

M2I Corporation



Industrial HMI Touch Panel

TOPR Series (Process Module)

Hardware Manual

Thank you for purchasing the industrial HMI touch panel series of M2I corporation.

Please read this manual carefully to know installing, wiring, operating this equipment for safe use of this product.





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Chapter 1 Safety Precautions

■ Before using the product





To use the product safely and effectively, please read the contents of this manual thoroughly before use. Please keep to the safety precaution, for it is to prevent accidents and potential danger from occurring. Safety precaution is classified into 'Warning' and 'Caution' and their meanings are as follows. Also the indicated illustrations on the product and in the manual have the following meanings.

 Warning	Violating the instruction may result in serious personal injury or death.
 Caution	Violating the instruction may result in slight personal injury or product damage.
	Be cautious, for danger may be present.
	Be cautious, for there is a possibility of an electric shock.

■ General Precautions Caution

-  Do not press the screen with a hard or sharp object (awl, screwdriver, pen) with too strong a force.
It may cause malfunction of touch due to damage of the front sheet.
-  Do not use or store in an environment with high vibration.
-  Do not allow foreign objects such as water, liquids, or metal powders to enter the product. This may cause breakage or electric shock.
-  Use the radio or mobile phone at least 30cm away from the main unit.
-  Two or fewer bright spots may appear on the LCD screen, and certain areas may appear brighter, but this is not a defect in LCD characteristics.
-  Do not store or operate in direct sunlight. Direct sunlight can change the properties of the LCD.
WARNING – DO NOT CONNECT OR DISCONNECT WHEN ENERGIZED. or equivalent.
AVERTISSEMENT – NE PAS CONNECTER OU DÉCONNECTER LORSQUE L'ÉQUIPEMENT EST SOUS TENSION.

■ Design Precautions

-  Install protection circuit on the outside of Products to protect the entire control system when external power supply or Products have problems.
-  As the malfunction & incorrect result of Products could damage the stability of the entire systems and human body, you must install damage preventing interlock circuit such as emergency stop, Protective circuits, positioning upper and lower limit switch and interlock for forward/reverse operation.
-  When computer or other controllers communicate and exchange data with products or change operation mode of products, set up protective sequence program in PC or Controller for protecting system from communication error.
-  The output signal or communication lines should be separated from the power line or high tension wire.
They should be installed 100mm(3.94 Inch) or more from each other.

■ Wiring Precautions Warning

- ❗ Be sure the wiring is done correctly by checking the product's rated voltage and the terminal layout. Incorrect wiring could result in fire, damage or malfunctions.
- ❗ Tighten the terminal screw with the specified torque. If the screws of terminal are loose, it could result in short circuit, fire, malfunctions.
- ❗ FG Terminal must be used a dedicated ground. Not doing so could result in malfunctions.
- ❗ a. Grounding should be the Class 3 grounding. The cable for grounding should be more than 2mm².
- ❗ b. grounding point be closed to the products and shorten the distance to the ground cable if possible. Please see below.

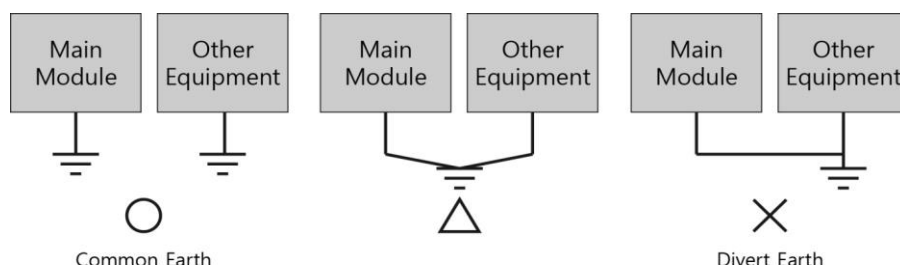


Fig. Grounding Example Diagram

■ Installation Precautions

- ⊘ Do not install the location which exceeds allowed temperature. Product can be damaged or shorten the life. Especially Install environment as below should be avoided.
- ⊘ Do not Install product to the place which the ambient temperature is out of limits, from 0 ~ 50°C or on the surface of control board which high pressure equipment is installed.
- ⊘ Do not install to the place where strong shock or vibration continuously have impacted on product.
- ⊘ Indoor use only.
- ⊘ Use the product under 2000M altitude.

