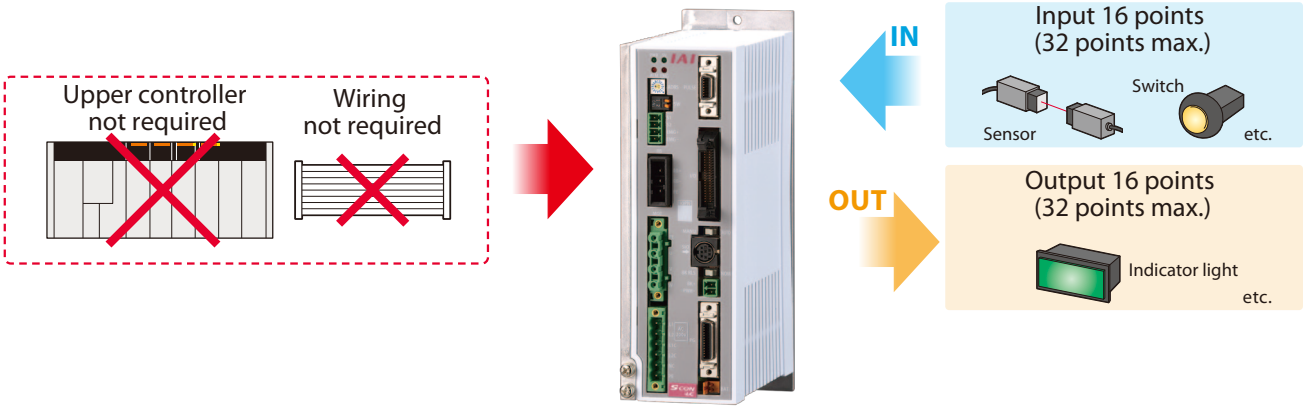
IAI
Quality and Innovation

Position controller with PLC function SCON-LC/LCG

www.intelligentactuator.com

With PLC Function

It's capable of operating actuators by a ladder program and ON/OFF control of I/O (input and output) signals. Small-scale devices can be controlled by SCON-LC/LCG only. For large-scale devices, load on the main PLC can be reduced by performing distributed control using SCON-LC/LCG for each procedure. In addition, it enables easier program simplification and troubleshooting.



Ladder Software

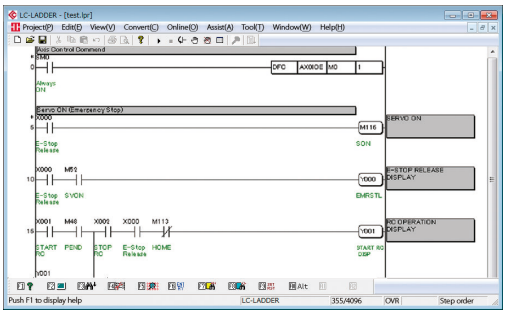
LC-LADDER

● Features of ladder software

As SCON-LC/LCG can be controlled by a ladder program, it can be easily used by those who had been using PLC. In addition, the editing software "LC-LADDER" can be used to easily create, monitor and debug a ladder program.

1 Program creation

Programs can be created using 27 types of basic command (contact command, output command, etc.) and 53 types of application command (data comparison, arithmetic, logical, etc.).



2 Monitor

The state when the program is run can be checked by respective function.

3 Debug function

Run the program upon specifying the conditions to check the operation of the program.

4 Simulation

You can check (simulate) the program on a PC without operating it on the controller.

Free of charge

* LC ladder can be downloaded here for free.

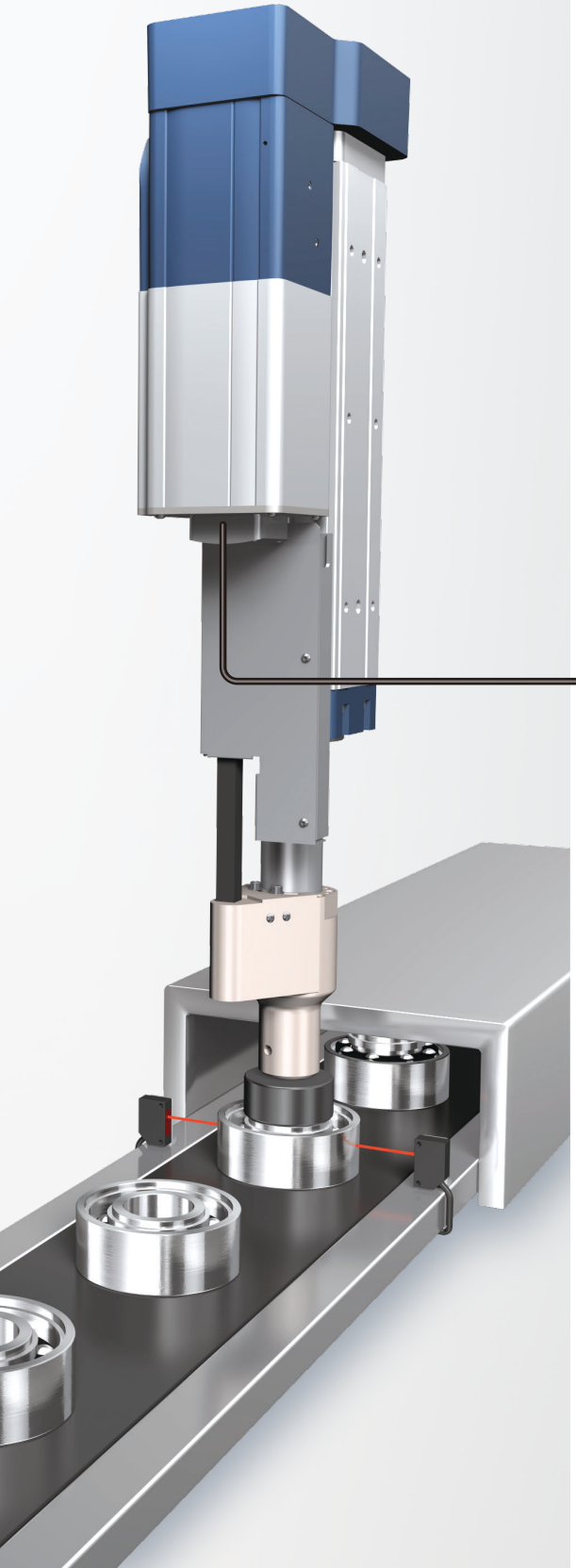
http://www.intelligentactuator.com/lc

SCON-LC/LCG

Application

"Application example using SCON-LC"

Cases of press-fitting bearings using our RCS3-RA8R. It's capable of servo pressing without using an external PLC.

