IAI
Quality and Innovation

Applicable Field Network
(DeviceNet, CC-Link, PROFIBUS, CompoNet, MECHATROLINK-II, EtherNet/IP, EtherCAT®)

MSCON
First Step Guide First Edition

Thank you for purchasing our product.
Make sure to read the Safety Guide and detailed Instruction Manual (CD/DVD) included with the product in addition to this First Step Guide to ensure correct use.
This Instruction Manual is original.

Warning : Operation of this equipment requires detailed installation and operation instructions which are provided on the CD/DVD Manual included in the box this device was packaged in. It should be retained with this device at all times.
A hard copy of Manual can be requested by contacting your nearest IAI Sales Office listed at the back cover of the Instruction Manual or on the First Step Guide.

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

No.	Part Name	Model	Quantity	Remarks
1	Controller	Refer to “How to read the model plate”, “How to read the model”	1	
	Accessories			
2	Control Power Supply Connector	MC1.5/5-STF-3.81 (Supplier: PHOENIX CONTACT)	1	Recommended cable size • Control Power Input area KIV3.5 to 0.75mm² (AWG12 to 18) • Brake Power Input area KIV0.75mm² (AWG18)
3	Motor Power Supply Connector	GMSTB2.5/3-STF-7.62 (Supplier: PHOENIX CONTACT)	1	Recommended cable size KIV3.5 to 1.25mm² (AWG12 to 16)
4	System I/O Connector	FMCD1.5/4-ST-3.5 (Supplier: PHOENIX CONTACT)	1	Recommended cable size KIV1.25 to 0.2mm² (AWG16 to 24)
5	CC-Link Connector (For CC-Link Type)	SMSTB2.5/5-ST-5.08 AU (Supplier: PHOENIX CONTACT)	1	Trminal resistance (130Ω±1/2W, 110Ω±1/2W) enclosed one unit each
6	DeviceNet Connector (For DeviceNet Type)	SMSTB2.5/5-ST-5.08 AU (Supplier: PHOENIX CONTACT)	1	Prepare a terminal resistor separately if this controller is to be allocated at the terminal.
7	Absolute Battery Unit (Option)	(Battery AB-5)	-	Depends on number of actuators to be used in absolute type
8	First Step Guide		1	
9	Instruction Manual (CD/DVD)		1	
10	Safety Guide		1	

2. Teaching Tool (to be purchased separately)
For the setup operation such as position setting and parameter setting by a teaching, conduct it on PC software.
Prepare a teaching tool such as PC software and so on for the operations and tunings.

No.	Part Name	Model
1	PC Software (Includes RS232C Exchange Adapter + Peripheral Communication Cable)	RCM-101-MW
2	PC Software (Includes USB Exchange Adapter + USB Cable + Peripheral Communication Cable)	RCM-101-USB
3	Teaching Pendant (Touch panel teaching)	CON-PTA
4	Teaching Pendant (Touch panel teaching equipped with a deadman switch)	CON-PDA
5	Teaching Pendant (Touch panel teaching equipped with a deadman switch + TP adapter (RCB-LB-TG))	CON-PGA
6	Teaching Pendant	CON-T
7	Teaching Pendant (equipped with dead man’s switch + TP adapter (RCB-LB-TG))	CON-TG
8	Gateway Parameter Setting Tool	-

3. Instruction Manuals related to this product, which are contained in the Instruction Manual (CD/DVD).

No.	Name		Manual No.
1	MSCON Controller Instruction Manual		ME0304
2	PC Software	RCM-101-MW/RCM-101-USB Instruction Manual	ME0155
3	Touch Panel Teaching	CON-PTA/PDA/PGA Instruction Manual	ME0295
4	Teaching Pendant	CON-T/TG Instruction Manual	ME0178

4. How to read the model plate

5. How to read the model
(Example) Consists of 5 axes : Axis No.0, 2, 3 = 60W actuators to be connected incremental type
Axis No.4, 5 = 100W actuators to be connected incremental type
Axis No.1 = When no connected axis

M S C O N - C - 5 - 6 0 I - N - 6 0 I - 6 0 I - 1 0 0 I - 1 0 0 I - D V - 2 - 0 - * *

<Type Name>
C : Standard Type

<Connected Axis>
1 to 6 : Number of driver axes

<Detail of Connected Axis>
[Motor Type]
12 : 12W Servo Motor, 20 : 20W Servo Motor
30D : 30W Servo Motor, 30R : 30W Servo Motor (for RS Series)
60 : 60W Servo Motor, 100 : 100W Servo Motor
150 : 150W Servo Motor, 200 : 200W Servo Motor
N : Not connected
[Encoder Type]
I : Incremental
A : Absolute
[Option]
HA : High Accel/Decel Type
L : Home Sensor/Limit Switch Type
C : Creep Sensor Type
B : Brake Type

<I/O Type>
DV : DeviceNet Type
CC : CC-Link Type
PR : PROFIBUS-DP Type
CN : CompoNet Type
ML : MECHATROLINK Type
EP : EtherNet/IP Type
EC : EtherCAT® Type

