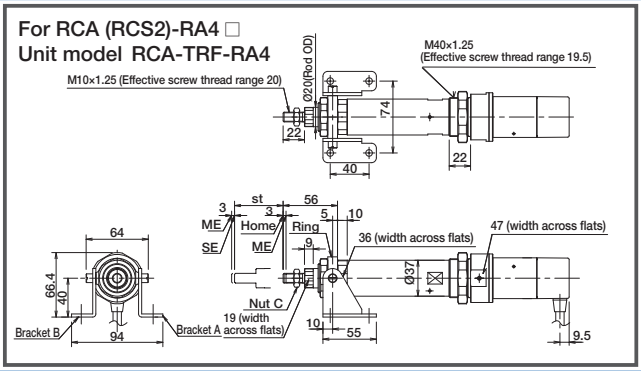
Applicable models	Rod Type	RCA-RA3C / RA3D / RA3R / RA4C / RA4D / RA4R RCS2-RA4C / RA4D / RA4R
Description	A bracket for aligning the cylinder movement when the load installed at the tip of the rod moves in a direction different from the rod.	

Caution If a rod is moved with a trunnion bracket mounted to it, use a guide type or install an external guide so no load is applied to the rod in a direction other than the proper direction the rod travels.

For RCA-RA3 □
Unit model RCA-TRF-RA3



For RCA (RCS2)-RA4 □
Unit model RCA-TRF-RA4



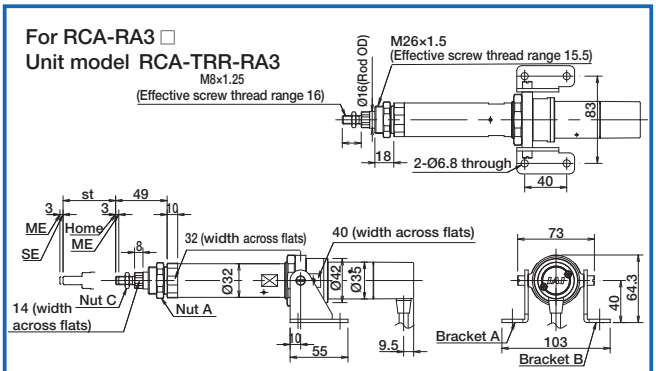
Rear trunnion

■ Models TRR

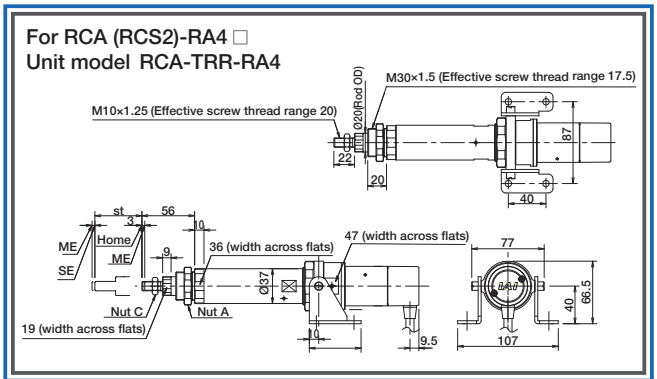
Applicable models	Rod Type	RCA-RA3C / RA3D / RA4C / RA4D RCS2-RA4C / RA4D
Description	A bracket for aligning the cylinder movement when the load installed at the tip of the rod moves in a direction different from the rod.	

Caution If a rod is moved with a trunnion bracket mounted to it, use a guide type or install an external guide so no load is applied to the rod in a direction other than the proper direction the rod travels.

For RCA-RA3 □
Unit model RCA-TRR-RA3



For RCA (RCS2)-RA4 □
Unit model RCA-TRR-RA4



Vacuum joint mounted on opposite side

■ Models VR

Applicable models	All cleanroom type models
Description	Looking from the motor side, the standard position for the vacuum joint is on the left side of the actuator, but this option allows users to change the position to the opposite side (right side).

Selection Guide (Push Force / Continuous Operation Thrust)

RCS2 Series Ultra-high-thrust Rod Type

The following three conditions must be met when using this device.
Condition 1: The pushing time must be less than the time determined.
Condition 2: One cycle of continuous thrust must be less than the rated thrust for an ultra-high-thrust actuator.
Condition 3: There must be one pushing operation in one cycle.

Selection Method

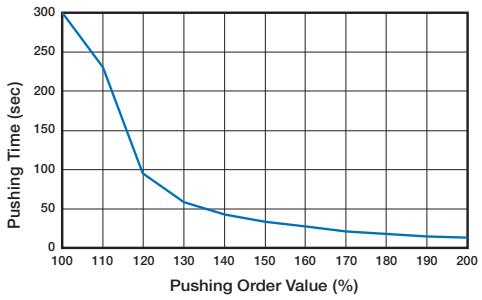
Condition 1. Pushing Time

The maximum pressing time for each pressing order must be determined as shown in the table below. The pressing time used must be less than the time indicated in the table below.
Actuator malfunction could result if the process is used without adhering to the table below.

Table 1

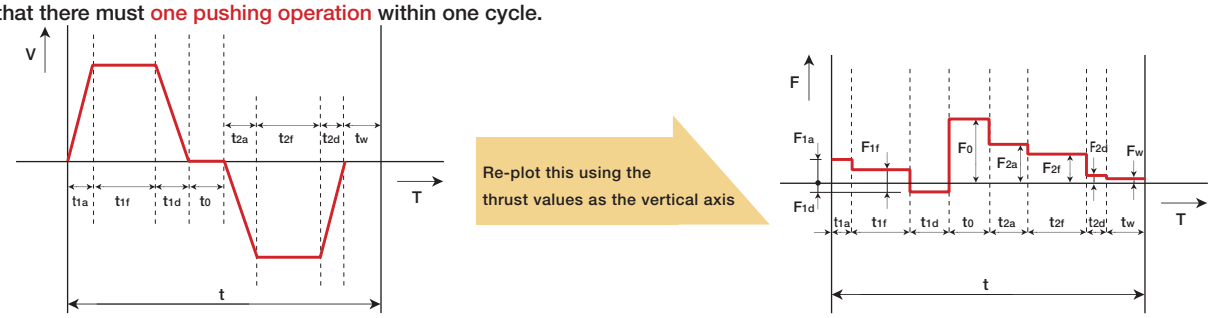
Pushing Order Value (%)	Maximum Pushing Time (sec)
70 or less	(Continuous pushing possible)
80~100	300
110	230
120	95
130	58
140	43
150	33
160	27
170	21
180	18
190	15
200	13

[Pushing Time]



Condition 2. Continuous Operation Thrust

Confirm that 1 cycle of continuous operation thrust Ft, based on a consideration of load and duty, is less than that of the rated thrust for a ultra-high-thrust actuator.
Note that there must one pushing operation within one cycle.



t : Operation duration per cycle (s)	t_{2a} : Acceleration duration2
t_{1a} : Acceleration duration1	t_{2f} : Constant speed duration2
t_{1f} : Constant speed duration1	t_{2d} : Deceleration duration2
t_{1d} : Deceleration duration1	t_w : Waiting duration
t_o : Pushing duration	

F_{1a} : Thrust1 needed for acceleration	F_{2a} : Thrust2 needed for acceleration
F_{1f} : Thrust1 needed for motion at constant speed	F_{2f} : Thrust2 needed for motion at constant speed
F_{1d} : Thrust1 needed for deceleration	F_{2d} : Thrust2 needed for deceleration
F_0 : Thrust needed for pushing	F_w : Thrust needed for waiting

Use the equation below to calculate the continuous operation thrust Ft for one cycle.

$$Ft = \sqrt{\frac{F_{1a}^2 \times t_{1a} + F_{1f}^2 \times t_{1f} + F_{1d}^2 \times t_{1d} + F_0^2 \times t_o + F_{2a}^2 \times t_{2a} + F_{2f}^2 \times t_{2f} + F_{2d}^2 \times t_{2d} + F_w^2 \times t_w}{t}}$$

* For horizontal use, it is not necessary to calculate the thrust needed for constant speed motion and for waiting.

- Since $F_{1a}/F_{2a}/F_{1d}/F_{2d}$ will change with the direction of motion, use the equations below.

