

- Same dimensions are applied to both the single axis and 2 axis units.
- The above figure shows the condition where the system memory backup battery (option) and absolute data backup battery (option) have been attached.

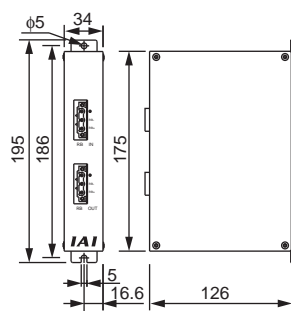
Regeneration Unit (Option) : REU-1, REU-2

Regenerative Resistor Unit: This unit converts the regenerative current brought at the time of the motor deceleration into heat

[Specification]

Item	Specification
Dimensions	W34 × H195 × D126mm
Weight	0.9kg
Internal Regenerative Resistor	220Ω 80W
Connection Cable (Accessories)	
REU-1	Model : CB-ST-REU010 1m
REU-2	Model : CB-SC-REU010 1m

[External Dimensions]



[Installation Standards]

When it is installed horizontally

Connected Actuator Motor Capacity Total	No. of Connected Regenerative Resistance Units
to 200W	Not Required
to 800W	1

When it is installed vertically

Connected Actuator Motor Capacity Total	No. of Connected Regenerative Resistance Units
to 200W	Not Required
to 600W	1
to 800W	2

* More regenerative resistance may be required depending on the operating condition.

Installation Environment

This product is capable for use in the environment of pollution degree 2¹ or equivalent.

*1 Pollution Degree 2 : Environment that may cause non-conductive pollution or transient conductive pollution by frost. (IEC60664-1)

1. 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 exceeds 85%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
- Environment that blocks the air vent [Refer to Installation and Noise Elimination Section]

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

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

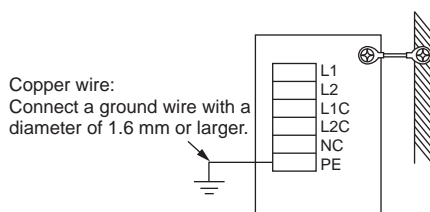
2. Storage and Preservation Environment

The storage and preservation environment should comply with the same standards as those for the installation environment. In particular, when the machine is to be stored for a long time, pay close attention to environmental conditions so that no condensation forms. Unless specially specified, moisture absorbency protection is not included in the package when the machine is delivered. In the case that the machine is to be stored and preserved in an environment where condensation is anticipated, take the condensation preventive measures from outside of the entire package, or directly after opening the package.

Installation and Noise Elimination

1. Noise Elimination Grounding (Frame Ground)

Attach the ground screw terminal to the earth ground.



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

2. Precautions regarding wiring method

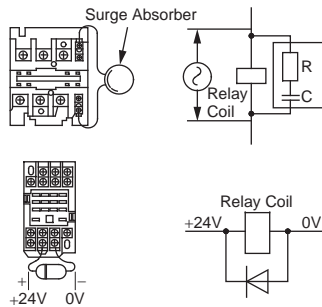
- Twist the wires for the 24V DC power unit.
- Separate the communication line from the power line.

3. Noise Sources and Elimination

Carry out noise elimination measures for power devices on the same power path and in the same equipment.

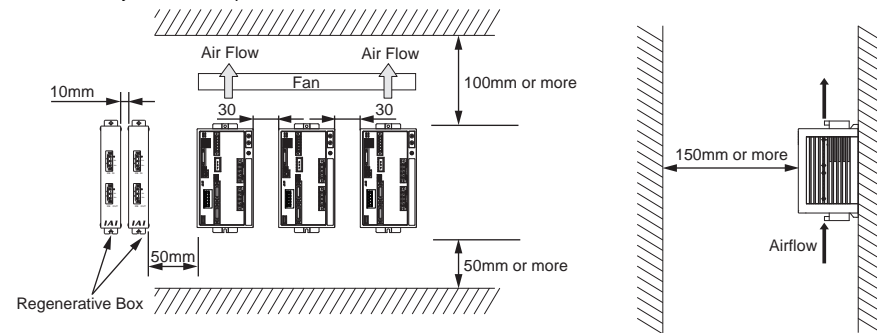
The following are examples of measures to eliminate noise sources.