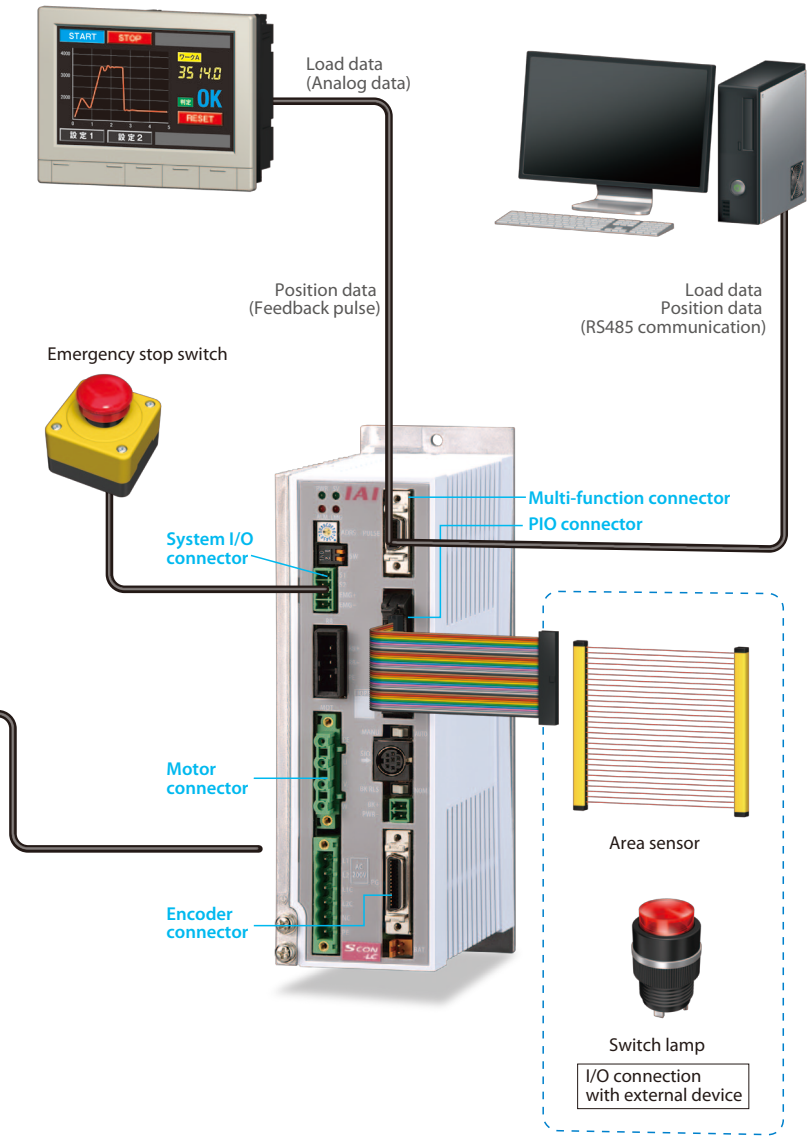


Touch panel display

- Performs analog current output of load data *
  * Servo press controller only
- Performs pulse output of position data feedback

PC

- The following data can be output by RS485 serial communication
  - •OK/NG judgment result
  - •Load data
  - •Position data



External PLC-less press

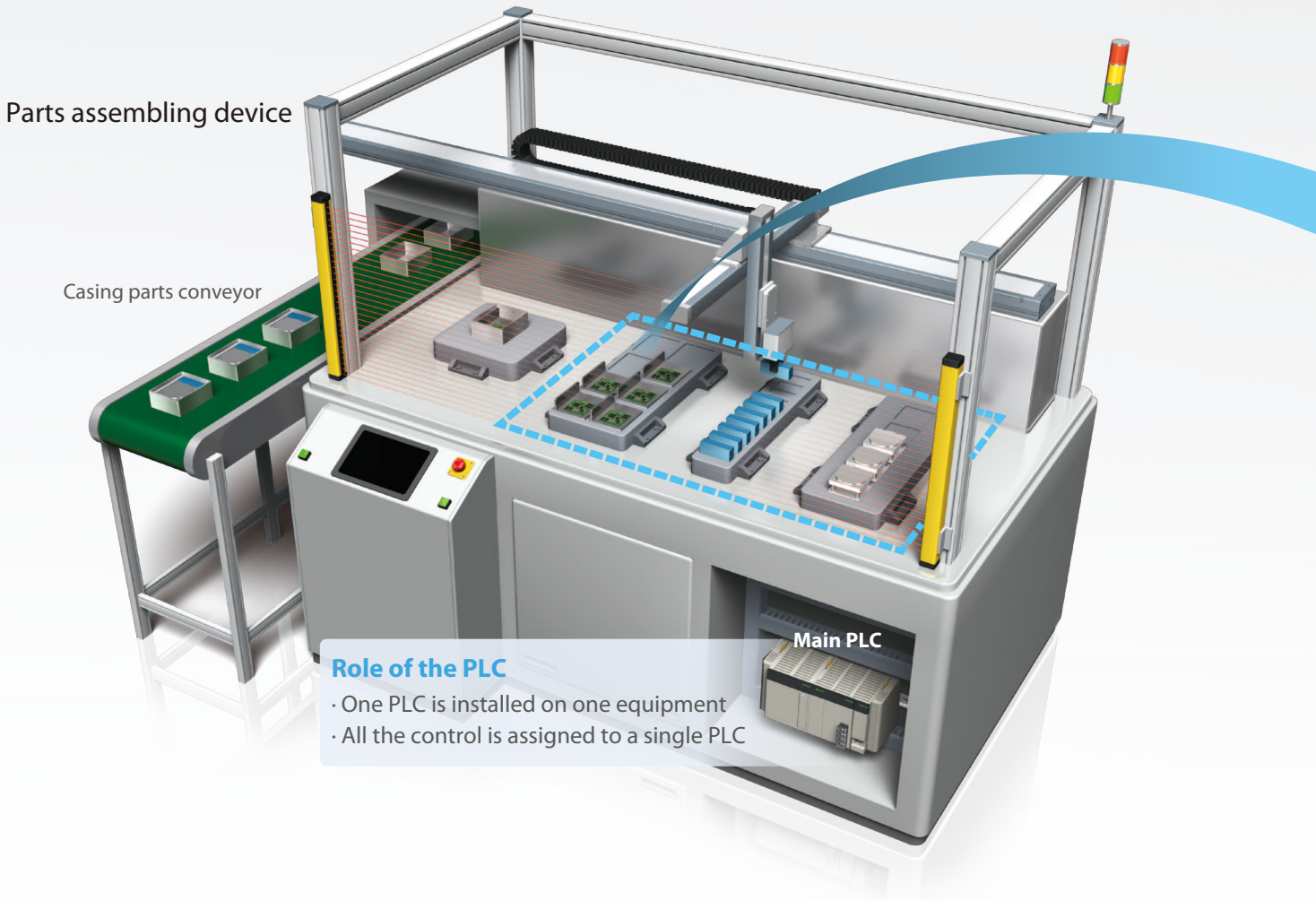
The greatest feature of SCON-LC/LCG is that the following controls can be performed through the 16-point input/16-point output of the built-in PLC without using an external PLC.

- Various push button switch input
- Output to various lamps
- Area sensor output

It can reduce the PLC purchase cost.

Advantage of Using SCON-LC with PLC Function

Conventional equipment



The following process is required once every two to three years.

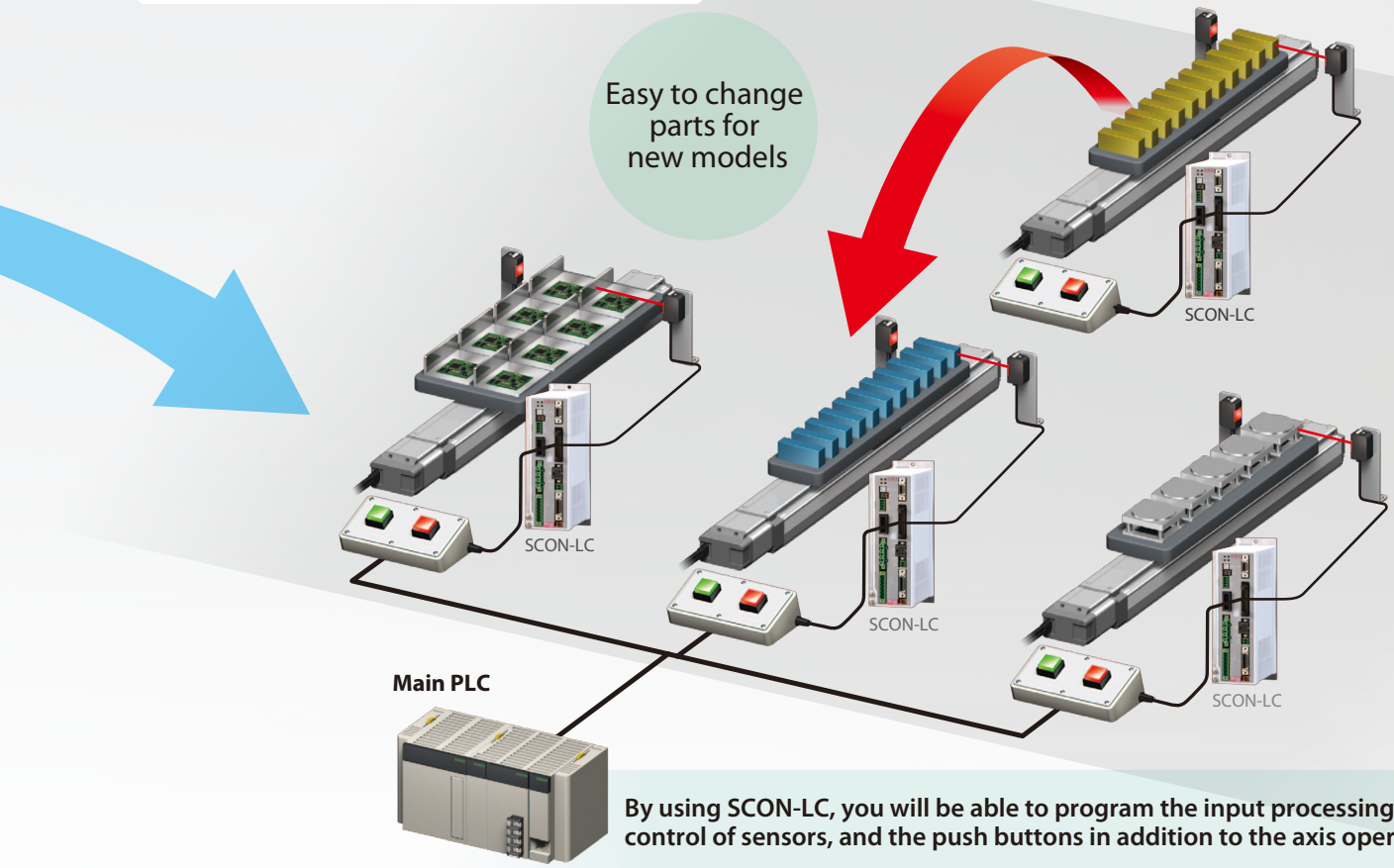
- Substantially modify the parts assembly equipment to accommodate changed product parts
- Further modify the inherently complex PLC ladder

