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Machine Controller MP930

IO350 EXTENSION I/O UNIT INSTRUCTIONS

Type: JEPMC-IO350

Upon receipt of the product and prior to initial operation, read these instructions thoroughly, and retain for future reference.



YASKAWA

MANUAL NO. TOEZ-C887-1.5

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Safety Information

The following conventions are used to indicate precautions in this manual. Failure to heed precautions provided in this manual can result in serious or possibly even fatal injury or damage to the products or to related equipment and systems.

⚠ WARNING	Indicates precautions that, if not heeded, could possibly result in loss or life or serious injury.
⚠ CAUTION	Indicates precautions that, if not heeded, could result in relatively serious or minor injury, damage to the product, or faulty operation.

The warning symbols for ISO and JIS standards are different, as shown below.

ISO	JIS
	

The ISO symbol is used in this manual.

Both of these symbols appear on warning labels on Yaskawa products. Please abide by these warning labels regardless of which symbol is used.

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Visual Aid

The following aid are used to indicate certain types of information for easier reference.

IMPORTANT Indicates important information that should be memorized.

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Overview

About this Manual

This manual describes the IO350 Unit for the MP930 Machine Controller.

Read this manual carefully to ensure the proper use of the MP930 Machine Controller. Also, keep this manual in a safe place so that it can be referred to whenever necessary.

Related Manuals

Refer to the following related manuals as required.

Thoroughly check the specifications, restrictions, and other conditions of the product before attempting to use it.

Manual Name	Manual Number	Contents
MP930 Machine Controller User's Manual: Design and Maintenance	SIEZ-C887-1.1	Describes the MP930 functions, specifications or operations such as setup.
MP9□□ Machine Controller User's Manual: Ladder Programming	SIEZ-C887-1.2	Describes the processing instructions used in MP930 ladder programs.
MP9□□ Machine Controller User's Manual: Motion Programming	SIEZ-C887-1.3	Describes the motion programming language used for the MP930.
MP9□□ Machine Controller User's Manual: Programming Panel Software	SIEZ-C887-2.2-1, SIEZ-C887-2.2-2 (To be prepared)	Describes the CP-717 Programming Panel software used for designing and maintaining the MP9□□.

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Safety Precautions

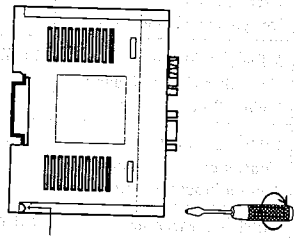
Before installation, operation, maintenance and inspections, read this manual and all other documents provided to ensure correct operations. Before using the equipment, familiarize yourself with equipment details, safety information, and all other precautions.

■ Installation

⚠ CAUTION

- Firmly tighten the Unit mounting screws and terminal block mounting screws to prevent them from loosening during operation.

  Loose screws may result in a malfunction of the MP930.



Unit mounting screw
(M4, Phillips head)

- Follow this instruction manual to mount the IO350 Unit correctly.

  Imperfect mounting may result in drop, failures or malfunctions of the product.

- Be sure to turn OFF the IO350 Unit before installing it.

- Insert the connectors of the cables that are to be connected to the IO350 Unit and secure them well.

  Incorrect insertion of the connectors may result in a malfunction of the MP930.

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■ Wiring

⚠ CAUTION

- Always connect a power supply that meets the given specifications.

  Connecting an inappropriate power supply may cause fires.

- Wiring must be performed by qualified personnel.

  Incorrect wiring may cause fires, product failure, or malfunctions.

- Do not accidentally leave foreign matter such as wire chips in the Unit when wiring.

  This may cause fires, failures, and malfunctions.

MANDATORY

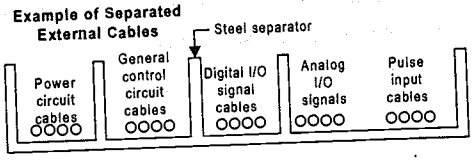
- Always ground the FG terminal to a ground resistance 100Ω or less.

  Failure to ground the MP930 may result in electrical shocks or malfunctions.

Select, separate, and lay external cables correctly.

- Consider the following items when selecting the I/O signal lines (external cables) to connect the MP930 to external devices.
  - Mechanical strength
  - Noise interference
  - Wiring distance
  - Signal voltage, etc.
- Separate the I/O signal lines from the power lines both inside and outside the control panel to reduce the influence of noise from the power lines.

  If the I/O signal lines and power lines are not separated properly, malfunctioning may result.



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■ Application Precautions

⚠ WARNING

- Do not touch any Unit terminals when the system power is ON.
  There is a risk of electrical shock.

