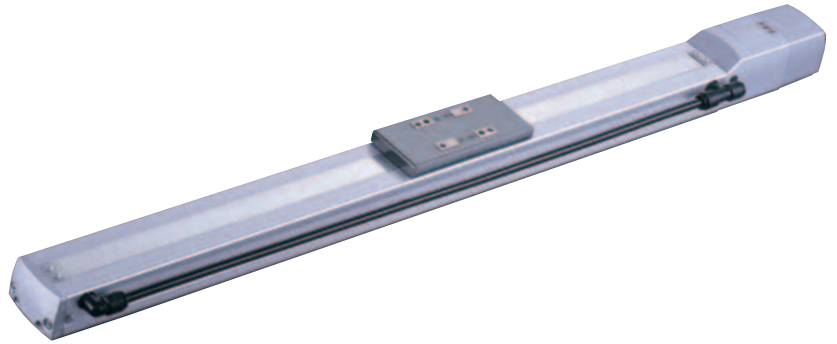




|                              |              |                         |               |            |            |           |     |
|------------------------------|--------------|-------------------------|---------------|------------|------------|-----------|-----|
| <b>RCS2</b><br><i>series</i> | Coupled Type | Aluminum Base           | 40mm width    | RCS2-SA4C  | 99         |           |     |
|                              |              |                         | 52mm width    | RCS2-SA5C  | 101        |           |     |
|                              |              |                         | 58mm width    | RCS2-SA6C  | 103        |           |     |
|                              |              |                         | 73mm width    | RCS2-SA7C  | 105        |           |     |
|                              |              | Steel Base              | 60mm width    | RCS2-SS7C  | 107        |           |     |
|                              |              |                         | 80mm width    | RCS2-SS8C  | 109        |           |     |
|                              |              | Built-in Type           | Aluminum Base | 40mm width | RCS2-SA4D  | 111       |     |
|                              |              |                         |               | 52mm width | RCS2-SA5D  | 113       |     |
|                              |              |                         |               | 58mm width | RCS2-SA6D  | 115       |     |
|                              | Slider       | Side-Mounted Motor Type | Aluminum Base | 40mm width | RCS2-SA4R  | 117       |     |
| 52mm width                   |              |                         |               | RCS2-SA5R  | 119        |           |     |
| 58mm width                   |              |                         |               | RCS2-SA6R  | 121        |           |     |
| 73mm width                   |              |                         |               | RCS2-SA7R  | 123        |           |     |
|                              |              |                         |               | Steel Base | 60mm width | RCS2-SS7R | 125 |
|                              |              |                         |               |            | 80mm width | RCS2-SS8R | 127 |

|                                |                      |                      |               |             |             |     |
|--------------------------------|----------------------|----------------------|---------------|-------------|-------------|-----|
| <b>RCS2CR</b><br><i>series</i> | Slider Coupling Type | Aluminum Base        | 40mm width    | RCS2CR-SA4C | 425         |     |
|                                |                      |                      | 52mm width    | RCS2CR-SA5C | 427         |     |
|                                |                      |                      | 58mm width    | RCS2CR-SA6C | 429         |     |
|                                |                      |                      | 73mm width    | RCS2CR-SA7C | 431         |     |
|                                |                      | Steel Base           | 60mm width    | RCS2CR-SS7C | 433         |     |
|                                |                      |                      | 80mm width    | RCS2CR-SS8C | 435         |     |
|                                | Cleanroom            | Slider Built-in Type | Aluminum Base | 52mm width  | RCS2CR-SA5D | 437 |
|                                |                      |                      |               | 58mm width  | RCS2CR-SA6D | 439 |



# 230 VAC Servo Motor RCS2

with dedicated controllers  
SCON, SSEL and XSEL

## Slider Type

- Slider Type
- Mini
- Standard
- Controllers Integrated
- Rod Type
- Mini
- Standard
- Controllers Integrated
- Table/Arm /Flat Type
- Mini
- Standard
- Gripper/ Rotary Type
- Linear Motor Type
- Cleanroom Type
- Splash-Proof
- Controllers
- PMEC /AMEC
- PSEP /ASEP
- ROBO NET
- ERC2
- PCON
- ACON
- SCON
- PSEL
- ASEL
- SSEL
- XSEL
- Pulse Motor
- Servo Motor (24V)
- Servo Motor (230V)
- Linear Motor

# RCS2-SA4C RoboCylinder Slider Type 40mm Width 230V Servo Motor Side-Mounted Motor

■ Configuration: **RCS2** - **SA4C** - [ ] - **20** - [ ] - [ ] - [ ] - [ ]

Series - Type - Encoder - Motor - Lead - Stroke - Compatible Controllers - Cable Length - Option

I : Incremental  
A: Absolute

20: 20W Servo motor

10: 10mm  
5: 5mm  
2.5: 2.5mm

50: 50mm  
400: 400mm (50mm pitch increments)

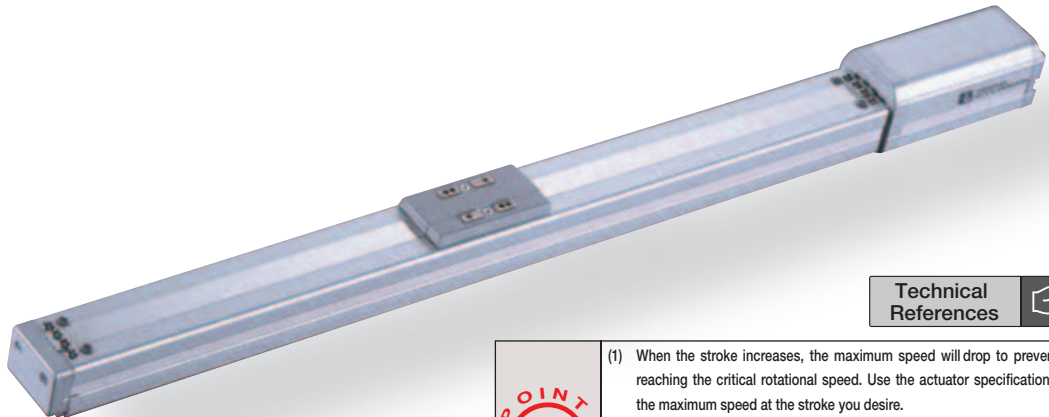
T1: XSEL-KE/KET  
T2: SCON  
SSEL  
XSEL-P/Q

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.

**For High Acceleration/Deceleration**  
(excluding the 2.5-mm lead model)



Technical References P. A-5

- POINT**  
Notes on Selection
- 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.
  - The load capacity is based on operation of the standard model at 0.3G (0.2G for 2.5mm-lead), and the high acceleration/deceleration model at 1G (excluding the 2.5mm-lead model). (Even when the acceleration/deceleration is dropped, the maximum load capacity values shown in the table below are the upper limits.)

| Actuator Specifications    |                  |           |                                    |                                  |                  |                          | Stroke and Maximum Speed |                            |  |
|----------------------------|------------------|-----------|------------------------------------|----------------------------------|------------------|--------------------------|--------------------------|----------------------------|--|
| ■ Lead and Load Capacity   |                  |           |                                    |                                  |                  |                          | Stroke (mm)              | 50 ~ 400 (50mm increments) |  |
| Model                      | Motor Output (W) | Lead (mm) | Max. Load Capacity Horizontal (kg) | Max. Load Capacity Vertical (kg) | Rated Thrust (N) | Lead                     |                          | 50 ~ 400 (50mm increments) |  |
| RCS2-SA4C-①-20-10-②-③-④-⑤  | 20               | 10        | 4                                  | 1                                | 19.6             | 50~400 (50mm increments) | 10                       | 665                        |  |
| RCS2-SA4C-①-20-5-②-③-④-⑤   |                  | 5         | 6                                  | 2.5                              | 39.2             |                          | 5                        | 330                        |  |
| RCS2-SA4C-①-20-2.5-②-③-④-⑤ |                  | 2.5       | 8                                  | 4.5                              | 78.4             |                          | 2.5                      | 165                        |  |

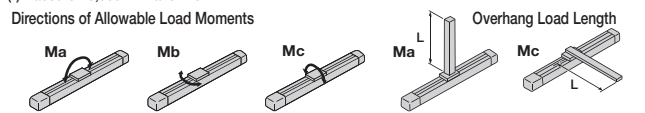
Legend ① Encoder ② Stroke ③ Compatible controller ④ Cable length ⑤ Options (Unit: mm/s)

| 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) |
|                 |                       |

\* For cables for maintenance, see page A-39.

| Actuator Specifications          |  |
|----------------------------------|--|
| Item                             | Description  |
| Drive System                     | Ball screw Ø8mm C10 grade                                  |
| Positioning Repeatability        | ±0.02mm  |
| Lost Motion                      | 0.1 mm or less   |
| Base                             | Material: Aluminum (white alumite treated)                 |
| Allowable Static Moment          | Ma: 6.9N·m Mb: 9.9N·m Mc: 17.0N·m                          |
| Allowable Dynamic Moment (*)     | Ma: 2.7N·m Mb: 3.9N·m Mc: 6.8N·m                           |
| Overhang Load Length             | Ma direction: 120mm or less Mb-Mc direction: 120mm or less |
| Ambient Operating Temp./Humidity | 0~40°C, 85% RH or less (Non-condensing)                    |

(\*) Based on 5,000km travel life.



| Option List                        |             |          |  |
|------------------------------------|-------------|----------|--|
| Name                               | Option Code | See Page |  |
| Brake                              | B           | → A-25   |  |
| Foot bracket                       | FT          | → A-29   |  |
| For High Acceleration/Deceleration | HA          | → A-32   |  |
| Home sensor                        | HS          | → A-32   |  |
| Reversed-home                      | NM          | → A-33   |  |
| Slider Roller                      | SR          | → A-36   |  |
| Slider spacer                      | SS          | → A-36   |  |

\* The high-acceleration/deceleration option and the slider roller option cannot be used together.  
\* The 2.5mm-lead model cannot be used with the high-acceleration/deceleration option.

Dimensions

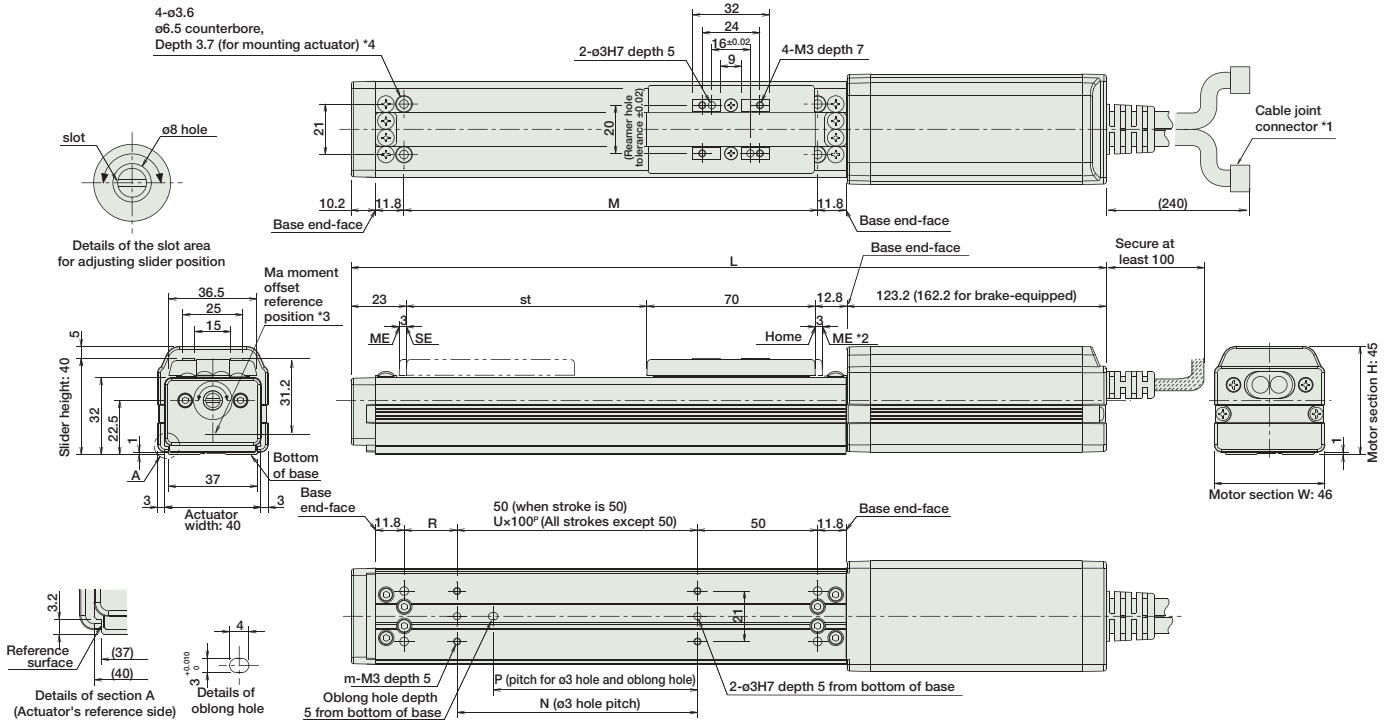
CAD drawings can be downloaded from IAI website. [www.robocylinder.de](http://www.robocylinder.de)



- \*1 A motor-encoder cable is connected here. See page A-39 for details on cables.
- \*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
- \*3 Reference position for calculating the moment Ma.

For Special Orders P. A-9

- \*4 If the actuator is secured using only the mounting holes provided on the top surface of the base, the base may twist to cause abnormal sliding of the slider, or may produce abnormal noise. Therefore, when using the mounting holes on the top surface of the base, keep the stroke at 200mm or less.



■ Dimensions/Weight by Stroke \* Brake-equipped models are heavier by 0.3kg.

| Stroke      | 50         | 100 | 150 | 200 | 250 | 300 | 350 | 400 |     |
|-------------|------------|-----|-----|-----|-----|-----|-----|-----|-----|
| L           | No Brake   | 279 | 329 | 379 | 429 | 479 | 529 | 579 | 629 |
|             | With Brake | 318 | 368 | 418 | 468 | 518 | 568 | 618 | 668 |
| M           | 122        | 172 | 222 | 272 | 322 | 372 | 422 | 472 |     |
| N           | 50         | 100 | 100 | 200 | 200 | 300 | 300 | 400 |     |
| P           | 35         | 85  | 85  | 185 | 185 | 285 | 285 | 385 |     |
| R           | 22         | 22  | 72  | 22  | 72  | 22  | 72  | 22  |     |
| U           | -          | 1   | 1   | 2   | 2   | 3   | 3   | 4   |     |
| m           | 4          | 4   | 4   | 6   | 6   | 8   | 8   | 10  |     |
| Weight (kg) | 0.7        | 0.8 | 0.9 | 1   | 1.1 | 1.2 | 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                    | Description  | Max. Positioning Points | Input Voltage   | Power Supply Capacity                                   | See Page |
|--------------------------------|---------------|--------------------------|--|-------------------------|---|---|----------|
| Positioner Mode                |               | SCON-C-20①②-NP-2-③       | Positioning is possible for up to 512 points                 | 512 points              | Single-Phase AC 115V<br>Single-Phase AC 230V<br>3-Phase AC 230V (XSEL-P/Q only) | 360VA max.<br>* 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 Axis Type  |               | SSEL-C-1-20 ①②-NP-2-③    | Programmed operation is possible<br>Can operate up to 2 axes | 20000 points            |   |   | → P577   |
| Program Control 1-6 Axis Type  |               | XSEL-④-1-20①②-N1-EEE-2-⑤ | Programmed operation is possible<br>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 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).

Slider Type

Mini

Standard

Controllers Integrated

Rod Type

Mini

Standard

Controllers Integrated

Table/Arm /Flat Type

Mini

Standard

Gripper/ Rotary Type

Linear Motor Type

Cleanroom Type

Splash-Proof

Controllers

PMEC /AMEC

PSEP /ASEP

ROBO NET

ERC2

PCON

ACON

SCON

PSEL

ASEL

SSEL

XSEL

Pulse Motor

Servo Motor (24V)

Servo Motor (230V)

Linear Motor

- Slider Type
- Mini
- Standard
- Controllers Integrated
- Rod Type
- Mini
- Standard
- Controllers Integrated
- Table/Arm /Flat Type
- Mini
- Standard
- Gripper/ Rotary Type
- Linear Motor Type
- Cleanroom Type
- Splash-Proof
- Controllers
- PMEC /AMEC
- PSEP /ASEP
- ROBO NET
- ERC2
- PCON
- ACON
- SCON
- PSEL
- ASEL
- SSEL
- XSEL
- Pulse Motor
- Servo Motor (24V)
- Servo Motor (230V)
- Linear Motor

# RCS2-SA5C

RoboCylinder Slider Type 52mm Width 230V Servo Motor Coupled

■ Configuration: **RCS2** -- **SA5C** --  -- **20** --  --  --  --  --

Series -- Type -- Encoder -- Motor -- Lead -- Stroke -- Compatible Controllers -- Cable Length -- Option

I : Incremental  
A: Absolute

20: 20W Servo motor

20 : 20mm  
12 : 12mm  
6 : 6mm  
3 : 3mm

50: 50mm  
500:500mm (50mm pitch increments)

T1: XSEL-KE/KET  
T2: SCON  
SSEL  
XSEL-P/Q

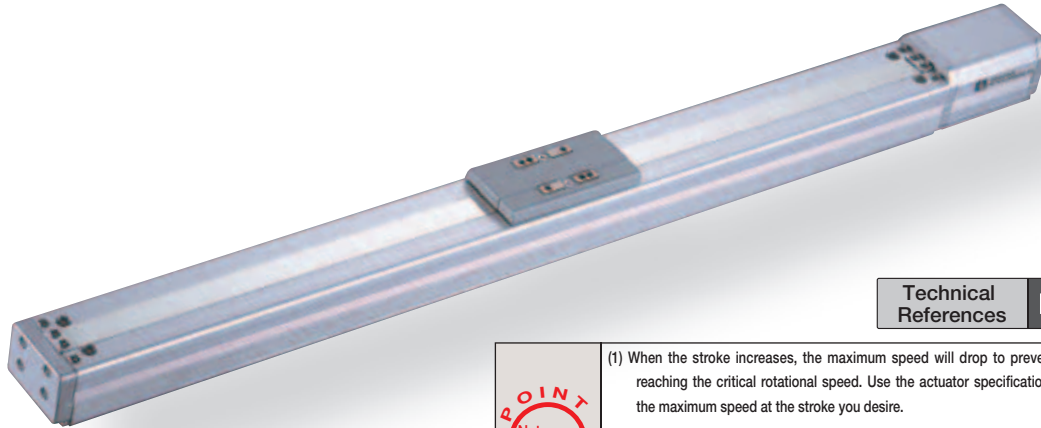
N : None  
P : 1m  
S : 3m  
M : 5m  
X  : Custom Length  
R  : Robot Cable

See Options below

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

## For High Acceleration/Deceleration

(excluding the 3-mm lead model)



Technical References P. A-5

- POINT**  
Notes on Selection
- 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.
  - The load capacity is based on operation of standard model at 0.3G (0.2G for 3mm-lead), and operation of the high acceleration/deceleration model at 0.8G (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.)

### Actuator Specifications

#### Lead and Load Capacity

| Model                     | Motor Output (W) | Lead (mm) | Max. Load Capacity |               | Rated Thrust (N) | Stroke (mm)                   |
|---------------------------|------------------|-----------|--------------------|---------------|------------------|-------------------------------|
|                           |                  |           | Horizontal (kg)    | Vertical (kg) |                  |                               |
| RCS2-SA5C-①-20-20-②-③-④-⑤ | 20               | 20        | 2                  | 0.5           | 9.9              | 50 ~ 500<br>(50mm increments) |
| RCS2-SA5C-①-20-12-②-③-④-⑤ |                  | 12        | 4                  | 1             | 16.7             |                               |
| RCS2-SA5C-①-20-6-②-③-④-⑤  |                  | 6         | 8                  | 2             | 33.3             |                               |
| RCS2-SA5C-①-20-3-②-③-④-⑤  |                  | 3         | 12                 | 4             | 65.7             |                               |

#### Stroke and Maximum Speed

| Lead | Stroke | 50 ~ 450          | 500  |
|------|--------|-------------------|------|
|      |        | (50mm increments) | (mm) |
| 20   | 20     | 1300              | 1300 |
| 12   | 12     | 800               | 760  |
| 6    | 6      | 400               | 380  |
| 3    | 3      | 200               | 190  |

(Unit: mm/s)

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

#### 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) |  |
|                 |                       |  |

\* For cables for maintenance, see page A-39.

#### Option List

| Name                               | Option Code | See Page |
|------------------------------------|-------------|----------|
| Brake                              | B           | → A-25   |
| Foot bracket                       | FT          | → A-29   |
| For High Acceleration/Deceleration | HA          | → A-32   |
| Home sensor                        | HS          | → A-32   |
| Reversed-home                      | NM          | → A-33   |
| Slider Roller                      | SR          | → A-36   |

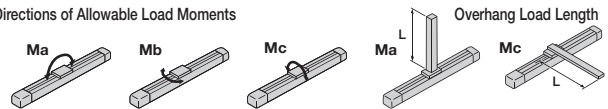
\* The high-acceleration/deceleration option and the slider roller option cannot be used together.  
\* The high acceleration/deceleration option cannot be used on the 3mm-lead model.

#### 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)                 |
| Allowable Static Moment          | Ma: 18.6N·m Mb: 26.6N·m Mc: 47.5N·m                        |
| Allowable Dynamic Moment (*)     | Ma: 4.9N·m Mb: 6.8N·m Mc: 11.7N·m                          |
| Overhang Load Length             | Ma direction: 150mm or less Mb-Mc direction: 150mm or less |
| Ambient Operating Temp./Humidity | 0~40°C, 85% RH or less (Non-condensing)                    |

(\*) Based on 5,000km travel life.

Directions of Allowable Load Moments



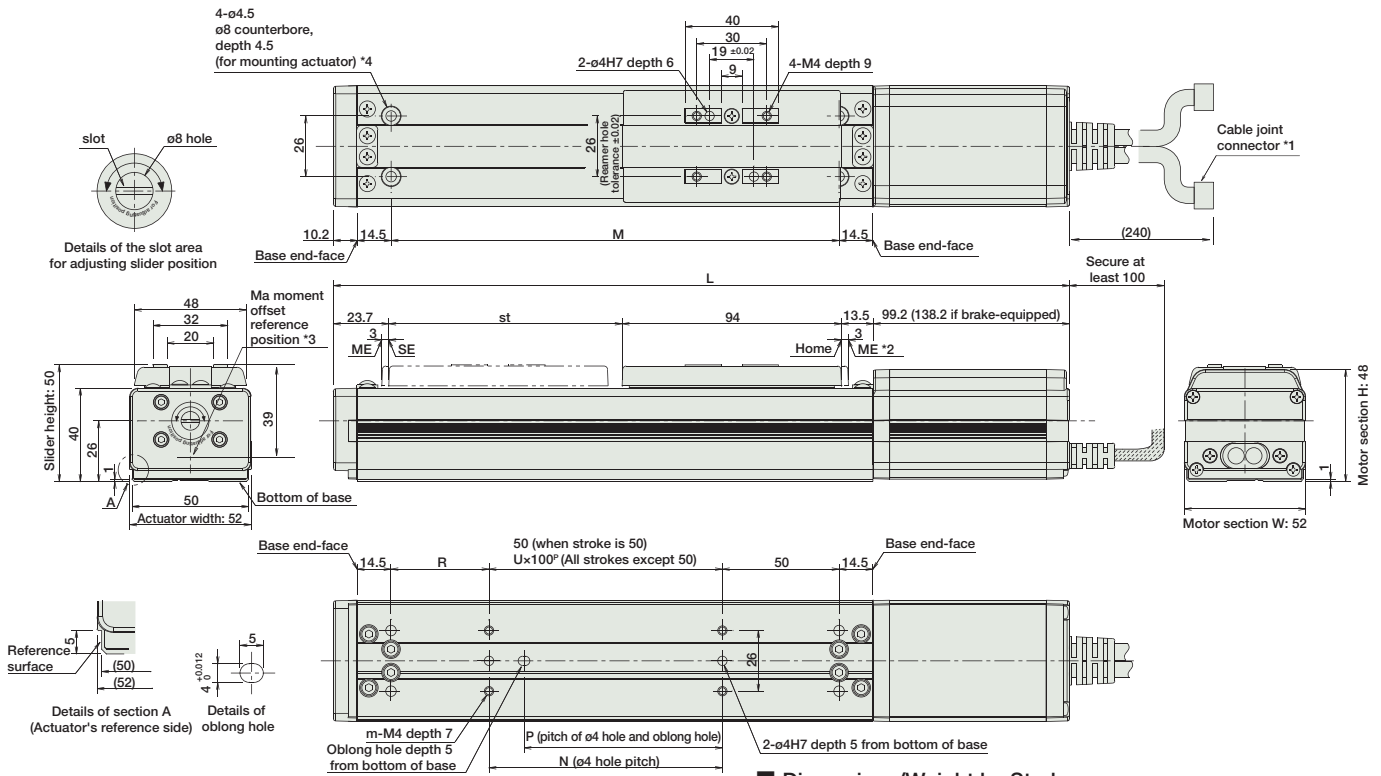
Dimensions

CAD drawings can be downloaded from IAI website. [www.robocylinder.de](http://www.robocylinder.de)

For Special Orders P. A-9



- \*1 A motor-encoder cable is connected here. See page A-39 for details on cables.
- \*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
- \*3 Reference position for calculating the moment Ma.
- \*4 If the actuator is secured using only the mounting holes provided on the top surface of the base, the base may twist to cause abnormal sliding of the slider, or may produce abnormal noise. Therefore, when using the mounting holes on the top surface of the base, keep the stroke at 300mm or less.



■ Dimensions/Weight by Stroke \* Brake-equipped models are heavier by 0.3kg.

| Stroke      | 50         | 100   | 150   | 200   | 250   | 300   | 350   | 400   | 450   | 500   |
|-------------|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| L           | No Brake   | 280.4 | 330.4 | 380.4 | 430.4 | 480.4 | 530.4 | 580.4 | 630.4 | 730.4 |
|             | With Brake | 319.4 | 369.4 | 419.4 | 469.4 | 519.4 | 569.4 | 619.4 | 669.4 | 769.4 |
| M           | 142        | 192   | 242   | 292   | 342   | 392   | 442   | 492   | 542   | 592   |
| N           | 50         | 100   | 100   | 200   | 200   | 300   | 300   | 400   | 400   | 500   |
| P           | 35         | 85    | 85    | 185   | 185   | 285   | 285   | 385   | 385   | 485   |
| R           | 42         | 42    | 92    | 42    | 92    | 42    | 92    | 42    | 92    | 42    |
| U           | -          | 1     | 1     | 2     | 2     | 3     | 3     | 4     | 4     | 5     |
| m           | 4          | 4     | 4     | 6     | 6     | 8     | 8     | 10    | 10    | 12    |
| Weight (kg) | 1.3        | 1.4   | 1.5   | 1.6   | 1.7   | 1.8   | 1.9   | 2     | 2.1   | 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-20①②-NP-2-③       | Positioning is possible for up to 512 points               | 512 points              | Single-Phase AC 115V            | 360VA max.<br>* 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               | Single-Phase AC 230V            |   |          |
| Pulse Train Input Control Type |               |                          | Dedicated to Pulse Train Input                             | (-)                     | 3-Phase AC 230V (XSEL-P/Q only) |   |          |
| Program Control 1-2 Axis Type  |               | SSEL-C-1-20①②-NP-2-③     | Programmed operation is possible. Can operate up to 2 axes | 20000 points            |                                 |   | → P577   |
| Program Control 1-6 Axis Type  |               | XSEL-4-1-20①②-N1-EEE-2-⑤ | 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 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).



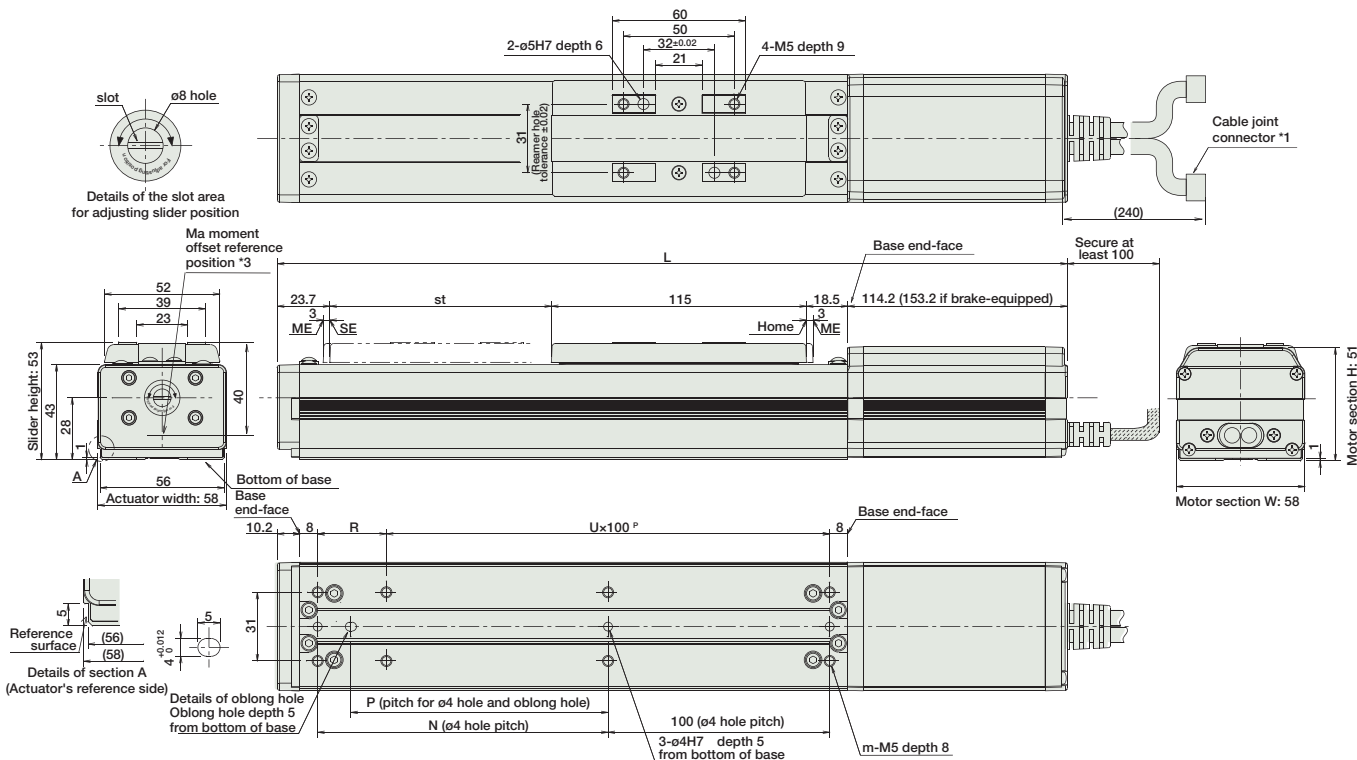
Dimensions

CAD drawings can be downloaded from IAI website. [www.robocylinder.de](http://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 slider moves to the ME; therefore, please watch for any interference with the surrounding objects.  
ME: Mechanical end SE: Stroke end
- \*3 Reference position for calculating the moment Ma.



Dimensions/Weight by Stroke

\* Brake-equipped models are heavier by 0.3kg.

| Stroke      | 50         | 100   | 150   | 200   | 250   | 300   | 350   | 400   | 450   | 500   | 550   | 600   |       |
|-------------|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| L           | No Brake   | 321.4 | 371.4 | 421.4 | 471.4 | 521.4 | 571.4 | 621.4 | 671.4 | 721.4 | 771.4 | 821.4 | 871.4 |
|             | With Brake | 360.4 | 410.4 | 460.4 | 510.4 | 560.4 | 610.4 | 660.4 | 710.4 | 760.4 | 810.4 | 860.4 | 910.4 |
| N           | 81         | 131   | 181   | 231   | 281   | 331   | 381   | 431   | 481   | 531   | 581   | 631   |       |
| P           | 66         | 116   | 166   | 216   | 266   | 316   | 366   | 416   | 466   | 516   | 566   | 616   |       |
| R           | 81         | 31    | 81    | 31    | 81    | 31    | 81    | 31    | 81    | 31    | 81    | 31    |       |
| U           | 1          | 2     | 2     | 3     | 3     | 4     | 4     | 5     | 5     | 6     | 6     | 7     |       |
| m           | 6          | 8     | 8     | 10    | 10    | 12    | 12    | 14    | 14    | 16    | 16    | 18    |       |
| Weight (kg) | 1.4        | 1.6   | 1.8   | 2     | 2.2   | 2.4   | 2.6   | 2.8   | 3     | 3.2   | 3.4   | 3.6   |       |

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-30D ①②-NP-2-③       | Positioning is possible for up to 512 points                 | 512 points              | Single-Phase AC 115V<br>Single-Phase AC 230V<br>3-Phase AC 230V (XSEL-P/Q only) | 360VA max.<br>* 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 Axis Type  |               | SSEL-C-1-30D ①②-NP-2-③     | Programmed operation is possible<br>Can operate up to 2 axes | 20000 points            |   |   | → P577   |
| Program Control 1-6 Axis Type  |               | XSEL-4-1-30D ①②-N1-EEE-2-⑤ | Programmed operation is possible<br>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 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).









- Slider Type
- Mini
- Standard
- Controllers Integrated
- Rod Type
- Mini
- Standard
- Controllers Integrated
- Table/Arm /Flat Type
- Mini
- Standard
- Gripper/ Rotary Type
- Linear Motor Type
- Cleanroom Type
- Splash-Proof
- Controllers
- PMEC /AMEC
- PSEP /ASEP
- ROBO NET
- ERC2
- PCON
- ACON
- SCON
- PSEL
- ASEL
- SSEL
- XSEL
- Pulse Motor
- Servo Motor (24V)
- Servo Motor (230V)
- Linear Motor

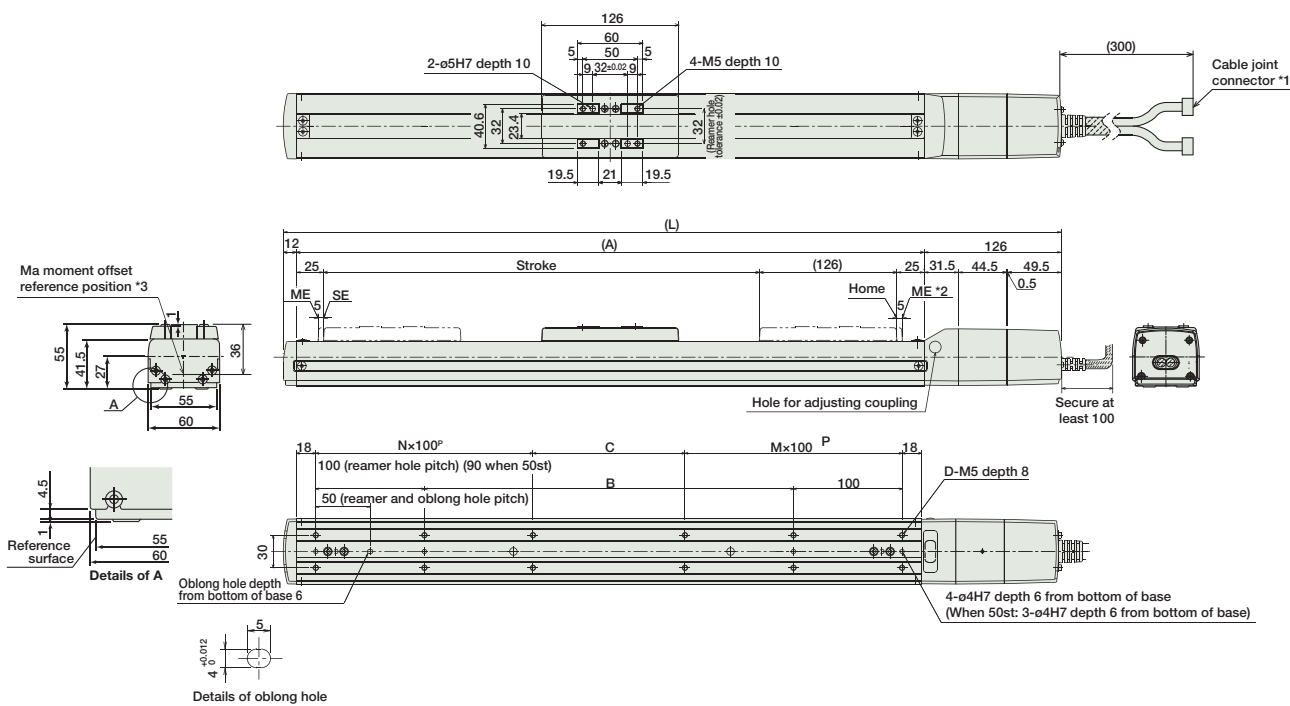
Dimensions

CAD drawings can be downloaded from IAI website. [www.robocylinder.de](http://www.robocylinder.de)

For Special Orders P. A-9



- \*1 A motor-encoder cable is connected here. See page A-39 for details on cables.
- \*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
- \*3 Reference position for calculating the moment Ma.



■ Dimensions/Weight by Stroke

| Stroke      | 50  | 100 | 150 | 200 | 250 | 300 | 350 | 400 | 450 | 500 | 550 | 600 |
|-------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| L           | 364 | 414 | 464 | 514 | 564 | 614 | 664 | 714 | 764 | 814 | 864 | 914 |
| A           | 226 | 276 | 326 | 376 | 426 | 476 | 526 | 576 | 626 | 676 | 726 | 776 |
| B           | 0   | 40  | 90  | 140 | 190 | 240 | 290 | 340 | 390 | 440 | 490 | 540 |
| C           | 90  | 40  | 90  | 140 | 190 | 240 | 290 | 340 | 390 | 440 | 490 | 540 |
| D           | 6   | 8   | 8   | 8   | 8   | 12  | 12  | 12  | 12  | 16  | 16  | 16  |
| M           | 1   | 1   | 1   | 1   | 1   | 2   | 2   | 2   | 2   | 3   | 3   | 3   |
| N           | 0   | 1   | 1   | 1   | 1   | 2   | 2   | 2   | 2   | 3   | 3   | 3   |
| Weight (kg) | 4.9 | 3.2 | 3.5 | 3.8 | 4.2 | 4.5 | 4.8 | 5.1 | 5.5 | 5.8 | 6.1 | 6.4 |

\* Adding a brake increases the actuator's overall length by 24.5mm and its weight by 0.3kg.

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<br>Single-Phase AC 230V<br>3-Phase AC 230V (XSEL-P/Q only) | 360VA max.<br>* 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 Axis Type  |               | SSEL-C-1-60①-NP-2-②     | Programmed operation is possible<br>Can operate up to 2 axes | 20000 points            |   |   | → P577   |
| Program Control 1-6 Axis Type  |               | XSEL-③-1-60①-N1-EEE-2-④ | Programmed operation is possible<br>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, 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).