■ Disposal Precautions Caution

When you dispose of product and battery, please treat it as industrial waste. It can create poisonous substances or explosion.

■ Cell Type Battery Specifications and Exchange Caution

Mounted on mainboard Model MS920SE Battery is not replaced by the user. If the battery has run out of service, please contact our Customer Support Center for replacement and inspection.

Item	Content
Battery Voltage	DC 3V(MS920SE)
Battery Model	MS920SE(Rechargeable Lithium-Ion Battery/Non-changeable)
Battery Lifetime	Permanent(In case of ambient temperature 25°C)
Battery Discharge	Last about 7 days After turn it off

* Specifications are subject to change depending on the model.

■ All field-wiring connections to this unit shall be from Limited Voltage / Limited Current, below 24Vdc isolated secondary source with an output fuse, or Class2.

Chapter 2 Overview

2.1 Introduction of Products

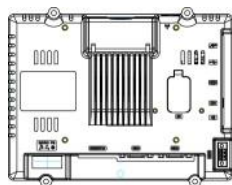

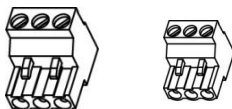




This industrial HMI touch panel is an industrial control device required in industrial field. It is a device based on RS-232C and RS-422/485, Ethernet which is used for the basic purpose of communication with another device (PLC).

The TOPR and TOPRT series consists of a Process module(TOPRP□□□) and a Display module(TOPRD□□□□□). This user manual is for a Process module(TOPRP□□□).

2.2 Package Contents

The components of the product are as follows.

Before using the product, please check that all of the following components are included.

Item	Figure	Quantity
Process Module		1
Manual		1
Power Connector Communication Connector		1 Each
Accessories (Sold separate)	 USB Memory  USB Cable  SD Card  Front Protect Sheet	User Options

2.3 Explanation of Model name

2.3.1 Processor Module (Main Unit)

TOPR	P	□□	□
Series	Type	Option	Power
	P: Process	10: Standard	D: DC
		20: Premium	A: AC
		50: Standard(10) + Performance improvement	

2.3.2 Display Module (Accessory Unit)

TOPR	D	□□	□□	□
Series	Type	Screen	Option	Resolution
	D: Display	10: 10.4"	10: Standard	Q: QVGA(320*240)
		12: 12.1"	20: Premium	V: VGA(640*480)
		15: 15.0"	30: 20" Premium + Added Function/Option	S: SVGA(800*600)
				X: XGA(1024*768)

2.3.3 Processor Module + Display Module

Model	Screen	Resolution	Assembled Module
TOPRT1210SD	12.1"	XGA(1024*768)	TOPRP10D + TOPRD1220X
TOPRT1230XD	12.1"	XGA(1024*768)	TOPRP10D + TOPRD1230X
TOPRT1240XD	12.1"	XGA(1024*768)	TOPRP50D + TOPRD1230X

Chapter 3 General Specifications

3.1 Electrical Specifications

Item \ Model			TOPRP10D, TOPRP20D, TOPRP50D	TOPRP10A, TOPRP20A	
Power Consumption	Input Voltage			DC24V	AC220V,50/60Hz
	Input Voltage Range			DC 20 ~ 28V	AC100~240V,50/60Hz
	Power Consumption	Process Module	TOPRD10 Series	9W	
			TOPRD20 Series	9W	
			TOPRP50D	9W	
		Display Module	TOPRD10 Series	9W	
			TOPRD1210S	9W	
			TOPRD1220X	9W	
			TOPRD1230X	9W	
			TOPRD15 Series	12W	
		Process + Display	TOPRT1210SD	18W	
	TOPRT1230XD		18W		
	TOPRT1240XD		18W		
Voltage endurance			DC 24V, within 10ms	AC85/170V, within 10ms	
Insulation Resistance			500V DC, 10 MΩ		

3.2 Memory Specifications

Screen Memory	128MB
Backup Memory	512KB: System buffer(10K Word), Including Alarm/Log/Recipe
Backup Period	Permanent
Real Time Clock	Built in(by Battery)