Disadvantages

- **It requires more steps**
- **It requires expertise**
- **Higher risk of issue occurrences**
- **Modification work may be prolonged**

Future investment
Large

Distributed control using SCON-LC



By using SCON-LC, you will be able to program the input processing, control of sensors, and the push buttons in addition to the axis operation.

It allows the work to be replenished and pallets to be exchanged outside of the device by placing the work pallet on the slider. In the past, this required someone to enter the device to get the same results. It also supports new models more easily.

It will be as follows by the distributed control.

- Supply unit is standardized for each part -> Supply unit can be swapped according to the parts
- Each unit to a self-contained control -> Ladder simplification of the main PLC
- Constant command from the main PLC -> Can be adjusted and tested per unit (requesting parts, completed installation, etc.)

Advantage

Processes related to parts supply such as stage disassembly, isolation, and supply error detection can be individually performed for each unit.

Reduced construction period
Reduced Issue Occurrences
Smoothly supports new models

List of Models

Models		SCON-LC/LCG									
External view											
I/O type		Standard specification		Field network type *1							
		PIO connection specification		DeviceNet connection specification	CC-Link connection specification	PROFIBUS-DP connection specification	CompoNet connection specification	MECHATRO LINK I,II connection specification *2	EtherCAT connection specification	EtherNet/IP connection specification	PROFINET IO connection specification
I/O type model number		NP/PN		DV	CC	PR	CN	ML	EC	EP	PRT
Supported encoder		Battery-less abs. Incremental Quasi abs.	Absolute	Battery-less absolute/Incremental/Absolute/Quasi absolute							
SCON -LC/LCG Motor type	12~150W	○	○	○	○	○	○	○	○	○	○
	200W	○	○								
	300~400W	○	○								
	600W	○	○								
	750W	○	○								

*1 It cannot be used with the PIO. *2 It is treated as an Intelligent I/O, and supports asynchronous communication command.
(Note) Pulse-train control is not available.

Models

SCON – [ ] – [ ] [ ] [ ] – [ ] – [ ] – [ ]

Series | Type | Motor Type | Encoder Type | Options | I/O Type | I/O Cable Length | Power Supply Voltage

Type

LC	PLC equipped type
LCG	Safety category PLC equipped type

Motor Type

12	12W	200	200W
20	20W	200S	200W
30D	30W	300S	300W
30R	30W	400	400W
60	60W	600	600W
100	100W	750	750W
100S	100W		
150	150W		

(Example) 12:12W servo motor supported

Encoder Type

WAI	Battery-less Absolute Incremental
A	Absolute
G	Quasi absolute*1
AI	Index absolute type *2
AM	Multi-rotation absolute type *2

*1 The quasi absolute is for LSAS Series.
*2 DD motor operation mode is added.

Options

HA	Hi-accel./decel. specification

* High acceleration/deceleration specification is only available if the high acceleration/deceleration supported option is selected for the actuator.
<High acceleration/deceleration supported actuator>
RCS2-SA4C/SA5C/SA6C/SA7C/RA4C/RA5C/RGS4C/RGS5C/RGD4C/RGD5C

I/O Type

NP	PIO NPN (Standard)
PN	PIO PNP
DV	DeviceNet
CN	CompoNet
CC	CC-Link
ML	MECHATROLINK-I, II
PR	PROFIBUS-DP
EC	EtherCAT
EP	EtherNet/IP
PRT	PROFINET IO

I/O Cable Length

0	No cable
2	2m (Standard)
3	3m
5	5m

* When a field network specification is selected, the I/O cable length is "0" (No cable).

Power Supply Voltage

1	Single-phase 100VAC
2	Single-phase 200VAC

* Check the power supply voltage that can be selected in the actuator page.

Notes

The motor type symbol is normally the same as that of the actuator to be connected, but there are some models which motor types of the controller and actuator do not match. Be sure to check the corresponding models listed below during selection.

<Actuators for 30D/30R/200S>

● Controller motor type [30D]
30W actuators other than RS

● Controller motor type [30R]
RS

● Controller motor type [200S]
DD-LT18□ DDCR-LT18□
DD-T18□ DDCR-T18□
* For 200S, the controller casing will be 400W. Check the 400W specification for the price.

SCON-LC/LCG
(For servo press only)
Models

Check SCON-CB/CGB controller pages on "RCS3 Servo Press" catalog for the features and detailed specifications of the servo press controller.
www.intelligentactuator.com/servopress

List of Models

Models		SCON-LC/LCG									
External view											
I/O type		Standard specification		Network connection specification (option) *1							
		PIO connection specification		DeviceNet	CC-Link	PROFIBUS	CompoNet	MECHATROLINK	EtherCAT	EtherNet/IP	PROFINET
				DeviceNet connection specification	CC-Link connection specification	PROFIBUS-DP connection specification	CompoNet connection specification	MECHATRO LINK I,II connection specification *2	EtherCAT connection specification	EtherNet/IP connection specification	PROFINET IO connection specification
I/O type model number		NP/PN		DV	CC	PR	CN	ML	EC	EP	PRT
Supported encoder		Incremental	Absolute	Incremental/Absolute							
Moter type	30W, 60W, 100W	○	○	○	○	○	○	○	○	○	○
	200W	○	○								
	400W	○	○								
	750W	○	○								
	3,000W	○	○								
	3,300W	○	○								

*1 It cannot be used with the PIO. *2 It is treated as an Intelligent I/O, and supports asynchronous communication command.
(Note) Pulse-train control is not available.

Models

SCON – [ ] – [ ] [ ] **F** – [ ] – [ ] – [ ]

Series | Type | Motor Type | Encoder Type | I/O Type | I/O Cable Length | Power Supply Voltage

LC	PLC equipped type
LCG	Safety category PLC equipped type

* Only LCG can be selected for RCS3-RA15R/20R.

F	For servo press only (Note 1)

1	Single-phase 100VAC
2	Single-phase 200VAC
3	Three-phase 200VAC

* Check the power supply voltage that can be selected in the actuator page.

30D	30W
60	60W
100	100W
200	200W
400	400W
750S	750W
3000	3,000W
3300	3,300W

WAI	Battery-less Absolute/Incremental
A	Absolute

* Currently only supports the incremental and absolute types.

NP	PIO NPN (Standard)
PN	PIO PNP
DV	DeviceNet
CN	CompoNet
CC	CC-Link
ML	MECHATROLINK-I, II
PR	PROFIBUS-DP
EC	EtherCAT
EP	EtherNet/IP
PRT	PROFINET IO

0	No cable
2	2m (Standard)
3	3m
5	5m

* When a field network specification is selected, the I/O cable length is "0" (No cable).

(Note 1) It is left blank if the press program is not used.