⚠ CAUTION

- Do not attempt to modify the MP930 programs, force outputs, switch between RUN and STOP, or perform other similar operations while the MP930 is operating.
  Incorrect programming or operation may damage the equipment or cause an accident.

■ Maintenance Precautions

⚠ WARNING

- Make sure that the polarity of the Unit's built-in battery is correct. The battery must be installed correctly and must not be charged, disassembled, heated, thrown into fire, or short-circuited.
  Improper handling may cause the battery to explode or ignite.

⚠ CAUTION

- Do not attempt to disassemble or modify the MP930 in any way.
  Doing so can cause fires, product failure, or malfunctions.
- The customer must not replace the built-in fuse.
  If the customer replace the built-in fuse, the MP930 may malfunction or break down.
  The built-in fuse must always be replaced by Yaskawa service staff.
- Do not remove the seals on both Unit ends.
  Excessive shock during transport under adverse conditions may remove the case.

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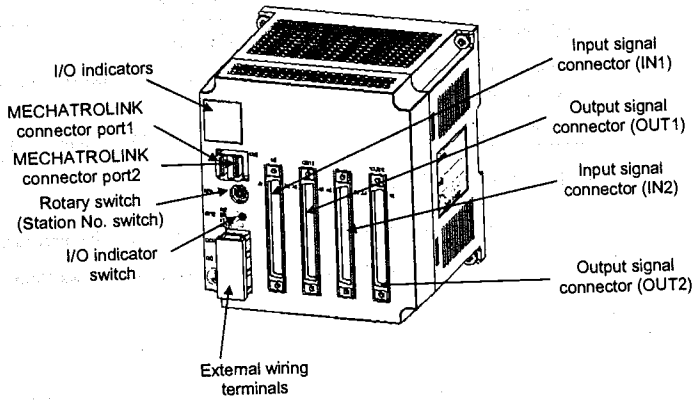
■ General Precautions

Always note the following to ensure safe use.
● MP930 was not designed or manufactured for use in devices or systems directly related to human life. Users who intend to use the product described in this manual for special purposes such as devices or systems relating to transportation, medical space aviation, atomic power control, or underwater use must contact Yaskawa Electric Corporation beforehand. ● MP930 has been manufactured under strict quality control guidelines. However, if this product is to be installed in any location in which a failure of MP930 involves a life and death situation or in a facility where failure may cause a serious accident, safely devices MUST be installed to minimize the likelihood of any accident. ● Drawings in this manual show typical product examples that may differ somewhat from the product delivered. ● This manual may change without prior notice due to product improvements and specification changes or for easier use. ● We will update the manual number of the manual and issue revisions when changes are made. The revision number of the revised manual appears on the back of the manual. ● Contact your nearest Yaskawa sales representative or the dealer from whom you purchased the product and quote the manual number on the front page of the manual if you need to replace a manual that was lost or destroyed. ● Contact your nearest Yaskawa sales representative or the dealer from whom you purchased the product to order new nameplates whenever a nameplate becomes worn or damaged. ● Products modified by the customer are not covered by the Yaskawa warranty, nor does Yaskawa assume any liability for injury or damage that may result from such modifications.

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1 NAMES AND MEANINGS OF INDICATOR LAMPS



■ I/O and Status Indicators

R	ACTIVE		F
1	9	17	25
2	10	18	26
3	11	19	27
4	12	20	28
5	13	21	29
6	14	22	30
7	15	23	31
8	16	24	32

Indicator Name	Indicator Color	Meaning when Indicator is Lit
R	Green	Lights during ON.
ACTIVE	Yellow	Lights during MECHATROLINK transmission.
F	Red	Broken fuse
1~32	Yellow	Input signal and output signal monitors. The indicator meaning is changed with the I/O indicator switch.

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2 MOUNTING UNIT

⚠ CAUTION

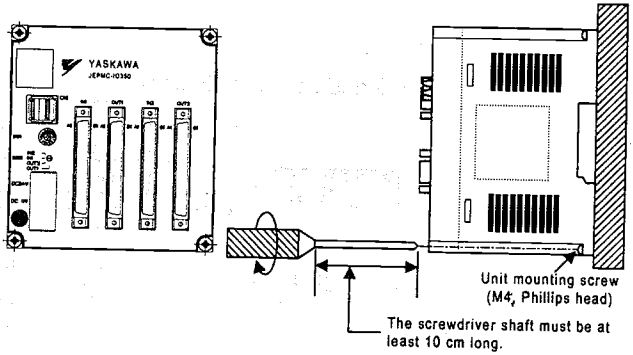
- Be sure to turn OFF the IO350 Unit before installing it.
- Insert the connectors of the cables that are to be connected to the IO350 Unit and secure them well.