Horizontal use (for both accel./decel.)	$F_{1a} = F_{1d} = F_{2a} = F_{2d} = (M+m) \times d$
Vertical use, downward acceleration	$F_{1a} = (M+m) \times 9.8 - (M+m) \times d$
Vertical use, constant downward speed	$F_{1f} = (M+m) \times 9.8 + \alpha$(*1)
Vertical use, downward deceleration	$F_{1d} = (M+m) \times 9.8 + (M+m) \times d$
Vertical use, upward acceleration	$F_{2a} = (M+m) \times 9.8 + (M+m) \times d$
Vertical use, constant upward motion	$F_{2f} = (M+m) \times 9.8 + \alpha$(*1)
Vertical use, upward deceleration	$F_{2d} = (M+m) \times 9.8 - (M+m) \cdot d$
Vertical use, waiting	$F_W = (M+m) \times 9.8$

M : Moveable weight (kg)
m : Loaded weight (kg)
d : Accel./decel. (m/s^2)
α : Thrust (taking into account the travel resistance by the external guide.)

Moveable weight for ultra-high-thrust actuator: 9kg

*1 If an external guide is attached, it is necessary to consider travel resistance.

● The method of calculating t□a, which is the acceleration duration, will vary for ① trapezoidal pattern vs. ② triangular patter movements.
Whether a movement pattern is trapezoidal or triangular can be determined by whether the peak speed reached after accelerating over a distance at a specified rate is greater than or less than the specified speed.

Peak Speed (Vmax)= $\sqrt{\text{Distance Moved (m)} \times \text{Set Acceleration (m/s}^2\text{)}}$

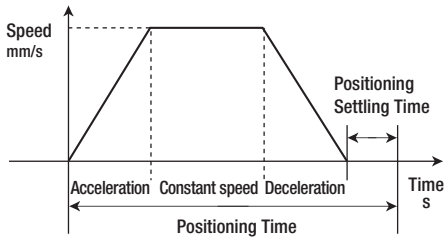
Set Speed < Peak Speed → ① Trapezoidal Pattern

Set Speed > Peak Speed → ② Triangular Pattern

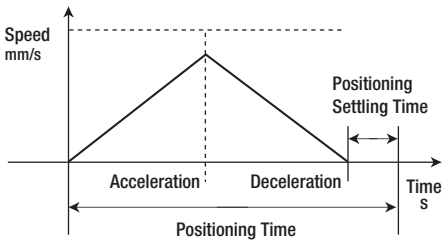
① For trapezoidal pattern,
t□a=Vs/a Vs : Set speed (m/s) a : Ordered acceleration (m/s²)

② For triangular pattern
t□a=Vt/a Vt : Peak speed (m/s) a : Ordered acceleration (m/s²)

① Trapezoidal Pattern



② Triangular Pattern



● t□f is the time taken to move at constant speed. You can calculate this time by computing the distance moved at constant speed.
t□f= Lc/V Lc : Distance moved at constant speed (m) V : Commanded acceleration (m/s)

* Distance moved at constant speed = total distance – accelerated distance – decelerated distance Accel./decel. distance = V²/2a

● t□d is the deceleration time. This is the same as the acceleration time, if the magnitude of acceleration and deceleration are the same.
t□d=V/a V : Set speed (trapezoidal pattern) or Peak speed (triangular pattern)(m/s) a : Commanded deceleration (m/s²)

If the continuous operation thrust Ft by this method is less than the rated thrust, then operation is possible.

Rated thrust for ultra-high-thrust actuator with 2.5 lead: 5100N	Rated thrust for ultra-high-thrust actuator with 1.25 lead: 10200N

Operation is possible if both of the above operating conditions 1 and 2 are met.
If either condition cannot be met, make adjustments such as shortening the pushing operation time or decreasing the duty.

Sample Problem

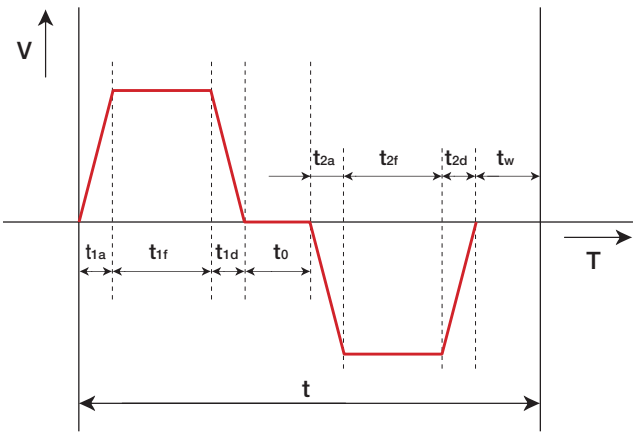
■ Select an operation pattern by using the selection method described above.

Operating Conditions

- Model used : Ultra-high-thrust actuator with 1.25 lead
- Mounting orientation : Vertical
- Speed : 62mm/s
- Acceleration : 0.098m/s² (0.01G, same value for deceleration.)
- Distance moved : 50mm
- Payload : 100kg
- Push order value : 200% (2000kgf)
- Pushing Time : 3 seconds
- Wait time : 2 seconds
- Push down 50mm, then raise 50mm, and finally wait 2 seconds.
  The conditions for downward and upward motions are identical.

Plotting the above operation yields the graph on the right.

1G = 9.8m/s²



Selection Guide (Push Force / Continuous Operation Thrust)

Using the selection method:

Condition 1. Confirm push operation time

By comparing our push time of 3 seconds with the maximum push time for a push order value of 200%, which is 13 seconds (see Table 1 on page A-71), it is clear that the pressing time is acceptable.

Condition 2. Calculate the continuous operation thrust

Substitute the above operational pattern to the previously mentioned equation for continuous operation thrust.

$$F_t = \sqrt{\frac{F_{1a}^2 \times t_{1a} + F_{1f}^2 \times t_{1f} + F_{1d}^2 \times t_{1d} + F_0^2 \times t_0 + F_{2a}^2 \times t_{2a} + F_{2f}^2 \times t_{2f} + F_{2d}^2 \times t_{2d} + F_w^2 \times t_w}{t}}$$

At this point, by looking at the motion pattern for t1a/t1d/t2a/t2d, the peak speed (Vmax) $=\sqrt{0.05 \times 0.098} \rightarrow 0.07$m/s, which is greater that the set speed, 62mm/s (0.06m/s). Hence this is a trapezoidal pattern.

Hence, $t_{1a}/t_{1d}/t_{2a}/t_{2d} = 0.062 \div 0.098 \rightarrow 0.63$s

Next, calculate t_{1f}/t_{2f}:
Distance moved at constant speed $= 0.05 - \{(0.062 \times 0.062) \div (2 \times 0.098)\} \times 2 \rightarrow 0.011$m, so $t_{1f}/t_{2f} = 0.011 \div 0.062 \rightarrow 0.17$s.

Also, calculating the F1a/F1f/F1d/F2a/F2f/F2d from the equations yields the following:
$F_{1a} = F_{2d} = (9+100) \times 9.8 - (9+100) \times 0.098 \rightarrow 1058$N
$F_{1d} = F_{2a} = (9+100) \times 9.8 + (9+100) \times 0.098 \rightarrow 1079$N
$F_{1f} = F_{2f} = f_w = (9+100) \times 9.8 \rightarrow 1068$N

