

SCON2

Position controllers for
Single-Axis/Cartesian Robots/Linear Servo/Robo Cylinder RCS2/RCS3/RCS4

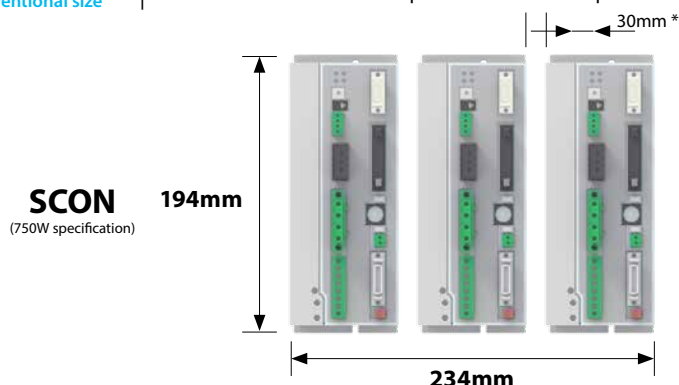


Sizes

Connectable to actuators equipped with a 200V servo motor of 60W to 750W. Because of the built-in fan, they can be installed with only 1mm gap, virtually no clearance, thus greatly saving the installation area for the controllers.

Comparison with the conventional size

Controller size of the 750W specification and comparison with conventional ones (in the case of three controllers installed)



* The minimum required distance for controllers to cool down naturally.

Installation area

45,396mm²

Reduced by
57%

Installation area

19,200mm²

Specifications

Setting for force-controlled push motion

It is now possible to input push force in N increments at the force-controlled push motions in the positioner mode.

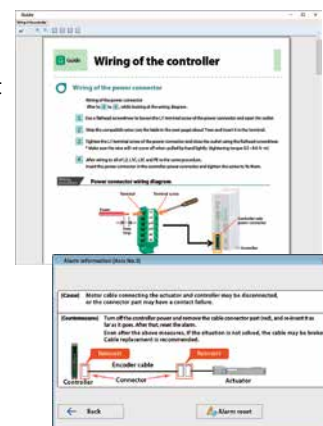
* For the current-controlled push motions, it can input in % only.

| Position data edit [Axis No.0 SCON2-CG] < >(COM2) | | | | | | |
|---|---------------|--------------|------------------|------------------|------------------------------|----------------------------|
| <div> <div>Update</div> <div>Save</div> <div>Transfer</div> <div>Print</div> <div>TEST</div> <div>Trial test</div> </div> | | | | | | |
| Select edit support function display Toggle display | | | | | | |
| No. | Position [mm] | Speed [mm/s] | Acceleration [G] | Deceleration [G] | Motion type (Push force [N]) | Load current threshold [N] |
| 0 | 0.00 | 100.00 | 0.30 | 0.30 | Push (6000N) | 0 |
| 1 | 50.00 | 100.00 | 0.30 | 0.30 | Push (6000N) | 0 |
| 2 | 100.00 | 100.00 | 0.30 | 0.30 | Push (6000N) | 0 |
| 3 | | | | | | |

PC teaching software [IA-OS]

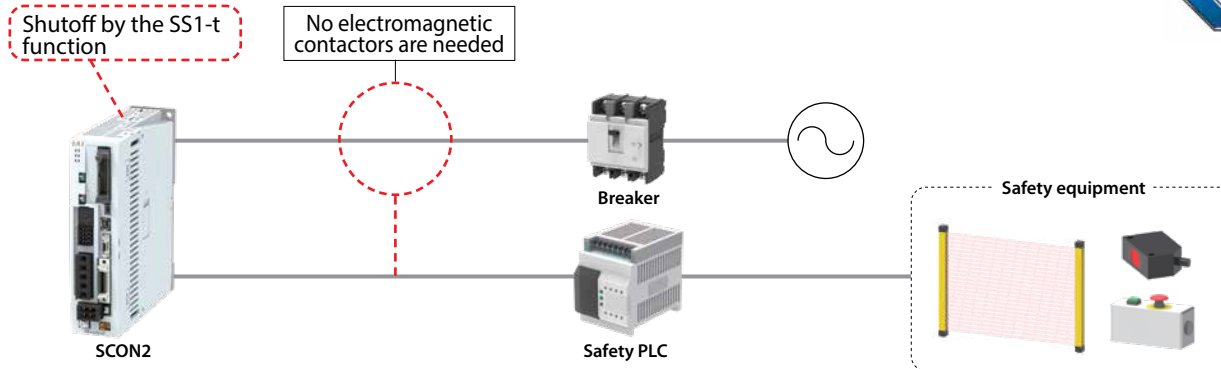
The IA-OS support from start up to troubleshooting. It is possible to connect to a PC using a commercially available USB cable.

- Wiring procedure
- Operating method of peripheral equipment
- Operating method of actuators
- Calculation of the cycle time
- Press programs
- Troubleshooting, etc.



Supporting the Safe Function

The SCON2 controller is equipped standard with the SS1-t function. Electromagnetic contactors are not needed, contributing to reduced installation space and longer equipment life.

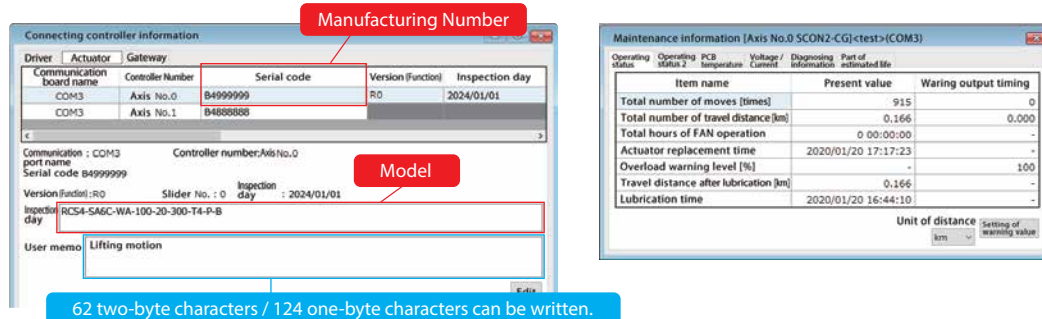


Maintenance

Actuator identifying function

Actuator information can now be identified by the teaching tool. There is a free space for the customer to write memos about the actuator.

* The actuators whose information can be fetched are those equipped with a battery-less absolute encoder, and IAI actuators whose manufacturing number starts with B4.

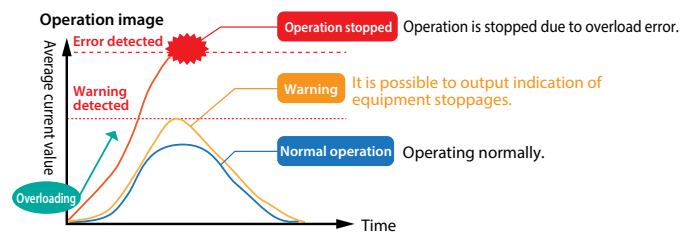


62 two-byte characters / 124 one-byte characters can be written.

Preventive maintenance (motor overload warning)

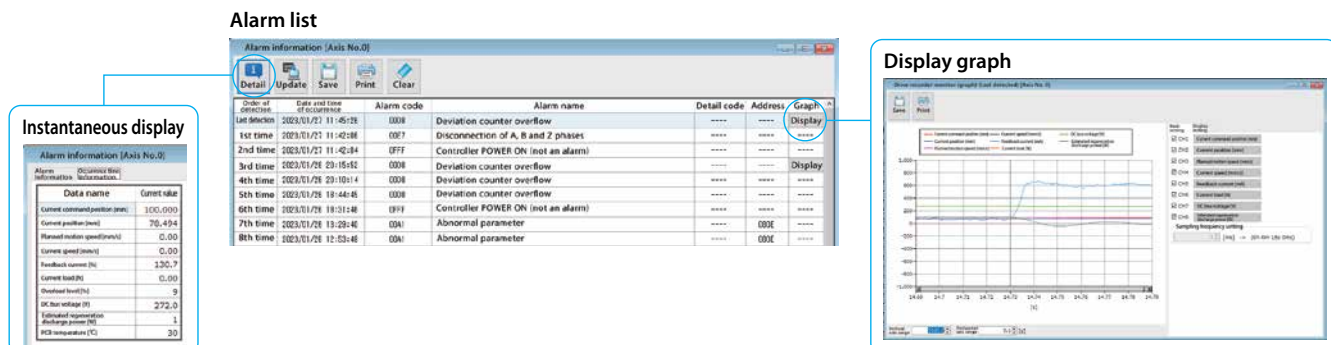
The controller is equipped with functions for monitoring the motor temperature changes and detecting motor overload for issuing a warning.

Carrying out maintenance after warning helps to prevent failures and troubles in advance.



Drive recorder function

Actuator movements can be recorded at the time of alarm, contributing to troubleshooting and quick recovery from the trouble.



Introduction of Field Network Functions

The SCON2 controllers support major field networks

CC-Link

CC-Link IE Field


MECHATROLINK

DeviceNet™

EtherNet/IP™

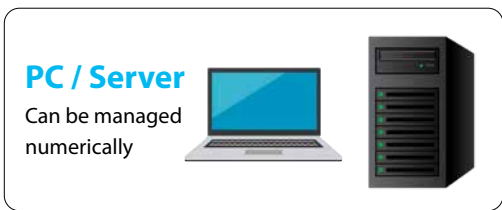
EtherCAT®

PROFINET®

Structure of network configuration

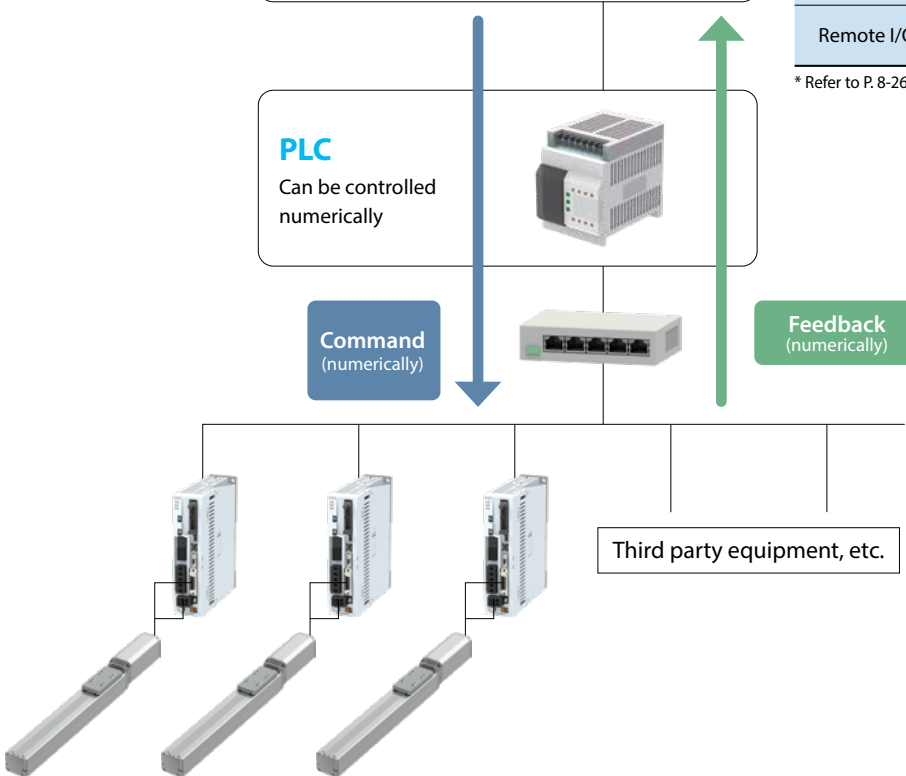
Network control

- Simple wiring.
- Numerical management and numerical control are possible.
- I/O control is also possible.