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

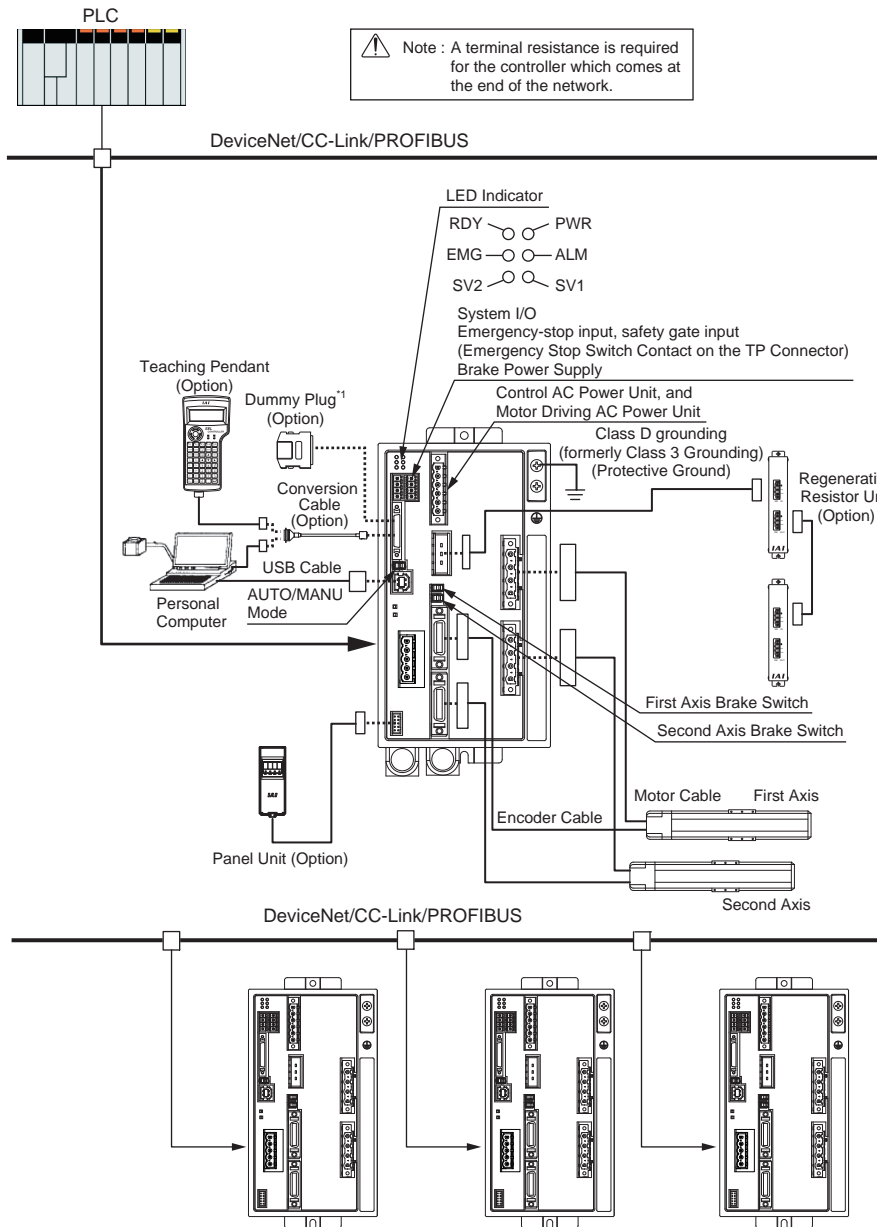


4. Heat Radiation and Installation

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.



Wiring



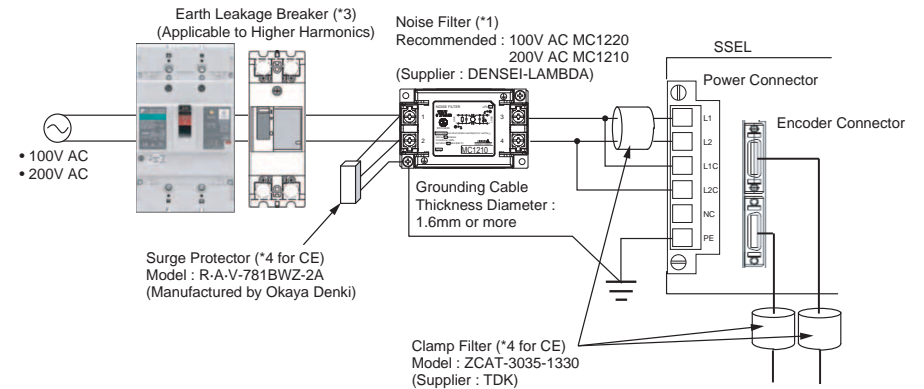
*1 When the PC is connected to the controller using the USB cable, it is required to attach the dummy plug to the controller to short circuit the Safety Gate Signal for the PC application software and teaching pendant.

*2 It shows an example of PIO interface. In the case of field bus type (DeviceNet, CC-Link or PROFIBUS-DP), the field bus connector (For DeviceNet, CC-Link or PROFIBUS-DP) should be used.

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.

