

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.
-  Do not allow foreign objects such as water, liquids, or metal powders to enter into the front(screen) protective sheet. The screen may be invisible or may cause a malfunction of the touch.
-  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.

■ Design Precautions Warning

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 4mm².
- ❗ b. grounding point be closed to the products and make short the distance to the ground cable if possible.

Please see below.

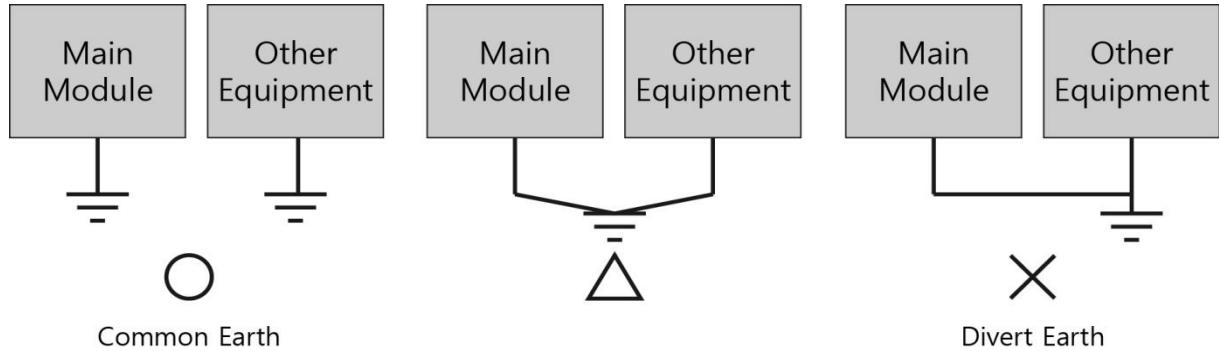


Fig. Grounding Example Diagram

Installation Precautions  **Caution**

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°C to 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.
- ❗ The space between back of product and back of control board must be more than 100mm for maintenance and ventilation.
- ⊘ In order to improve water retention and ventilation, the space between the back of the main body and the console box should be 100mm or more, and install the cooling fan when installed in an enclosed space.

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
Battery Model	MS920SE (lithium / Rechargeable)
Battery lifetime	Permanent (In case of ambient temperature 25°C)
Battery Discharge	Last about 7 days After turn it off

* Depending on the model specifications are subject to change.

- All field-wiring connections to this unit shall be from Limited Voltage / Limited Current, below 24 Vdc isolated secondary source with an output fuse, or Class 2.

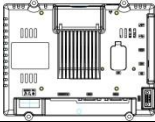

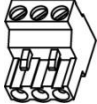


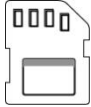

Chapter 2. Overview

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).

2.2 Package Contents

The components of the product are as follows.

Item	Figure	Quantity
Process Module		1
Manual		1
Power Connector		1
Accessories (Sold separate)	 <p data-bbox="788 1014 949 1048">USB Memory</p>  <p data-bbox="804 1137 933 1171">USB Cable</p>  <p data-bbox="820 1263 922 1296">SD Card</p>  <p data-bbox="751 1391 986 1424">Front Protect Sheet</p>	User Options

2.3 Explanation of Model name

2.3.1 Process Module

TOPR	P	□□	□
Series	Type	Display Size	Power
		10 : Standard	D : DC
		20 : Premium	A : AC

2.3.2 Display Module

TOPR	D	□□	□□	□
Series	Type	Display Size	Option	Resolution
		10 : 10.4"	10 : Standard	Q : QVGA (320*240)
		12 : 12.1"	20 : Premium	V : VGA (640*480)
		15 : 15"		S : SVGA (800*600)
				X : XGA (1024*768)
				W : WQVGA (480*272)
				WVGA (800*480)

Chapter 3. General Specifications

3.1 Electrical Specifications

Item		Model		TOPRP10D	TOPRP10A	
				TOPRP20D	TOPRP20A	
전원	Input Voltage			DC24V	AC220V, 50/60Hz	
	Input Voltage Range			DC 20 ~ 28V	AC100~240V, 50/60Hz	
	Consumption Power	Only Process		6W or less		
		Display Module included	TOPRD10	Under 15W	100Vac: 29VA / 240Vac: 46VA	
			TOPRD12	Under 15W	100Vac: 29VA / 240Vac: 46VA	
	TOPRD15		Under 18W	100Vac: 33VA / 240Vac: 49VA		
	Voltage endurance			DC 24V, 10 ms	AC85/170V, 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))