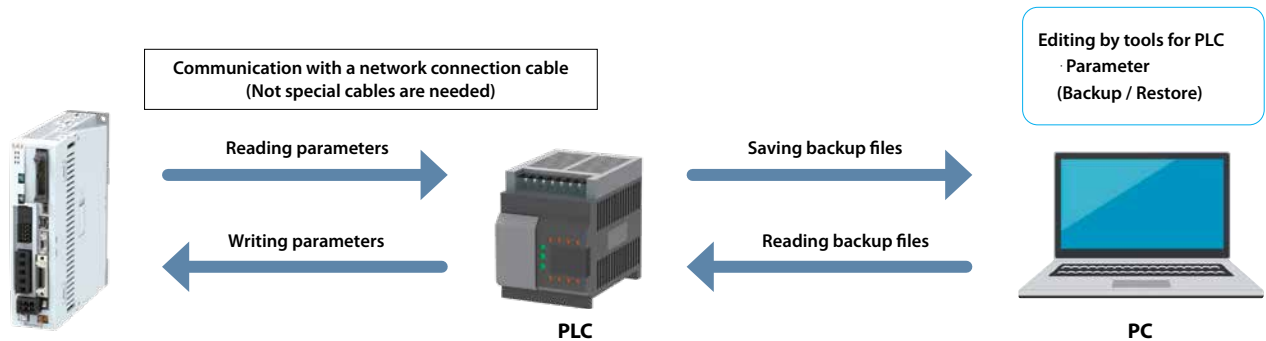
| Operating mode | Features |
|------------------------|--|
| Direct numeric command | Command for position, speed and acceleration/deceleration is numerically specified from the PLC. |
| Simple direct value | Only the positions are commanded numerically from the PLC. |
| Remote I/O | Controlled by ON/OFF signals like the PIO specification. |

* Refer to P. 8-266 for the detail of operating mode.



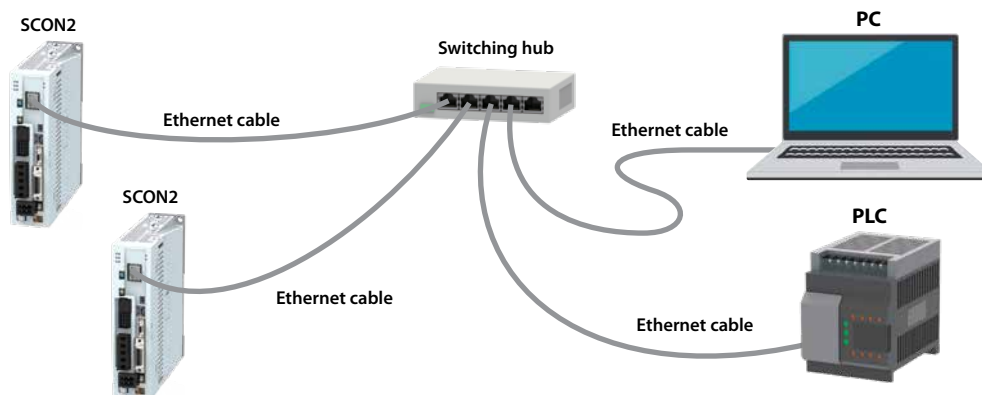
Controller Data Backup

Parameter backup and restore are possible via field network without using special cables or software. It enables easy management in common with different devices from other manufacturers.



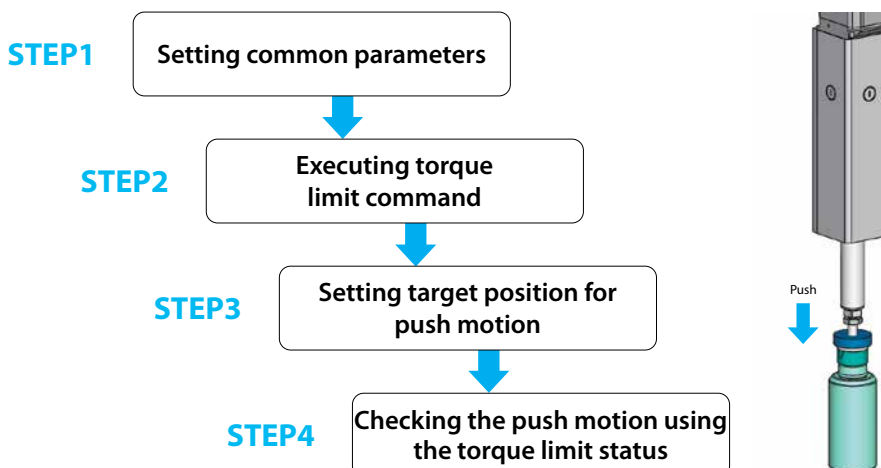
Modbus TCP Communication

Communication with the PC teaching software, IA-OS is possible via the field network communication port. Special cables are not necessary and the cable can be plugged/unplugged, making the maintenance easier.



Push control by motion

It is possible to control the "Push Motion" that was difficult by motion control.



Model Specification Items

Controller

<SCON2 controller>

SCON2 - CG - S - - - - -

Series Type Motor type Hardware options Optional functions I/O type I/O cable length Power voltage Absolute battery

CG

Safety category compliant type

S

200V servo

(Blank)

No option

C

With multi-function connector *1

(Blank)

No option

F

Press program *2

M

Motion *3

NP

PIO (NPN)

PN

PIO (PNP)

DV

DeviceNet

CC

CC-Link

CIE

CC-Link IE Field

ML3

MECHATROLINK-III *4

EC

EtherCAT ※4EtherCAT *4

EP

EtherNet/IP

PRT

PROFINET IO

RC

RCON/RSEL

0

No cable

2

2m (standard)

3

3m

5

5m

1

Single-phase AC100V

2

Single-phase AC200V

(Blank)

No absolute battery

AB

With absolute battery

* Select "C" when a pulse-train control mode is used.

*1 Cannot be selected for optional function "M" and I/O type "RC."

*2 Cannot be selected for I/O type "RC."

*3 Can be selected for either I/O type "ML3" or "EC."

* When the optional function is "blank" or the press program "F" is selected, it becomes remote I/O specification. When the motion "M" is selected, it becomes motion specification.

* When the field network specification is selected, the I/O cable length becomes 0 (zero).

* The selectable power voltage varies depending on the actuator motor wattage.

* When connecting an absolute specification actuator, select "AB."

*2 Cannot be selected for I/O type "RC."

*3 Can be selected for either I/O type "ML3" or "EC."

* When the optional function is "blank" or the press program "F" is selected, it becomes remote I/O specification. When the motion "M" is selected, it becomes motion specification.

* When the field network specification is selected, the I/O cable length becomes 0 (zero).

* The selectable power voltage varies depending on the actuator motor wattage.

* When connecting an absolute specification actuator, select "AB."

Models not shown here

Model selection

RCON

RSEL

REC

RSEL (Cartesian 6-axis)

RCP6S

PCON -CB/CFB

PCON -CBP (Pulse press)

PCON

ACON-CB DCON-CB

ACON DCON

SCON2

SCON -CB

SCON -CB (Servo press)

SSEL

MSEL

XSEL -RA/SA

XSEL -P/Q

XSEL (SCARA)








PSA-24

TB -03/02

Software

Product list

■ SCON2 Controller

| Model / Type | | | SCON2-CG | | | | | | | | | |
|--------------------|----|---------------------------|------------------------|-------------------|---|---|---|---|---|---|---|-----------|
| I/O type | | | Standard specification | | Filed network type | | | | | | | |
| | | | PIO connection | |  |  |  |  |  |  |  | RCON/RSEL |
| | | | NPN specification | PNP specification | Device Net | CC-Link | CC-Link IE Field | MECHATRO LINK-III | EtherCAT® | EtherNet/IP | PROFINET IO | |
| I/O type name | | | NP | PN | DV | CC | CIE | ML3 | EC | EP | PRT | RC |
| Hardware options | C | (with function connector) | — | | | | | | | | | — |
| Optional functions | F | (press program) | — | | | | | | | | | — |
| | M | (Motion) | — | — | — | — | — | — | — | — | — | — |
| Absolute battery | AB | (with battery) | — | | | | | | | | | |

Connection limitations

● The following actuators cannot be connected to SCON2.

- Actuators with the motor wattage less than 60W, or greater than 750W.
- Rotating axis index mode of the motion network specification (ML3 and EC).
- ZR

● There are limitations on the power voltage of connecting actuators and controllers.

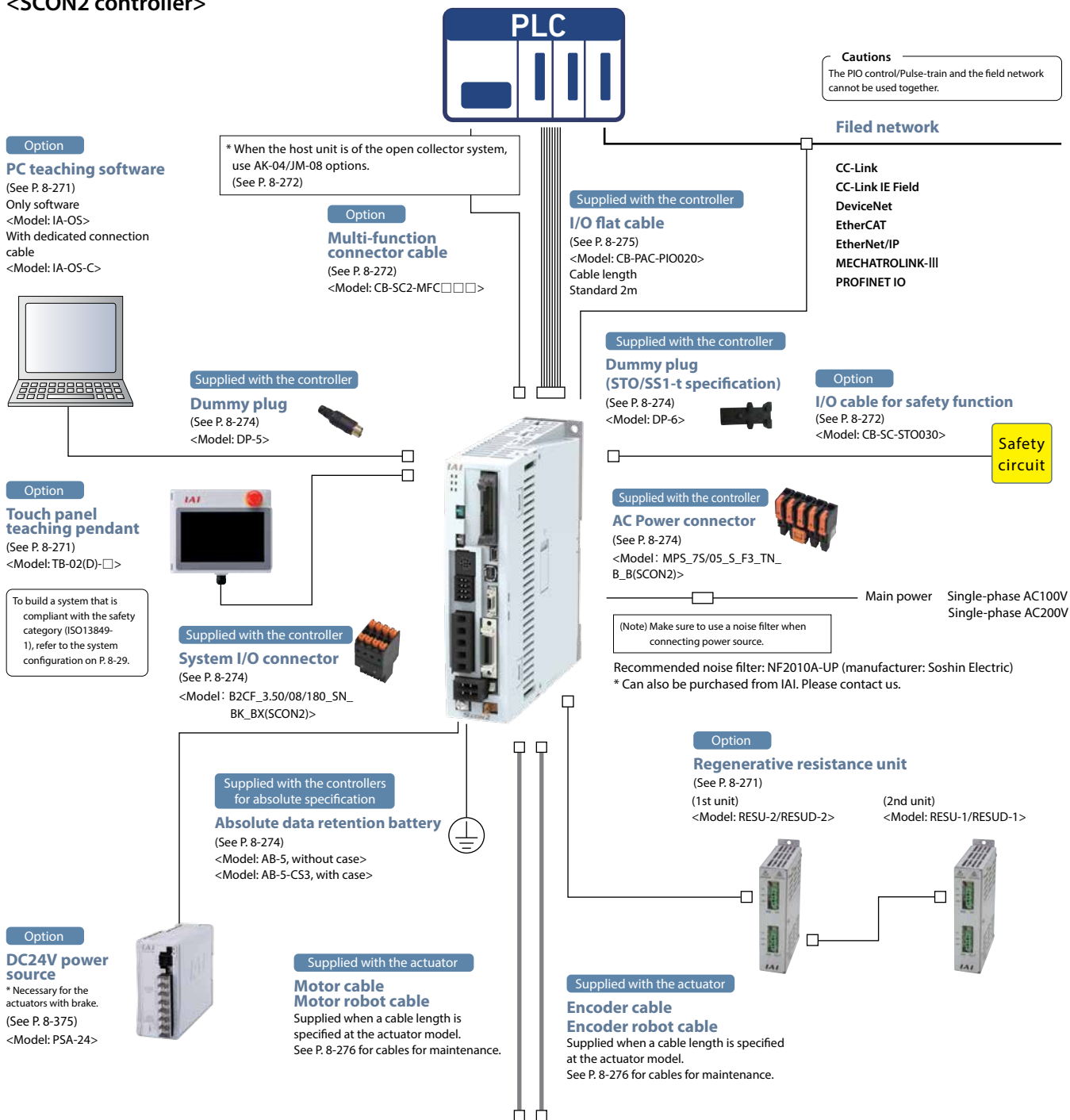
Select controllers of connectable power voltage from the table below.

| Actuator motor wattage | Power voltage | |
|---|---------------------|---------------------|
| | Single-phase AC100V | Single-phase AC200V |
| 30W * 60W~200W | ○ | ○ |
| 100W (LSA/LSAS) 200W (DD/DDA/LSA/LSAS) | × | ○ |
| 300W~750W | × | ○ |

* Only the following model can be connected.

- RS (30W motor)

<SCON2 controller>



Connectable actuators



* Refer to P. 8-260 for the wiring diagrams of RCS2-RA13R and DDA with brake specification.

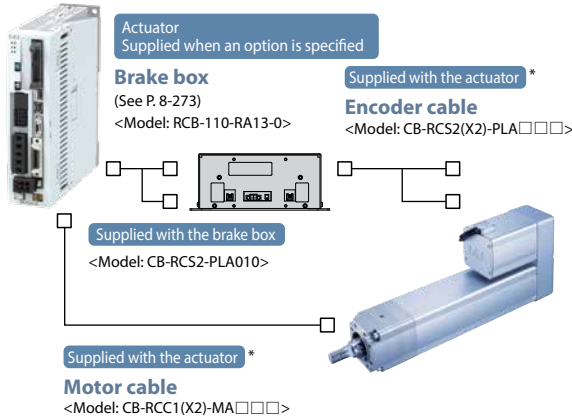
[Caution] The SCON2 is not equipped with the relay that automatically detects the teaching tool attached and switches the circuit. Connect the dummy plug (DP-5) if a teaching tool is not attached.