  Incorrect insertion of the connectors may result in a malfunction of the MP930.

2.1 Mounting with Screws

Mount the IO350 Unit of the MP930 in the following procedure.

Be sure to securely tighten the Unit mounting screws (four places) to secure the IO350 Unit to the mounting surface.

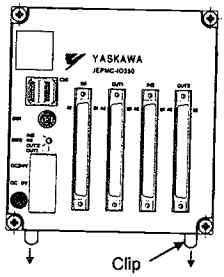


2.2 Mounting to DIN Track

Mount the IO350 Unit of the MP930 to the DIN track in the following procedure.

1. Release the mounting clips.

   Pull down the DIN track mounting clips to release them.

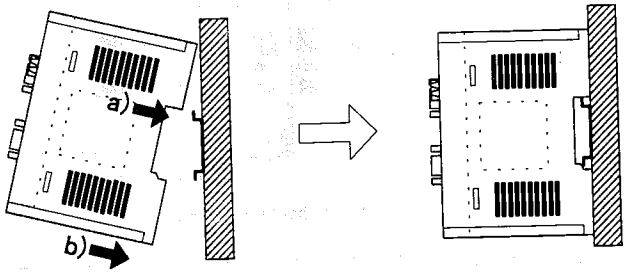


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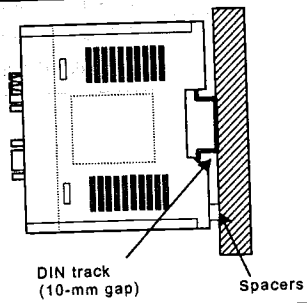
2. Mount the Unit on the DIN track.

a) Hook the IO350 Unit on the DIN track.

b) Push the Unit inward at the bottom until the MP930 comes into contact with the mounting surface.

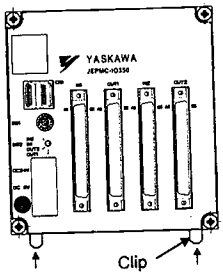


When a DIN track with a 10-mm gap is used, mount spacers on the mounting surface.



3. Lock the mounting clips.

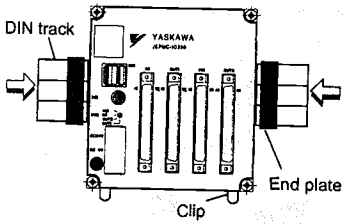
Push in the DIN track mounting clips and lock the clips.



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4. Attach the End Plate.

Attach End Plates on the DIN track on both sides of the MP930 to secure it in place.



The unit has been mounted.

IMPORTANT

Parts used to mount the IO350 on the DIN track are optional, not included in the product package. Purchase the following parts.

- Model: JEPMC-OP300

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3 CONNECTING CABLE

⚠ CAUTION
● Insert the connectors of the cables that are to be connected to the IO350 Unit and secure them well. Incorrect insertion of the connectors may result in a malfunction of the MP930.

Connect the external I/O signal cables to be connected to the IO350 Unit in the following procedure.

1. Verify that the IO350 Unit has been mounted securely.
2. Insert the cables to the IO350 Unit connectors.
3. Tighten the connector mounting screws.

4 REMOVING CABLE

Remove the external I/O signal cables in the following procedure.

1. Tighten the connector mounting screws.
2. Remove the connectors from the IO350 Unit.

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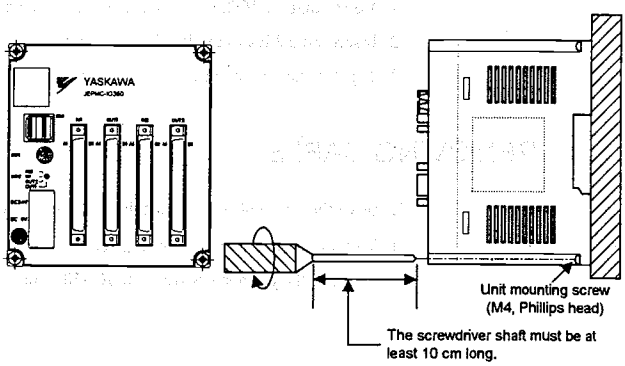
5 REMOVING UNIT

⚠ CAUTION
• Be sure to turn OFF the IO350 Unit before installing it.

5.1 Removing Unit Mounted with Screws

Remove the MP930 IO350 Unit in the following procedure.

Loosen the four Unit mounting screws to remove the IO350 Unit.

