

PSEL, ASEL

First Step Guide Fifth Edition

Thank you for purchasing our product.

Make sure to read the Safety Guide and detailed Instruction Manual as well as this First Step Guide to ensure correct use. This Instruction Manual is original.

Warning : Read the instruction manual carefully and follow the instruction manual when handling this equipment. Please download the user's manual from our website. You can download it free of charge. User registration is required for first time users.
 URL:www.iai-robot.co.jp/data_d/CAD_MANUAL/

Keep a printout of the introduction manual near the equipment in which this product is installed so that it can be checked at all times, or display it on your computer, tablet terminal, etc. so that you can check it immediately.
 If you need a bound copy of the instruction manual, order it from the nearest sales office listed in the First Step Guide or at the end of the instruction manual. It will be provided for a fee.

- Using or copying all or part of this Instruction Manual without permission is prohibited.
- The company names, names of products and trademarks of each company shown in the sentences are registered trademarks.

Product Check

This product is comprised of the following parts if it is of standard configuration.

If you find any fault in the contained model or any missing parts, contact us or our distributor.

1. Parts (The option is excluded.)

No.	Part Name	Model
1	Controller	Refer to "How to read the model plate" and "How to read the model of the controller".
Accessories		
2	I/O Flat cable	CB-DS-PIO*** ***indicates the cable length.
3	Battery for saving Absolute Data *1	AB-5
4	Control Power Unit•System I/O plug	MC1.5/6-ST-3.5 (Maker: PHOENIX CONTACT)
5	Motor Power Plug	MSTB2.5/2-STF-5.08 (Maker: PHOENIX CONTACT)
6	First Step Guide	ME0210
7	Safety Guide	M0194

*1 It is attached when the unit is absolute type.

2. Teaching Tool (Option)

A teaching tool such as PC software is necessary to perform commissioning of this product. Any of the following teaching tools may be used.

No.	Part Name	Model
1	PC Software (with RS232C Cable + Emergency Stop Box + Connector conversion adapter)	IA-101-X-MW-J
2	PC Software (USB Cable with a dummy plug)	IA-101-X-USB
3	Teaching pendant	SEL-T
4	Teaching pendant (with deadman switch)	SEL-TD
5	Teaching pendant (with deadman switch + TP adapter (IA-LB-TG))	SEL-TG
6	Teaching pendant	IA-T-X
7	Teaching pendant (with deadman switch)	IA-T-XD
8	Panel Unit *2	PU-1

*2 It is the unit specially for "Status" indication.

3. Operation manuals related to this product

No.	Name	Manual No.
1	PSEL Controller Operation Manual	ME0172
2	ASEL Controller Operation Manual	ME0165
3	PC Software IA-101-X-MW/ IA-101-X-USBMW	ME0154
4	Teaching pendant SEL-T/TD/TG	ME0183
5	Teaching pendant IA-T-X/XD	ME0160
6	DeviceNet Operation Manual	ME0124
7	CC-Link Operation Manual	ME0123
8	PROFIBUS-DP Operation Manual	ME0153
9	EtherCAT Operation Manual	ME0309
10	EtherNet/IP Operation Manual	ME0308

4. How to read the model plate

Model → MODEL PSEL-C-2-42PI-42PI-NP-2-0
 Serial number → SERIAL No. 600117538 MADE IN JAPAN

5. How to read the model of the controller

[PSEL]

PSEL - C - 2 - 20PI - 20PIB - NP - 2 - 0 - ABU - H
 ① ② ③ ④ ④ ⑤ ⑥ ⑦ ⑧ ⑨

Model table

① Series	② Controller Type	③ Number of axes	④ Details of axis 1 to axis 2			⑤ Standard I/O	⑥ I/O Flat cable length	⑦ Power-supply voltage	⑧ Simple absolute unit	⑨ High acceleration transportati on type
PSEL	C (Standard Type) CS (Standard Type)	1 (1-axis)	20P (20 angles)	I (Incremental)	Not Specified (w/o brake)	NP Standard PIO Input 24/ Output 8 NPN type	2 : 2m (standard)	0 : 24VDC	Not Specified (Not use)	Not Specified (standard)
		2 (2-axis)	28P (28 angles) 28SP (For RCP2-RA3C) 35P (35 angles) 42P (42 angles) 56P (56 angles)			PN Standard PIO Input 24/ Output 8 PNP type	3 : 3m 5 : 5m 0 : None			

[ASEL]

ASEL - C - 2 - 30A - 30AB - NP - 2 - 0
 ① ② ③ ④ ④ ⑤ ⑥ ⑦

Model table

① Series	② Controller Type	③ Number of axes	④ Details of axis 1 to axis 2						⑤ Standard I/O	⑥ I/O Flat cable length	⑦ Power-supply voltage
			Motor Output	Encoder type	Brake	Home Sensor	High Accel/Decel Type	Less Power consumption Type			
ASEL	C (Standard Type) CS (Standard Type)	1 (1-axis)	2 (2W)	I (Incremental) A (Absolute)	Not Specified (w/o brake)	Not Specified (w/o home sensor)	Not Specified (Standard Type)	Not Specified (Standard Type)	NP Standard PIO Input 24/ Output 8 NPN type	2 : 2m (standard)	0 : 24VDC
		2 (2-axis)	5 (5W) 10 (10W) 20S (20W*) 20 (20W) 30 (30W)								

*1 : When the RCA-RA3C, -RA3D, -RA3R, -RGS3C, -RGS3D, -RGD3C, -RGD3D, RCA2-SA4C or -TA5C is connected, the motor type should be 20S.