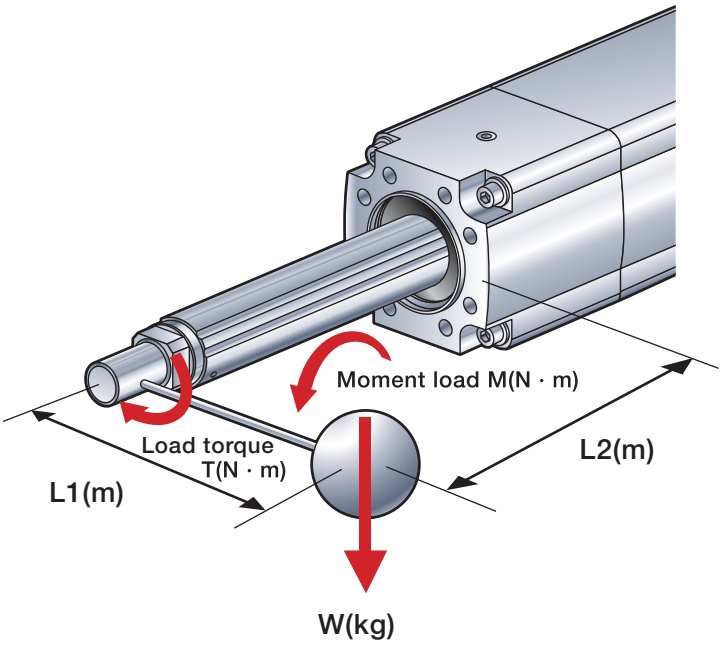
By substituting these values to the continuous operation thrust equation,

$$F_t = \sqrt{\{(1058 \times 1058) \times 0.63 + (1068 \times 1068) \times 0.17 + (1079 \times 1079) \times 0.63 + (19600 \times 19600) \times 3 + (1079 \times 1079) \times 0.63 + (1068 \times 1068) \times 0.17 + (1058 \times 1058) \times 0.63 + (1068 \times 1068) \times 2\} \div (0.63+0.17+0.63+3+0.63+0.17+0.63+2)} \rightarrow 12113\text{N}$$

Since this exceeds the rated thrust for the 2-ton ultra-high-thrust actuator, which is 10200N, operation with this pattern is not possible.

In response, let us increase the wait time. (i.e. decrease the duty)
Recalculating with tw=6.12s(t=12s) will change the thrust to F_t=9814N, making it operable.

Information on Moment Selection



The ultra-high-thrust actuator can apply a load on the rod within the range of conditions calculated below.

$M+T \leqq 120$ (N · m)
Moment Load $M = Wg \times L_2$
Load Torque $T = Wg \times L_1$

* g = Gravitational acceleration 9.8
* L1 = Distance from the center of rod to the center of gravity of the work piece
* L2 = Distance from the actuator mounting surface to the center of gravity of the work piece + 0.07

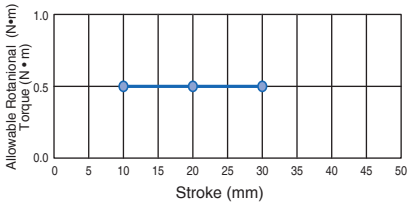
If the above condition is not met, consider installing an external guide, or the like, so that the load is not exerted on the rod.

Guide-Equipped Type RCA2/ERC2/RCP2/RCA/RCS2

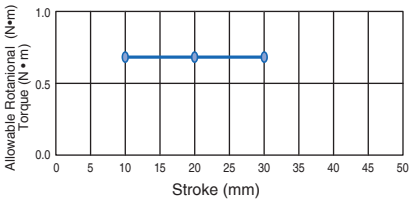
Allowable Rotating Torque

The allowable torque for each model is as shown below.
When rotational torque is exerted, use within the range of the values below. Further, single-guide types cannot be subjected to rotational torque.