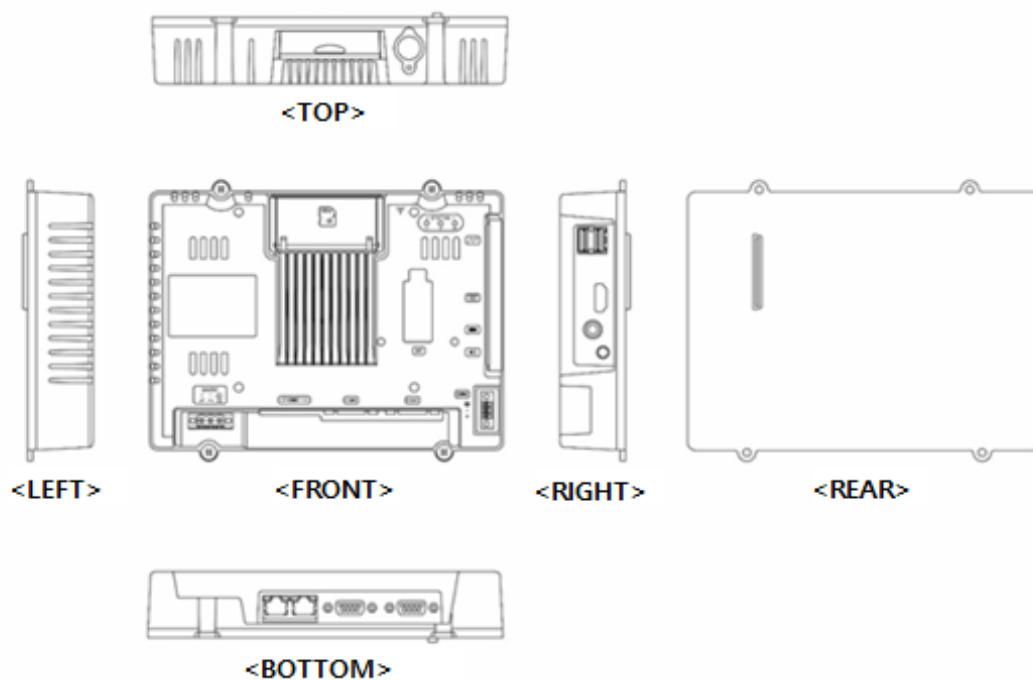
3.3 Environment Specifications

Operation Temperature(°C)	-10 ~ +50
Storage Temperature(°C)	-20 ~ +60
Operation Humidity(%RH)	0 ~ 90 (No dew)
Atmosphere	No corrosive gas
Vibration Endurance	Amplitude: 10≤F < 25 Hz(2G) X,Y,Z each direction(for 30 minutes)
Noise Immunity	1000Vp-p(Pulse width 1 μs)
Static Electricity Discharge	Connective discharge from EN61000-4-2: ±4 kV
Shock Endurance	10G X,Y,Z each direction(for 3 times)
Surge Voltage	500V(Line-Line)
Ground Connection	Class 3(Under 100Ω)
Protection Classification	IP2X(Display Module: IP65)

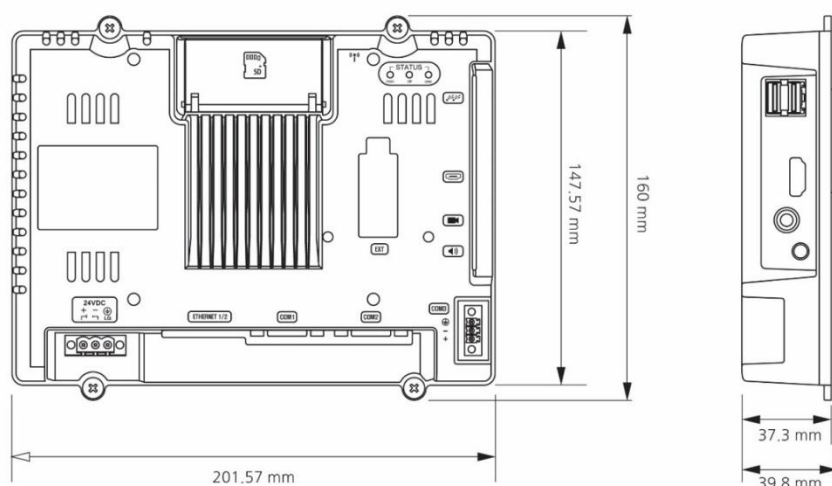
3.4 Structure Specifications

Weight(kg)	0.8
Cooling System	Natural air circulation
Case Material	AL(Aluminium)