Basic Specifications

PSEL Specifications

Specification Item		Single-Axis Type		Double-Axis Type	
Control Power Source Voltage		24VDC ± 10%			
Motor Power Source Voltage		24VDC ± 10%			
Control Power Capacity		1.2A			
Motor Power Capacity ^{*1}	Actuator	Rated	Max ^{*2}	Rated	Max ^{*2}
	20, 28P, 28SP Motor	0.4A	2.0A	0.8A	4.0A
	35, 42, 56P Motor	1.2A		2.4A	
Heating value		14.4W			
Momentary Power Interruption Tolerance		0.5msec			
Insulation Resistance		500VDC 10MΩ or more			
Insulation Strength		400VAC for 1min (Between all power terminals and FG)			
Axis Control System		AC Full -digital Servo			
Encoder Resolution		800Pulse/rev			
Battery for Backup		For System Memory Backup : Manufactured by our company AB-5 (Option)			
Program language		Super SEL language			
Max. Number of program steps		2000 steps			
Max. Number of position		1500 positions			
Max. Number of programs		64 programs			
Max. Number of multitask programs		8 programs			
Data storage device		Flash ROM + SRAM battery backup (Option)			
Data input method		Teaching pendant or PC software			
I/O Interface		24 Input Points (Total of Dedicated Input Points + Universal Input Points) 8 Output Points (Total of Dedicated Output Points + Universal Output Points)			
PIO Interface Power Unit		24VDC ± 10% (Externally supplied)			
Serial Communication Interface		RS232C : 1CH · · Dedicated protocol (at AUTO Mode) or for connection to PC software			
USB Interface		1CH (B Connector) · · Dedicated protocol (at AUTO Mode) or for connection to PC software			
Communication cable length	RS232C	15m or less			
	USB	5m or less			
System I/O		Emergency-stop input, safety gate input			
Protective functions		Overvoltage, motor over current, motor overload, driver temperature abnormality, and Encoder abnormality etc.			
Drive-source cutoff method		Internal Relay			
Environ-ment	Surrounding air temperature	0 to +40°C			
	Surrounding humidity	10% to 95%RH (non-condensing)			
	Surrounding environment	There should not be any corrosive gas. In particular, there should not be much dust accumulation.			
	Surrounding storage temperature	-25 to 70 degrees (However, except for battery (option))			
	Surrounding storage humidity	10% to 95%RH (non-condensing)			
	Vibration strength	XYZ directions 10 to 57Hz Pulsating amplitude 0.035mm (continuous)0.075mm (intermittent) 57 to 150Hz 4.9m/s ² (continuous) 9.8m/s ² (intermittent)			
	Impact	147mm/s ² , 11ms Semi-sine wave pulse three times to each of the directions X, Y and Z			
Protection class		IP20			
Cooling method		Natural air-cooling			
Weight		440g			
External dimensions		(Refer to the Item for the External dimensions Dimension)			

- *1 Rush current of the control power when the power is turned ON, is about 30.0A for 5msec both for single axis type and double axis type.
 *2 After the servo-motor is turned on, the excitation detection operation is performed. Excitation phase detection is performed after power-on. In such a case, the current becomes maximum (About 100msec). However, after the motor driving power is turned OFF, when the motor driving power is turned ON again, about 6.0A of current passes for single axis type and 12.0A of current for double axis type. (for approx. 1 to 2msec)



As a +24VDC power supply, select the power supply of the "peak load support" specification or one with sufficient capacity.

ASEL Specifications

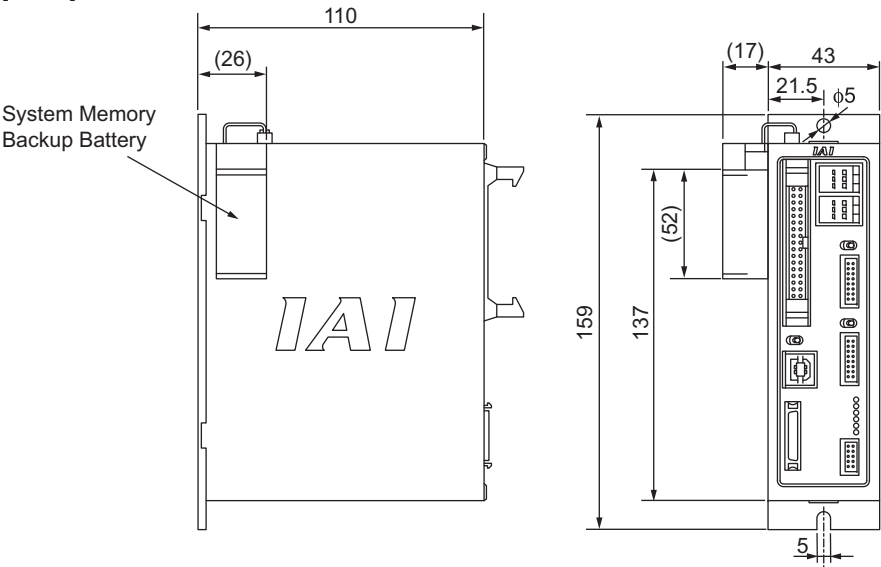
Specification Item		Single-Axis Type				Double-Axis Type				
Control Power Source Voltage		24VDC ± 10%								
Motor Power Source Voltage		24VDC ± 10%								
Control Power Capacity		1.2A								
Motor Power Capacity ^{*1}	Actuator	Standard Type / High Accel/Decel Type		Power consumption Type		Standard Type / High Accel/Decel Type		Power consumption Type		
		Rated	Max ^{*2}	Rated	Max ^{*3}	Rated	Max ^{*2}	Rated	Max ^{*3}	
	R C A	20W	1.3A	4.4A	1.3A	2.5A	2.6A	8.8A	2.6A	5.0A
		30W	1.3A	4.0A	1.3A	2.2A	2.6A	8.0A	2.6A	4.4A
		20W [Model code mark: 20S]	1.7A	5.1A	1.7A	3.4A	3.4A	10.2A	3.4A	6.8A
	R C A 2	10W	1.3A	4.4A	1.3A	2.5A	2.6A	8.8A	2.6A	5.0A
		20W [Model code mark: 20]	1.3A	4.4A	1.3A	2.5A	2.6A	8.8A	2.6A	5.0A
		30W	1.3A	4.0A	1.3A	2.2A	2.6A	8.0A	2.6A	4.4A
	R C L	20W [Model code mark: 20S]	1.7A	5.1A	1.7A	3.4A	3.4A	10.2A	3.4A	6.8A
		2W	0.8A	4.6A			1.6A	9.2A		
		5W	1.0A	6.4A			2.0A	12.8A		
	10W	1.3A	6.4A			2.6A	12.8A			
Heating value		14.4W								
Momentary Power Interruption Tolerance		0.5msec								
Insulation Resistance		500VDC 10MΩ or more								
Insulation Strength		500VAC for 1min (Between all power terminals and FG)								
Axis Control System		AC Full -digital Servo								
Encoder Resolution	RCA	800Pulse/rev								
	RCA2	RCA2-□□□N	1048Pulse/rev							
		Other than RCA2-□□□N	800Pulse/rev							
	RCL	RA1L, SA1L, SA4L, SM4L	715Pulse/rev							
		RA2L, SA2L, RA5L, SA5L	855Pulse/rev							
		RA3L, SA3L, RA6L, SA6L	1145Pulse/rev							
Battery for Backup		For Absolute Data Backup : Manufactured by our company AB-5 For System Memory Backup : Manufactured by our company AB-5 (Option)								
Program language		Super SEL language								
Max. Number of program steps		2000 steps								
Max. Number of position		1500 positions								
Max. Number of programs		64 programs								
Max. Number of multitask programs		8 programs								
Data storage device		Flash ROM + SRAM battery backup (Option)								
Data input method		Teaching pendant or PC software								
I/O Interface		24 Input Points (Total of Dedicated Input Points + Universal Input Points) 8 Output Points (Total of Dedicated Output Points + Universal Output Points)								
PIO Interface Power Unit		24VDC ± 10% (Externally supplied)								
Serial Communication Interface		RS232C : 1CH ・ ・ Dedicated protocol (at AUTO Mode) or for connection to PC software								
USB Interface		1CH (B Connector) ・ ・ Dedicated protocol (at AUTO Mode) or for connection to PC software								
Communication cable length	RS232C	15m or less								
	USB	5m or less								
System I/O		Emergency-stop input, safety gate input								
Protective functions		Overvoltage, motor over current, motor overload, driver temperature abnormality, Encoder abnormality etc.								
Drive-source cutoff method		Internal Relay								
Environ-ment	Surrounding air temperature	0 to +40℃								
	Surrounding humidity	10% to 95%RH (non-condensing)								
	Surrounding environment	There should not be any corrosive gas. In particular, there should not be much dust accumulation.								
	Surrounding storage temperature	-25 to 70 degrees (However, except for battery (option))								
	Surrounding storage humidity	10% to 95%RH (non-condensing)								
	Vibration resistance	XYZ directions 10 to 57Hz Pulsating amplitude 0.035mm (continuous)0.075mm (intermittent) 57 to 150Hz 4.9m/s ² (continuous) 9.8m/s ² (intermittent)								
Impact	147mm/s ² , 11ms Semi-sine wave pulse three times to each of the directions X, Y and Z									
Protection class		IP20								
Cooling method		Natural air-cooling								
Weight		450g								
External dimensions		(Refer to the Item for the External dimensions Dimension)								