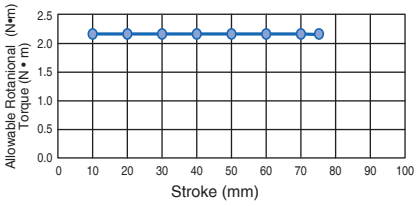
RCA2-GD3NA Type



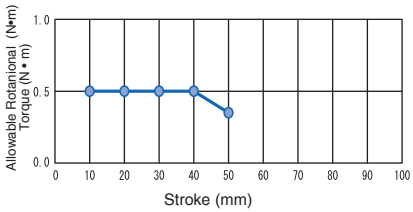
RCA2-GD4NA Type



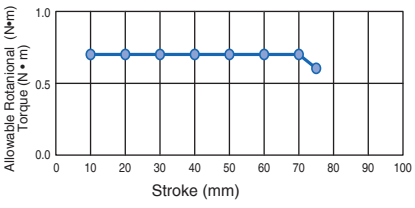
RCS2-GD5N Type



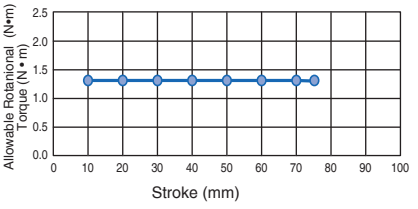
RCA2-SD3NA Type



RCA2-SD4NA Type

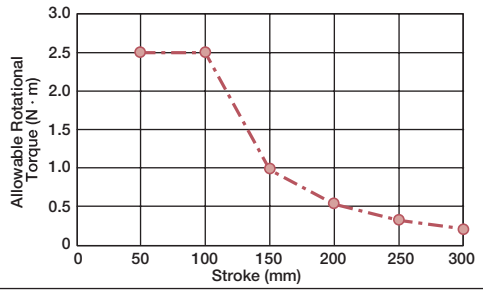


RCS2-SD5N Type



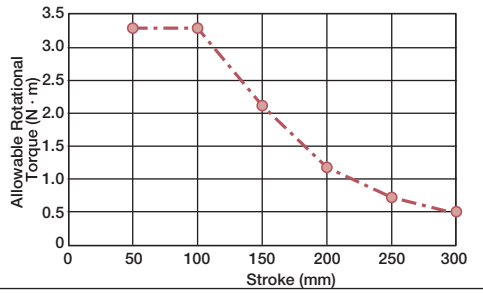
ERC2-RGD6C Type

■ Double-guide



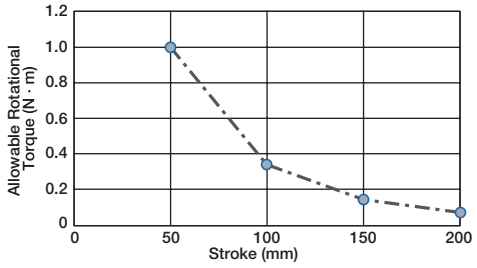
ERC2-RGD7C Type

■ Double-guide



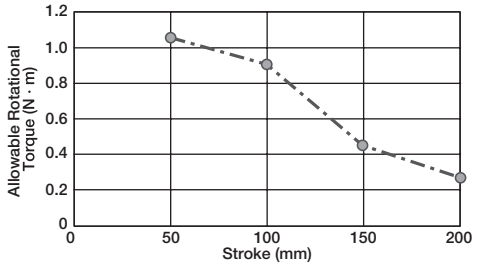
RCA / RCS2-RGD3□ Type

■ Double-guide



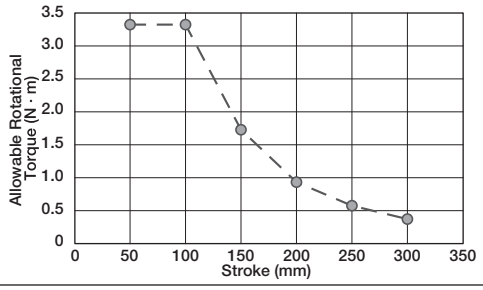
RCS2-RGD4□ Type

■ Double-guide



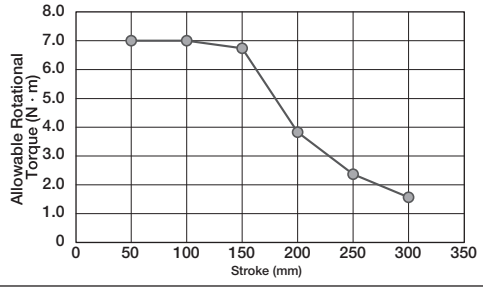
RCS2-RGD5C Type

■ Double-guide



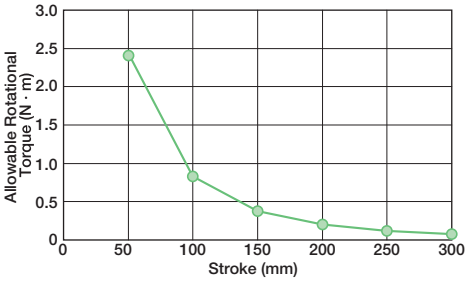
RCS2-SRGD7BD Type

■ Double-guide

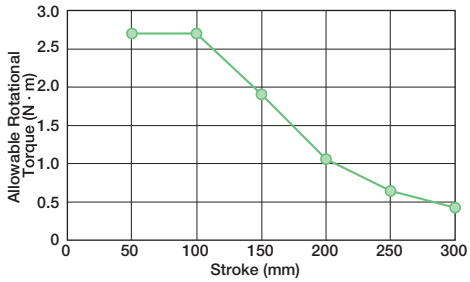


RCP2-RGD3C Type

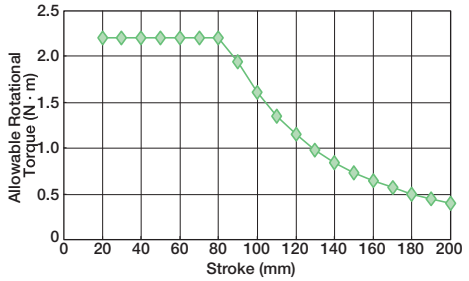
RCP2-RGD4C Type



RCP2-RGD6C Type



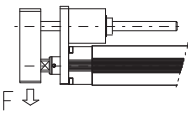
RCP2-SRGD4R Type



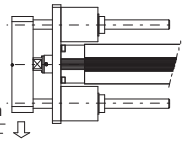
Relationship Between Allowable Load at Tip & Running Service Life

The greater the load at the guide tip, the shorter the running service life. Select the appropriate model, considering balance between load and service life.

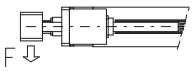
■ Single-guide type



■ Double-guide type
<Vertical>



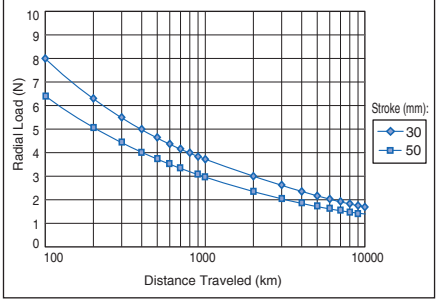
<Horizontal>



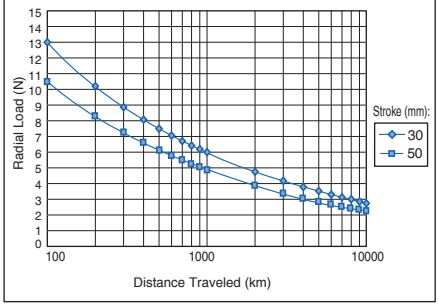
* The single-guide specification can only be used with vertical loads.