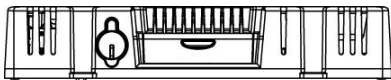
3.3 Environment Specifications

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)

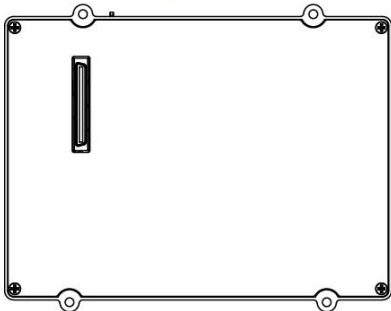
3.4 Structure Specifications

Dimension(mm)	201.6X147.6X39.8
Weight(kg)	0.8kg
Cooling System	Natural air circulation
Case Material	AL(Aluminium)

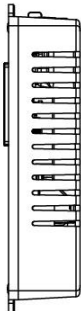
Chapter 4. Parts Identification and Functions



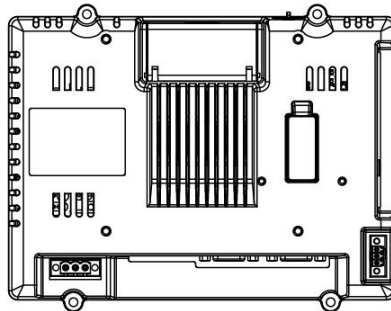
TOP



Rear



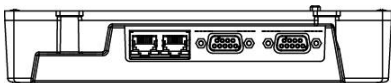
Right



Front



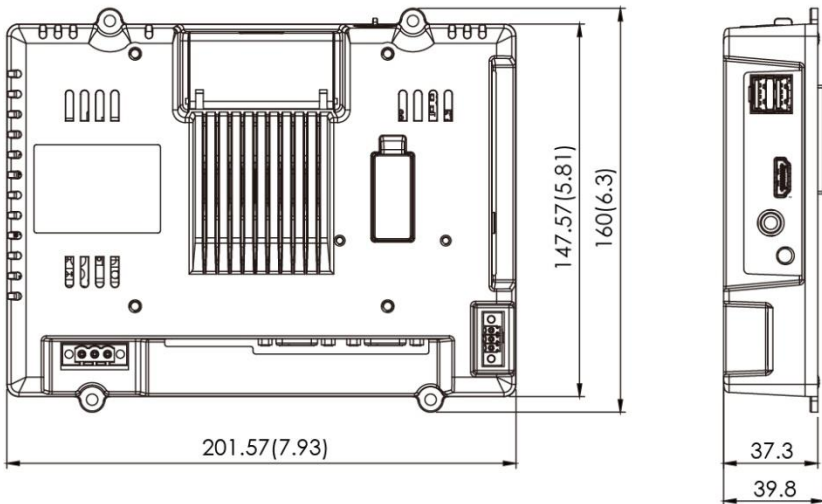
Left



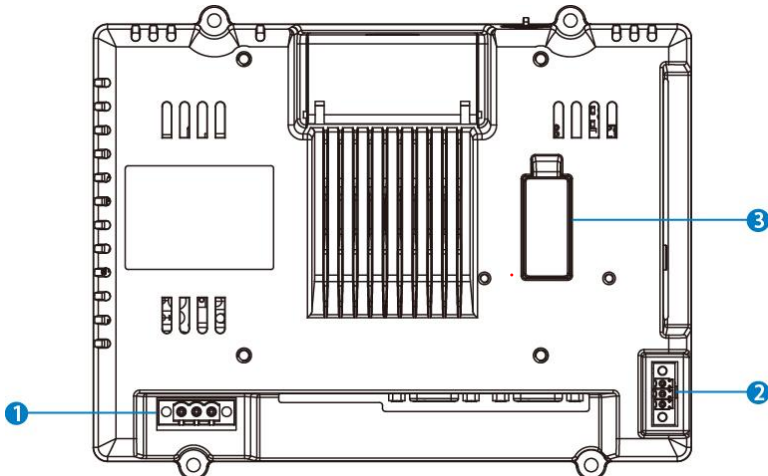
Bottom

4.1 External Dimension

mm(in.)