- Slider Type
- Mini
- Standard
- Controllers Integrated
- Rod Type
- Mini
- Standard
- Controllers Integrated
- Table/Arm /Flat Type
- Mini
- Standard
- Gripper/ Rotary Type
- Linear Motor Type
- Cleanroom Type
- Splash-Proof
- Controllers
- PMEC /AMEC
- PSEP /ASEP
- ROBO NET
- ERC2
- PCON
- ACON
- SCON
- PSEL
- ASEL
- SSEL
- XSEL
- Pulse Motor
- Servo Motor (24V)
- Servo Motor (230V)
- Linear Motor

# RCS2-SS8C RoboCylinder Slider Type 80mm Width 230V Servo Motor Coupled Steel Base

■ Configuration: **RCS2** — **SS8C** — [ ] — [ ] — [ ] — [ ] — [ ] — [ ] — [ ]

Series — Type — Encoder — Motor — Lead — Stroke — Compatible Controllers — Cable Length — Option

I : Incremental  
A: Absolute

100: 100W Servo motor  
150: 150W Servo motor

20: 20mm  
10: 10mm

50: 50mm  
1000: 1000mm (50mm pitch increments)

T1: XSEL-KE/KET  
T2: SCON  
SSEL  
XSEL-P/Q

N : None  
P : 1m  
S : 3m  
M : 5m  
X [ ] : Custom Length  
R [ ] : Robot Cable

B : Brake  
NM : Reversed-home  
SR : Slider Roller

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



Technical References P. A-5

- POINT**  
Notes on Selection
- 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.
  - The load capacity is based on operation at an acceleration of 0.3G. These values are the upper limits for the acceleration.

| Actuator Specifications    |                  |           |                    |               |                  |                             |
|----------------------------|------------------|-----------|--------------------|---------------|------------------|-----------------------------|
| ■ Lead and Load Capacity   |                  |           |                    |               |                  |                             |
| Model                      | Motor Output (W) | Lead (mm) | Max. Load Capacity |               | Rated Thrust (N) | Stroke (mm)                 |
|                            |                  |           | Horizontal (kg)    | Vertical (kg) |                  |                             |
| RCS2-SS8C-①-100-20-②-③-④-⑤ | 100              | 20        | 20                 | 4             | 84.9             | 50 ~ 1000 (50mm increments) |
| RCS2-SS8C-①-100-10-②-③-④-⑤ |                  | 10        | 40                 | 8             | 169              |                             |
| RCS2-SS8C-①-150-20-②-③-④-⑤ | 150              | 20        | 30                 | 6             | 128              |                             |
| RCS2-SS8C-①-150-10-②-③-④-⑤ |                  | 10        | 60                 | 12            | 256              |                             |

| ■ Stroke and Maximum Speed |                            |            |            |            |             |
|----------------------------|----------------------------|------------|------------|------------|-------------|
| Stroke / Lead              | 50 ~ 600 (50mm increments) | ~ 700 (mm) | ~ 800 (mm) | ~ 900 (mm) | ~ 1000 (mm) |
|                            | 20                         | 1000       | 960        | 765        | 625         |
| 10                         | 500                        | 480        | 380        | 310        | 255         |

(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) |
|                 |                       |

\* For cables for maintenance, see page A-39.

| Option List   |             |          |  |
|---------------|-------------|----------|--|
| Name          | Option Code | See Page |  |
| Brake         | B           | → A-25   |  |
| Reversed-home | NM          | → A-33   |  |
| Slider Roller | SR          | → A-36   |  |

| Actuator Specifications          |  |
|----------------------------------|--|
| Item                             | Description  |
| Drive System                     | Ball screw ø16mm C10 grade                                 |
| Positioning Repeatability        | ±0.02mm  |
| Lost Motion                      | 0.1mm or less  |
| Base                             | Material: Special alloy steel                              |
| Allowable Static Moment          | Ma: 198.9 N·m Mb: 198.9 N·m Mc: 416.7 N·m                  |
| Allowable Dynamic Moment (*)     | Ma: 36.3 N·m Mb: 36.3 N·m Mc: 77.4 N·m                     |
| Overhang Load Length             | Ma direction: 450mm or less Mb-Mc direction: 450mm or less |
| Ambient Operating Temp./Humidity | 0~40°C, 85% RH or less (Non-condensing)                    |

(\*) Based on 10,000km travel life.

Directions of Allowable Load Moments

Overhang Load Length

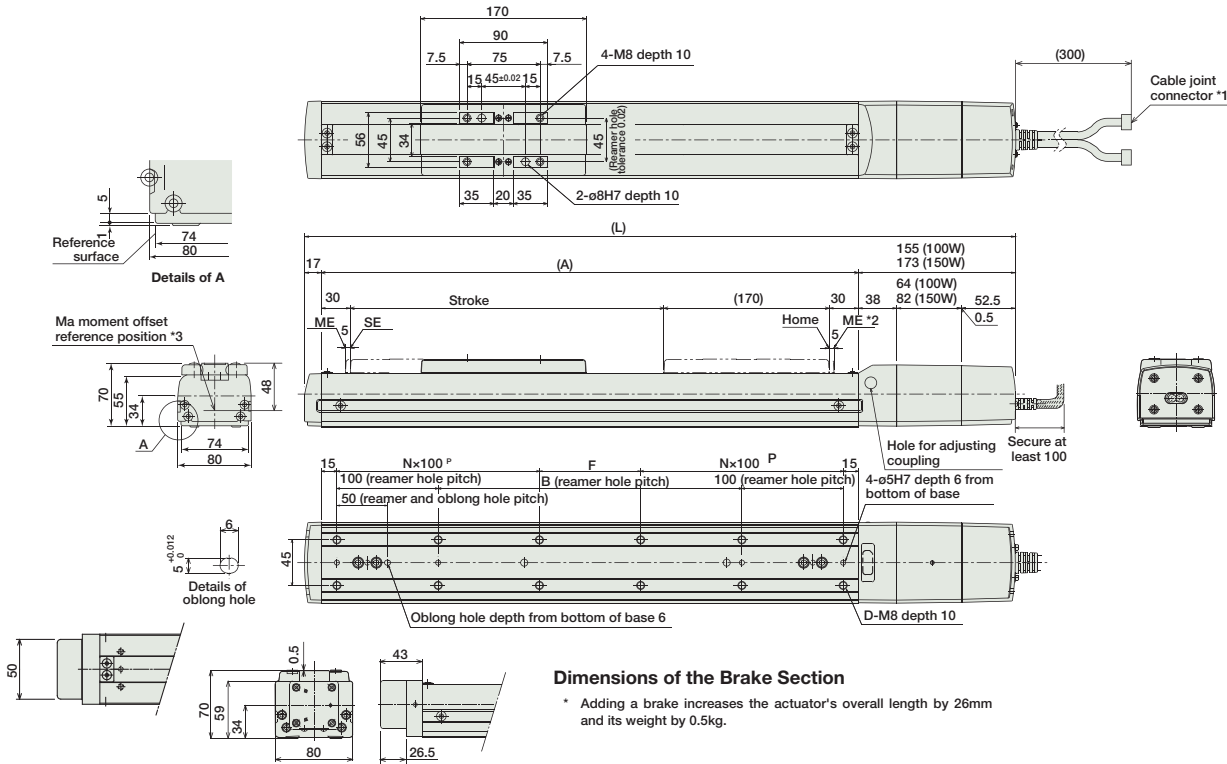
Dimensions

CAD drawings can be downloaded from IAI website. [www.robocylinder.de](http://www.robocylinder.de)



- \*1 A motor-encoder cable is connected here. See page A-39 for details on cables.
- \*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
- \*3 Reference position for calculating the moment Ma.

For Special Orders P. A-9



■ Dimensions/Weight by Stroke

| Stroke      | 50  | 100 | 150 | 200 | 250 | 300 | 350 | 400 | 450  | 500  | 550  | 600  | 650  | 700  | 750  | 800  | 850  | 900  | 950  | 1000 |
|-------------|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|------|------|------|------|------|
| L (100W)    | 452 | 502 | 552 | 602 | 652 | 702 | 752 | 802 | 852  | 902  | 952  | 1002 | 1052 | 1102 | 1152 | 1202 | 1252 | 1302 | 1352 | 1402 |
| L (150W)    | 470 | 520 | 570 | 620 | 670 | 720 | 770 | 820 | 870  | 920  | 970  | 1020 | 1070 | 1120 | 1170 | 1220 | 1270 | 1320 | 1370 | 1420 |
| A           | 280 | 330 | 380 | 430 | 480 | 530 | 580 | 630 | 680  | 730  | 780  | 830  | 880  | 930  | 980  | 1030 | 1080 | 1130 | 1180 | 1230 |
| B           | 50  | 100 | 150 | 200 | 250 | 300 | 350 | 400 | 450  | 500  | 550  | 600  | 650  | 700  | 750  | 800  | 850  | 900  | 950  | 1000 |
| D           | 8   | 8   | 8   | 10  | 12  | 12  | 12  | 14  | 16   | 16   | 16   | 18   | 20   | 20   | 22   | 24   | 24   | 24   | 24   | 26   |
| F           | 50  | 100 | 150 | 0   | 50  | 100 | 150 | 0   | 50   | 100  | 150  | 0    | 50   | 100  | 150  | 0    | 50   | 100  | 150  | 0    |
| N           | 1   | 1   | 1   | 2   | 2   | 2   | 2   | 3   | 3    | 3    | 3    | 4    | 4    | 4    | 4    | 5    | 5    | 5    | 5    | 6    |
| Weight (kg) | 6.0 | 6.5 | 7.1 | 7.6 | 8.2 | 8.7 | 9.3 | 9.8 | 10.4 | 10.9 | 11.5 | 12.0 | 12.6 | 13.1 | 13.7 | 14.2 | 14.8 | 15.3 | 15.9 | 16.4 |

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-100①-NP-2-②<br>SCON-C-150①-NP-2-②             | Positioning is possible for up to 512 points                 | 512 points              | Single-Phase AC 115V<br>Single-Phase AC 230V<br>3-Phase AC 230V (XSEL-P/Q only) | 360VA max.<br>* 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 Axis Type  |               | SSEL-C-1-100①-NP-2-②<br>SSEL-C-1-150①-NP-2-②         | Programmed operation is possible<br>Can operate up to 2 axes | 20000 points            |   |   | → P577   |
| Program Control 1-6 Axis Type  |               | XSEL-③-1-100①-N1-EEE-2-④<br>XSEL-③-1-150①-N1-EEE-2-④ | Programmed operation is possible<br>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, 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).



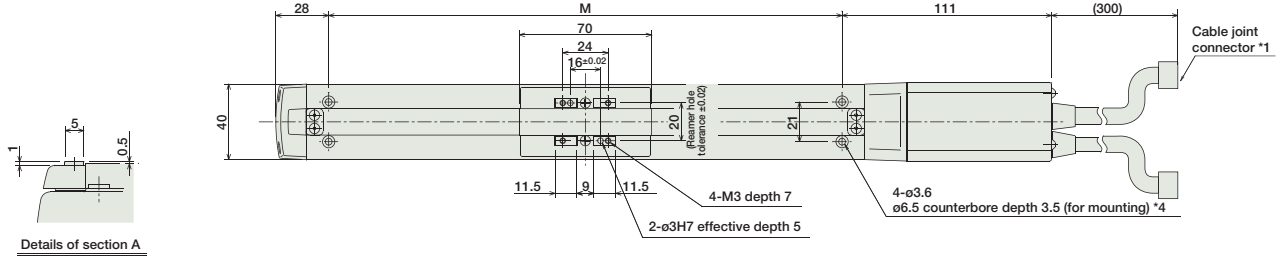
Dimensions

CAD drawings can be downloaded from IAI website. [www.robocylinder.de](http://www.robocylinder.de)

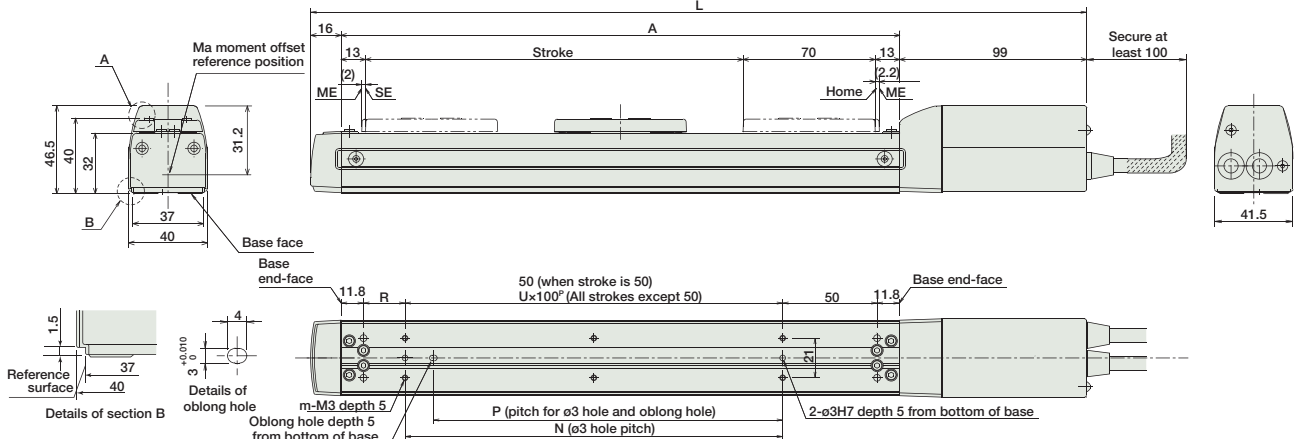


- \*1 A motor-encoder cable is connected here. See page A-39 for details on cables.
- \*2 When homing, the slider moves to the ME; therefore, please watch for any interference with the surrounding objects.  
ME: Mechanical end SE: Stroke end
- \*3 Reference position for calculating the moment Ma.
- \*4 If the actuator is secured using only the mounting holes provided on the top surface of the base, the base may twist to cause abnormal sliding of the slider, or may produce abnormal noise. Therefore, when using the mounting holes on the top surface of the base, keep the stroke at 200mm or less.

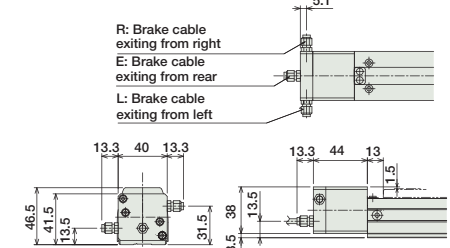
For Special Orders P. A-9



Details of section A



Dimensions of the Brake Section



\* Adding a brake increases the actuator's overall length (L) by 28mm (41.3mm with the cable coming out its end), and its weight by 0.2kg.

Dimensions/Weight by Stroke

| Stroke      | 50  | 100 | 150 | 200 | 250 | 300 |
|-------------|-----|-----|-----|-----|-----|-----|
| L           | 261 | 311 | 361 | 411 | 461 | 511 |
| A           | 146 | 196 | 246 | 296 | 346 | 396 |
| M           | 122 | 172 | 222 | 272 | 322 | 372 |
| N           | 50  | 100 | 100 | 200 | 200 | 300 |
| P           | 35  | 85  | 85  | 185 | 185 | 285 |
| R           | 22  | 22  | 72  | 22  | 72  | 22  |
| U           | -   | 1   | 1   | 2   | 2   | 3   |
| m           | 4   | 4   | 4   | 6   | 6   | 8   |
| Weight (kg) | 0.8 | 0.9 | 1.0 | 1.1 | 1.2 | 1.3 |

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       | Positioning is possible for up to 512 points                 | 512 points              | Single-Phase AC 115V<br>Single-Phase AC 230V<br>3-Phase AC 230V (XSEL-P/Q only) | 360VA max.<br>* 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 Axis Type  |               | SSEL-C-1-20①-NP-2-②     | Programmed operation is possible<br>Can operate up to 2 axes | 20000 points            |   |   | → P577   |
| Program Control 1-6 Axis Type  |               | XSEL-③-1-20①-N1-EEE-2-④ | Programmed operation is possible<br>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, 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).

- Slider Type
- Mini
- Standard
- Controllers Integrated
- Rod Type
- Mini
- Standard
- Controllers Integrated
- Table/Arm /Flat Type
- Mini
- Standard
- Gripper/ Rotary Type
- Linear Motor Type
- Cleanroom Type
- Splash-Proof
- Controllers
- PMEC /AMEC
- PSEP /ASEP
- ROBO NET
- ERC2
- PCON
- ACON
- SCON
- PSEL
- ASEL
- SSEL
- XSEL
- Pulse Motor
- Servo Motor (24V)
- Servo Motor (230V)
- Linear Motor

- Slider Type
- Mini
- Standard
- Controllers Integrated
- Rod Type
- Mini
- Standard
- Controllers Integrated
- Table/Arm /Flat Type
- Mini
- Standard
- Gripper/ Rotary Type
- Linear Motor Type
- Cleanroom Type
- Splash-Proof
- Controllers
- PMEC /AMEC
- PSEP /ASEP
- ROBO NET
- ERC2
- PCON
- ACON
- SCON
- PSEL
- ASEL
- SSEL
- XSEL
- Pulse Motor
- Servo Motor (24V)
- Servo Motor (230V)
- Linear Motor

# RCS2-SA5D

RoboCylinder Slider Type 52mm Width 230V Servo Motor  
Motor Built-In (Direct Coupled)

■ Configuration: **RCS2** - **SA5D** - [ ] - **20** - [ ] - [ ] - [ ] - [ ]

Series - Type - Encoder - Motor - Lead - Stroke - Compatible Controllers - Cable Length - Option

I : Incremental  
A: Absolute

20: 20W Servo motor

12: 12mm  
6: 6mm  
3: 3mm

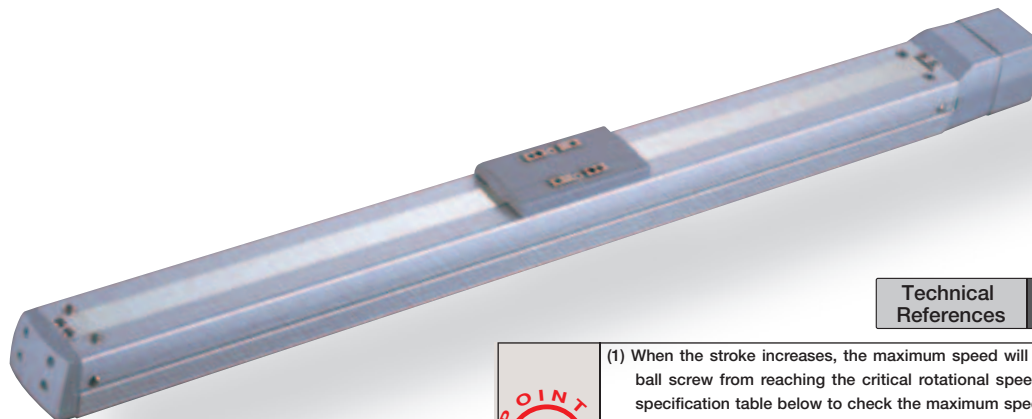
50: 50mm  
500: 500mm (50mm pitch increments)

T1: XSEL-KE/KET  
T2: SCON  
SSEL  
XSEL-P/Q

N : None  
P : 1m  
S : 3m  
M : 5m  
X [ ] : Custom Length  
R [ ] : Robot Cable

BE : Brake (Cable exiting end)  
BL : Brake (Cable exiting left)  
BR : Brake (Cable exiting right)  
NM: Reversed-home  
SR : Slider Roller

\* 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.

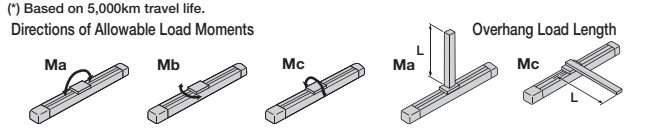
| Actuator Specifications   |                  |           |                    |               |                  | Stroke and Maximum Speed   |             |                            |          |     |
|---------------------------|------------------|-----------|--------------------|---------------|------------------|----------------------------|-------------|----------------------------|----------|-----|
| ■ Lead and Load Capacity  |                  |           |                    |               |                  |                            |             |                            |          |     |
| Model                     | Motor Output (W) | Lead (mm) | Max. Load Capacity |               | Rated Thrust (N) | Stroke (mm)                | Stroke Lead | 50 ~ 450 (50mm increments) | 500 (mm) |     |
| RCS2-SA5D-①-20-12-②-③-④-⑤ | 20               | 12        | Horizontal (kg)    | Vertical (kg) | 16.7             | 50 ~ 500 (50mm increments) | 12          | 800                        | 760      |     |
| RCS2-SA5D-①-20-6-②-③-④-⑤  |                  | 6         | 8                  | 2             |                  |                            | 33.3        | 6                          | 400      | 380 |
| RCS2-SA5D-①-20-3-②-③-④-⑤  |                  | 3         | 12                 | 4             |                  |                            | 65.7        | 3                          | 200      | 190 |

Legend ① Encoder ② Stroke ③ Compatible controller ④ Cable length ⑤ Options (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) |
|                 |                       |

\* For cables for maintenance, see page A-39.

| 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)                 |
| Allowable Static Moment          | Ma: 18.6N·m Mb: 26.6N·m Mc: 47.5N·m                        |
| Allowable Dynamic Moment (*)     | Ma: 4.9N·m Mb: 6.8N·m Mc: 11.7N·m                          |
| Overhang Load Length             | Ma direction: 150mm or less Mb-Mc direction: 150mm or less |
| Ambient Operating Temp./Humidity | 0~40°C, 85% RH or less (Non-condensing)                    |



| Option List                 |             |          |  |
|-----------------------------|-------------|----------|--|
| Name                        | Option Code | See Page |  |
| Brake (Cable exiting end)   | BE          | → A-25   |  |
| Brake (Cable exiting left)  | BL          | → A-25   |  |
| Brake (Cable exiting right) | BR          | → A-25   |  |
| Reversed-home               | NM          | → A-33   |  |
| Slider Roller               | SR          | → A-36   |  |





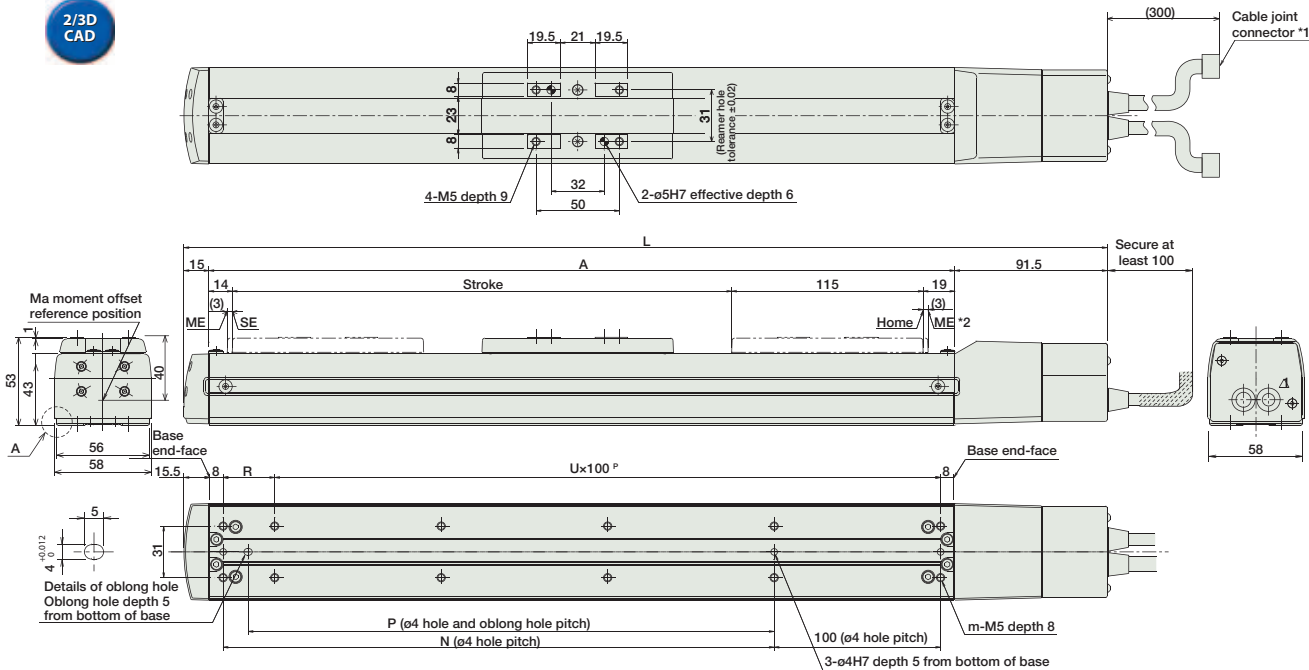


Dimensions

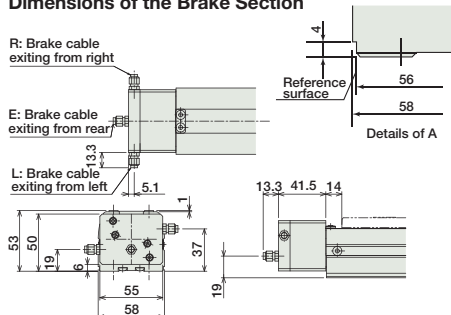
CAD drawings can be downloaded from IAI website. [www.robocylinder.de](http://www.robocylinder.de)

For Special Orders P. A-9

2/3D CAD



Dimensions of the Brake Section



\* Adding a brake increases the actuator's overall length (L) by 26.5mm (39.8mm with the cable coming out its end), and its weight by 0.3kg.

- \*1 A motor-encoder cable is connected here. See page A-39 for details on cables.
- \*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
- \*3 Reference position for calculating the moment Ma.

■ Dimensions/Weight by Stroke

| Stroke      | 50    | 100   | 150   | 200   | 250   | 300   | 350   | 400   | 450   | 500   | 550   | 600   |
|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| L           | 304.5 | 354.5 | 404.5 | 454.5 | 504.5 | 554.5 | 604.5 | 654.5 | 704.5 | 754.5 | 804.5 | 854.5 |
| A           | 198   | 248   | 298   | 348   | 398   | 448   | 498   | 548   | 598   | 648   | 698   | 748   |
| N           | 81    | 131   | 181   | 231   | 281   | 331   | 381   | 431   | 481   | 531   | 581   | 631   |
| P           | 66    | 116   | 166   | 216   | 266   | 316   | 366   | 416   | 466   | 516   | 566   | 616   |
| R           | 81    | 31    | 81    | 31    | 81    | 31    | 81    | 31    | 81    | 31    | 81    | 31    |
| U           | 1     | 2     | 2     | 3     | 3     | 4     | 4     | 5     | 5     | 6     | 6     | 7     |
| m           | 6     | 8     | 8     | 10    | 10    | 12    | 12    | 14    | 14    | 16    | 16    | 18    |
| Weight (kg) | 1.3   | 1.5   | 1.7   | 1.9   | 2.1   | 2.3   | 2.5   | 2.7   | 2.9   | 3.1   | 3.3   | 3.5   |

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-30D①-NP-2-②       | Positioning is possible for up to 512 points                 | 512 points              | Single-Phase AC 115V<br>Single-Phase AC 230V<br>3-Phase AC 230V (XSEL-P/Q only) | 360VA max.<br>* 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 Axis Type  |               | SSEL-C-1-30D①-NP-2-②     | Programmed operation is possible<br>Can operate up to 2 axes | 20000 points            |   |   | → P577   |
| Program Control 1-6 Axis Type  |               | XSEL-③-1-30D①-N1-EEE-2-④ | Programmed operation is possible<br>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, 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).

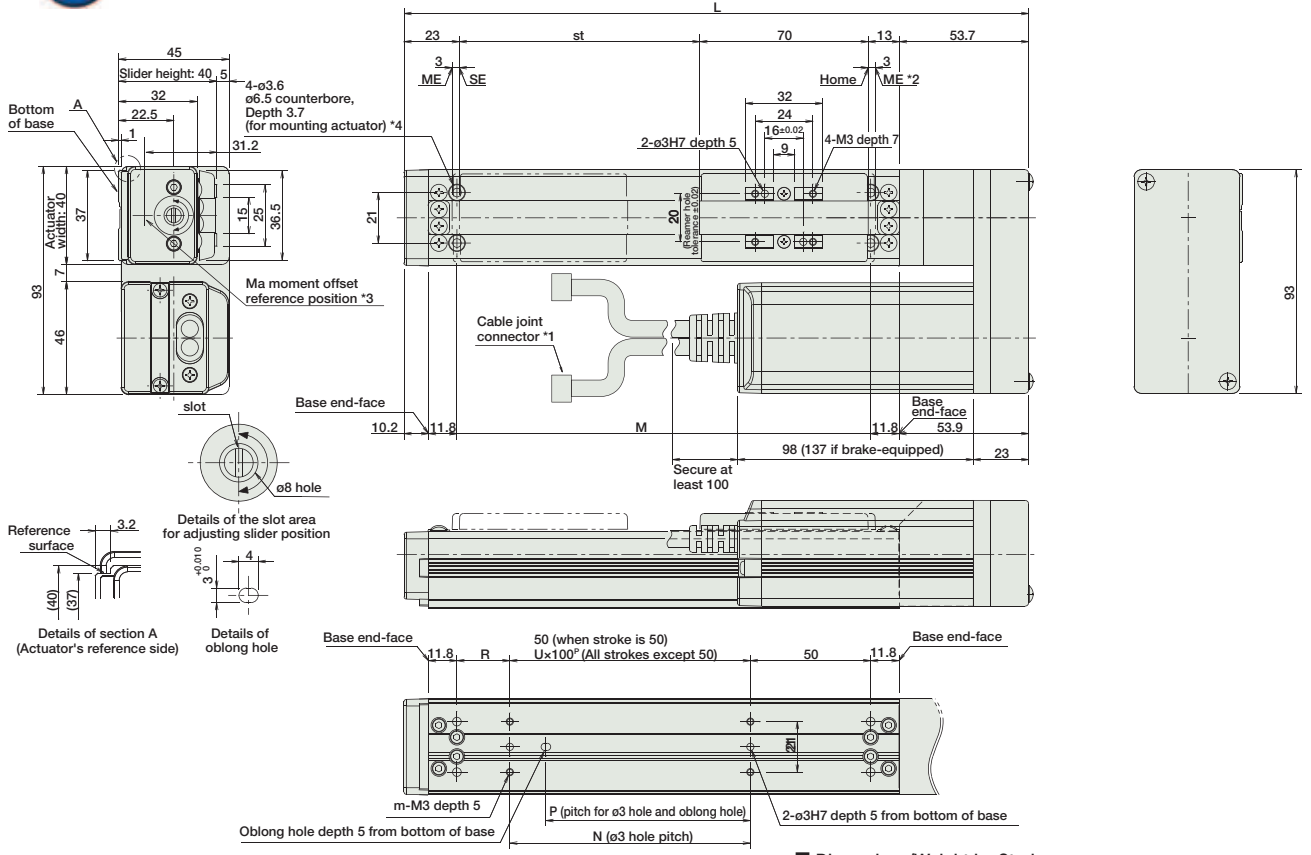


Dimensions

CAD drawings can be downloaded from IAI website. [www.robocylinder.de](http://www.robocylinder.de)

For Special Orders P. A-9

2/3D CAD



**■ Dimensions/Weight by Stroke** \* Brake-equipped models are heavier by 0.3kg.

| Stroke      | 50    | 100   | 150   | 200   | 250   | 300   | 350   | 400   |
|-------------|-------|-------|-------|-------|-------|-------|-------|-------|
| L           | 209.7 | 259.7 | 309.7 | 359.7 | 409.7 | 459.7 | 509.7 | 559.7 |
| M           | 122   | 172   | 222   | 272   | 322   | 372   | 422   | 472   |
| N           | 50    | 100   | 100   | 200   | 200   | 300   | 300   | 400   |
| P           | 35    | 85    | 85    | 185   | 185   | 285   | 285   | 385   |
| R           | 22    | 22    | 72    | 22    | 72    | 22    | 72    | 22    |
| U           | -     | 1     | 1     | 2     | 2     | 3     | 3     | 4     |
| m           | 4     | 4     | 4     | 6     | 6     | 8     | 8     | 10    |
| Weight (kg) | 0.8   | 0.9   | 1.0   | 1.1   | 1.2   | 1.3   | 1.4   | 1.5   |

- \*1 The motor-encoder cable is connected here. See page A-39 for details on cables.
- \*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
- \*3 Reference position for calculating the moment Ma.
- \*4 If the actuator is secured using only the mounting holes provided on the top surface of the base, the base may twist to cause abnormal sliding of the slider, or may produce abnormal noise. Therefore, when using the mounting holes on the top surface of the base, keep the stroke at 200mm or less.

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       | Positioning is possible for up to 512 points                 | 512 points              | Single-Phase AC 115V<br>Single-Phase AC 230V<br>3-Phase AC 230V (XSEL-P/Q only) | 360VA max.<br>* 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 Axis Type  |               | SSEL-C-1-20①-NP-2-②     | Programmed operation is possible<br>Can operate up to 2 axes | 20000 points            |   |   | → P577   |
| Program Control 1-6 Axis Type  |               | XSEL-③-1-20①-N1-EEE-2-④ | Programmed operation is possible<br>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, 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).

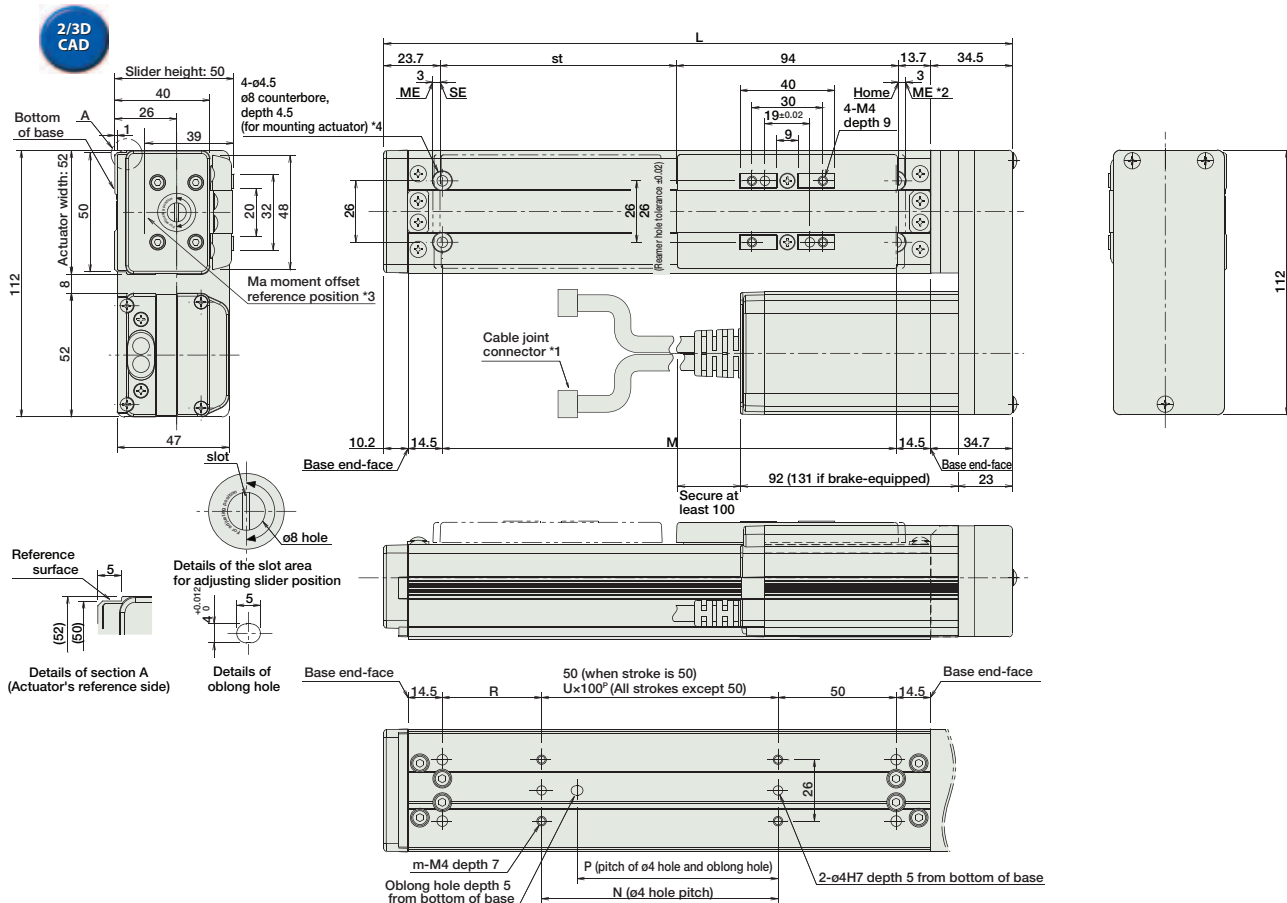
- Slider Type
- Mini
- Standard
- Controllers Integrated
- Rod Type
- Mini
- Standard
- Controllers Integrated
- Table/Arm /Flat Type
- Mini
- Standard
- Gripper/ Rotary Type
- Linear Motor Type
- Cleanroom Type
- Splash-Proof
- Controllers
- PMEC /AMEC
- PSEP /ASEP
- ROBO NET
- ERC2
- PCON
- ACON
- SCON
- PSEL
- ASEL
- SSEL
- XSEL
- Pulse Motor
- Servo Motor (24V)
- Servo Motor (230V)
- Linear Motor



Dimensions

CAD drawings can be downloaded from IAI website. [www.robocylinder.de](http://www.robocylinder.de)

For Special Orders P. A-9



■ Dimensions/Weight by Stroke \* Brake-equipped models are heavier by 0.3kg.

| Stroke      | 50    | 100   | 150   | 200   | 250   | 300   | 350   | 400   | 450   | 500   |
|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| L           | 215.9 | 265.9 | 315.9 | 365.9 | 415.9 | 465.9 | 515.9 | 565.9 | 615.9 | 665.9 |
| M           | 142   | 192   | 242   | 292   | 342   | 392   | 442   | 492   | 542   | 592   |
| N           | 50    | 100   | 100   | 200   | 200   | 300   | 300   | 400   | 400   | 500   |
| P           | 35    | 85    | 85    | 185   | 185   | 285   | 285   | 385   | 385   | 485   |
| R           | 42    | 42    | 92    | 42    | 92    | 42    | 92    | 42    | 92    | 42    |
| U           | -     | 1     | 1     | 2     | 2     | 3     | 3     | 4     | 4     | 5     |
| m           | 4     | 4     | 4     | 6     | 6     | 8     | 8     | 10    | 10    | 12    |
| Weight (kg) | 1.5   | 1.6   | 1.7   | 1.8   | 1.9   | 2.0   | 2.1   | 2.2   | 2.3   | 2.4   |

- \*1 The motor-encoder cable is connected here. See page A-39 for details on cables.
- \*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
- \*3 Reference position for calculating the moment Ma.
- \*4 If the actuator is secured using only the mounting holes provided on the top surface of the base, the base may twist to cause abnormal sliding of the slider, or may produce abnormal noise. Therefore, when using the mounting holes on the top surface of the base, keep the stroke at 300mm or less.