- *1 Rush current of the control power when the power is turned ON, is about 30.0A for 5msec both for single axis type and double axis type.
- *2 It is the maximum current in accelerating or decelerating.
- *3 The current reaches its maximum level when the servo-motor exciting phase is detected which is to be performed in the first servo-motor turning ON processing after the power injection. (Normal: Approx. 1 to 2sec, Max.: 10sec)

As a +24VDC power supply, select the power supply of the “peak load support” specification or one with sufficient capacity.

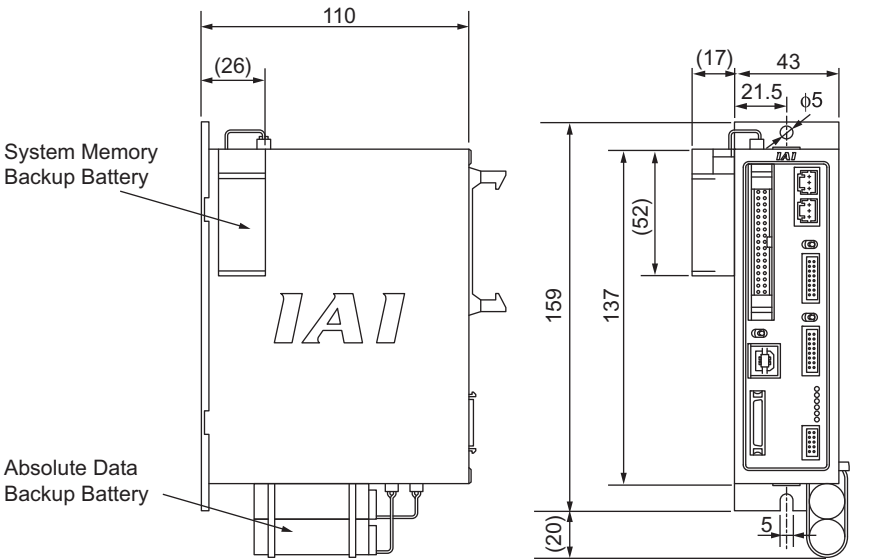
External Dimensions

[PSEL]



- * Same dimensions are applied to both the single axis and double axis units.
- * The above figure shows the condition where the system memory backup battery (option) is attached.

[ASEL]



- * Same dimensions are applied to both the single axis and double axis units.
- * The above figure shows the condition where the system memory backup battery (option) and absolute data backup battery have been attached.

Installation Environment

Do not use this product in the following environment:

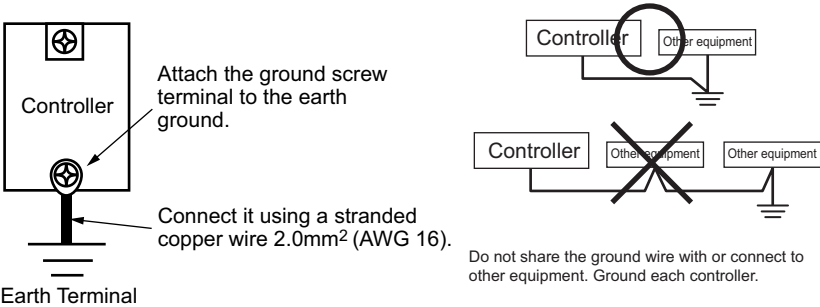
- Location where the surrounding air temperature exceeds the range of 0 to 40°C
- Location where condensation occurs due to abrupt temperature changes
- Location where relative humidity smaller than 30% or larger than 95%RH
- Location exposed to corrosive gases or combustible gases
- Location exposed to significant amount of dust, salt or iron powder
- Location subject to direct vibration or impact
- Location exposed to direct sunlight
- Location where the product may come in contact with water, oil or chemical droplets

When using the product in any of the locations specified below, provide a sufficient shield.

- Location subject to electrostatic noise
- Location where high electrical or magnetic field is present
- Location with the mains or power lines passing nearby

Installation and Noise Elimination

1. Noise Elimination Grounding (Frame Ground)



Class D grounding
(Formerly Class-III grounding: Grounding resistance at 100Ω or less)

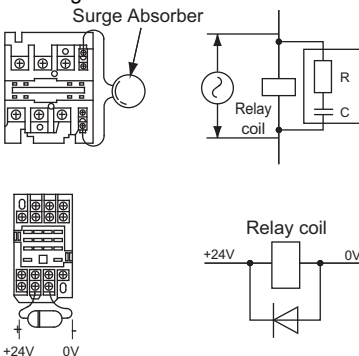
2. Precautions Regarding Wiring Method

- Use a twisted cable for connection to power supply.
- Separate the I/O line, communication line and power or driving line to each other.

3. Noise Sources and Elimination

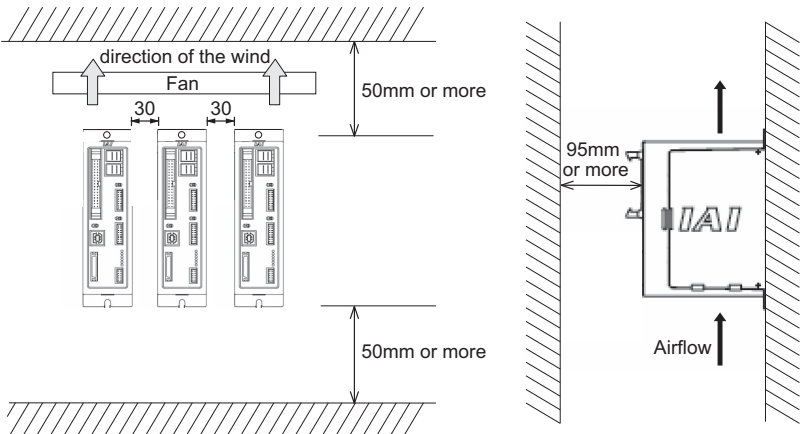
Carry out noise elimination measures for power devices on the same power path and in the same equipment. The following are examples of measures to eliminate noise sources:

- ①AC solenoid valves, magnet switches and relays
[Measure] Install a surge absorber parallel with the coil.
- ②DC solenoid valves, magnet switches and relays
[Measure] Install a diode parallel with the coil. Use a DC relay with a built-in diode.