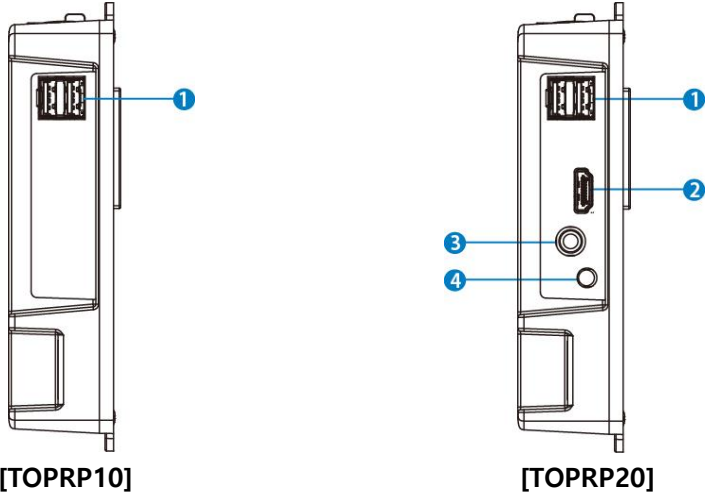


4.2 Front Part Names and Specifications



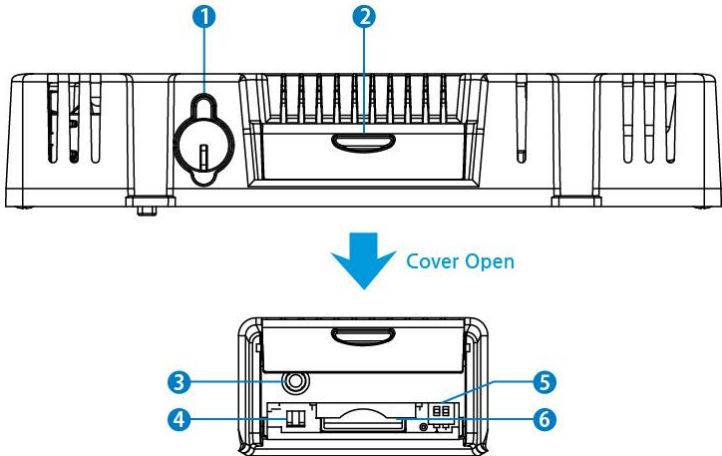
No.	Title	Type	Feature	
①	Power Connector	TB5mm 3P	TOPRP10D, TOPRP20D	TOPRP10A, TOPRP20A
			DC 20V~28V	AC100~240V, 50/60Hz
②	COM3 Connector	TB3.5mm 3P	RS-485 Serial Comm. with PLC	
③	Extension Module Connector		Use Extension Module in open the cover (Option)	

4.3 Right Part Names and Specifications



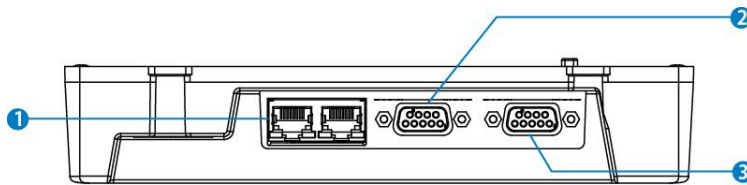
No.	Title	Type	Description	Support Model
①	USB	Type A 2Ch	Complies with USB V2.0 Device(Host) 5V/0.5A limit	TOPRP10 TOPRP20
②	HDMI	HDMI Receptacle	HDMI Output, Max. Resolution 1920X1080, Connect to TV/ Monitor	TOPRP20
③	Video	RCA Jack	Connect to CCTV Camera Supports NTSC, PAL, SECAM	TOPRP20
④	Audio	Headphone Jack	Connect to Extension Speaker Supports WAV	TOPRP20

4.4 TOP Part Names and Specifications



No.	Title	Type	Description	Support Model
①	Wireless Antenna	RP-SMA FEMALE	WLAN Standard: IEEE802.11 B/G/N Soft AP mode, Client mode Connect to Dipole Antenna	TOPRP20
②	SD Card Cover	Plastic Cover	SD Card , Reset Switch , Mode Switch included	TOPRP10 TOPRP20
③	Reset Switch	Tact Switch	System Reset Switch	
④	Cover Sensor	Photo coupler	Sense Open/Close of Cover	
⑤	SD Card Socket	SD Card Socket	Support SD, SDHC(Max. 32GB)	
⑥	Mode Switch	DIP Switch 2 Digit	Set Up System Mode	

4.5 Bottom Part Names and Specifications



No.	Title	Type	Description
①	ETHERNET Connector	RJ45 2ch	10BASE-T/100BASE-TX, Auto-MDIX(RJ45)
②	COM1 Connector	DSUB9	RS-232C/422/485 Serial Comm. with PLC (Switchable the Comm. Via Software)
③	COM2 Connector	DSUB9	RS-232C/422/485 Serial Comm. with PLC (Switchable the Comm. Via Software)

Chapter 5. Interface

5.1 Serial Interface

For Serial communication, please refer below tables of each TOPR Model.