Power Supply and Emergency Stop Circuit

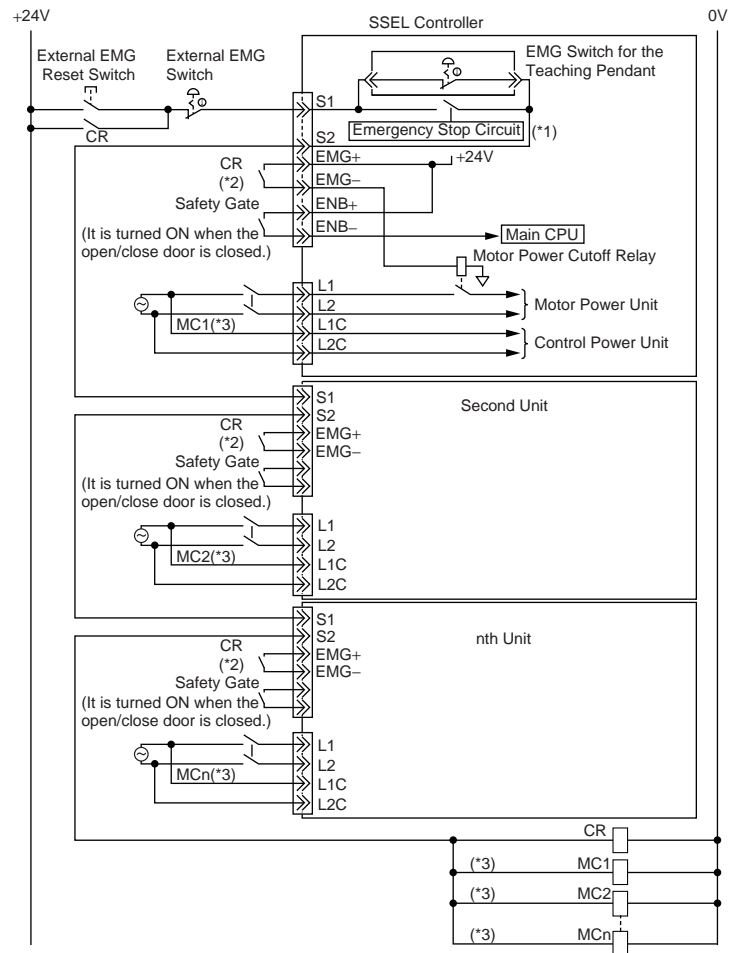
- SSEL Controller Power Supply Wiring (The Client should prepare it).



- Make sure to install the noise filter.
- Follow the instructions below for the selection of the circuit breaker.
Breaker Rated Current Value > Power Capacity / AC Input Voltage
(Refer to "Power Capacity and Heat Generation" for Power Capacity.)
 - Three times more than the rated current might flow through the controller during acceleration. Select one that does not trip when the above current passes. If a trip occurs, select an interrupter that possesses the rated current of one grade higher.
 - Select an interrupter that does not trip with the in-rush current. (Refer to the operating characteristic curve described in the manufacturer's catalog.)
 - For the rated breaking current, select the current value which can break the current even when a short circuit occurs.
Breaking current > A short circuit occurs = Primary Power Supply Capacity / Power-Supply voltage
Consider margin for the rated current on the circuit breaker.
- A ground fault circuit interrupter needs to be selected carefully considering the purposes of prevention of fire and protection of human.
Have a measurement of the leak current where a ground fault circuit interrupter is to be installed.
Use the "harmonic type" for the ground fault circuit interrupter.
- For the CE marked type, the attachment of the clamp filter for each model shown in the figure, and the connection to the surge protector, are required.
In addition, for all the cables to be connected to the SSEL, arrange them with a length less than 30 m.

- Emergency Stop Input Cable Arrangement Example

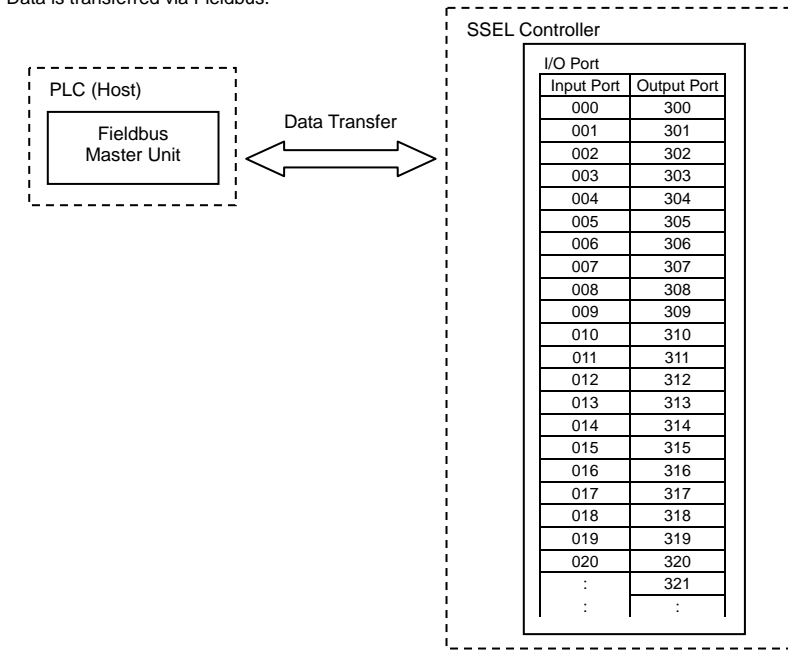
Following is an example of an emergency stop circuit of the whole system when the emergency stop for multiple controllers is included in it.



