M₂I Corporation



Industrial HMI Touch Panel TOPRX Series

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.

Marning	Violating the instruction may result in serious personal injury or death			
A Caution	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				

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 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.
- O Do not use or store in an environment with high vibration.
- ① Do not allow foreign objects such as water, liquids, or metal powders to enter the product. This may cause breakage or electric shock.
- O 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.
- ODo not store or operate in direct sunlight. Direct sunlight can change the properties of the LCD.

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 in/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.

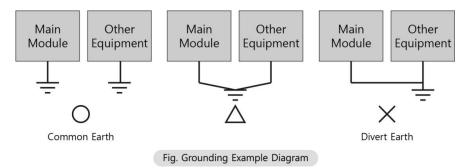
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- Be sure the wiring is done correctly by checking the product's rated voltage and the terminal layout.

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



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.

- O 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.
- \bigcirc Do not install to the place where strong shock or vibration continuously have impacted on product.

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

MS920SE Battery is not replaced by the user.

Item	Content
Battery Voltage	DC 3.0V
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 24Vdc isolated secondary source with an output fuse, or Class 2 secondary circuits.

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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

Package contents of TOPRX Series are below. please make sure that all of components are in the package Series before using TOPRX.

Item	Figure	Quantity
Process Module and User Manual		1 each
Clamp		4
Power Connector and COM3 Communication Connector		1 each
Accessories (Sold separate)	USB Memory USB Cable SD Card Ont Protect Sheet	User Options

2.3 Explanation of Model name

TOPRX				
Series	Display Size	Option	Resolution	power
	05: 5.6"	00: Standard	Q: QVGA (320*240)	A: AC
	08: 8.4"	10: Premium	V: VGA (640*480)	D: DC
	10: 10.4"		S: SVGA (800*600)	
	12: 12.1"		X: XGA (1024*768)	
	15: 15"			

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Chapter 3 General Specifications

3.1 Electrical Specifications

In a set Valtage	TOPRX□□□□□A	AC 100~240V, 50/60Hz
Input Voltage	TOPRX DD	DC 20~28V
	TOPRX05 Series	12W or less
	TOPRX08 Series	12W Of less
Consumption Power	TOPRX10 Series	15W or loss
	TOPRX12 Series	15W or less
	TOPRX15 Series	18W or less
Valtage andurance	TOPRX□□□□□A	AC 85/170V, Within 10ms
Voltage endurance	TOPRX□□□□□D	DC 24V, 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 Conform to IP65	

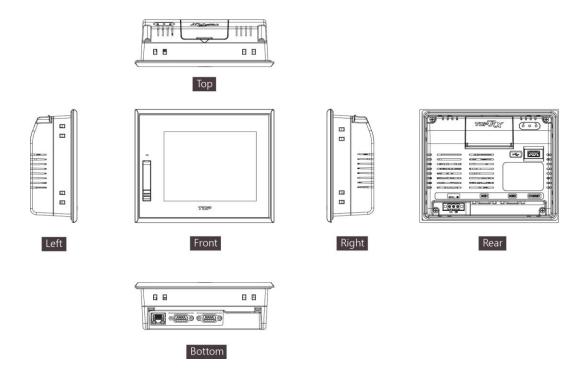
3.4 Structure Specifications

	TOPRX05	TOPRX08	TOPRX10	TOPRX12	TOPRX15
Weight (Kg)	0.62	1.06	1.68	2.18	2.78
Cooling System	Natural air circulation				
Case Material	PC(Flameless)				

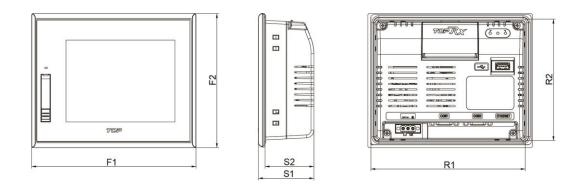
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Chapter 4 Parts Identification and Functions

4.1 TOPRX05/08 Series



4.1.1 External Dimension

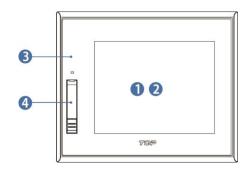


(mm)