5.1.1 RS-232C

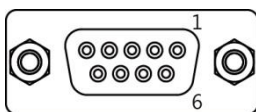
Items		Contents
Protocol		Half Duplex
Synch.		Asynchronous
Communication Distance		About 15m
Type of connection		1:1
Control Code		ASCII Code or HEXA Code
Baud Rate		2400,4800,9600,19200,38400,57600,76800, 115200 bps
Data Type	Data Bit	7, 8 bit
	Parity Bit	NONE, ODD, EVEN Parity
	Stop Bit	1, 2 bit
Connector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

5.1.2 RS-422/485

Items		Contents
Protocol		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, 115200 bps
Data Type	Data Bit	7, 8 bit
	Parity Bit	NONE, ODD, EVEN Parity
	Stop Bit	1, 2 bit
Connector		DSUB 9

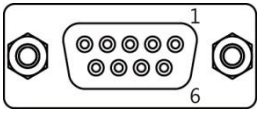
5.1.3 COM1 D-Sub Connector

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




*1 When need VCC for external equipment, use 7.VCC and 8.VCC Gnd that output is 0.2A

5.1.4 COM2 D-Sub Connector

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

5.1.5 COM3 Terminal Block Connector

Type	Pin No.	Signal	Direction	Meaning
	1	D+	-	Data +
	2	D-	-	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.
- Do not use shield wire of communication line as signal ground. It may cause communication failure.

5.2 Ethernet Communication Specifications

5.2.1 Ethernet

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

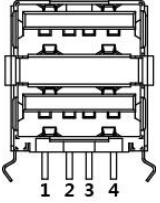
5.2.2 RJ-45 Pin Layout

Type	Pin No.	Color	Signal
	1	Orange/White	TD+
	2	Orange	TD-
	3	Green/White	RD+
	4	Blue	Not Available in 10BaseT
	5	Blue/White	Not Available in 10BaseT
	6	Green	RD-
	7	Brown/White	Not Available in 10BaseT
	8	Brown	Not Available in 10BaseT

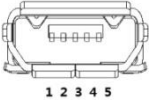
- When HUB is using, Straight cable should be used.
Ex) Straight Cable Wiring: Connect 1:1 according to the wiring diagram above.
- In case of do not using HUB,
Do not use HUB, when it is connected directly, Cross Cable should be used.
Ex) Cross Cable Wiring: In the above wiring diagram, TD+ and RD+ are changed, and TD- and RD- are exchanged.

5.3 USB Interface

(1) USB Host

Type	Item	Specification
	USB Interface	EHCI/OHCI Specification Version 1.0, USB2.0/1.1 호환
	Communication Method	Control/Bulk
	Transfer Speed	480Mb/s
	Support Device	USB Storage (FAT16/FAT32 File Format Available)
	Connector Type	Type A Double

(2) USB Device

Type	Item	Specification
	USB Interface	USB 2.0
	Communication Method	Interrupt/Bulk/Isochronous
	Transfer Speed	480Mb/s
	Supporting OS	Windows 98SE/2000/XP/VISTA/7(32/64bit)
	Cable Length	1.5m (recommended to use M2I's Option Cable)
	Connect Type	Micro USB AB, Female
	Connect Method	Connect Via USB Front of Display Module