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       | Positioning is possible for up to 512 points                 | 512 points              | Single-Phase AC 115V<br>Single-Phase AC 230V<br>3-Phase AC 230V (XSEL-P/Q only) | 360VA max.<br>* 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 Axis Type  |               | SSEL-C-1-20①-NP-2-②     | Programmed operation is possible<br>Can operate up to 2 axes | 20000 points            |   |   | → P577   |
| Program Control 1-6 Axis Type  |               | XSEL-③-1-20①-N1-EEE-2-④ | Programmed operation is possible<br>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, 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).



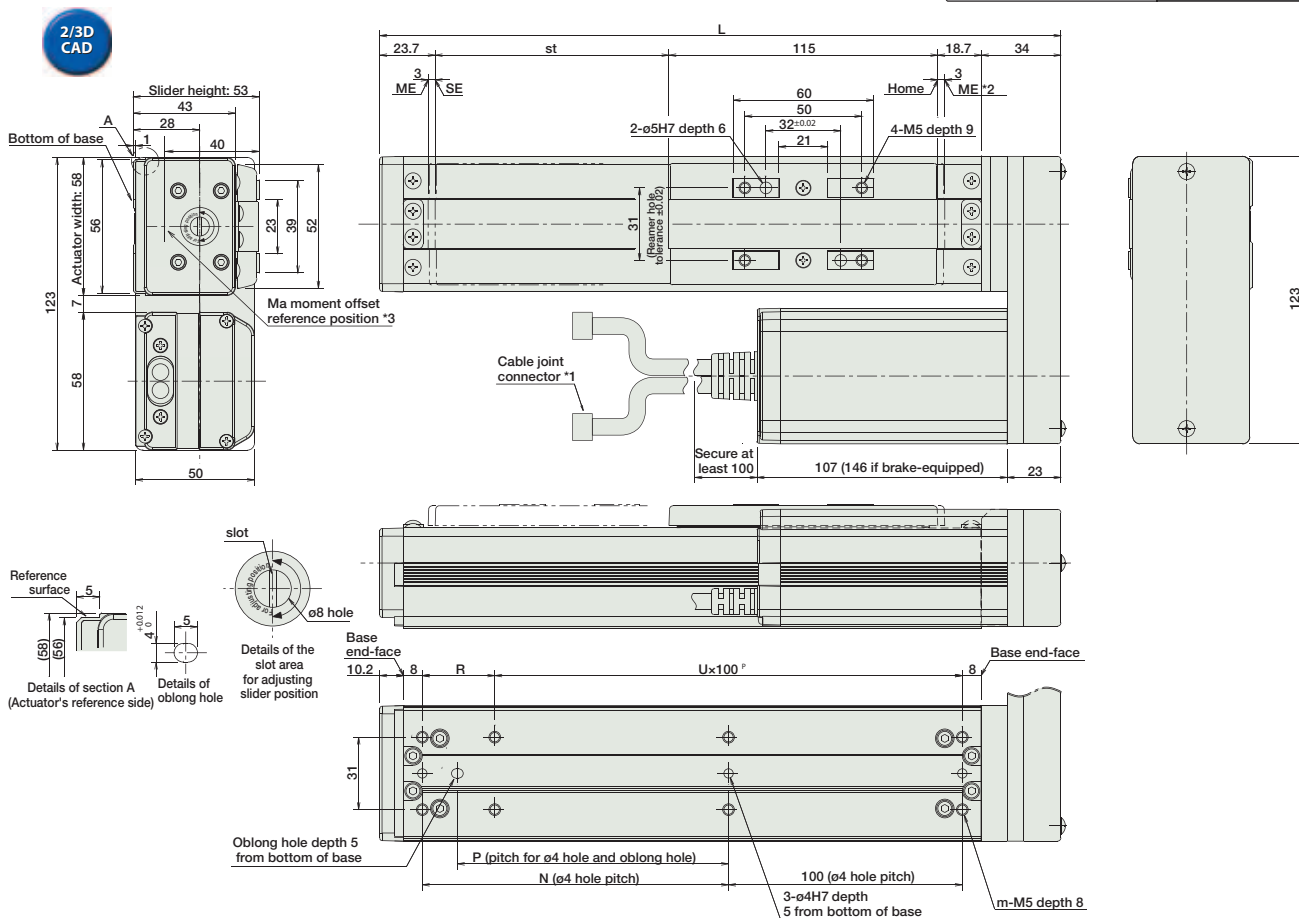


- Slider Type
- Mini
- Standard
- Controllers Integrated
- Rod Type
- Mini
- Standard
- Controllers Integrated
- Table/Arm /Flat Type
- Mini
- Standard
- Gripper/ Rotary Type
- Linear Motor Type
- Cleanroom Type
- Splash-Proof
- Controllers
- PMEC /AMEC
- PSEP /ASEP
- ROBO NET
- ERC2
- PCON
- ACON
- SCON
- PSEL
- ASEL
- SSEL
- XSEL
- Pulse Motor
- Servo Motor (24V)
- Servo Motor (230V)
- Linear Motor

Dimensions

CAD drawings can be downloaded from IAI website. [www.robocylinder.de](http://www.robocylinder.de)

For Special Orders P. A-9



Dimensions/Weight by Stroke

\* Brake-equipped models are heavier by 0.3kg.

| Stroke      | 50    | 100   | 150   | 200   | 250   | 300   | 350   | 400   | 450   | 500   | 550   | 600   |
|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| L           | 241.4 | 291.4 | 341.4 | 391.4 | 441.4 | 491.4 | 541.4 | 591.4 | 641.4 | 691.4 | 741.4 | 791.4 |
| N           | 81    | 131   | 181   | 231   | 281   | 331   | 381   | 431   | 481   | 531   | 581   | 631   |
| P           | 66    | 116   | 166   | 216   | 266   | 316   | 366   | 416   | 466   | 516   | 566   | 616   |
| R           | 81    | 31    | 81    | 31    | 81    | 31    | 81    | 31    | 81    | 31    | 81    | 31    |
| U           | 1     | 2     | 2     | 3     | 3     | 4     | 4     | 5     | 5     | 6     | 6     | 7     |
| m           | 6     | 8     | 8     | 10    | 10    | 12    | 12    | 14    | 14    | 16    | 16    | 18    |
| Weight (kg) | 1.7   | 1.9   | 2.1   | 2.3   | 2.5   | 2.7   | 2.9   | 3.1   | 3.3   | 3.5   | 3.7   | 3.9   |

- \*1 The motor-encoder cable is connected here. See page A-39 for details on cables.
- \*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
- \*3 Reference position for calculating the moment Ma.

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-30D①-NP-2-②       | Positioning is possible for up to 512 points                 | 512 points              | Single-Phase AC 115V<br>Single-Phase AC 230V<br>3-Phase AC 230V (XSEL-P/Q only) | 360VA max.<br>* 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 Axis Type  |               | SSEL-C-1-30D①-NP-2-②     | Programmed operation is possible<br>Can operate up to 2 axes | 20000 points            |   |   | → P577   |
| Program Control 1-6 Axis Type  |               | XSEL-③-1-30D①-N1-EEE-2-④ | Programmed operation is possible<br>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, 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).



Dimensions

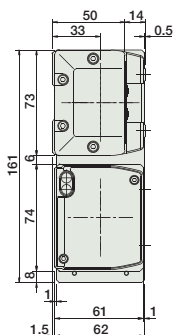
CAD drawings can be downloaded from IAI website. [www.robocylinder.de](http://www.robocylinder.de)

For Special Orders

P. A-9

2/3D CAD

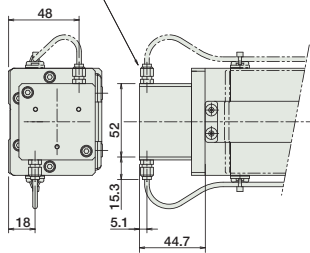
\* The reference surface is the same as the SA7C type. (See P106)  
 \* The offset reference position for the moment Ma is the same as the SA7C type. (See P106)



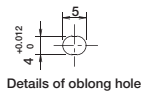
Dimensions of the Brake Section

\* Adding a brake will increase the actuator's overall length by 43mm, and its weight by 0.6kg.

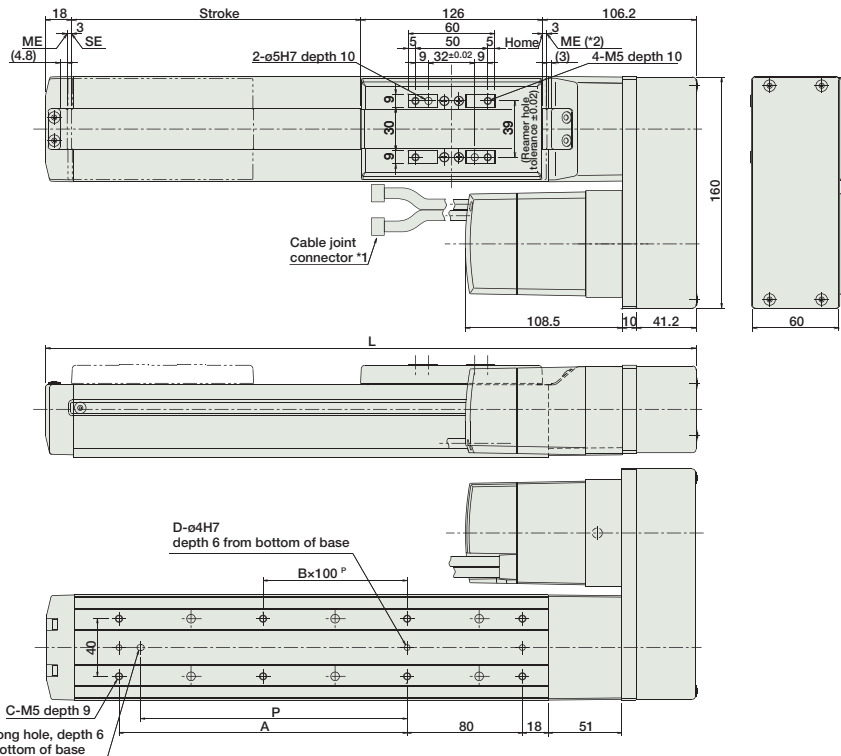
Mounting direction: symmetrically opposite



\* For brake cable exiting from the side, it can only exit from the motor side.



Details of oblong hole



Memo:  
ME: Mechanical end, SE: Stroke end

■ Dimensions/Weight by Stroke

| Stroke      | 50    | 100   | 150   | 200   | 250   | 300   | 350   | 400   | 450   | 500   | 550   | 600   | 650   | 700   | 750    | 800    |
|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|--------|--------|
| L           | 300.2 | 350.2 | 400.2 | 450.2 | 500.2 | 550.2 | 600.2 | 650.2 | 700.2 | 750.2 | 800.2 | 850.2 | 900.2 | 950.2 | 1000.2 | 1050.2 |
| A           | 0     | 100   | 100   | 200   | 200   | 300   | 300   | 400   | 400   | 500   | 500   | 600   | 600   | 700   | 700    | 800    |
| B           | 0     | 0     | 0     | 1     | 1     | 2     | 2     | 3     | 3     | 4     | 4     | 5     | 5     | 6     | 6      | 7      |
| C           | 4     | 6     | 6     | 8     | 8     | 10    | 10    | 12    | 12    | 14    | 14    | 16    | 16    | 18    | 18     | 20     |
| D           | 2     | 3     | 3     | 3     | 3     | 3     | 3     | 3     | 3     | 3     | 3     | 3     | 3     | 3     | 3      | 3      |
| H           | 0     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1     | 1      | 1      |
| P           | 0     | 85    | 85    | 185   | 185   | 285   | 285   | 385   | 385   | 485   | 485   | 585   | 585   | 685   | 685    | 785    |
| Weight (kg) | 4.0   | 4.2   | 4.4   | 4.6   | 4.9   | 5.1   | 5.3   | 5.5   | 5.8   | 6.0   | 6.2   | 6.4   | 6.7   | 6.9   | 7.1    | 7.3    |

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

\*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

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<br>Single-Phase AC 230V<br>3-Phase AC 230V (XSEL-P/Q only) | 360VA max.<br>* 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 Axis Type  |               | SSEL-C-1-60①-NP-2-①     | Programmed operation is possible<br>Can operate up to 2 axes | 20000 points            |   |   | → P577   |
| Program Control 1-6 Axis Type  |               | XSEL-③-1-60①-N1-EEE-2-④ | Programmed operation is possible<br>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, 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).

Slider Type

Mini

Standard

Controllers Integrated

Rod Type

Mini

Standard

Controllers Integrated

Table/Arm /Flat Type

Mini

Standard

Gripper/ Rotary Type

Linear Motor Type

Cleanroom Type

Splash-Proof

Controllers

PMEC /AMEC

PSEP /ASEP

ROBO NET

ERC2

PCON

ACON

SCON

PSEL

ASEL

SSEL

XSEL

Pulse Motor

Servo Motor (24V)

Servo Motor (230V)

Linear Motor



- Slider Type
- Mini
- Standard
- Controllers Integrated
- Rod Type
- Mini
- Standard
- Controllers Integrated
- Table/Arm /Flat Type
- Mini
- Standard
- Gripper/ Rotary Type
- Linear Motor Type
- Cleanroom Type
- Splash-Proof
- Controllers
- PMEC /AMEC
- PSEP /ASEP
- ROBO NET
- ERC2
- PCON
- ACON
- SCON
- PSEL
- ASEL
- SSEL
- XSEL
- Pulse Motor
- Servo Motor (24V)
- Servo Motor (230V)
- Linear Motor

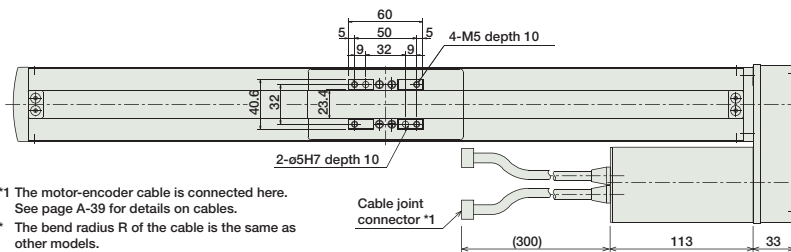
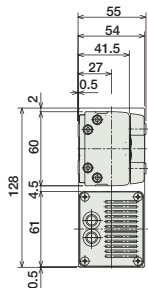
Dimensions

CAD drawings can be downloaded from IAI website. [www.robocylinder.de](http://www.robocylinder.de)

For Special Orders P. A-9



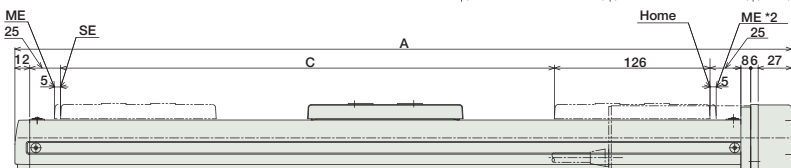
\*The reference surface is the same as the SS7C type. (See P108)  
 \*The offset reference position for the moment Ma is the same as the SS7C type. (See P108)



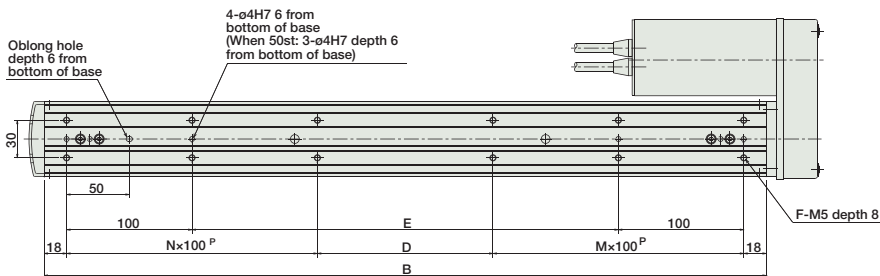
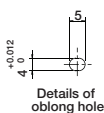
\*1 The motor-encoder cable is connected here. See page A-39 for details on cables.  
 \* The bend radius R of the cable is the same as other models.

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

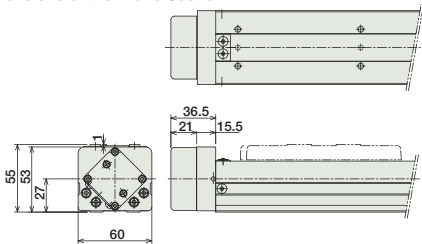
\* Note that in order to change the home orientation, arrangements must be made to send in the product to IAI.  
 \* For the reversed-home model, the dimensions (distance from the ME to home) on the motor-side and that on the opposite side are flipped.



\* Adding a brake increases the actuator's overall length by 24.5mm and its weight by 0.3kg.



Dimensions of the Brake Section



■ Dimensions/Weight by Stroke

| Stroke      | 50  | 100 | 150 | 200 | 250 | 300 | 350 | 400 | 450 | 500 | 550 | 600 |
|-------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| A           | 279 | 329 | 379 | 429 | 479 | 529 | 579 | 629 | 679 | 729 | 779 | 829 |
| B           | 226 | 276 | 326 | 376 | 426 | 476 | 526 | 576 | 626 | 676 | 726 | 776 |
| C           | 50  | 100 | 150 | 200 | 250 | 300 | 350 | 400 | 450 | 500 | 550 | 600 |
| D           | 90  | 40  | 90  | 140 | 190 | 40  | 90  | 140 | 190 | 40  | 90  | 140 |
| E           | 0   | 40  | 90  | 140 | 190 | 240 | 290 | 340 | 390 | 440 | 490 | 540 |
| F           | 6   | 8   | 8   | 8   | 8   | 12  | 12  | 12  | 12  | 16  | 16  | 16  |
| M           | 1   | 1   | 1   | 1   | 1   | 2   | 2   | 2   | 2   | 3   | 3   | 3   |
| N           | 0   | 1   | 1   | 1   | 1   | 2   | 2   | 2   | 2   | 3   | 3   | 3   |
| Weight (kg) | 3.7 | 4.0 | 4.3 | 4.6 | 4.9 | 5.2 | 5.5 | 5.8 | 6.1 | 6.4 | 6.7 | 7.0 |

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-60①-NP-2-②       | Positioning is possible for up to 512 points                 | 512 points              | Single-Phase AC 115V<br>Single-Phase AC 230V<br>3-Phase AC 230V (XSEL-P/Q only) | 360VA max.<br><br>* 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 Axis Type  |               | SSEL-C-1-60①-NP-2-②     | Programmed operation is possible<br>Can operate up to 2 axes | 20000 points            |   |   | →P577    |
| Program Control 1-6 Axis Type  |               | XSEL-③-1-60①-N1-EEE-2-④ | Programmed operation is possible<br>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, 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).

- Slider Type
- Mini
- Standard
- Controllers Integrated
- Rod Type
- Mini
- Standard
- Controllers Integrated
- Table/Arm /Flat Type
- Mini
- Standard
- Gripper/ Rotary Type
- Linear Motor Type
- Cleanroom Type
- Splash-Proof
- Controllers
- PMEC /AMEC
- PSEP /ASEP
- ROBO NET
- ERC2
- PCON
- ACON
- SCON
- PSEL
- ASEL
- SSEL
- XSEL
- Pulse Motor
- Servo Motor (24V)
- Servo Motor (230V)
- Linear Motor

# RCS2-SS8R

RoboCylinder Slider Type 80mm Width 230V Servo Motor  
Side Mounted Motor Steel Base

■ Configuration: **RCS2** — **SS8R** — [ ] — [ ] — [ ] — [ ] — [ ] — [ ] — [ ]

Series — Type — Encoder — Motor — Lead — Stroke — Compatible Controllers — Cable Length — Option

I : Incremental  
A : Absolute

100: 100W Servo motor  
150: 150W Servo motor

20: 20mm  
10: 10mm

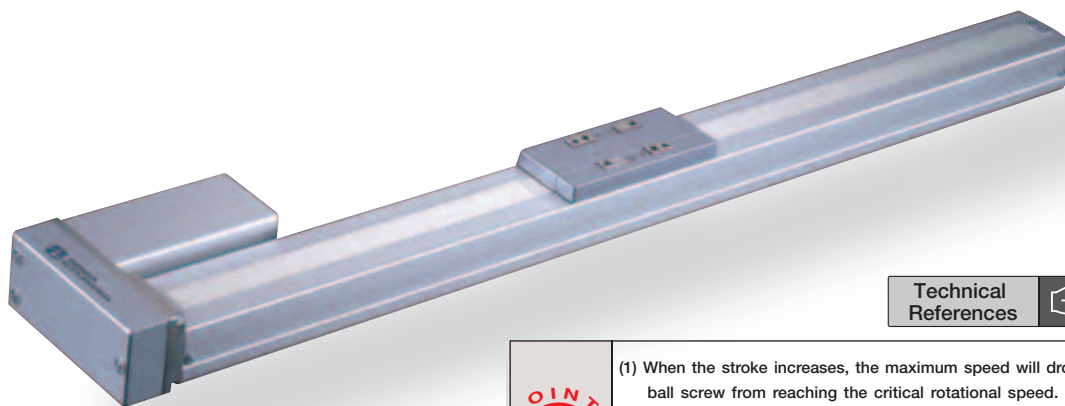
50: 50mm  
1000: 1000mm (50mm pitch increments)

T1: XSEL-KE/KET  
T2: SCON  
SSEL  
XSEL-P/Q

N : None  
P : 1m  
S : 3m  
M : 5m  
X [ ] : Custom Length  
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 explanation of each code that makes up the configuration name.



Pictured: Left-mounted motor model (ML).

Technical References P. A-5

- POINT**  
Notes on Selection
- 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.
  - The load capacity is based on operation at an acceleration of 0.3G. These values are the upper limits for the acceleration.

| Actuator Specifications    |              |           |                    |               |                  |
|----------------------------|--------------|-----------|--------------------|---------------|------------------|
| ■ Lead and Load Capacity   |              |           |                    |               |                  |
| Model                      | Motor Output | Lead (mm) | Max. Load Capacity |               | Rated Thrust (N) |
|                            |              |           | Horizontal (kg)    | Vertical (kg) |                  |
| RCS2-SS8R-①-100-20-②-③-④-⑤ | 100          | 20        | 20                 | 4             | 84.9             |
| RCS2-SS8R-①-100-10-②-③-④-⑤ |              | 10        | 40                 | 8             | 169              |
| RCS2-SS8R-①-150-20-②-③-④-⑤ | 150          | 20        | 30                 | 6             | 128              |
| RCS2-SS8R-①-150-10-②-③-④-⑤ |              | 10        | 60                 | 12            | 256              |

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

| ■ Stroke and Maximum Speed |                            |            |            |            |             |
|----------------------------|----------------------------|------------|------------|------------|-------------|
| Stroke / Lead              | 50 ~ 600 (60mm increments) | ~ 700 (mm) | ~ 800 (mm) | ~ 900 (mm) | ~ 1000 (mm) |
| 20                         | 1000                       | 960        | 765        | 625        | 515         |
| 10                         | 500                        | 480        | 380        | 310        | 255         |

(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) |
|                 |                       |

\* For cables for maintenance, see page A-39.

| Actuator Specifications          |  |
|----------------------------------|--|
| Item                             | Description  |
| Drive System                     | Ball screw ø16mm C10 grade                                 |
| Positioning Repeatability        | ±0.02mm  |
| Lost Motion                      | 0.1 mm or less   |
| Base                             | Material: Special alloy steel                              |
| Allowable Static Moment          | Ma: 198.9N·m Mb: 198.9N·m Mc: 416.7N·m                     |
| Allowable Dynamic Moment (*)     | Ma: 36.3N·m Mb: 36.3N·m Mc: 77.4N·m                        |
| Overhang Load Length             | Ma direction: 450mm or less Mb-Mc direction: 450mm or less |
| Ambient Operating Temp./Humidity | 0~40°C, 85% RH or less (Non-condensing)                    |

(\*) Based on 5,000km travel life.  
Directions of Allowable Load Moments

| Option List                   |             |          |
|-------------------------------|-------------|----------|
| Name                          | Option Code | See Page |
| Brake                         | B           | →A-25    |
| Reversed-home                 | NM          | →A-33    |
| Left-Mounted Motor (Standard) | ML          | →A-33    |
| Right-Mounted Motor           | MR          | →A-33    |
| Slider Roller                 | SR          | →A-36    |

Dimensions

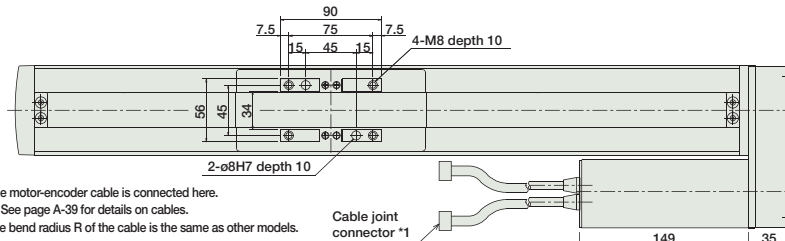
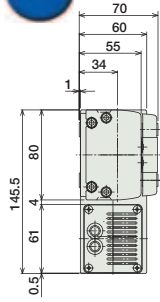
CAD drawings can be downloaded from IAI website. [www.robocylinder.de](http://www.robocylinder.de)

For Special Orders

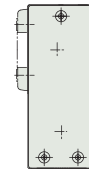
P. A-9

2/3D CAD

\*The reference surface is the same as the SS8C type. (See P110)



\*1 The motor-encoder cable is connected here. See page A-39 for details on cables.  
\* The bend radius R of the cable is the same as other models.



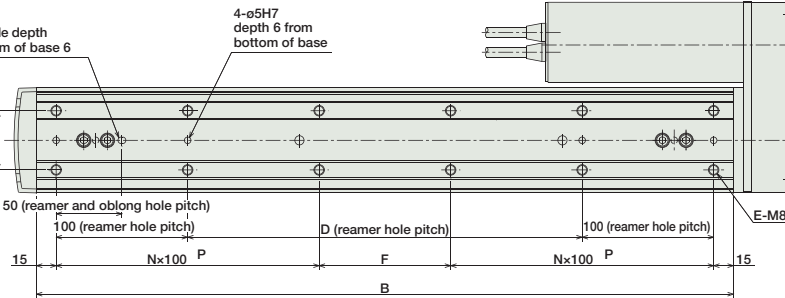
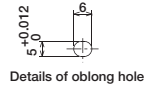
\*2 When homing, the slider moves to the ME; therefore, please watch for any interference with the surrounding objects. SE: Stroke end ME: Mechanical end

Dimensions of the Brake Section

\* Adding a brake increases the actuator's overall length by 26mm and its weight by 0.5kg.



Oblong hole depth from bottom of base 6  
4-ø5H7 depth 6 from bottom of base



\* The offset reference position for the moment Ma is the same as the SS8C type. (See P110)  
\* Note that in order to change the home orientation, arrangements must be made to send in the product to IAI.  
\* For the reversed-home model, the dimensions (distance from the ME to home) on the motor-side and that on the opposite side are flipped.

■ Dimensions/Weight by Stroke

| Stroke      | 50  | 100 | 150 | 200 | 250 | 300 | 350 | 400  | 450  | 500  | 550  | 600  | 650  | 700  | 750  | 800  | 850  | 900  | 950  | 1000 |
|-------------|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|
| A           | 340 | 390 | 440 | 490 | 540 | 590 | 640 | 690  | 740  | 790  | 840  | 890  | 940  | 990  | 1040 | 1090 | 1140 | 1190 | 1240 | 1290 |
| B           | 280 | 330 | 380 | 430 | 480 | 530 | 580 | 630  | 680  | 730  | 780  | 830  | 880  | 930  | 980  | 1030 | 1080 | 1130 | 1180 | 1230 |
| C           | 50  | 100 | 150 | 200 | 250 | 300 | 350 | 400  | 450  | 500  | 550  | 600  | 650  | 700  | 750  | 800  | 850  | 900  | 950  | 1000 |
| D           | 50  | 100 | 150 | 200 | 250 | 300 | 350 | 400  | 450  | 500  | 550  | 600  | 650  | 700  | 750  | 800  | 850  | 900  | 950  | 1000 |
| E           | 8   | 8   | 8   | 10  | 12  | 12  | 12  | 14   | 16   | 16   | 16   | 18   | 20   | 20   | 20   | 22   | 24   | 24   | 24   | 26   |
| F           | 50  | 100 | 150 | 0   | 50  | 100 | 150 | 0    | 50   | 100  | 150  | 0    | 50   | 100  | 150  | 0    | 50   | 100  | 150  | 0    |
| N           | 1   | 1   | 1   | 2   | 2   | 2   | 2   | 3    | 3    | 3    | 3    | 4    | 4    | 4    | 4    | 5    | 5    | 5    | 5    | 6    |
| Weight (kg) | 6.7 | 7.2 | 7.7 | 8.2 | 8.7 | 9.2 | 9.7 | 10.2 | 10.7 | 11.2 | 11.7 | 12.2 | 12.7 | 13.2 | 13.7 | 14.2 | 14.7 | 15.2 | 15.7 | 16.2 |

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-100①-NP-2-②<br>SCON-C-150①-NP-2-②             | Positioning is possible for up to 512 points                 | 512 points              | Single-Phase AC 115V<br>Single-Phase AC 230V<br>3-Phase AC 230V (XSEL-P/Q only) | 360VA max.<br>* 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 Axis Type  |               | SSEL-C-1-100①-NP-2-②<br>SSEL-C-1-150①-NP-2-②         | Programmed operation is possible<br>Can operate up to 2 axes | 20000 points            |   |   | →P577    |
| Program Control 1-6 Axis Type  |               | XSEL-③-1-100①-N1-EEE-2-④<br>XSEL-③-1-150①-N1-EEE-2-④ | Programmed operation is possible<br>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, 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).

Slider Type

Mini

Standard

Controllers Integrated

Rod Type

Mini

Standard

Controllers Integrated

Table/Arm /Flat Type

Mini

Standard

Gripper/ Rotary Type

Linear Motor Type

Cleanroom Type

Splash-Proof

Controllers

PMEC /AMEC

PSEP /ASEP

ROBO NET

ERC2

PCON

ACON

SCON

PSEL

ASEL

SSEL

XSEL

Pulse Motor

Servo Motor (24V)

Servo Motor (230V)

Linear Motor

# RCS2CR-SA4C

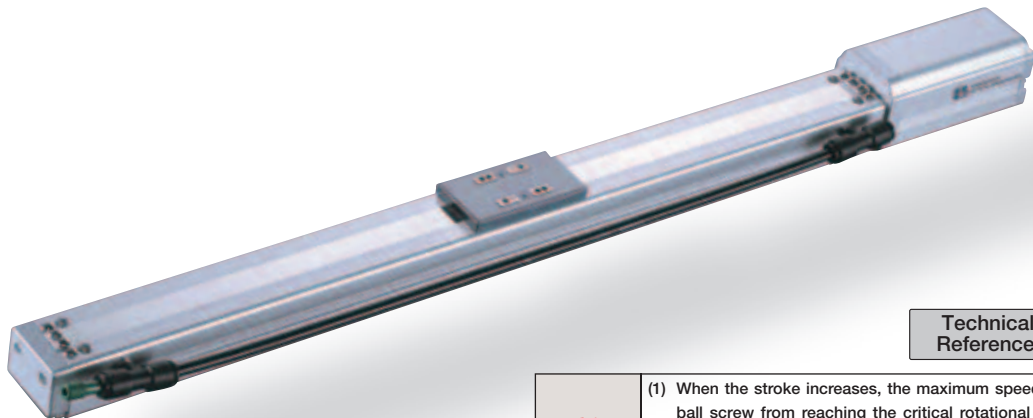
Cleanroom RoboCylinder Slider Coupling Type 40mm Width 230V Servo Motor Aluminum Base

■ Configuration: **RCS2CR-SA4C** - [ ] - **20** - [ ] - [ ] - [ ] - [ ]

Series — Type — Encoder — Motor — Lead — Stroke — Compatible Controllers — Cable Length — Option

I : Incremental    20 : 20W servo motor    10: 10mm    5: 5mm    2.5: 2.5mm    50: 50mm }    T1: XSEL-KE/KET    N : None    See Options below  
 A : Absolute    motor    400: 400mm (50mm pitch increments)    T2: SCON    P : 1m    S : 3m    M : 5m    X [ ] : Custom    R [ ] : Robot cable

\* 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 2.5mm-lead model). This is the upper limit of the acceleration.

### Actuator Specifications

| Model                        | Motor Output (W) | Lead (mm) | Max. Load Capacity |               | Rated Thrust (N) | Stroke (mm) | Stroke, Max. Speed/Suction Volume |                            |                         |
|------------------------------|------------------|-----------|--------------------|---------------|------------------|-------------|-----------------------------------|----------------------------|-------------------------|
|                              |                  |           | Horizontal (kg)    | Vertical (kg) |                  |             | Stroke Lead                       | 50 ~ 400 (50mm increments) | Suction Volume (Nl/min) |
| RCS2CR-SA4C-①-20-10-②-③-④-⑤  | 20               | 10        | 4                  | 1             | 19.6             | 10          | 665                               | 50                         |                         |
| RCS2CR-SA4C-①-20-5-②-③-④-⑤   |                  | 5         | 6                  | 2.5           | 39.2             | 5           | 330                               | 30                         |                         |
| RCS2CR-SA4C-①-20-2.5-②-③-④-⑤ |                  | 2.5       | 8                  | 4.5           | 78.4             | 2.5         | 165                               | 15                         |                         |

Legend: ① Encoder ② Stroke ③ Compatible controller ④ Cable length ⑤ Options (Unit: mm/s)

### Cable List

| Type            | Cable Symbol          |
|-----------------|-----------------------|
| Standard Type   | 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.

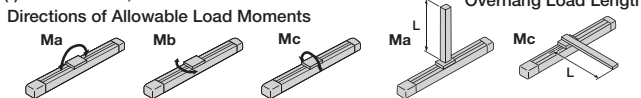
### Option List

| Name                                 | Option Code | See Page |
|--------------------------------------|-------------|----------|
| Brake                                | B           | → A-25   |
| Foot bracket                         | FT          | → A-29   |
| Home sensor                          | HS          | → A-32   |
| Reversed-home                        | NM          | → A-33   |
| Slider spacer                        | SS          | → A-36   |
| Intake port mounted on opposite side | VR          | → A-38   |

### Actuator Specifications

| Item                             | Description   |
|----------------------------------|---|
| Drive System                     | Ball screw ø8mm C10 grade                                   |
| Positioning Repeatability        | ±0.02mm   |
| Lost Motion                      | 0.1mm or less   |
| Base                             | Material: Aluminum (white alumite treated)                  |
| Allowable Static Moment          | Ma: 6.9N·m Mb: 9.9N·m Mc: 17.0N·m                           |
| Allowable Dynamic Moment (*)     | Ma: 2.7N·m Mb: 3.9N·m Mc: 6.8N·m                            |
| Overhang Length                  | Ma direction: 120mm or less; Mb-Mc direction: 120mm or less |
| Grease Type                      | Low dust generation grease (both ball screw and guide)      |
| Cleanliness                      | ISO class 4 (US FED STD class 10)                           |
| Ambient Operating Temp./Humidity | 0~40°C, 85% RH or less (non-condensing)                     |

(\*) Based on a 5,000km service life.





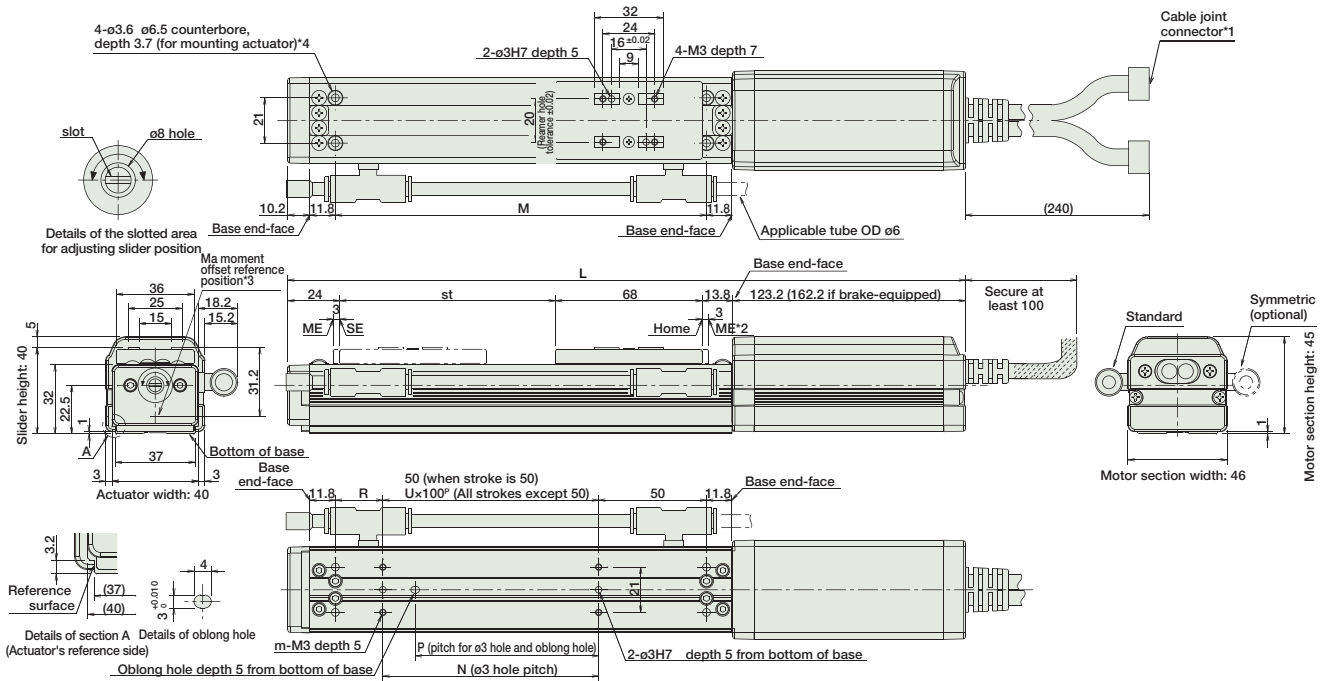
## Dimensions

CAD drawings can be downloaded from IAI website. [www.robocylinder.de](http://www.robocylinder.de)

2/3D CAD

- \*1 The motor-encoder cable is connected here. See page A-39 for details on cables.
- \*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
- \*3 Reference position for calculating the moment Ma.
- \*4 If the actuator is secured using only the mounting holes provided on the top surface of the base, the base may twist to cause abnormal sliding of the slider, or may produce abnormal noise. Therefore, when using the mounting holes on the top surface of the base, keep the stroke at 200mm or less.