Single-guide

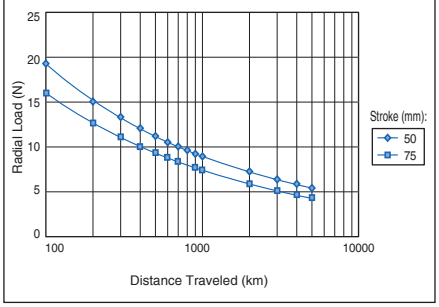
RCA2-GS3NA Type



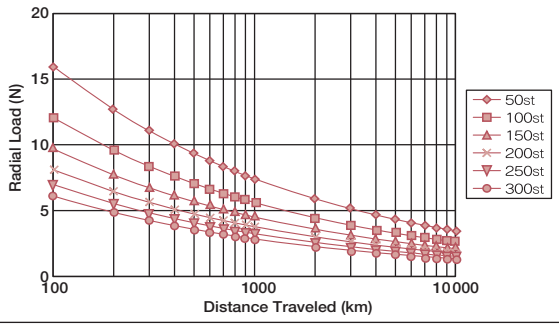
RCA2-GS4NA Type



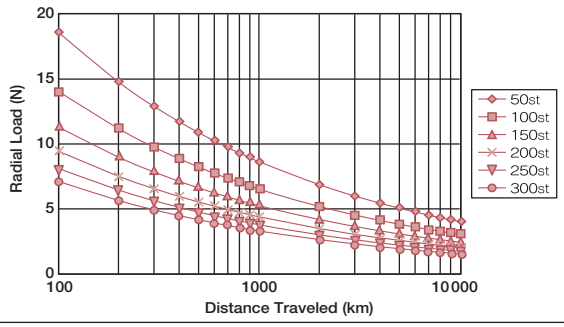
RCS2-GS5N Type



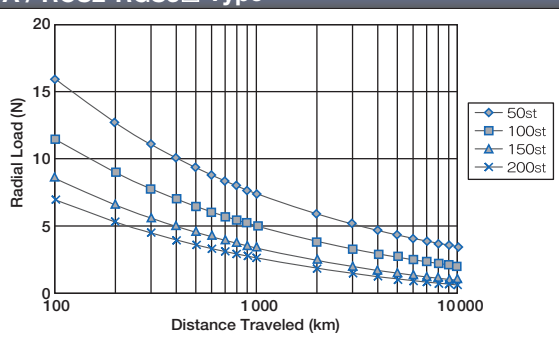
ERC2-RGS6C Type



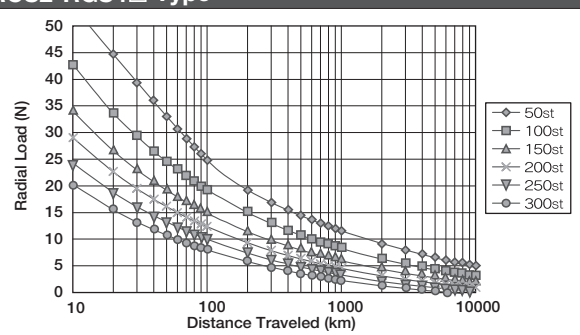
ERC2-RGS7C Type



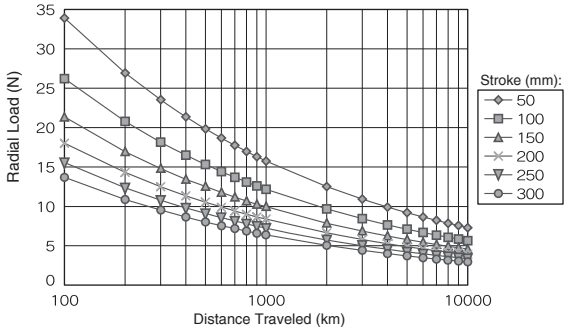
RCA / RCS2-RGS3□ Type



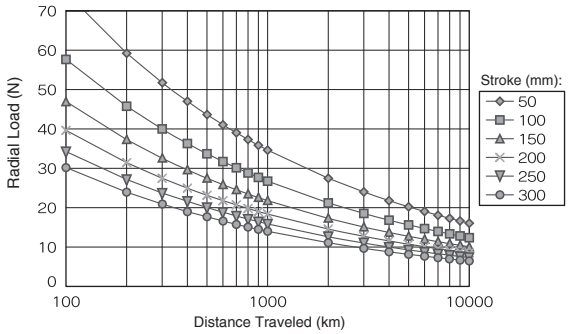
RCS2-RGS4□ Type



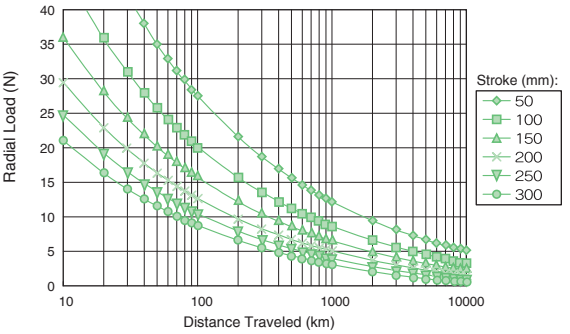
RCS2-RGS5C Type



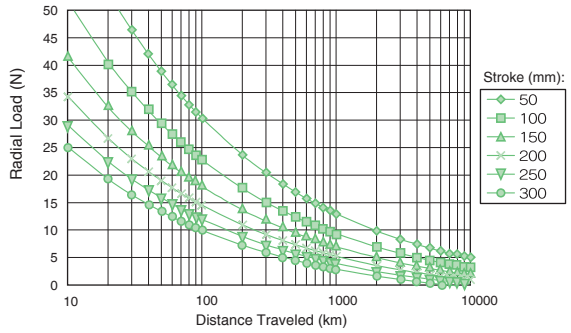
RCS2-SRGS7BD Type



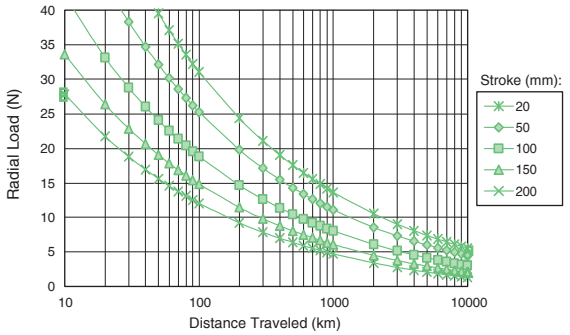
RCP2-RGS4C Type



RCP2-RGS6C Type

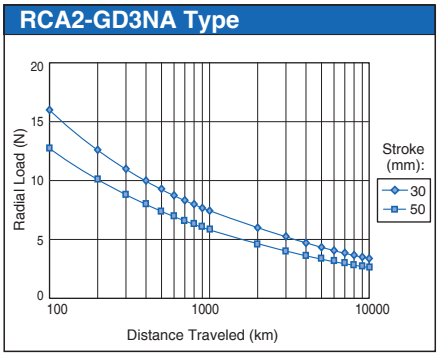


RCP2-SRGS4R Type

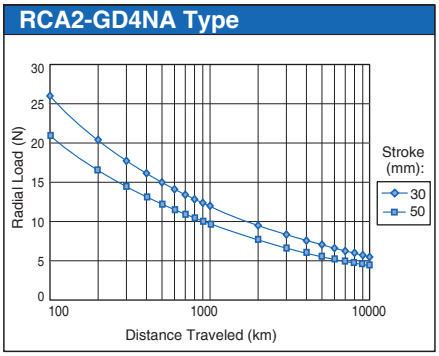


Double-Guide

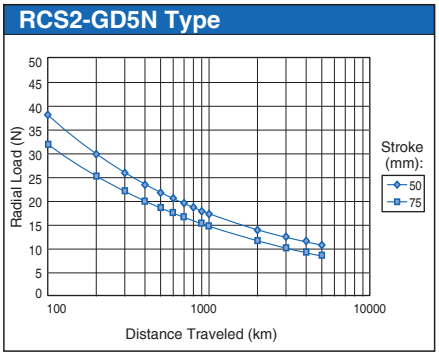
RCA2-GD3NA Type



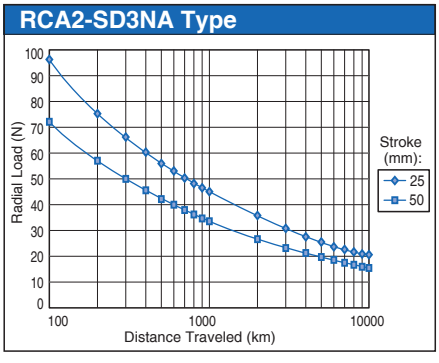
RCA2-GD4NA Type



RCS2-GD5N Type



RCA2-SD3NA Type



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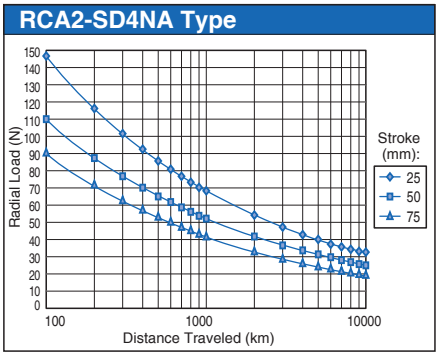

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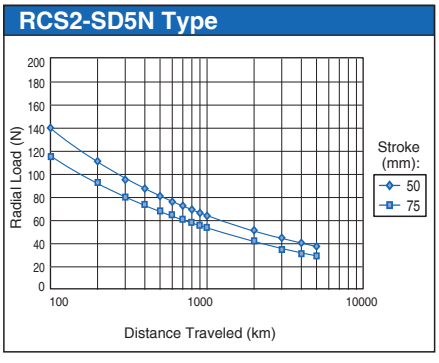
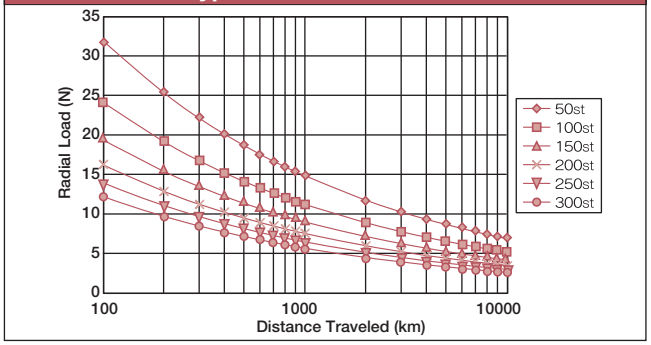
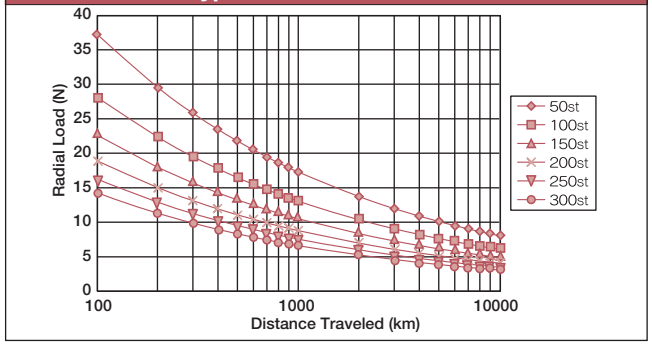