System Configuration

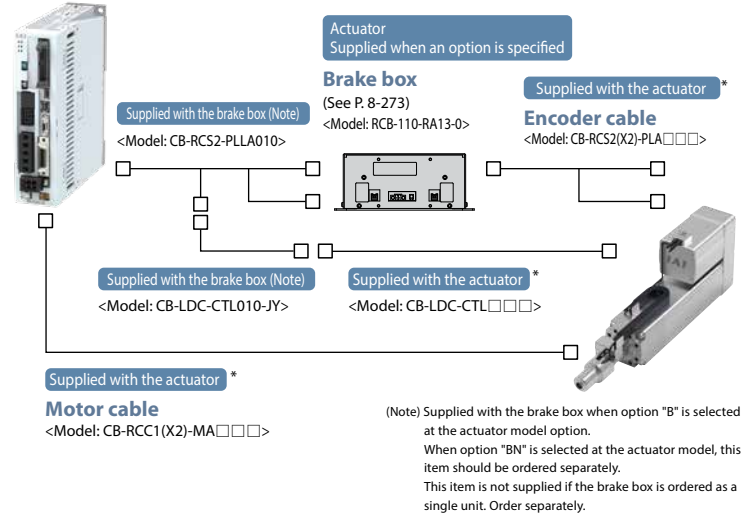
<Connection of SCON2 controller and RCS2-RA13R (with brake)>

* Supplied when a cable length is specified at the actuator model.
Refer to P. 8-276 for maintenance cables.

(In the case of actuators without a load cell)

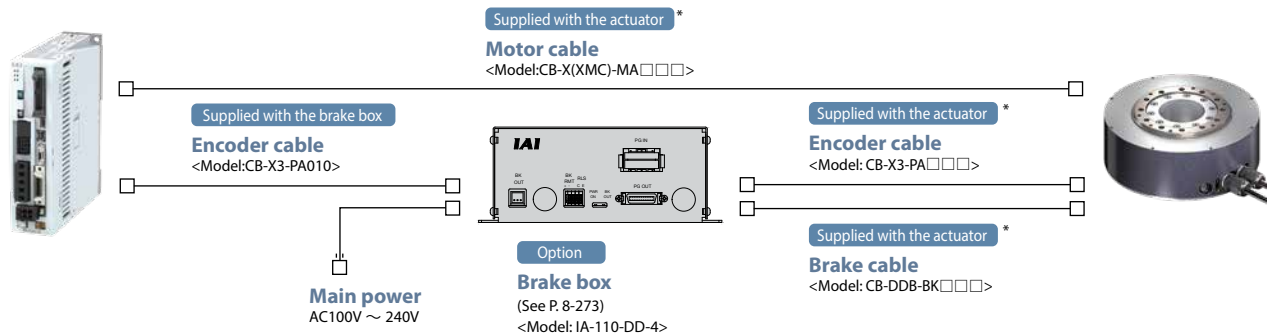


(In the case of actuators with a load cell)



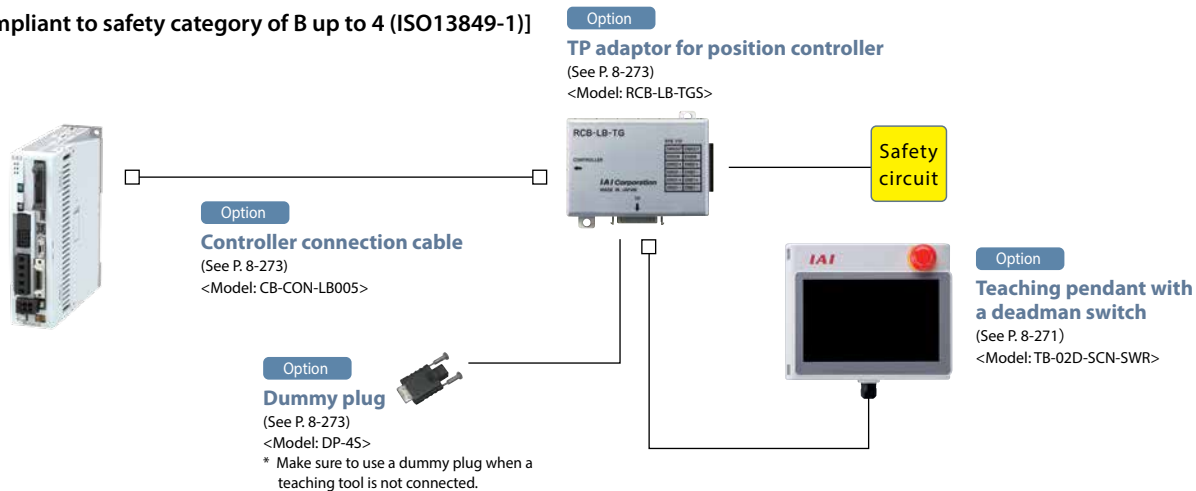
<Connection of SCON2 controller and DDA (brake specification)>

* Supplied when a cable length is specified at the actuator model.
See P. 8-276 for cables for maintenance.



<Connection diagram for safety category-compliance>

[Compliant to safety category of B up to 4 (ISO13849-1)]



Basic Specifications

<SCON2 controller>

| Item | | | SCON2 |
|--|-----------------------------|-----------------------|--|
| Applicable motor capacity | | | 60W～750W |
| Power voltage | | | Single-phase AC100-115V Single-phase AC200-230V (Power voltage fluctuation ±10% or less) |
| Rush current | Power voltage AC100V | | Control side: 30A (up to 25℃), 70A (up to 60℃) (Note 1) Driving side: 30A (up to 25℃), 80A (up to 60℃) (Note 1) |
| | Power voltage AC200V | | Control side: 30A (up to 25℃), 60A (up to 60℃) (Note 1) Driving side: 30A (up to 25℃), 70A (up to 60℃) (Note 1) |
| Leak current (Note 2) (Primary side when a noise filter is installed on the power line) | | | 3.5mA |
| Load capacity, heat quantity | | | Refer to [Power capacity / Heat quantity] |
| PIO power (Note 3) | | | DC24V±10% |
| Power for electromagnetic brakes (In the case of actuators with a brake) | | | DC24V±10% 1A (Maximum) (Supplied from external) |
| Supported encoders | | | Incremental (including ABZ/Parallel) Absolute serial encoder Serial encoder quasi-absolute Battery-less absolute encoder |
| Series communication interface | | SIO connector | RS-485: 1CH Modbus protocol RTU/ASCII compliant, Speed :9.6 - 230.4Kbps |
| | | USB | Communication standard: USB 2.0, Speed: 12MHz, Connector: mini-B |
| External interface | PIO specification | | DC24V dedicated signal input/output (PNP/PNP selectable).... Input max. 16, output max. 16. |
| | Field network specification | | DeviceNet, CC-Link, CC-Link IE Field, MECHATROLINK-III, EtherCAT, EtherNet/IP, PROFINET IO |
| | Others | | RCON/RSEL connection specification |
| | Multi-function connector | Input pulse frequency | Differential system (line driver system): Max. 2.5Mpps Open collector system: Max. 200Kpps (when using the AK-04 option) Command pulse magnification (electronic gear: A/B) Setting range of A and B (set as parameter): 1 - 99999999 |
| | | Feedback pulse | Differential system (line driver system): Max. 2.5Mpps Open collector system: Max. 500Kpps (when using the JM-08 option) |
| | | Analog output | One output (load data) 4 - 20mA current output (±1%) Load resistance 10 - 600Ω |
| Data setting and input method | | | PC teaching software and teaching pendant |
| Data retention memory | | | Saving position data and parameters in a non-volatile memory (unlimited number of writing) |
| Operating mode | | | Positioner mode/Pulse-train control mode/Press program/Motion |
| Number of positions for positioner mode | | | Standard 64 points, Max. 384 points (PIO specification), 384 points (field network specification) (Note) The number of positioning points varies depending on the PIO pattern and the field network mode. |
| Insulation resistance (between secondary and FG) | | | DC500V, 10MΩ or higher (Note) Withstand voltage of the force-control load cell is DC50V. |
| Insulation withstand voltage (between primary and FG) | | | AC1500V for one minute |
| Operating ambient temperature | | | 0 - 60℃ |
| Operating ambient humidity | | | 5%RH - 85%RH (non-condensing, not frost) |
| Vibration resistance | | | Frequency 10-57Hz/Amplitude: 0.035mm (continuous), 0.075mm (intermittent) Frequency 57-150Hz/Acceleration: 4.9m/S ² (continuous), 9.8m/s ² (intermittent) XYZ direction sweepage time: 10 minutes, Number of sweepages: 10 times |
| Impact resistance | | | Motions: half sine-wave, Amplitude/time: 50m/s ² (5G)/30ms |
| Over voltage category | | | III |
| Mass | | | Approx. 800g |
| Cooling system | | | Forced-air cooling |

(Note 1) Beware that the rush current flows for approx. 20ms after the power is turned ON.

The rush current varies depending on the power line impedance and the rush current limiting circuit of the thermistor of internal elements.

(Note 2) The leak current varies depending on the motor capacity, cable length and ambient environment. Measure the leak current at the place where a leak current breaker is installed for protection.

The leak current breaker should be selected considering the prevention of fire and protection of humans. Use a leak current breaker of the high frequency type (for inverter).

(Note 3) Power for the PIO is not necessary if an SIO converter is used in place of an PIO. In such a case, set the parameter No. 74 "PIO power monitor" to "1" (disabled).

If this setting is not performed, an alarm 0CF "I/O 24V power abnormal" will occur.

Basic Specifications

Power capacity and Heat quantity

| Actuator motor wattage | Motor power capacity [VA] | Momentum maximum motor power capacity [VA] | Control power capacity [VA] | Rated power capacity [VA] | Momentum maximum power capacity [VA] | Heat quantity [W] |
|---------------------------------|---------------------------|--|-----------------------------|---------------------------|--------------------------------------|-------------------|
| 30R (for RS) | 138 | 414 | 48 | 186 | 462 | 33 |
| 60 | 138 | 414 | | 186 | 462 | 33 |
| 60 (RCS3-CTZ5) | 197 | 591 | | 245 | 639 | 32 |
| 100 | 234 | 702 | | 282 | 750 | 35 |
| 100S (LSA) | 283 | 851 | | 331 | 899 | 36 |
| 150 | 328 | 984 | | 376 | 1,032 | 37 |
| 200 | 421 | 1,263 | | 469 | 1,311 | 38 |
| 200 (DD) | 503 | 1,509 | | 551 | 1,557 | 36 |
| 200 (Other than LSA(S)-N15H) | 486 | 1,458 | | 534 | 1,506 | 38 |
| 200 (LSA(S)-N15H) | 773 | 2,319 | | 821 | 2,367 | 56 |
| 300 (LSA) | 662 | 1,986 | | 710 | 2,034 | 40 |
| 400 | 920 | 2,760 | | 968 | 2,808 | 45 |
| 400 (RCS3-CT8) | 1,230 | 3,690 | | 1,278 | 3,738 | 47 |
| 600 | 1,164 | 2,328 | | 1,212 | 2,376 | 56 |
| 600 (DD) | 1,462 | 4,386 | | 1,510 | 4,434 | 49 |
| 750 | 1,521 | 3,042 | | 1,569 | 3,090 | 58 |
| 750 (RCS2-RA13R with load cell) | | 4,563 | | | 4,611 | |

RS: Rotational axis LSA: Linear actuator DD: Direct drive motor

Selection of circuit breakers

The controller current flow is up to three times of the rated value at accelerating motions.

Select a circuit breaker that does not trip due to such peak current flow and the rush current.

Select the rated shutoff current such that the current will be shutoff without fail when short-circuit current flows.

$$\text{Rated shutoff current} > \text{Short-circuit current} = \text{Primary power capacity} \div \text{Power voltage}$$

Calculation method for selection

<Circuit breaker rated current value>

$$\text{Rated motor power capacity [VA]} + \text{Control power capacity [VA]} \div \text{AC input voltage} \times \text{Safety factor (guideline 1.2 - 1.4)}$$

Short-circuit breaker

The short-circuit breaker should be selected for the purpose of prevention of fire and protection of humans, etc.

The leak current varies depending on the motor capacity, cable length and ambient environment. Measure the leak current at the place where a leak current breaker is installed for protection.

Use a leak current breaker of the high frequency type.

Testing conditions at the time of acquiring the safety certification

The normal operation of the short-circuit breaker has been confirmed under the following conditions.