For Special Orders P. A-9



■ Dimensions and Weight by Stroke \* Adding a brake will increase the actuator's weight by 0.3kg.

| Stroke      | 50         | 100 | 150 | 200 | 250 | 300 | 350 | 400 |     |
|-------------|------------|-----|-----|-----|-----|-----|-----|-----|-----|
| L           | No Brake   | 279 | 329 | 379 | 429 | 479 | 529 | 579 | 629 |
|             | With Brake | 318 | 368 | 418 | 468 | 518 | 568 | 618 | 668 |
| M           | 122        | 172 | 222 | 272 | 322 | 372 | 422 | 472 |     |
| N           | 50         | 100 | 100 | 200 | 200 | 300 | 300 | 400 |     |
| P           | 35         | 85  | 85  | 185 | 185 | 285 | 285 | 385 |     |
| R           | 22         | 22  | 72  | 22  | 72  | 22  | 72  | 22  |     |
| U           | -          | 1   | 1   | 2   | 2   | 3   | 3   | 4   |     |
| m           | 4          | 4   | 4   | 6   | 6   | 8   | 8   | 10  |     |
| Weight (kg) | 0.7        | 0.8 | 0.9 | 1   | 1.1 | 1.2 | 1.3 | 1.4 |     |

## Compatible Controllers

The RCS2CR 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       | Positioning is possible for up to 512 points                              | 512 points              | Single-Phase AC 115V<br>Single-Phase AC 230V<br>3-Phase AC 230V (XSEL-P/Q only) | 106 VA max.<br>* It depends on the controller type. Please refer each controller manual in detail. | → 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     | Programmed operation is possible<br>Operation is possible on up to 2 axes | 20000 points            |   |  | → P577   |
| Program Control 1-6 Axes Type  |               | XSEL-③-1-20②-N1-EEE-2-④ | Programmed operation is possible<br>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, 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).



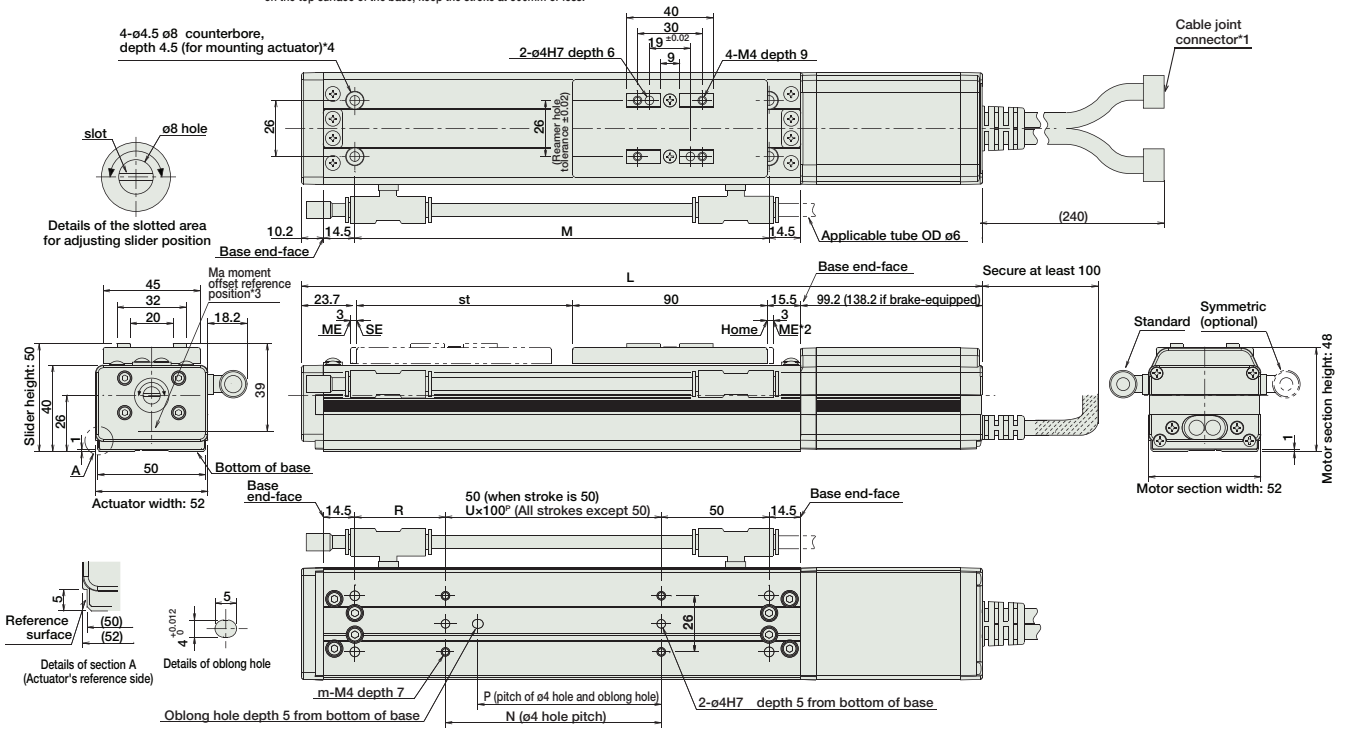
Dimensions

CAD drawings can be downloaded from IAI website. [www.robocylinder.de](http://www.robocylinder.de)



- \*1 The motor-encoder cable is connected here. See page A-39 for details on cables.
- \*2 After homing, the slider moves to the ME; therefore, please watch for any interference with the surrounding objects.  
ME: Mechanical end SE: Stroke end
- \*3 Reference position for calculating the moment Ma.
- \*4 If the actuator is secured using only the mounting holes provided on the top surface of the base, the base may twist to cause abnormal sliding of the slider, or may produce abnormal noise. Therefore, when using the mounting holes on the top surface of the base, keep the stroke at 300mm or less.

For Special Orders P. A-9



■ Dimensions and Weight by Stroke \* Adding a brake will increase the actuator's weight by 0.3kg.

| Stroke      | 50         | 100   | 150   | 200   | 250   | 300   | 350   | 400   | 450   | 500   |
|-------------|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| L           | No Brake   | 280.4 | 330.4 | 380.4 | 430.4 | 480.4 | 530.4 | 580.4 | 630.4 | 730.4 |
|             | With Brake | 319.4 | 369.4 | 419.4 | 469.4 | 519.4 | 569.4 | 619.4 | 669.4 | 769.4 |
| M           | 142        | 192   | 242   | 292   | 342   | 392   | 442   | 492   | 542   | 592   |
| N           | 50         | 100   | 100   | 200   | 200   | 300   | 300   | 400   | 400   | 500   |
| P           | 35         | 85    | 85    | 185   | 185   | 285   | 285   | 385   | 385   | 485   |
| R           | 42         | 42    | 92    | 42    | 92    | 42    | 92    | 42    | 92    | 42    |
| U           | -          | 1     | 1     | 2     | 2     | 3     | 3     | 4     | 4     | 5     |
| m           | 4          | 4     | 4     | 6     | 6     | 8     | 8     | 10    | 10    | 12    |
| Weight (kg) | 1.3        | 1.4   | 1.5   | 1.6   | 1.7   | 1.8   | 1.9   | 2     | 2.1   | 2.2   |

Compatible Controllers

The RCS2CR 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       | Positioning is possible for up to 512 points                              | 512 points              | Single-Phase AC 115V<br>Single-Phase AC 230V<br>3-Phase AC 230V (XSEL-P/Q only) | 106 VA max.<br>* It depends on the controller type. Please refer each controller manual in detail. | → 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     | Programmed operation is possible<br>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 | Programmed operation is possible<br>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, 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).

- Slider Type
- Mini
- Standard
- Controllers Integrated
- Rod Type
- Mini
- Standard
- Controllers Integrated
- Table/Arm /Flat Type
- Mini
- Standard
- Gripper/ Rotary Type
- Linear Motor Type
- Cleanroom Type
- Splash-Proof
- Controllers
- PMEC /AMEC
- PSEP /ASEP
- ROBO NET
- ERC2
- PCON
- ACON
- SCON
- PSEL
- ASEL
- SSEL
- XSEL
- Pulse Motor
- Servo Motor (24V)
- Servo Motor (230V)
- Linear Motor



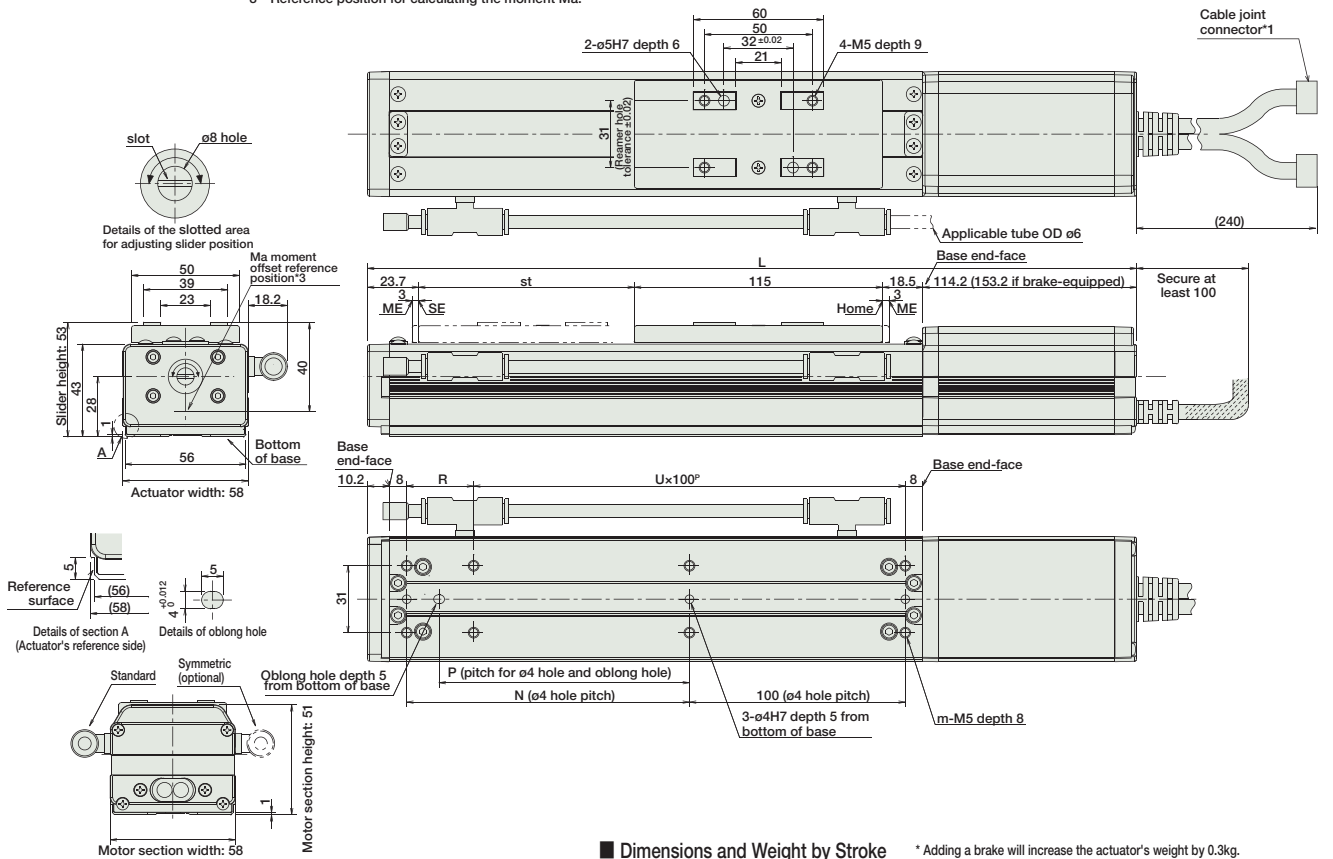
## Dimensions

CAD drawings can be downloaded from IAI website. [www.robocylinder.de](http://www.robocylinder.de)



- \*1 The motor-encoder cable is connected here. See page A-39 for details on cables.
- \*2 After homing, the slider moves to the ME; therefore, please watch for any interference with the surrounding objects.  
ME: Mechanical end SE: Stroke end
- \*3 Reference position for calculating the moment Ma.

For Special Orders P. A-9



### Dimensions and Weight by Stroke

\* Adding a brake will increase the actuator's weight by 0.3kg.

| Stroke      | 50         | 100   | 150   | 200   | 250   | 300   | 350   | 400   | 450   | 500   | 550   | 600   |       |
|-------------|------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| L           | No Brake   | 321.4 | 371.4 | 421.4 | 471.4 | 521.4 | 571.4 | 621.4 | 671.4 | 721.4 | 771.4 | 821.4 | 871.4 |
|             | With Brake | 360.4 | 410.4 | 460.4 | 510.4 | 560.4 | 610.4 | 660.4 | 710.4 | 760.4 | 810.4 | 860.4 | 910.4 |
| N           | 81         | 131   | 181   | 231   | 281   | 331   | 381   | 431   | 481   | 531   | 581   | 631   |       |
| P           | 66         | 116   | 166   | 216   | 266   | 316   | 366   | 416   | 466   | 516   | 566   | 616   |       |
| R           | 81         | 31    | 81    | 31    | 81    | 31    | 81    | 31    | 81    | 31    | 81    | 31    |       |
| U           | 1          | 2     | 2     | 3     | 3     | 4     | 4     | 5     | 5     | 6     | 6     | 7     |       |
| m           | 6          | 8     | 8     | 10    | 10    | 12    | 12    | 14    | 14    | 16    | 16    | 18    |       |
| Weight (kg) | 1.4        | 1.6   | 1.8   | 2     | 2.2   | 2.4   | 2.6   | 2.8   | 3     | 3.2   | 3.4   | 3.6   |       |

## Compatible Controllers

The RCS2CR 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-30D①-NP-2-②       | Positioning is possible for up to 512 points                              | 512 points              | Single-Phase AC 115V<br>Single-Phase AC 230V<br>3-Phase AC 230V (XSEL-P/Q only) | 126 VA max.<br>* It depends on the controller type. Please refer each controller manual in detail. | → 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-1-30D①-NP-2-②     | Programmed operation is possible<br>Operation is possible on up to 2 axes | 20000 points            |   |  | → P577   |
| Program Control 1-6 Axes Type  |               | XSEL-③-1-30D①-N1-EEE-2-④ | Programmed operation is possible<br>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, 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).







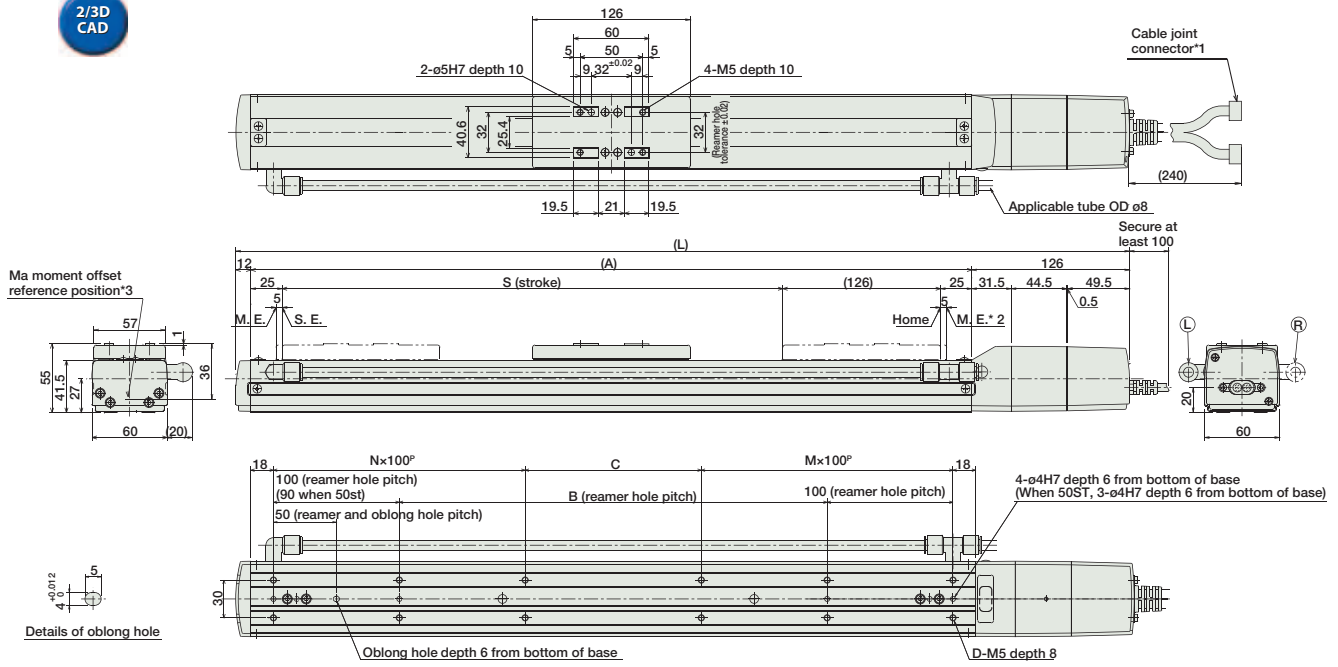


## Dimensions

CAD drawings can be downloaded from IAI website. [www.robocylinder.de](http://www.robocylinder.de)

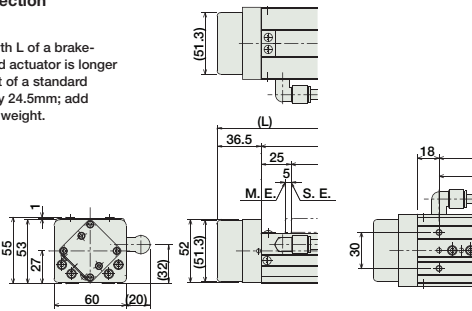
For Special Orders P. A-9

2/3D CAD



### Dimensions of the Brake Section

\*The length L of a brake-equipped actuator is longer than that of a standard model by 24.5mm; add 0.3kg to weight.



- \*1. The motor-encoder cable is connected here. See page A-39 for details on cables.
- \*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  
The values enclosed in "( )" are reference dimensions.
- \*3. Reference position for calculating the moment Ma.

### Dimensions and Weight by Stroke

| Stroke      | 50  | 100 | 150 | 200 | 250 | 300 | 350 | 400 | 450 | 500 | 550 | 600 |
|-------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| L           | 364 | 414 | 464 | 514 | 564 | 614 | 664 | 714 | 764 | 814 | 864 | 914 |
| A           | 226 | 276 | 326 | 376 | 426 | 476 | 526 | 576 | 626 | 676 | 726 | 776 |
| B           | 0   | 40  | 90  | 140 | 190 | 240 | 290 | 340 | 390 | 440 | 490 | 540 |
| C           | 90  | 40  | 90  | 140 | 190 | 40  | 90  | 140 | 190 | 40  | 90  | 140 |
| D           | 6   | 8   | 8   | 8   | 8   | 12  | 12  | 12  | 12  | 16  | 16  | 16  |
| M           | 1   | 1   | 1   | 1   | 1   | 2   | 2   | 2   | 2   | 3   | 3   | 3   |
| N           | 0   | 1   | 1   | 1   | 1   | 2   | 2   | 2   | 2   | 3   | 3   | 3   |
| Weight (kg) | 3.1 | 3.4 | 3.7 | 4.0 | 4.4 | 4.7 | 5.0 | 5.3 | 5.7 | 6.0 | 6.3 | 6.6 |

### Compatible Controllers

The RCS2CR 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<br>Single-Phase AC 230V<br>3-Phase AC 230V (XSEL-P/Q only) | 218 VA max.<br>* It depends on the controller type. Please refer each controller manual in detail. | → 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-2-④     | Programmed operation is possible<br>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<br>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, 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).

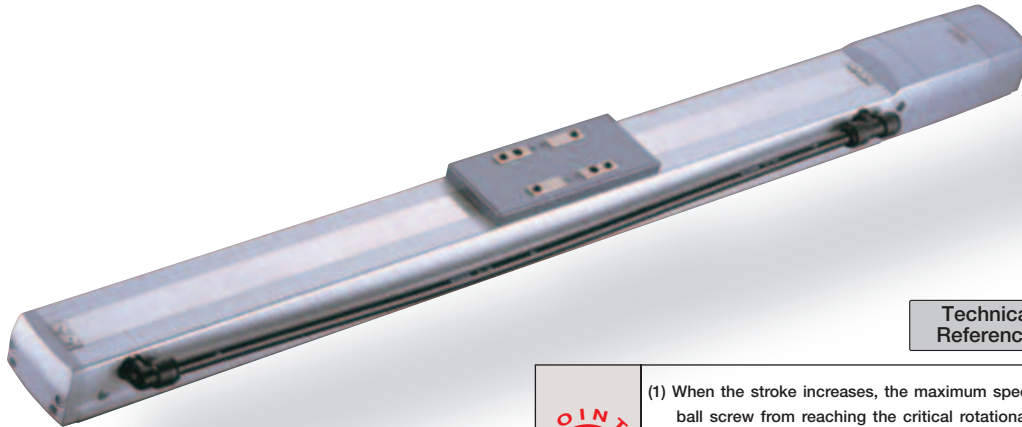
# RCS2CR-SS8C

Cleanroom RoboCylinder Slider Coupling Type 80mm Width 230V Servo Motor Steel Base

■ Configuration: **RCS2CR-SS8C** — [ ] — [ ] — [ ] — [ ] — [ ] — [ ] — [ ]

| Series                          | Type | Encoder  | Motor                  | Lead   | Stroke  | Compatible Controllers  | Cable Length | Option            |
|---------------------------------|------|--|------------------------|--|---|---|--------------|-------------------|
| I : Incremental<br>A : Absolute |      | 100 : 100W servo motor<br>150 : 150W servo motor | 20 : 20mm<br>10 : 10mm | 50 : 50mm<br>1000 : 1000mm (50mm pitch increments) | T1 : XSEL-KE/KET<br>T2 : SCON<br>SSEL<br>XSEL-P/Q | N : None<br>P : 1m<br>S : 3m<br>M : 5m<br>X [ ] : Custom<br>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. This is the upper limit of the acceleration.

### Actuator Specifications

#### Lead and Load Capacity

| Model                        | Motor Output (W) | Lead (mm) | Max. Load Capacity |               | Rated Thrust (N) | Stroke (mm)                  |
|------------------------------|------------------|-----------|--------------------|---------------|------------------|------------------------------|
|                              |                  |           | Horizontal (kg)    | Vertical (kg) |                  |                              |
| RCS2CR-SS8C-①-100-20-②-③-④-⑤ | 100              | 20        | 20                 | 4             | 84.9             | 50~1000<br>(50mm increments) |
| RCS2CR-SS8C-①-100-10-②-③-④-⑤ |                  | 10        | 40                 | 8             | 169              |                              |
| RCS2CR-SS8C-①-150-20-②-③-④-⑤ | 150              | 20        | 30                 | 6             | 128              |                              |
| RCS2CR-SS8C-①-150-10-②-③-④-⑤ |                  | 10        | 60                 | 12            | 256              |                              |

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

#### Stroke, Max. Speed/Suction Volume

| Lead | Stroke                   |           |           |           |            | Suction Volume (Nl/min) |
|------|--------------------------|-----------|-----------|-----------|------------|-------------------------|
|      | 50~600 (50mm increments) | ~700 (mm) | ~800 (mm) | ~900 (mm) | ~1000 (mm) |                         |
| 20   | 1000                     | 960       | 765       | 625       | 515        | 80                      |
| 10   | 500                      | 480       | 380       | 310       | 255        | 40                      |

(Unit: mm/s)

### Cable List

| Type            | Cable Symbol          |
|-----------------|-----------------------|
| Standard Type   | 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.

### Option List

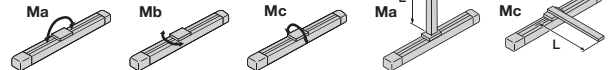
| Name                                 | Option Code | See Page |
|--------------------------------------|-------------|----------|
| Brake                                | B           | → A-25   |
| Reversed-home                        | NM          | → A-33   |
| Intake port mounted on opposite side | VR          | → A-38   |

### Actuator Specifications

| Item                             | Description  |
|----------------------------------|--|
| Drive System                     | Ball screw $\phi$ 16mm C10 grade                           |
| Positioning Repeatability        | $\pm$ 0.02mm   |
| Lost Motion                      | 0.1 mm or less   |
| Base                             | Material: Special alloy steel                              |
| Allowable Static Moment          | Ma: 198.9N·m Mb: 198.9N·m Mc: 416.7N·m                     |
| Allowable Dynamic Moment (*)     | Ma: 36.3N·m Mb: 36.3N·m Mc: 77.4N·m                        |
| Overhang Load Length             | Ma direction: 450mm or less Mb-Mc direction: 450mm or less |
| Grease Type                      | Low dust generation grease (both ball screw and guide)     |
| Cleanliness                      | ISO class 4 (US FED STD class 10)                          |
| Ambient Operating Temp./Humidity | 0~40°C, 85% RH or less (non-condensing)                    |

(\*) Based on a 10,000km service life.

#### Directions of Allowable Load Moments

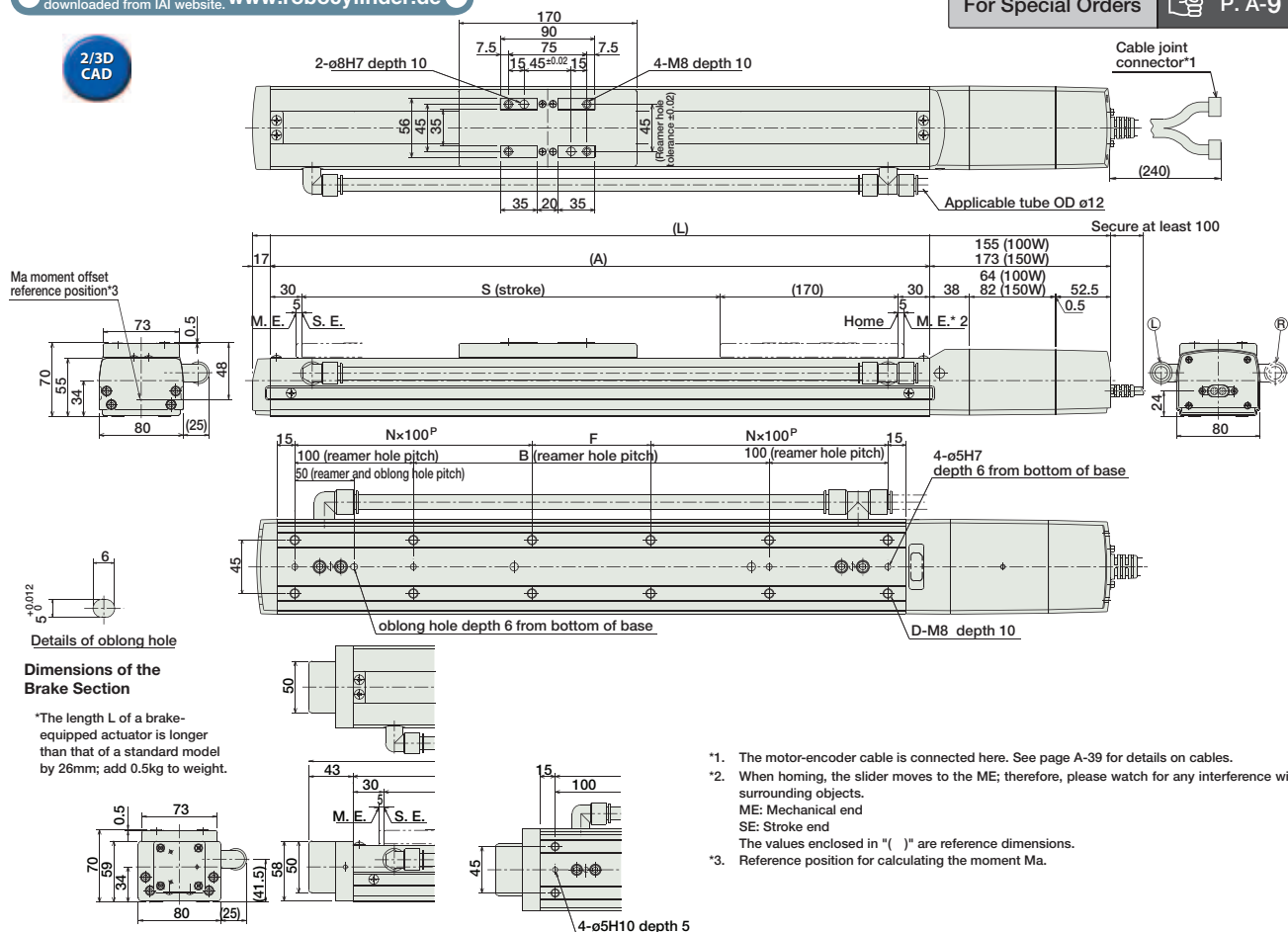


## Dimensions

CAD drawings can be downloaded from IAI website. [www.robocylinder.de](http://www.robocylinder.de)

2/3D CAD

For Special Orders P. A-9



Ma moment offset reference position\*3

Details of oblong hole

### Dimensions of the Brake Section

\*The length L of a brake-equipped actuator is longer than that of a standard model by 26mm; add 0.5kg to weight.

- \*1. The motor-encoder cable is connected here. See page A-39 for details on cables.
- \*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  
The values enclosed in "( )" are reference dimensions.
- \*3. Reference position for calculating the moment Ma.

### Dimensions and Weight by Stroke

| Stroke      | 50  | 100 | 150 | 200 | 250 | 300 | 350 | 400  | 450  | 500  | 550  | 600  | 650  | 700  | 750  | 800  | 850  | 900  | 950  | 1000 |
|-------------|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|------|------|------|------|------|------|------|------|------|
| L (100W)    | 452 | 502 | 552 | 602 | 652 | 702 | 752 | 802  | 852  | 902  | 952  | 1002 | 1052 | 1102 | 1152 | 1202 | 1252 | 1302 | 1352 | 1402 |
| L (150W)    | 470 | 520 | 570 | 620 | 670 | 720 | 770 | 820  | 870  | 920  | 970  | 1020 | 1070 | 1120 | 1170 | 1220 | 1270 | 1320 | 1370 | 1420 |
| A           | 280 | 330 | 380 | 430 | 480 | 530 | 580 | 630  | 680  | 730  | 780  | 830  | 880  | 930  | 980  | 1030 | 1080 | 1130 | 1180 | 1230 |
| B           | 50  | 100 | 150 | 200 | 250 | 300 | 350 | 400  | 450  | 500  | 550  | 600  | 650  | 700  | 750  | 800  | 850  | 900  | 950  | 1000 |
| D           | 8   | 8   | 8   | 10  | 12  | 12  | 12  | 14   | 16   | 16   | 16   | 18   | 20   | 20   | 20   | 22   | 24   | 24   | 24   | 26   |
| F           | 50  | 100 | 150 | 0   | 50  | 100 | 150 | 0    | 50   | 100  | 150  | 0    | 50   | 100  | 150  | 0    | 50   | 100  | 150  | 0    |
| N           | 1   | 1   | 1   | 2   | 2   | 2   | 3   | 3    | 3    | 3    | 3    | 4    | 4    | 4    | 4    | 5    | 5    | 5    | 5    | 6    |
| Weight (kg) | 6.5 | 7.0 | 7.6 | 8.1 | 8.7 | 9.2 | 9.8 | 10.3 | 10.9 | 11.4 | 12.0 | 12.5 | 13.1 | 13.6 | 14.2 | 14.7 | 15.3 | 15.8 | 16.4 | 16.9 |

## Compatible Controllers

The RCS2CR 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-100①-NP-2-②<br>SCON-C-150①-NP-2-②             | Positioning is possible for up to 512 points                              | 512 points              | Single-Phase AC 115V<br>Single-Phase AC 230V<br>3-Phase AC 230V (XSEL-P/Q only) | 408 VA max.<br>* It depends on the controller type. Please refer each controller manual in detail. | → 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-1-100①-NP-2-②<br>SSEL-C-1-150①-NP-2-②         | Programmed operation is possible<br>Operation is possible on up to 2 axes | 20000 points            |   |  | → P577   |
| Program Control 1-6 Axes Type  |               | XSEL-③-1-100①-N1-EEE-2-④<br>XSEL-③-1-150①-N1-EEE-2-④ | Programmed operation is possible<br>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, 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).

Slider Type

Mini

Standard

Controllers Integrated

Rod Type

Mini

Standard

Controllers Integrated

Table/Arm /Flat Type

Mini

Standard

Gripper/ Rotary Type

Linear Motor Type

Cleanroom Type

Splash-Proof

Controllers

PMEC /AMEC

PSEP /ASEP

ROBO NET

ERC2

PCON

ACON

SCON

PSEL

ASEL

SSEL

XSEL

Pulse Motor

Servo Motor (24V)

Servo Motor (230V)

Linear Motor







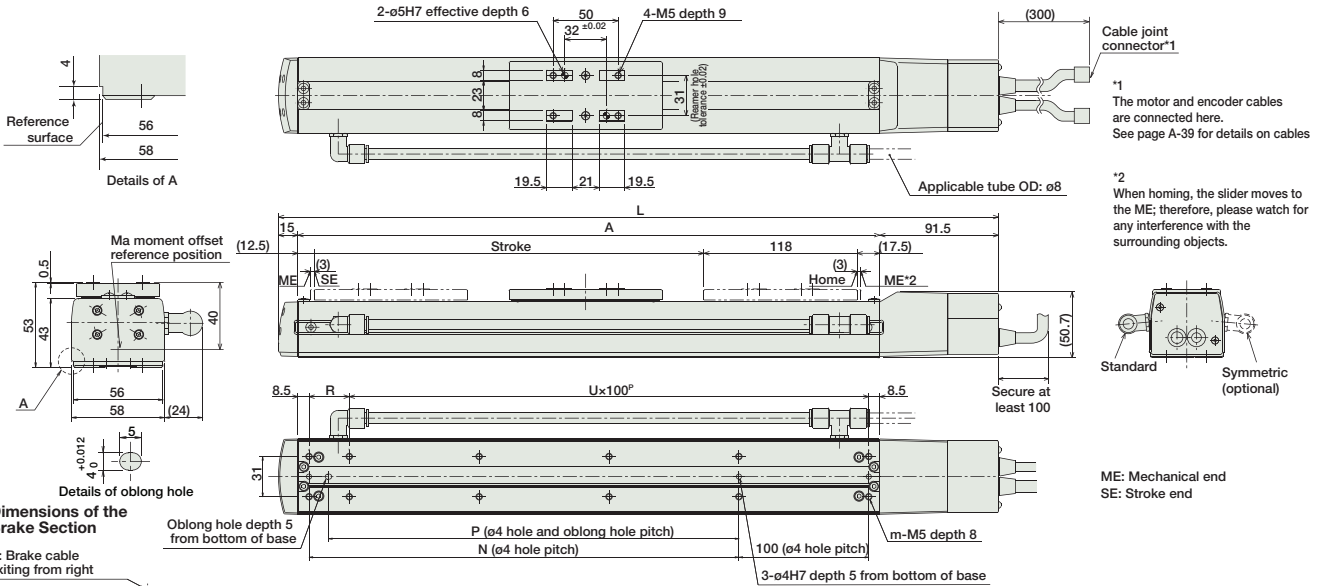
## Dimensions

CAD drawings can be downloaded from IAI website. [www.robocylinder.de](http://www.robocylinder.de)

2/3D CAD

\* Note that in order to change the home orientation, arrangements must be made to send in the product to IAI.  
 \* In the reversed-home model (NM), the new home position is set 3mm inward from the ME opposite of the motor-side.

For Special Orders P. A-9



\* Adding a brake increases the actuator's overall length (L) by 25.5mm. It also increases the cable coming out length and its weight by 0.3kg with the cable coming out the end, and its weight by 0.3kg.

### Dimensions and Weight by Stroke

| Stroke      | 50    | 100   | 150   | 200   | 250   | 300   | 350   | 400   | 450   | 500   | 550   | 600   |
|-------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| L           | 304.5 | 354.5 | 404.5 | 454.5 | 504.5 | 554.5 | 604.5 | 654.5 | 704.5 | 754.5 | 804.5 | 854.5 |
| A           | 198   | 248   | 298   | 348   | 398   | 448   | 498   | 548   | 598   | 648   | 698   | 748   |
| N           | 81    | 131   | 181   | 231   | 281   | 331   | 381   | 431   | 481   | 531   | 581   | 631   |
| P           | 66    | 116   | 166   | 216   | 266   | 316   | 366   | 416   | 466   | 516   | 566   | 616   |
| R           | 81    | 31    | 81    | 31    | 81    | 31    | 81    | 31    | 81    | 31    | 81    | 31    |
| U           | 1     | 2     | 2     | 3     | 3     | 4     | 4     | 5     | 5     | 6     | 6     | 7     |
| m           | 6     | 8     | 8     | 10    | 10    | 12    | 12    | 14    | 14    | 16    | 16    | 18    |
| Weight (kg) | 2.0   | 2.1   | 2.3   | 2.4   | 2.6   | 2.7   | 2.9   | 3.0   | 3.2   | 3.3   | 3.5   | 3.6   |

### Compatible Controllers

The RCS2CR 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-30D ①-NP-2-②       | Positioning is possible for up to 512 points                              | 512 points              | Single-Phase AC 115V<br>Single-Phase AC 230V<br>3-Phase AC 230V (XSEL-P/Q only) | 126 VA max.<br>* It depends on the controller type. Please refer each controller manual in detail. | → 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-1-30D ①-NP-2-②     | Programmed operation is possible<br>Operation is possible on up to 2 axes | 20000 points            |   |  | → P577   |
| Program Control 1-6 Axes Type  |               | XSEL-③-1-30D ①-N1-EEE-2-④ | Programmed operation is possible<br>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, 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).