4. Heat Radiation and Installation

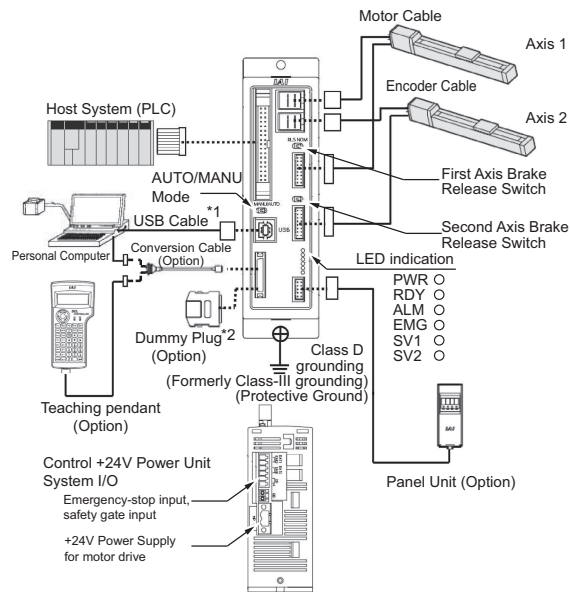
Conduct design and manufacture in consideration of the control box size, controller layout and cooling in such a way that the temperature around the controller will be 40°C or less.



The controller in the above figure is PSEL. ASEL works under the same conditions for PSEL.

Connection Diagram

For PSEL and ASEL controller, the same wiring is applied.



*1 When the PC is connected to the controller using the USB cable, it is required to attach the dummy plug to the controller to short Safety Gate Signal for the PC application software and teaching pendant.

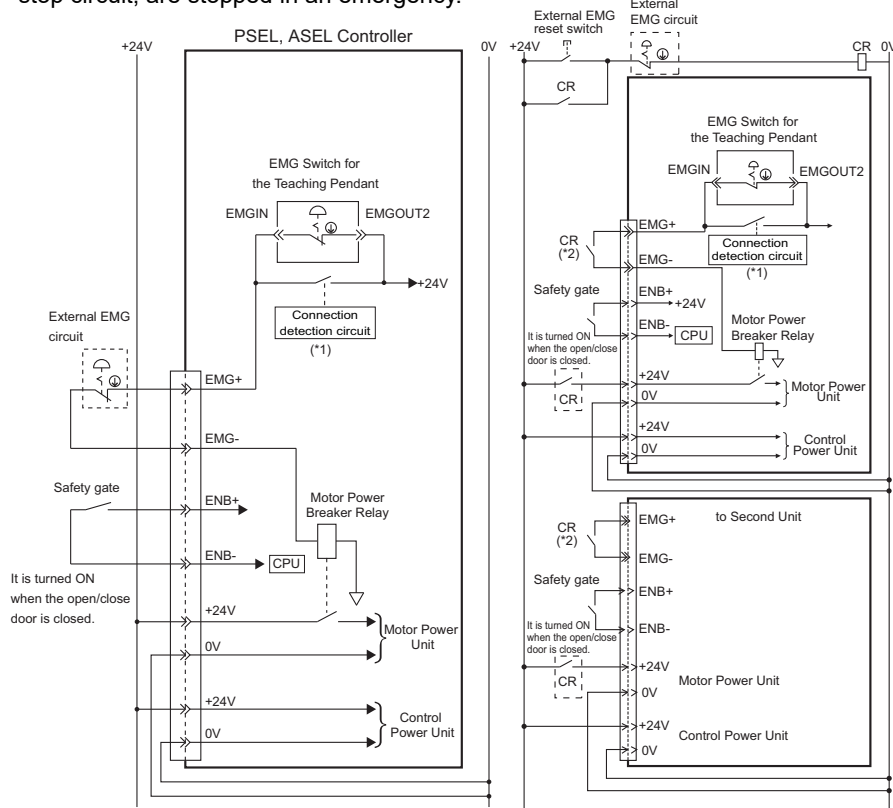
*2 The conversion cable and dummy plug differ depending on the model code of PSEL and ASEL.

Type	Applicable Conversion Cable	Applicable Dummy Plug
PSEL-C ASEL-C	CB-SEL-SJ002	DP-3
PSEL-CS ASEL-CS	CB-SEL-SJS002	DP-4S

Warning When the PC is connected to the controller using the USB cable, the emergency stop box can not be connected. In the case of stop in an emergency, process it in the system.

Wiring for the Power/Emergency Stop Circuit and Brake Forced Release Switch

Shown is an example when two or more controllers on the whole system emergency stop circuit, are stopped in an emergency.



*1 The connection of the teaching pendant is automatically recognized using the controller.

*2 For the CR contacts between EMG "+" and EMG "-", use 24VDC, 0.5A/contact or more.

*3 When the safety category requirements include the motor driving source interception, connect CR.