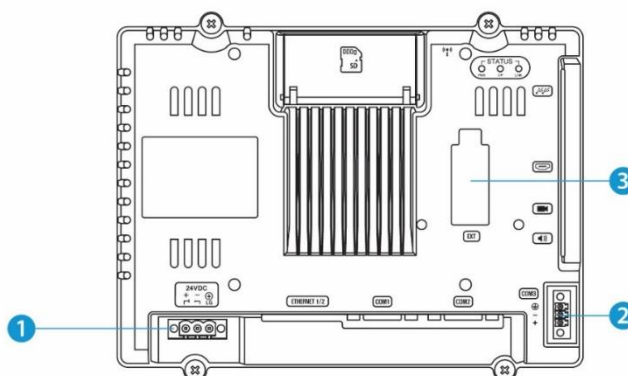
Chapter 4 Parts Identification and Detail Specifications



4.1. Product Dimension

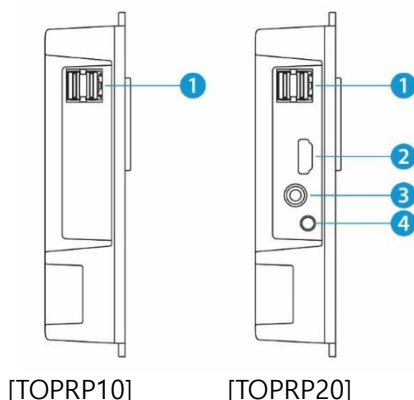


4.2 Part Names and Specifications of Front



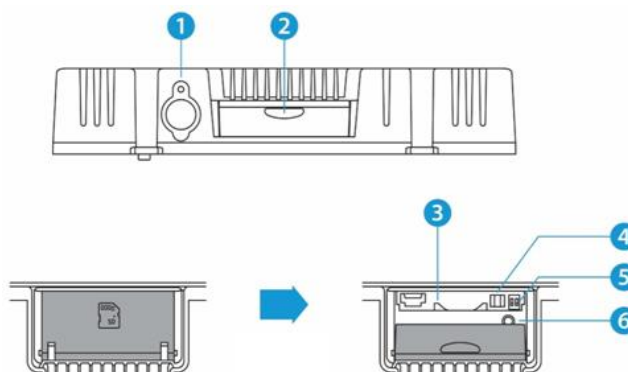
No.	Part	Form	Description	Model
①	Power Connector	TB 5mm 3P	Power Supply for Product	Common
②	COM3 Connector	TB 3.5mm 3P	RS-485 Serial Communication Connector	Common
③	Extension Connector	-	Expansion module mounting cover	Common

4.3 Side Part Names and Specifications



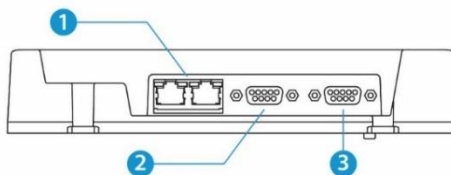
No.	Part	Form	Description	Model
①	USB HOST	USB A type x 2ch	Connector for option for USB storage. 5V/0.5A limit	TOPRP10/20
			Connector for option for USB storage. 5V/0.9A limit	TOPRP50
②	HDMI	Standard HDMI	HDMI output terminal, external video device connection (TV / Monitor connection). *Max resolution 1920X1080.	TOPRP20
③	RCA Jack	Composite RCA Jack (Yellow)	VIDEO input terminal, external video device connection. Input format: NTSC, PAL, SECAM	TOPRP20
④	AUDIO	3.5mm Audio Plug	AUDIO output terminal, external speaker connection. * Video, WAV file playback support.	TOPRP20

4.4 Top Part Names and Specifications



No.	Part	Form	Description	Model
①	External antenna connector	-	Not used	Common
②	SD Card Cover	Plastic Cover	SD Card, Reset Switch, Mode Switch included	Common
③	SD Card Socket	SD Card Socket	Data upload / download	Common
④	Cover Sensor	Photo coupler	Cover open / close detection	Common
⑤	Mode Switch	DIP Switch 2P	Set Up System Mode	Common
⑥	Reset Switch	Tact Switch	System reset Switch	Common