Notes

The motor type symbol is normally the same as that of the actuator to be connected, but there are some models which motor types of the controller and actuator do not match. Be sure to check the corresponding models listed below during selection.

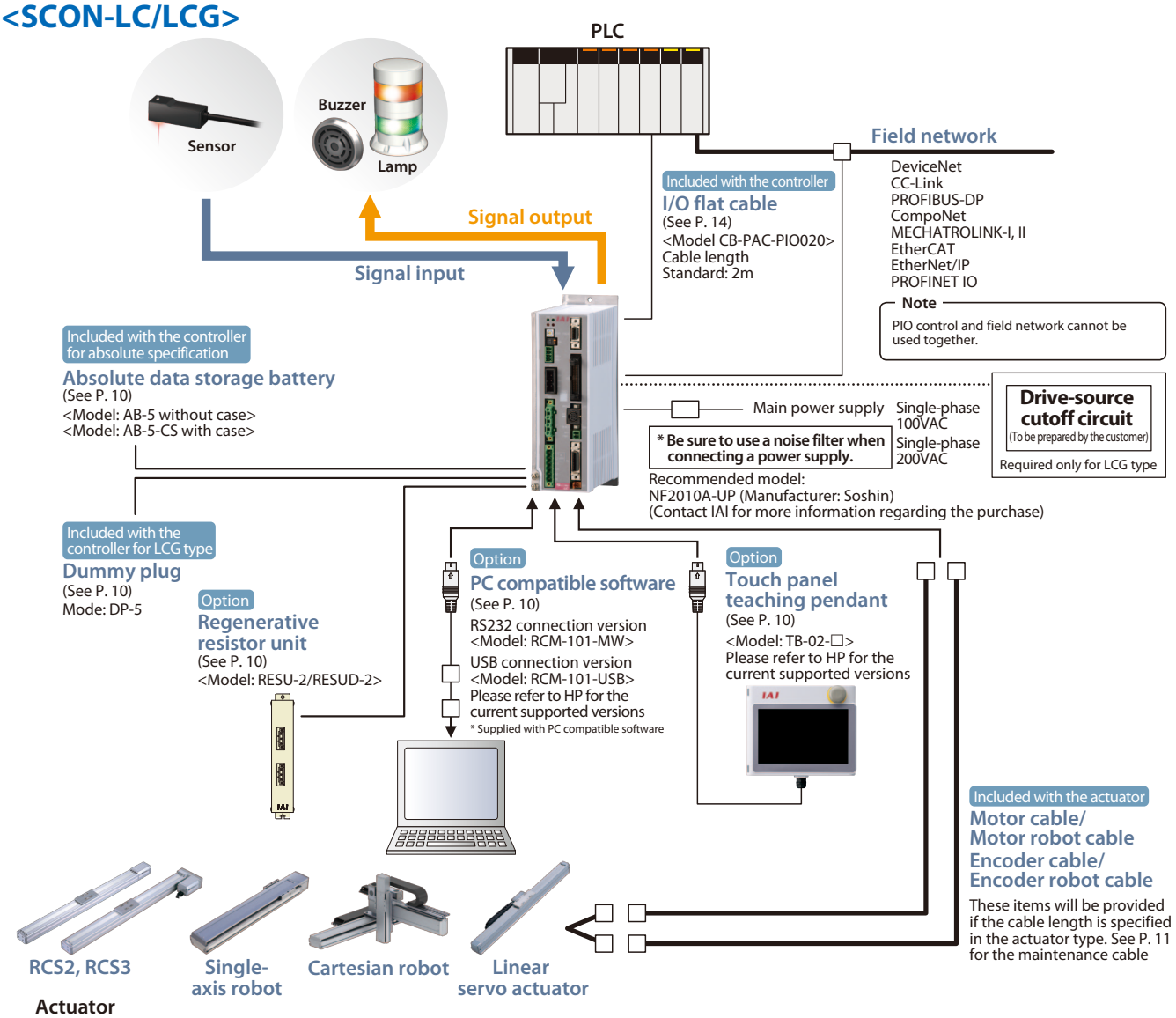
<Actuators for 30D/750S>

● Controller motor type [30D]
RCS3-RA4R

● Controller motor type [750S]
RCS2-RA13R When selecting the LCT option

System Configuration

<SCON-LC/LCG>



Actuator
RCS2 Series*/RCS3 Series/
Single-axis robot/Cartesian robot/Linear servo actuator
* RCS2-RA13R has different wiring. Please refer to the webpage, www.intelligentactuator.com/wiring-RCS2-RA13R, for more information.

Operation Pattern (allocation) of Field Network

Each bit of the field network communication uses generic input and output. If necessary, use a ladder program to connect it to an internal relay with each I/O pattern allocated.

* Set the operation pattern to the parameter No.84 field bus operation mode.

Set value of parameter No.84	Operation pattern	CC link								Excluding CC link							
		Input area				Output area				Input area				Output area			
		RWr0	RWr1	RWr2	RWr3	RWw0	RWw1	RWw2	RWw3	Input 0	Input 1	Input 2	Input 3	Output 0	Output 1	Output 2	Output 3
0	Remote I/O mode	General-purpose input				General-purpose output				General-purpose input				General-purpose output			
1	Position/simple direct value mode																
2	Half direct value mode																
3	Full direct value mode																
4	Remote I/O mode 2																
5	Position/simple direct value mode 2																
6	Half direct value mode 2																
7	Remote I/O mode 3																
8	Half direct value mode 3																

* Check SCON-CB/CGB controller pages on "RCS3 Servo Press" catalog for the specifications of the servo press controller. - www.intelligentactuator.com/servopress

SCON-LC/LCG General Specifications

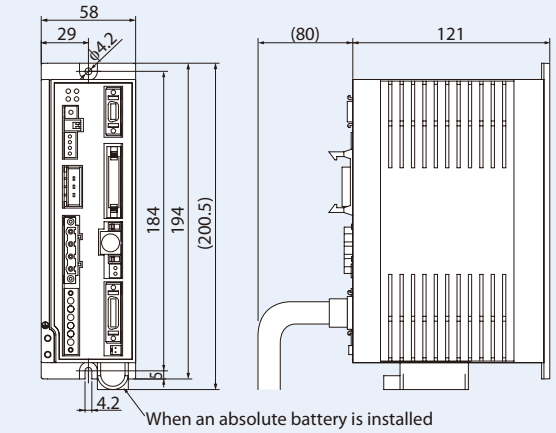
Specifications Table

Item			SCON-LC/LCG	
Compatible motor capacity			Under 400W	400W~750W
Number of controlled axes			1 axis	
Method of operation			Positioner type	
Number of positioning points			512 points (PIO specification), 768 points (field network specification)	
Backup memory			Non-volatile memory (FRAM)	
Power supply voltage			Single-phase 100~115VAC Single-phase 200~230VAC (Power supply fluctuations: within ±10%)	Single-phase 200~230VAC (Power supply fluctuations: within ±10%)
PIO power supply			24VDC ±10%	
Electromagnetic brake power (For actuator with brake)			24VDC ±10%, 1A (MAX) (Supplied from the outside)	
Electromagnetic brake force release			External brake release switch ON/OFF	
Power supply capacity (Note 1)			12W/89VA 20W/74VA 30W (Excluding RS)/94VA 30W (For RS)/186VA 60W (Excluding RCS3-CTZ5C)/186VA 60W (For RCS3-CTZ5C)/245VA 100W/282VA 150W/376VA 200W/469VA	100SW (For LSA/LSAS-N10) (*)/331VA 200SW (For LSA-S10H, LSA/LSAS-N15S) (*)/534VA 200SW (For LSA/LSAS-N15H) (*)/821VA 300SW (For LSA-N19) (*)/710VA 400W (Excluding RCS3-CT8C)/968VA 400W (For RCS3-CT8C)/1,278VA 600W/1,212VA 750W/1,569VA 750SW/1,569VA
Vibration resistant			XYZ directions 10~57Hz single-side width 0.035mm (continuous), 0.075mm (intermittent) 58~150Hz 4.9m/s² (continuous), 9.8m/s² (intermittent)	
Motor control method			Sine wave PWM vector current control	
Compatible encoder			Incremental serial encoder Absolute serial encoder Battery-less absolute encoder ABZ (UVW) parallel encoder Quasi absolute encoder	
Drive-source cutoff function			LC: Yes (built-in relay) LCG: None	
Serial communication interface			RS485: 1CH .. Modbus protocol RTU/ASCII compliant, Speed: 9.6~230.4Kbps Can be controlled by serial communication Total cable length: 100m or less	
External interface	PIO specification		24VDC general-purpose signal input/output (NPN/PNP selection) ... Input max. of 16 points, output max. of 16 points	
	Field network specification		DeviceNet, CC-Link, PROFIBUS-DP, CompoNet, MECHATROLINK-I/II, EtherCAT, EtherNet/IP, PROFINET IO	
	Multi-function connector	Serial communication interface 2	For display connection RS485: 1CH .. Modbus protocol RTU/ASCII compliant, Speed: 9.6~230.4Kbps	
		Feedback pulse	Differential type (line-driver type): MAX. 2.5Mpps Open collector method: MAX 500Kpps (JM-08 option)	
Data setting, input method			PC compatible software, touch panel teaching box, teaching box	
Number of Programmable steps			4K	
Data retention memory			Position data and parameters are saved in non-volatile memory. (No limit to rewrite)	
Calendar/clock functionality	Retention time		Approx. 10 days	
	Charging time		Approx. 100 hours	
Protection functionality			Overcurrent, abnormal temperature, fan speed degradation monitoring, encoder disconnection, etc.	
Ambient operating temperature			0~40°C	
Ambient operating humidity			85% or less (Non-condensing)	
Operating ambience			Free from corrosive gases	
Degree of protection			IP20	
Weight			Approx. 900g (25g added for simple absolute specification)	Approx. 1.2kg (25g added for simple absolute specification)
External dimensions (Note 1)			58mm (W) × 194mm (H) × 121mm (D)	72mm (W) × 194mm (H) × 121mm (D)