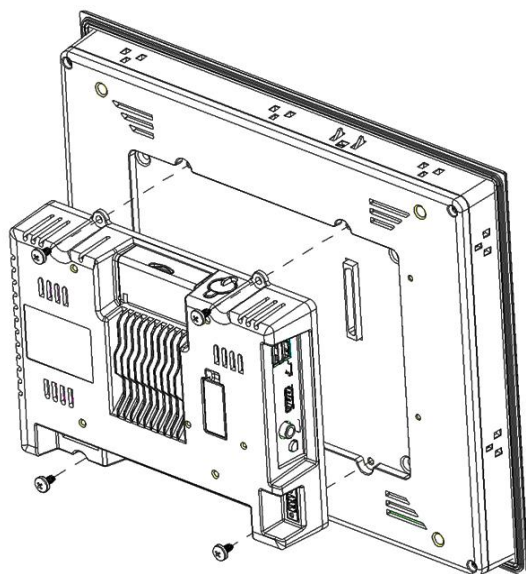
5.4 WIFI Interface

Item	Specification
Standards	IEEE 802.11b, IEEE 802.11g, IEEE 802.11n
Frequency	2.4GHz
Receiver Sensitivity	-87dBm@11Mbps , -73dBm@54Mbps , -69dBm@MCS7
Transmit Output Power	+17dBm/802.11b , +15 dBm/802.11g , +14.5 dBm/802.11n
Modulation	64QAM , 16QAM , QPSK, BPSK CCK ,DQPSK , DBPSK
Encryption	WEP40/64, WEP104/128, AES , TKIP
Antenna	RP-SMA External Antenna
Link configuration	AD Hoc , Infrastructure
Mode	SoftAP, Client

Chapter 6. Installation

Insert Process Module to Guide of Rear of Display Module and Mount with Bolts included in Package.


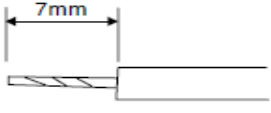
(Bolt Size: M4 X 8L, Torque: 0.2N.m)



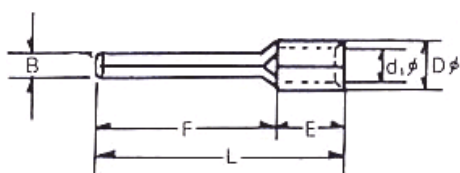
Chapter 7. Wiring Warning

7.1 Power wiring Warning


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

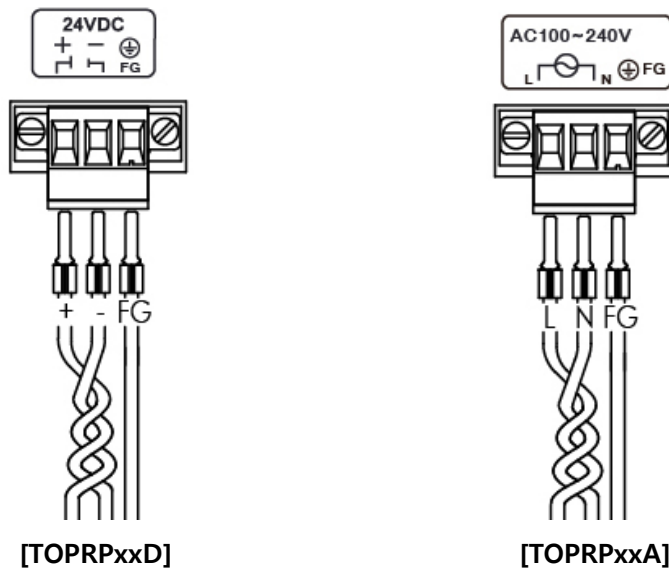
Power Cable Specification	0.75~2.5mm ² (18~12AWG)
F.G Cable Specification	Over 4mm ² (11AWG)
Bolt torque	≥ 0.2N.m  Warning
Conductor type	Simple or Stranded wire (use copper conductor only)
Conductor length	
Temperature rating of the field installed conductors	65°C Only

(2) The Power terminal should have the following specification



B	L	F	E	D	d
1.8~2.0	22~18	12~14	5	3.3~3.8	2~2.5

(3) Wiring of power is as follows  Warning



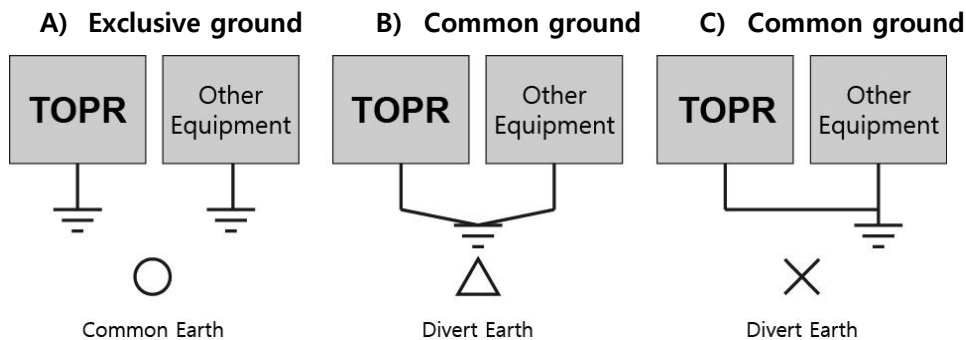
7.2 Ground wiring

(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 not doing the exclusive ground, do common ground like figure B).