<I/O cable Length>
0 : No cable

<Power-supply Voltage>
1 : AC100V
2 : AC200V

<Identification for IAI use only>
*There is no identification in some cases

Basic Specifications

Specifications

Number of Controlled Axes		Max. 6-axis
Control Power Voltage		24V DC ± 10%
Control Power Current Consumption		Max. 2.4A
Add the Control Power In Rush Current (Note1)		Max. 7A 5msec or less
Drive (Motor) Power Supply Voltage	Driving Source Voltage 100V AC Specification	AC100 to 115V ± 10%
	Driving Source Voltage 200V AC Specification	AC200 to 230V ± 10%
Drive (Motor) Power Supply In-Rush Current (Note1)	Driving Source Voltage 100V AC Specification	10A max. with 20A for 80msec (driving source voltage 100V in ambient temp. 25°C) 10A max. with 45A for 80msec (driving source voltage 115V × 10% in ambient temp. 40°C)
	Driving Source Voltage 200V AC Specification	10A max. with 45A for 40msec (driving source voltage 200V in ambient temp. 25°C) 10A max. with 95A for 40msec (driving source voltage 230V × 10% in ambient temp. 40°C)
Motor Capacity of Connectable Actuators	Driving Source Voltage 100V AC Specification	Max. 200W/axis (up to 450W in total for six axes)
	Driving Source Voltage 200V AC Specification	Max. 200W/axis (up to 900W in total for six axes)
Electromagnetic Brake Power Supply Voltage (when brake-equipped actuator connected)		DC24V ± 10%
Brake Power Supply Current		Max. 1A/axis (0.5A/axis at steady state)
Brake Power Supply In-Rush Current (Note1)		Max. 10A 10msec or less
Drive (Motor) Power Capacity		Refer to Power Capacity and Heat Generation.
Leak Current		3.5mA (Motor power supply) © There is no leak current of control power supply and brake power supply.
Heat Generation		Refer to Power Capacity and Heat Generation.
Drive (Motor) Frequency		50/60Hz ± 5%
Transient Power Cutoff Durability		1msec (Control Power Supply), 20msec (Drive (Motor) Power Supply), 5msec (Brake Power Supply)
Motor Control System		Sinusoidal Wave PWM Vector Current Control
Applicable Encoder		Incremental Serial Encoder Absolute Serial Encoder
Actuator Cable Length		Max. 20m
Serial Communication (SIO Port: For Teaching)		RS485 1ch (complying with Modbus Protocol) Speed : 9.6 to 230.4kbps
External Interface		DeviceNet, CC-Link, PROFIBUS-DP, CompoNet, MECHATROLINK II, EtherNet/IP, EtherCAT®
Data Setting and Input		PC software, Teaching pendant, Gateway parameter setting tool
Number of Positioning Points		Position data and parameters are saved in the nonvolatile memory. (There is no limitation in number of writing)
Number of Positioning Points		Max. 256 points (There is no limit for simple direct and direct indication modes) Note: The number of positioning points differs depending on the operation mode select by the parameter setting.
LED Indication (Mounted on Front Panel)		LED lamp for driver status display 2 points Gateway Status LED 5 points Fieldbus Status LED 2 points Power Supply Status LED 2 points
Forcibly Releasing of Electromagnetic Brake (Mounted on Front Panel)		Switching NOM (standard)/RLS (compulsory release)
Protective Functions		Overload, overcurrent, overvoltage, etc.
Protection Function against Electric Shock		Class I
Insulation Resistance (Between secondary power source and FG)		500V DC 10MΩ or more

Withstanding Voltage (Between primary and secondary power sources, Between primary power source and PE)		1500V AC for 1 min. (for MSCON individually)
Cooling Method		Forced air-cooling
External Dimensions		225W × 154H × 115D
Weight (when drivers for 6 axes mounted)	Incremental Type	Approx. 1900g
	Absolute Type	Approx. 2000g (including batteries)
Enviro-nment	Surrounding air temperature	0 to 40°C
	Surrounding humidity	85%RH or less (non-condensing)
	Surrounding environment	[Refer to Installation and Storage Environment.]
	Surrounding storage temperature	-20 to 70 °C (Note) 0 to 40 °C for absolute battery.
	Surrounding storage humidity	85%RH or less (non-condensing)
	Usable Altitude	1000m or lower above sea level
	Vibration Durability	Frequency 10 to 57Hz/ Swing width: 0.075mm Frequency 57 to 150Hz/ Acceleration 9.8m/s² XYZ Each direction Sweep time: 10 min. Number of sweep: 10 times
	Package Drop	Dropping height 800mm, 1 corner, 3 edges and 6 surfaces
	Protection Class	IP20
	Pollution Degree	I
	Overvoltage Category	II

Note 1 The rush current value varies depending on the impedance of the power line.

<Power Capacity and Heat Generation>
Shown in the table is the relation between the motor wattage and motor power capacity of an actuator that can be connected

Actuator Motor Wattage	Motor Power Capacity [VA]	Peek Max. Motor Power Capacity [VA]	Heat Generation [W]
12	41	123	1.7
20	50	150	2.0
30D (Excluding RS)	47	141	2.0
30R (for RS)	138	414	4.0
60	146	438	4.8
100	238	714	7.0
150	328	984	8.3
200	421	1263	9.2

RS : Rotary Shaft

<Remark 1> Selection of Circuit Breaker
- 3 times of the rated current flows to the controller during the acceleration/deceleration. Select an interrupter that does not trip with this value of current. If a trip occurs, select an interrupter that possesses the rated current of one grade higher. (Check the operation characteristics curves in the product catalog.)
- Select an interrupter that does not trip with the in-rush current. (Check the operation characteristics curves in the product catalog.)
- Consider the current that enables to cutoff the current even when a short circuit current is flown for the rated cutoff current.
Rated Interrupting Current > Short Circuit Current = Circuit Breaker Primary Power Capacity / Power Voltage
Consider margin for the rated current on the circuit breaker.

Rated Current for Circuit Interrupter >
Total capacity of motor power for all the connected actuators / AC input voltage × Safety margin (1.2 to 1.3 for reference)

<Remark 2> Selection of Leak Current Breaker
- It may be mandatory by low to install a leakage breaker.
- A ground fault circuit interrupter needs to be selected carefully considering the purposes of prevention of fire and protection of human (Determined by law).
- Leak current varies depending on the capacity of connected motor, cable length and the surrounding environment. Measure the leak current at the point where a ground fault circuit interrupter is to be installed when leakage protection is conducted.
- Use the harmonic type (for inverter) for the ground fault circuit interrupter.