For the TN system

| Protective device | | | System voltage | Fault loop impedance |
|---|---------------|--|----------------------|----------------------|
| Model name | Rated current | Rated sensitivity current ($I_{\Delta n}$) | | |
| Fuji Electric Co., Ltd. EW32AAG-2P010B | 10A | 30mA | 100-115V 200-230V | Less than 3Ω |

For the TT system

| Protective device | | | System voltage | Fault loop impedance |
|---|---------------|--|----------------------|----------------------|
| Model name | Rated current | Rated sensitivity current ($I_{\Delta n}$) | | |
| Fuji Electric Co., Ltd. EW32AAG-2P010B | 10A | 30mA | 100-115V 200-230V | Less than 100Ω |

Control system

The control system of the SCON2 controller can be selected from six specifications.

| No. | Specifications | Controller specifications | Description | Reference page |
|-----|--|---|--|----------------|
| ① | Positioner specifications | Specifications other than 3 - 6 | • Position data numbers are designated externally • Motion commands by direct value | 8-263 |
| ② | Pulse-train control specifications | I/O type: NP and PN Hardware option: C | • Control by pulse input | |
| ③ | Press program | Optional function: F | • Control by press programs | 8-267 |
| ④ | Field network (Remote I/O specification) | I/O type: other than 2 and 6 Optional function: None | • Control by remote I/O specification (ML3 supports "Standard I/O profile") | 8-266/8-268 |
| ⑤ | Field networks (Motion specification) | I/O type: ML3, EC Optional function: M | • Control by motion network (ML3 supports "Standard servo profile.") (EC supports "EtherCAT CiA402 Drive Profile.") | — |
| ⑥ | RCON/RSEL connection specification | I/O type: RC | • Connection to R-unit (RCON/RSEL) • Control by field network of RCON/RSEL specification (Refer to "R-unit" for details) | — |

Operation mode * Positioner/Pulse-train

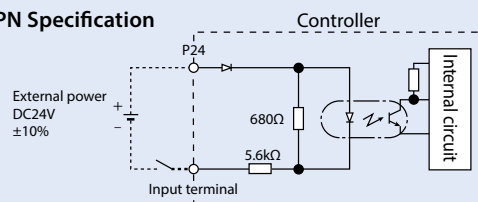
| Mode | | PIO pattern | Number of positioning points | Features |
|------------------------------------|--|-------------|------------------------------|--|
| Positioner mode | Positioning mode | 0 | 64 points | Standard mode as the default factory setting It operates by the number of the position to be moved. |
| | Teach mode | 1 | 64 points | This mode enables the slider (rod) to move by external signals and the stop positions to register as position data. |
| | 256-point mode | 2 | 256 points | The positioning points of this mode have been expanded to 256 points. |
| | 384-point mode | 3 | 384 points | The positioning points of this mode have been expanded to 384 points. |
| | Solenoid valve mode 1 | 4 | 7 points | This mode enables the actuator to move by ON/OFF signals only, which is the same as the solenoid valve of air cylinders. |
| | Solenoid valve mode 2 | 5 | 3 points | The output signals of this mode is the same as the auto switch of an air cylinder at the solenoid valve mode. |
| | Force control mode 1 | 6 | 32 points | This mode enables position movements by positioning mode for the force control. (Maximum number of positioning points is 32) |
| | Force control mode 2 | 7 | 5 points | This mode enables position movements by the solenoid valve mode for the force control. (Maximum number of positioning points is 5) |
| Pulse-train control specifications | Pulse-train control mode for incremental | 0 | — | Data input of position data to the controller is not needed. Operates according to the transmitted pulses. |
| | Pulse-train control mode for absolute | 1 | | |

PIO input/output interface

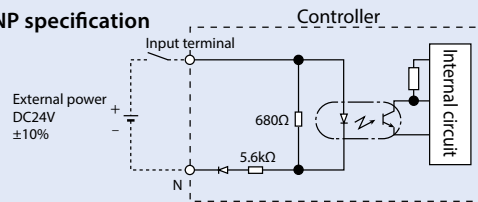
Input part External input specification

| Item | Specification |
|-------------------|--|
| Input voltage | DC24V $\pm 10\%$ |
| Input current | 4mA/1 circuit |
| ON/OFF voltage | ON voltage: Minimum DC18.0V OFF voltage: Maximum DC6.0V |
| Insulation system | Photocoupler |

NPN Specification



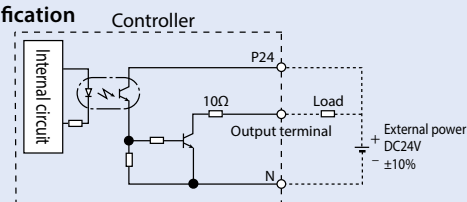
PNP specification



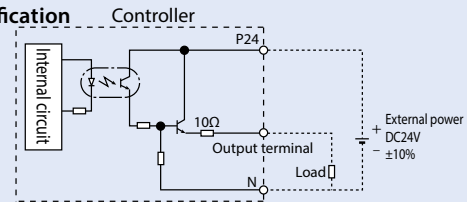
Output part External output specification

| Item | Specification |
|----------------------|--------------------|
| Load voltage | DC24V |
| Maximum load current | 50mA / point |
| Lead current | Max. 0.1mA / point |
| Insulation system | Photocoupler |

NPN Specification



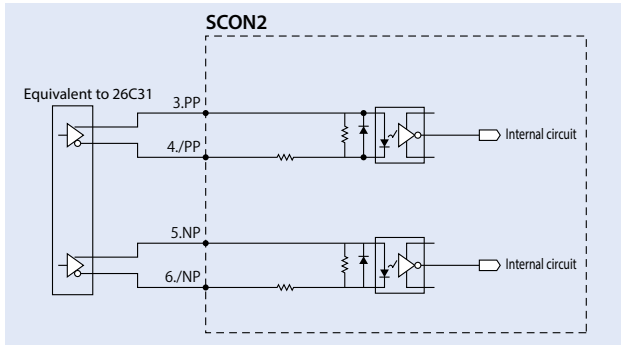
PNP specification



Pulse-train type input/output specification (differential line driver specification)

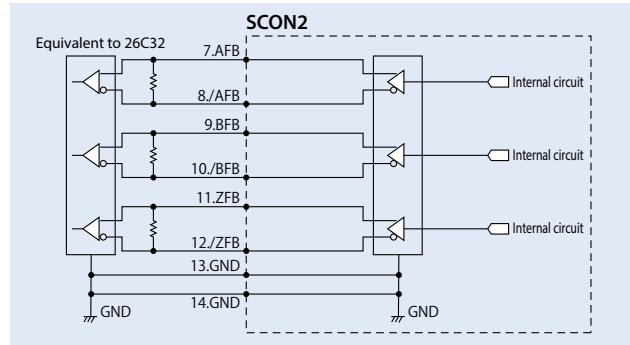
Input part

Maximum number of input pulses: line driver interface 2.5Mpps
Insulation system: Photocoupler insulation



Output part

Maximum number of output pulses : line driver interface 2.5Mpps
Insulation/Non-insulation: Non-insulation



Pulse-train type input/output specification (Open collector specification)

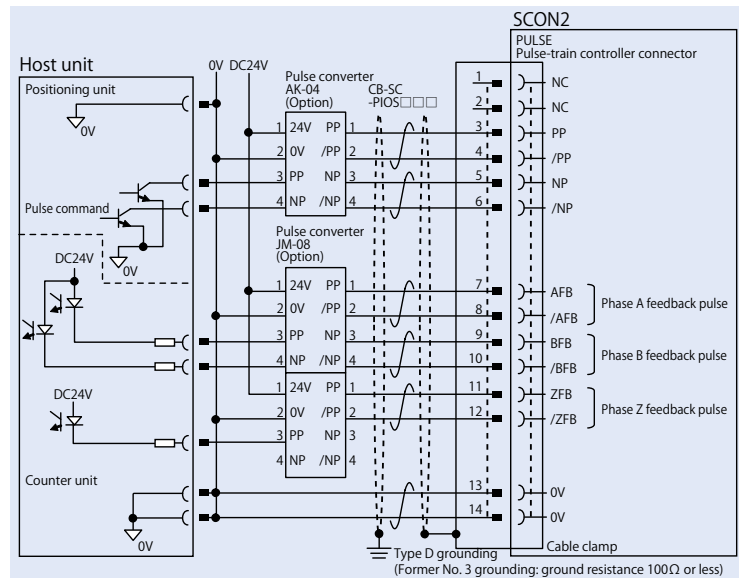
When the host (PLC) is an open collector, AK-04 (option) is necessary for pulse-train input. Pulse-train output needs JM-08 (option).

Maximum number of input pulses: 200kps (AK-04 needed)
Maximum number of output pulses: 500kps (AK-08 needed)

- * DC24 power source connected to AK-04 should be in common with that for the PIO interface power.
- * Keep the cable between the pulse output unit (PLC) and AK-04/JM-08 as short as possible.
- Also, keep the cable between AK-04/JM-08 and the pulse-train control connector less than 2m.

Caution

Use the common power for the host open collector input/output and AK-04/JM-08.



Command pulse input form

| Command pulse input form | | Input terminal | Normal rotation | Reverse rotation |
|--------------------------|---|----------------|-----------------|------------------|
| Negative logic | Normal pulse-train | PP·/PP | | |
| | Reverse pulse-train | NP·/NP | | |
| | The number of motor rotations is such that the normal pulse-train is the normal direction and the reserve pulse-train is the reserve direction. | | | |
| | Pulse-train | PP·/PP | | |
| | Code | NP·/NP | Low | High |
| | The command pulse is the number of motor rotations and the command code is the direction of rotation. | | | |
| Positive logic | A/B-phase pulse-train | PP·/PP | | |
| | | NP·/NP | | |
| | A/B phase (multiplied by 4) pulses with a phase difference of 90° are used to command the amount and direction of rotation of the motor. | | | |
| | Normal rotation pulse-train | PP·/PP | | |
| | Reverse rotation pulse-train | NP·/NP | | |

I/O Signal Table * I/O signal allocation can be selected from 9 modes. Positioner/Pulse-train

| Pin No. | Category | Number of positioning points | Selection of parameter (PIO patterns) | | | | | | | | |
|---------|----------|------------------------------|---------------------------------------|-------------|----------------|----------------|-----------------------|-----------------------|----------------------|----------------------|------------------|
| | | | 0 | 1 | 2 | 3 | 4 | 5 | 6 (Note 1) | 7 (Note 1) | 0/1 |
| | | | Positioning mode | Teach mode | 256-point mode | 384-point mode | Solenoid valve mode 1 | Solenoid valve mode 2 | Force control mode 1 | Force control mode 2 | Pulse-train mode |
| | | | 64 points | 64 points | 256 points | 384 points | 7 points | 3 points | 32 points | 5 points | — |
| 1A | 24V | | 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 | CSTP |
| 10A | | IN5 | PC32 | PC32 | PC32 | PC32 | ST5 | — | — | — | DCLR |
| 11A | | IN6 | — | MODE | PC64 | PC64 | ST6 | — | — | — | BKRL |
| 12A | | IN7 | — | JISL | PC128 | PC128 | — | — | — | — | RMOD |
| 13A | | IN8 | — | JOG+ | — | PC256 | — | — | CLBR | CLBR | RSTR (Note 1) |
| 14A | | IN9 | BKRL | JOG— | BKRL | BKRL | BKRL | BKRL | BKRL | BKRL | — |
| 15A | | IN10 | RMOD | RMOD | RMOD | RMOD | RMOD | RMOD | RMOD | RMOD | — |
| 16A | | IN11 | HOME | HOME | HOME | HOME | HOME | — | HOME | HOME | — |
| 17A | | IN12 | *STP | *STP | *STP | *STP | *STP | — | *STP | *STP | — |
| 18A | | IN13 | CSTR | CSTR/PWRT | CSTR | CSTR | — | — | CSTR | — | — |
| 19A | | IN14 | RES | RES | RES | RES | RES | RES | RES | RES | — |
| 20A | | IN15 | SON | SON | SON | SON | SON | SON | SON | SON | — |
| 1B | Output | OUT0 | PM1 | PM1 | PM1 | PM1 | PE0 | LSO | 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 | *ALML |
| 14B | | OUT13 | *EMGS | *EMGS | *EMGS | *EMGS | *EMGS | *EMGS | *EMGS | *EMGS | REND (Note 2) |
| 15B | | OUT14 | *ALM | *ALM | *ALM | *ALM | *ALM | *ALM | *ALM | *ALM | ZONE1 |
| 16B | | OUT15 | *ALML | *ALML | *ALML | *ALML | *ALML | *ALML | *ALML | *ALML | ZONE2 |
| 17B | — | | — | | | | | | | | |
| 18B | — | | — | | | | | | | | |
| 19B | 0V | | N | | | | | | | | |
| 20B | 0V | | N | | | | | | | | |

* The codes in the () in the above table are functions before home return.