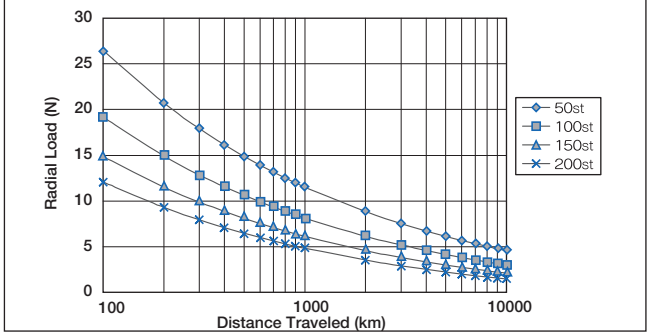
ERC2-RGD6C Type



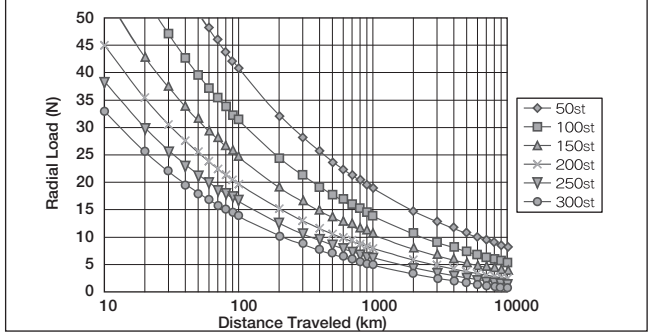
ERC2-RGD7C Type



RCA / RCS2-RGD3□ Type



RCS2-RGD4□ Type



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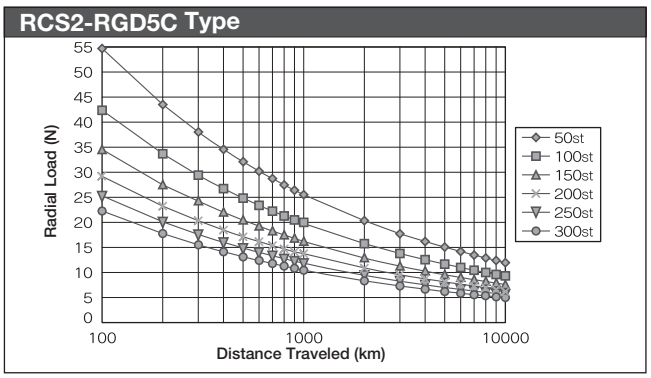
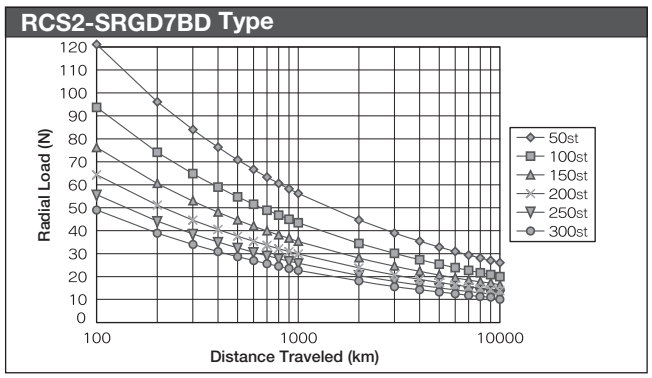
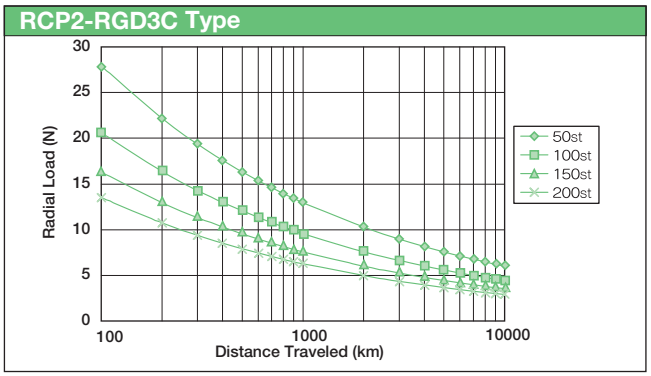


RCS2-SRGD7BD Type



RCP2-RGD3C Type



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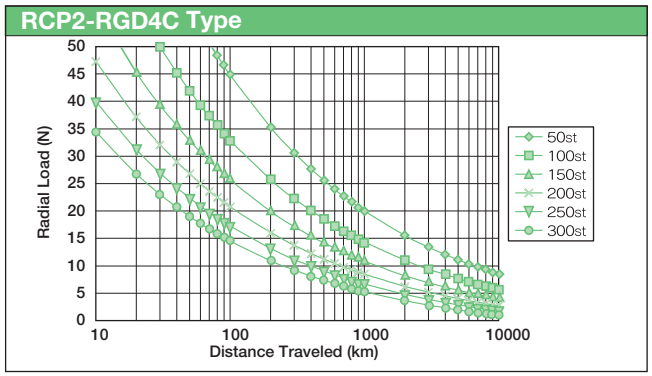

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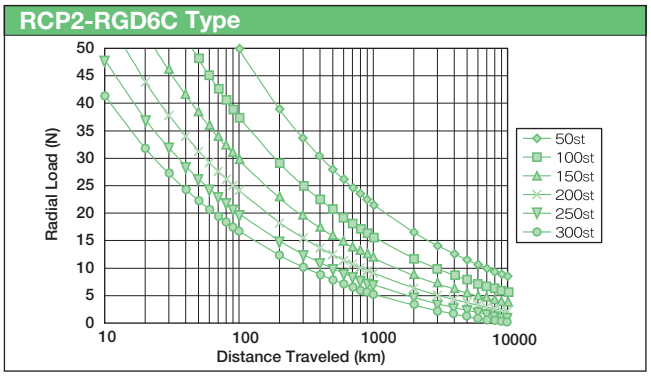
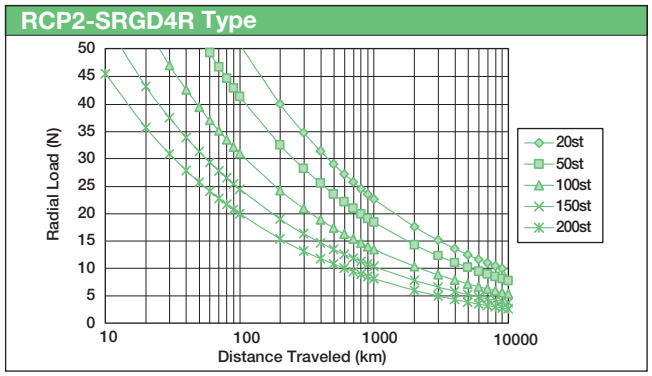


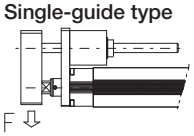
RCP2-SRGD4R Type



Radial Load & Tip Deflection

The graph below shows the correlation between the load exerted at the guide tip and the amount of deflection generated.

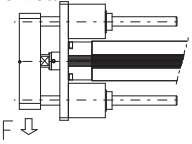
■ Single-guide type



* The single-guide specification can only be used with vertical loads.

■ Double-guide type

<Vertical>



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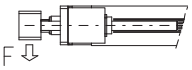
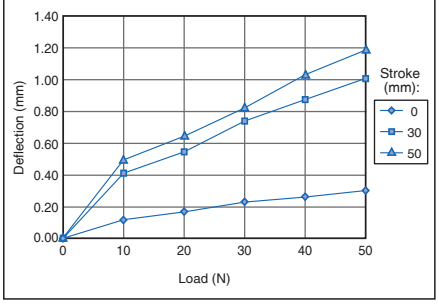
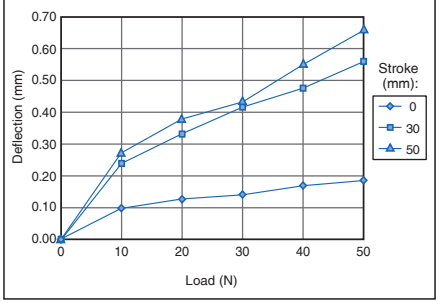