I/O Signals

Program Mode

Input

Pin No.	Electric wire color	Port No.	Function in Standard Setting (in Delivery)	Parameter No.	Parameter Name	Input Function Set Value (at the delivery from factory)	Input Function Set Value *1	Function
1 A	BR-1	-	I/O power connector + 24V	-	-	-	0	Universal Input
1 B	RD-1	016	Program No. 1 Selection (MSB)	251	Input Function Selection 016	9	1	Program Start (BCD) (ON Edge) Signal
2A	OR-1	017	Program No. 2 Selection (The second bit)	252	Input Function Selection 017	10	2	Program Start (BIN) (ON Edge) Signal
2B	YW-1	018	Program No. 3 Selection (The third bit)	253	Input Function Selection 018	11	3	Software Reset (Turning ON for 1 second)
3A	GN-1	019	Program No. 4 Selection (The fourth bit)	254	Input Function Selection 019	12	4	Servo ON signal (ON Edge)
3B	BL-1	020	Program No. 5 Selection (The fifth bit)	255	Input Function Selection 020	13	5	Automatic Start Program Start-up Signal (ON Edge)
4A	PL-1	021	Program No. 6 Selection (The sixth bit)	256	Input Function Selection 021	14	6	All servo-axes soft interlock (OFF level)
4B	GY-1	022	Program No. 7 Selection (The seventh bit)	257	Input Function Selection 022	15	7	Operation Pause Cancellation (ON Edge)
5A	WT-1	023	Program No. 8 Selection (The eighth bit)	258	Input Function Selection 023	3	8	Pause Signal (OFF level)
5B	BK-1	000	Program Start	30	Input Function Selection 000	1	9	Program No. appointment (MSB)
6A	BR-2	001	Universal Input	31	Input Function Selection 001	0	10	Program No. appointment (The second bit)
6B	RD-2	002	Universal Input	32	Input Function Selection 002	0	11	Program No. appointment (The third bit)
7A	OR-2	003	Universal Input	33	Input Function Selection 003	0	12	Program No. appointment (The fourth bit)
7B	YW-2	004	Universal Input	34	Input Function Selection 004	0	13	Program No. appointment (The fifth bit)
8A	GN-2	005	Universal Input	35	Input Function Selection 005	0	14	Program No. appointment (The sixth bit)
8B	BL-2	006	Universal Input	36	Input Function Selection 006	0	15	Program No. appointment (The seventh bit)
9A	PL-2	007	Universal Input	37	Input Function Selection 007	0	16	Error Reset (ON edge)
9B	GY-2	008	Universal Input	38	Input Function Selection 008	0	17	Driving Power Interruption Cancellation Input (ON Edge)
10A	WT-2	009	Universal Input	39	Input Function Selection 009	0	18	Homing Command Signal for All Effective Axes (ON Edge)
10B	BK-2	010	Universal Input	40	Input Function Selection 010	0	19	All Increment Effective Axes Homing(ON Edge)
11A	BR-3	011	Universal Input	41	Input Function Selection 011	0	20	PC and Teaching Pendant Servo-Motor Movement Command Receipt Permission Input
11B	RD-3	012	Universal Input	42	Input Function Selection 012	0	21	Remote Mode Control Input
12A	OR-3	013	Universal Input	43	Input Function Selection 013	0	22	First Axis Brake Forced Release Input
12B	YW-3	014	Universal Input	44	Input Function Selection 014	0	23	Second Axis Brake Forced Release Input
13A	GN-3	015	Universal Input	45	Input Function Selection 015	0		

*1 When the input function set values (0 to 23) are set in the I/O parameters 30 to 45 (input function selection 000 to 015) and I/O parameters 251 to 258 (input function selection 016 to 023), the set functions are allocated.

Program Mode

Output

Pin No.	Electric wire color	Port No.	Function in Standard Setting (in Delivery)	Parameter No.	Parameter Name	Output Function Set Value (at the delivery from factory)	Output Function Set Value *1	Function
13B	BL-3	300	Alarm Output	46	Output Function Selection 300	2	0	Universal Input
14A	PL-3	301	READY Output	47	Output Function Selection 301	7	1	Error Output at the Operation Cancellation Level or more(ON)
14B	GY-3	302	Universal Output	48	Output Function Selection 302	0	2	Error Output at the Operation Cancellation Level or more(OFF)
15A	WT-3	303	Universal Output	49	Output Function Selection 303	0	3	Error Output at the Operation Cancellation Level or more+ Emergency-stop Output (ON)
15B	BK-3	304	Universal Output	50	Output Function Selection 304	0	4	Error Output at the Operation Cancellation Level or more+ Emergency-stop Output (OFF)
16A	BR-4	305	Universal Output	51	Output Function Selection 305	0	5	READY Output (PIO Trigger Program Operation Available)
16B	RD-4	306	Universal Output	52	Output Function Selection 306	0	6	READY Output (PIO Trigger Program Operation Available) and without occurrence of any error at the operation cancellation level or more
17A	OR-4	307	Universal Output	53	Output Function Selection 307	0	7	READY Output (PIO Trigger Program Operation Available) and READY Output (PIO Trigger Program Operation Available), and without occurrence of any error at the cold start level or more or more level or more
17B	YW-4	N	I/O power connector 0V	-	-	-	8	Emergency-stop Output(ON)
							9	Emergency-stop Output (OFF)
							10	AUTO Mode Output
							11	Output during the Automatic Operation
							12	Output at the time of "All Effective Axes Homing (=0)"
							13	Output when all the effective axes homing is completed
							14	Output when all the effective axes home preset coordinates are set
							15	System Memory Battery (Option) Voltage Drop Warning Output
							16	Voltage Drop Warning Output for the Battery (Option) for maintaining the Absolute Data
							17	Driving Source Interception (SDN) Notification Output
							24	Output during the first axis servo ON
							25	Output during the second axis servo ON

*1 When the output function set values (0 to 17, 24, 25) are set in the I/O parameters 46 to 53 (output function selection 300 to 307), the set functions are allocated. The mixed allocation of output function set values 1, 2, 3 and 4 is not available. The mixed allocation of output function set value 5, 6 and 7 is not available.