- The connection of the teaching pendant is automatically recognized using the controller.
- For the CR contacts between EMG "+" and EMG "-", use 24V DC, 0.5A/contact or more.
- When the safety category demands a break in the driving source, connect the MC.
Select contact rating for MC based on the current value found in the circuit breaker selection.
Arrange it so that the total does not exceed 0.5A.
If the total exceeds 0.5A, attach an auxiliary relay.

I/O Port

I/O port is a place where the data inside SSEL Controller is sent and received.
1 port can handle data of 1 contact (1 bit).
Data is transferred via Fieldbus.



I/O Mapping

At delivery, the I/O port numbers and their functions are show below for the SSEL controller.
The port numbers and their function assignments can be changed in the I/O parameters.
[Please refer to the “SSEL Controller Instruction Manual” for the details.]

	Port No.	Function		Port No.	Function
Input	016	Program select (RPG No.1)	Input	008	General-purpose Input
	017	Program select (RPG No.2)		009	General-purpose Input
	018	Program select (RPG No.4)		010	General-purpose Input
	019	Program select (RPG No.8)		011	General-purpose Input
	020	Program select (RPG No.10)		012	General-purpose Input
	021	Program select (RPG No.20)		013	General-purpose Input
	022	Program select (RPG No.40)		014	General-purpose Input
	023	Software reset (Restart)		015	General-purpose Input
	000	Program Start	Output	300	Alarm Output
	001	General-purpose Input		301	Ready Output
	002	General-purpose Input		302	General-purpose Output
	003	General-purpose Input		303	General-purpose Output
	004	General-purpose Input		304	General-purpose Output
	005	General-purpose Input		305	General-purpose Output
	006	General-purpose Input		306	General-purpose Output
	007	General-purpose Input		307	General-purpose Output

(Note) Number of I/O ports is:

Input 000 to 299 (MAX. 300 points)
Output 300 to 599 (MAX. 300 points)

Initial Setting (I/O parameter)

No.	Parameter Name	Initial Value (Reference)	Input Range	Reference
1	I/O Port Allocation Type	1	0, 1	0: Fixed Allocation 1: Automatic Allocation (Order of Priority : Field Bus Port) → Standard I/O Board (Slot 1)
14	Number of Network I/F Card Remote Input Ports	64	0 to 256	Multiples of 8 Set up the number of input ports to be used for Fieldbus. For No. 14 and 15, choose the greater number and input the same value.
15	Number of Network I/F Card Remote Output Ports	64	0 to 256	Multiples of 8 Set up the number of output ports to be used for Fieldbus. For No. 14 and 15, choose the greater number and input the same value.
16	Network I/F Module Fix-Allocated Input Port Start No.	0	-1, 0 to 299	Multiples of 8 (Unavailable when it is negative figure) Input which input port is to be used for Fieldbus.
17	Network I/F Module Fix-Allocated Output Port Start No.	300	-1, 300 to 599	Multiples of 8 (Unavailable when it is negative figure) Input which output port is to be used for Fieldbus.
18	Network I/F Module Error Monitor	1	0 to 5	0: No Monitoring 1: Monitoring

The occupied address area on the PLC side is determined by the number of used inputs and outputs.
Refer to Instruction Manual (CD) or the instruction manual of the master unit for the details.

DeviceNet

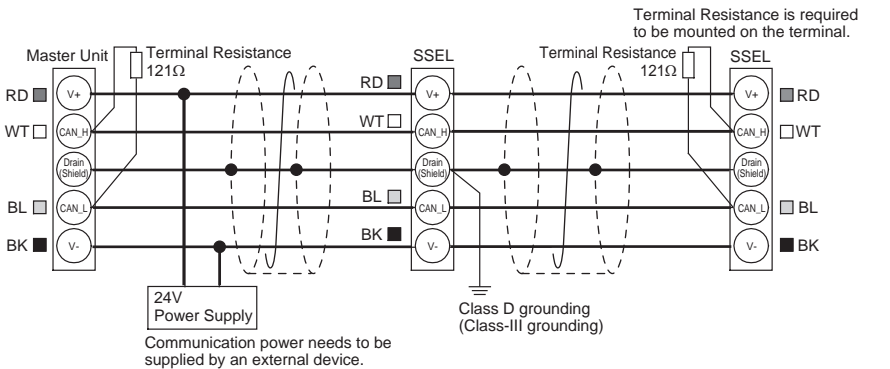
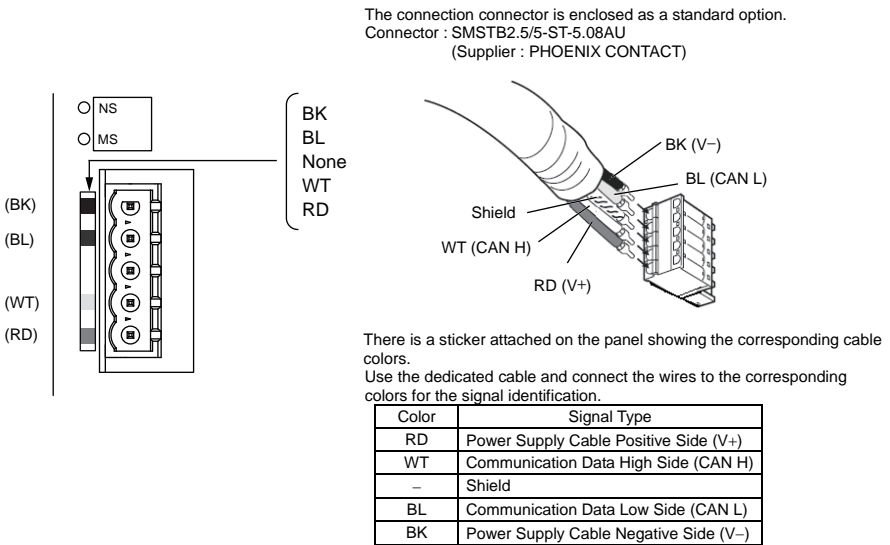
• Specification