* The above signals with an asterisk (*) become OFF while in motion.

(Note 1) The mode supports actuators with a load cell.

(Note 2) Can be used only for the pulse-train control mode PIO pattern 1.

Field Network Specification Operation mode details (except the motion specification)

When the SCON2 is controlled via a field network, it can be operated by selecting from the following nine modes. Beware that the necessary data area necessary for the PLC changes depending on the mode.

Description of modes

| Mode | Description |
|---------------------------------------|--|
| 0 Remote I/O mode | This mode operates by controlling bit's ON/OFF via network same as the PIO specification. The number of positions and their functions vary depending on the motion patterns (PIO pattern) that can be set at the controller parameter. |
| 1 Position/Simple direct value mode | The target position is specified by direct values and other operating conditions (speed, acceleration, etc.) are specified by specifying position numbers that are entered in the position data. |
| 2 Half direct value mode | Except for the target position, speed, acceleration/deceleration and push current values are directly specified for operation. |
| 3 Full direct value mode | Target position, speed, acceleration/deceleration and push current limit are specified with direct numerical values. Current positions, current speed and specified current values can be read. |
| 4 Remote I/O mode 2 | This mode is the above I/O mode with the additional functions of the current position reading and command current value reading. |
| 5 Position/Simple direct value mode 2 | This mode is the above position/simple direct value mode with the addition of the force control function in place of the zone function. |
| 6 Half direct value mode 2 | This mode is the above half direct value mode with the addition of the load cell data reading feature in place of the command current reading function. It also supports force control function. |
| 7 Remote I/O mode 3 | This mode is the above half direct value mode with the addition of the current position and load cell data reading functions. |
| 8 Half direct value mode 3 | This mode is the above half direct value mode with the addition of the damping control function in place of the jog function. |

Required number of data for each network

| Mode | DeviceNet | CC-Link | CC-Link IE Field (Note 1) | MECHATROLINK-III (Note 2) | EtherCAT | EtherNet/IP | PROFINET IO |
|---------------------------------------|-----------|-----------|---------------------------|---------------------------|----------|-------------|-------------|
| 0 Remote I/O mode | 2 bytes | 1 station | 4 words | 16-, 32-, 48-byte mode | 2 bytes | 2 bytes | 2 bytes |
| 1 Position/Simple direct value mode | 8 bytes | 1 station | 4 words | 16-, 32-, 48-byte mode | 8 bytes | 8 bytes | 8 bytes |
| 2 Half direct value mode | 16 bytes | 2 station | 8 words | 32-, 48-byte mode | 16 bytes | 16 bytes | 16 bytes |
| 3 Full direct value mode | 32 bytes | 4 station | 16 words | 48-byte mode | 32 bytes | 32 bytes | 32 bytes |
| 4 Remote I/O mode 2 | 12 bytes | 1 station | 4 words | 16-, 32-, 48-byte mode | 12 bytes | 12 bytes | 12 bytes |
| 5 Position/Simple direct value mode 2 | 8 bytes | 1 station | 4 words | 16-, 32-, 48-byte mode | 8 bytes | 8 bytes | 8 bytes |
| 6 Half direct value mode 2 | 16 bytes | 2 station | 8 words | 32-, 48-byte mode | 16 bytes | 16 bytes | 16 bytes |
| 7 Remote I/O mode 3 | 12 bytes | 1 station | 4 words | 16-, 32-, 48-byte mode | 12 bytes | 12 bytes | 12 bytes |
| 8 Half direct value mode 3 | 16 bytes | 2 station | 8 words | 32-, 48-byte mode | 16 bytes | 16 bytes | 16 bytes |

(Note 1) The remote register areas are as shown in the above table. It shares 32 remote I/O areas in all the modes.

(Note 2) Compatible byte modes are shown.

Table of functions by operation mode

| | Remote I/O mode | Position/simple direct value mode | Half direct value mode | Full direct value mode | Remote I/O mode 2 | Position/Simple director value mode 2 | Half direct value mode 2 | Remote I/O mode 3 | Half direct value mode 3 |
|---|-----------------|-----------------------------------|------------------------|------------------------|-------------------|---------------------------------------|--------------------------|-------------------|--------------------------|
| Number of positioning points | 384 points | 384 points | No limit | No limit | 384 points | 384 points | No limit | 384 points | No limit |
| Operation with position data direct command | × | ○ | ○ | ○ | × | ○ | ○ | × | ○ |
| Speed/Acceleration direct specification | × | × | ○ | ○ | × | × | ○ | × | ○ |
| Push motion | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Current position reading | × | ○ | ○ | ○ | ○ | ○ | ○ | ○ | ○ |
| Current position reading | × | × | ○ | ○ | × | × | ○ | × | ○ |
| Position No. specified operation | ○ | ○ | × | × | ○ | ○ | × | ○ | × |
| Complete position No. reading | ○ | ○ | × | × | ○ | ○ | × | ○ | × |
| Force control | △(Note 1) | × | × | ○ | △(Note 1) | ○ | ○ | △(Note 1) | × |
| Damping control | ○ | ○ | × | ○ | ○ | ○ | × | ○ | ○ |
| Servo gain switching | ○ | ○ | ○ | ○ | ○ | ○ | × | ○ | ○ |

* ○ shows operation possible. X shows operation impossible.

(Note 1) Can be used when the PIO pattern is 6 or 7.

Operation mode * Only for the press program

Setting is made using a dedicated press program. Can be selected from eight press motion modes.

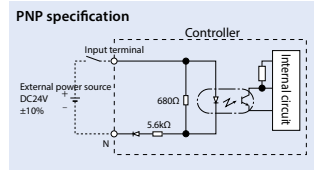
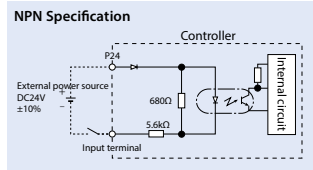
| | |
|---|-------------------------------|
| Speed control After completing a press motion, it stops while keeping the reached position . | Position stop |
| | Distance stop |
| | Load stop |
| | Increment load stop |
| Force control After completing a press motion, it stops while keeping the force . | Position stop/Position stop 2 |
| | Distance stop |
| | Load stop |
| | Increment load stop |



PIO input/output interface

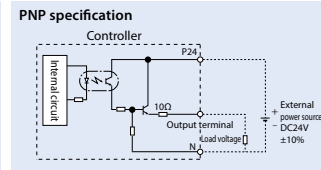
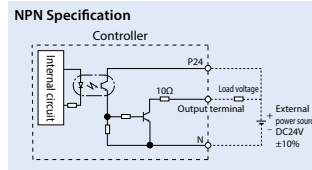
Input part External input specification

| Item | Specification |
|-------------------|--|
| Input voltage | DC24V $\pm 10\%$ |
| Input current | 4mA/circuit |
| ON/OFF voltage | ON voltage: Minimum DC18.0V OFF voltage: Maximum DC6.0V |
| Insulation system | Photocoupler |



Output part External output specification

| Item | Specification |
|-------------------|------------------|
| Load voltage | DC24V |
| Max. load current | 50mA/point |
| Leak current | Max. 0.1mA/point |
| Insulation system | Photocoupler |



I/O Signal Table *Only for the press program

| Pin No. | Category | Signal | Symbol | Name |
|---------|----------|--------|--------|--------------------------------------|
| 1A | 24V | | P24 | For I/O, +24V supply |
| 2A | 24V | | P24 | For I/O, +24V supply |
| 3A | — | | NC | — |
| 4A | — | | NC | — |
| 5A | Input | IN0 | PC1 | Command program No.1 |
| 6A | | IN1 | PC2 | Command program No.2 |
| 7A | | IN2 | PC4 | Command program No.4 |
| 8A | | IN3 | PC8 | Command program No.8 |
| 9A | | IN4 | PC16 | Command program No.16 |
| 10A | | IN5 | PC32 | Command program No.32 |
| 11A | | IN6 | PSTR | Program start |
| 12A | | IN7 | PHOM | Program home position return |
| 13A | | IN8 | ENMV | Axis operation allowed |
| 14A | | IN9 | FPST | Program forced stop |
| 15A | | IN10 | CLBR | Load cell calibration command |
| 16A | | IN11 | BKRL | Brake forced-release |
| 17A | Output | IN12 | RMOD | Operation mode switch |
| 18A | | IN13 | HOME | Home return |
| 19A | | IN14 | RES | Alarm reset |
| 20A | | IN15 | SON | Servo ON command |
| 1B | | OUT0 | PCMP | Program completed normally |
| 2B | | OUT1 | PRUN | Program being executed |
| 3B | | OUT2 | PORG | Program home position |
| 4B | | OUT3 | APRC | Approach motion being executed |
| 5B | | OUT4 | SERC | Probe motion being executed |
| 6B | | OUT5 | PRSS | Press motion being executed |
| 7B | | OUT6 | PSTP | Pressure motion stopping |
| 8B | | OUT7 | MPHM | Moving to program home position |
| 9B | | OUT8 | JDOK | Overall judgment OK |
| 10B | | OUT9 | JDNG | Overall judgment NG |
| 11B | | OUT10 | CEND | Load cell calibration completed |
| 12B | | OUT11 | RMDS | Operation mode status |
| 13B | | OUT12 | HEND | Home return complete |
| 14B | | OUT13 | SV | Servo ON status |
| 15B | | OUT14 | *ALM | Alarm (negative logic) |
| 16B | | OUT15 | *ALML | Minor failure alarm (negative logic) |
| 17B | — | | — | — |
| 18B | — | | — | — |
| 19B | 0V | | N | for I/O 0V supplied |
| 20B | 0V | | N | for I/O 0V supplied |

Field Network Specification Operation Mode * Only for the press program

When SCON2 is controlled via a field network, it can be operated by selecting from the following three modes.
The necessary data area necessary for the PLC changes depending on the mode.

Description of the mode

| Mode | | Description |
|------|-------------------------|---|
| 0 | Remote I/O mode | This mode operates by controlling bit's ON/OFF via network same as the PIO specification. The number of positions and their functions vary depending on the motion patterns (PIO pattern) that can be set at the controller parameter. |
| 1 | Full direct value mode | In addition to servo press functions such as starting press programs and reading the judgment results, this mode also supports all the functions including motions by direct numeric command and current load data reading. |
| 2 | Press direct value mode | This is an operation mode to specify "press stage" directly by numeric value in a press program. Both the press direct value and positioning direct value operations. |

Number of required data in each network

| Mode | | DeviceNet | CC-Link | CC-Link IE Field (Note 1) | MECHATROLINK-III (Note 2) | EtherCAT | EtherNet/IP | PROFINET IO |
|------|-------------------------|-----------|------------|---------------------------|---------------------------|----------|-------------|-------------|
| 0 | Remote I/O mode | 2 bytes | 1 stations | 4 words | 16,32,48 -byte mode | 2 bytes | 2 bytes | 2 bytes |
| 1 | Full function mode | 32 bytes | 4 stations | 16 words | 48 -byte mode | 32 bytes | 32 bytes | 32 bytes |
| 2 | Press direct value mode | 32 bytes | 4 stations | 16 words | 48 -byte mode | 32 bytes | 32 bytes | 32 bytes |

(Note 1) The remote register areas are as shown in the above table. It shares 32 remote I/O areas in all the modes.

(Note 2) It shows corresponding byte mode.