Positioner Mode Function description for I/O Signals

Input

Signal Abbreviation	Signal Name	Function Description	Parameter No.25				
			1	2	3	4	16
PC1 to PC13 PC1 to PC11	Command Position No. Signal	Input of the position number to move (binary input)	○		○	○	
Item Change Mode PC1 to PC16	Position/Item No. Signal	Input of the No. of item to be moved and position No. (Binary Input)		○			
DC-S-C1 Interchangeable Mode PC1 to PC1000	Command Position No. Signal	Input of the position number to move (BCD input) (PC1 to 8 : Units Digit, PC10 to 80 : Tens Digit, PC100 to 800 : Hundreds Digit, PC1000 : Thousands Digit)					○
RES	Reset Signal	An alarm will be reset when this signal is turned ON. Also, when it is turned ON in the pause mode (*STP is turned OFF), the remaining movement amount can be cancelled.	○	○	○	○	
CSTR	PTP Strobing Signal (Start Signal)	The actuator will start to move to the position set by the command position number.	○	○			○
Double Axis Independent Mode CSTR1, CSTR2	PTP Strobing Signal (Start Signal)	The actuator will start to move to the position set by the command position number. • CSTR1 : First Axis • CSTR2 : Second Axis			○		
HOME	Home Return Signal	The controller will perform home return operation when this signal is turned ON.	○	○			
Double Axis Independent Mode HOME1, HOME2	Home Return Signal	The controller will perform home return operation when this signal is turned ON. • HOME1 : First Axis • HOME2 : Second Axis			○		
SON	Servo ON signal	The servo remains ON while this signal is ON, or OFF while this signal is OFF.	○	○			○
Double Axis Independent Mode SON1, SON2	Servo ON signal	The servo remains ON while this signal is ON, or OFF while this signal is OFF. • SON1 : First Axis • SON2 : Second Axis			○		
PUSH	Pressing Signal	When the command position No. signal and start signal are input in the Signal ON mode, the pressing operation is performed.	○	○			
*STP	Pause Signal	When this signal turns OFF while the actuator is moving, the actuator will decelerate to stop. The remaining movement is retained and will resume when the signal is turned ON again.	○	○			○
Double Axis Independent Mode *STP1, *STP2	Pause Signal	When this signal turns OFF while the actuator is moving, the actuator will decelerate to stop. The remaining movement is retained and will resume when the signal is turned ON again. • *STP1 : First Axis • *STP2 : Second Axis			○		
DC-S-C1 Interchangeable Mode STP	Pause Signal	When this signal turns ON while the actuator is moving, the actuator will decelerate to stop. The remaining movement is retained and will resume when the signal is turned OFF again.					○
*CANC	Cancel Signal	When this signal turns OFF while the actuator is moving, the actuator will decelerate to stop. During the stop condition, the remaining movement amount is cancelled, so even when this signal is turned ON, the movement is not restarted.	○	○			
Double Axis Independent Mode *CANC1, *CANC2	Cancel Signal	When this signal turns OFF while the actuator is moving, the actuator will decelerate to stop. During the stop condition, the remaining movement amount is cancelled, so even when this signal is turned ON, the movement is not restarted. • *CANC1 : First Axis • *CANC2 : Second Axis			○		
LINE	Interpolation Signal	When the double axis unit is used and this signal is turned ON, the two axes perform the linear interpolation operation	○	○			○
DC-S-C1 Interchangeable Mode CPRES	CPU Reset Signal	When this signal is turned ON the controller is re-started up.					○
Teaching Mode JOG1 +, JOG1 - JOG2 +, JOG2 -	Jog Signal	When the MODE signal is turned ON and the mode is set to Teaching Mode, using the ON edge detection of this signal, the jog operation is performed in plus or minus direction. When the OFF edge is detected during the jog operation, it is decelerated and stopped. • JOG1 +, JOG1 - : First Axis • JOG2 +, JOG2 - : First Axis					○
Teaching Mode IC001 IC01 IC05 IC1	Inching (Manual Axis Operation) Distance Signal	When the MODE signal is turned on and the mode is set to Teaching Mode, specifying the inching (manual axis operation) distance and entering the jog signal (JOG1+, JOG1-, JOG2+ or JOG2-), performs the inching (manual axis) operation. • IC001 : Set the Inching (manual axis operation) Distance to "0.01mm". • IC01 : Set the Inching (manual axis operation) Distance to "0.1mm". • IC05 : Set the Inching (manual axis operation) Distance to "0.5mm". • IC1 : Set the Inching (manual axis operation) Distance to "1mm". When two or more inching (manual axis operation) distances (IC001 to IC1) are set, the inching (manual axis operation) is performed for the total distance.					○
Teaching Mode CSTR/PWRT	PTP Strobing Signal (Start Signal) Current Position Write Signal	When the MODE signal is turned OFF and the mode is set to Normal Positioning Mode, it is used as the start signal. When the MODE signal is turned ON and the mode is set to Teaching Mode, it is used as the current position write signal. Specifying the write position and turning ON this signal for 20msec or more, writes the current position onto the specified position.					○
Teaching Mode MODE	Teaching Mode Specifying Signal	When the MODE signal is turned OFF, the mode is set to Normal Positioning Mode. When the MODE signal is turned ON, the mode is changed to Teaching Mode. (When the SERVO is turned ON and jog signal is turned ON, turning ON the MODE signal starts up the actuator. Be careful.)					○

Output

Signal Abbreviation	Signal Name	Function Description	Parameter No.25				
			1	2	3	4	16
*ALM	Controller Alarm Status Signal	When the controller is turned ON normally, it is turned ON and when the controller is in alarm mode, it is turned OFF. When the controller is recovered from alarm mode, it is turned ON again.	○	○	○	○	
DC-S-C1 Interchangeable Mode ALM	Controller Alarm Status Signal	When the controller is turned OFF normally, it is turned ON and when the controller is in alarm mode, it is turned ON. When the controller is recovered from alarm mode, it is turned OFF again.					○
RDY	Ready Signal	When the controller initialization is completed normally and the control is enabled, it is turned ON.	○	○	○	○	○
PEND	Positioning Completion Signal	This signal is turned ON when the positioning is completed (the actuator reaches within the positioning range). When the start signal is turned ON and the movement command is issued, this signal is turned OFF. Then, after the movement, the start signal is turned OFF and the actuator reaches within the positioning width, this signal is turned ON. Until the start signal is turned ON, even when the actuator is out of the positioning width, this signal is not turned ON. When the start signal continues to be turned ON, even when the actuator reaches within the positioning width, this signal is not turned ON.	○	○			○
Double Axis Independent Mode PEND1 PEND2	Positioning Completion Signal	This signal is turned ON when the positioning is completed (the actuator reaches within the positioning range). When the start signal is turned ON and the movement command is issued, this signal is turned OFF. Then, after the movement, the start signal is turned OFF and the actuator reaches within the positioning width, this signal is turned ON. Until the start signal is turned ON, even when the actuator is out of the positioning width, this signal is not turned ON. When the start signal continues to be turned ON, even when the actuator reaches within the positioning width, this signal is not turned ON. • PEND1 : First Axis • PEND2 : Second Axis			○		
HEND	Homing Completion Signal	When the power is input, it is in the OFF mode. This signal will turn ON when home return has been completed. It is turned ON when the homing command is issued.	○	○			○
Double Axis Independent Mode HEND1, HEND2	Homing Completion Signal	When the power is input, it is in the OFF mode. This signal will turn ON when home return has been completed. It is turned ON when the homing command is issued. • HEND1 : First Axis • HEND2 : Second Axis			○		
SVON	Servo ON Status Signal	This signal will remain ON while the servo is ON.	○	○			○
Double Axis Independent Mode SVON1, SVON2	Servo ON Status Signal	This signal will remain ON while the servo is ON. • SVON1 : First Axis • SVON2 : Second Axis			○		
PSED	Pressing Completion Signal	In the pressing operation, when the operation is completed, this is turned ON. When the swing error does not occur (when the pressing operation is completed), the turning-off condition is continued.	○	○			○
SSER*1	System Battery Error Signal	When the system memory battery (option) voltage drops, it is turned ON.	○	○			○
ABER*1	Battery for the Absolute Data Maintenance	When the absolute data preservation battery (option) voltage drops, it is turned ON.	○	○			○
Teaching Mode PEND/WEND	Positioning Completion Signal/ Writing Completion Signal	In the normal positioning mode (MODE signal is turned OFF), it is used as the positioning completion signal. This signal will turn ON when the target position has been reached after movement and the actuator has entered the in-position range. In the teaching mode (MODE signal is turned ON), it is used as the writing completion signal. At the moment when the current position data writing is completed, it is turned ON.					○
Teaching Mode TCMD	Operation Mode Status Signal	It is turned OFF in the Normal Positioning Mode and turned ON in the Teaching Mode.					○

*1 Turn ON the lamp, etc., with this signal. Use this signal for the alarm for battery change.