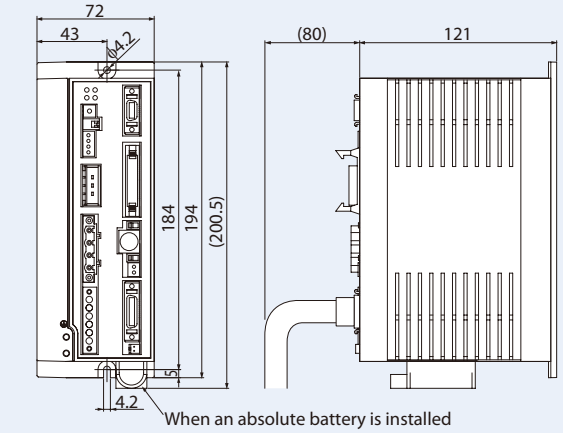
(Note 1) External dimensions of controllers under 400W that operate models marked with (*) are that of 400W~750W.

External Dimensions

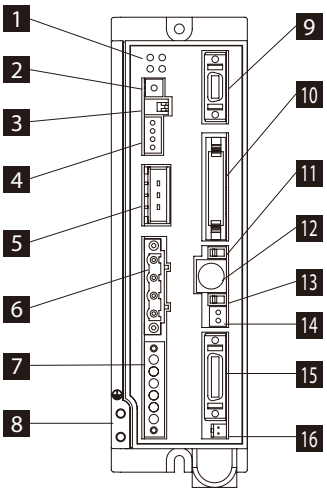
Less than 400W

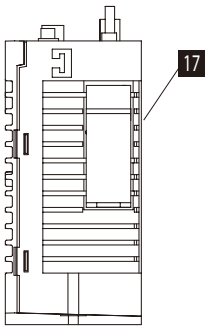


400W~750W



Name of Each Component





1 Status display LED

It represents the state of the controller.

Type	Color	Description
PWR	Green	Lights up on system-ready (after the power is turned on, in normal CPU)
SV	Green	Lights up on servo-on
ALM	Orange	Lights up on alarm
EMG	Red	Lights up on emergency stop

2 Axis number setting switch

A switch for setting the axis number when operating multiple axes by serial communication.

3 Operation mode switch

Switch for the positioner mode and pulse-train PP control mode. Pulse-train PP control mode cannot be selected for this product.

Type	Description
1	Used by the manufacturer for adjustment. Always keep this switch OFF.
2	

4 System I/O connector

Connector for emergency stop switch, etc.

5 Regenerative resistance unit connector

Resistance unit connector for absorbing regenerative current that occurs when the actuator decelerates to a stop.

6 Motor connector

Connector for motor cable of actuator.

7 Power supply connector

Connector for the AC power supply. It has divided inputs on the control power supply side and motor power supply side.

8 Ground terminal

Screw for protective grounding. Be sure to ground.

9 Multi-function connector

Connector for using the feedback pulse output and SIO communication function (SIO2).

10 PIO connector

Cable connector for performing parallel communication with peripheral devices such as PLC. It is not to be installed for the field network specification.

11 Operation mode selection switch

Type	Description
MANU	It does not accept commands from the ladder.
AUTO	It can accept commands from the ladder.

* The stop switch of the teaching box is enabled upon connection regardless of AUTO/MANU. Be sure to turn OFF the power when disconnecting the teaching box and SIO communication cable.

12 SIO connector

Connector for teaching box or PC communication cable.

13 Brake release switch

Electromagnetic forced brake release switch equipped on the actuator.
*24VDC power supply needs to be connected to drive brake.

14 Brake power supply connector

Brake power 24VDC supply connector (required only when a brake-equipped actuator is connected).

15 Encoder/sensor connector

Connector for encoder/sensor cable.

16 Connector for the absolute data backup battery

Absolute data backup battery connector (required only for the absolute encoder specifications).

17 Absolute battery holder

Battery holder for installing the absolute data backup battery.

* Check SCON-CB/CGB controller pages on "RCS3 Servo Press" catalog for the specifications of the servo press controller. - www.intelligentactuator.com/servopress

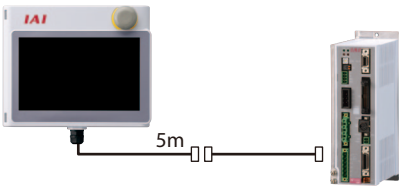
Options

Touch panel teaching pendant

Feature A teaching device equipped with functions such as position teaching, trial operation, and monitoring.

Model **TB-02-□**

Configuration



Specification

Rated voltage	24VDC
Power consumption	3.6W or less (150mA or less)
Ambient operating temperature	0~40°C
Ambient operating humidity	20~ 85% RH (Non-condensing)
Environmental resistance	IP20
Weight	470g (TB-02 unit only)

PC compatible software (Windows only)

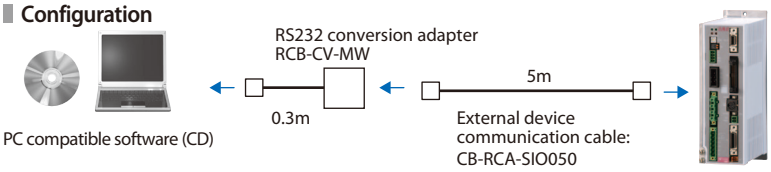
Feature The start-up support software which comes equipped with functions such as position teaching, trial operation, and monitoring. A complete range of functions needed for making adjustments contributes to a reduced start-up time.

Supported Windows versions:
XP SP2 or later/Vista/7/8

Model **RCM-101-MW** (with an external device communication cable + RS232 conversion unit)

Refer to IAI for the current supported versions.

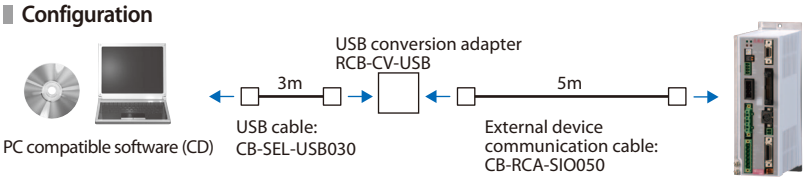
Configuration



Model **RCM-101-USB** (with an external device communication cable +USB conversion adapter + USB cable)

Refer to IAI for the current supported versions.

Configuration



Regenerative resistor unit

Feature Unit that converts the regenerative current generated in motor deceleration to heat. Check the total W of the actuator to be operated in the table below, and prepare one if regenerative resistance is required.