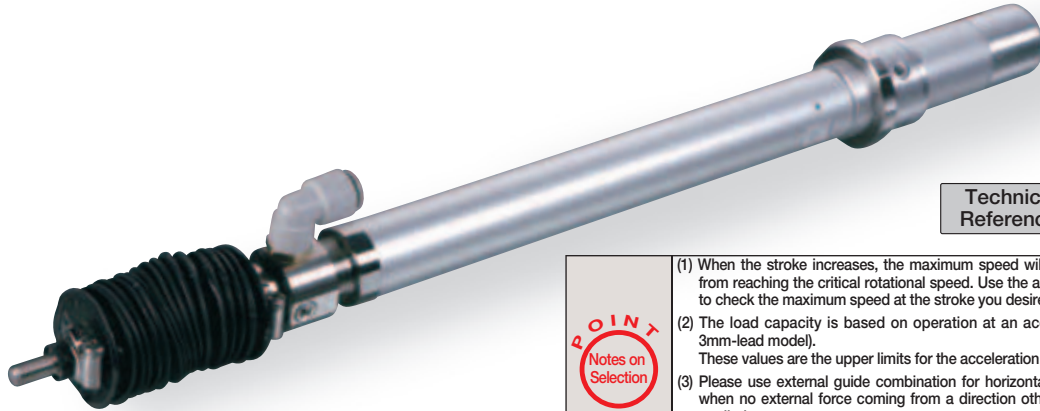
# RCS2W-RA4C/RA4D/RA4R

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:<br>Coupled type | I : Incremental Type<br>A : Absolute Type | 20 : 20W servo motor<br>30 : 30W servo motor | 12 : 12mm<br>6 : 6mm<br>3 : 3mm | 50:50mm<br>300:300mm<br>(50mm pitch increments) | T1 : XSEL-KE/KET<br>T2 : SCON<br>SSEL<br>XEL-P/Q | N : None<br>P : 1m<br>S : 3m<br>M : 5m<br>X [ ] : Custom Length<br>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 |              | Rated thrust (N) | Stroke (mm)                 |
|-------------------------|------------------|-----------|--------------------|--------------|------------------|-----------------------------|
|                         |                  |           | Horizontal(kg)     | Vertical(kg) |                  |                             |
| RCS2W-①-②-20-12-③-④-⑤-⑥ | 20               | 12        | 3.0                | 1.0          | 18.9             | 50-300<br>(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            |                             |

#### Stroke and Maximum Speed

| Lead | Stroke | 50-300<br>(50mm increments) |
|------|--------|-----------------------------|
|      | 12     | 600                         |
| 6    | 300    |                             |
| 3    | 150    |                             |

(Unit: mm/s)

Legend ① Type ② Encoder ③ Stroke ④ Compatible controller ⑤ Cable length ⑥ 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) |
|                 | R01 (1m) ~ R03 (3m)   |
| Robot Cable     | 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](http://www.robocylinder.de)



Note: No 3D CAD data for RA4D type.

For Special Orders



Dimensions/Weight by Stroke

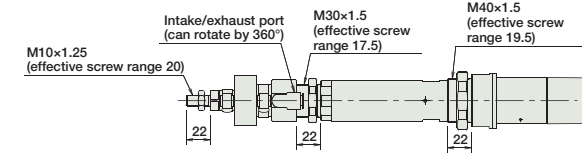
RCS2W-RA4C/RA4D/RA4R (without brake)

| 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   |

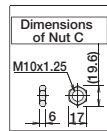
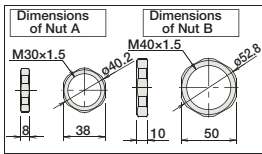
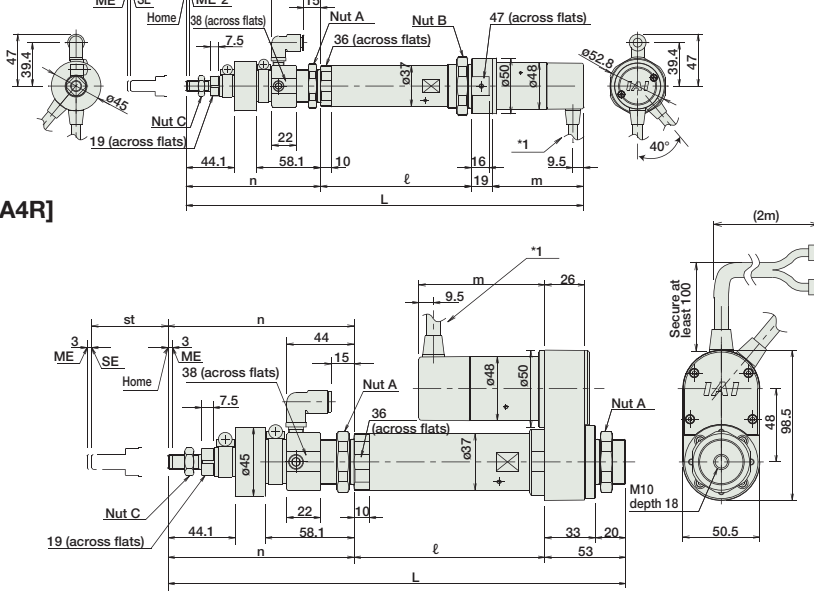
RCS2W-RA4C/RA4D/RA4R (with brake)

| 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     | No brake-equipped model. |       |       |       |       |       |
|             | 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     | No brake-equipped model. |       |       |       |       |       |
|             | 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     | No brake-equipped model. |       |       |       |       |       |
|             | 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     | No brake-equipped model. |       |       |       |       |       |
|             | 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   |

[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.

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<br>SCON-C-30D ①-NP-2-②             | Positioning possible for up to 512 points                    | 512 points              | Single-Phase AC 115V<br>Single-Phase AC 230V<br>3-Phase AC 230V (XSEL-P/Q only) | 126 VA max.<br>* 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-1-20 ①-NP-2-②<br>SSEL-C-1-30D ①-NP-2-②         | Programmed operation is possible<br>Can operate up to 2 axes | 20000 points            |   |  | → P577   |
| Program control 1-6 Axes type  |               | XSEL-③-1-20 ①-N1-EEE-2-④<br>XSEL-③-1-30D ①-N1-EEE-2-④ | Programmed operation is possible<br>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).

- Slider Type
- Mini
- Standard
- Controllers Integrated
- Rod Type
- Mini
- Standard
- Controllers Integrated
- Table/Arm /Flat Type
- Mini
- Standard
- Gripper/ Rotary Type
- Linear Motor Type
- Cleanroom Type
- Splash Proof
- Controllers
- PMEC /AMEC
- PSEP /ASEP
- ROBO NET
- ERC2
- PCON
- ACON
- SCON
- PSEL
- ASEL
- SSEL
- XSEL
- Pulse Motor
- Servo Motor (24V)
- Servo Motor (230V)
- Linear Motor

# SCON

## Models C / CA

Position Controllers  
For RCS2 series



C

CA

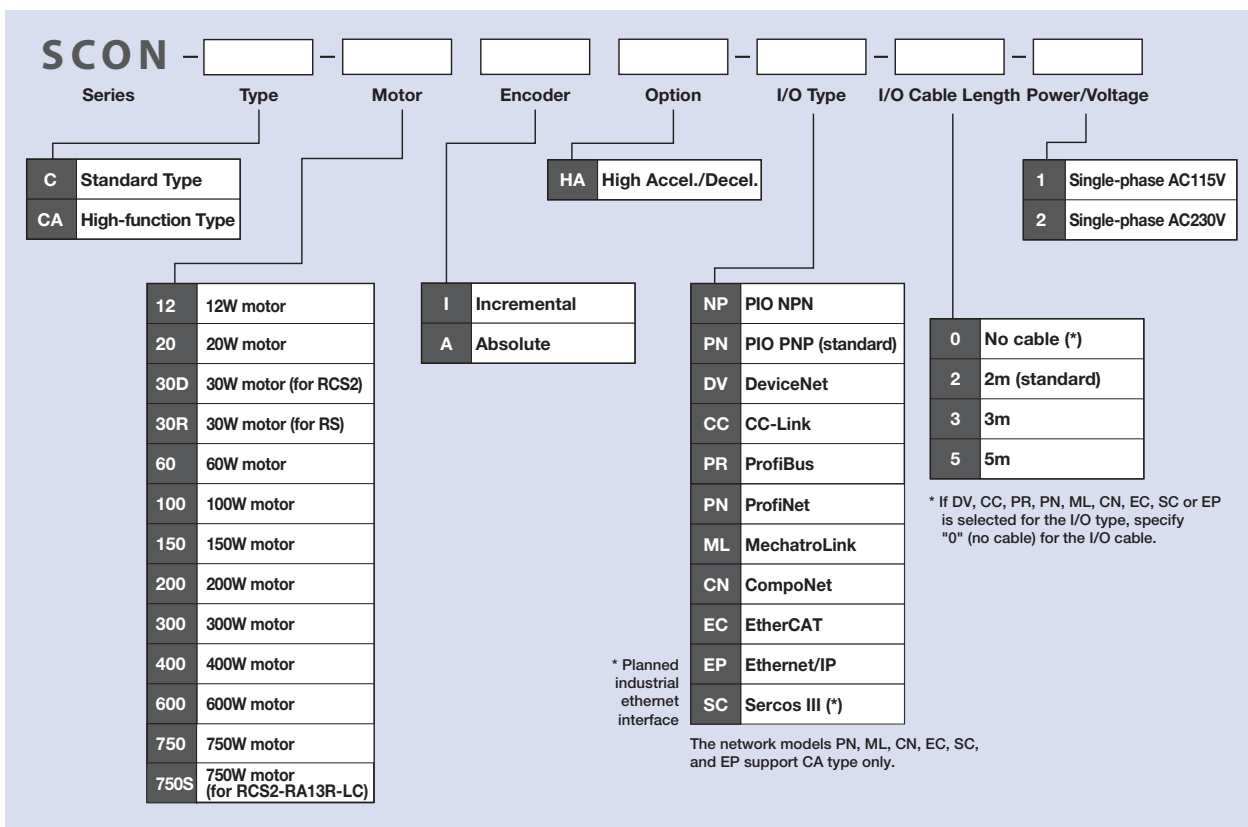
### List of models

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.

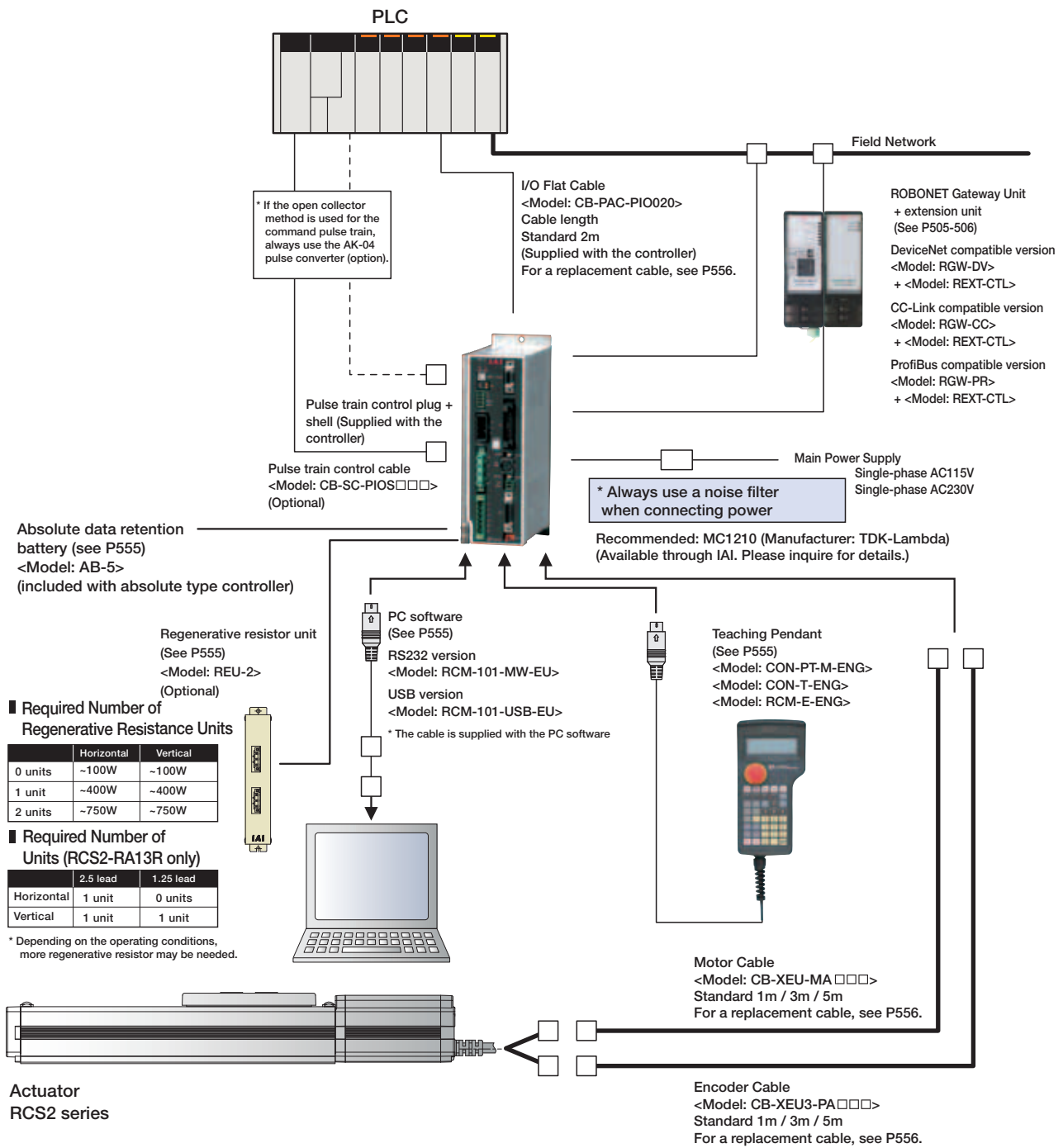
| Type               | C / CA  |  |                       |                        |         | CA   |          |              |          |          |             |                 |
|--------------------|---|--|-----------------------|------------------------|---------|--|----------|--------------|----------|----------|-------------|-----------------|
| I/O type           | Standard specifications   |  |                       |                        |         | Network connection specifications (optional) |          |              |          |          |             |                 |
| External View      |   |  |                       |                        |         |  |          |              |          |          |             |                 |
| Description        | Positioning mode, Teaching mode<br>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



System configuration



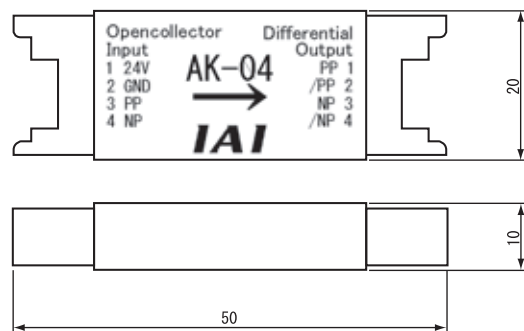
Pulse converter AK-04 (option)

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 0.3mm<sup>2</sup>)  
Outer diameter of finished wire 1.0 to 1.2mm

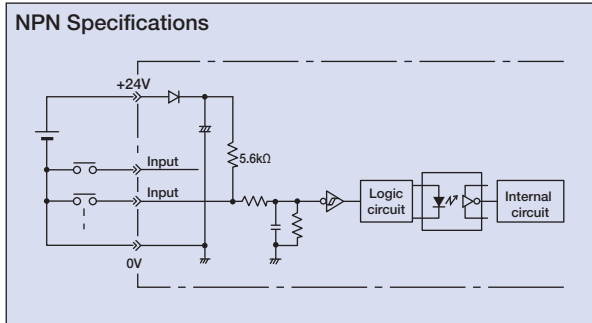


- Slider Type
- Mini
- Standard
- Controllers Integrated
- Rod Type
- Mini
- Standard
- Controllers Integrated
- Table/Arm /FlatType
- Mini
- Standard
- Gripper/ Rotary Type
- Linear Motor Type
- Cleanroom Type
- Splash-Proof
- Controllers
- PMEC /AMEC
- PSEP /ASEP
- ROBO NET
- ERC2
- PCON
- ACON
- SCON
- PSEL
- ASEL
- SSEL
- XSEL
- Pulse Motor
- Servo Motor (24V)
- Servo Motor (230V)
- Linear Motor

## I/O Specifications

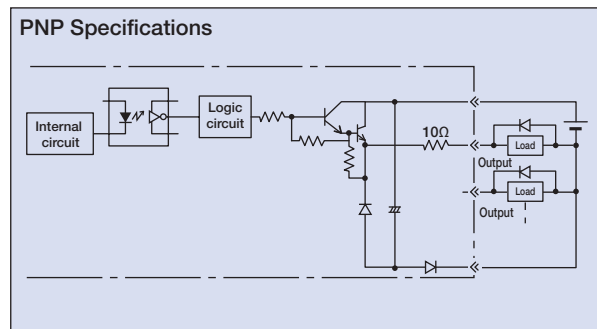
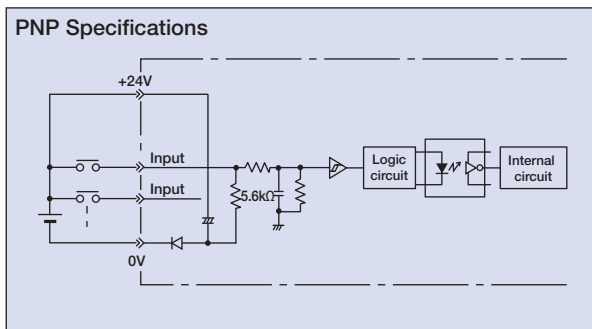
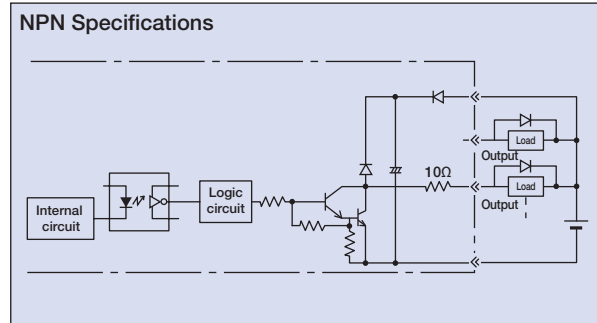
### Input section External input specifications

| Item                | Specifications  |
|---------------------|---|
| Input voltage       | DC24V ±10%  |
| Input current       | 4mA / 1 point   |
| ON/OFF power supply | ON voltage...Min DC18.0V (3.5mA)<br>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                     |



## 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<br>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<br>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<br>In this mode, the number of positioning points available in the positioning mode has been increased to 256 points.                   |
|                          | 512-point mode               | 512 points<br>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<br>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<br>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<br>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<br>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.   |
|                | Output                     | CSTP  | Forced Stop Signal   |
| DCLR           |                            | Deviation counter clear signal  | When this signal is ON, the position deviation counter is cleared continuously.  |
| 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.

Slider Type

Mini

Standard

Controllers Integrated

Rod Type

Mini

Standard

Controllers Integrated

Table/Arm /FlatType

Mini

Standard

Gripper/ Rotary Type

Linear Motor Type

Cleanroom Type

Splash-Proof

Controllers

PMEC /AMEC

PSEP /ASEP

ROBO NET

ERC2

PCON

ACON

SCON

PSEL

ASEL

SSEL

XSEL

Pulse Motor

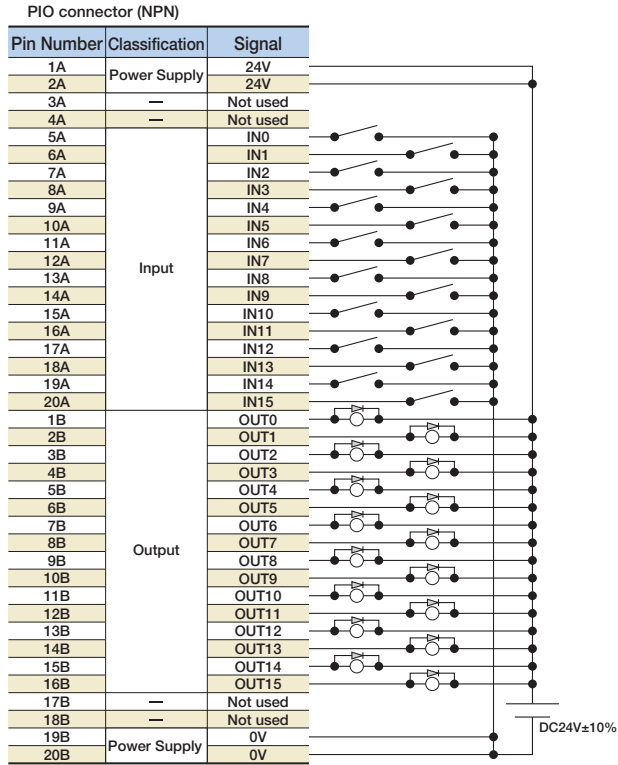
Servo Motor (24V)

Servo Motor (230V)

Linear Motor

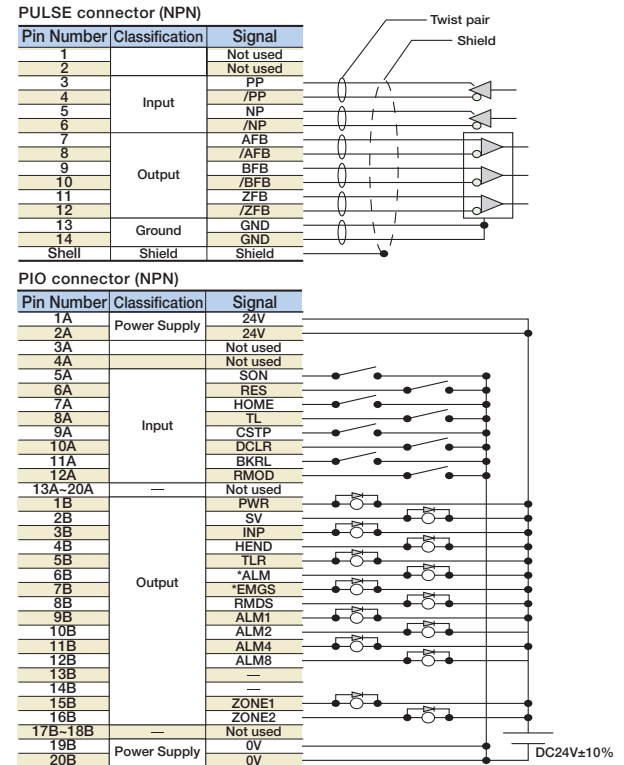
I/O wiring drawing

■ Positioning mode / teaching mode / solenoid valve mode



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

■ Pulse train mode (differential output)



\* 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.

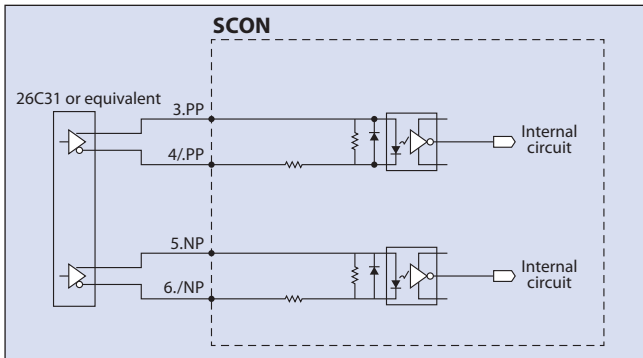
| Pin No. | Category | Parameter (PIO pattern) selection | Parameter (PIO pattern) selection |               |                |                |                       |                       |                 | Pulse-train mode |               |
|---------|----------|-----------------------------------|-----------------------------------|---------------|----------------|----------------|-----------------------|-----------------------|-----------------|------------------|---------------|
|         |          |                                   | 0                                 | 1             | 2              | 3              | 4                     | 5                     | 6               |                  | 7             |
|         |          | Positioning point                 | Positioning mode                  | Teaching mode | 256-point mode | 512-point mode | Solenoid valve mode 1 | Solenoid valve mode 2 | Force mode 1 ** | Force mode 2 **  | Standard mode |
| 1A      | 24V      |                                   | 64 points                         | 64 points     | 256 points     | 512 points     | 7 points              | 3 points              | 32 points       | 5 points         | P24           |
| 2A      | 24V      |                                   |                                   |               |                |                |                       |                       |                 |                  | P24           |
| 3A      | —        |                                   |                                   |               |                |                |                       |                       |                 |                  | NC            |
| 4A      | —        |                                   |                                   |               |                |                |                       |                       |                 |                  | 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              | CSTR          |
| 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             | BKRL          |
| 15A     |          | IN10                              | RMOD                              | RMOD          | RMOD           | RMOD           | RMOD                  | RMOD                  | RMOD            | RMOD             | RMOD          |
| 16A     |          | IN11                              | HOME                              | HOME          | HOME           | HOME           | HOME                  | HOME                  | —               | HOME             | HOME          |
| 17A     |          | IN12                              | *STP                              | *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              | RES           |
| 20A     | IN15     | SON                               | 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                     |                       |                 |                  |               |
| 20B     | 0V       |                                   |                                   |               |                |                | 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)

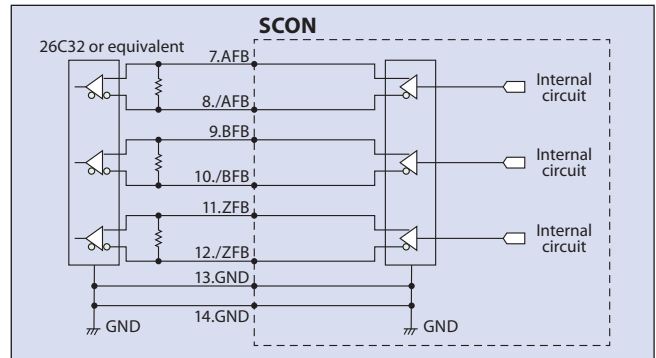
Input Section

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.

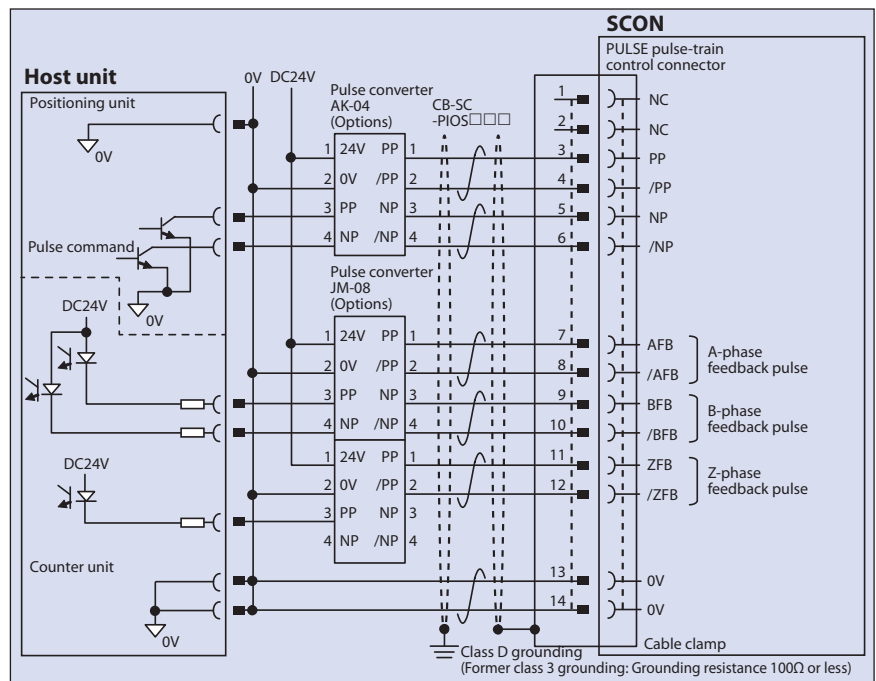
Maximum number of input pulses:  
200kpps (The AK-04 is needed.)  
Maximum number of output pulses:  
500kpps (The JM-08 is needed.)

\* 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.                      |                 |         |         |  |
| Positive Logic             | 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.          |                 |         |         |  |
|                            | Forward pulse train  | PP /PP          |         |         |  |
|                            | Reverse pulse train  | NP /NP          |         |         |  |
|                            | Sign   | NP /NP          | High    | Low     |  |
| A/B phase pulse train      | PP /PP   |                 |         |         |  |
|                            | NP /NP   |                 |         |         |  |

## Table of specifications

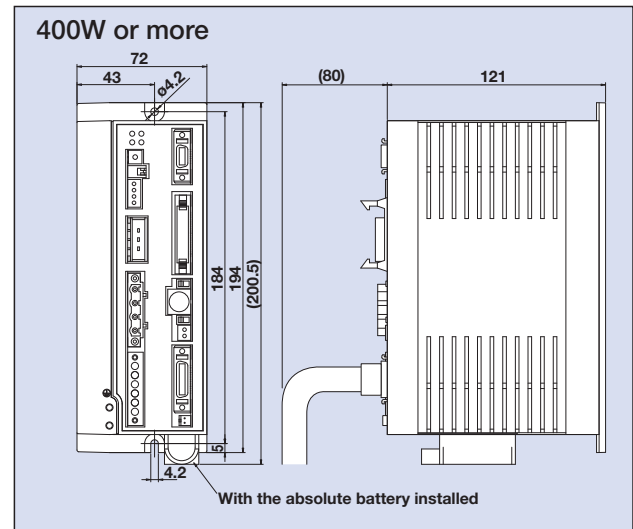
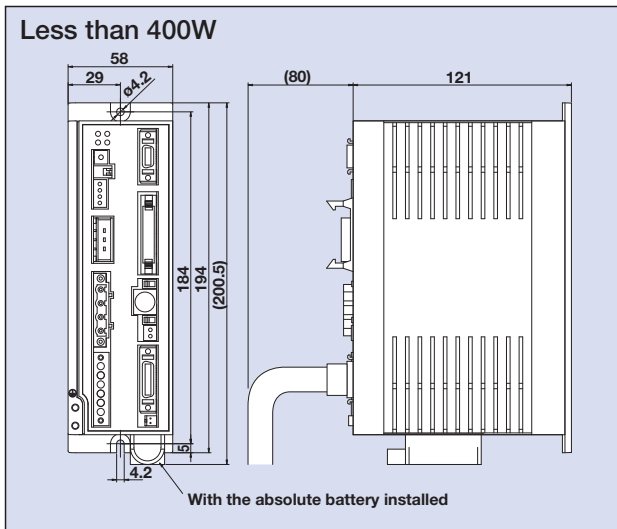
| Item                                  | Specifications  |   |
|---------------------------------------|---|---|
| Motor Capacity                        | Less than 400W  | 400W or more  |
| Connected actuator                    | RCS2 series actuator / single axis robot / linear motor   |   |
| Number 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: additionally 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<br>Single-phase AC180V to AC253V   | Single-phase AC180V to AC253V   |
| Power Supply Capacity                 | 20W / 74VA    30W / 94VA<br>60W / 186VA    100W / 282VA<br>150W / 376VA    200W / 469VA                                     | 400W / 844VA<br>600W / 1212VA<br>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)<br>58 to 150 Hz 4.9 m/s <sup>2</sup> (continuous), 9.8 m/s <sup>2</sup> (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.

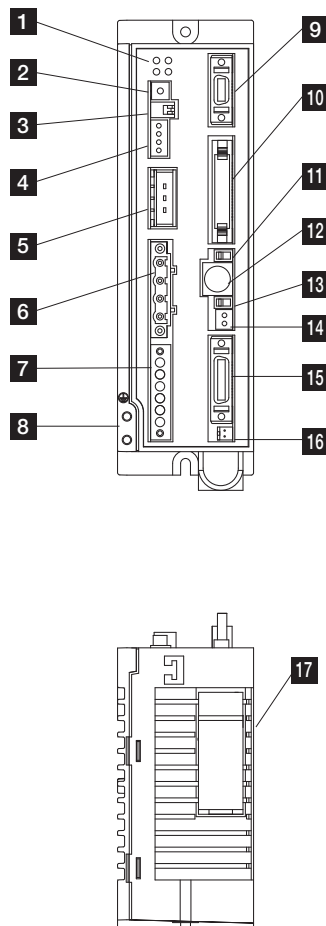
- Slider Type
- Mini
- Standard
- Controllers Integrated
- Rod Type
- Mini
- Standard
- Controllers Integrated
- Table/Arm /FlatType
- Mini
- Standard
- Gripper/ Rotary Type
- Linear Motor Type
- Cleanroom Type
- Splash-Proof
- Controllers
- PMEC /AMEC
- PSEP /ASEP
- ROBO NET
- ERC2
- PCON
- ACON
- SCON
- PSEL
- ASEL
- SSEL
- XSEL
- Pulse Motor
- Servo Motor (24V)
- Servo Motor (230V)
- Linear Motor



External dimensions



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<br>OFF: positioner mode ON: pulse train control mode<br>*Enabled at power ON.   |
| 2    | Remote update switch (normally set to OFF)<br>OFF: normal operating mode ON: update mode<br>*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

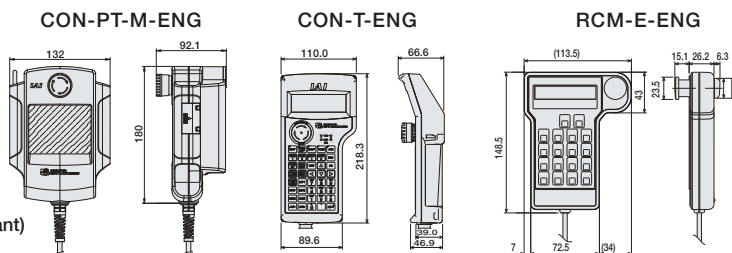
- Slider Type
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- Standard
- Controllers Integrated
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- Mini
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- Splash-Proof
- Controllers
- PMEC /AMEC
- PSEP /ASEP
- ROBO NET
- ERC2
- PCON
- ACON
- SCON
- PSEL
- ASEL
- SSEL
- XSEL
- Pulse Motor
- Servo Motor (24V)
- Servo Motor (230V)
- Linear Motor

## Option

### Teaching Pendant

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

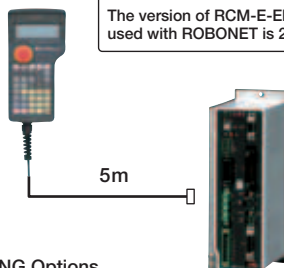
**Model**  
**CON-PT-M-ENG** (Touch panel teaching pendant)  
**CON-T-ENG** (Standard type)  
**RCM-E-ENG** (Simple teaching pendant)



**Configuration**

**Note:**

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

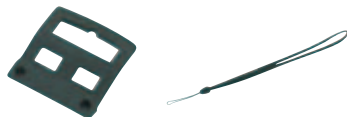


**Specifications**

| Item                            | CON-PT-M-ENG                            | CON-T-ENG                      | RCM-E-ENG                      |
|---------------------------------|---|--------------------------------|--------------------------------|
| Data input                      | ○                                       | ○                              | ○                              |
| Actuator motion                 | ○                                       | ○                              | ○                              |
| 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 |

**CON-T-ENG Options**

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

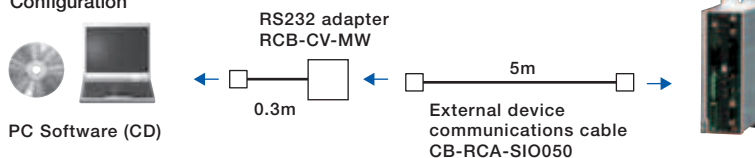


### PC Software (Windows Only)

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

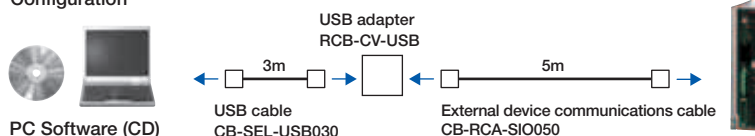
**Model** **RCM-101-MW-EU** (External device communications cable + RS232 conversion unit)

**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    |

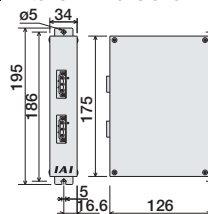
**Required Number of Units (RCS2-RA13R only)**

|            | 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**



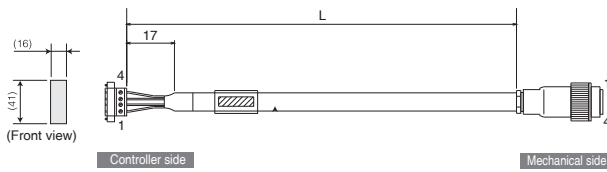
Spare parts

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

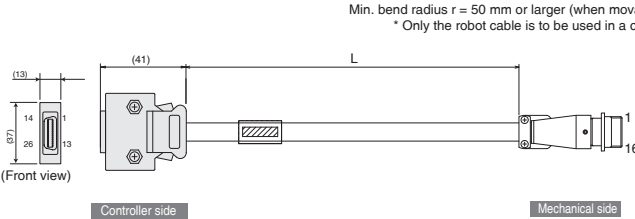
| Wire   | Color | Signal | No. | No. | Signal | Color | Wire                |
|--------|-------|--------|-----|-----|--------|-------|---------------------|
| 0.75sq | Green | PE     | 1   | 2   | U      | Red   | 0.75sq<br>(crimped) |
|        | Red   | U      | 2   | 1   | V      | White |                     |
|        | 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)

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

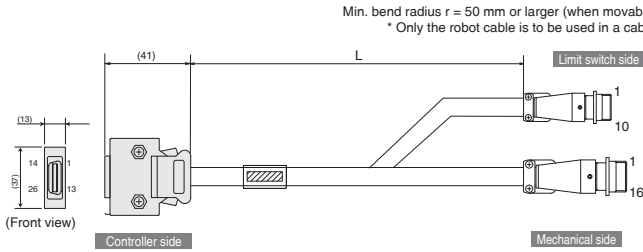
| Wire         | Color | Signal | No. | No. | Signal | Color        | Wire               |     |
|--------------|-------|--------|-----|-----|--------|--------------|--------------------|-----|
| ---          | ---   | ---    | 10  | --- | ---    | ---          | ---                |     |
| ---          | ---   | E24V   | 11  | --- | ---    | ---          | ---                |     |
| ---          | ---   | E24V   | 12  | --- | ---    | ---          | ---                |     |
| Gray/White   | LS    | LS     | 13  | --- | ---    | ---          | ---                |     |
| Brown/White  | LS    | LS     | 14  | --- | ---    | ---          | ---                |     |
| ---          | ---   | CREEP  | 25  | --- | ---    | ---          | ---                |     |
| ---          | ---   | OT     | 23  | --- | ---    | ---          | ---                |     |
| ---          | ---   | RSV    | 23  | --- | ---    | ---          | ---                |     |
| ---          | ---   | ---    | 9   | --- | ---    | ---          | ---                |     |
| ---          | ---   | ---    | 18  | --- | ---    | ---          | ---                |     |
| ---          | ---   | ---    | 19  | --- | ---    | ---          | ---                |     |
| Blue         | A+    | A+     | 1   | 2   | A      | Green        | AWG26<br>(crimped) |     |
| Purple       | A-    | A-     | 2   | 3   | B      | White        |                    |     |
| White        | B+    | B+     | 3   | 4   | B      | White        |                    |     |
| Black/Red    | B-    | B-     | 4   | 5   | Z      | Orange/White |                    |     |
| Orange/White | Z+    | Z+     | 5   | 6   | Z      | Orange/White |                    |     |
| ---          | ---   | ---    | 6   | 7   | ---    | ---          |                    | --- |
| Blue         | SFD+  | SFD+   | 8   | 8   | SD     | Blue         |                    |     |
| Orange       | SFD-  | SFD-   | 8   | 9   | SD     | Orange       |                    |     |
| Black        | BAT+  | BAT+   | 14  | 10  | BAT+   | Black        |                    |     |
| Yellow       | BAT-  | BAT-   | 15  | 11  | BAT-   | Yellow       |                    |     |
| Green        | VCC   | VCC    | 16  | 12  | VCC    | Green        |                    |     |
| Brown        | GND   | GND    | 17  | 13  | GND    | Brown        |                    |     |
| Gray         | BKR-  | BKR-   | 20  | 14  | LS-    | Gray/White   |                    |     |
| Red          | BKR+  | BKR+   | 21  | 15  | BK+    | Red          |                    |     |
| ---          | ---   | ---    | 22  | 16  | BK+    | Red          |                    |     |