Item	Specification			
Communication Protocol	DeviceNet 2.0 (Certified Interface)			
For Communication	Master/Slave Connection		Bit Strobe	
			Polling	
			Cyclic	
Baud Rate	500k/250k/125kbps			
Communication Cable Length (Note1)	Baud Rate	Max. Network Length	Max. Branch Line Length	Total Branch Line Length
	500kbps	100m	6m	39m
	250kbps	250m		78m
	125kbps	500m		156m
	(Note) When DeviceNet dedicated cable is used			
No. of Occupied Nodes	1 node			
Communication Power Supply	Voltage 24V DC±10% Current Consumption 60mA Externally Supplied (Supplied from DeviceNet communication cable side)			
Communication Cable	Dedicated cable for DeviceNet			

Note 1 Refer to the Instruction Manuals for the master unit and the mounted programmable logic controller (stated as PLC from now on) when a T-junction communication is to be conducted.

• Wiring

For details, refer to the Instruction Manuals of the master unit and PLC in which in the master unit is installed.



• Network Type Setting

The I/O Parameter No. 225 “Network I/F Module Control” has been set to “2_H” (DeviceNet) when the unit is delivered. (Therefore, the setting is not necessary.)

• Node Addresses

Station number is set with parameter.
Set the node address to I/O Parameter No. 226 “Network I/F Module Communication Attribute 1”. The setting range is from 0 to 63. (Set in delivery : 0)
(Note) “D75: Fieldbus Parameter Error” would occur if the set address is out of the allowable range.

• Baud Rate Setting

There is no need to set the baud rate since it automatically follows the master setting.

(Note) Make sure to reboot the controller after the parameter setting is complete, and do not forget to turn the mode changeover switch to “AUTO” side.

CC-Link

• Specification

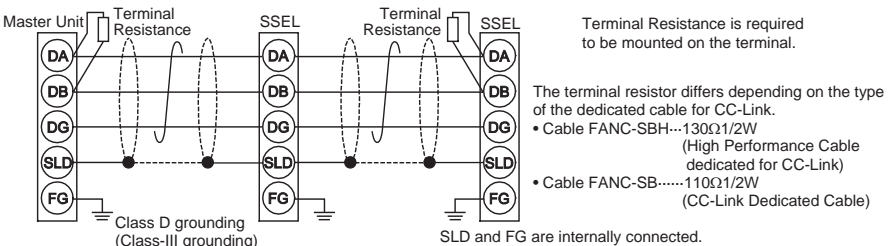
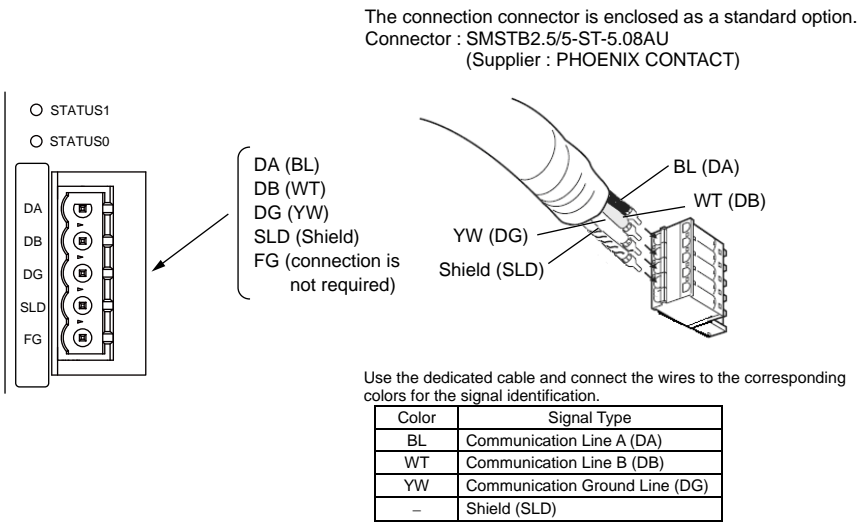
Item	Specification					
Communication Protocol	CC-Link Ver1.10					
Baud Rate	10M/5M/2.5M/625k/156kbps					
Communication System	Broadcast Polling System					
Synchronization System	Frame synchronization system					
Transmission Path Format	Bus format (EIA RS485 conformance 3-line type)					
Error Control System	CRC ($X^{16} + X^{12} + X^5 + 1$) ^{*1}					
No. of Occupied Stations	Remote Device Station [Refer to Field Network Wirings and Settings Section]					
Communication Cable Length (Note1)	Baud Rate	10Mbps	5Mbps	2.5Mbps	625kbps	156kbps
	Total Cable Length	100m	160m	400m	900m	1200m
Communication Cable	Dedicated cable for CC-Link					