4.5 Bottom Part Names and Specifications



No.	Part	Form	Description	Model
①	ETHERNET Connector	RJ45 x 2ch	10BASE-T/100BASE-TX, Auto-MDIX	TOPRP10 / 20
			IEEE802.3i/IEEE802.3u/IEEE802.3ab, 10BASE-T/100BASE-TX/1000BASE-T	TOPRP50
②	COM1	DSUB9	RS-232C/422/485 Serial Comm. with PLC (Switchable the Comm. Software select)	Common
③	COM2	DSUB9	RS-232C/422/485 Serial Comm. with PLC (Switchable the Comm. Software select)	Common

Chapter 5 External Device Interface

In order for the main unit to communicate with an external device, it is necessary to connect the two devices by referring to the following.

5.1 Serial Interface

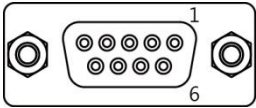
5.1.1 RS-232C

Items		Contents
Protocol		Full Duplex
Synch.		Asynchronous
Communication Distance		About 15M
Type of connection		1:1
Control Code		ASCII Code or HEXA Code
Baud Rate		2400, 4800, 9600, 19200, 38400, 57600, 76800, 115200bps
Data Type	Data Bit	7, 8bit
	Parity Bit	NONE, ODD, EVEN Parity
	Stop Bit	1, 2bit
Connector		DSUB 9Pin

5.1.2 RS-422/485

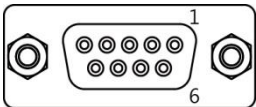
Items		Contents
Protocol		Full Duplex / Half Duplex
Synch		Asynchronous
Communication Distance		About 500m
Type of connection		1:N (N≤31)
Control Code		ASCII Code or HEXA Code
Baud Rate		2400, 4800, 9600, 19200, 38400, 57600, 76800, 115200bps
Data Type	Data Bit	7, 8bit
	Parity Bit	NONE, ODD, EVEN Parity
	Stop Bit	1, 2bit
Connector		DSUB 9Pin

5.1.3 COM1 Connector pin number and Signal name

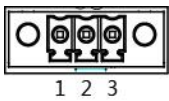
Type	Pin No.	Signal	Direction	Description
9Pin Female 	1	RDA(RD+)	Input	RS-422/485 Data Receive(+)
	2	RD(RxD)	Input	RS-232C Data Receive
	3	SD(TxD)	Output	RS-232C Data Send
	4	RDB(RD-)	Input	RS-422/485 Data Receive(-)
	5	SG	-	Signal Ground
	6	SDA(SD+)	Output	RS-422/485 Data Send(+)
	7	Power*1)	-	+5V, 0.2A
	8	N.C	-	N.C
	9	SDB(SD-)	Output	RS-422/485 Data Send(-)

*1) If VCC is required for an external device, connect pin 7(+5.0V) and pin 5. (*0.2A output)

5.1.4 COM2 Connector pin number and Signal name

Type	Pin No.	Signal	Direction	Description
9Pin Female 	1	RDA(RD+)	Input	RS-422/485 Data Receive(+)
	2	RD(RxD)	Input	RS-232C Data Receive
	3	SD(TxD)	Output	RS-232C Data Send
	4	RDB(RD-)	Input	RS-422/485 Data Receive(-)
	5	SG	-	Signal Ground
	6	SDA(SD+)	Output	RS-422/485 Data Send(+)
	7	RTS	Output	RS-232C Send Request Signal
	8	CTS	Input	RS-232C Send Available Signal
	9	SDB(SD-)	Output	RS-422/485 Data Send(-)

5.1.5 COM3 Connector pin number and Signal name

Type	Pin No.	Signal	Direction	Description
	1	D+	I/O	RS-485 Data (+)
	2	D-	I/O	RS-485 Data (-)
	3	SG	-	Signal Ground

* Be sure to connect the RD and SD to the RS-232C communication line by crossing each other with a Twisted Pair Cable. Please connect SG directly.

* RS-422/485 communication line must use RDA and RDB as Twisted Pair Cable, SDA and SDB as Twisted Pair Cable.