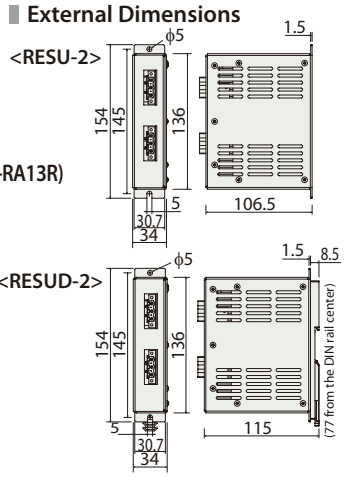
Model **RESU-2** (standard)/**RESUD-2** (DIN rail specification)

* If two regenerative units are required, please prepare RESU-2 and RESU-1 (See "RCS3 Servo Press" catalog).

Specification

Model Number	RESU-2	RESUD-2
Unit weight	Approximately 0.4kg	
Built-in regenerative resistance value	235Ω 80W	
Mounting method	Screw mount	DIN rail mount
Induded cable	CB-SC-REU010	

External Dimensions



Necessary Amount Guideline

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

* More regenerative resistance may be required than the above depending on the operating conditions.
* The measures of the linear servo actuator is in the table above. However, one unit is required for the LSA/LSAS-N10S type.

Necessary Amount Guideline (RCS2-RA13R)

	Lead 2.5	Lead 1.25
Horizontal	1	0
Vertical	1	1

* More regenerative resistance may be required than the above depending on the operating conditions.

Necessary Amount Guideline (DD)

Series	Type	Required number
DD	T18□/LT18□	1
	H18□/LH18□	2

Absolute data storage battery

Feature Absolute data storage battery for operating an actuator of the absolute specification.

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

Dummy plug

Feature This is required when the safety category specification (SCON-LCG) is used.

Model **DP-5**

* Check SCON-CB/CGB controller pages on "RCS3 Servo Press" catalog for the specifications of the servo press controller. - www.intelligentactuator.com/servopress

Maintenance Parts

When placing an order for the replacement cable, please use the model number shown below.

■Table of compatible cables

Model number			Motor cable	Motor robot cable	Encoder cable	Encoder robot cable
①	RCS2(CR/W) RCS3(CR)	Models other than ②~④	CB-RCC-MA□□□	CB-RCC-MA□□□-RB	CB-RCS2-PA□□□	CB-X3-PA□□□
②	RCS3	CTZ5C CT8C			–	CB-X1-PA□□□
③	RCS2	RT	CB-RCC-MA□□□	CB-RCC-MA□□□-RB	CB-RCS2-PLA□□□	CB-X2-PLA□□□
④		RA13R (standard) *2	CB-RCC-MA□□□	CB-RCC-MA□□□-RB	CB-RCS2-PLA□□□	CB-X2-PLA□□□
		RA13R (With brake)			CB-RCS2-PLA□□□ * CB-RCS2-PLA□□□ between the controller and brake	CB-X2-PLA□□□ * CB-X2-PLA□□□ between the controller and brake
⑤	NS	Without LS	–	CB-X-MA□□□	–	CB-X3-PA□□□
⑥		With LS	–		–	CB-X2-PLA□□□
⑦	LSA	S/H/L/N	–		–	CB-X3-PA□□□
		W	–	CB-XMC-MA□□□	–	CB-X2-PLA□□□
⑧	DD DDCR DDW	T18□/LT18□	–	CB-X-MA□□□	–	CB-X3-PA□□□
⑨		H18□/LH18□	–	CB-XMC-MA□□□	–	
⑩	IS(P)WA	S/M/L	–	CB-XEU-MA□□□	–	CB-X1-PA□□□-WC
⑪	Models other than ①~⑩		–	CB-X-MA□□□	–	CB-X1-PA□□□ (For 20m or less) *1
						CB-X1-PA□□□-AWG24 (For 21m or more)
⑫	Models other than ①~⑩ LS specification		–		–	CB-X1-PLA□□□ (For 20m or less) *1
						CB-X1-PLA□□□-AWG24 (For 21m or more)

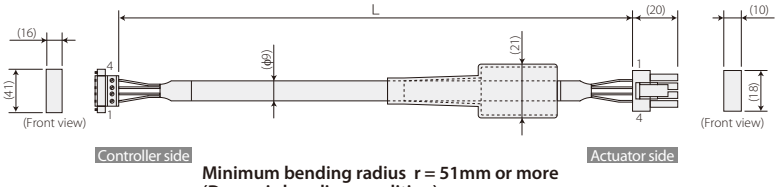
*1 Those that do not have the battery-less absolute specification will also be CB-X1-PA□□□/CB-X1-PLA□□□ for 21m or more.
*2 For the RCS2-RA13R load cell specification cables, refer to SCON-CB/CGB controller pages on "RCS3 Servo Press" catalog - www.intelligentactuator.com/servopress

Model number		PIO flat cable
⑬	SCON-LC/LCG	CB-PAC-PIO□□□

* Check SCON-CB/CGB controller pages on "RCS3 Servo Press" catalog for the specifications of the servo press controller. - www.intelligentactuator.com/servopress

Model Number CB-RCC-MA□□□/CB-RCC-MA□□□-RB

* Please indicate the cable length (L) in □□□, e.g.) 080 = 8m, maximum 30m



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

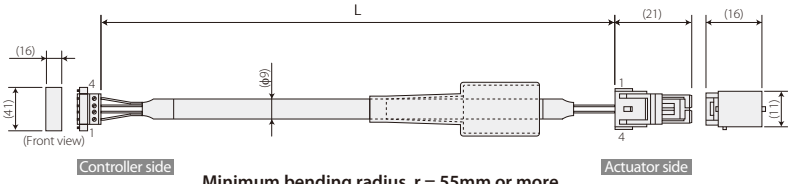
No.	Signal	Color	Wiring
1	U	Red	0.75sq (Crimped)
2	V	White	
3	W	Black	
4	PE	Green	

Minimum bending radius r = 51mm or more (Dynamic bending condition)

*** Please use the robot cable if the cable needs to be installed through the cable track.**

Model Number CB-XMC-MA□□□

* Please indicate the cable length (L) in □□□, e.g.) 080 = 8m SCON/SSEL: 20m, XSEL: 30m



Wiring	Color	Signal	No.
1.25sq	Green	PE	1
	Red	U	2
	White	V	3
	Black	W	4

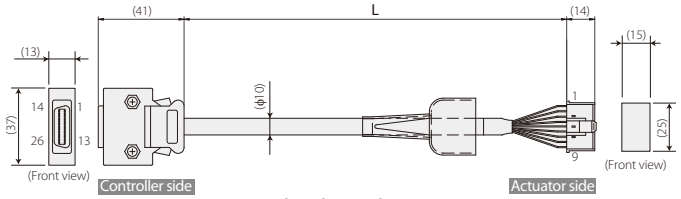
No.	Signal	Color	Wiring
1	U	Red	1.25sq (Crimped)
2	V	White	
3	W	Black	
4	PE	Green	

Minimum bending radius r = 55mm or more (Dynamic bending condition)

*** Only robot cable is available for this model (Standard non-robot cable unavailable)**

Model Number CB-RCS2-PA□□□ (for RCS2/RCS3)/CB-X3-PA□□□ (for NS/RCS2/RCS3)

* Please indicate the cable length (L) in □□□, e.g.) 080 = 8m, maximum 30m



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

Shield is clamp connected to the hood

Drain wire and braided shield

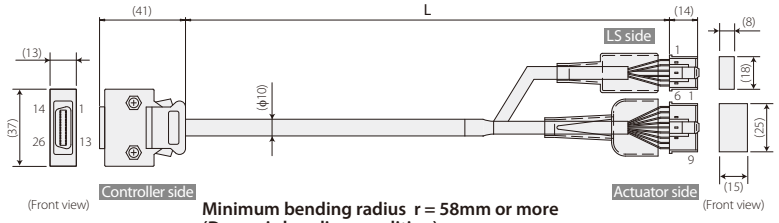
No.	Signal	Color	Wiring
1	A	White/Blue	AWG26 (Crimped)
2	A	White/Yellow	
3	B	White/Red	
4	B	White/Black	
5	Z	White/Purple	
6	Z	White/Gray	
7	LS+	White/Orange	
8	—	—	
9	FG	Drain	
10	SD	Orange	
11	SD	Green	
12	BAT+	Purple	
13	BAT−	Gray	
14	VCC	Red	
15	GND	Black	
16	LS−	White/Green	
17	BK−	Blue	
18	BK+	Yellow	

Minimum bending radius r = 58mm or more (Dynamic bending condition)

*** Please use the robot cable if the cable needs to be installed through the cable track.**

Model Number CB-RCS2-PLA□□□ (for RCS2 rotary)/CB-X2-PLA□□□ (NS LS specification/for RCS2 rotary)

* Please indicate the cable length (L) in □□□, e.g.) 080 = 8m, maximum 30m



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

Shield is clamp connected to the hood

Drain wire and braided shield

(White/blue cable colors indicate the band color and insulator color.)