Model	F1	F2	S1	S2	R1	R2
TOPRX05	172	140	58	51	157	125
TOPRX08	236	182	58.9	52.9	221	167

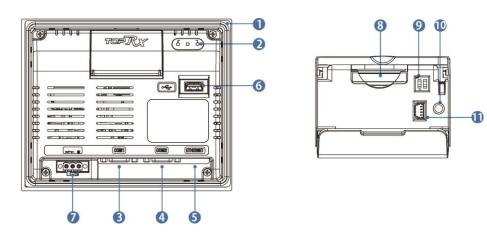
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4.1.2 Front Part Names and Specifications



No.	Part	Description	
1	LCD	TFT 16M Color LCD	
2	Touch Panel	Analog Touch	
3	Front Sheet	Front Cover Sheet for Damp Proof and Dust Proof	
4	USB Port	USB Download/Upload Port	

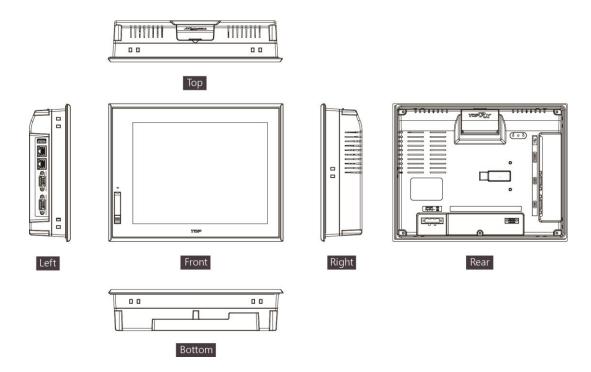
4.1.3 Rear Part Names and Specifications



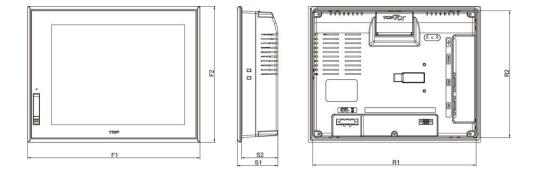
No.	Part	Form	Description
9		Dulch an Darlin n	Silicone Gasket for Impact Buffering and IP Securing for Wall
1	Rubber Packing	-	Mounting
2	Status LED	3	Status of Power, Communication and CPU
	COM1 Connector	ON 11 C	RS-232C/422/485 Serial Comm. with PLC
3	COMIT Connector	DSUB9	(Switchable the Comm. Via Software)
	4 COM2 Connector	COM2 Connector DSUB9	RS-232C/422/485 Serial Comm. with PLC
(4)			(Switchable the Comm. Via Software)
(5)	ETHERNET Connector	RJ45	10BASE-T/100BASE-TX, Auto-MDIX
6	USB	Type A	USB Connectors for Storage Options
7	Power Input Terminal	TB 5mm,3P	Power Supply of Main Unit
8	SD Card Cover	Plastic Cover	SD Card , Reset Switch , Mode Switch included
9	Mode Switch	DIP Switch 2Digit.	Set Up System Mode
10	Reset Switch	Tact Switch	System Reset Switch
11)	Diagnose Connector	2mm 4P	Diagnose System (Manufacturer Only)

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4.2 TOPRX10/12/15 Series



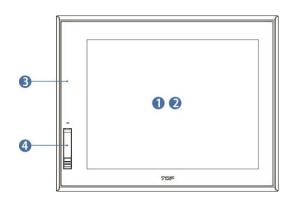
4.2.1 External Dimension



(mm)

Model	F1	F2	S1	S2	R1	R2
TOPRX10	274	216	64.7	58.7	259	201
TOPRX12	320	261	64.7	58.7	305	246
TOPRX15	369	300	67.2	61.2	354	285

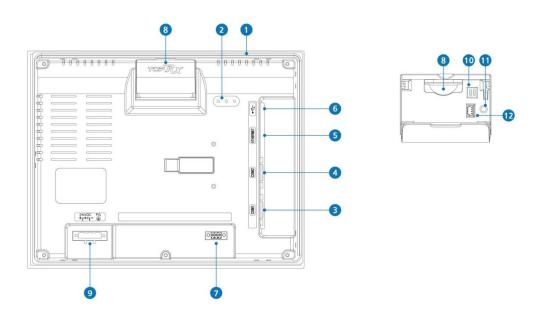
4.2.2 Front Part Names and Specifications