5.2 Ethernet Communication Specifications

5.2.1 Ethernet

Item	Description
Ethernet Method	IEEE802.3i/IEEE802.3u, 10BaseT / 100BaseT
Speed	10M / 100Mbps
Communication Method	Base Band
Switching Method	AUTO MDIX
Maximum Segment Length	100M (Between Hub)
Communication Cable	UTP (Unshielded Twisted Pair)
Modular Jack	RJ45 x 2ch

5.2.2 RJ-45 Pin Layout

Type	Pin No.	Color	10M/100MHz	1GHz	Model
	1	Orange/White	TD+	BI_DA+	All
	2	Orange	TD-	BI_DA-	All
	3	Green/White	RD+	BI_DB+	All
	4	Blue	Unused	BI_DC+	TOPRP50D
	5	Blue/White	Unused	BI_DC-	TOPRP50D
	6	Green	RD-	BI_DB-	All
	7	Brown/White	Unused	BI_DD+	TOPRP50D
	8	Brown	Unused	BI_DD-	TOPRP50D

* When HUB is used, Straight cable should be used.

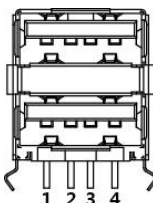
Ex) Straight Cable Wiring: Connect 1:1 according to the wiring diagram above.

* In case of connected directly without HUB, Cross Cable should be used.

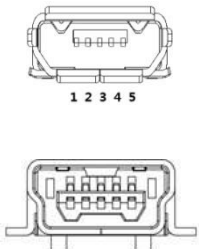
Ex) Cross Cable Wiring: In the above wiring diagram, TD+ and RD+ are changed, and TD- and RD- are exchanged.

5.3 USB Interface


5.3.1 USB Host

Type	Items		Specifications
	USB Interface	TOPRP10D	EHCI/OHCI Specification Version 1.0, USB2.0/1.1 compatible
		TOPRP50D	EHCI/OHCI Specification Version 1.0, USB3.0/2.0/1.1 compatible
	Communication Method		Control/Bulk
	Transfer Speed	TOPRP10D	Max. 480Mb/s
		TOPRP50D	Max. 5Gb/s
	Support Device		USB Storage (FAT16/FAT32 File Format Available)
	Connector Type		Type A(2ch)


5.3.2 USB Device

Type	Items	Specifications
	USB Interface	USB 2.0
	Communication Method	Interrupt/Bulk/Isochronous
	Transfer Speed	480Mb/s
	Supported OS	Windows 98SE/2000/XP/VISTA/7/10(32/64bit)
	Cable Length	1.5m
	Connector Type	- TOPRD1220X: Micro USB Type AB, Female - TOPRD1230X: Mini USB Type B, Female
	Connection Method	Through USB Connector on Front Side of Display Module


5.4 RCA Specifications [TOPRP20 Only]

Type	Item	Specification
	Interface	CVBS Standard
	Video signal	NTSC, PAL or SECAM video
	Connector Type	Composite RCA Jack (Yellow)

5.5 HDMI Specifications [TOPRP20 Only]

Type	Item	Specification
 HDMI (FEMALE)	HDMI Standards	HDMI v1.4a
	Mode selection	Mirror / Dual
	Support resolution	1920x1080, 1280x1024, 1024x768, 720x480, 640x480
	Connector Type	HDMI Type A

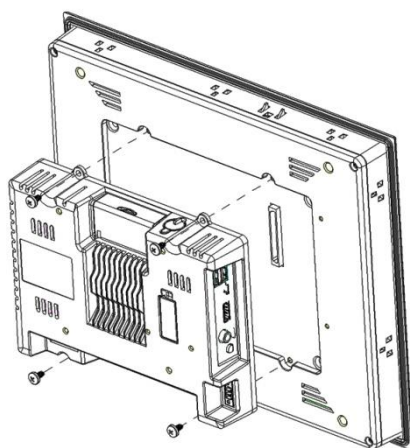
5.6 AUDIO Specifications [TOPRP20 Only]

Type	Item	Specification
	Output specification	Stereo audio output
	Connector Type	3.5mm Audio Plug

Chapter 6 Installation

6.1 TOPRD Series 설치


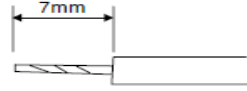
Insert Process Module to Guide of Rear of Display Module and Mount with Bolts included in Package.
(Bolt Size: M4 x 8L, 0.4N.m)



Chapter 7 Wiring Warning

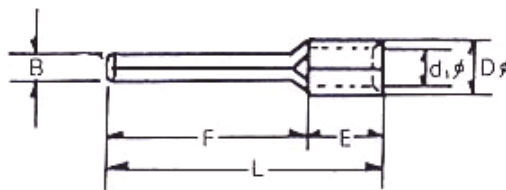
7.1 Power Cable Wiring

(1) The Power cable should have the following specification.