<Control Power Capacity>
Follow the description below for the calculation of 24V DC power capacity.
(1) Control Power Current Consumption :
Select from control power supply current in the table below ……1)

Number of Controlled Axes (Note1)	1 Axis	2 Axis	3 Axis	4 Axis	5 Axis	6 Axis
Control Power Unit Heating Value [W]	25.5	31.5	38.2	44.2	50.9	56.9
Control Power Capacity [A]	1.1	1.3	1.6	1.8	2.1	2.4

Note 1 : See the line of max. number of controlled axes connectable to corresponding MSCON.
manufacturing name plate : MSCON-C-*-• • •: “*” is the maximum number of connectable axes.
(2) Current Consumption of Brake Power Supply :
1A or 0.5A (Note 2) × number of brake-equipped actuators ……2)
Note 2 : The maximum current of 1A per actuator runs for approximately 100ms when a brake is released. The current consumption after the release is 0.5A per unit.
Calculate the capacity with 0.5A per unit when a 24V DC power supply corresponding to transient load change such as peak load appliance is used and capable for the maximum current described above. For other cases, calculate with 1A per unit.
(3) Add the Control Power In Rush Current : 7A ……3)

[Selection of Power Supply]
Usually, the rated current is to be approximately 1.3 times higher than the total of Control Power 1) and Motor Power 2) above considering approximately 30% of margin to the load current. However, considering the inrush currents [excitation 3)], even though it is a short time, select a power supply with sufficient “peak load capacity”. If a power supply with insufficient peak capacity is utilized, a transient voltage drop or cutoff may occur. This may present issues with power supplies providing remote sensing functionality.

<Remark 3> Selection of Power Supply Protection Circuit Breaker
It is recommended that the power supply protection is conducted on the primary side (AC power side) of the 24V DC power supply unit.
If having 24V DC turned ON/OFF, keep the 0V connected and have the +24V ON/OFF (cut one side only).
Be careful to the in-rush current of the 24V DC power supply unit when making a selection. (Check it in the operation characteristics curve graph in a catalog provided by the supplier.)
Consider the current that enables to cutoff the current even when a short circuit current is flown for the rated cutoff current.
- Rated Interrupting Current > Short Circuit Current = Circuit Breaker Primary Power Capacity / Power Voltage
- (Remark) In-rush Current of IAI Power Supply Unit PS241 = 50 to 60A, 3msec

● Specifications of DeviceNet Interface

Item	Specification			
Communication Protocol	DeviceNet 2.0			
	Group 2 Dedicated Server			
	Network-Powered Insulation Node			
Baud Rate	Automatically follows the master			
Communication System	Master-Slave System (Polling)			
Number of Occupied Nodes	1 Node			
Communication Cable Length (Note2)	Baud Rate	Max. Network Length	Total Branch Line Length	Max. Branch Line Length
	500kbps	100m	39m	6m
	250kbps	250m	78m	
	125kbps	500m	156m	
Communications Cable	Use the dedicated cable.			
Connector (Note1)	MSTBA2.5/5-G-5.08-ABGY AU (Manufactured by PHOENIX CONTACT or equivalent)			
Consumption Current of Communication Power Supply	60mA			
Communication Power Supply	24V DC (Supplied from DeviceNet)			

Note 1 The cable-side connector is a standard accessory. (SMSTBA2.5/5-ST-5.08 AU by PHOENIX CONTACT)
Note 2 For T branch communication, refer to the Instruction Manuals for the master unit and programmable logic controller (stated as PLC from now on) to be mounted.

● Specifications of CC-Link Interface

Item	Specification					
Communication Protocol	CC-Link Ver. 1.1 or Ver. 2					
Station Type	Remote device station (4 stations max. to occupy)					
Baud Rate	10M/5M/2.5M/625K/156kbps					
Communication System	Broadcast Polling System					
Communication Cable Length (Note2)	Baud Rate [bps]	10M	5M	2.5M	625k	156k
	Total Cable Length [m]	100	160	400	900	1200
Communications Cable	Use the dedicated cable.					
Connector (Note1)	MSTBA2.5/5-G-5.08 AU (Manufactured by PHOENIX CONTACT or equivalent)					

Note 1 The cable-side connector is a standard accessory. (SMSTBA2.5/5-ST-5.08 AU by PHOENIX CONTACT)
Note 2 For T branch communication, refer to the Instruction Manuals for the master unit and PLC to be mounted.

● Specifications of PROFIBUS-DP Interface

Item	Specification		
Communication Protocol	PROFIBUS-DP		
Baud Rate	Automatically follows the master		
Communication System	Hybrid System (Master-Slave System or Token Passing System)		
Communication Cable Length	Max. Total Network Length	Baud Rate	Cable Type
	100m	12,000/6,000/3,000kbps	Type A Cable
	200m	1,500kbps	
	400m	500kbps	
	1000m	187.5kbps	
	1200m	9.6/19.2/93.75kbps	
Communications Cable	STP cable AWG18		
Connector (Note1)	9 pin female D-sub Connector		
Transmission Path Format	Bus/Tree/Star		

Note 1 Prepare the 9-pin male D-sub connector as the connector on the cable side.

● Specifications of CompoNet Interface

Item	Specification
Communication System	CompoNet specialized protocol
Communication Type	Remote I/O Communication
Baud Rate	Automatically follows the master
Communication Cable Length	Follows CompoNet Type
Slave Type	Word Mixed Slave
Available Node Addresses for Setting	0 to 63 (Setting conducted on controller parameter)
Communications Cable (Prepare separately)	Round-type cable (JIS C3306, VCTF2 conductors) Flat cable I (with no sheathed) Flat cable II (sheathed)
Connector (Controller side)	XW7D-PB4-R (manufactured by OMRON or equiv.)