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No.	Part	Description
1	LCD	TFT 16M Color LCD
2	Touch Panel	Analog Touch
3	Front Sheet	Front Cover Sheet for Damp Proof and Dust Proof
4	USB Port	USB Download/Upload Port

4.2.3 Rear Part Names and Specifications



No.	Part	Form	Description
1	Rubber Packing	-	Silicone Gasket for Impact Buffering and IP Securing for Wall Mounting
2	Status LED	3	Status of Power, Communication and CPU
3	COM1 Connector	DSUB9	RS-232C/422/485 Serial Comm. with PLC (Switchable the Comm. Via Software)
4	COM2 Connector	DSUB9	RS-232C/422/485 Serial Comm. with PLC (Switchable the Comm. Via Software)
(5)	ETHERNET Connector	RJ45	10BASE-T/100BASE-TX, Auto-MDIX
6	USB	Type A	USB Connectors for Storage Options
7	COM3 Connector	TB 3.5mm 3P	RS-485 Serial Comm. only
8	SD Card Cover	Plastic Cover	SD Card, Reset Switch, Mode Switch included
9	Power Input Terminal	TB 7.6mm,3P	Power Supply of Main Unit
10	Mode Switch	DIP Switch 2Digit.	Set Up System Mode
11)	Reset Switch	Tact Switch	System Reset Switch
12	Diagnose Connector	2mm 4P	Diagnose System (Manufacturer Only)

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Chapter 5 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 Communication Specifications

5.1.1 RS-232C

Items		Contents		
Prot	tocol	Full Duplex		
Syı	nch	Asynchronous		
Communicat	tion Distance	About 15m		
Type of C	onnection	1:1		
Contro	ol Code	ASCII Code or HEXA Code		
Transmiss	ion Speed	2400, 4800, 9600, 19200, 38400, 57600, 76800, 115200bps		
	Data Bit	7, 8bit		
Data Type	Parity Bit	NONE, ODD, EVEN Parity		
	Stop Bit	1, 2bit		
Modul	ar Jack	DSUB 9pin		

5.1.2 RS-422/485

Items		Contents	
Prot	ocol	Full Duplex / Half Duplex	
Syr	nch	Asynchronous	
Communicat	ion Distance	About 500m	
Type of C	onnection	1:N (N ≤ 31)	
Contro	l Code	ASCII Code or HEXA Code	
Transmiss	on Speed	2400,4800,9600,19200,38400,57600,76800,115200 bps	
	Data Bit	7, 8bit	
Data Type	Parity Bit	NONE, ODD, EVEN Parity	
	Stop Bit	1, 2bit	
Modul	ar Jack	DSUB 9pin	

5.1.3 COM1 Connector pin number and Signal name

Туре	Pin No.	Signal	Direction	Meaning
	1	RDA(RD+)	Input	RS-422/485 Receive Data(+)
9Pin Female	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	6	SDA(SD+)	Output	RS-422/485 Send Data(+)
	7	VCC*1	Output	+5V, 0.2A
	8	VCC GND*1	-	Power Ground
	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.

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5.1.4 COM2 Connector pin number and Signal name

Туре	Pin No.	Signal	Direction	Meaning
	1	RDA(RD+)	Input	RS-422/485 Receive Data(+)
	2	RD(RxD)	Input	RS-232C Receive Data
9Pin Female	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 Clear To Send
	9	SDB(SD-)	Output	RS-422/485 Send Data(-)

5.1.5 COM3 Connector pin number and Signal name

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

5.2 Ethernet Interface

5.2.1 Ethernet

Item	Specification
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 product)
Communication Cable	UTP (Unshielded Twisted Pair)
Modular Jack	RJ-45

5.2.2 RJ-45 Pin Layout

Туре	Pin No.	Color	Signal
	1	Orange/White	TD+
	2	Orange	TD-
1 8	3	Green/White	RD+
<u> </u>	4	Blue	Not Available in 10BaseT
	5	Blue/White	Not Available in 10BaseT
# 1	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.