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

Chapter 8. Maintenance

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

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

(2) Power

Is the input voltage within the change range (-15%~+10%)?

(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.

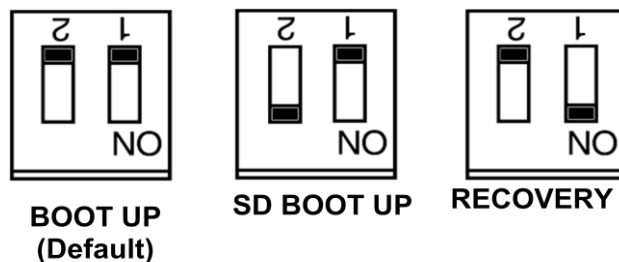
8.3 Problems with the Device

- 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.

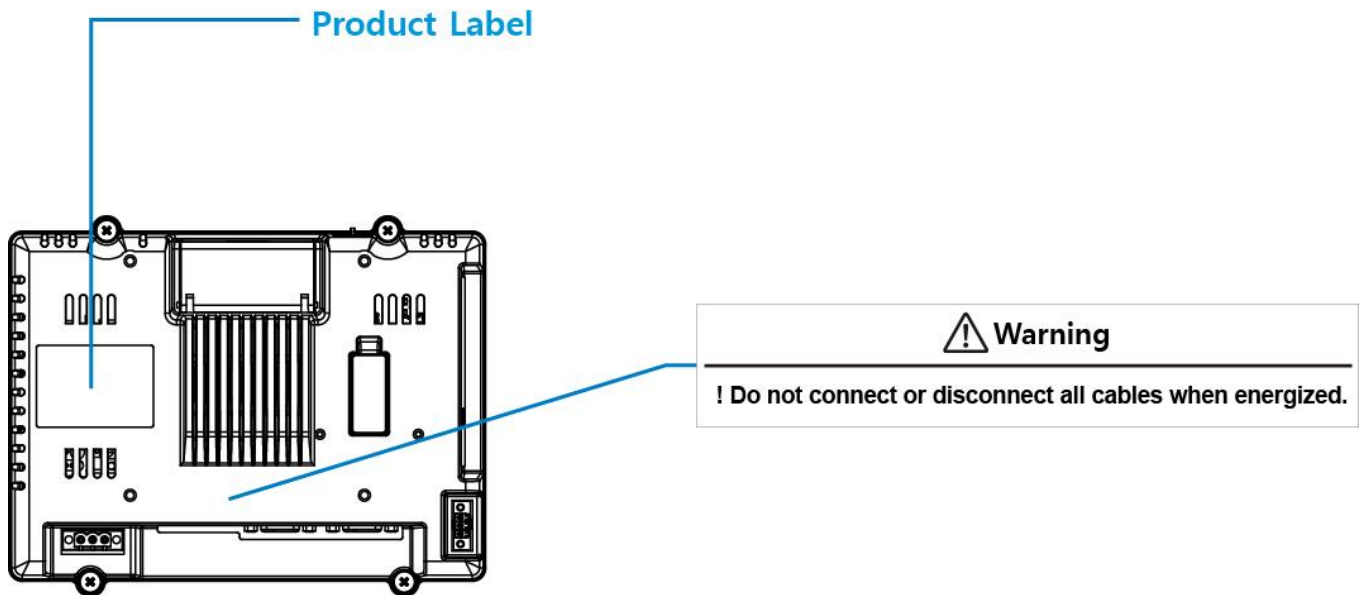
8.4 Setting System Recovery Mode

- 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 "BOOT UP" state when booting normally. If the system is recovering, turn off the power and set it to "RECOVERY".
- When the recovery is completed, the buzzer sounds, then turn off the power and reset to "BOOT UP" state.



Chapter 9. Products and Warning Label Location



Chapter 10. Products Label



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: **TOPRP10D(A)/TOPRP20D(A)**

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

Power Specifications: **24 Vdc, 18W(100-240V~ 50/60 Hz)**

KC Certificate No.:

Inside Cell: Model Name MS920SE (Rechargeable lithium Battery/irreplaceable)

Serial Number:

Copyright: M2I corporation 2020.11

www.m2i.co.kr

- 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.