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

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

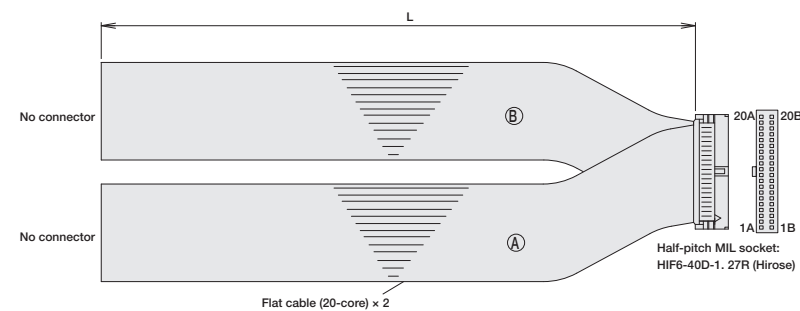
| Wire         | Color | Signal | No. | No. | Signal | Color        | Wire               |                    |
|--------------|-------|--------|-----|-----|--------|--------------|--------------------|--------------------|
| ---          | ---   | ---    | 10  | --- | ---    | ---          | ---   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

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

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



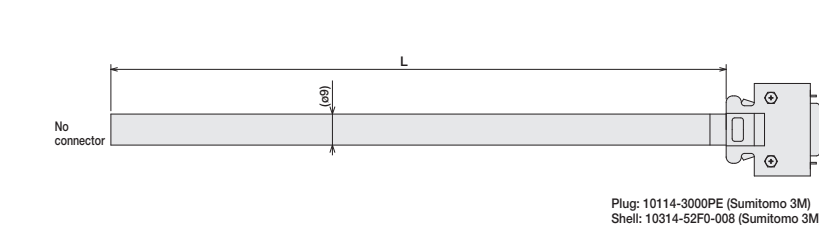
HIF6-40D-1.27R

| Pin No. | Signal | Color    | Wire                        | Pin No. | Signal | Color    | Wire                                 |
|---------|--------|----------|-----------------------------|---------|--------|----------|--------------------------------------|
| 1A      | 24V    | Brown-1  | Flat cable (A)<br>(crimped) | 1B      | OUT0   | Brown-3  | Flat cable (B)<br>(crimped)<br>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



Plug: 10114-3000PE (Sumitomo 3M)  
Shell: 10314-52F0-008 (Sumitomo 3M)

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

- Slider Type
- Mini
- Standard
- Controllers Integrated
- Rod Type
- Mini
- Standard
- Controllers Integrated
- Table/Arm /FlatType
- Mini
- Standard
- Controllers Integrated
- Gripper/ Rotary Type
- Linear Motor Type
- Cleanroom Type
- Splash-Proof
- Controllers
- PMEC /AMEC
- PSEP /ASEP
- ROBO NET
- ERC2
- PCON
- ACON
- SCON
- PSEL
- ASEL
- SSEL
- XSEL
- Pulse Motor
- Servo Motor (24V)
- Servo Motor (230V)
- Linear Motor

# SSEL



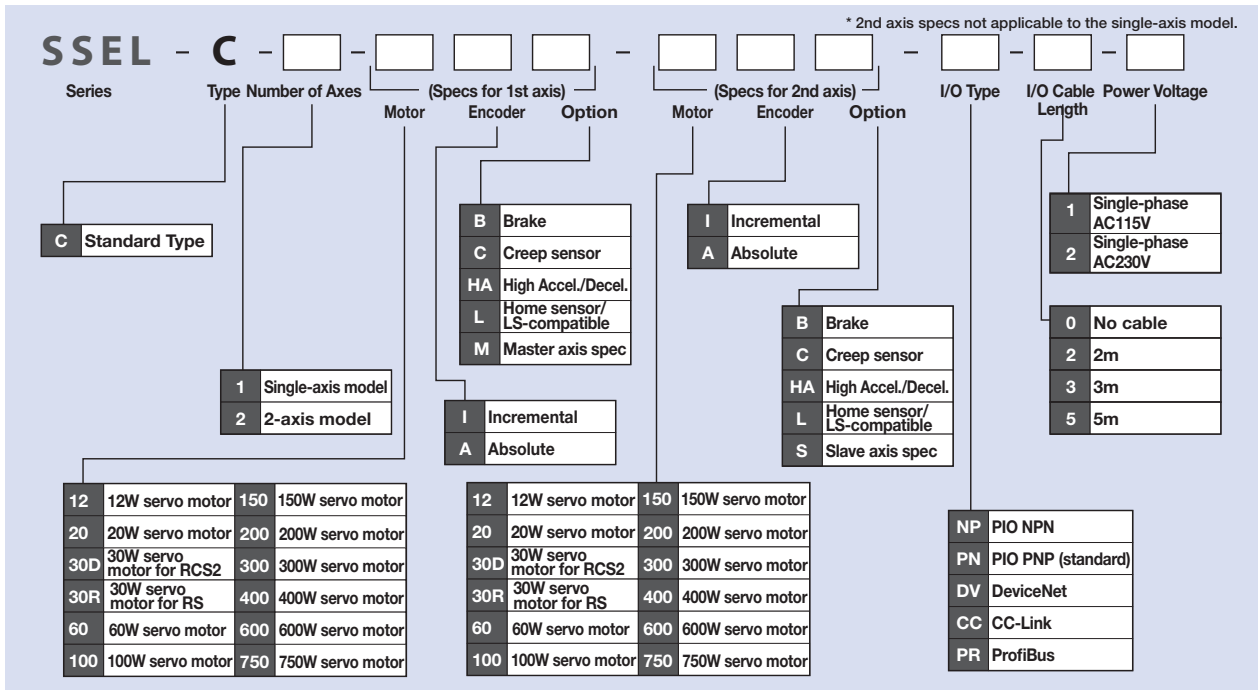
Program controller  
For RCS2 series

## List of models

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

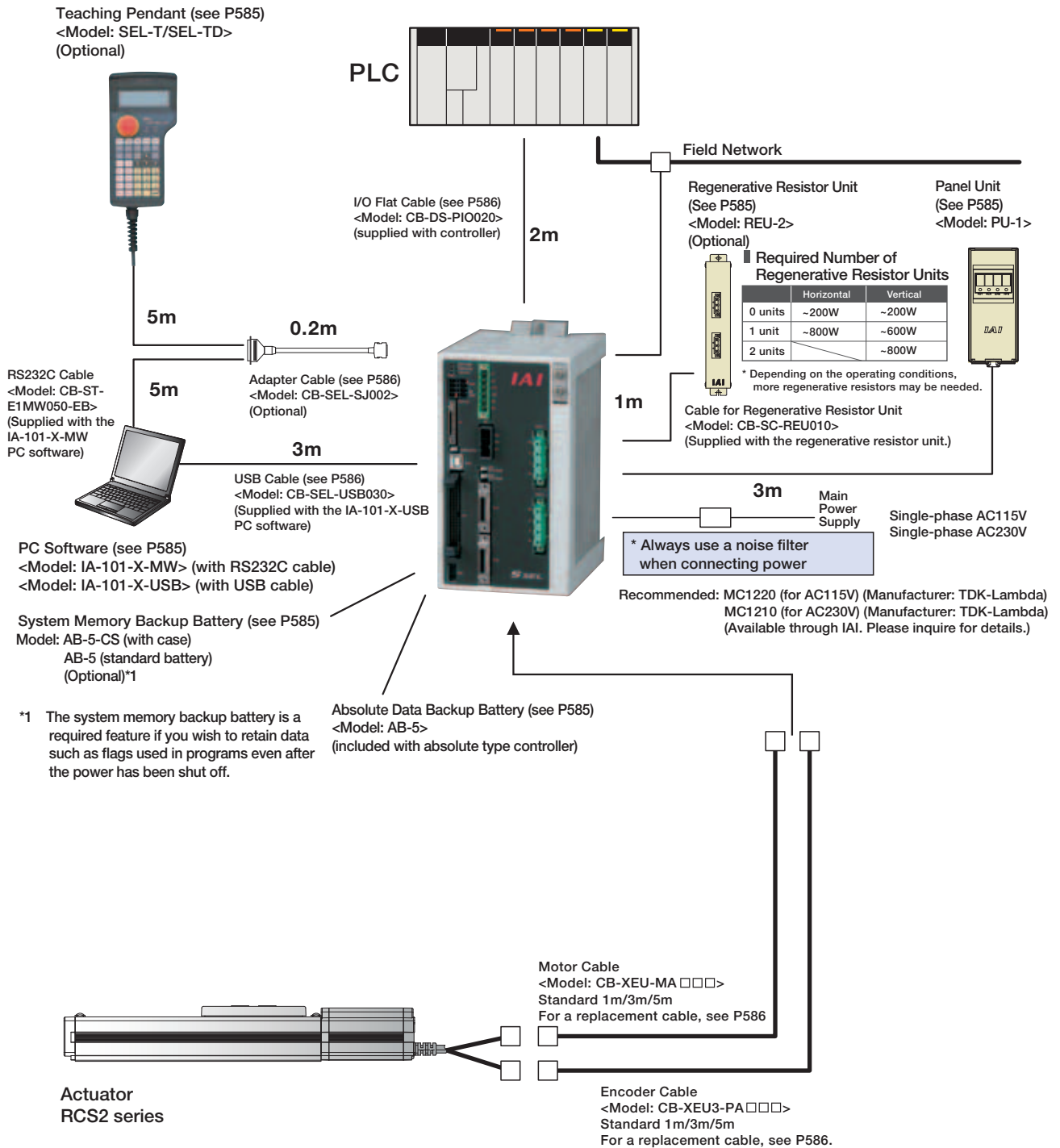
|                         |   |   |
|-------------------------|---|---|
| Type                    | C   |   |
| Name                    | Program mode  | Positioner Mode   |
| External View           |   |   |
| Description             | Both the actuator operation and communication with external equipment 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



System configuration

- Slider Type
- Mini
- Standard
- Controllers Integrated
- Rod Type
- Mini
- Standard
- Controllers Integrated
- Table/Arm /Flat Type
- Mini
- Standard
- Gripper/ Rotary Type
- Linear Motor Type
- Cleanroom Type
- Splash-Proof
- Controllers
- PMEC /AMEC
- PSEP /ASEP
- ROBO NET
- ERC2
- PCON
- ACON
- SCON
- PSEL
- ASEL
- SSEL
- XSEL
- Pulse Motor
- Servo Motor (24V)
- Servo Motor (230V)
- Linear Motor

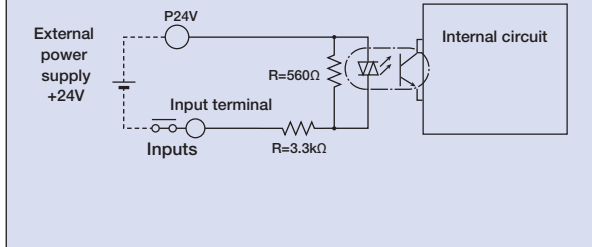


## I/O Specifications

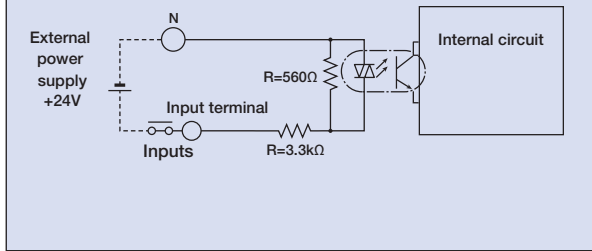
### Input section External input specifications

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

#### NPN Specifications



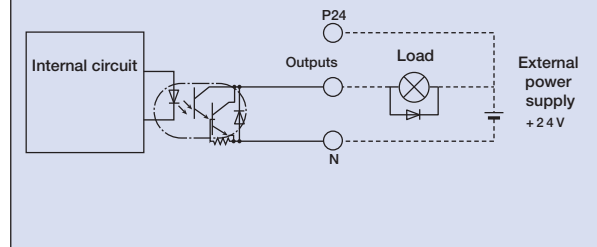
#### PNP Specifications



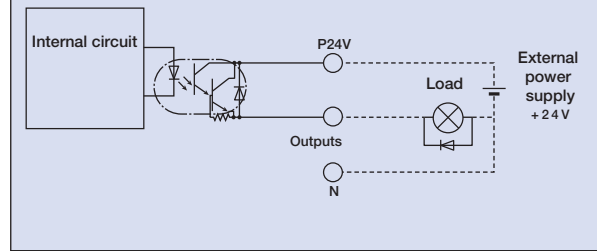
### Output section External output specifications

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

#### NPN 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   | NPN* Wiring Diagram |   |
|------------|----------|----------|------------------------|---|---------------------|---|
| 1A         | P24      |          | 24V input              | Connect 24V.  |                     |   |
| 1B         |          | 016      | Select Program No. 1   | Selects the program number to start.<br>(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        |          | 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.   |                     |   |

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

Positioner mode

| Pin Number | Category | Port No. | Positioner Standard Mode       | Functions   | NPN* Wiring Diagram |   |
|------------|----------|----------|--------------------------------|---|---------------------|---|
| 1A         | P24      |          | 24V input                      | Connect 24V.  |                     |   |
| 1B         |          | 016      | Position input 10              | Specifies the position numbers to move to, using port number 007 to 019<br>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.<br>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        |          | 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.   |                     |   |

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

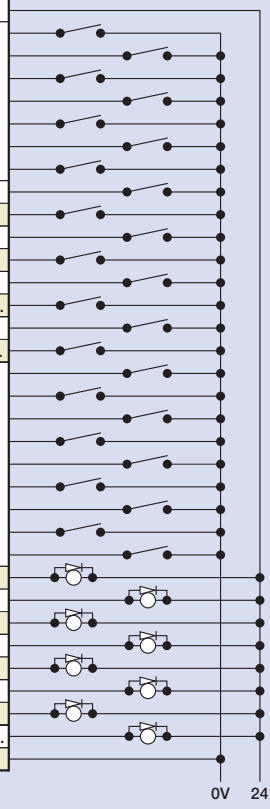
- Slider Type
- Mini
- Standard
- Controllers Integrated
- Rod Type
- Mini
- Standard
- Controllers Integrated
- Table/Arm /Flat Type
- Mini
- Standard
- Gripper/ Rotary Type
- Linear Motor Type
- Cleanroom Type
- Splash-Proof
- Controllers
- PMEC /AMEC
- PSEP /ASEP
- ROBO NET
- ERC2
- PCON
- ACON
- SCON
- PSEL
- ASEL
- SSEL
- XSEL
- Pulse Motor
- Servo Motor (24V)
- Servo Motor (230V)
- Linear Motor

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.<br>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.<br>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



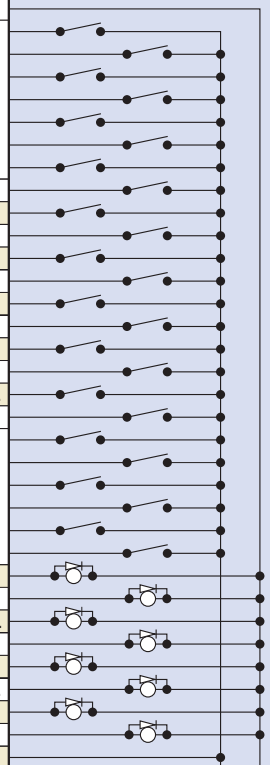
\*Note: With regard to PNP wiring diagram, please refer to SSEL manual.

0V 24

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.<br>The position numbers on the 1st and 2nd axes are assigned by parameter settings.<br>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.<br>The position numbers on the 1st and 2nd axes are assigned by parameter settings.<br>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.

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Explanation of I/O Signal Functions

Positioner, Teaching Mode

| Pin Number | Category | Port No.                       | Positioner Teaching Mode   | Functions                | NPN* Wiring Diagram |  |
|------------|----------|--------------------------------|--|--------------------------|---------------------|--|
| 1A         | Input    | P24                            | 24V input  | Connect 24V.             |                     |  |
| 1B         |          |                                | 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.<br>(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.<br>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        | 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.  |                          |                     |  |

\*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             | NPN* Wiring Diagram |   |
|------------|----------|--------------------------------|--|-----------------------|---------------------|---|
| 1A         | Input    | P24                            | 24V input  | Connect 24V.          |                     |   |
| 1B         |          |                                | 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.<br>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        | 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.  |                       |                     |   |

(\*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.

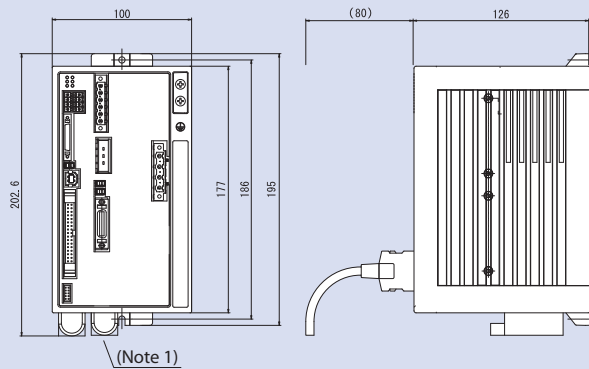
- Slider Type
- Mini
- Standard
- Controllers Integrated
- Rod Type
- Mini
- Standard
- Controllers Integrated
- Table/Arm /Flat Type
- Mini
- Standard
- Gripper/ Rotary Type
- Linear Motor Type
- Cleanroom Type
- Splash-Proof
- Controllers
- PMEC /AMEC
- PSEP /ASEP
- ROBO NET
- ERC2
- PCON
- ACON
- SCON
- PSEL
- ASEL
- SSEL
- XSEL
- Pulse Motor
- Servo Motor (24V)
- Servo Motor (230V)
- Linear Motor

## 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   |
| Control specification  | Vibration resistance                       | XYZ directions 10 to 57Hz, One side amplitude: 0.035mm (continuous), 0.075mm (intermittent)<br>58 to 150 Hz 4.9 m/s <sup>2</sup> (continuous), 9.8 m/s <sup>2</sup> (intermittent) |
|                        | 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  |
| Program                | Operating method                           | Program operation / Positioner operation (switchable)  |
|                        | 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   |
| Communication          | Data memory device                         | FLASHROM (A system-memory backup battery can be added as an option)  |
|                        | Data input method                          | Teaching pendant or PC software  |
|                        | 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  |
| General specifications | Field Network                              | DeviceNet, CC-Link, ProfiBus   |
|                        | Motor Cable                                | CB-XEU-MA □□□ (Max. 20m)   |
|                        | Encoder cable                              | CB-XEU3-PA □□□ (Max. 20m)  |
|                        | Protection function                        | Motor overcurrent, Motor driver temperature check, Overload check, Encoder open-circuit check<br>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)  |

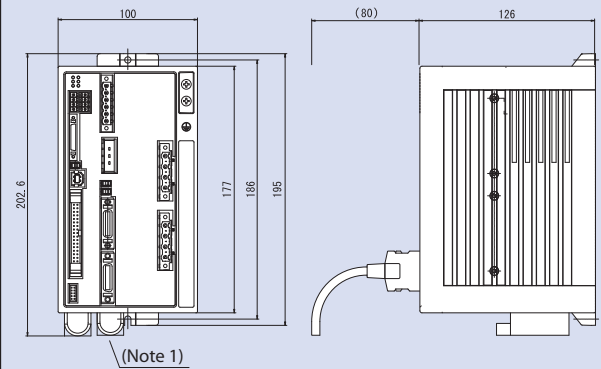
## External Dimensions

### SSEL 1-axis controller



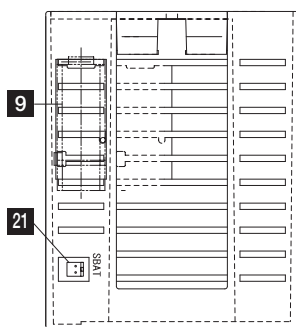
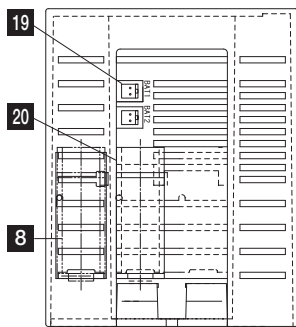
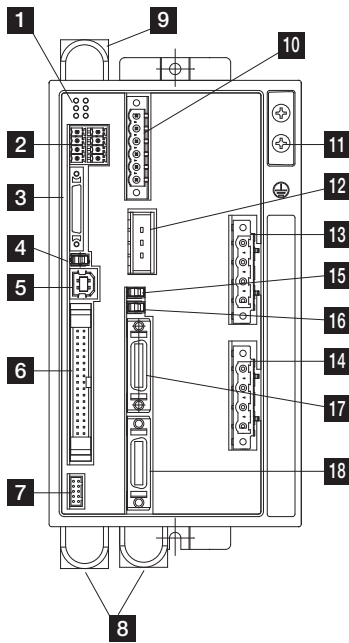
(Note 1) Absolute data back-up battery. Not installed with incremental specification.

### 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.

- Slider Type
- Mini
- Standard
- Controllers Integrated
- Rod Type
- Mini
- Standard
- Controllers Integrated
- Table/Arm /Flat Type
- Mini
- Standard
- Gripper/ Rotary Type
- Linear Motor Type
- Cleanroom Type
- Splash-Proof
- Controllers
- PMEC /AMEC
- PSEP /ASEP
- ROBO NET
- ERC2
- PCON
- ACON
- SCON
- PSEL
- ASEL
- SSEL
- XSEL
- Pulse Motor
- Servo Motor (24V)
- Servo Motor (230V)
- Linear Motor

## Option

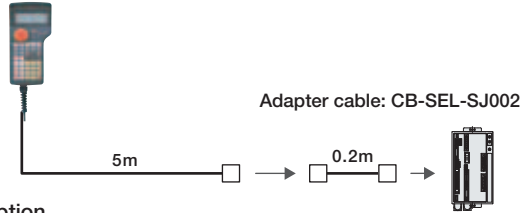
### Teaching Pendant

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

**Model/Price**

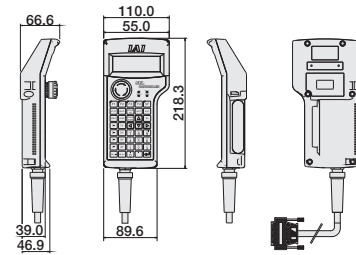
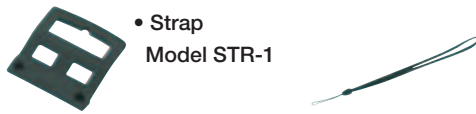
| Model    | Description                             |
|----------|---|
| SEL-T-J  | Standard type with adapter cable        |
| SEL-TD-J | Deadman's switch type and adapter cable |

**Configuration**



**SEL-T option**

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



**Specifications**

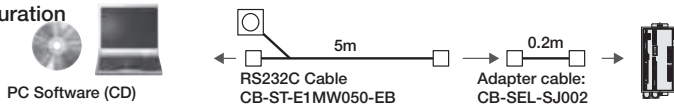
| Item                             | SEL-T-J                           | SEL-TD-J  |
|----------------------------------|-----------------------------------|-----------|
| 3-position Enable Switch         | No                                | Yes       |
| ANSI/UL standards                | Non-compliant                     | Compliant |
| CE mark                          | Compliant                         |           |
| Display                          | 20 char. x 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.

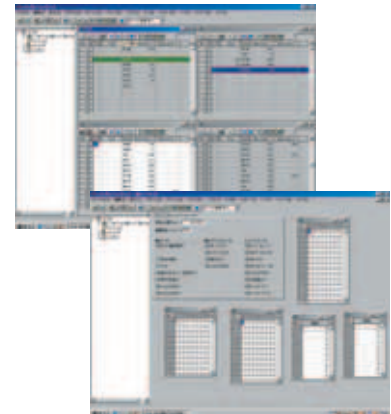
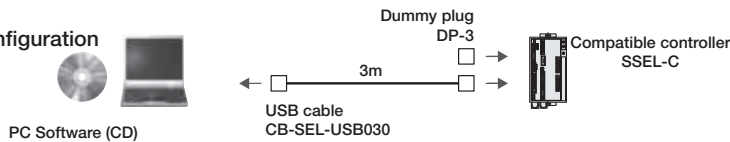
**Model** IA-101-X-MW-J (with RS232C cable + adapter cable)  
IA-101-X-MW (with RS232C cable)

**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 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) |

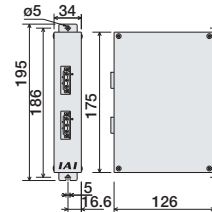
**Required Number of Units**

|         | Horizontal | Vertical |
|---------|------------|----------|
| 0 units | ~200W      | ~200W    |
| 1 unit  | ~800W      | ~600W    |
| 2 units | ~800W      | ~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).

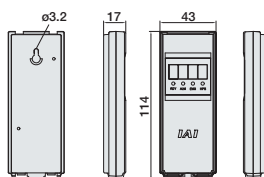
**Exterior Dimensions**



### 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.

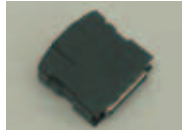
**Model** AB-5-CS (with case)  
AB-5 (Standalone battery)



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)



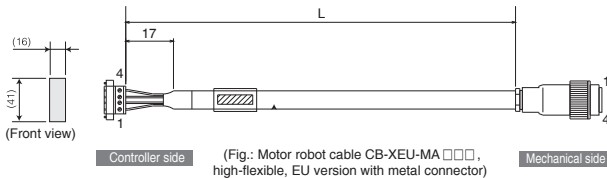
Spare parts

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



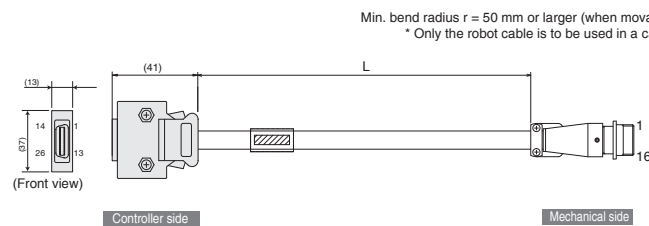
Min. bend radius  $r = 50$  mm or larger (when movable type is used)  
\* Only the robot cable is to be used in a cable track

| Wire  | Color | Signal | No. | No. | Signal | Color            | Wire |
|-------|-------|--------|-----|-----|--------|------------------|------|
| 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  |                  |      |

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

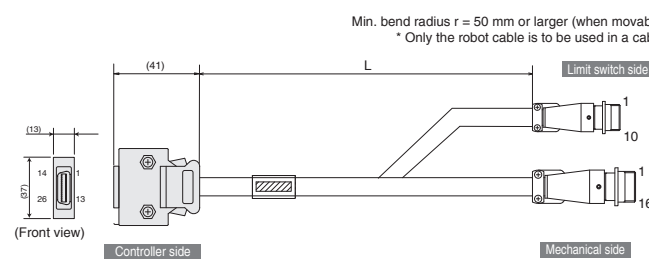
| Wire        | Color | Signal | No. | No. | Signal | Color        | Wire |
|-------------|-------|--------|-----|-----|--------|--------------|------|
| -           | -     | E24V   | 10  | 1   | A      | Pink         |      |
| -           | -     | E24V   | 11  | 2   | A      | Green        |      |
| -           | -     | 0V     | 12  | 3   | B      | White        |      |
| Gray/White  | 0V    | LS     | 13  | 4   | B      | Blue/Red     |      |
| Brown/White | LS    | 26     | 5   | 5   | Z      | Orange/White |      |
| -           | -     | CLERR  | 27  | 6   | Z      | Green/White  |      |
| -           | -     | OT     | 24  | 7   | LS+    | Brown/White  |      |
| -           | -     | RSV    | 23  | 8   | SD     | Blue         |      |
| -           | -     | -      | 9   | 9   | SD     | Blue         |      |
| -           | -     | -      | 18  | 10  | BAT+   | Black        |      |
| -           | -     | -      | 19  | 11  | BAT-   | Yellow       |      |
| Pink        | A+    | 1      | 12  | 12  | VCC    | Green        |      |
| Purple      | A-    | 2      | 13  | 13  | GND    | Brown        |      |
| White       | B+    | 3      | 14  | 14  | LS-    | Brown/White  |      |
| Blue/Red    | B-    | 4      | 15  | 15  | BK-    | Gray         |      |
| Brown/White | Z+    | 5      | 16  | 16  | BK+    | Red          |      |
| Green/White | Z-    | 6      | 17  | 17  | GND    | Black        |      |
| Blue        | SRD+  | 7      | 18  | 18  | LS-    | Gray/White   |      |
| Orange      | SRD-  | 8      | 19  | 19  | BK-    | Gray         |      |
| Green       | BAT+  | 14     | 20  | 20  | BK+    | Red          |      |
| Black       | BAT-  | 15     | 21  | 21  | GND    | Black        |      |
| Gray        | BKR+  | 20     | 22  | 22  | BK+    | Red          |      |
| Green       | VCC   | 16     |     |     |        |              |      |
| Brown       | GND   | 17     |     |     |        |              |      |
| Gray        | BKR+  | 20     |     |     |        |              |      |
| Red         | BKR+  | 21     |     |     |        |              |      |
| Blue        | BKR+  | 20     |     |     |        |              |      |
| Yellow      | BKR+  | 21     |     |     |        |              |      |
| -           | -     | -      | 22  |     |        |              |      |

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

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

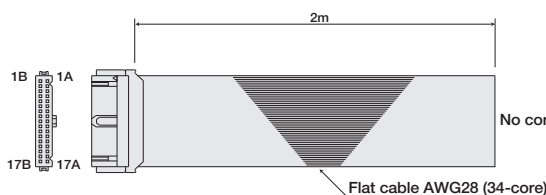
| Wire         | Color  | Signal | No. | No. | Signal | Color        | Wire |
|--------------|--------|--------|-----|-----|--------|--------------|------|
| -            | -      | E24V   | 12  | 1   | A      | White/Blue   |      |
| White/Orange | E24V   | 12     | 2   | 2   | 0V     | White/Yellow |      |
| White/Green  | 0V     | 13     | 3   | 3   | B      | White/Red    |      |
| Brown/Blue   | LS     | 26     | 4   | 4   | LS     | White/Red    |      |
| Brown/Yellow | CLERR+ | 27     | 5   | 5   | CLERR+ | White/Black  |      |
| Brown/Red    | OT     | 24     | 6   | 6   | OT     | White/Purple |      |
| Brown/Black  | RSV    | 23     | 7   | 7   | RSV    | White/Gray   |      |
| -            | -      | -      | 8   | 8   | -      | -            |      |
| -            | -      | -      | 18  | 9   | -      | -            |      |
| -            | -      | -      | 19  | 10  | -      | -            |      |
| White/Blue   | A+     | 1      | 11  | 11  | A      | White/Blue   |      |
| White/Yellow | A-     | 2      | 12  | 12  | A      | White/Yellow |      |
| White/Red    | B+     | 3      | 13  | 13  | B      | White/Red    |      |
| White/Black  | B-     | 4      | 14  | 14  | B      | White/Black  |      |
| White/Gray   | Z+     | 5      | 15  | 15  | Z      | White/Purple |      |
| White/Gray   | Z-     | 6      | 16  | 16  | Z      | White/Gray   |      |
| Orange       | SRD+   | 7      | 17  | 17  | LS+    | Brown/White  |      |
| Green        | SRD-   | 8      | 18  | 18  | SD     | Blue         |      |
| Purple       | BAT+   | 14     | 19  | 19  | SD     | Orange       |      |
| Gray         | BAT-   | 15     | 20  | 20  | BAT+   | Green        |      |
| Red          | VCC    | 16     | 21  | 21  | BAT-   | Purple       |      |
| Black        | GND    | 17     | 22  | 22  | LS-    | Gray         |      |
| Blue         | BKR+   | 20     |     |     | VCC    | Red          |      |
| Yellow       | BKR+   | 21     |     |     | LS-    | Gray/White   |      |
| -            | -      | -      | 22  |     | BK-    | Blue         |      |
| -            | -      | -      |     |     | BK+    | Yellow       |      |

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

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  |      | 9B      | Gray 2   |      |
| 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      | Blue 1   |      | 12A     | Orange 3 |      |
| 4A      | Purple 1 |      | 12B     | Yellow 3 |      |
| 4B      | Gray 1   |      | 13A     | Purple 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 |      |


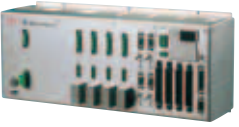


# X-SEL



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      Number of Axes      (Specs for 1st axis)      (Specs for axis 2 - 4)      (Slot 1)      (Slot 2)      (Slot 3)      (Slot 4)      I/O Cable Length      Power/Voltage

|   |  |  |       |         |        |       |         |        |              |               |  |  |
|---|--|--|-------|---------|--------|-------|---------|--------|--------------|---------------|--|--|
| <b>KE</b> General purpose type                    |  |  | Motor | Encoder | Option | Motor | Encoder | Option | Standard I/O | Expansion I/O |  |  |
| <b>KET</b> Safety-compliant, general purpose type |  |  |       |         |        |       |         |        |              |               |  |  |

|                     |                |                |                |
|---------------------|----------------|----------------|----------------|
| 1 Single-axis model | 2 2-axis model | 3 3-axis model | 4 4-axis model |
|---------------------|----------------|----------------|----------------|

|                      |                       |                              |                                    |                           |                          |
|----------------------|-----------------------|------------------------------|------------------------------------|---------------------------|--------------------------|
| <b>B</b> Brake       | <b>C</b> Creep sensor | <b>HA</b> High Accel./Decel. | <b>L</b> Home sensor/LS-compatible | <b>M</b> Master axis spec | <b>S</b> Slave axis spec |
| <b>I</b> Incremental | <b>A</b> Absolute     |                              |                                    |                           |                          |

|                      |                   |
|----------------------|-------------------|
| <b>I</b> Incremental | <b>A</b> Absolute |
|----------------------|-------------------|

|                      |                   |
|----------------------|-------------------|
| <b>I</b> Incremental | <b>A</b> Absolute |
|----------------------|-------------------|

|                                    |                                    |
|------------------------------------|------------------------------------|
| <b>N1</b> Input 32/Output 16 (NPN) | <b>P1</b> Input 32/Output 16 (PNP) |
| <b>DV</b> DeviceNet board          | <b>CC</b> CC-Link board            |
| <b>PR</b> ProfiBus board           | <b>ET</b> Ethernet board           |

|                                    |                                    |
|------------------------------------|------------------------------------|
| <b>E</b> Not used                  | <b>P1</b> Input 32/Output 16 (PNP) |
| <b>N1</b> Input 32/Output 16 (NPN) | <b>P2</b> Input 16/Output 32 (PNP) |
| <b>N2</b> Input 16/Output 32 (NPN) | <b>SA</b> Expansion SIO type A     |
|                                    | <b>SB</b> Expansion SIO type B     |
|                                    | <b>SC</b> Expansion SIO type C     |

|                              |                              |
|------------------------------|------------------------------|
| <b>1</b> Single-phase AC115V | <b>2</b> Single-phase AC230V |
| <b>0</b> No cable            | <b>2</b> 2m (standard)       |
|                              | <b>3</b> 3m                  |
|                              | <b>5</b> 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.

|                                     |                             |                                     |                             |
|-------------------------------------|-----------------------------|-------------------------------------|-----------------------------|
| <b>20</b> 20W servo motor           | <b>200</b> 200W servo motor | <b>20</b> 20W servo motor           | <b>200</b> 200W servo motor |
| <b>30D</b> 30W servo motor for RCS2 | <b>300</b> 300W servo motor | <b>30D</b> 30W servo motor for RCS2 | <b>300</b> 300W servo motor |
| <b>30R</b> 30W servo motor for RS   | <b>400</b> 400W servo motor | <b>30R</b> 30W servo motor for RS   | <b>400</b> 400W servo motor |
| <b>60</b> 60W servo motor           | <b>600</b> 600W servo motor | <b>60</b> 60W servo motor           | <b>600</b> 600W servo motor |
| <b>100</b> 100W servo motor         | <b>750</b> 750W servo motor | <b>100</b> 100W servo motor         | <b>750</b> 750W servo motor |
| <b>150</b> 150W servo motor         |                             | <b>150</b> 150W servo motor         |                             |

[XSEL-P/Q type]

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

**XSEL** - [ ] - [ ] - [ ] - [ ] - [ ] - ( [ ] [ ] [ ] [ ] [ ] [ ] ) - [ ] - [ ] - [ ] - [ ] - [ ]

Series      Type      Number of Axes      (Specs for 1st axis)      (Specs for axis 2 - 6)      Dedicated network slot      (Slot 1)      (Slot 2)      (Slot 3)      (Slot 4)      I/O Cable Length      Power/Voltage

|  |  |  |       |         |        |       |         |        |  |              |               |  |
|--|--|--|-------|---------|--------|-------|---------|--------|--|--------------|---------------|--|
| <b>P</b> Large-capacity type                   |  |  | Motor | Encoder | Option | Motor | Encoder | Option |  | Standard I/O | Expansion I/O |  |
| <b>Q</b> Safety-compliant, large-capacity type |  |  |       |         |        |       |         |        |  |              |               |  |

|                     |                |
|---------------------|----------------|
| 1 Single-axis model | 4 4-axis model |
| 2 2-axis model      | 5 5-axis model |
| 3 3-axis model      | 6 6-axis model |

|                      |                       |                              |                                    |                           |                          |
|----------------------|-----------------------|------------------------------|------------------------------------|---------------------------|--------------------------|
| <b>B</b> Brake       | <b>C</b> Creep sensor | <b>HA</b> High Accel./Decel. | <b>L</b> Home sensor/LS-compatible | <b>M</b> Master axis spec | <b>S</b> Slave axis spec |
| <b>I</b> Incremental | <b>A</b> Absolute     |                              |                                    |                           |                          |

|                      |                   |
|----------------------|-------------------|
| <b>I</b> Incremental | <b>A</b> Absolute |
|----------------------|-------------------|

|                      |                   |
|----------------------|-------------------|
| <b>I</b> Incremental | <b>A</b> Absolute |
|----------------------|-------------------|

|                       |                           |
|-----------------------|---------------------------|
| <b>Blank</b> Not used | <b>DV</b> DeviceNet board |
|                       | <b>CC</b> CC-Link board   |
|                       | <b>PR</b> ProfiBus board  |
|                       | <b>ET</b> Ethernet board  |

|                   |                                    |
|-------------------|------------------------------------|
| <b>E</b> Not used | <b>N1</b> Input 32/Output 16 (NPN) |
|                   | <b>N2</b> Input 16/Output 32 (NPN) |
|                   | <b>P1</b> Input 32/Output 16 (PNP) |
|                   | <b>P2</b> Input 16/Output 32 (PNP) |
|                   | <b>S</b> With expansion I/O base   |

|  |   |
|--|---|
| <b>2</b> Single-phase AC230V                   | <b>3</b> Three-phase AC230V               |
| <b>2L</b> Dedicated linear single-phase AC230V | <b>3L</b> Dedicated linear 3-phase AC230V |
| <b>0</b> No cable                              | <b>2</b> 2m (standard)                    |
|  | <b>3</b> 3m                               |
|  | <b>5</b> 5m                               |