Single-guide

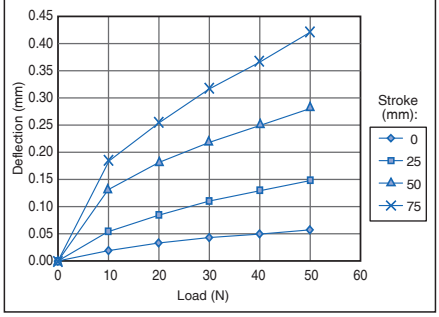
RCA2-GS3NA Type



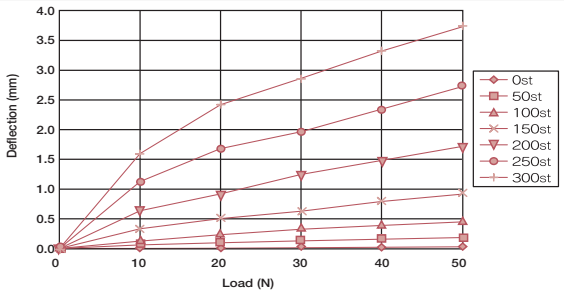
RCA2-GS4NA Type



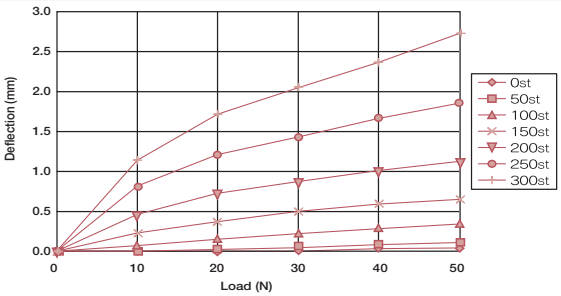
RCS2-GS5N Type



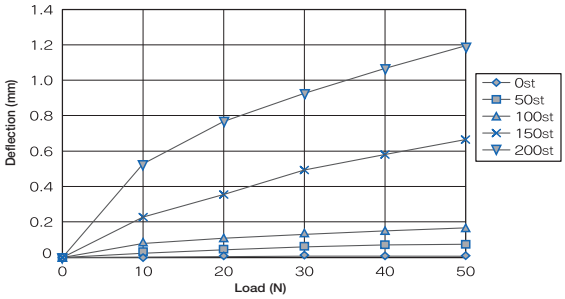
ERC2-RGS6C Type



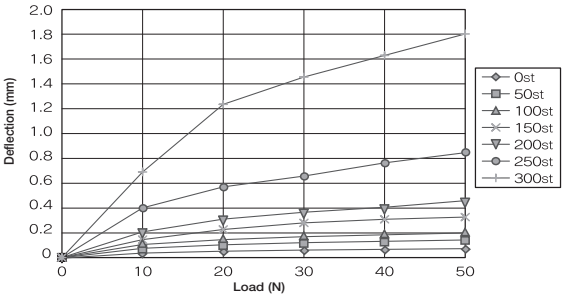
ERC2-RGS7C Type



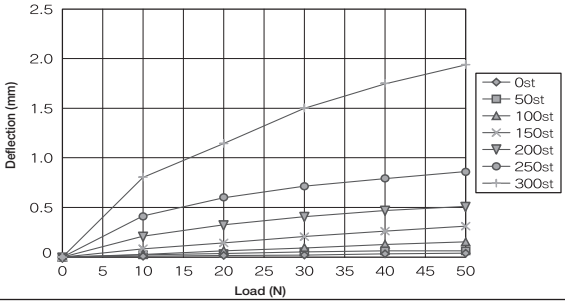
RCA / RCS2-RGS3□ Type



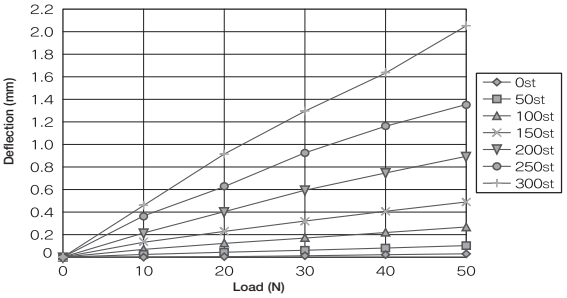
RCS2-RGS4□ Type



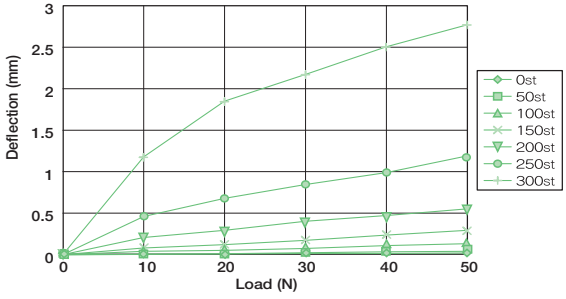
RCS2-RGS5C Type



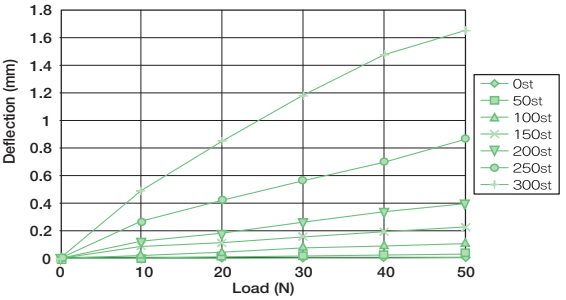
RCS2-SRGS7BD Type



RCP2-RGS4C Type

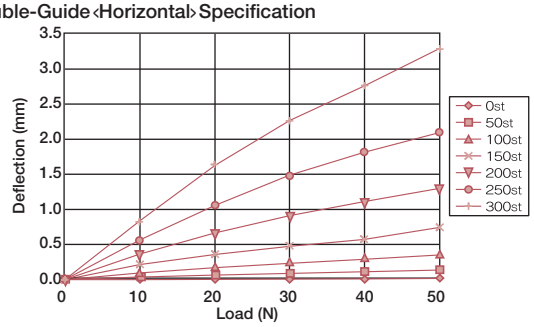


RCP2-RGS6C Type



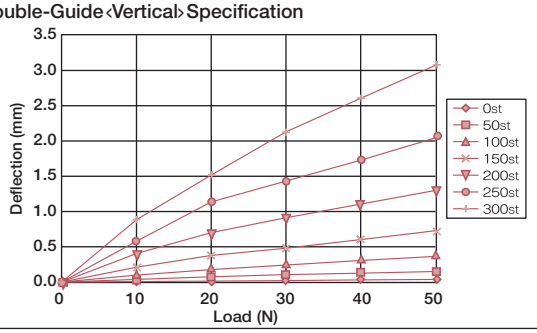
ERC2-RGD6C Type

■Double-Guide〈Horizontal〉Specification



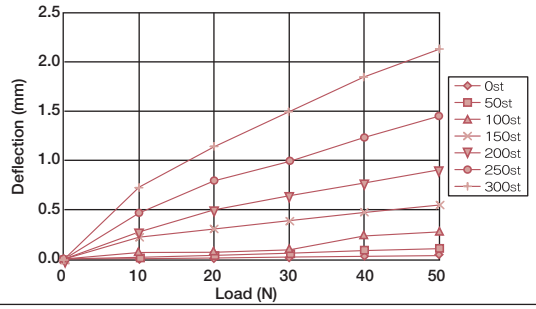
ERC2-RGD6C Type

■Double-Guide〈Vertical〉Specification



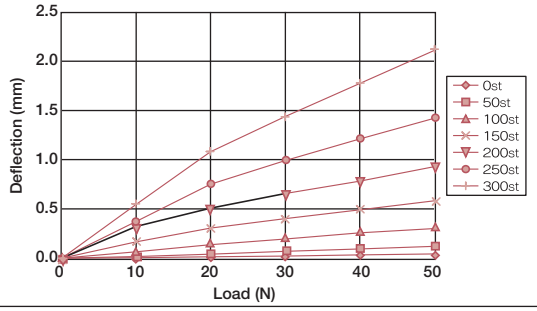
ERC2-RGD7C Type

■Double-Guide〈Horizontal〉Specification



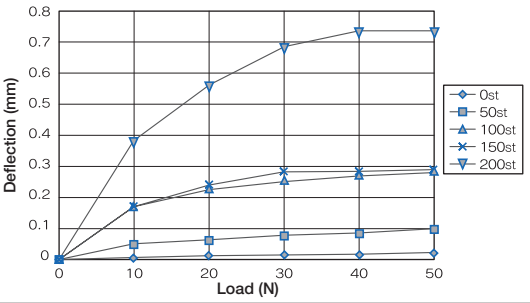
ERC2-RGD7C Type

■Double-Guide〈Vertical〉Specification



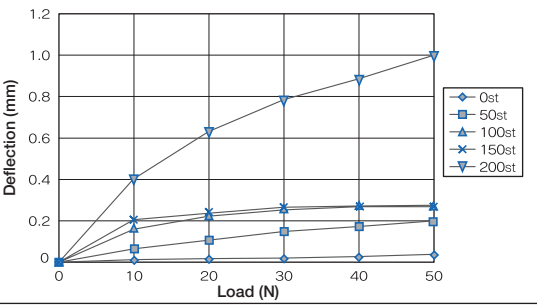
RCA / RCS-RGD3□ Type

■Double-Guide〈Horizontal〉Specification



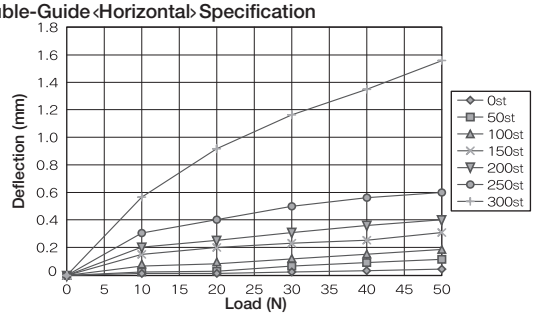
RCA / RCS-RGD3□ Type

■Double-Guide〈Vertical〉Specification



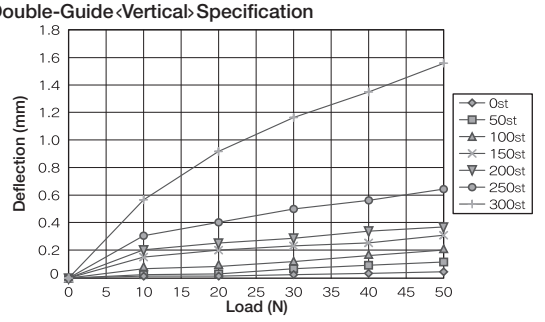
RCS2-RGD4□ Type