No.	Signal	Color	Wiring
1	E24V	Brown/White	AWG26 (Crimped)
2	0V	Gray/White	
3	LS	Red/White	
4	CREEP	Black/White	
5	OT	Yellow/Black	
6	RSV	Pink/Black	

No.	Signal	Color	Wiring
1	A+	Pink	AWG26 (Crimped)
2	A−	Purple	
3	B+	White	
4	B−	Blue/Red	
5	Z+	Orange/White	
6	Z−	Green/White	
7	—	–	
8	—	–	
9	FG	Drain	
10	SD	Blue	
11	SD	Orange	
12	BAT+	Black	
13	BAT−	Blue	
14	VCC	Green	
15	GND	Brown	
16	—	–	
17	BK−	Gray	
18	BK+	Red	

Minimum bending radius r = 58mm or more (Dynamic bending condition)

*** Please use the robot cable if the cable needs to be installed through the cable track.**

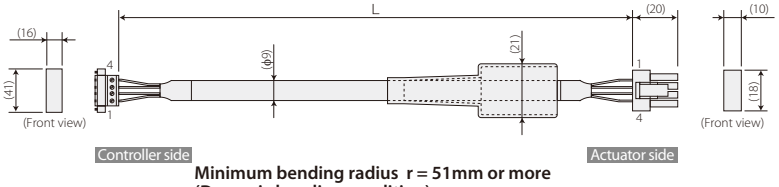
*** The above is the wiring diagram of encoder cables. For the wiring diagram of encoder robot cables, please contact IAI.**

Maintenance Parts

When placing an order for the replacement cable, please use the model number shown below.

Model Number CB-X-MA□□□

* Please indicate the cable length (L) in □□□, e.g.) 080 = 8m, maximum 30m



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

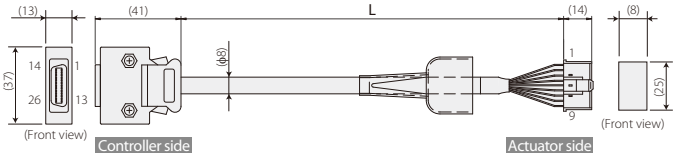
No.	Signal	Color	Wiring
1	U	Red	0.75sq (Crimped)
2	V	White	
3	W	Black	
4	PE	Green	

Minimum bending radius r = 51mm or more (Dynamic bending condition)

*** Only robot cable is available for this model. (Standard non-robot cable unavailable)**

Model Number CB-X1-PA□□□

* Please indicate the cable length (L) in □□□, e.g.) 080 = 8m, maximum 30m



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

Shield is clamp connected to the hood

Drain wire and braided shield

No.	Signal	Color	Wiring
1	BAT+	Purple	AWG26 (Crimped)
2	BAT–	Gray	
3	SD	Orange	
4	SD	Green	
5	VCC	Red	
6	GND	Black	
7	FG	Drain	
8	BK–	Blue	
9	BK+	Yellow	

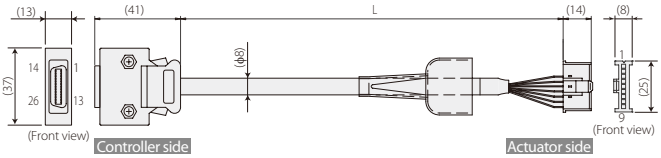
Minimum bending radius r = 44mm or more (Dynamic bending condition)

*** Only robot cable is available for this model. (Standard non-robot cable unavailable)**

*** If you require ISB/ISDB/ISDBCR (encoder type is battery-less absolute) with the cable of 21m or longer, select the CB-X1-PA□□□-AWG24.**

Model Number CB-X1-PA□□□-AWG24

* Please indicate the cable length (L) in □□□, e.g.) 021 = 21m, maximum 30m



Wiring	Color	Signal	No.
AWG24 (Soldered)	–	–	10
	–	–	11
	–	E24V	12
	–	OV	13
	–	LS	26
	–	CREEP	25
	–	OT	24
	–	RSV	23
	–	–	9
	–	–	18
	–	–	19
	–	A+	1
	–	A–	2
	–	B+	3
	–	B–	4
	–	Z+	5
	–	Z–	6
	Orange	SRD+	7
	Green	SRD–	8
	–	BAT+	14
	–	BAT–	15
	Red	VCC	16
	Black	GND	17
	Blue	BKR–	20
	Yellow	BKR+	21
	–	–	22

Shield is clamp connected to the hood

Twisted pair

Drain wire and braided shield

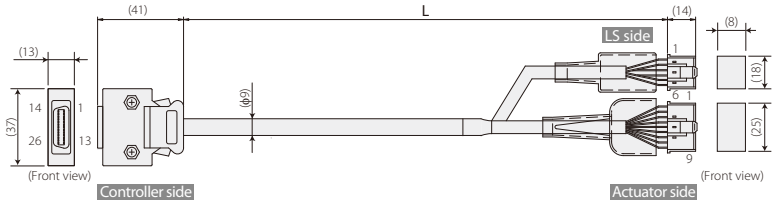
No.	Signal	Color	Wiring
1	BAT+	–	AWG24 (Crimped)
2	BAT-	–	
3	SD	Orange	
4	SD	Green	
5	VCC	Red	
6	GND	Black	
7	FG	Drain	
8	BK-	Blue	
9	BK+	Yellow	

Minimum bending radius r = 44mm or more (Dynamic bending condition)

*** Only robot cable is available for this model. (Standard non-robot cable unavailable)**

Model Number CB-X1-PLA□□□

* Please indicate the cable length (L) in □□□, e.g.) 080 = 8m, maximum 30m



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

Shield is clamp connected to the hood

Drain wire and braided shield

No.	Signal	Color	Wiring
1	E24V	White/Blue	AWG26 (Crimped)
2	OV	White/Yellow	
3	LS	White/Red	
4	CREEP	White/Black	
5	OT	White/Purple	
6	RSV	White/Gray	

No.	Signal	Color	Wiring
1	BAT+	Purple	AWG26 (Crimped)
2	BAT–	Gray	
3	SD	Orange	
4	SD	Green	
5	VCC	Red	
6	GND	Black	
7	FG	Drain	
8	BK–	Blue	
9	BK+	Yellow	

(White/blue cable colors indicate the band color and insulator color.)