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

\* 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.

e.g. Expansion I/O on slot 2, remaining slots unused  
Expansion I/O base attached, but not the expansion I/O

XSEL-P-2-100A-100A-N1-N1EE-2-3  
XSEL-P-2-100A-100A-N1-SSS-2-3

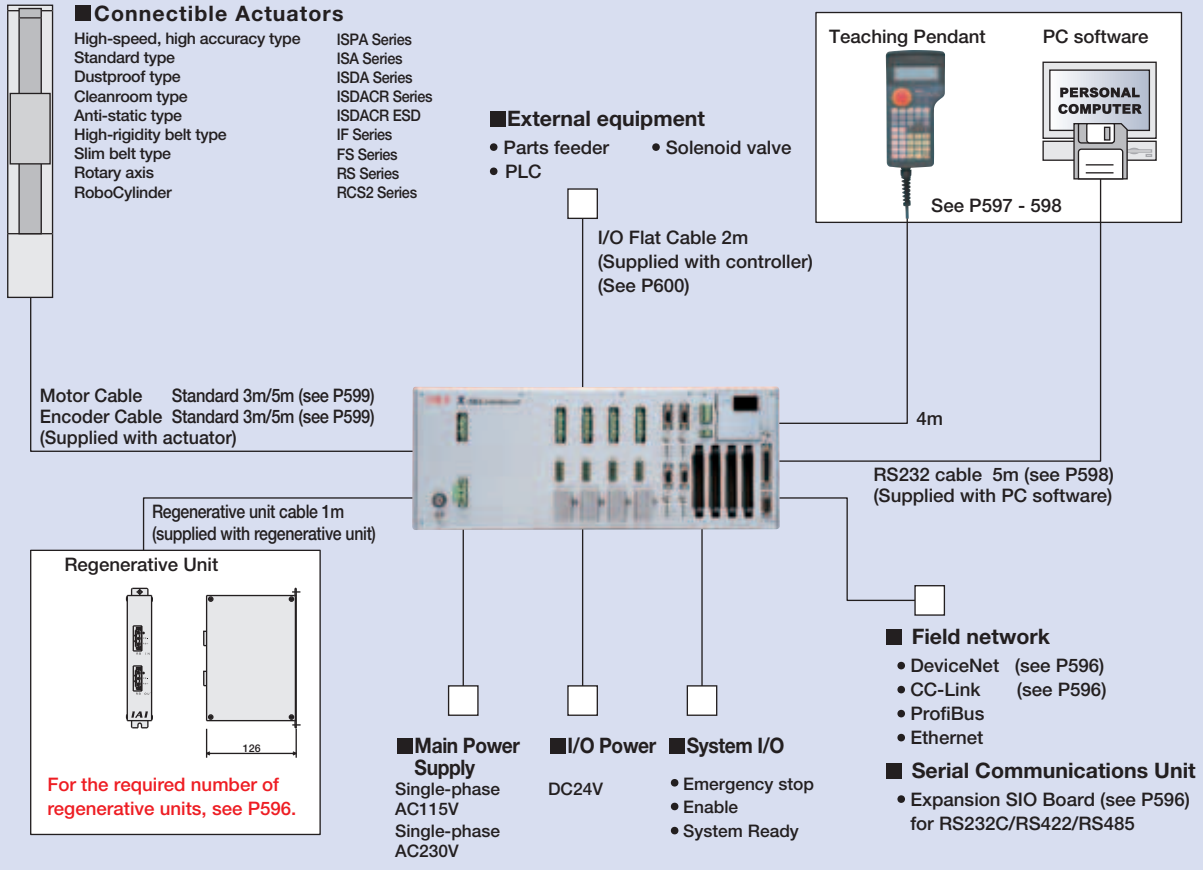
|                                     |                             |   |                             |
|-------------------------------------|-----------------------------|---|-----------------------------|
| <b>12</b> 12W servo motor           | <b>200</b> 200W servo motor | <b>12</b> 12W servo motor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

Note:

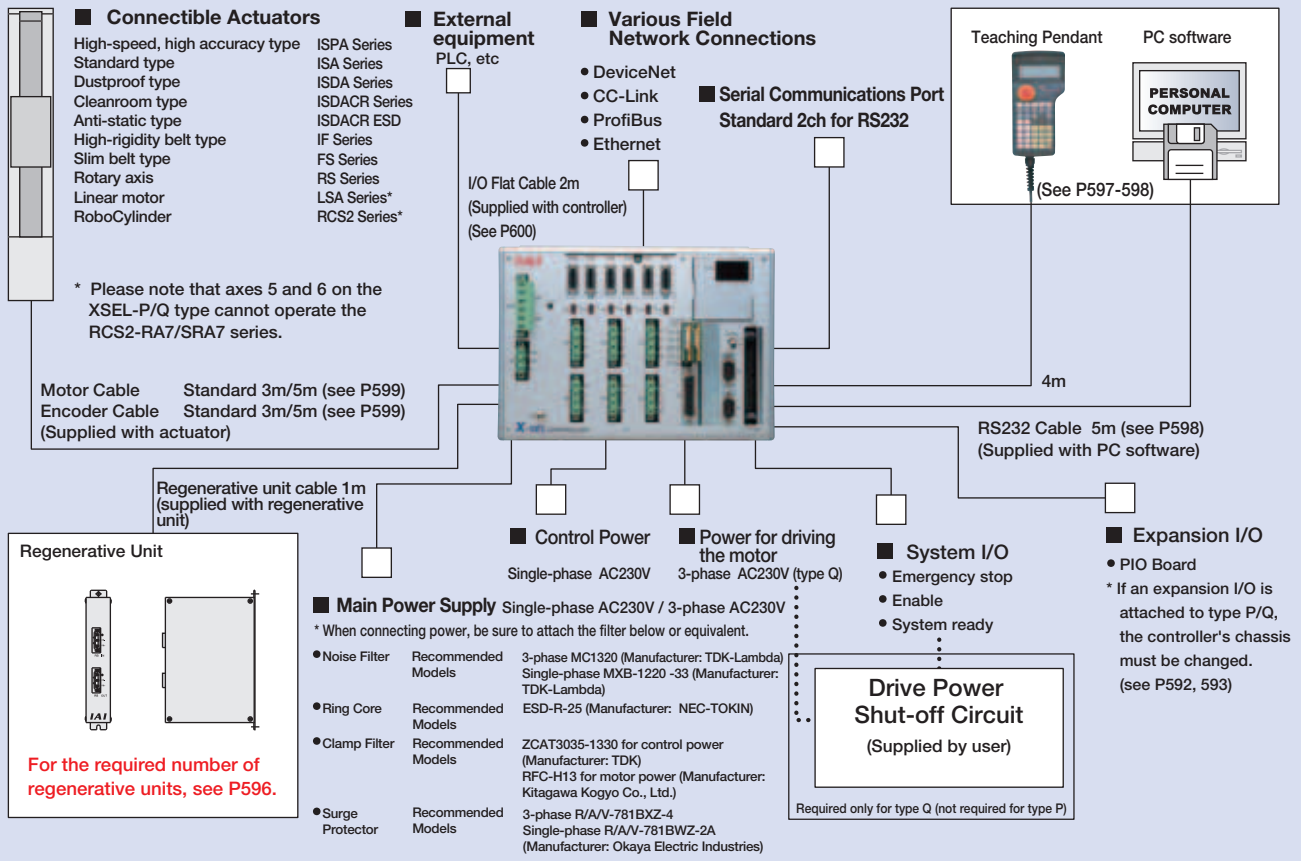
For axis 5 and 6 of XSEL-P/Q type, LSA series, and the RCS2-RA7 / SRA7 series actuators are unavailable.

**System configuration**

**KE (standard type) / KET (global type)**



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

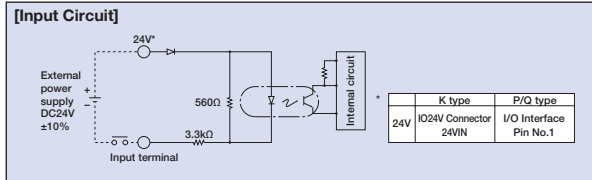




I/O wiring drawing

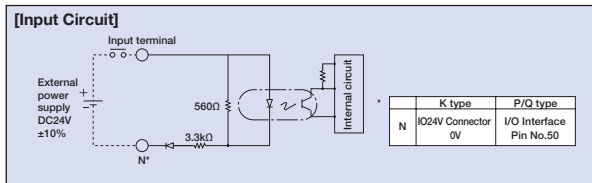
Input section External input specification (NPN specification)

| 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)<br>(2) Photoelectric Proximity Sensor (NPN Type)<br>(3) PLC Transistor Output (Open Collector Type)<br>(4) PLC Contact Output (Minimum Load approx. DC5V, 1mA) |



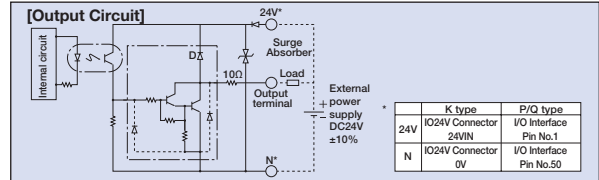
Input section External input specification (PNP specification)

| 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)<br>(2) Photoelectric Proximity Sensor (PNP Type)<br>(3) PLC Transistor Output (Open Collector Type)<br>(4) PLC Contact Output (Minimum Load approx. DC5V, 1mA) |



Output section External input specification (NPN specification)

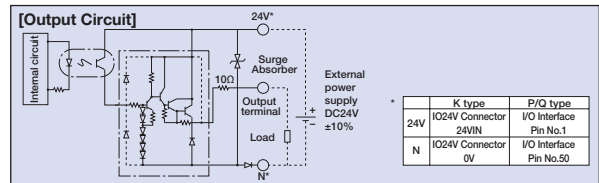
| Item                           | Specifications                          |
|--------------------------------|---|
| Load Voltage                   | DC24V                                   |
| Max. load current              | 100mA / point 400 mA                    |
| Leak current                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



Output section External input specification (PNP specification)

| Item                           | Specifications                           |
|--------------------------------|--|
| Load Voltage                   | DC24V                                    |
| Max. load current              | 100mA / 1 point<br>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.)



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      | Input          | 014                   | General Purpose Input                   |
| 17      |                | 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      | Output         | 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      |                | 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      | 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      |                       | —                                       |

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       | Input                  | 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      | General Purpose Input  |   |
| 18      | Output                 | 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      |                        | 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   |   |               |               |                   |   |               |               |
|-----------------------------------|---|---|---------------|---------------|-------------------|---|---------------|---------------|
|                                   | KE (Standard) Type  |   |               |               | KET (Global) Type |   |               |               |
| Controller Series, Type           | RCS2 / ISA / ISPA / ISP / ISDA / ISDACR / ISPDACR / IF / FS / RS  |   |               |               |                   |   |               |               |
| 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<br>800  | Max. 1600 (When power supply voltage is 230V)<br>Max. 800 (When power supply voltage is 115V) |               |               | Max<br>800        | Max. 1600 (When power supply voltage is 230V)<br>Max. 800 (When power supply voltage is 115V) |               |               |
| Input Voltage                     | 115V Specification: Single-phase AC100 to 115V<br>230V Specification: Single-phase AC200 to 230V  |   |               |               |                   |   |               |               |
| Motor Power Input                 | ±10%  |   |               |               |                   |   |               |               |
| Power Supply Frequency            | 50Hz/60Hz   |   |               |               |                   |   |               |               |
| Power Supply Capacity             | Max<br>1670VA   | Max<br>3120VA   | Max<br>3220VA | Max<br>3310VA | Max<br>1670VA     | Max<br>3120VA   | Max<br>3220VA | Max<br>3310VA |
| Position detection method         | Incremental Encoder (Serial encoder)<br>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<br>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   |               |               |               |               |               |   |               |               |               |               |               |
|--|---|---------------|---------------|---------------|---------------|---------------|---|---------------|---------------|---------------|---------------|---------------|
|  | P (Standard) Type   |               |               |               |               |               | Q (Global) Type   |               |               |               |               |               |
| Controller Series, Type                      | RCS2 / ISA / ISPA / ISP / ISDA / ISDACR / ISPDACR / IF / FS / RS / LSA  |               |               |               |               |               |   |               |               |               |               |               |
| 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<br>1744VA   | Max<br>3266VA | Max<br>4787VA | Max<br>4878VA | Max<br>4931VA | Max<br>4998VA | Max<br>1744VA   | Max<br>3266VA | Max<br>4787VA | Max<br>4878VA | Max<br>4931VA | Max<br>4998VA |
| Position detection method                    | Incremental Encoder (Serial encoder)<br>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<br>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) |                        |                        |           |
| 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 |  |                          |                                   |   |           |

- Slider Type
- Mini
- Standard
- Controllers Integrated
- Rod Type
- Mini
- Standard
- Controllers Integrated
- Table/Arm /FlatType
- Mini
- Standard
- Gripper/ Rotary Type
- Linear Motor Type
- Cleanroom Type
- Splash-Proof
- Controllers
- PMEC /AMEC
- PSEP /ASEP
- ROBO NET
- ERC2
- PCON
- ACON
- SCON
- PSEL
- ASEL
- SSEL
- XSEL
- Pulse Motor
- Servo Motor (24V)
- Servo Motor (230V)
- Linear Motor

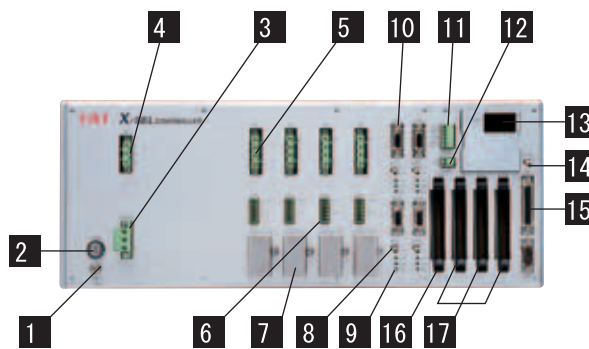
## External dimensional drawing

### [Q Type]

|                                |                               | Basic Layout<br>(Incremental Specification) | With brake/absolute<br>unit | Basic Layout<br>+ I/O expansion base | With brake/absolute unit<br>+ I/O expansion base | Side View   |
|--------------------------------|-------------------------------|---|-----------------------------|--------------------------------------|--|---|
| Controllers<br>Specifications  | Encoder                       | Incremental                                 | Absolute                    | Incremental                          | Absolute   |   |
|                                | Brake                         | None  | Yes                         | None                                 | Yes  |   |
|                                | I/O                           | Standard only                               | Standard only               | Standard + Expansion                 | Standard + Expansion                             |   |
| Single phase<br>Specifications | 1 to 4 axis<br>Specifications |   |                             |                                      |  | <p>Battery Box<br/>(Applies to<br/>ABS model)</p> |
|                                | 5 to 6 axis<br>Specifications |   |                             |                                      |  |   |
| 3 phase<br>Specifications      | 1 to 4 axis<br>Specifications |   |                             |                                      |  |   |
|                                | 5 to 6 axis<br>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 DI 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.

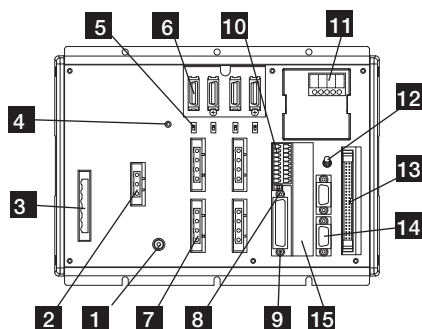
**17** Expansion I/O Slots (Slot 2, Slot 3, Slot 4)

Install an expansion I/O board. (Option)

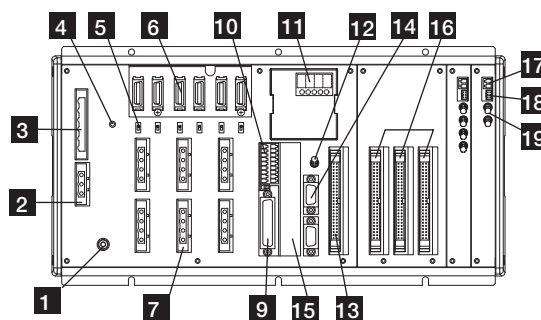
- Slider Type
- Mini
- Standard
- Controllers Integrated
- Rod Type
- Mini
- Standard
- Controllers Integrated
- Table/Arm /FlatType
- Mini
- Standard
- Controllers Integrated
- Gripper/ Rotary Type
- Linear Motor Type
- Cleanroom Type
- Splash-Proof
- Controllers
- PMEC /AMEC
- PSEP /ASEP
- ROBO NET
- ERC2
- PCON
- ACON
- SCON
- PSEL
- ASEL
- SSEL
- XSEL
- Pulse Motor
- Servo Motor (24V)
- Servo Motor (230V)
- Linear Motor

## Part Names

P type (4-axis)



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

### 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 BKMR1\* 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 |

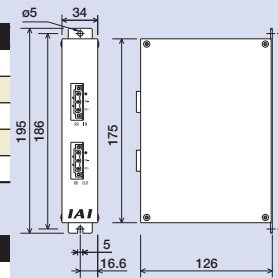
Installation Standards Determined by the total motor capacity of vertical axes connected.

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 IAL. |
| 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.)



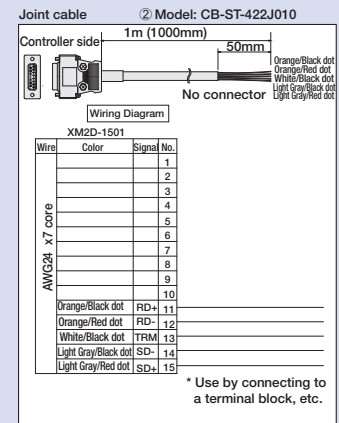
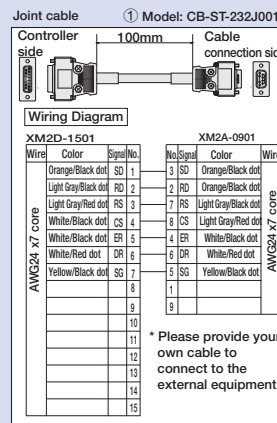
Expansion SIO Board (for XSEL-KE/KET)

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).



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.)

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   |                        |                       |                     |
| Communication specifications                | Insulated node operating on network power supply                              |                        |                       |                     |
|   | Master-Slave connection   |                        | Bit strobe            |                     |
|   |   |                        | Polling               |                     |
| Communication Rate                          | 500k/250k/125kbps (Selectable by DIP switch)                                  |                        |                       |                     |
|   | Communication Rate  | Maximum network length | Maximum branch length | Total branch length |
| Communication cable 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 <sup>16</sup> +X <sup>12</sup> +X <sup>5</sup> +1)              |     |     |      |           |
| 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)                             |     |     |      |           |

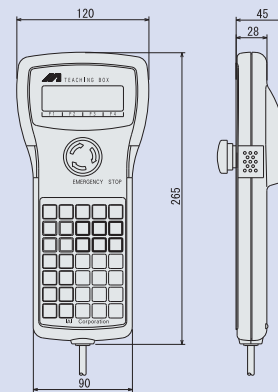
(\*1) The connector on the cable (SMSTB2.5/5-ST-5.08AU by Phoenix Contact) is a standard accessory.

## 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  |

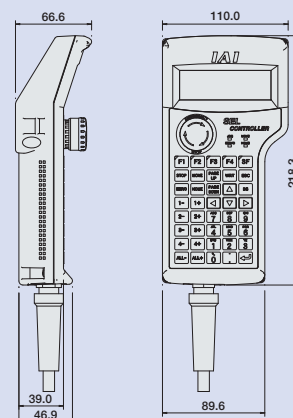
### Note:

\* 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 40°C 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

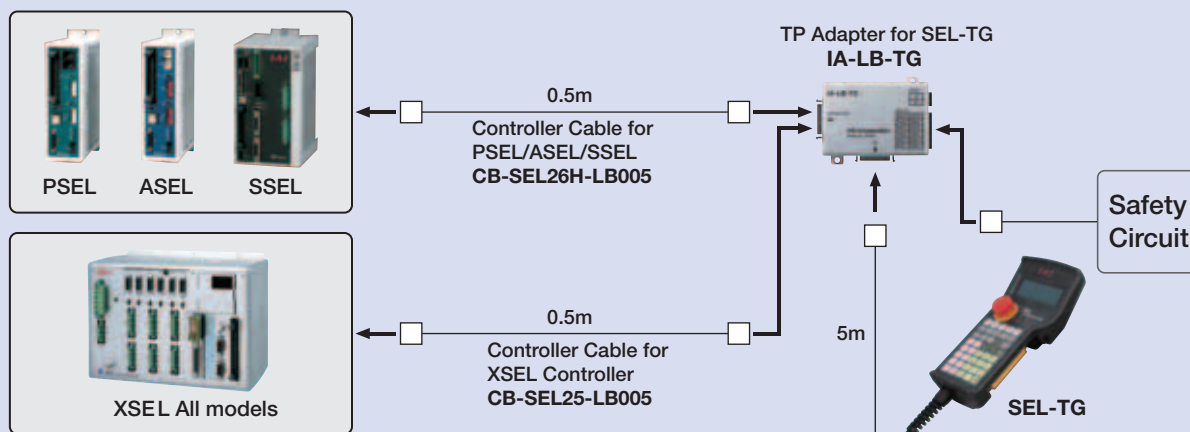
|                     |                | IA-T-X     | IA-T-XD               | SEL-T      | SEL-TD                    | SEL-TG                    |
|---------------------|----------------|------------|-----------------------|------------|---------------------------|---------------------------|
|                     |                | 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        | -          | -                     | ○          | ◎                         | ◎                         |
|                     |                |            |                       |            |                           |                           |

\* ◎ corresponds to safety category B to 4.

○ does not correspond 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:**

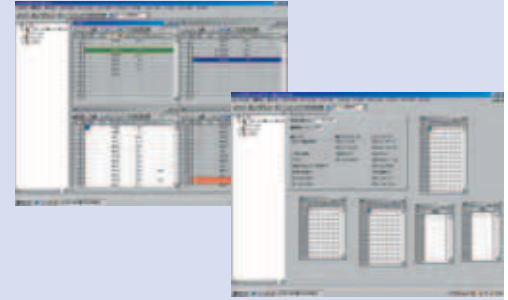
- \* Versions older than 3.0.0 cannot be used with XSEL-P/Q.
- \* Versions older than 2.0.0 cannot be used with SCARA.
- \* Please use IA-101-XA-MW for safety category 4-compliant controller.

**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**

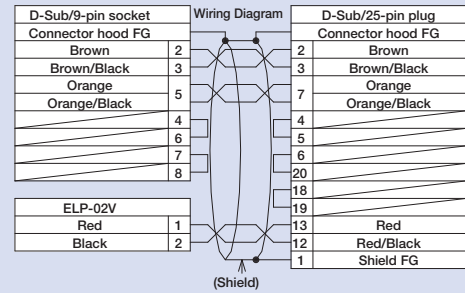
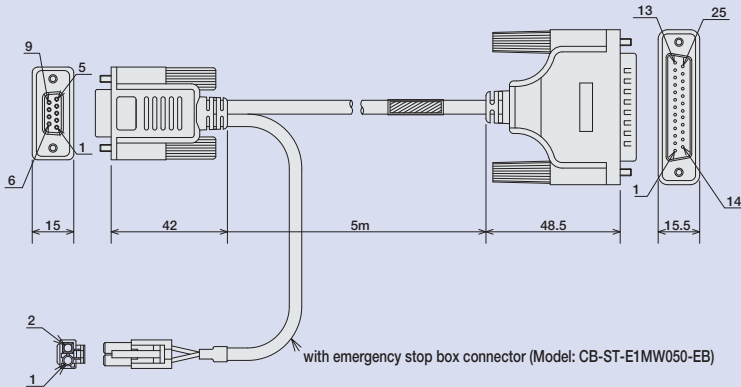
Software (CD-ROM)  
(Corresponding to Windows98, NT, 2000, ME, and XP)  
PC connecting cable 5m, model: CB-ST-9-25 (with emergency stop box: CB-ST-E1MW050-EB)



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.



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**

Software (CD-ROM)  
(Accessory)  
(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)

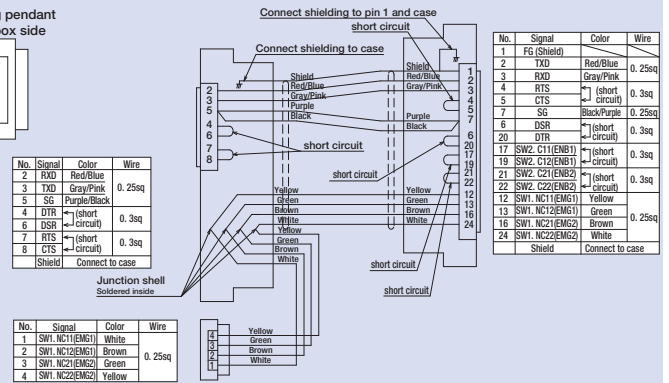
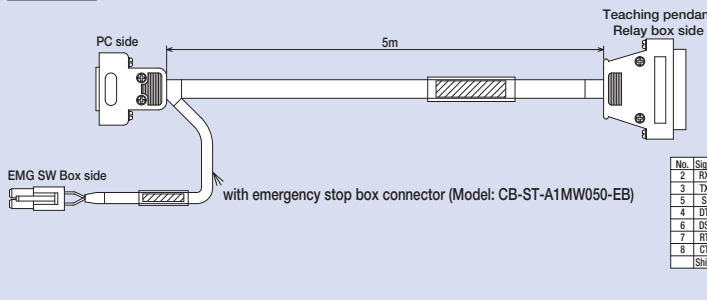
**Dimensions**

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

\* 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.



USB-compatible PC software

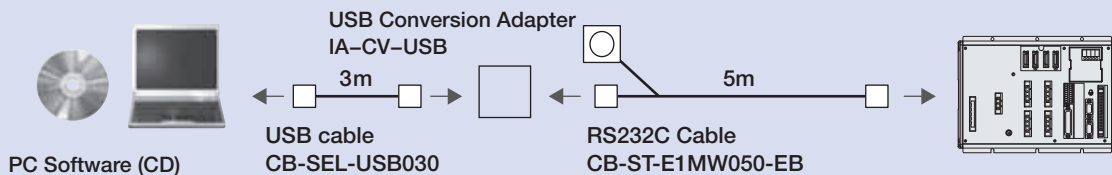
**Model** IA-101-X-USBMW

**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



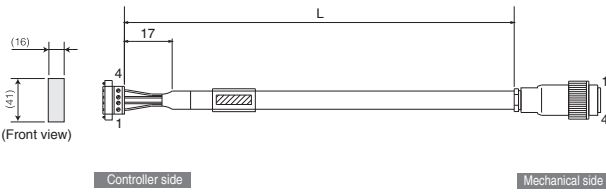
## Spare Parts

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



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

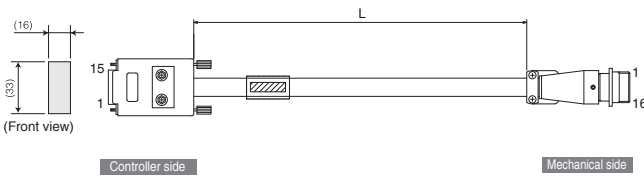
Min. bend radius  $r = 50$  mm or larger (when movable type is used)  
\* Only the robot cable is to be used in a cable track

| Wire   | Color | Signal | No. | 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 |                  |

### 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



(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

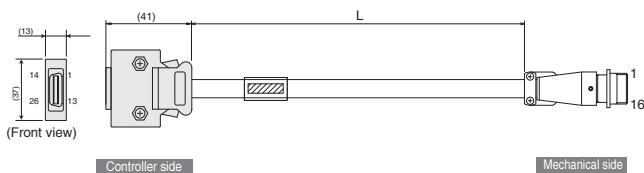
| Wire             | Color  | Signal | No. | No. | Signal | Color  | Wire              |
|------------------|--------|--------|-----|-----|--------|--------|-------------------|
| 0.15sq (crimped) | -      | -      | 1   | 1   | SD     | Blue   | 0.15sq (soldered) |
|                  | -      | -      | 2   | 2   | SD     | Orange |                   |
|                  | -      | -      | 3   | -   | -      | -      |                   |
|                  | -      | -      | 4   | -   | -      | -      |                   |
|                  | -      | -      | 5   | -   | -      | -      |                   |
|                  | -      | -      | 6   | -   | -      | -      |                   |
|                  | -      | -      | 7   | -   | -      | -      |                   |
|                  | Blue   | SD     | 7   | 8   | -      | -      |                   |
|                  | Orange | SD     | 8   | 9   | -      | -      |                   |
|                  | Black  | BAT+   | 9   | 10  | VCC    | Green  |                   |
|                  | Yellow | BAT-   | 10  | 11  | GND    | Brown  |                   |
|                  | Green  | VCC    | 11  | 12  | BAT+   | Black  |                   |
|                  | Brown  | GND    | 12  | 13  | BAT-   | Yellow |                   |
|                  | Gray   | BK-    | 13  | 14  | -      | -      |                   |
|                  | Red    | BK+    | 14  | 15  | BK-    | Gray   |                   |
| -                | -      | 15     | 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.

### 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



(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

| Wire             | Color        | Signal | No. | No. | Signal | Color        | Wire            |
|------------------|--------------|--------|-----|-----|--------|--------------|-----------------|
| AWG26 (soldered) | -            | -      | 10  | 1   | A      | Pink         | AWG26 (crimped) |
|                  | -            | -      | 11  | 2   | A      | Green        |                 |
|                  | -            | -      | 12  | 3   | B      | White        |                 |
|                  | -            | -      | 13  | 4   | B      | Blue/Red     |                 |
|                  | -            | -      | 14  | 5   | Z      | Orange/White |                 |
|                  | -            | -      | 15  | 6   | Z      | Green/White  |                 |
|                  | -            | -      | 16  | 7   | LS+    | Brown/White  |                 |
|                  | -            | -      | 17  | 8   | SD     | Blue         |                 |
|                  | -            | -      | 18  | 9   | SD     | Orange       |                 |
|                  | -            | -      | 19  | 10  | BAT+   | Black        |                 |
|                  | Pink         | A+     | 1   | 11  | BAT-   | Yellow       |                 |
|                  | Purple       | A-     | 2   | 12  | VCC    | Green        |                 |
|                  | White        | B+     | 3   | 13  | GND    | Brown        |                 |
|                  | Blue/Red     | B-     | 4   | 14  | LS-    | Gray         |                 |
|                  | Orange/White | Z+     | 5   | 15  | GND    | Gray/White   |                 |
|                  | Green/White  | Z-     | 6   | 16  | BK-    | Gray         |                 |
|                  | Blue         | SRD+   | 7   | 17  | BK+    | Red          |                 |
|                  | Orange       | SRD-   | 8   | 18  | -      | -            |                 |
|                  | Black        | BAT+   | 14  | 19  | -      | -            |                 |
|                  | Yellow       | BAT-   | 15  | 20  | -      | -            |                 |
|                  | Green        | VCC    | 16  | 21  | -      | -            |                 |
|                  | Brown        | GND    | 17  | 22  | -      | -            |                 |
| Gray             | BKR+         | 20     | -   | -   | -      |              |                 |
| Red              | BKR+         | 21     | -   | -   | -      |              |                 |
| -                | -            | 22     | -   | -   | -      |              |                 |

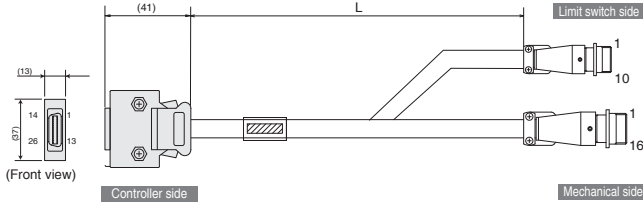
The shield is connected to the hood by a clamp. Ground wire and shield braiding. The shield is connected to the hood by a clamp.

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

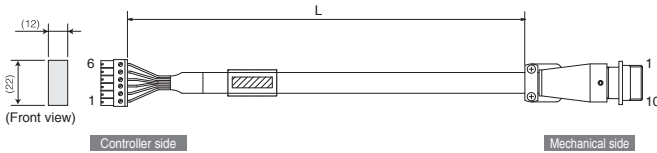
| Wire         | Color | Signal | No. | No.   | Signal       | Color           | Wire |
|--------------|-------|--------|-----|-------|--------------|-----------------|------|
| -            | -     | -      | 10  | 1     | E24 V        | White/Blue      | -    |
| -            | -     | -      | 11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

The shield is connected to the hood by a clamp.

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)

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

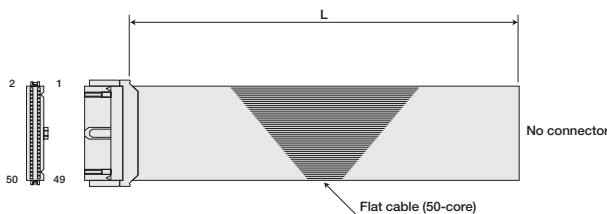
| Wire        | Color  | Signal | No. | No.     | Signal      | Color            | Wire |
|-------------|--------|--------|-----|---------|-------------|------------------|------|
| Sky blue    | 24VOUT | 6      | 1   | 24V OUT | Sky blue    | -                |      |
| Purple      | N      | 5      | 2   | n       | Purple      | -                |      |
| Lime green  | LS     | 4      | 3   | -       | -           | -                |      |
| Orange      | CREEP  | 3      | 4   | LS      | Lime green  | AWG 24 (crimped) |      |
| Gray        | OT     | 2      | 5   | CREEP   | Orange      | -                |      |
| 1B/Sky blue | RSV    | 1      | 6   | O.T     | Gray        | -                |      |
| -           | -      | -      | 7   | RSV     | 1B/Sky blue | -                |      |
| -           | -      | -      | 8   | -       | -           | -                |      |
| -           | -      | -      | 9   | -       | -           | -                |      |
| -           | -      | -      | 10  | -       | -           | -                |      |

Note: "1B" means 1 black dot mark

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  | -    | 18     | Gray 2   | -    | 35     | Green 4  | -    |
| 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      | Blue 1   | -    | 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 | -    | -      | -        | -    |

**RCS2 Series**  
**Extract Cat. No. 0812-E**

The information contained in this catalog is subject to change without notice for the purpose of product improvement



Providing quality products  
since 1986



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## ■ 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>

- ① 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).
- ② 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.
- ③ As the stroke becomes longer, the maximum speed decreases, due to hazardous RPMs.  
For details, see "■ Stroke vs. Maximum Speed" on each product page.
- ④ 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.
- ⑤ For PMEC/AMEC controllers, a minimum speed is set for each actuator.  
See the instructions manual for the PMEC/AMEC controllers.
- ⑥ 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 ( $0.3G = 2940\text{mm/sec}^2$ ).

\* For rotary type,  $0.3G = 2940 \text{ degrees/sec}^2$

#### <Note>

- ① 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.
- ② 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.
- ③ 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  $\pm$ .

## 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  $\pm 0.05\text{mm}$ .
- 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 | Series | Type             | Encoder Pulse Number |
|--------|--|----------------------|--------|------------------|----------------------|
| RCP3   | All models   | 800                  | RCA    | All models       | 800                  |
| RCP2   | All models   | 800                  | RCL    | SA1L/RA1L        | 715                  |
| RCA2   | RN□N/RP□N/GS□N/<br>GD□N/SD□N/TCA□N/<br>TWA□N/TFA□N | 1048                 |        | SA2L/RA2L        | 855                  |
|        | All other models                                   | 800                  |        | 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)

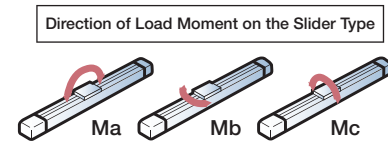
Pulse motors and 24V servo motors may exhibit slight vibration when the motor is excited while the servo is on.

# RoboCylinder Series Cautionary Notes

## ■ Notes on Specifications in this Catalog (All Models)

### 10. Allowable Load Moment (Ma, Mb, Mc)

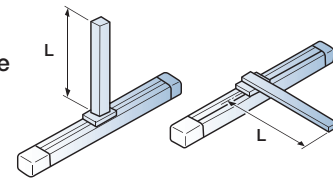
Models with a built-in linear guide have static and dynamic allowable moments. Please note that using the guide with a load moment that exceeds specification will result in shorter service life of the guide.  
(See page A-5 for details on load moment and its calculation method)



### 11. Overhang Load Length (L)

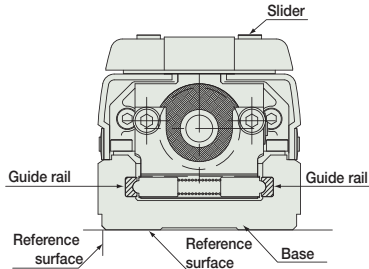
When mounting a workpiece or a bracket at an offset distance from the center of actuator/slider, the overhang load length indicates the maximum offset at which the actuator can operate smoothly.

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

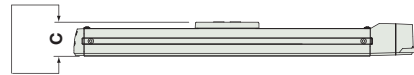
Below are the measures of precision for the body of the slider-type RoboCylinder. Moreover, the side and bottom surfaces of the actuator's base provide references for the run of the slider, and hence can be used as a guide to ensure parallel mounting of the actuator.



\* Parallelism does not apply to RCP2W-SA16C, due to its sliding guide.

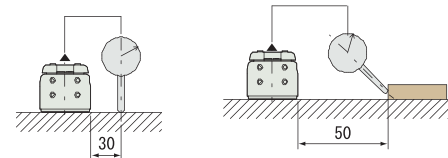
Parallelism: Base Underside & Load Surface (Top Side)

ERC2:  $\leq \pm 0.1\text{mm/m}$   
RCP2/RCA/RCS2:  $\leq \pm 0.05\text{mm/m}$



Parallelism When Mounted onto a Frame (Fixed onto a Smooth Surface\*1)

ERC2:  $\leq \pm 0.1\text{mm/m}$   
RCP2/RCA/RCS2:  $\leq \pm 0.05\text{mm/m}$



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 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.

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## 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.

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## 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.

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## 20. Warranty

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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.