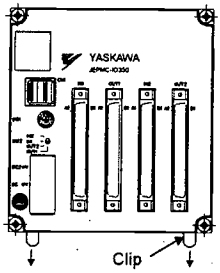


5.2 Removing Unit Mounted to DIN Track

Remove the MP930 IO350 Unit from the DIN track in the following procedure.

1. Release the mounting clips.

   Pull down the DIN track mounting clips to release them.

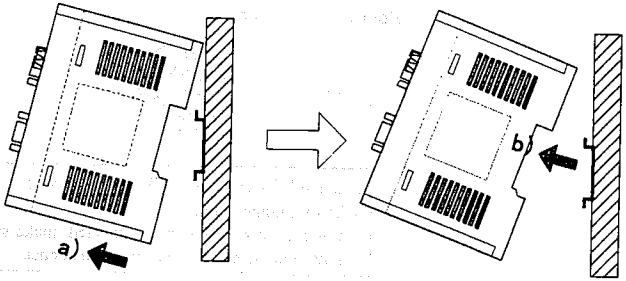


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2. Remove the Unit from the DIN track.

a) Swing up the IO350 Unit.

b) Remove the IO350 Unit from the DIN track.



The Unit has been removed.

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6 ROTARY SWITCH

IO350 Rotary Switch is used to set the MECHATROLINK station number.

Rotary Switch Function

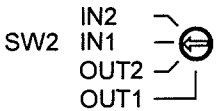
SW1 

Sets the MECHATROLINK station number.
- Setting range: 1 to E
- When multiple Units are connected, make sure the same station number is not used more than once.

7 I/O INDICATOR SWITCH

This switch is used to change the I/O signal monitor displays.

I/O Indicator Switch Function



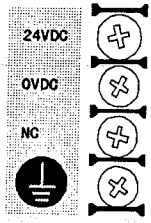
The I/O signal monitor displays can be switched in 32-point units.
- IN1: Input signals 1 to 32
- IN2: Input signals 33 to 64
- OUT1: Output signals 1 to 32
- OUT2: Output signals 33 to 64

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8 EXTERNAL WIRING TERMINALS

The external wiring terminal supplies 24 VDC to the IO350 Unit.

Function of External Wiring Terminals



Terminal Name	Function
24 VDC	+24 VDC
0 VDC	0 VDC
NC	Not used
FG	Protective ground terminal

9 CONNECTION TO EXTERNAL I/O SIGNAL CONNECTORS

⚠ CAUTION

- Always connect a power supply that meets the given specifications.
  Connecting an inappropriate power supply may cause fires.
- Do not accidentally leave foreign matter such as wire chips in the Unit when wiring.
  Ths may cause fires, failures, and malfunctions.

It is necessary to connect the power supply line for I/O signals and the I/O signal line to the IO350 Unit external I/O signal connector.

For IO350 Unit external I/O signal connector, DC power supply (24 VDC) must be provided externally as the I/O signal power supply. Concerning such DC power supply, observe the above cautions.

For the conditions of the IO350 Unit I/O signals, refer to paragraph 11 "IO350 UNIT HARDWARE SPECIFICATIONS".

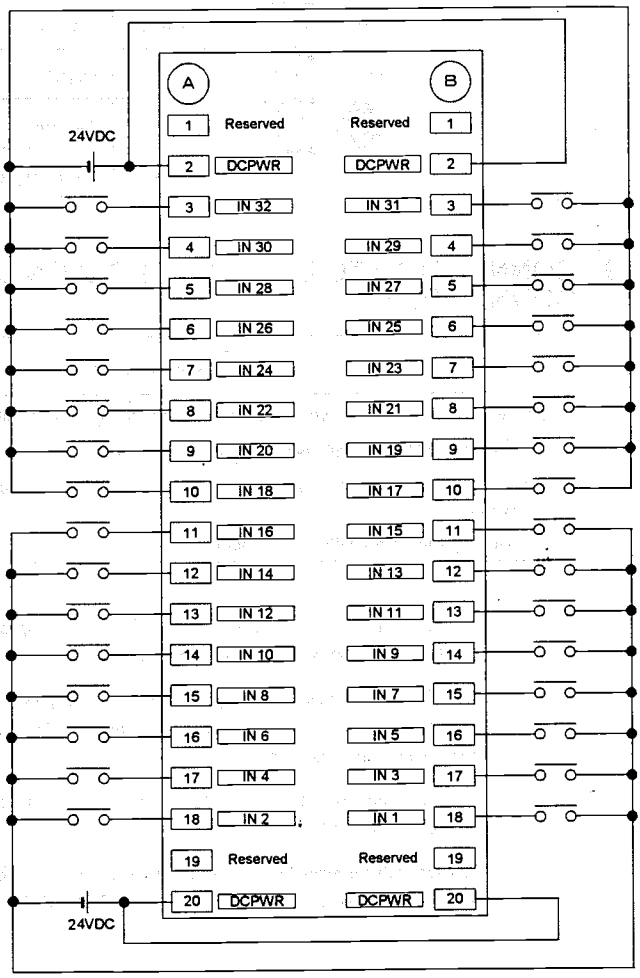
Standard cable is available for I/O cable to be connected to the IO350 Unit. For details, refer to paragraph 12 "CONNECTION WITH EXTERNAL DEVICES".