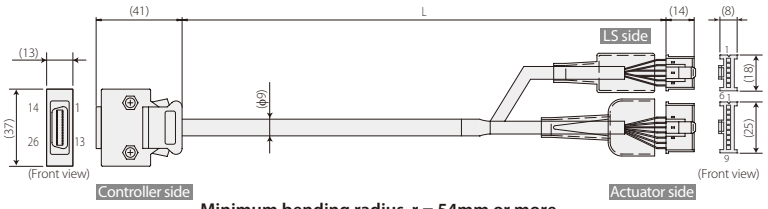
Minimum bending radius r = 54mm or more (Dynamic bending condition)

*** Only robot cable is available for this model. (Standard non-robot cable unavailable)**

*** If you require ISB/ISDB/ISDBCR (encoder type is battery-less absolute) with the cable of 21m or longer, select the CB-X1-PLA□□□-AWG24.**

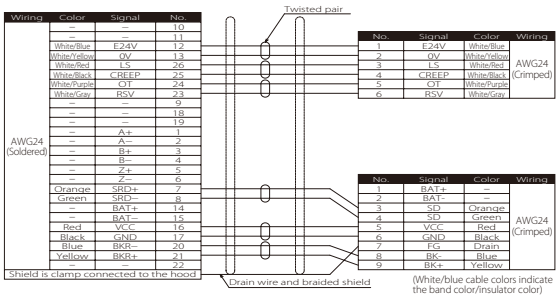
Model Number CB-X1-PLA□□□-AWG24

* Please indicate the cable length (L) in □□□, e.g.) 080 = 8m, maximum 30m



Minimum bending radius r = 54mm or more (Dynamic bending condition)

*** Only robot cable is available for this model. (Standard non-robot cable unavailable)**



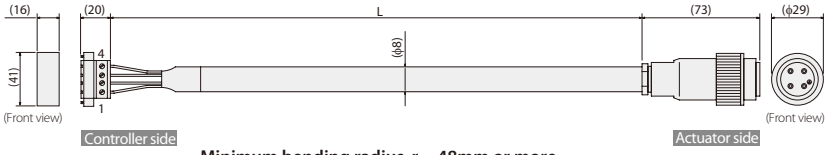
Wiring	Color	Signal	No.
	–	–	10
	–	–	11
	White/Blue	E24V	12
	White/Yellow	0V	13
	White/Red	LS	26
	White/Black	CREEP	25
	White/Purple	OT	24
	White/Gray	RSV	23
	–	–	9
	–	–	18
	–	–	19
	–	A+	1
	–	A–	2
	–	B+	3
	–	B–	4
	–	Z+	5
	–	Z–	6
	Orange	SRD+	7
	Green	SRD–	8
	–	BAT+	14
	–	BAT–	15
	Red	VCC	16
	Black	GND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

No.	Signal	Color	Wiring
1	E24V	White/Blue	AWG24 (Crimped)
2	0V	White/Yellow	
3	LS	White/Red	
4	CREEP	White/Black	
5	OT	White/Purple	
6	RSV	White/Gray	

No.	Signal	Color	Wiring
1	BAT+	–	AWG24 (Crimped)
2	BAT–	–	
3	SD	Orange	
4	SD	Green	
5	VCC	Red	
6	GND	Black	
7	FG	Drain	
8	BK–	Blue	
9	BK+	Yellow	

Model Number CB-XEU-MA□□□

* Please indicate the cable length (L) in □□□, e.g.) 080 = 8m, maximum 30m



Minimum bending radius r = 48mm or more (Dynamic bending condition)

*** Only robot cable is available for this model. (Standard non-robot cable unavailable)**

Plug
GIC2.5/4-STF-7.62 (Phoenix)

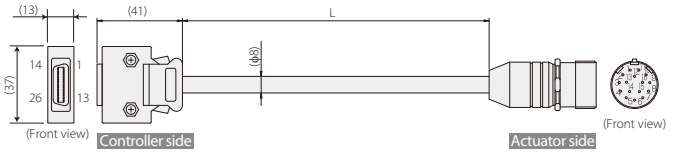
Wiring	Signal	No.
0.75sq	PE	1
	U	2
	V	3
	W	4

Plug connector
99-4222-00-04(BINDER)

No.	Signal	Wiring
⊕	PE	0.75sq (Crimped)
1	U	
2	V	
3	W	

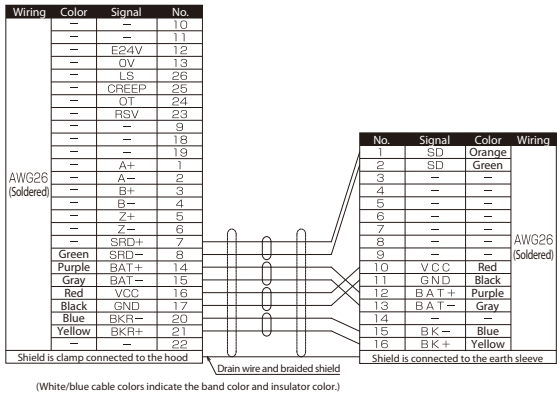
Model Number CB-X1-PA□□□-WC

* Please indicate the cable length (L) in □□□, e.g.) 080 = 8m, maximum 30m



Minimum bending radius r = 44mm or more (Dynamic bending condition)

*** Only robot cable is available for this model. (Standard non-robot cable unavailable)**

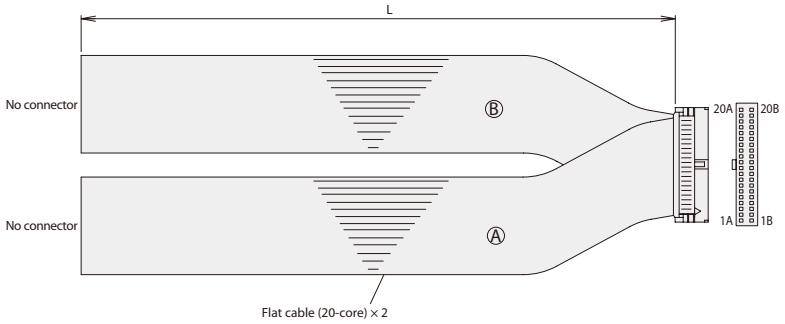


Wiring	Color	Signal	No.
	–	–	10
	–	–	11
	–	E24V	12
	–	0V	13
	–	LS	26
	–	CREEP	25
	–	OT	24
	–	RSV	23
	–	–	9
	–	–	18
	–	–	19
	–	A+	1
	–	A–	2
	–	B+	3
	–	B–	4
	–	Z+	5
	–	Z–	6
	–	SRD+	7
	Green	SRD–	8
	Purple	BAT+	14
	Gray	BAT–	15
	Red	VCC	16
	Black	GND	17
	Blue	BKR–	20
	Yellow	BKR+	21
	–	–	22

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

Model Number CB-PAC-PIO□□□

* Please indicate the cable length (L) in □□□, e.g.) 080 = 8m, maximum 10m



HIF6-40D-1.27R

No.	Signal Type	Cable Color	Wiring
1A	24V	Brown-1	Flat cable (Crimped) Ⓐ
2A	24V	Red-1	
3A	–	Orange-1	
4A	–	Yellow-1	
5A	IN0	Green-1	
6A	IN1	Blue-1	
7A	IN2	Purple-1	
8A	IN3	Gray-1	
9A	IN4	White-1	
10A	IN5	Black-1	
11A	IN6	Brown-2	
12A	IN7	Red-2	
13A	IN8	Orange-2	
14A	IN9	Yellow-2	
15A	IN10	Green-2	
16A	IN11	Blue-2	
17A	IN12	Purple-2	
18A	IN13	Gray-2	
19A	IN14	White-2	
20A	IN15	Black-2	

No.	Signal Type	Cable Color	Wiring
1B	OUT0	Brown-3	Flat cable (Crimped) AWG28 Ⓑ
2B	OUT1	Red-3	
3B	OUT2	Orange-3	
4B	OUT3	Yellow-3	
5B	OUT4	Green-3	
6B	OUT5	Blue-3	
7B	OUT6	Purple-3	
8B	OUT7	Gray-3	
9B	OUT8	White-3	
10B	OUT9	Black-3	
11B	OUT10	Brown-4	
12B	OUT11	Red-4	
13B	OUT12	Orange-4	
14B	OUT13	Yellow-4	
15B	OUT14	Green-4	
16B	OUT15	Blue-4	
17B	–	Purple-4	
18B	–	Gray-4	
19B	0V	White-4	
20B	0V	Black-4	

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IAI America, Inc.

Headquarters: 2690 W. 237th Street, Torrance, CA 90505 (800) 736-1712
Chicago Office: 110 E. State Pkwy, Schaumburg, IL 60173 (800) 944-0333
Atlanta Office: 1220 Kennestone Circle, Suite 108, Marietta, GA 30066 (888) 354-9470

www.intelligentactuator.com

IAI Industrieroboter GmbH
Ober der Röth 4, D-65824 Schwalbach am Taunus, Germany

IAI (Shanghai) Co., Ltd.
Shanghai Jiahua Business Center A8-303, 808,
Hongqiao Rd., Shanghai 200030, China

IAI Robot (Thailand) Co., Ltd.
825 Phairojkijja Tower 12th Floor, Bangna-Trad RD.,
Bangna, Bangna, Bangkok 10260, Thailand