● Specifications of MECHATROLINK II Interface

Item	Specification
Slave Type	Intelligent I/O
Baud Rate	10Mbps
Max. Transmittable Distance	50m
Min. Distance between Stations	0.5m
Transmission Frequency	1 to 8ms
Data Length	32 bytes
Settable Node Address Range	61 to 7F [hex.]
Communications Cable (Prepare separately)	STP Cable (characteristic impedance 130Ω)

● Specifications of EtherNet/IP Interface

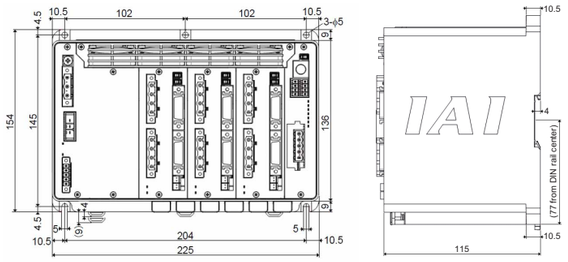
Item	Specification
Communication Protocol	IEC61158 (IEEE802.3)
Baud Rate	10BASE-T/100BASE-T (Autonegotiation setting is recommended)
Communication Cable Length	EtherNet/IP Specifications (Distance between hub and each node: 100m or less)
Number of Connection	Master Unit
Available Node Addresses for Setting	0.0.0.0 to 255.255.255.255
Communications Cable (Prepare separately)	Category 5e or higher (Double shielded cable braided with aluminum foil recommended)
Connector	RJ45 Connector × 1pc

● Specifications of EtherCAT® Interface

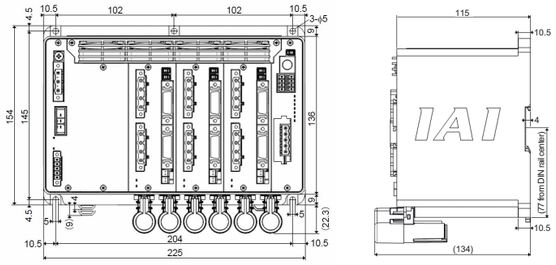
Item	Specification
Communication Protocol	IEC61158 type12
Physical Layer	100Base-TX (IEEE802.3)
Baud Rate	Automatically follows the master
Communication Cable Length	Depends on EtherCAT® Specification (Distance between each node: 100m or less)
Slave Type	I/O slave
Available Node Addresses for Setting	0 to 127 (17 to 80 : When connected to the master (CJ1W-NC*82) manufactured by OMRON)
Communications Cable (Prepare separately)	Category 5e or more (Double shielded cable braided with aluminum foil recommended)
Connector	RJ45 Connector × 2pcs (Input×1, Output×1)
Connection	Daisy chain only

External Dimensions

Incremental Type



Absolute Type



Installation Environment

This product is capable for use in the environment of pollution degree 2*1 or equivalent.
*1 Pollution Degree 2 : Environment that may cause non-conductive pollution or transient conductive pollution by frost (IEC60664-1)

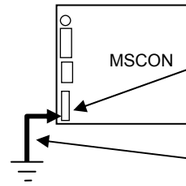
1. Installation Environment
Do not use this product in the following environment.
- Location where the surrounding air temperature exceeds the range of 0 to 40°C
- Location where condensation occurs due to abrupt temperature changes
- Location where relative humidity exceeds 85%RH
- Location exposed 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]

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

2. Storage Environment
- Storage environment follows the installation environment. Especially in a long-term storage, consider to avoid condensation of surrounding air.
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 in an environment where dew condensation is anticipated, take the condensation preventive measures from outside of the entire package, or directly after opening the package.

Installation and Noise Elimination

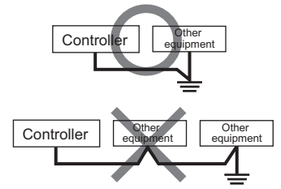
1. Noise Elimination Grounding (Frame Ground)



Connect using FG connection terminal on the main unit.

Copper Wire:
Connect to an ground cable with diameter 1.6mm ($2mm^2$: AWG14) or more.

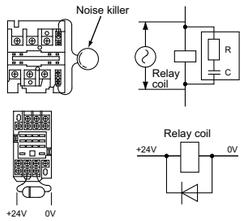
Earth Terminal
Class D grounding (Formerly Class-III grounding:
Grounding resistance at 100Ω or less)



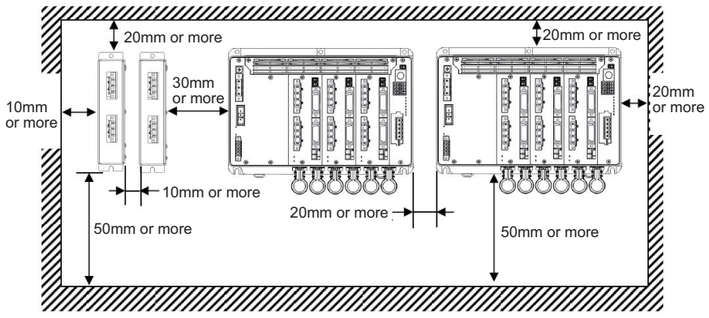
Do not share the ground wire with or connect to other equipment. Ground each controller.

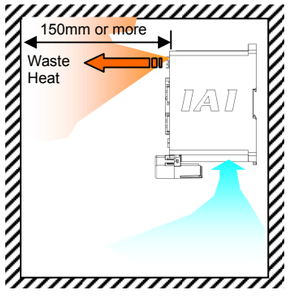
2. Precautions regarding wiring method
1) Wire is to be twisted for the 24V DC power supply.
2) Separate the signal and encoder lines from the power supply and power lines.