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10 CONNECTOR PIN LAYOUT AND SIGNAL NAMES

■ IO350 Unit·IN Connector (IN1)

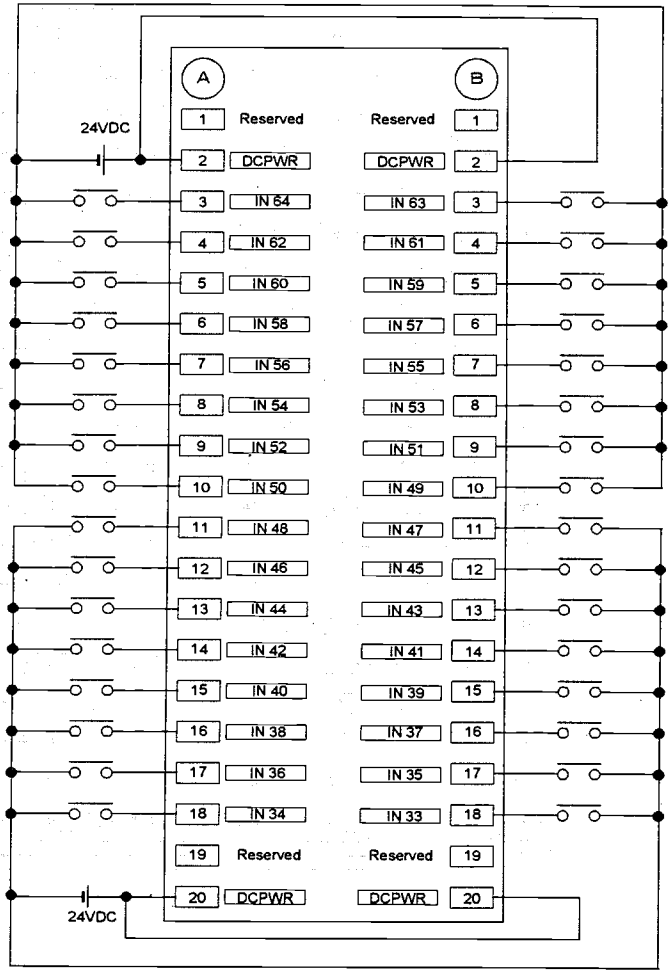
The following diagram shows the IO350 Unit IN1 connector pin layout and the signal names.



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■ IO350 Unit·IN Connector (IN2)

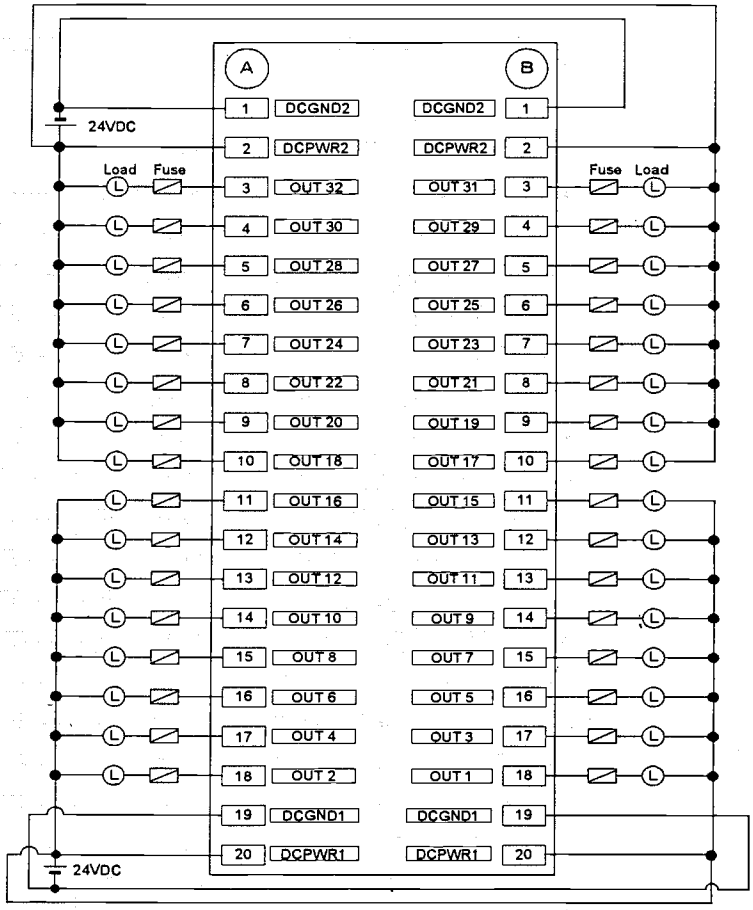
The following diagram shows the IO350 Unit IN2 connector pin layout and the signal names.