Power Cable Specification	0.75 ~ 2.5mm ² (18~12AWG)
F.G Cable Specification	At Least 2mm ² (14AWG)
Conductor type	Simple or Stranded wire (use copper conductor only)
Bolt torque	0.4N.m  Warning
Conductor length	
Temperature rating of the field installed conductors	65°C or less


(2) The Power terminal should have the following specification.

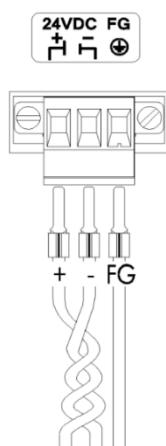
The use of the Pin Terminal when installing the power supply and ground terminal is important for maintaining the performance of the device.



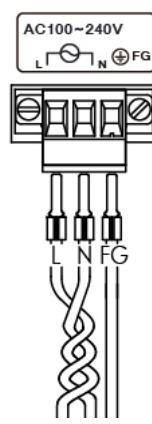
(mm)

B	L	F	E	D	d
1.8~2.0	14~22	8~14	5	3.3~3.8	2~2.5

(3) Wiring of power is as follows.  **Warning**



[TOPRP**D]



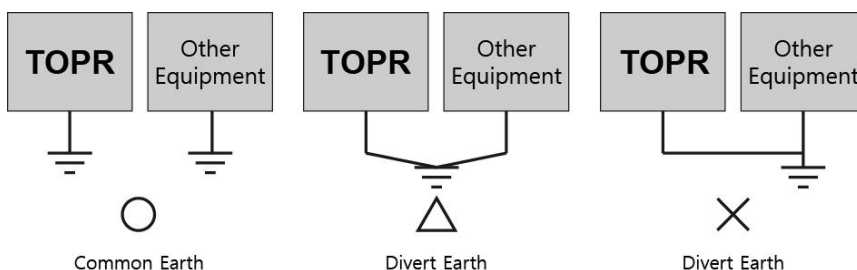
[TOPRP**A]

7.2 Ground wiring **Warning**

(1) The TOPR Panel has enough anti-noise measure, so except that there are many noises specially, the ground is not needed. When doing ground, please refer to the followings.

(2) The ground should be the exclusive ground. The ground should be type 3 ground. (ground resistor is less than 100Ω)

(3) When the exclusive ground is not possible, do common ground like figure B).



(4) Use the cable more than 2mm². Put the point of the ground near product and shorten Ground line.

Chapter 8 Maintenance Warning

8.1 Cleaning the Display

When the surface or frame of the display become dirty, spray the cleaning solution onto a soft cloth and wipe the device. Do not spray the cleaning solution directly onto the device.

8.2 Periodic Check Points

Check the followings periodically for best condition of the device.

(1) Environment

- Is the operating temperature within the allowable range(-10~50°C)?
- Is the operating humidity within the allowable range(10~80%RH)?
- Is the Surrounding pollution no corrosive gas?

(2) Power

- Is the input voltage within the change range ($\pm 15\%$)?

(3) Related Items

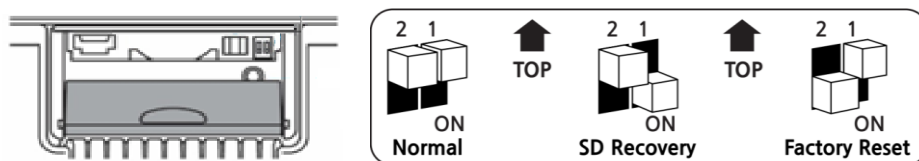
- Check the battery when is exchanged and voltage drop is indicated.
- Check the guarantee duration of LCD Backlight by eye.
- Check the touch pad there is no damage, scratch or pollution by eye.