3. Noise Sources and Elimination
Carry out noise elimination measures for electrical devices on the same power path and in the same equipment. The following are examples of measures to eliminate noise sources.
1) AC solenoid valves, magnet switches and relays
[Measure] Install a Surge absorber parallel with the coil.
2) DC solenoid valves, magnet switches and relays
[Measure] Mount the windings and diodes in parallel.
Select a diode built-in type for the DC relay.



4. Heat Radiation and Installation
Design and Build the system considering the size of the controller box, location of the controller and cooling factors to keep the ambient temperature around the controller below 40°C.
Pay a special attention to the battery unit since the performance of it would drop both in the low and high temperatures. Keep it in a room temperature environment as much as possible. (Approximately 20°C is the recommended temperature.)

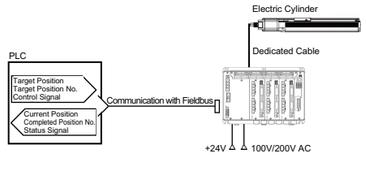
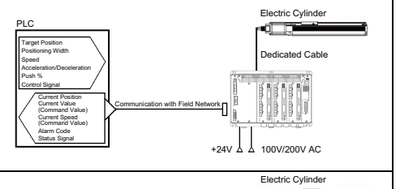
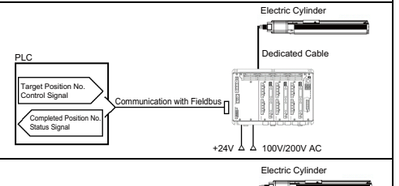
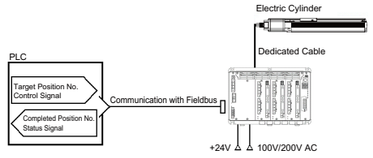




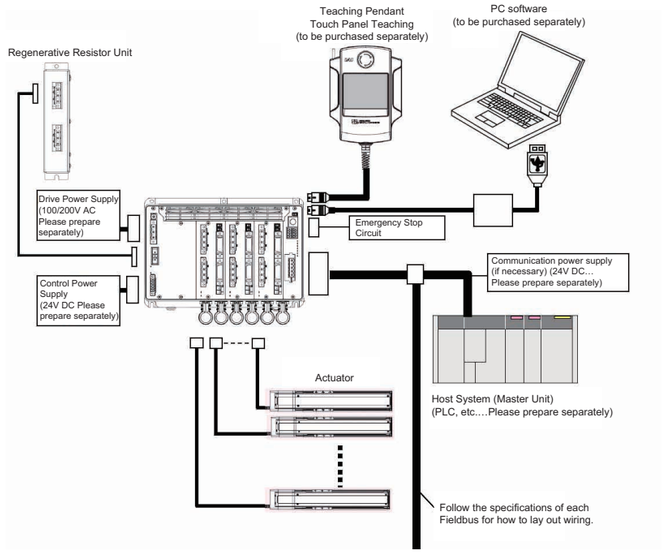
To install the unit, use the attachment holes on the top and bottom of the main body and affix with screws, or attach to DIN rails. (Regenerative resistance unit is separated to screw attachment type and DIN rail attachment type. Have an appropriate way to affix the unit for each type.)

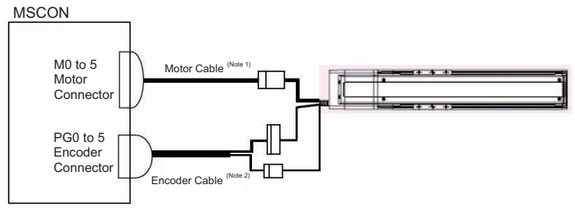
Operation Mode Available

7 types of operation modes are available to select from. The settings are to be established with Gateway Parameter Setting Tool.

Operation Pattern	Contents	Overview
Positioner 1	In Positioner 1 Mode, 256 points of position data can be registered at the maximum and is able to stop at the registered positions. Monitoring of the current position is also available.	
Simple Direct Mode	In Simple Direct Mode, the target position can be indicated directly by inputting a value. Monitoring of the current position is also available. Those other than the target position are to be indicated in the position table, and the setting can be done for 256 points at maximum.	
Direct Indication Mode Direct Indication 2 Mode	The target position, speed acceleration/deceleration and pressing current limit can be indicated with inputting a number. Monitoring of not only the current position, but also the current speed and indicated current are available. In Direct Indication 2 Mode, anti-vibration control is available instead of JOG operation.	
Position 2 Mode	This is the operation mode of the position data of 256 points at maximum set in the position table. The monitoring of the current position is not available This mode is that the transferred data is reduced from Positioner 1 Mode.	
Position 3 Mode	This is the operation mode of the position data of 256 points at maximum set in the position table. The monitoring of the current position is not available This is the mode to control with the minimized number of signals to perform the positioning operation by reducing the amount of sent and received data from Positioner 2 Mode.	
Remote I/O	Five types (Note 1) of control same for PIO are available. (Note 1) PIO patterns 0, 1, 2, 4 and 5 can be selected (by switching over in driver board parameters).	

Connection Diagram





Note 1 Applicable Moter Cable types □□□ : cable length Example) 030 = 3m

Model Name	Cable	Reference
For Single Axis Robot Connection	CB-RCC-MA□□□-RB	Robot cable from 0.5 to 20m
	CB-RCC-MA□□□	Standard cable from 0.5 to 20m
	CB-X-MA□□□-RB	Robot cable from 0.5 to 20m
	CB-X-MA□□□	Standard cable from 0.5 to 20m