Positioner Mode

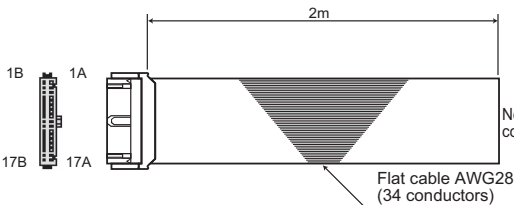
Mode			Standard Mode	Item Change Mode	Double Axis Independent Mode	Teaching Mode	DS-S-C1 Interchangeable Mode
Other Parameter No. 25			1	2	3	4	16
Pin No.	Electric wire color	Category					
1A	BR-1	+24V	P24				
1B	RD-1		PC10	PC10	PC7	JOG1-	PC1000
2A	OR-1		PC11	PC11	PC8	JOG2+	-
2B	YW-1		PC12	PC12	PC9	JOG2-	-
3A	GN-1		PC13	PC13	PC10	IC001	-
3B	BL-1		-	PC14	PC11	IC01	-
4A	PL-1		-	PC15	PC12	IC05	-
4B	GY-1		-	PC16	PC13	IC1	-
5A	WT-1		RES	RES	RES	RES	CPRES
5B	BK-1		CSTR	CSTR	CSTR1	CSTR/PWRT	CSTR
6A	BR-2		HOME	HOME	HOME1	SON	STP
6B	RD-2		SON	SON	SON1	*STP	CANC
7A	OR-2		PUSH	PUSH	*STP1	PC1	LINE
7B	YW-2		*STP	*STP	*CANC1	PC2	PC1
8A	GN-2		*CANC	*CANC	CSTR2	PC3	PC2
8B	BL-2		LINE	LINE	HOME2	PC4	PC4
9A	PL-2		PC1	PC1	SON2	PC5	PC8
9B	GY-2		PC2	PC2	*STP2	PC6	PC10
10A	WT-2		PC3	PC3	*CANC2	PC7	PC20
10B	BK-2		PC4	PC4	PC1	PC8	PC40
11A	BR-3		PC5	PC5	PC2	PC9	PC80
11B	RD-3		PC6	PC6	PC3	PC10	PC100
12A	OR-3		PC7	PC7	PC4	PC11	PC200
12B	YW-3		PC8	PC8	PC5	MODE	PC400
13A	GN-3		PC9	PC9	PC6	JOG1+	PC800
13B	BL-3	*ALM	*ALM	*ALM	*ALM	ALM	
14A	PL-3	RDY	RDY	RDY	RDY	RDY	
14B	GY-3	PEND	PEND	PEND1	PEND/WEND	PEND	
15A	WT-3	HEND	HEND	HEND1	HEND	-	
15B	BK-3	SVON	SVON	SVON1	SVON	-	
16A	BR-4	PSER	PSER	PEND2	TCMD	-	
16B	RD-4	SSER	SSER	HEND2	SSER	SSER	
17A	OR-4	ABER	ABER	SVON2	ABER	ABER	
17B	YW-4	0V	N				

I/O Flat cable

Model CB-DS-PIO□□□

* Enter the cable length (L) in□□□ (up to 10m)

Example) 080=8m

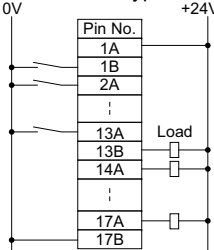


No.	color	Wiring	No.	color	Wiring
1A	BR-1	Flat cable (Press welding)	9B	GY-2	Flat cable (Press welding)
1B	RD-1		10A	WT-2	
2A	OR-1		10B	BK-2	
2B	YW-1		11A	BR-3	
3A	GN-1		11B	RD-3	
3B	BL-1		12A	OR-3	
4A	PL-1		12B	YW-3	
4B	GY-1		13A	GN-3	
5A	WT-1		13B	BL-3	
5B	BK-1		14A	PL-3	
6A	BR-2	Flat cable (Press welding)	14B	GY-3	Flat cable (Press welding)
6B	RD-2		15A	WT-3	
7A	OR-2		15B	BK-3	
7B	YW-2		16A	BR-4	
8A	GN-2		16B	RD-4	
8B	BL-2		17A	OR-4	
9A	PL-2		17B	YW-4	

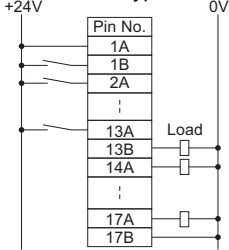
Specification	Input section		Output section	
	Item	Specification	Item	Specification
	Input voltage	24VDC± 10%	Load voltage	24VDC
	Input current	7mA	Peak load electric current	100mA/1 point 400mA/8 points *1
	ON/OFF Voltage	NPN	ON Voltage: MIN. 16.0VDC OFF Voltage: MAX. 5.0VDC	Leakage Current
PNP		ON Voltage: MIN. 8.0VDC OFF Voltage: MAX. 19.0VDC		
		*1 The total of lead current reaches max. 400mA every 8 ports from output port No. 300.		
NPN	Controller		Controller	

The I/O circuit is an equivalent circuit expressing the logic.