Note 1 Refer to the Instruction Manuals for the master unit and the mounted programmable logic controller (stated as PLC from now on) when a T-junction communication is to be conducted.

*1 CRC : Cyclic Redundancy Check It is a data error detection method often used for the synchronous transmission

• Wiring

For details, refer to the Instruction Manuals of the master unit and PLC in which in the master unit is installed.



• Network Type Setting

The I/O Parameter No. 225 “Network I/F Module Control” has been set to “1_H” (CC-Link) when the unit is delivered. (Therefore, the setting is not necessary.)

• Node Addresses

Set the station number to I/O Parameter No. 226 “Network I/F Module Communication Attribute 1”. The setting range is from 1 to 63. (Set in delivery : 0)
(Note) “D75: Fieldbus Parameter Error” would occur if either of the occupied stations is set to a station number 0 or more than 65.

• Baud Rate Setting

Set the baud rate to the bits 0 to 3 in I/O Parameter No. 227 “Network I/F Module Communication Attribute 2”.
The setting range is from 0 to 4_H.

Value set in I/O parameter No.227	Baud Rate [bps]
0	156k
1	625k
2	2.5M
3	5M
4 (Set in delivery)	10M

(Note) Set the baud rate to match with the setting in the master station.

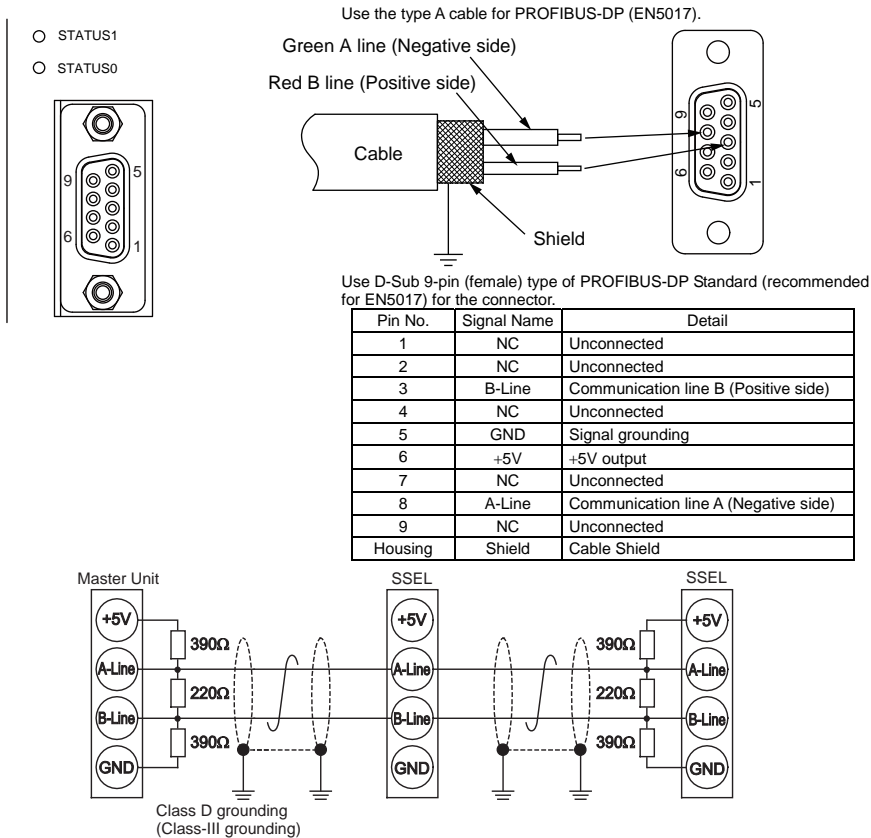
PROFIBUS-DP

• Specification

Item	Specification					
Communication Protocol	PROFIBUS-DP (RS485 conformance)					
Communication System	Hybrid System (Master-Slave System or Token Passing System)					
Baud Rate	9.6k to 12Mbps (Automatically follows the master)					
Communication Cable Length (Type A Cable)	Baud Rate	12/6/3Mbps	1.5Mbps	500kbps	187.5kbps	93.75/45.45/19.2/9.6kbps
	Total Cable Length	100m	200m	400m	1000m	1500m
No. of Occupied Nodes	1 node					
Communication Cable	Type A Cable for PROFIBUS-DP (Standard EN50170)					

• Wiring

For details, refer to the Instruction Manuals of the master unit and PLC in which in the master unit is installed.