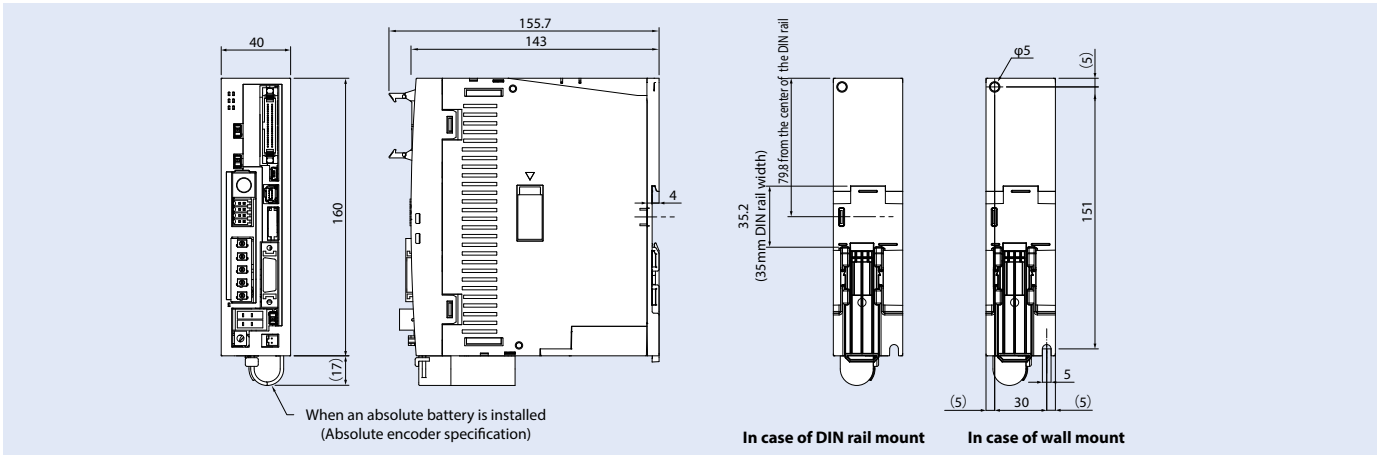
List of functions by operating mode

| | Remote I/O mode | Full function mode | Press direct value mode |
|---|-----------------|--------------------|-------------------------|
| Position data command operation | × | ○ | ○ |
| Speed, Acceleration/Deceleration direct specification | × | ○ | ○ |
| Press load direct command | × | × | ○ |
| Current position reading | × | ○ | ○ |
| Current speed reading | × | ○ | ○ |
| Program No. command operation | ○ | ○ | × |
| Judgment result reading | ○ | ○ | ○ |
| Current load data reading | × | ○ | ○ |
| Overload level monitor | × | ○ | ○ |
| Servo gain switching | ○ (*1) | ○ (*1) | ○ |

(*1) One servo gain can be registered in one press program.

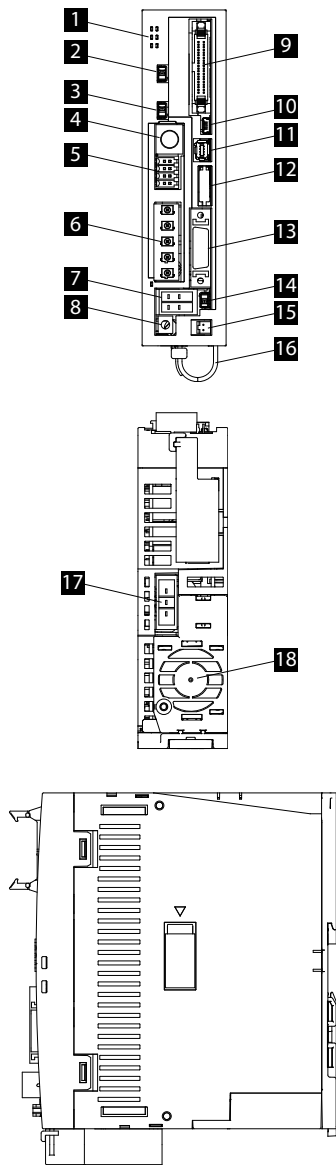
External dimensions

<SCON2 controller>



Names of each part

<SCON2 controller>



1 Status display LED

It shows the status of the controller

| LED name | Color | Description |
|----------|--------|--|
| PWR | Green | Turned on when the controller started normally |
| SV | Green | Turned on at servo ON |
| ALM | Orange | Turned on when the alarm is activated |
| WRG | Orange | Turned on for warning |
| STOP | Red | Turned on at stopping status |
| SAFE | Red | Turned for safety functions |

2 Jog switch

This is a switch for jog motions

| Setting of the switch | Description |
|-----------------------|--|
| JOG+ | Motion to the + direction (The opposite direction to the home position) |
| JOG- | Motion to the - direction (The direction to the home position) |

3 Setting switch for operation modes

Toggle of AUTO/MANU modes

| Name | Description |
|------|-------------------------------------|
| AUTO | Enable to receive commands from PIO |
| MANU | Unable to receive commands from PIO |

4 SIO connector

Connector for the teaching pendant or PC communication cable.

5 System I/O connector

Connector for connecting the emergency stop switch and enable switch, etc.

6 Power connector

Connector for supplying power source for control and driving motors.

7 Motor connector

Connecting the motor cable.

8 FG grounding terminal

Screw for protective grounding. Make sure to connect it.

9 PIO connector or field network connector

Connector for connecting the PIO selected in the I/O type or the field network connector.

Refer to P. 8-270 for the details of cables and connectors.

10 USB Connector

This connector is used for a USB cable for PC teaching software.

11 I/O connector for safety function

This connector is equipped with external safety request signal (SRI) input and external detection signal (EDM) to comply with the SS-1 function. See P. 8-270 for the I/O signals.

12 Multi-function connector

This connector enables the use of pulse-train input, feedback pulse output and analog output of the load cell load data. See P. 8-270 for the signals.

13 Encoder connector

This connector is for connecting the encoder cable.

14 Brake release switch

This item is to forcedly release the brake for actuators with a brake. Warning: For normal operations, make sure to set it to the NOM side. If it is set to the RLS side, the brake will not be applied even at the servo OFF status. In a vertical operation, the workpiece may drop and cause damages to humans or workpieces.

15 Absolute battery connecto

This connector is for connecting the battery for absolute encoder.

16 Absolute battery holder

This item is to hold the backup battery for the absolute data.

17 Regenerative unit connector

This is a connector for connecting an external regenerative resistance unit.

18 Fan unit

This fan unit releases heat inside the controller.

Details of each part

About cables and connectors for network connection.

PIO (NP/PN) connection specification

Supplied item: PIO cable (Model: CB-PAC-PIO□□□□)
 * A cable with the specified length when a network option NP or PN is purchased.
 See P. 8-275 for the detail of the cable.

DeviceNet specification

Network connection cable

| Pin No. | Signal (color) | Description | Compatible wire diameter |
|---------|----------------|------------------------------|---------------------------|
| 1 | V-(Black) | Power cable minus (-) side | DeviceNet dedicated cable |
| 2 | CAN L (Blue) | Communication data low side | |
| 3 | — | Drain (shield) | |
| 4 | CAN H (White) | Communication data high side | |
| 5 | V+ (Red) | Power cable + side | |

Supplied item: Network connector
 (Model: MSTB2.5/5-STF-5.08 AUM)

CC-Link IE Field connection specification

Network connection cable

| Pin No. | Signal name | Description | Compatible wire diameter/Connector model |
|---------|-------------|-------------|--|
| 1 | TP0+ | Data 0+ | The Ethernet cable should be a straight STP cable of Category 5e or above. |
| 2 | TP0— | Data 0- | |
| 3 | TP1+ | Data 1+ | |
| 4 | TP2+ | Data 2+ | |
| 5 | TP2— | Data 2- | |
| 6 | TP1— | Data 1- | 8P8C modular plug (RJ-45) with the shield of Ethernet ANSI/TIA/EIA-568-B Category 5e or above. |
| 7 | TP3+ | Data 3+ | |
| 8 | TP3— | Data 3- | |

Connection specification with EtherCAT

Network connection cable

| Pin No. | Signal name | Description | Compatible wire diameter/connector model |
|---------|-------------|---------------------|--|
| 1 | TD + | Transmission data + | The Ethernet cable should be a straight STP cable of Category 5e or above. |
| 2 | TD — | Transmission data - | |
| 3 | RD + | Receiving data | |
| 4 | — | Not used | |
| 5 | — | Not used | |
| 6 | RD — | Receiving data | 8P8C modular plug (RJ-45) with the shield of Ethernet ANSI/TIA/EIA-568-B Category 5e or above. |
| 7 | — | Not used | |
| 8 | — | Not used | |

I/O connector for safety function

- PCB side connector: 2294417-1 (Tyco Electronics)
- Counter part side: 2013595-1 (Tyco Electronics)

| Pin No. | Signal name | Name | Description |
|---------|-------------|---------------------------------------|---|
| 1 | NC | — | Do not wire |
| 2 | NC | — | Do not wire |
| 3 | /SRI1— | Safety requirement Input signal 1 | Input safety request input signals. ON (conductive): Release the motion request for the safety function OFF (open): Request for the safety function |
| 4 | /SRI1+ | | |
| 5 | /SRI2— | Safety request Input signal 2 | Input safety request input signals. ON (conductive): Release the motion request for the safety function OFF (open): Request for the safety function |
| 6 | /SRI2+ | | |
| 7 | EDM— | External device monitor output signal | This output signal is to show that the safety function is working without problems. |
| 8 | EDM+ | | |

RCON/RSEL connection specification

Supplied item: SCON connection cable (Model: CB-RE-CTL002)
 * This cable is supplied when purchasing a network option "RC" specification.
 Refer to P. 8-275 for the details of cables.

CC-Link connection specification

Network connection cable

| Pin No. | Signal name (color) | Description | Compatible cable diameter |
|---------|---------------------|--|---------------------------|
| 1(6) | DA (Blue) | Communication line A | CC-Link dedicated cable |
| 2(7) | DB (White) | Communication line B | |
| 3(8) | DG (Yellow) | Digital grounding | |
| 4(9) | SLD | (Connecting internally with the 5-pin FG and control power connector 1 Pin FG) | |
| 5 | FG | Frame grounding (Connecting internally with the 4-pinSLD and control power connector 1 Pin FG) | |

Supplied item: Network connector
 (Model: MSTB2.5/5-STF-5.08 with AU Terminal resistor 110Ω / 130Ω)

MECHATROLINK-III connection specification

Network connection cable

| Pin No. | Signal name | Description | Compatible cable diameter/connector model |
|---------|-------------|---------------------|---|
| 1 | TXD + | Transmission data + | Use a dedicated cable for MECHATROLINK-III. |
| 2 | TXD — | Transmission data - | |
| 3 | RXD + | Receiving data + | |
| 4 | — | Not used | |
| 5 | — | Not used | |
| 6 | RXD — | Receiving data - | Industrial mini I/O plug |
| 7 | — | Not used | |
| 8 | — | Not used | |

EtherNet/IP / PROFINET IO connection specification

Network connection cable

| Pin No. | Signal name | Description | Compatible cable diameter/connector model |
|---------|-------------|---------------------|--|
| 1 | TD + | Transmission data + | The Ethernet cable should be a straight STP cable of Category 5e or above. |
| 2 | TD — | Transmission data - | |
| 3 | RD + | Receiving data + | |
| 4 | — | Not used | |
| 5 | — | Not used | |
| 6 | RD — | Receiving data - | 8P8C modular plug (RJ-45) with the shield of Ethernet ANSI/TIA/EIA-568-B Category 5e or above. |
| 7 | — | Not used | |
| 8 | — | Not used | |

Multi-function connector

- PCB side connector: HDR-EC14LFDN-SLD+ (Honda Tsushin)
- The counter part side connector: HDR-E14MSG1+ (Honda Tsushin)

| Pin No. | Signal name | Description |
|---------|-------------|--|
| 1 | IOUT | Outputting the load data detected by the load cell as analog data (current). |
| 2 | GND | |
| 3 | PP | Command pulse-train input (PP) |
| 4 | /PP | Command pulse-train input (/PP) |
| 5 | NP | Command pulse-train input (NP) |
| 6 | /NP | Command pulse-train input (/NP) |
| 7 | AFB | Feedback pulse (+A) |
| 8 | /AFB | Feedback pulse (-A) |
| 9 | BFB | Feedback pulse (+B) |
| 10 | /BFB | Feedback pulse (-B) |
| 11 | ZFB | Feedback pulse (+Z) |
| 12 | /ZFB | Feedback pulse (-Z) |
| 13 | GND | 0V |
| 14 | GND | 0V |

Options

Touch panel teaching pendant

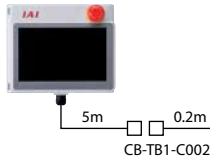
CAD drawings can be downloaded from our website.
www.intelligentactuator.com



■ **Features** This is a teaching device equipped with functions such as position input, trial operations and monitoring.

■ **Model** (Standard specification) **TB-02-C**
(Deadman switch specification) **TB-02D-C-SWR**

■ Configuration



Visit our website for supported versions.

* To comply with the safety category, an TP adaptor and a dummy plug are separately needed.
See P.8-260 for details.

■ Specification

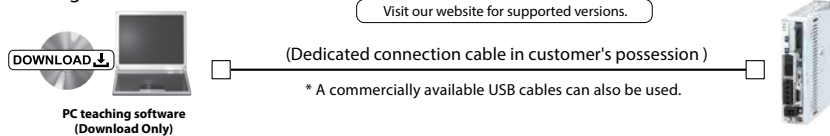
| | |
|-------------------------------|-------------------------------|
| Rated voltage | 24VDC |
| Power consumption | 3.6W or less (150mA or less) |
| Operating ambient temperature | 0~40°C |
| Operating ambient humidity | 5%RH - 85%RH (non-condensing) |
| Degree of protection | IP20 |
| Mass | 470g (TB-02 unit only) |

PC teaching software (Windows only)

■ **Features** Supporting software with functions such as position teaching, trial operations and monitoring. Start up times can be shortened due to necessary functions for adjustments.