NPN type

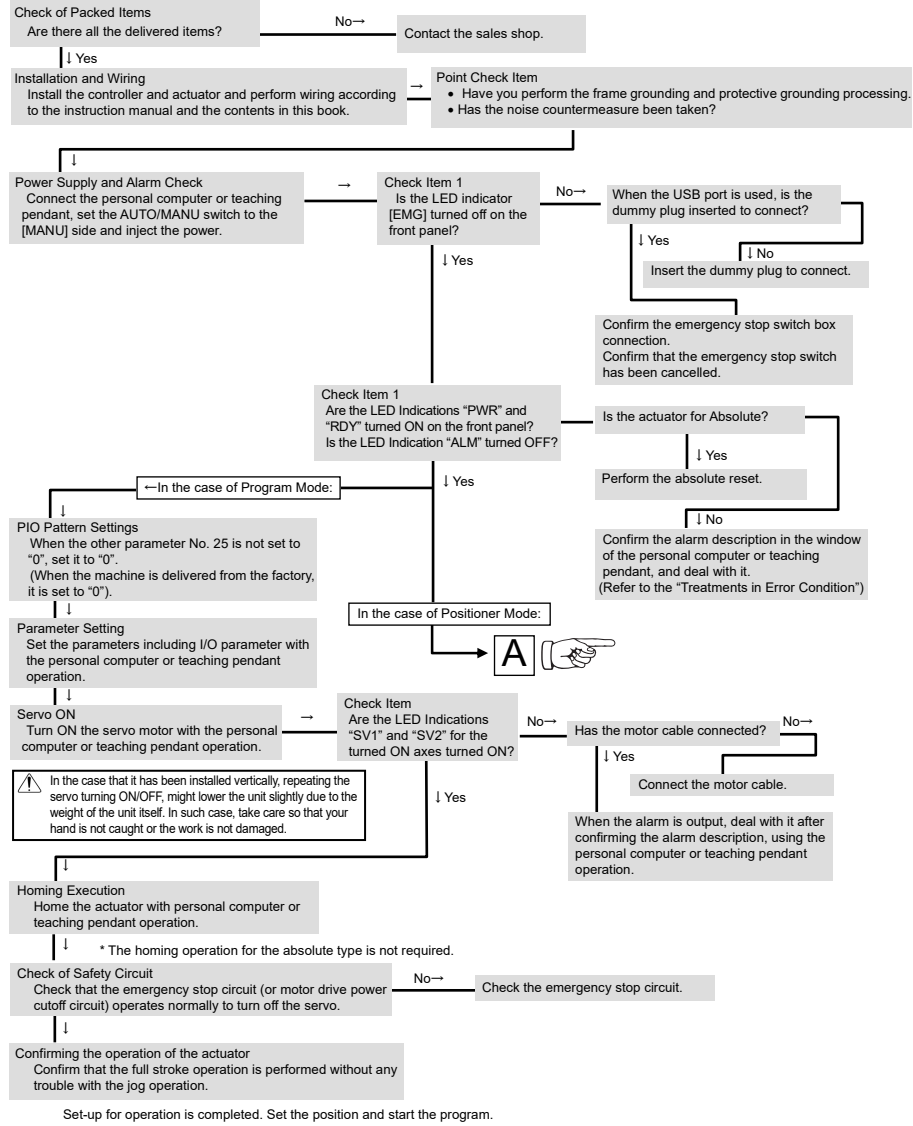


PNP type

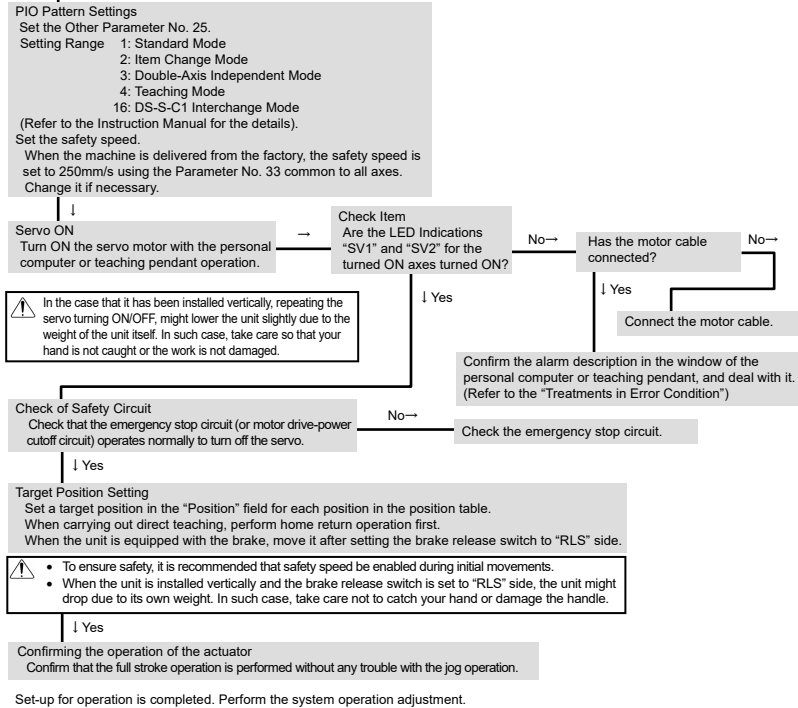


Starting Procedures

When using this product for the first time, make sure to avoid mistakes and incorrect wiring by referring to the procedure below.



A



Troubleshooting

The following alarm displays are frequently generated at the start-up operation. Process it referring to the following description. Deal with each of them referring to the following table.

Code	Status contents	Cause and Remedy	Status display		
			LED	Personal Computer TB	Panel Unit (Option)
EMG	During emergency-stop	It is not an alarm. - It is generated when the emergency stop switch in the teaching pendant or the personal computer application software is not cancelled. In such case, cancel it. - It is generated when the personal computer cable is not connected to the emergency stop box. - Check the emergency stop circuit.	○		EMG
enb	Safety gate remains opening Deadman switch OFF	It is not an alarm. - It is generated when the system I/O ENB signal is opened. Check the ENB signal. (It is generated when the safety gate is open. Close the safety gate.) - It is generated when the AUTO/MANU switch has been set to "MANU" and the personal computer or the teaching pendant is not connected. Connect the personal computer or the teaching pendant or set the AUTO/MANU switch to "AUTO". - When the actuator is to be started up, hold the deadman switch on the teaching pendant to turn it on.			enb
DCF	DC Power Interruption Momentary Power Failure Power Voltage Drop	It is generated when the power voltage is not supplied. Check the power supply.			DCF
CA1	Absolute Data Backup Battery Voltage Error	It is caused when the battery is not attached or battery voltage drops. In the case of the actuator for the single-axis robots or Cartesian robots with the absolute data specifications, it is generated when the power is connected for the first time. Perform the absolute reset.		○	CA1
D12	Encoder Disconnection Error	It is generated when the cable is broken or the encode cable is not connected to the controller. Check the wiring.		○	D12
D19	Encoder Reception Time Out	It is generated when the encoder is broken down, the cable is broken or the encoder cable is not connected to the controller. Check the wiring.		○	D19
E69 E6C	24V I/O Error DO output current error	It is generated when the +24V power for I/O is not supplied. Check the power supply. (How to start up the controller without connecting the I/O 24V power) Set both the I/O parameter No. 10 to "0".		○	E69 E6C
D5□	Field Bus Error	It is generated when the field bus link connection is not established. Check the link cable connection, I/O parameter and PLC parameter settings. (How to start up the controller without connecting the field bus) Set both the I/O parameter No. 10 to "0".		○	D5□



IAI Corporation

Head Office: 577-1 Obane Shimizu-KU Shizuoka City Shizuoka 424-0103, Japan
TEL +81-54-364-5105 FAX +81-54-364-2589
website: www.iai-robot.co.jp/

IAI America, Inc.

Head Office: 2690 W. 237th Street, Torrance, CA 90505
TEL (310) 891-6015 FAX (310) 891-0815
Chicago Office: 110 East State Parkway, Schaumburg, IL 60173
TEL (847) 908-1400 FAX (847) 908-1399
Atlanta Office: 1220 Kennestone Circle, Suite 108, Marietta, GA 30066
TEL (678) 354-9470 FAX (678) 354-9471
website: www.intelligentactuator.com

IAI Industrieroboter GmbH

Ober der Röth 4, D-65824 Schwalbach am Taunus, Germany
TEL 06196-88950 FAX 06196-889524
website: www.iai-automation.com

Technical Support available in Great Britain



Duttons Way, Shadsworth Business Park, Blackburn, Lancashire, BB1 2QR, United Kingdom
TEL 01254-685900
website: www.lcautomation.com

IAI (Shanghai) Co., Ltd.

SHANGHAI JIAHUA BUSINESS CENTER A8-303, 808, Hongqiao Rd. Shanghai 200030, China
TEL 021-6448-4753 FAX 021-6448-3992
website: www.iai-robot.com

IAI Robot (Thailand) Co., Ltd.

825 PhairojKijja Tower 7th Floor, Debaratana RD., Bangna-Nuea, Bangna, Bangkok 10260, Thailand
TEL +66-2-361-4458 FAX +66-2-361-4456
website: www.iai-robot.co.th