8.3 Problems with the Device Warning

- If there is a problem during operation, stop using it and contact the A/S department of M2I Corporation, which is indicated on the product label.
- Only the authorized worker from M2I Corporation can check and repair problems related to malfunction of the machine.
- If the problem cannot be solved at the installation site, the equipment can be collected and moved to M2I Corporation.
- The manufacturer, M2I Corporation, is not responsible for damage or malfunction of the equipment caused by the use conditions of the user beyond the installation and use standards described in the manual.

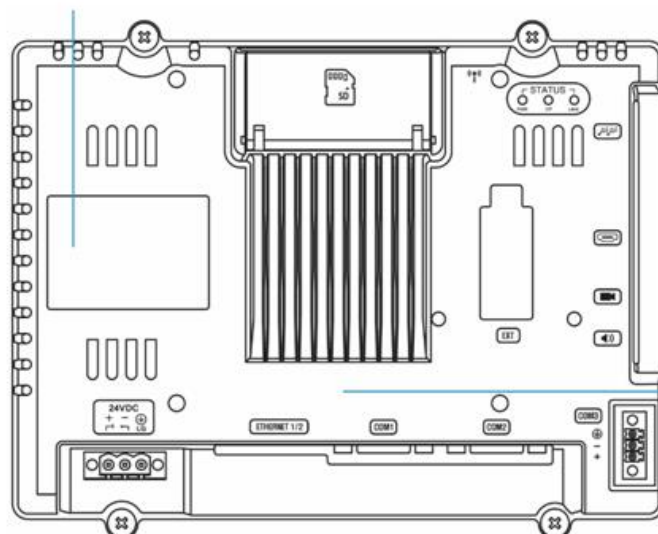
8.4 Setting System Recovery Mode

- If the system fails to boot normally due to a problem during operation, the built-in recovery function can be used to maintain the factory default state. Please note that the built-in project will be deleted when using the recovery mode.
- After opening the rear cover, you can adjust the setting switch. Keep the "Normal" state when booting normally. If the system is recovering, turn off the power and set it to "Factory Reset".
- When the recovery is completed, the buzzer sounds, then turn off the power and reset to "Normal" state.



Chapter 9 Warning Label

Product Label



Warning Label

Chapter 10 Product Label

10.1 AC Power Models



Manufacture (AS): M2I Corporation

11-35, Simin-daero 327beon-gil, Dongan-gu, Anyang-si, Gyeonggi-do 14055, Korea

Tel: 82-31-465-3366 www.m2i.co.kr

Product Name: Industrial HMI Touch Panel

Model Name: TOPRP□□A

Operating Temp: $-10^{\circ}\text{C} \leq T_a \leq +50^{\circ}\text{C}$

Power Specifications: TOPRP Series...A, AC 100-240V, 50/60 Hz, 6W

KC Certificate No.:

Inside Cell: Model Name MS920SE (Rechargeable lithium Battery)

Serial Number:

10.2 DC Power Models



Manufacture (AS): M2I Corporation

11-35, Simin-daero 327beon-gil, Dongan-gu, Anyang-si, Gyeonggi-do 14055, Korea

Tel: 82-31-465-3366 www.m2i.co.kr

Product Name: Industrial HMI Touch Panel

Model Name:

- Processor Module: TOPRP□□D
- Assembled Model: TOPRT□□□□□

Operating Temp: $-10^{\circ}\text{C} \leq T_a \leq +50^{\circ}\text{C}$

Power Specifications:

- TOPRD10D: 24Vdc, 9W
- TOPRD20D: 24Vdc, 9W
- TOPRD50D: 24Vdc, 9W
- TOPRT1210SD(*TOPRP10D Module + TOPRD1220XD Module): 24Vdc (20~28Vdc), 18W
- TOPRT1230XD(*TOPRP10D Module + TOPRD1230XD Module): 24Vdc (20~28Vdc), 18W
- TOPRT1240XD(*TOPRP50D Module + TOPRD1230XD Module): 24Vdc (20~28Vdc), 18W

KC Certificate No.:

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Serial Number:

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- When using M2I equipment, thoroughly read this datasheet and associated manuals introduced in this datasheet, also pay careful attention to safety and handle the module properly.
- Store this datasheet in a safe place so that you can take it out read it whenever necessary.

User Guide
This product has Relevant Assessments for business environment. If this product is used in home environment, there can be an interference.