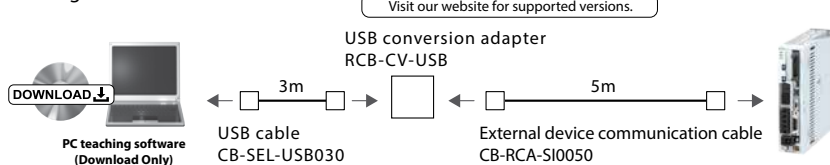
■ **Model** **IA-OS** (software only. For those who own the dedicated connection cable)

■ **Configuration** * Please purchase through your distributor and a download link will be sent to your valid email address.



■ **Model** **IA-OS-C** (with external device communication cable + USB conversion adapter + USB cable)

■ **Configuration** * Please purchase through your distributor and a download link will be sent to your valid email address.



Supported Windows: 7/10



Regenerative resistance unit

CAD drawings can be downloaded from our website.
www.intelligentactuator.com



■ **Features** This unit converts the regenerative current that generates when motor slows down into heat. Confirm the wattage of operating actuators in the table below, and prepare necessary quantity of regenerative resistance unit if required.

■ **Model** **RESU-1/2** (Standard specification)

RESUD-1/2 (DIN rail mount specification)

■ Specification

| Connection | Direct connection with SCON2 | | Connection of regenerative resistance units with each other | |
|--|-------------------------------|----------------|---|----------------|
| Model | RESU-2 | RESUD-2 | RESU-1 | RESUD-1 |
| Main unit mass | Approx. 0.4kg | | | |
| Built-in regenerative resistance value | 235Ω 80W | | | |
| Main unit mounting method | Screw mount | DIN rail mount | Screw mount | DIN rail mount |
| Supplied cable | CB-SC-REU010 | | CB-ST-REU010 | |
| Number of connected units | Horizontal | | Vertical | |
| | RCS2-RA13R | | RCS2-RA13R | |
| 0 unit (not needed) | up to 200W (Note) | | up to 200W (Note) | — |
| 1 unit | 300W to 400W (including LS-L) | Lead 1.25 | 300W to 400W (including LS-L) | Lead 1.25 |
| 2 units | 600W~750W | — | 600W~750W | — |

(Note) The LSA/LSAS-N10S types need one unit.

* More regenerative resistance may be required than the number specified in the above table depending on the operating conditions such as the duty ratio of 50% or higher, etc.

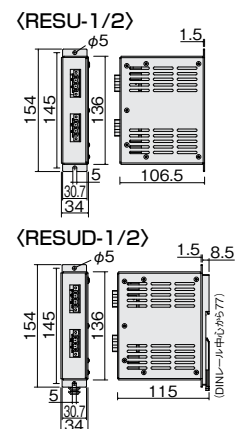
When the regenerative resistance is not enough, an alarm will be activated.

The optimal number of regenerative resistance units can be confirmed using the "Calculator software." The "calculator software" can be downloaded from our website.

[Cautions on ordering and connection]

- When connecting with SCON2 directly, order RESU(D)-2.
- After the second unit, if the regenerative resistance units are connected with each other, order RESU(D)-1.
- Regenerative resistance units can be connected up to 4.

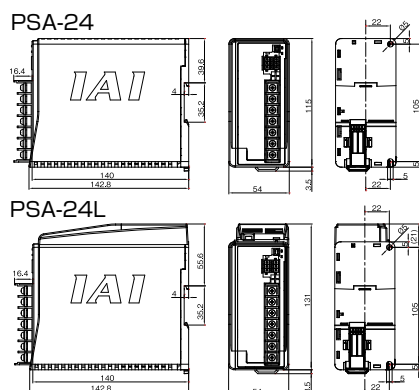
■ External dimensions



24V power source

- Features Compact size power source
- Model **PSA-24 (without fan)**
- Model **PSA-24L (with fan)**

External dimensions



Specifications

| Item | Specifications | |
|---------------------------|--|--|
| | AC100V input | AC200V input |
| Power input voltage range | AC100V~AC230V±10% | |
| Input power current | 3.9A or less | 1.9A or less |
| Power capacity | Without fan: 250VA With fan: 390VA | Without fan: 280VA With fan: 380VA |
| Rush current *1 | With fan: 17A (typ) With fan: 27.4A (typ) | Without fan: 34A (typ) With fan: 54.8A (typ) |
| Heat quantity | 33W (204W continuous rated) 54W (300W continuous rated) | 23W (204W continuous rated) 37W (330W continuous rated) |
| Output voltage range *2 | 24V ±10% | |
| Continuous rated output | Without fan: 8.5A (204W), With fan: 13.8A (330W) | |
| Peak output | 17A (408W) | |
| Efficiency | 86% or higher | 90% or higher |
| Parallel connection *3 | Maximum 5 units | |

(*1) The pulse width of rush current flow is 5ms or less.

(*2) This power source can change output voltage according to the load to enable parallel operations. Because of the above feature, this power source is only for IAI controllers.

(*3) Parallel operations are impossible under the following conditions.

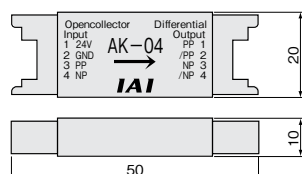
- Parallel connection of PSA-24 (without fan) and PSA-24L (with fan).
- Parallel connection of power units other than this power unit.
- Parallel connection with PS-24.

Pulse converter

- Features It converts open collector specification pulses into those for the differential system. Use this converter when host controller's output pulse is that of the open collector specification.

Model **AK-04**

External dimensions



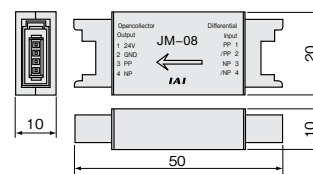
Specifications

| Item | Specifications |
|-----------------|--|
| Input power | DC24V±10% (Max.50mA) |
| Input pulse | Open collector (collector current Max. 12mA) |
| Input frequency | 200kHz or less |
| Output pulse | Differential output (Max. 10mA) (Equivalent to 26C31) |
| Mass | 10g or less (excluding the cable connector) |
| Supplied item | 37104-3122-000FL (e-CON connector, make: 3M) 2 units Compatible wire AWG24 - 26 |

- Features It converts differential system pulses into open collector specification pulses. Use this converter when host controller's pulse input is that of the open collector specification.

Model **JM-08**

External dimensions



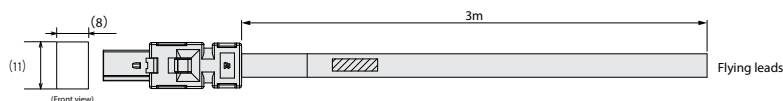
Specifications

| Item | Specifications |
|-----------------|--|
| Input power | DC24V±10% (Max.50mA) |
| Input pulse | Differential input (Max. 10mA) (RS-422 compliant) |
| Input frequency | 500kHz or less |
| Output pulse | DC24V open collector (collector current Max. 25mA) |
| Mass | 10g or less (excluding the cable connector) |
| Supplied item | 37104-3122-000FL (e-CON connector, make: 3M) 2 units Compatible wire AWG24 - 26 |

I/O cable for safety function

- Features This cable connects the I/O connector for safety function and safety device.

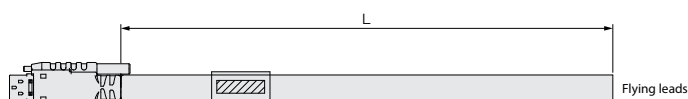
Model **CB-SC-STO 030**



Multi-function connector cable

- Features Together with the multi-function connector, this cable is for pulse-train control and analog output.

Model **CB-SC2-MFC** ☐ ☐ ☐ * Indicate the cable length (L) in ☐☐☐, Max. 10m



2013595-1 (YE)

| Wiring | Color | Signal | No. |
|--------|-------------|-------------------------------|-----|
| AWG26 | — | — | 1 |
| | Black | /SR11 | 2 |
| | Black/White | /SR11 | 3 |
| | Red | /SR12 | 4 |
| | Red/White | /SR12 | 5 |
| | Green | EDM | 7 |
| | Green/White | EDM+ | 8 |
| | Shield | connected to the cable clamp. | |
| | Black | Black / White | |
| | Red | Red / White Flying leads | |

HDR-E14MSG1+

| Wiring | Color | Signal | No. |
|--------|-------------------|-------------------------------|-----|
| AWG28 | Orange/Red1 | IOUT | 1 |
| | Orange/Black1 | GND | 2 |
| | Light gray/Red1 | PP | 3 |
| | Light gray/Black1 | PG | 4 |
| | White/Red1 | NP | 5 |
| | White/Black1 | NG | 6 |
| | Yellow/Red1 | AFB | 7 |
| | Yellow/Black1 | AFB | 8 |
| | Pink/Red1 | BFB | 9 |
| | Pink/Black1 | /BFB | 10 |
| | Orange/Red2 | ZFB | 11 |
| | Orange/Black2 | ZFB | 12 |
| | Light gray/Red2 | GND | 13 |
| | Light gray/Black2 | GND | 14 |
| | Shield | connected to the cable clamp. | |
| | Orange/Red1 | Orange / Red1 | |
| | Orange/Black1 | Orange / Black1 | |
| | Light gray/Red1 | Light gray / Red1 | |
| | Light gray/Black1 | Light gray / Black1 | |
| | White/Red1 | White / Red1 | |
| | White/Black1 | White / Black1 | |
| | Yellow/Red1 | Yellow / Red1 | |
| | Yellow/Black1 | Yellow / Black1 | |
| | Pink/Red1 | Pink / Red1 | |
| | Pink/Black1 | Pink / Black1 | |
| | Orange/Red2 | Orange / Red2 | |
| | Orange/Black2 | Orange / Black2 | |
| | Light gray/Red2 | Light gray / Red2 | |
| | Light gray/Black2 | Light gray / Black2 | |
| | Shield | Shield | |

Brake box

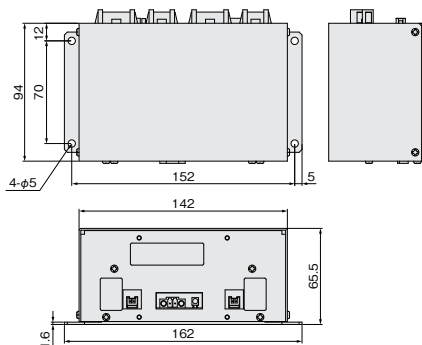
■ Features This item is necessary when the RCS2-RA13R of actuator with brake is connected.

■ Model **RCB-110-RA13-0**

■ Specifications

| Item | Specifications |
|-----------------------------|-----------------------------------|
| Main unit dimensions | 162×94×65.5mm |
| Power voltage and current | DC24V±10% 1A |
| Connecting cable (supplied) | Encoder cable (CB-RCS2-PLA010) 1m |
| Number of controlled axes | 2 |

■ External dimensions



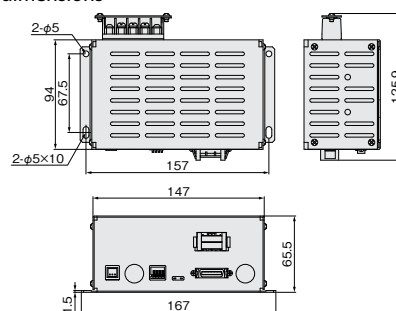
■ Features Needed when connecting to DDA actuators with brake.

■ Model **IA-110-DD-4**

■ Specifications

| Item | Specifications |
|-----------------------------|--|
| Input power voltage | AC100-240V ±10% |
| Input power current | Rated excitation AC100V: 0.25A/AC200V: 0.15A |
| | Over excitation AC100V: 0.6A/AC200V: 0.3A |
| Heat quantity | 6.0W (rated excitation) / 10.0W (over excitation) |
| Over excitation time | 1.2s±0.2s |
| Connection cable (supplied) | Encoder cable (CB-X3-PA010) 1m |
| Environment | Operating ambient temperature 0~40°C |
| | Operating ambient humidity 5 - 85%RH or less (non-condensing) |
| | Degree of protection IP20 |
| External dimensions | 147x94x65.5mm (excluding mounting part) |
| Mass | Approx. 0.4kg |

■ External dimensions

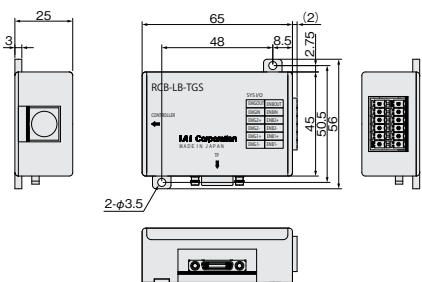


TP adaptor for position controller

■ Features Needed to connect the teaching pendant and the controller when building a system that complies with the safety category (ISO12100-1).