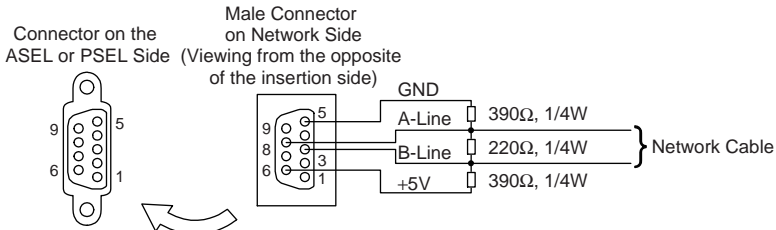
• Bus Termination

When connecting to the network terminal, apply a terminal resistor to PROFIBUS-DP Communication Connector as shown below or apply a connector already equipped with a terminal resistor.

- An example for a connector equipped with a terminal resistor :

SUBCON-PLUS-PROFIB/AX/SC (PHOENIX CONTACT)

• Connection of Terminal Resistor



• Network Type Setting

The I/O Parameter No. 225 "Network I/F Module Control" has been set to "3_H" (PROFIBUS-DP) when the unit is delivered. (Therefore, the setting is not necessary.)

• Node Addresses

Station number is set with parameter.

Set the node address to I/O Parameter No. 226 "Network I/F Module Communication Attribute 1". The setting range is from 0 to 125. (Set in delivery : 1)

(Note) "D75: Fieldbus Parameter Error" would occur if the set address is out of the allowable range.

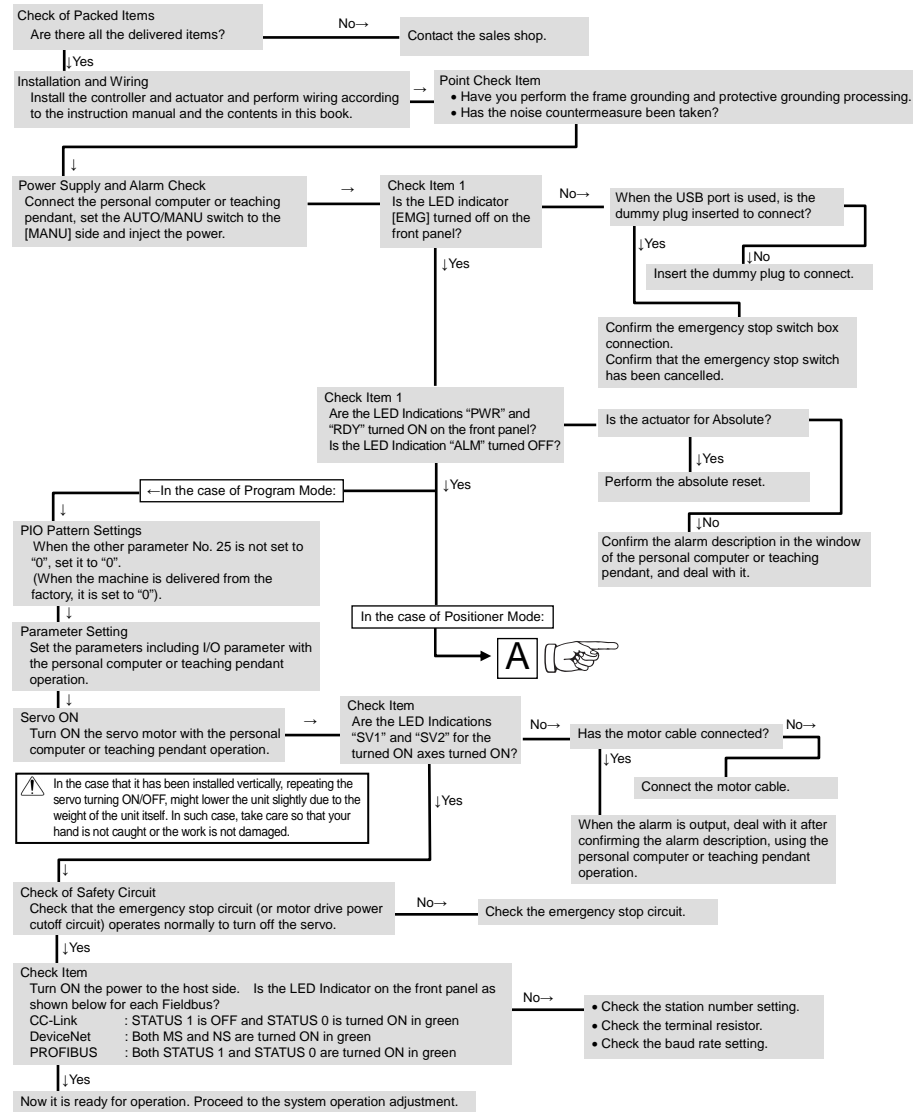
• Baud Rate Setting

There is no need to set the baud rate since it automatically follows the master setting.