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^{*} 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.

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

5.3.1 USB Host

Type	ltem	Specification	
	USB Interface	EHCI/OHCI Specification Version 1.0, USB2.0/1.1 호환	
	Communication Method	Control/Bulk	
1 2 3 4	Transfer Speed	480Mb/s	
	Support Device	USB Storage (FAT16/FAT32 File Format Available)	
	Connector Type	Type A(1ch)	

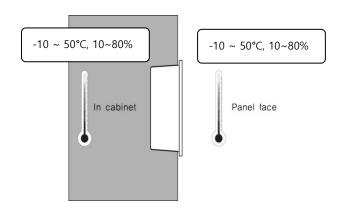
5.3.2 USB Device

Type	Item	Specification	
	USB Interface	USB 2.0	
	Communication Method	Interrupt/Bulk/Isochronous	
	Transfer Speed	480Mb/s	
(0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	Supporting OS	Windows 98SE/2000/XP/VISTA/710(32/64bit)	
	Cable Langeth	M2I manufacturer's cable is recommended (3M), and 1.5M	
	Cable Length	or less when purchased separately	
	Connect Type	Mini USB B, Female	
	Connect Method	Front, USB OTG connector	

Chapter 6 Installation

6.1 Installation Requirements

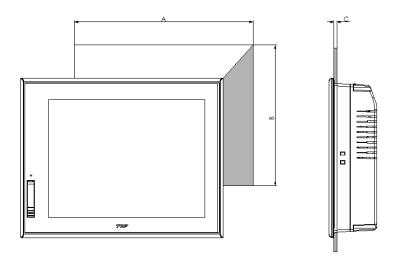
- (1) It should be installed within $-10\sim50^{\circ}$ C and $10\sim80\%$ relative-humidity, otherwise the screen may be changed or cause malfunction and damage.
- (2) Be sure that heat from surrounding equipment does not cause product to exceed its standard operating temperature.
- (3) In order to minimize external mechanical hazards, please control the mechanical hazards of the surrounding environment.



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6.2.1 Panel Cut-out

Make a panel cut which product is mounted and insert the TOPRX to the panel form the front side. Making the Panel Cut (Mounting Size) per each TOPRX Series as below Table, Before Installation.



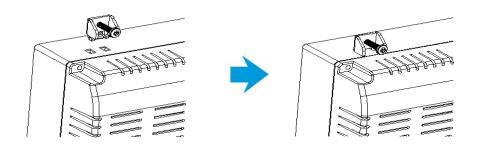
(mm)

모델명	А	В	С
TOPRX05	158(+1.0/0)	125(+1.0/0)	
TOPRX08	222(+1.0/0)	168(+1.0/0)	
TOPRX10	260(+1.0/0)	202(+1.0/0)	1-5(+1.0/0)
TOPRX12	306(+1.0/0)	247(+1.0/0)	
TOPRX15	355(+1.0/0)	286(+1.0/0)	

6.2.2 Fixing Marning

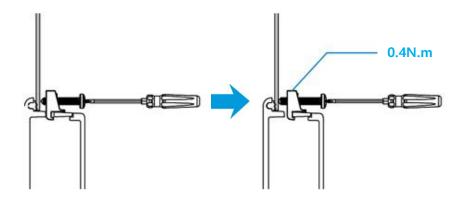
Install clamps with this product should be installed as follows to maintain the IP performance of the device.

(1) Insert the clamp into the slot of the product.



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(2) Screw the unit into the panel cut with a screwdriver.



If the screw is over tightened, it may cause the front deformation, thus resulting the touch sensor can't work properly Tighten the screws to a torque of 0.4N.m.

Chapter 7 Wiring Marning

7.1 Power wiring

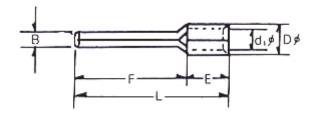
(1) The Power cable should have the following specification.