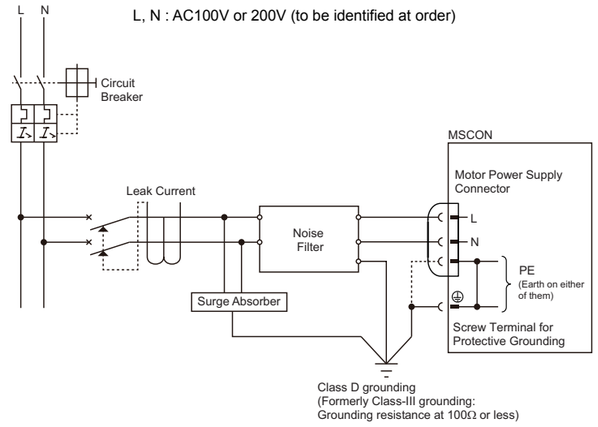
Note 2 Applicable Encoder Cable types □□□ : cable length Example) 030 = 3m

Model Name	Cable	Reference
For Single Axis Robot Connection	CB-X1-PA□□□	Robot cable from 0.5 to 20m
For Connection of Single Axis Robot Equipped with LS (Option)	CB-X1-PLA□□□	Robot cable from 0.5 to 20m
For RCS2 [models equipped with LS and rotary models (RT*) are excluded]	CB-X3-PA□□□	Robot cable from 0.5 to 20m
	CB-RCS2-PA□□□	Standard cable from 0.5 to 20m
RCS2 [for models equipped with LS and rotary models (RT*)]	CB-X2-PLA□□□	Robot cable from 0.5 to 20m
	CB-RCS2-PLA□□□	Standard cable from 0.5 to 20m

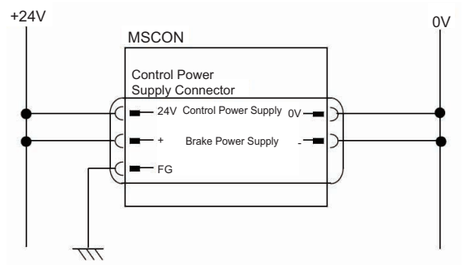
⚠ CAUTION
The model code and the manufacturing number of the connected actuator are printed on MSCON front panel. Check the information before connecting the actuator. Wrong connection will issue an error such as the encoder wire breakage.

Power Line and Emergency Stop Circuit

<Drive (Motor) Power Supply Circuit>

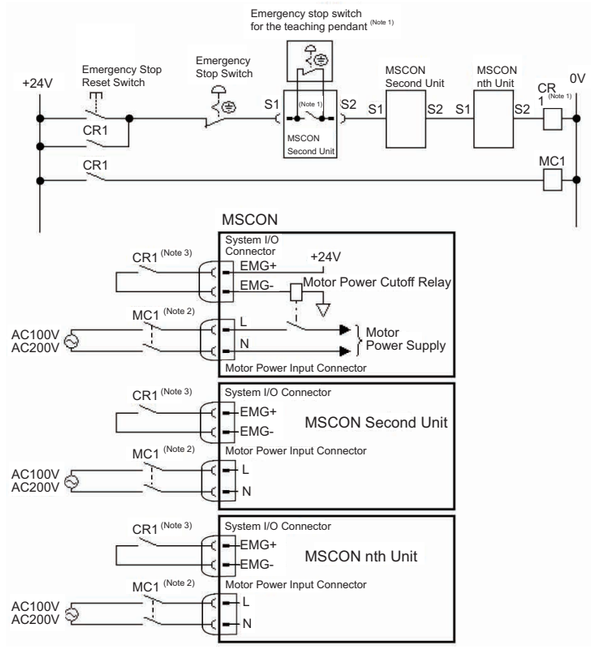


< Control Power Supply and Brake Power Supply Circuit>



⚠ Caution
- When using an actuator equipped with a brake, supply a brake power (24V DC). With the power not being supplied, 0A5 Electromagnetic Brake Non-Release Error will occur. Do not attempt to supply a brake power if there is no actuator with a brake.
- If having the control power supplied/cut on the 24V DC side, keep the 0V connected and have the +24V supplied/cut (cut one side only). If cut also on 0V side (cut both sides), it may damage the internal circuit.

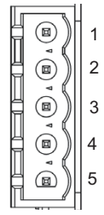
<Emergency Stop Circuit>
It is the example of circuit layout when an emergency switch of the teaching pendant is used to the emergency stop circuit of the equipment.



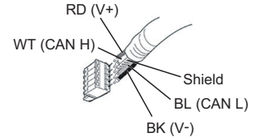
Note 1 When the teaching pendant is not connected, S1 and S2 become short-circuited inside the controller.
Note 2 When the motor power must be disconnected externally for safety category compliance, apply a safety rated contactor between L and N.
Note 3 The rating for the emergency stop signal (EMG-) to turn ON/OFF at contact CR1 is 24V DC and 30mA.
Note 4 For CR1, select the one with coil current 0.1A or less.

DeviceNet Type

Check the instruction manuals for each Field Network master unit and mounted PLC for the details.



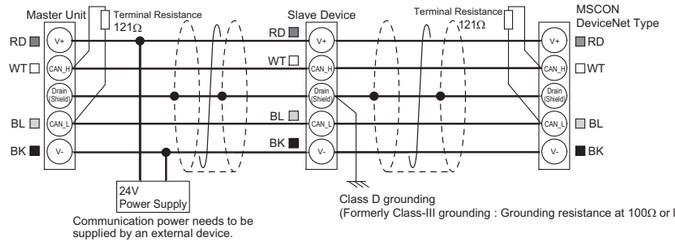
Front view of connector on controller side



Connector Name	DeviceNet Connector	
Cable Side	SMSTB2.5/5-ST-5.08 AU	Enclosed in standard package Manufactured by PHOENIX CONTACT
Controller Side	MSTBA2.5/5-G-5.08 ABGY AU	

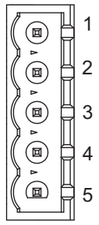
Pin No.	Signal Name	Contents	Applicable Cable
1	V- (BK)	Power Supply Cable Negative Side	DeviceNet Dedicated Cable
2	CAN L (BL)	Communication Data Low Side	
3	Shield (None)	Shield	
4	CAN H (WT)	Communication Data High Side	
5	V+ (RD)	Power Supply Cable Positive Side	

Connect the terminal resistor if the unit is placed at the end of the network.