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■ IO350 Unit·OUT Connector (OUT1)

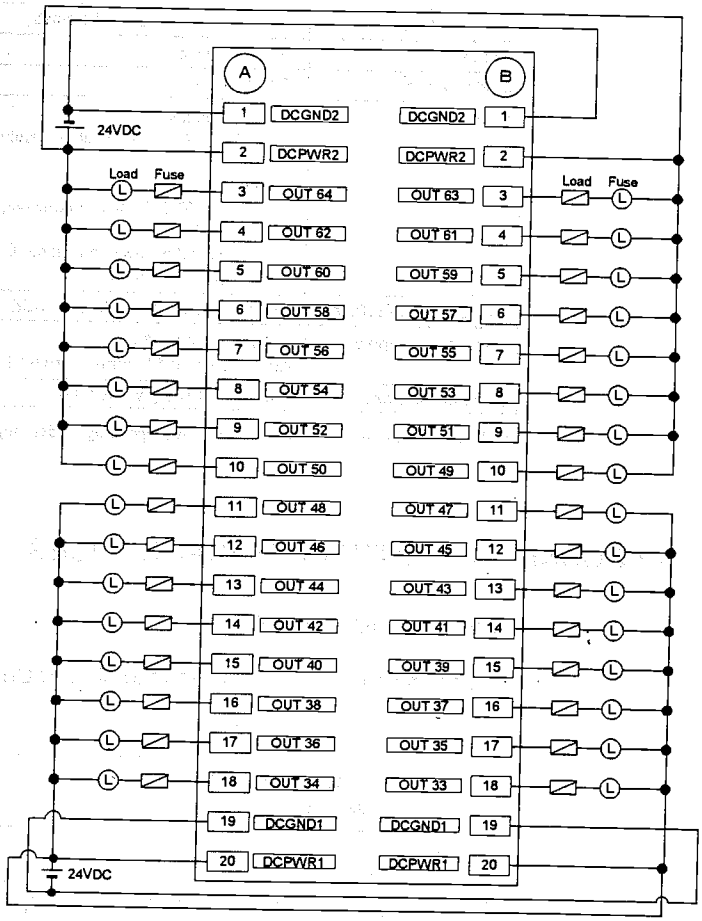
The following diagram shows the IO350 Unit OUT1 connector pin layout and the signal names.



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■ IO350 Unit·OUT Connector (OUT2)

The following diagram shows the IO350 Unit OUT2 connector pin layout and the signal names.



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11 IO350 UNIT HARDWARE SPECIFICATIONS

The following table indicates hardware specifications of the IO350 Unit.

IO350 Unit Hardware Specifications

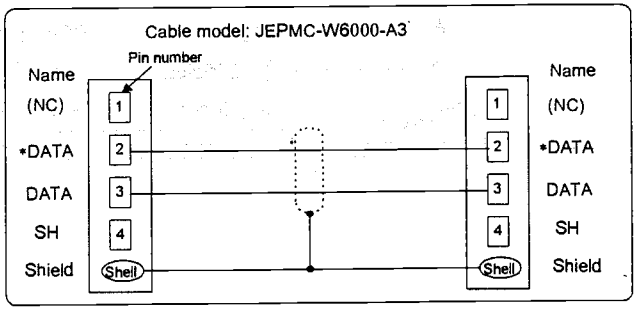
Item	Specifications
Name	IO350 I/O Unit
Model Number	JEPMC-IO350
I/O Signals	Inputs: 64 points 24 VDC, 5 mA, combined sinking/sourcing Outputs: 64 points 24 VDC, 50 mA, sinking outputs (all points ON) * Signal connection method: Connector (FCN360 Series)
MC350 Unit Interface	MECHATROLINK (high-speed field network)
Unit Power Supply	24 VDC (20.4 to 28.8 V) Rated current: 0.5A; inrush current: 1 A
Dimensions (mm)	120 × 130 × 105 (W × H × D)

* The maximum rating per point is 100 mA (depending on derating conditions).