Power Cable Specification	0.75~2.5mm ² (18~12AWG)		
FG Cable Specification	Over 2mm² (14AWG)		
Conductor type	Simple or Stranded wire		
Bolt tightening force	≥ 0.2N.m M warning		
Conductor length	7mm		

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

The use of the Pin Terminal(ferrule) when installing the power supply and ground terminal is important for maintaining the performance of the device. Failure to install power and ground using the same Pin Terminal(ferrule) as below may cause explosion due to spark due to abnormal cable loss.

Therefore, please be sure to familiarize yourself with how to use Pin Terminal(ferrule) below.

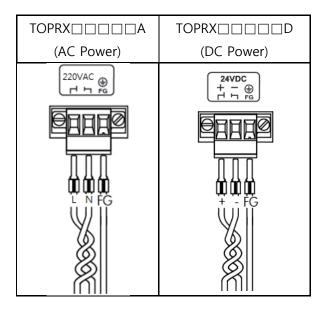


(mm)

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

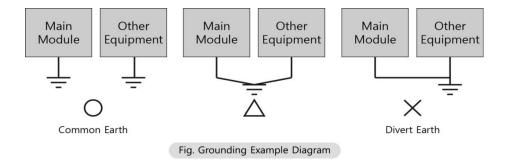
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7.2 Ground wiring

- (1) The product 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 class 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 2mm². Put the point of the ground near product and shorten Ground line.



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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
 - a. Is the input voltage within the change range $(-15\% \sim +10\%)$?
- (3) Related Items
 - a. Check the guarantee duration of LCD Backlight by eye.
 - b. Check the touch pad there is no damage, scratch or pollution by eye.

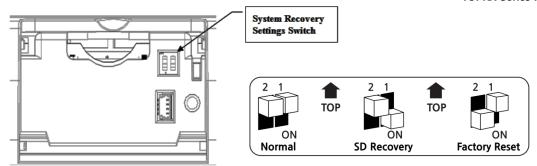
8.3 Problems with the Device

- (1) 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.
- (2) Only the authorized worker from M2I Corporation can check and repair problems related to malfunction of the machine.
- (3) If the problem cannot be solved at the installation site, the equipment can be collected and moved to M2I Corporation.
- (4) 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

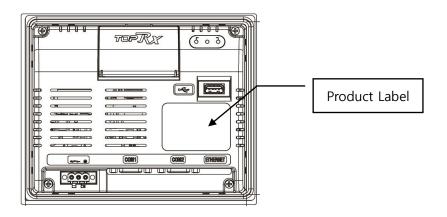
- (1) If the system fails to boot normally due to a problem during operation, the built-in recovery function can be used to maintain the factory default state. Please note that the built-in project will be deleted when using the recovery mode.
- (2) After opening the rear cover, you can adjust the setting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

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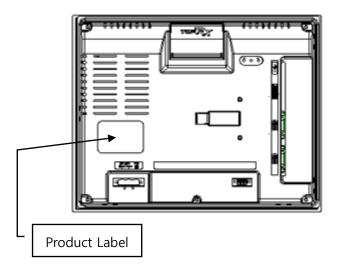


Chapter 9 Products and Warning Label Location

9.1 TOPRX05/08 Series



9.2 TOPRX10/12/15 Series



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Chapter 10 Products 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

Product Name: Industrial HMI Touch Panel

Model Name: **TOPRX** \square \square \square **A** Operating Temp: -10°C \leq Ta \leq +50°C

Power specification: AC 100~240V, 50/60Hz, TOPRX05/08 12W, TOPRX10/12 15W, TOPRX15 18W

Inside Battery: MS920SE (Lithium/ Rechargeable)

KC Certificate NO.: MSIP-REM-PFX- TOPRX

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

Product Name: Industrial HMI Touch Panel

Model Name: **TOPRX** \square \square \square \square \square \square \square Operating Temp: -10° C \leq Ta \leq $+50^{\circ}$ C

Power specification: 20~28Vdc, Class 2, TOPRX05/08 12W, TOPRX10/12 15W, TOPRX15 18W

Inside Battery: MS920SE (Lithium/ Rechargeable)

KC Certificate NO.: MSIP-REM-PFX- TOPRX

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.

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