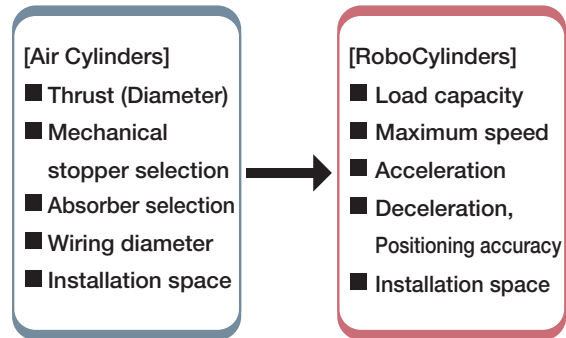
For this reason, there are many cases where air cylinders are selected largely out of past experience and familiarity. RoboCylinders are easy-to-use electric cylinders offering a variety of functions not achievable with air cylinders. The RoboCylinder product family makes it easy for you to select the 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

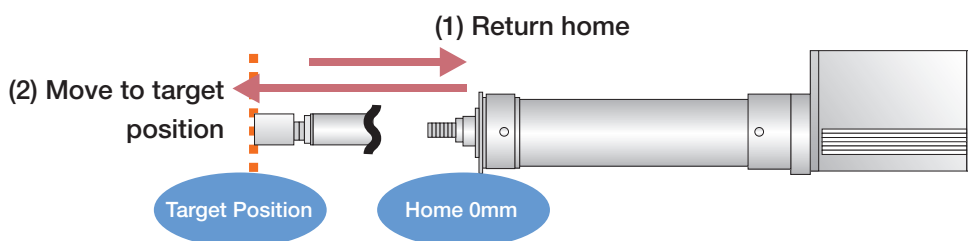
RoboCylinders are driven by a motor. Compared with air cylinders, simply from a size perspective, the RoboCylinder requires more attention paid to space requirements for installation.

## 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.

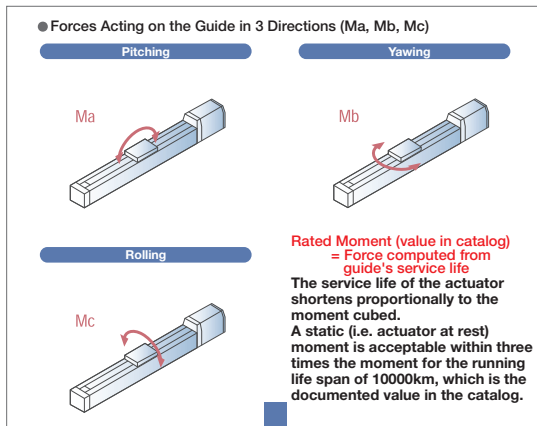
IAI uses the following equation calculate the service life: (for 10000km service life)

$$L_{10} = \left( \frac{C_{IA}}{P} \right)^3 \cdot 10000\text{km}$$

$L_{10}$  : Service life (90% Survival Probability)  
 $C_{IA}$  : Allowable Dynamic Moment in IAI Catalog  
 $P$  : Moment used

## Allowable Dynamic Moment

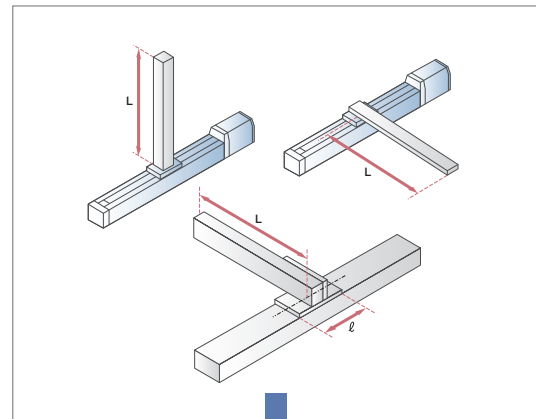
The allowable dynamic moment is the maximum offset load exerted on the slider, calculated from the guide service life. The direction in which force is exerted on the guide is categorized into 3 directions -  $M_a$  (pitch),  $M_b$  (yaw),  $M_c$  (roll) - the tolerance for each of which are set for each 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.

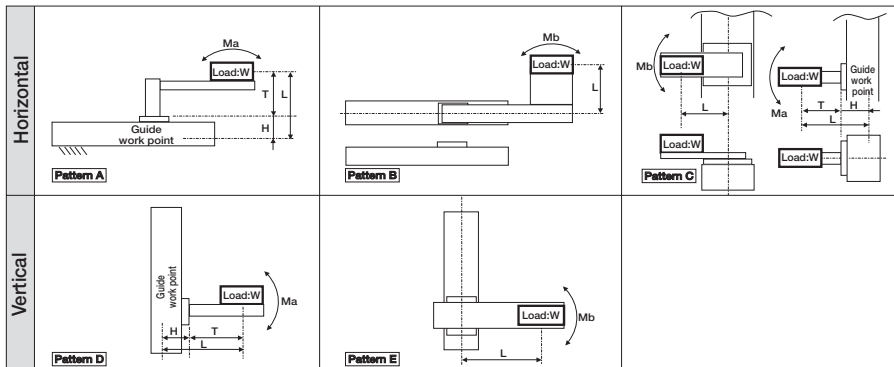
**$L/l = 5$  or less**

\* 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

$$M_2 \text{ (N}\cdot\text{m)} = W \text{ (kg)} \times L \text{ (mm)} \times a \text{ (G)} \times 9.8/1000$$



- 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.

$$M_{50} = f_w \times M_S \div \left(\frac{50}{S}\right)^{\frac{1}{3}} \dots \dots \text{Equation 1}$$

$M_S$  : 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  $f_w=1.2$ . 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 $f_w$ |
|---|------------------------|
| 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                |

$$L_{10} = \left(\frac{C_{IA}}{P} \cdot \frac{1.2}{f_w}\right)^3 \times S \dots \dots \text{Equation (2)}$$

$L_{10}$  : Service life (90% Survival Probability)  
 $C_{IA}$  : Allowable dynamic moment in IAI Catalog (5000km or 10000km)  
 $P$  : Moment used ( $\leq C_{IA}$ )  
 $S$  : 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.

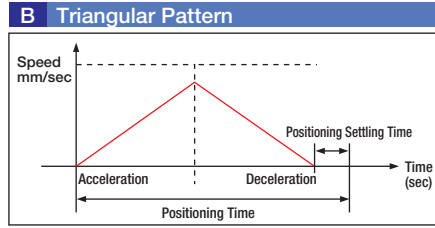
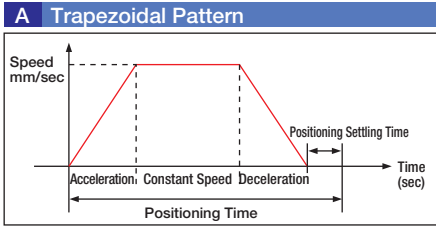
These values are simply calculated strictly from the permanent deformation done to the steel ball and its rolling surface. However, the actual moment value is restricted by the rigidity and deformation of the base. Hence, the allowable static moment the actual moment that can be applied statically, taking 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:



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  $V_{max} > V$ : Trapezoidal pattern

If  $V_{max} < V$ : Triangular pattern, where  $V_{max}$  is the peak speed reached and  $V$  is the speed that was specified.

## Method of Calculating the Positioning Time

### A Trapezoidal Pattern

$$\text{Positioning Time (T)} = \frac{\text{Distance (mm)}}{\text{Speed (mm/sec)}} + \frac{\text{Speed (mm/sec)}}{\text{Accel. (mm/sec}^2)} + \text{Positioning Settling Time}$$

### B Triangular Pattern

$$\text{Positioning Time} = 2 \sqrt{\frac{\text{Distance (mm)}}{\text{Accel. (mm/sec}^2)}} + \text{Positioning Settling Time}$$

$$\text{Accel. Time} = \frac{\text{Speed* (mm/sec)}}{\text{Accel. (mm/sec}^2)}$$

$$\text{Distance Accelerated} = \frac{\text{Accel. (mm/sec}^2) \times (\text{Accel. Time (sec)})^2}{2}$$

\* 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/sec<sup>2</sup>. If the acceleration setting in the controller is 0.3G, then 0.3 × 9800mm/sec<sup>2</sup> = 2940mm/sec<sup>2</sup>.
- 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.

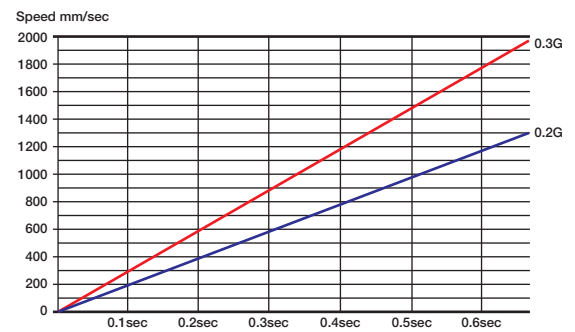
## Positioning time (sec)

| 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

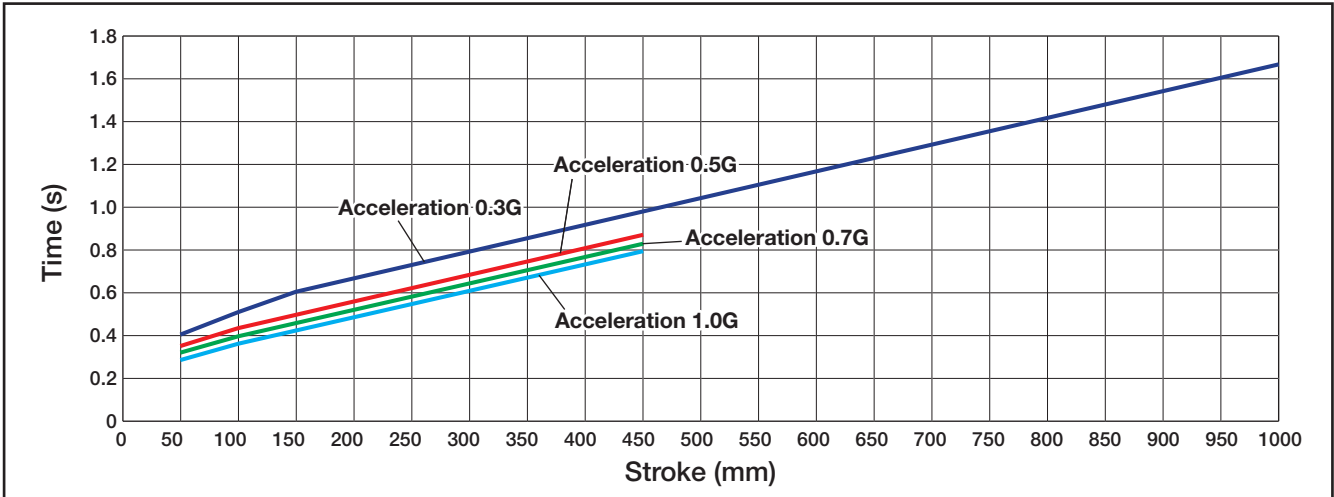


# Reference Chart of Movement Time per Speed/Acceleration

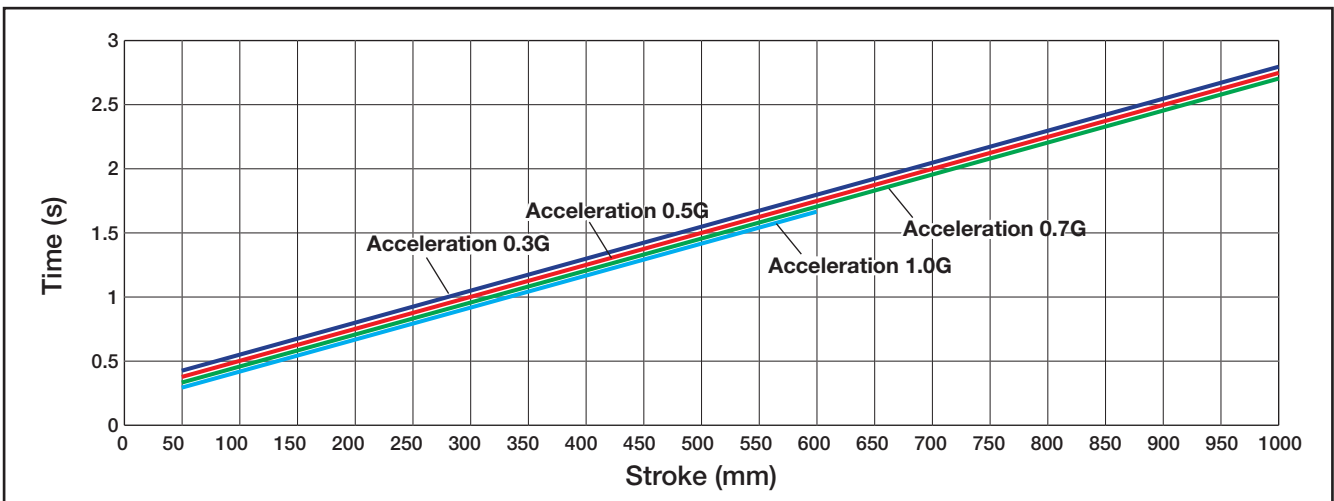
The charts below show the estimated time required for the movement per speed/acceleration. Please use it as a reference for cycle time.

(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.

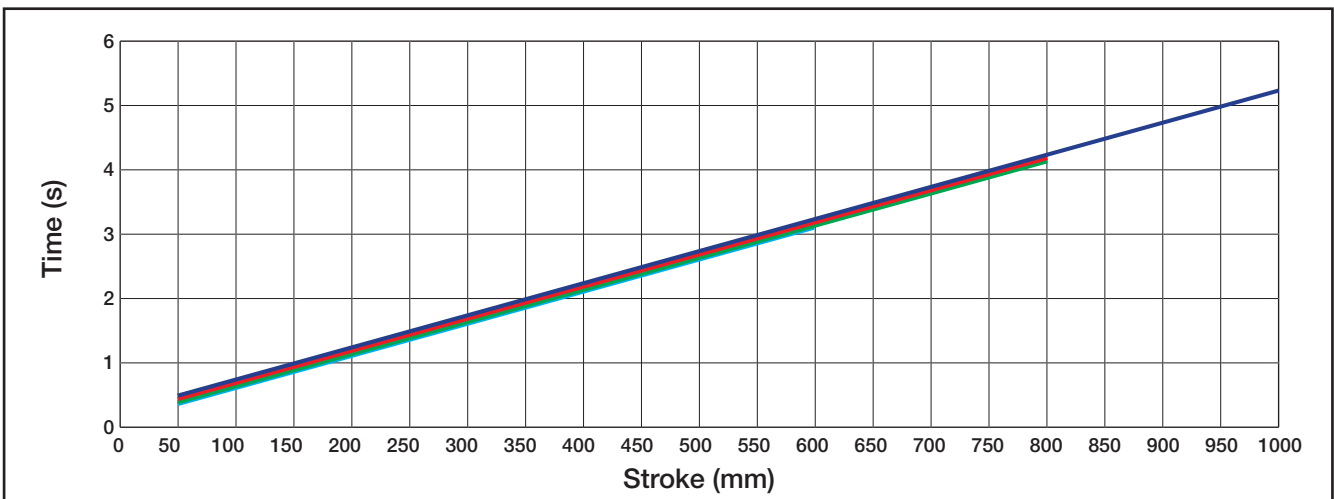
## Speed 800mm/s



## Speed 400mm/s




## Speed 200mm/s



# Information on special orders

If you don't find your desired product in this catalog, feel free to contact us, as we are able to fill special orders. Some typical special orders are shown below for your reference.

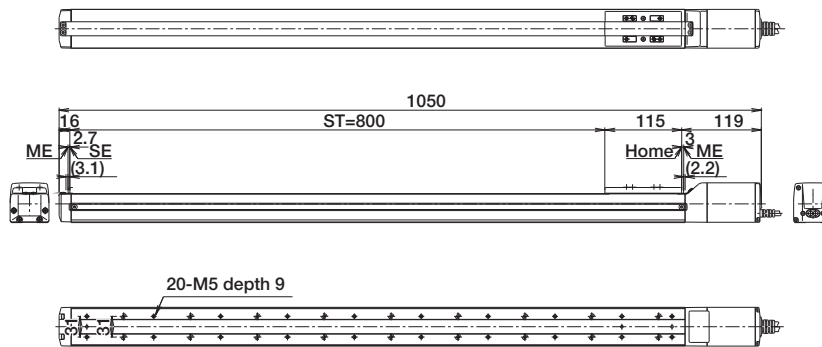
 **Caution:**

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Special order is not always available for all the models. Please feel free to contact us for details.

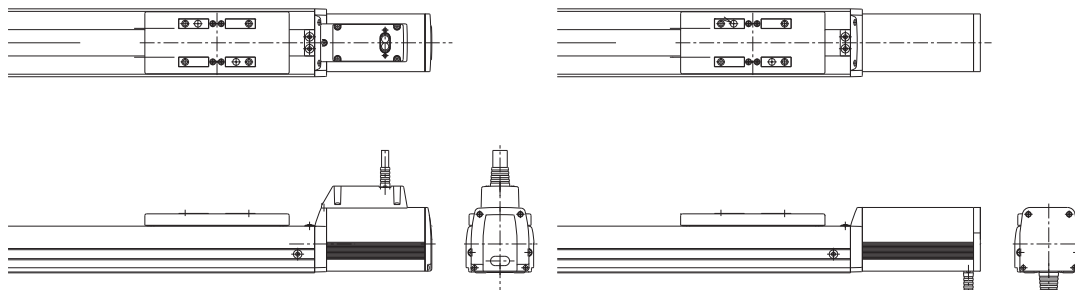
**Special Stroke**

Ex.) RCP2-SA6 800 Stroke (Non-standard stroke)



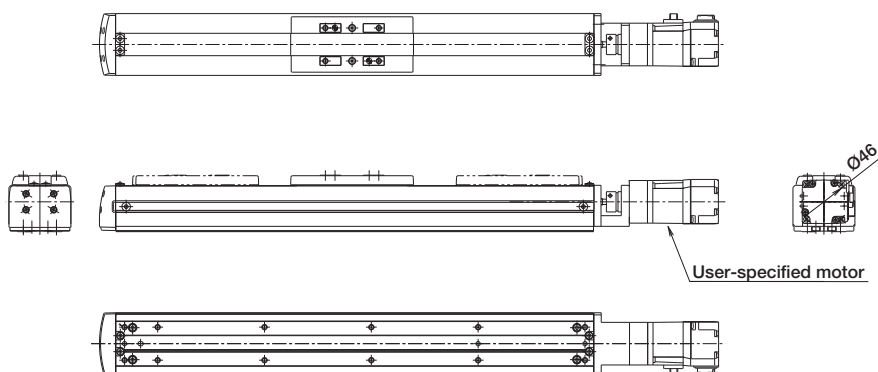
**Cable Outlet Directional Changes**

Ex.) Actuator cable outlet top/bottom



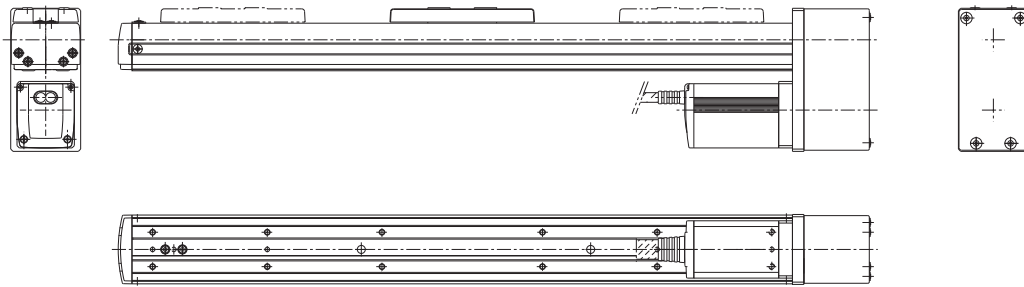
**Special Motor**

Ex.) Mount Customer-Specified Motor Specification



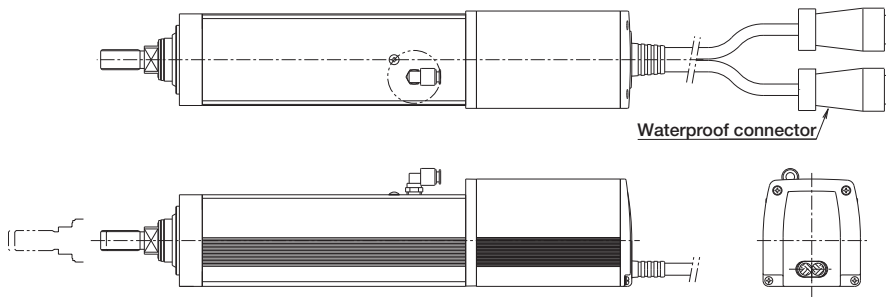
Side-Mount Motor Orientation

Ex.) Side-Mount Motor to the Bottom



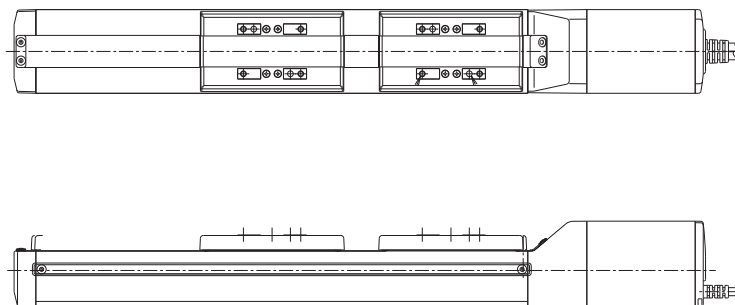
Special Connector

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.

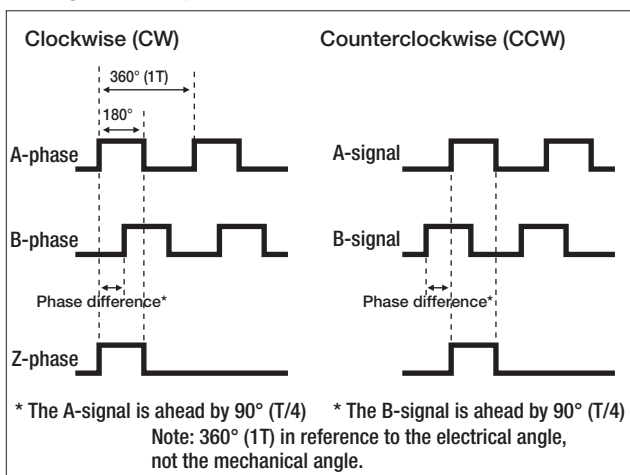
## 50km service life

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

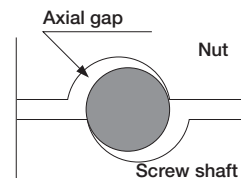


## Absolute positioning accuracy

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



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 resonance 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

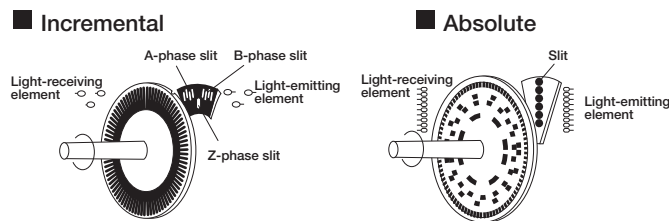
Indicates the work ratio in the equipment industry. (e.g. The time that the actuator operates in one cycle.)

## 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.



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/sx20mm/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.

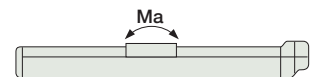
The accuracy required to meet the C10 standard is to be within a margin of error of  $\pm 0.21\text{mm}$  for every 300mm of length. Generally the screw pitch error deviation accumulates in a plus or minus direction. One method of improving these items is to grind them in a finishing process.

[e.g.] When positioning 300mm from home:

The machine accepts a set position of  $300 \pm 0.21$ . Supposing that the actual stop position is 300.21, if this position is repeatable and maintained at  $300.21 \pm 0.02$  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  $M_a$ )



## PLC

Abbreviation for Programmable Logic Controller.

(Also referred to as sequencers or programmable controllers).

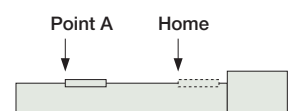
These are controllers that can be programmed to control production facilities and equipment.

## 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

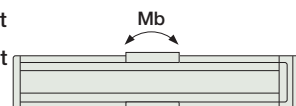
The load exerted in the axial direction.

### 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

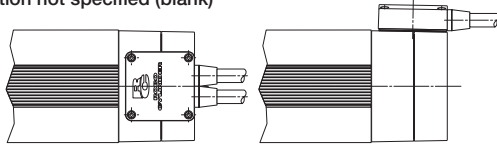
### Models A1, A2, and A3

**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.

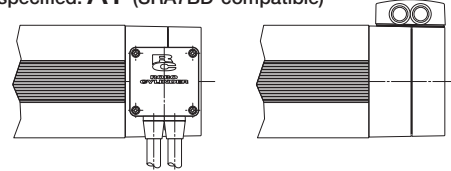
#### Actuator cable taken out from motor side (standard)

Option not specified (blank)



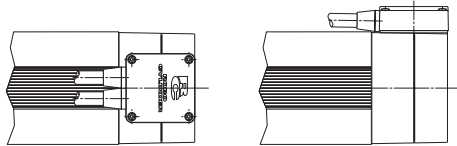
#### Actuator cable taken out from left

Option specified: **A1** (SRA7BD-compatible)



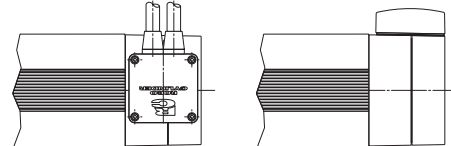
#### Actuator cable taken out from rod side

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□, RP□, GS□, GD□, SD□ and RCA / RCS2 built-in types)  
 All table-type models (excluding TCA□, TWA□ and TFA□)  
 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.

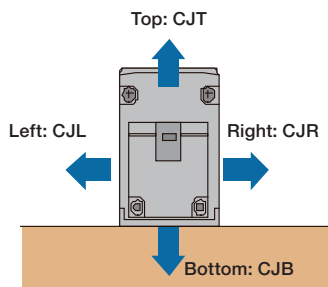
## Cable exit direction

### Models CJT, CJR, CJL, CJB and CJO

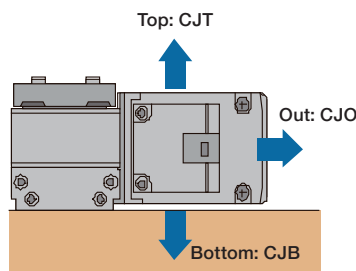
**Applicable models** RCP3 (RCA2)-SA3C / SA4C / SA5C / SA6C / SA3R / SA4R / SA5R / SA6R  
 RCP3 (RCA2)-TA4C / TA5C / TA6C / TA7C / TA4R / TA5R / TA6R / TA7R

**Description**

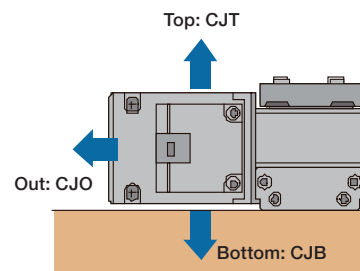
The direction of the motor-encoder cable mounted on the actuator can be changed vertically or horizontally.



Straight Type



Side-Mounted Motor Type  
Mounted on left side (ML)



Side-Mounted Motor Type  
Mounted on right side (MR)

# 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.

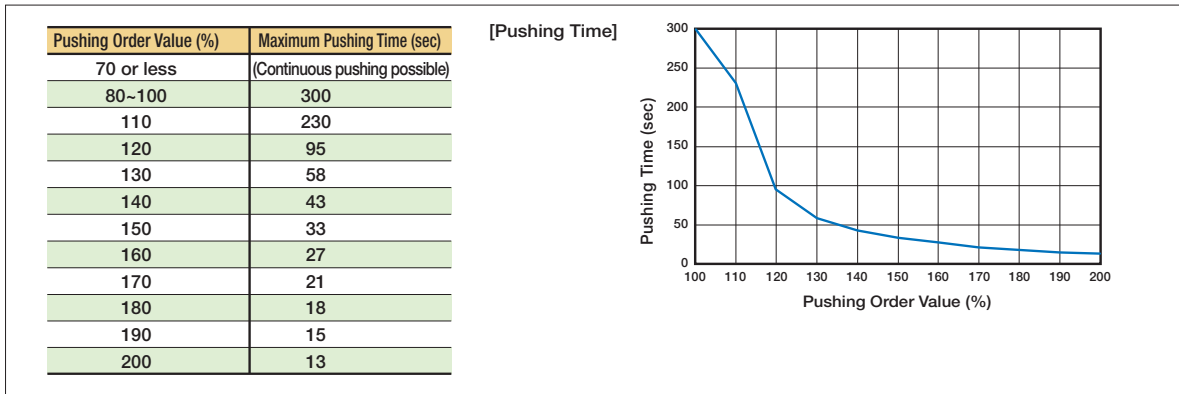
### Selection Method

#### 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.

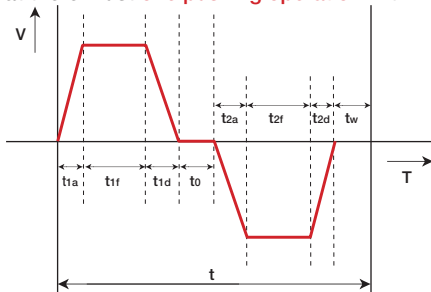
Table 1



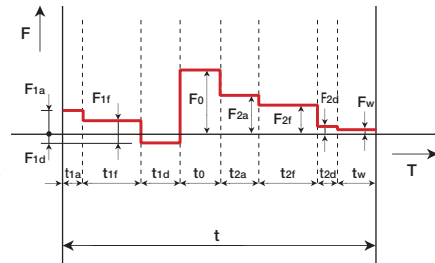
#### Condition 2. Continuous Operation Thrust

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 be **one pushing operation** within one cycle.



Re-plot this using the thrust values as the vertical axis



- t : Operation duration per cycle (s)
- t<sub>1a</sub> : Acceleration duration1
- t<sub>1f</sub> : Constant speed duration1
- t<sub>1d</sub> : Deceleration duration1
- t<sub>0</sub> : Pushing duration
- t<sub>2a</sub> : Acceleration duration2
- t<sub>2f</sub> : Constant speed duration2
- t<sub>2d</sub> : Deceleration duration2
- t<sub>w</sub> : Waiting duration

- F<sub>1a</sub> : Thrust1 needed for acceleration
- F<sub>1f</sub> : Thrust1 needed for motion at constant speed
- F<sub>1d</sub> : Thrust1 needed for deceleration
- F<sub>0</sub> : Thrust needed for pushing
- F<sub>2a</sub> : Thrust2 needed for acceleration
- F<sub>2f</sub> : Thrust2 needed for motion at constant speed
- F<sub>2d</sub> : Thrust2 needed for deceleration
- F<sub>w</sub> : Thrust needed for waiting

Use the equation below to calculate the continuous operation thrust Ft for one cycle.

$$F_t = \sqrt{\frac{F_{1a}^2 \times t_{1a} + F_{1f}^2 \times t_{1f} + F_{1d}^2 \times t_{1d} + F_0^2 \times t_0 + F_{2a}^2 \times t_{2a} + F_{2f}^2 \times t_{2f} + F_{2d}^2 \times t_{2d} + F_w^2 \times t_w}{t}}$$

\* For horizontal use, it is not necessary to calculate the thrust needed for constant speed motion and for waiting.

● Since F<sub>1a</sub>/F<sub>2a</sub>/F<sub>1d</sub>/F<sub>2d</sub> will change with the direction of motion, use the equations below.

- Horizontal use (for both accel./decel.) F<sub>1a</sub> = F<sub>1d</sub> = F<sub>2a</sub> = F<sub>2d</sub> = (M+m) × d
- Vertical use, downward acceleration F<sub>1a</sub> = (M+m) × 9.8 - (M+m) × d
- Vertical use, constant downward speed F<sub>1f</sub> = (M+m) × 9.8 + α(\*1)
- Vertical use, downward deceleration F<sub>1d</sub> = (M+m) × 9.8 + (M+m) × d
- Vertical use, upward acceleration F<sub>2a</sub> = (M+m) × 9.8 + (M+m) × d
- Vertical use, constant upward motion F<sub>2f</sub> = (M+m) × 9.8 + α(\*1)
- Vertical use, upward deceleration F<sub>2d</sub> = (M+m) × 9.8 - (M+m) × d
- Vertical use, waiting F<sub>w</sub> = (M+m) × 9.8

- M : Moveable weight (kg)
- m : Loaded weight (kg)
- d : Accel./decel. (m/s<sup>2</sup>)
- 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  $t_{\square a}$ , which is the acceleration duration, will vary for ① trapezoidal pattern vs. ② triangular pattern 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

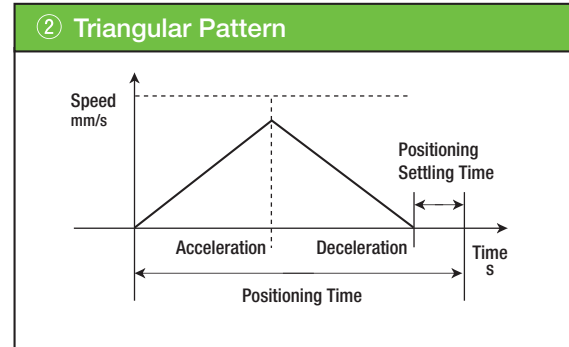
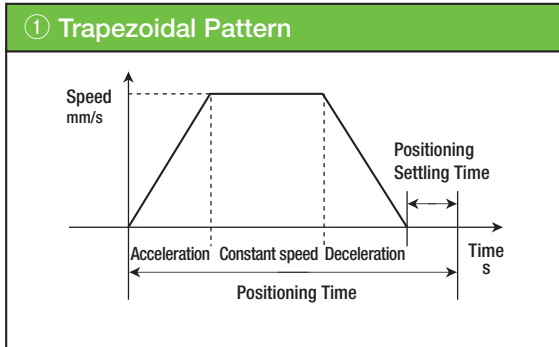
Set Speed > Peak Speed → ② Triangular Pattern

① For trapezoidal pattern,

$t_{\square a} = V_s/a$   $V_s$  : Set speed (m/s)  $a$  : Ordered acceleration (m/s<sup>2</sup>)

② For triangular pattern

$t_{\square a} = V_t/a$   $V_t$  : Peak speed (m/s)  $a$  : Ordered acceleration (m/s<sup>2</sup>)



- $t_{\square f}$  is the time taken to move at constant speed. You can calculate this time by computing the distance moved at constant speed.  $t_{\square f} = L_c/V$   $L_c$  : 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 =  $V^2/2a$

- $t_{\square d}$  is the deceleration time. This is the same as the acceleration time, if the magnitude of acceleration and deceleration are the same.  $t_{\square d} = V/a$   $V$  : Set speed (trapezoidal pattern) or Peak speed (triangular pattern)(m/s)  $a$  : Commanded deceleration (m/s<sup>2</sup>)

If the continuous operation thrust  $F_t$  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.

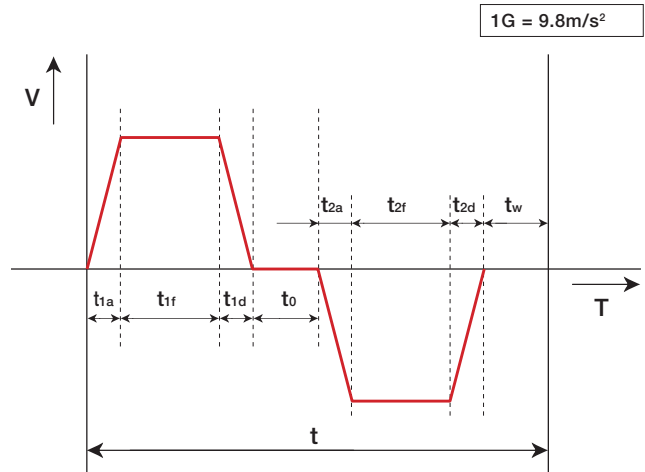
### Sample Problem

- 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/s<sup>2</sup> (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.





# 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) =  $\sqrt{0.05 \times 0.098} \rightarrow 0.07\text{m/s}$ , which is greater than the set speed, 62mm/s (0.06m/s). Hence this is a trapezoidal pattern.

Hence,  $t_{1a}/t_{1d}/t_{2a}/t_{2d} = 0.062 \div 0.098 \rightarrow 0.63\text{s}$

Next, calculate t1f/t2f:

Distance moved at constant speed =  $0.05 - \{(0.062 \times 0.062) \div (2 \times 0.098)\} \times 2 \rightarrow 0.011\text{m}$ , so  $t_{1f}/t_{2f} = 0.011 \div 0.062 \rightarrow 0.17\text{s}$ .

Also, calculating the F1a/F1f/F1d/F2a/F2f/F2d from the equations yields the following:

$$F_{1a} = F_{2d} = (9+100) \times 9.8 - (9+100) \times 0.098 \rightarrow 1058\text{N}$$

$$F_{1d} = F_{2a} = (9+100) \times 9.8 + (9+100) \times 0.098 \rightarrow 1079\text{N}$$

$$F_{1f} = F_{2f} = f_w = (9+100) \times 9.8 \rightarrow 1068\text{N}$$

By substituting these values to the continuous operation thrust equation,

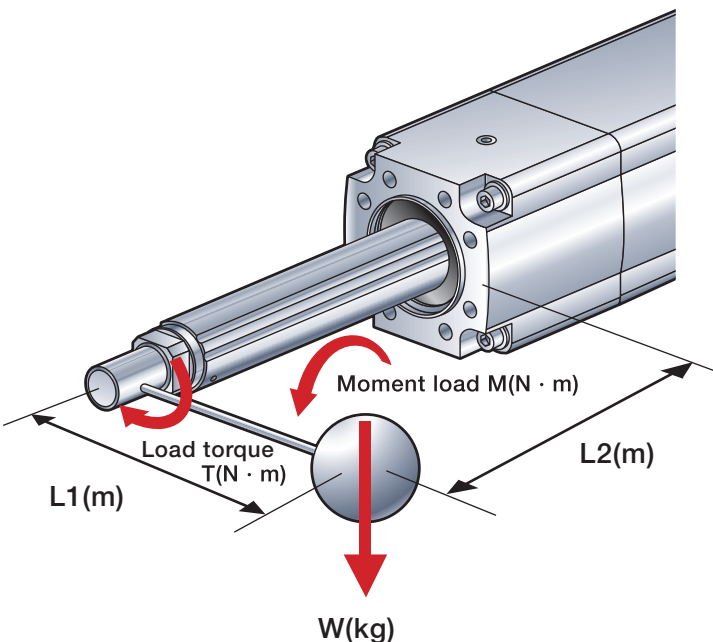
$$F_t = \sqrt{\frac{\{(1058 \times 1058) \times 0.63 + (1068 \times 1068) \times 0.17 + (1079 \times 1079) \times 0.63 + (19600 \times 19600) \times 3 + (1079 \times 1079) \times 0.63 + (1068 \times 1068) \times 0.17 + (1058 \times 1058) \times 0.63 + (1068 \times 1068) \times 2\}}{(0.63 + 0.17 + 0.63 + 3 + 0.63 + 0.17 + 0.63 + 2)}} \rightarrow 12113\text{N}$$

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 Fi=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.

$$M+T \leq 120 \text{ (N} \cdot \text{m)}$$

$$\text{Moment Load } M = Wg \times L_2$$

$$\text{Load Torque } T = Wg \times L_1$$

\* 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.