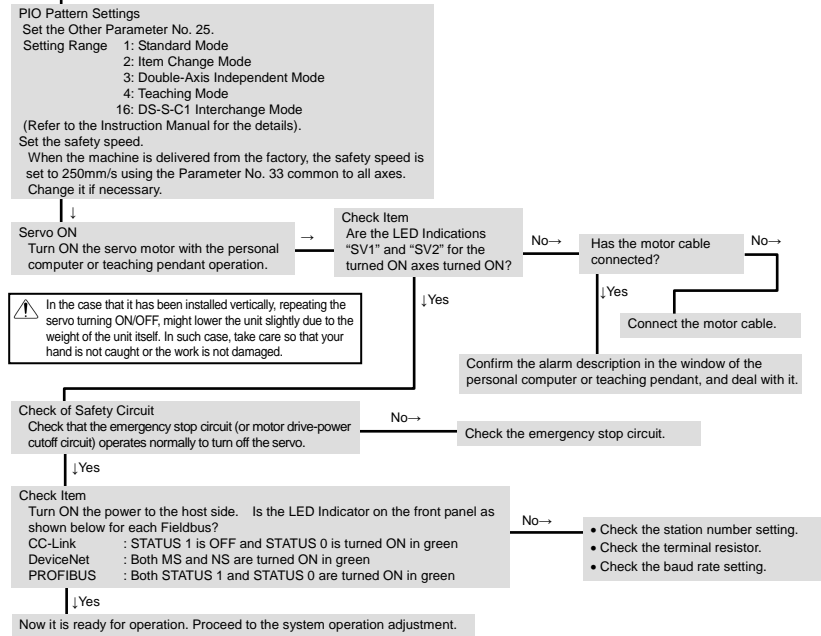
(Note) Make sure to reboot the controller after the parameter setting is complete, and do not forget to turn the mode switch to "AUTO" side.

Starting Procedures

When using this product for the first time, work while making sure to avoid omission and incorrect wiring by referring to the procedure below.



A



Troubleshooting

If an error has occurred, it is possible to check the operation condition on the status LEDs on the front panel.

• In the case of DeviceNet:

LED Indicators for Monitoring				Condition	Treatment
MS	OR	GN	OR		
GN	OR	GN	OR		
Illuminating	—	Illuminating	—	In normal operation	
Illuminating	—	OFF	OFF	Waiting for the completion of the node address duplication check on the master side	• Check if the communication speed of the master is the same as that for all the slave units. • Correct the setting and re-start the machine. • Check if the connector is connected correctly.
Illuminating	—	Flashing	—	Waiting for the establishment of the connection with the master	• Check if the master is operated normally. • Check if it has been registered in the master's scanning list.
—	Illuminating	OFF	OFF	A hardware error occurred.	• Contact our company.
—	Flashing	OFF	OFF	Dip Switch Setting Error	• Check if the communication speed of this unit is the same as that of the master. • Check if the configuration has been set correctly.
Illuminating	—	—	Illuminating	Duplicated node address or Busoff (Communication stop due to frequent data error) detection	• Correct the node address and restart the machine. • Check if there is any noise source close to the unit or the communication cable is not arranged parallel to the power line, and check for the influence of the noise.
Illuminating	—	—	Flashing	Communication Time-out	• Check if the communication speed of this unit is the same as that of the master.
In NS, green light is turned ON and flashes repeatedly or red light and green light flash repeatedly.				Communication Error	• Check if it has been registered in the master's scanning list. • Check if the I/O area is not duplicated with that of the other slave unit. • Check if the I/O area does not exceed the area permitted by the master unit. (in the case of fixed allocation)

• In the case of CC-Link

STATUS1	STATUS0	Condition
Illuminating	Illuminating	Impossible condition
Illuminating	OFF	• An error occurs. (CRC Error, Station Setting Error or Communication Speed Setting Error) • Since turning the power ON or software reset till completion of CC-Link initialization
OFF	Illuminating	Normal Communication Status
OFF	OFF	Power Failure: Remote station power unit breakdown or communication cable breakage
Flashing	Illuminating	Impossible condition
Flashing	OFF	The station number setting or the baud rate setting is changed during the communication

• In the case of PROFIBUS-DP

LED	Color	Illumination Status	Indication Description (Meaning)
STATUS 1	GN	Illuminating	Online from fieldbus and communication in normal condition.
		Flashing	Offline from fieldbus.
STATUS 0	OR	Flashing	Communication error is occurred.
		Illuminating	In normal operation.
		Flashing	Getting ready for operation.
STATUS 0	OR	Illuminating	An error detected on communication-related hardware during preparing for operation.

IAI
Quality and Innovation

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/

Technical Support available in USA, Europe and China

IAI America, Inc.

Head Office: 2690 W, 237th Street Torrance, CA 90505
TEL (310) 891-6015 FAX (310) 891-0815
Chicago Office: 1261 Hamilton Parkway Itasca, IL 60143
TEL (630) 467-9900 FAX (630) 467-9912
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

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

Manual No.: ME0264-3A