■ Model **RCB-LB-TGS**

■ External dimensions



Dummy plug

■ Features To be attached to the TP adaptor when a teaching pendant is not used in a safety category compliant system.

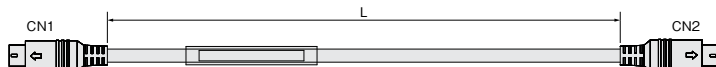
■ Model **DP-4S**



Controller adaptor connection cable

■ Features This cable connects the teaching box and the controller in a safety category compliant system.

■ Model **CB-CON-LB005**



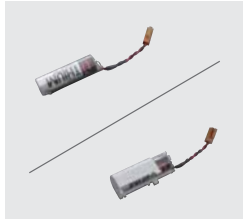
Maintenance parts

Basically, these parts are supplied with each unit, but if necessary to purchase due to lost item, purchase it as a single unit separately.

For SCON2 controller

Absolute data retention battery

- Features This battery retains absolute data of the actuator of absolute specification.
- Model **AB-5 (battery single unit)**
- Model **AB-5-CS3 (with case)**



Fan unit

- Model **SCON2-FU**



Dummy plug

- Features Necessary when the teaching pendant is not connected to the SIO connector.
- Model **DP-5**



Dummy plug (STO/SS1-t specification)

- Features Necessary to operate when the STO/SS1-t function is not used.
- Model **DP-6**



AC Power connector

- Model **MPS_7S/05_S_F3_TN_B_B(SCON2)**



System I/O connector

- Model **B2CF_3.50/08/180_SN_BK_BX(SCON2)**



Network connector

for DeviceNet

- Model **MSTB2.5/5-STF-5.08 AUM**



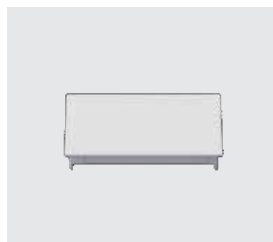
for CC-Link With terminal resistance 110Ω/130Ω

- Model **MSTB2.5/5-STF-5.08 AU**



Safety unit connector cover

- Model **SCON2-COV**



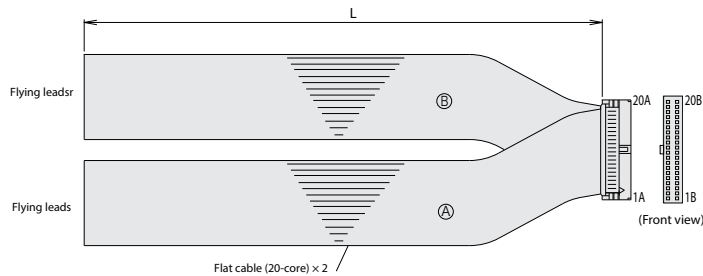
Maintenance parts

For SCON2 controller

PIO cable * A cable with the specified length is supplied when NP or PN specification is purchased as an option.

Model **CB-PAC-PIO**

* Indicate the cable length (L) in
Max. 10m, e.g.) 080=8m

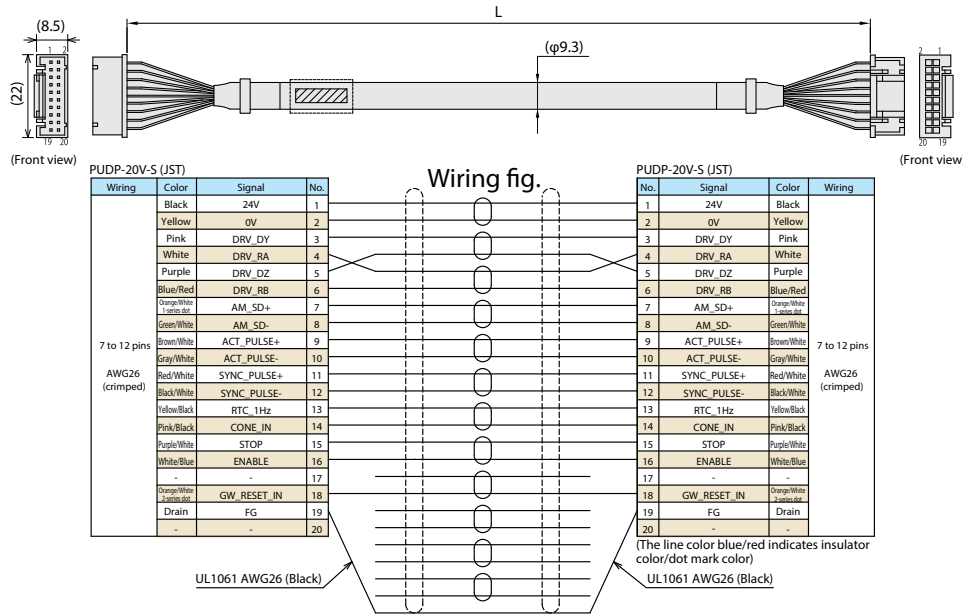


| HIF6-40D-1.27R(Hirose) | | | | | | | |
|------------------------|-------------|-------------|--------------------------------|-----|-------------|-------------|--------------------------------------|
| No. | Signal name | Cable color | Wiring | No. | Signal name | Cable color | Wiring |
| 1A | 24V | Brown-1 | Flat cable Ⓢ (pressure-welded) | 1B | OUT0 | Brown-3 | Flat cable Ⓢ (pressure-welded) 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 connection cable * A 0.2m cable is supplied when "RC" of the RCON\RSEL connection specification is purchased at the network option.

Model **CB-RE-CTL**

* Indicate the cable length (L) in
Max. 10m, e.g.) 030=3m



Maintenance parts (cables)

After purchasing the product, when necessary to order parts for cable replacement, etc. refer to the model numbers below.
Please contact IAI for more details on cables.

The cable model search system is recommended!
<https://www.intelligentactuator.com/iai-cables-search-tool/>



Cable correspondence table

| No. | Actuator | | Maximum cable length | Connection cable (Note 1) | | | |
|-----|--|---|----------------------|---------------------------|-------------------|---|--|
| | Series | Type | | Motor cable | Motor robot cable | Encoder cable | Encoder robot cable |
| ① | RCS4 RCS4CR | | 20m | CB-RCC1-MA □□□ | CB-X2-MA □□□ | — | CB-X1-PA □□□ |
| ② | RCS3(P) RCS3(P)CR | CTZ5C CT8C | 20m | CB-RCC1-MA □□□ | CB-X2-MA □□□ | — | CB-X1-PA □□□ |
| ③ | | RA4R RA6R RA7R RA8R | 20m | CB-RCC1-MA □□□ | CB-X2-MA □□□ | CB-RCS2-PLDA□□□ | CB-RCS2-PLDA□□□-RB |
| ④ | | Other than ② and ③ | 20m | CB-RCC1-MA □□□ | CB-X2-MA □□□ | CB-RCS2-PA □□□ | CB-X3-PA □□□ |
| ⑤ | RCS2 | RTC □ L, RT6 | 20m | CB-RCC1-MA □□□ | CB-X2-MA □□□ | CB-RCS2-PLA □□□ | CB-X2-PLA □□□ |
| ⑥ | RCS2CR RCS2W | Other than ⑤ | 20m | CB-RCC1-MA □□□ | CB-X2-MA □□□ | CB-RCS2-PA □□□ | CB-X3-PA □□□ |
| ⑦ | RCS2 | RA13R | 20m | CB-RCC1-MA □□□ | CB-X2-MA □□□ | CB-RCS2-PLA □□□ | CB-X2-PLA □□□ |
| ⑧ | | RA13R With brake (with brake box) | 20m | CB-RCC1-MA □□□ | CB-X2-MA □□□ | [Actuator - brake box] CB-RCS2-PLA □□□ [Brake box - controller] CB-RCS2-PLA □□□ | [Actuator - brake box] CB-X2-PLA □□□ [Brake box - controller] CB-X2-PLA □□□ |
| ⑨ | | RA13R With brake (without brake box) | 20m | CB-RCC1-MA □□□ | CB-X2-MA □□□ | [Actuator - brake box] CB-RCS2-PLA □□□ | [Actuator - brake box] CB-X2-PLA □□□ |
| ⑩ | | RA13R With brake (with brake box) | 20m | CB-RCC1-MA □□□ | CB-X2-MA □□□ | CB-RCS2-PLA□□□ * Between controller and brake CB-RCS2-PLLA□□□ * Between load cell and controller CB-LDC-CTL□□□-JY | CB-X2-PLA□□□ * Between controller and brake CB-RCS2-PLLA□□□-RB |
| ⑪ | | RA13R Without brake (without brake box) | 20m | CB-RCC1-MA □□□ | CB-X2-MA □□□ | CB-RCS2-PLLA□□□ | CB-RCS2-PLLA□□□-RB |
| ⑫ | IS(P)B IS(P)DB IS(P)DBCR | (Option: when the limit switch is not selected) | 30m | — | CB-X2-MA □□□ | — | CB-X1-PA □□□ * The following cable is used when the cable length is 21m or longer) CB-X1-PA □□□ -AWG24 |
| ⑬ | | (Option: when the limit switch is selected) | 30m | — | CB-X2-MA □□□ | — | CB-X1-PLA □□□ * The following cable is used when the cable length is 21m or longer) CB-X1-PLA □□□ -AWG24 |
| ⑭ | IS(P)A IS(P)DA | (Option: when the limit switch is not selected) | 30m | — | CB-X2-MA □□□ | — | CB-X1-PA □□□ |
| ⑮ | IS(P)DACR SSPA SSPDACR IF/IFA FS RS | (Option: when the limit switch is selected) | 30m | — | CB-X2-MA □□□ | — | CB-X1-PLA □□□ |
| ⑯ | NSA | | 30m | — | CB-X2-MA □□□ | — | CB-X1-PA □□□ |
| ⑰ | NS | (Option: when the limit switch is not selected) | 30m | — | CB-X2-MA □□□ | — | CB-X3-PA □□□ |
| ⑱ | | (Option: when the limit switch is selected) | 30m | — | CB-X2-MA □□□ | — | CB-X2-PLA □□□ |
| ⑲ | DD | T18 □ L, T18 □ | 30m | — | CB-X2-MA □□□ | — | CB-X3-PA □□□ |
| ⑳ | DDCR DDW DDA DDACR | H18 □ L, H18 □ | 30m | — | CB-XMC1-MA □□□ | — | CB-X3-PA □□□ |
| ㉑ | LSA | W □□□ | 20m | — | CB-XMC1-MA □□□ | — | CB-X2-PLA □□□ |
| ㉒ | | Other than W□□□ | 20m | — | CB-X2-MA □□□ | — | CB-X3-PA □□□ |
| ㉓ | LSAS | | 20m | — | CB-X2-MA □□□ | — | CB-X1-PA □□□ |
| ㉔ | ISWA ISPWA | | 30m | — | CB-XEU1-MA □□□ | — | CB-X1-PA □□□ -WC |

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Midwest Branch Office (Chicago) : 110 East State Parkway, Schaumburg, Illinois 60173 (847) 908-1400
Southeast Branch Office (Atlanta) : 1220 Kennestone Circle, Suite 108, Marietta, GA 30066 (678) 354-9470
www.intelligentactuator.com

JAPAN Headquarters : 577-1 Obane, Shimizu-ku, Shizuoka-shi, Shizuoka, 424-0103, JAPAN

The information contained in this product brochure may change without prior notice due to product improvements.

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IAI Robot (Thailand) Co., Ltd.: 825 Phairokijja Tower 7th Floor, Debaratana Rd., Bangna Nuea, Bangna, Bangkok 10260, Thailand

| |
|-------------------------|
| Controller |
| Models not shown here |
| Model selection |
| RCON |
| RSEL |
| REC |
| RSEL (Cartesian 6-axis) |
| RCP6S |
| PCON -CB/CFB |
| PCON -CBP (Pulse press) |
| PCON |
| ACON-CB |
| DCON-CB |
| ACON |
| DCON |
| SCON2 |
| SCON -CB |
| SCON -CB (Servo press) |
| SSEL |
| MSEL |
| XSEL -RA/SA |
| XSEL -P/Q |
| XSEL (SCARA) |
| PSA-24 |
| TB -03/02 |
| Software |