12 CONNECTION WITH EXTERNAL DEVICES

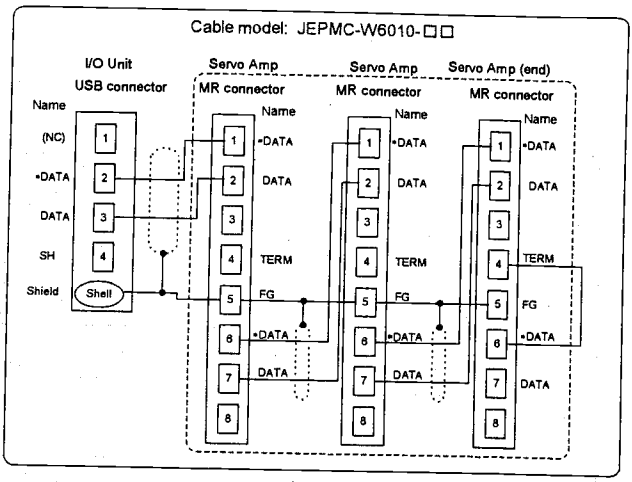
MECHATROLINK CABLE

■ Connection of Cables between the MC350 Unit and the IO350 Unit



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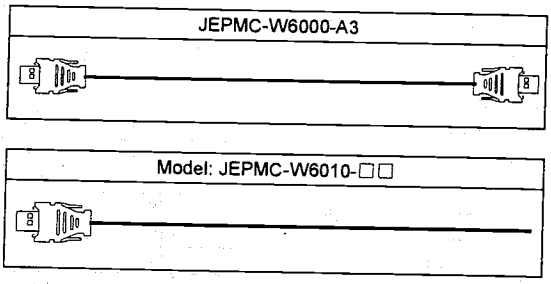
■ Connections of 1:N MECHATROLINK Cable



Note 1: The JEPMC-6010-□□ has loose wires on one end and a USB connector on the other. The customer must prepare the 1:N cable using an MR connector and wire material.

2: Red lead: DATA
Black lead: *DATA

■ Appearance of the MECHATROLINK Cable



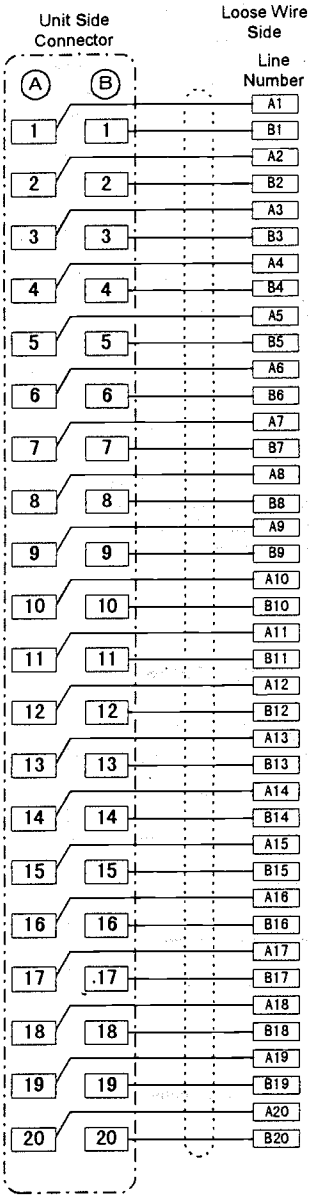
I/O CABLE

W5410 cables can be used as both of input cables and output cables.