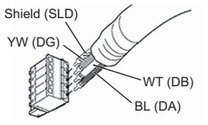


CC-Link Type

Check the instruction manuals for each Field Network master unit and mounted PLC for the details.

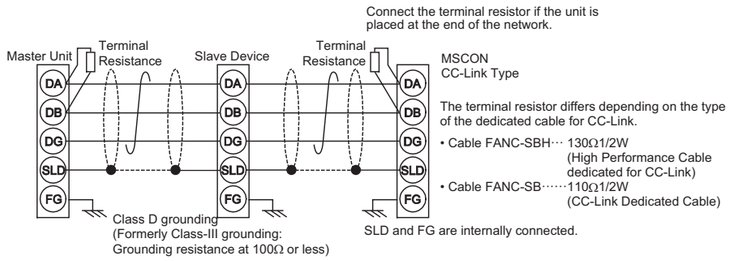


Front view of connector on controller side



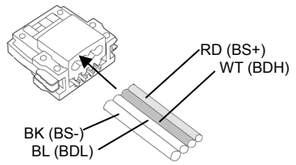
Connector Name	CC-Link Connector	
Cable Side	SMSTB2.5/5-ST-5.08 AU	Enclosed in standard package Manufactured by PHOENIX CONTACT
Controller Side	MSTBA2.5/5-G-5.08AU	

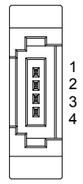
Pin No.	Signal Name	Contents	Applicable Cable
1	DA (BL)	Communications Line A	CC-Link Dedicated Cable
2	DB (WT)	Communications Line B	
3	DG (YW)	Digital GND	
4	SLD	Connect the shield of the shielded cable (Connect the FG of the 5 pins and controller FG internally)	
5	FG	Frame Ground (Connect the SLD of the 4 pins and controller FG internally)	



CompoNet Type

Check the instruction manuals for each Field Network master unit and mounted PLC for the details.



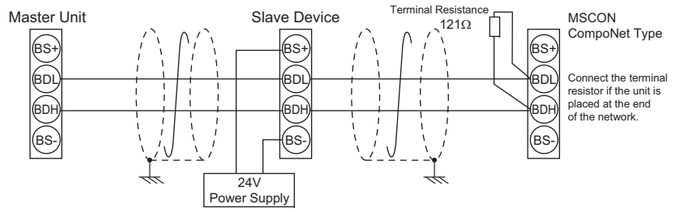


Front view of connector on controller side

Connector Name	CompoNet Connector	
Cable Side	Connector that complies with CompoNet standards	
Controller Side	XW7D-PB4-R	Manufactured by OMRON

Pin No.	Signal Name	Contents	Applicable Cable
1	BS+ (RD)	Communication Power Supply + (Note 1)	CompoNet Dedicated Cable
2	BDH (WT)	Signal Cable H Side	
3	BDL (BL)	Signal Cable L Side	
4	BS- (BK)	Communication Power Supply - (Note 1)	

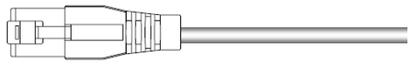
Note 1 It is unnecessary to supply the communication power. (Internal power source is used.) If conducting multi power supply to other slave devices via communication cables, there is no problem with connecting the power supply to BS+ and BS- terminals.

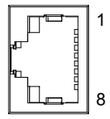


Supply power separately to the slave devices that requires the communication power supply. It is not necessary to supply communication power, however, there is no problem even if communication power is supplied.

EtherNet/IP Type

Check the instruction manuals for each Field Network master unit and mounted PLC for the details.

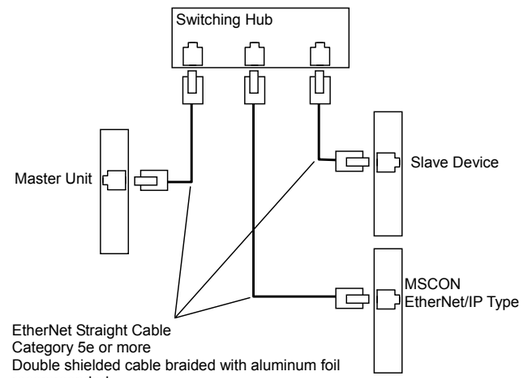




Front view of connector on controller side

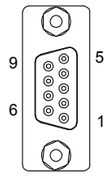
Connector Name	EtherNet/IP Connector	
Cable Side	8P8C Modular Plug	
Controller Side	8P8C Modular Jack	

Pin No.	Signal Name	Contents	Applicable Cable
1	TD+	Sent data +	For EtherNet cable, use a straight STP cable that possesses the performance of Category 5e or more.
2	TD-	Sent data -	
3	RD+	Received data +	
4	-	Not used	
5	-	Not used	
6	RD-	Received data -	
7	-	Not used	
8	-	Not used	

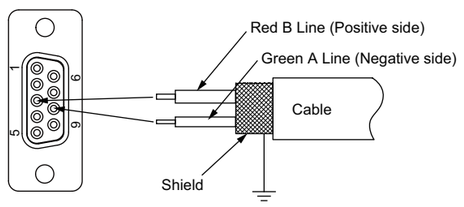


PROFIBUS-DP Type

Check the instruction manuals for each Field Network master unit and mounted PLC for the details.