■Double-Guide〈Horizontal〉Specification



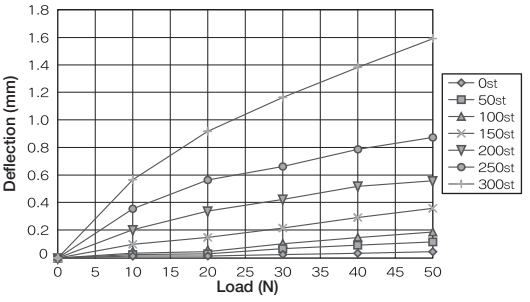
RCS2-RGD4□ Type

■Double-Guide〈Vertical〉Specification



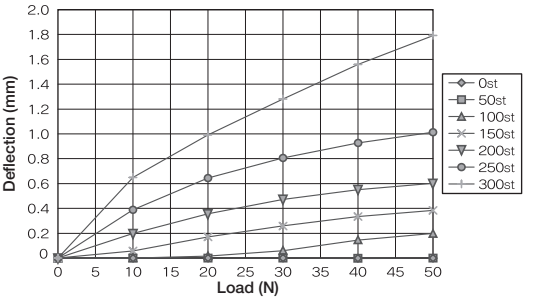
RCS2-RGD5C Type

■Double-Guide〈Horizontal〉Specification



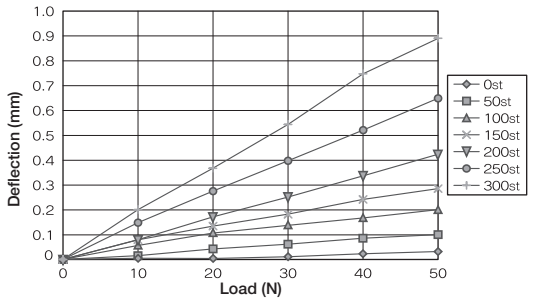
RCS2-RGD5C Type

■Double-Guide〈Vertical〉Specification



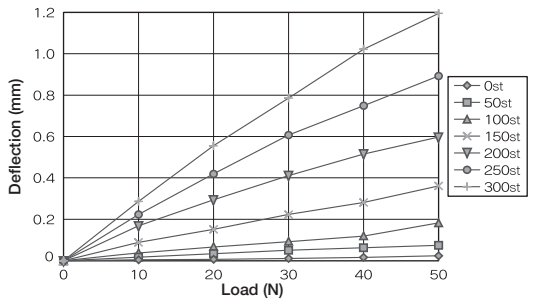
RCS2-SRGD7BD Type

■Double-Guide〈Horizontal〉Specification



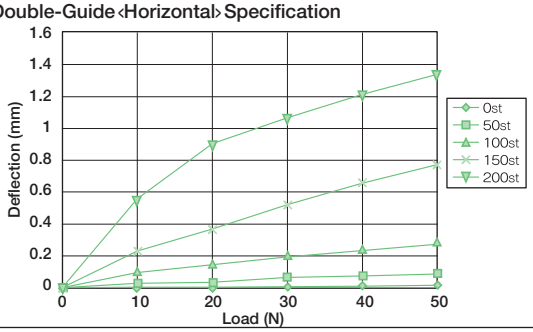
RCS2-SRGD7BD Type

■Double-Guide〈Vertical〉Specification



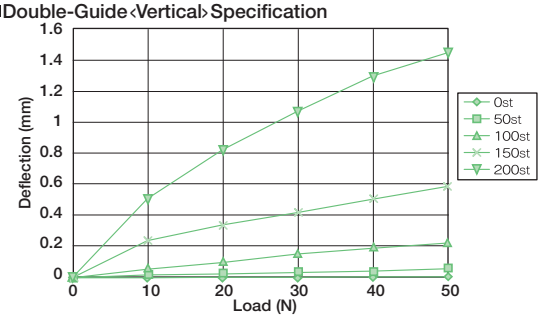
RCP2-RGD3C Type

■Double-Guide〈Horizontal〉Specification



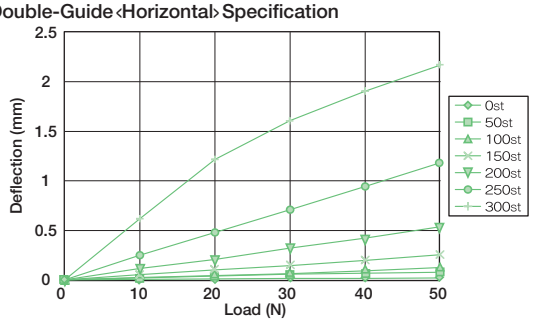
RCP2-RGD3C Type

■Double-Guide〈Vertical〉Specification



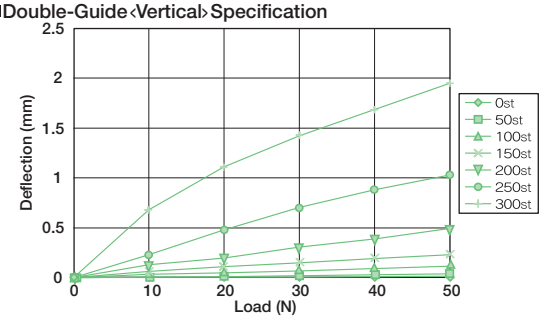
RCP2-RGD4C Type

■Double-Guide〈Horizontal〉Specification



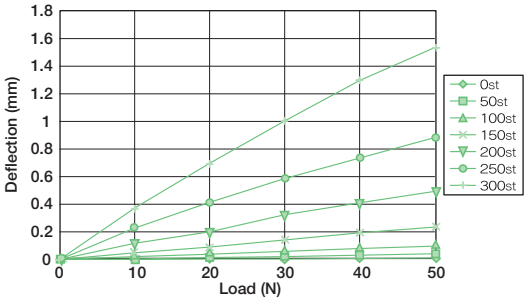
RCP2-RGD4C Type

■Double-Guide〈Vertical〉Specification



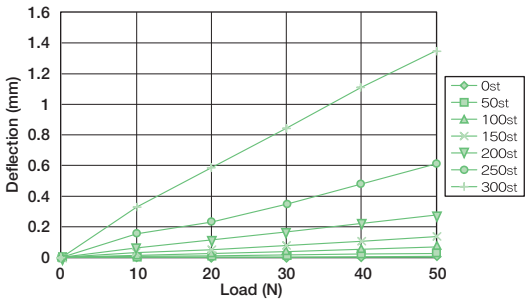
RCP2-RGD6C Type

■Double-Guide〈Horizontal〉Specification



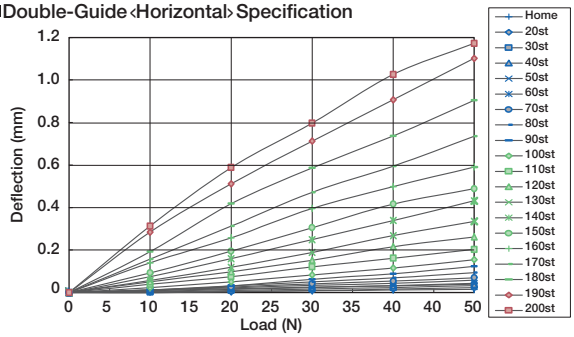
RCP2-RGD6C Type

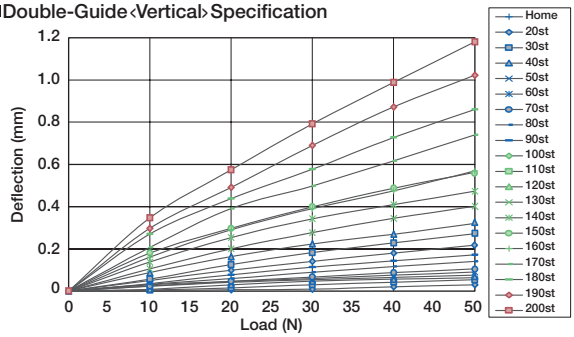
■Double-Guide〈Vertical〉Specification



RCP2-SRGD4R Type

■Double-Guide〈Horizontal〉Specification



RCP2-SRGD4R Type

■Double-Guide〈Vertical〉Specification