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■ INPUT Cable Signal Names

Model: JEPMC-W5410-□□

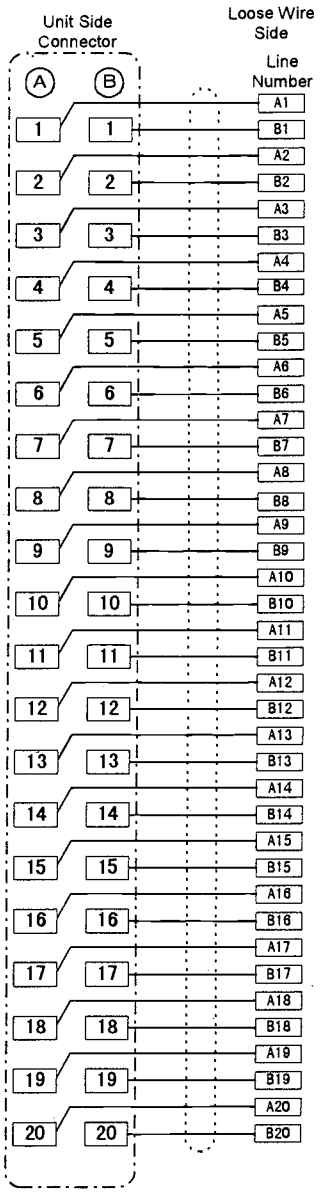


Signal Name IN1	Signal Name IN2	Sheath Color	Dot Mark: approx. 1mm Space between Dot Marks: approx. 1mm
–	–	Blue	Red –
–	–	Blue	Black –
DCPWR	DCPWR	Pink	Red –
DCPWR	DCPWR	Pink	Black –
IN32	IN64	Green	Red –
IN31	IN63	Green	Black –
IN30	IN62	Orange	Red –
IN29	IN61	Orange	Black –
IN28	IN60	Gray	Red –
IN27	IN59	Gray	Black –
IN26	IN58	Blue	Red – –
IN25	IN57	Blue	Black – –
IN24	IN56	Pink	Red – –
IN23	IN55	Pink	Black – –
IN22	IN54	Green	Red – –
IN21	IN53	Green	Black – –
IN20	IN52	Orange	Red – –
IN19	IN51	Orange	Black – –
IN18	IN50	Gray	Red – –
IN17	IN49	Gray	Black – –
IN16	IN48	Blue	Red – – –
IN15	IN47	Blue	Black – – –
IN14	IN46	Pink	Red – – –
IN13	IN45	Pink	Black – – –
IN12	IN44	Green	Red – – –
IN11	IN43	Green	Black – – –
IN10	IN42	Orange	Red – – –
IN9	IN41	Orange	Black – – –
IN8	IN40	Gray	Red – – –
IN7	IN39	Gray	Black – – –
IN6	IN38	Blue	Red – – – –
IN5	IN37	Blue	Black – – – –
IN4	IN36	Pink	Red – – – –
IN3	IN35	Pink	Black – – – –
IN2	IN34	Green	Red – – – –
IN1	IN33	Green	Black – – – –
–	–	Orange	Red – – – –
–	–	Orange	Black – – – –
DCPWR	DCPWR	Gray	Red – – – –
DCPWR	DCPWR	Gray	Black – – – –

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■ Output Cable Signal Names

Model: JEPMC-W5410-□□



Signal Name OUT1	Signal Name OUT2	Sheath Color	Dot Mark: approx. 1mm Space between Dot Marks: approx. 1mm
DCGND2	DCGND2	Blue	Red —
DCGND2	DCGND2	Blue	Black —
DCPWR2	DCPWR2	Pink	Red —
DCPWR2	DCPWR2	Pink	Black —
OUT32	OUT64	Green	Red —
OUT31	OUT63	Green	Black —
OUT30	OUT62	Orange	Red —
OUT29	OUT61	Orange	Black —
OUT28	OUT60	Gray	Red —
OUT27	OUT59	Gray	Black —
OUT26	OUT58	Blue	Red — —
OUT25	OUT57	Blue	Black — —
OUT24	OUT56	Pink	Red — —
OUT23	OUT55	Pink	Black — —
OUT22	OUT54	Green	Red — —
OUT21	OUT53	Green	Black — —
OUT20	OUT52	Orange	Red — —
OUT19	OUT51	Orange	Black — —
OUT18	OUT50	Gray	Red — —
OUT17	OUT49	Gray	Black — —
OUT16	OUT48	Blue	Red — — —
OUT15	OUT47	Blue	Black — — —
OUT14	OUT46	Pink	Red — — —
OUT13	OUT45	Pink	Black — — —
OUT12	OUT44	Green	Red — — —
OUT11	OUT43	Green	Black — — —
OUT10	OUT42	Orange	Red — — —
OUT9	OUT41	Orange	Black — — —
OUT8	OUT40	Gray	Red — — —
OUT7	OUT39	Gray	Black — — —
OUT6	OUT38	Blue	Red — — — —
OUT5	OUT37	Blue	Black — — — —
OUT4	OUT36	Pink	Red — — — —
OUT3	OUT35	Pink	Black — — — —
OUT2	OUT34	Green	Red — — — —
OUT1	OUT33	Green	Black — — — —
DCGND1	DCGND1	Orange	Red — — — —
DCGND1	DCGND1	Orange	Black — — — —
DCPWR1	DCPWR1	Gray	Red — — — —
DCPWR1	DCPWR1	Gray	Black — — — —

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Machine Controller MP930

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