Front view of connector on controller side

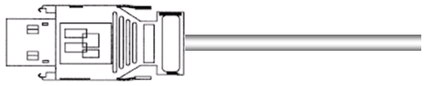


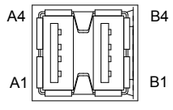
Connector Name	PROFIBUS-DP Connector	
Cable Side	D-sub 9-pin connector (Male)	Please prepare separately
Controller Side	D-sub 9-pin connector (Female)	

Pin No.	Signal Name	Contents	Applicable Cable
1	NC	Unconnected	PROFIBUS-DP Dedicated Cable (Type A : EN5017)
2	NC	Unconnected	
3	B-Line	Communications Line B (RS485)	
4	RTS	Request for Sending	
5	GND	Signal GND (Insulated)	
6	+5V	+5V Output (Insulated)	
7	NC	Unconnected	
8	A-Line	Communications Line A (RS485)	
9	NC	Unconnected	

MECHATROLINK Type

Check the instruction manuals for each Field Network master unit and mounted PLC for the details.

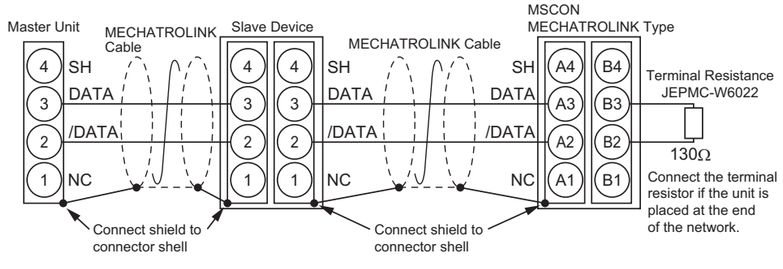




Front view of connector on controller side

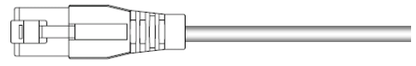
Connector Name	MECHATROLINK Connector	
Cable Side	Connector that complies with MECHATROLINK standards	
Controller Side	DUSB-ARB82-T11A-FA	Manufactured by DDK

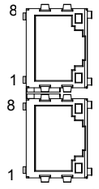
Pin No.	Signal Name	Contents	Applicable Cable
A1/B1	NC	Unconnected	MECHATROLINK Dedicated Cable
A2/B2	/DATA	Signal Cable - Side	
A3/B3	DATA	Signal Cable + Side	
A4/B4	SH	Shield	



EtherCAT® Type

Check the instruction manuals for each Field Network master unit and mounted PLC for the details.

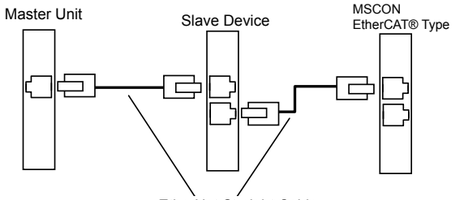




Front view of connector on controller side

Connector Name	EtherCAT® Connector	
Cable Side	8P8C Modular Plug	
Controller Side	8P8C Modular Jack	

Pin No.	Signal Name	Contents	Applicable Cable
1	TD+	Sent data +	For EtherNet cable, use a straight STP cable that possesses the performance of Category 5e or more.
2	TD-	Sent data -	
3	RD+	Received data +	
4	-	Not used	
5	-	Not used	
6	RD-	Received data -	
7	-	Not used	
8	-	Not used	



(Note) Terminal resistor is not required.

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. “PC” stated in this section means “PC software”.

Check of Packed Items
Are all the delivered items present?
No → Contact your local IAI distributor.

↓ Yes

Installation and Wiring
Install the controller and actuator and perform wiring according.

↓

Important Check Item
• Is frame ground (FG) connected?
• Has the noise countermeasure been taken?

↓

Power Supply and Alarm Check
Connect the PC software, set the operation mode setting switch to “MANU” side and turn the power ON.
Select [Teaching Mode 1 Safety Speed Activated / Prohibit PIO Startup] in the PC software.

↓

Check Item
Is RDY in Gateway Status LEDs turned ON in green?
No → Connect the PC software, confirm the alarm code, and remedy the indicated situation.

↓ Yes

Initial Setting and PIO Pattern Select
Conduct the initial selection for those such as PIO Patterns for each axis from the PC.
Register the operation mode to MSCON using Gateway Parameter Setting Tool.

↓

Servo ON
Turn the servo ON for all the connected axes by operating the PC.

⚠ Caution
Please perform this process with the actuator away from the mechanical end or interfering objects as much as possible. Move the actuator away from interfering surroundings. It may generate an alarm if the actuator hit the mechanical end or interfering objects when the servo is turned ON.
The slider may get slightly dropped by self-weight if servo ON and OFF is repeatedly performed at the same position. Be careful not to pinch the hand or damage the work.

↓

Check Item
Is SV* on the status LED display for the driver on the axis number indicated for the servo-on turned ON in green?
No → If an alarm is generated, check the detail of the alarm on the PC and have an appropriate treatment.

↓ Yes

Check of Safety Circuit
Does the emergency stop circuit (drive cutoff circuit) work properly and turn the servo OFF?
No → Check the emergency stop circuit.

↓ Yes

Target Position Setting [Except for simple direct mode and direct numerical specification mode]
Set a target position in the “Position” field for each position in the position table.

↓

Establish Link to Field Network
1) Assign MSCON as the host controller [Refer to the instruction manual of the master unit].
2) Put the operation mode setting switch on the front panel of MSCON to AUTO side, and reboot the power.
3) Once the link with the master unit is established, turn ON MON signal in the gateway control signals.
(While MON Signal is ON, control from field network is available.)

↓

Test Run Adjustment 1
1) Cancel the emergency stop, do not put a work piece on, set to low speed and check the operation with commands from the PC.
2) Check the operation (of communication) with commands from the host system (PLC, etc.).

↓

Check Item
Any vibration or abnormal noise?
No → Check if there is any problem with the installation of the actuator and the condition of the actuator use exceeds the ranges of the rated values. Adjust the servo if necessary.

↓ Yes

Test Run Adjustment 2
Check the system operation conducted.

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Quality and Innovation

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Manual No.: ME0305-1B