

M2I Corporation

Industrial HMI Touch Panel TOPRW 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.
Caution	Violating the instruction may result in slight personal injury or product damage.
0	Be cautious, for danger may be present.
0	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

- O 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 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.
- 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.
- O Do not store or operate in direct sunlight. Direct sunlight can change the properties of the LCD.

■ Design Precautions **M**Warning

- Install protection circuit on the outside of Products to protect the entire control system when external power supply or Products have problems.
- ① 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.

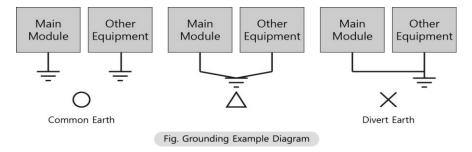
■ Wiring Precautions **Marning**

- 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.
- 1 Tighten the terminal screw with the specified torque. If the screws of terminal are loose, it could result in

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short circuit, fire, malfunctions. FG Terminal must be used a dedicated ground. Not doing so could result in malfunctions.

- $lue{1}$ a. Grounding should be the Class 3 grounding. The cable for grounding should be more than $4mn^2$.
- **1** b. grounding point be closed to the products and make short the distance to the ground cable if possible. Please see below.



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 -10°C to 50°C or on the surface of control board which high pressure equipment is installed.
- igwedge Do not install to the place where strong shock or vibration continuously have impacted on product.
- igotimes Do not store or operate the product under direct sunlight. This may damage to the quality of LCD.
- O Use the product indoors only.
- Ouse the product under 2000M altitute

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 24Vdc isolated secondary source with an output fuse, or Class 2.

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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 used for the basic purpose of communication with another device (PLC).

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.

ltem	Figure	Quantity
Process Module and Manual		1
Clamp		1
Power Connector		4
Accessories (Sold separate)	USB Memory USB Cable SD Card Protection Sheet	User Options

2.3 Explanation of Model Name

TOPRW					Ex		
Series	Screen	Options	Resolution	Power	Explosion Proof	Blank	Etc
	05: 5.0" 07: 7.0" 10: 10.0"	00: Basic	W: WQVGA (480*272), WVGA (800*480)	D: DC	-Ex: Explosion Proof NE: Non-Ethernet Blank: Normal		□□: Not affective to explosion proof, it can be shown as letters or numbers

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Chapter 3 General Specifications

3.1 Power Specifications

Input Voltage	DC 24V, Class 2			
Input Voltage Range	DC 20~28V			
	TOPRW0500WD			
Danier Carrentia	TOPRW0700WD	12W or less		
Power Consumption	TOPRW0700WD NE			
	TOPRW1000WD	15W or less		
Voltage endurance	DC 24V, within 10 ms			
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 Display Specifications

Color	16M Colors
Brightness	10 Level(by software)
Backlight	LED
Backlight Lifetime	50,000 hours
Display Font	MS Windows Vector font, Free Resolution Font
Front LED Indicate	Built in

3.4 Touch Specifications

Touch Type Built-in, Analog resistive touch sensor	
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3.5 Environment Specifications

Operation Temperature (°C)	perature (°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 μ s)		
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	Front IP65, Rear IP2X		

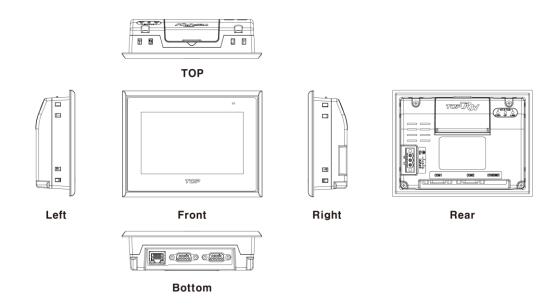
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3.6 Structure Specifications

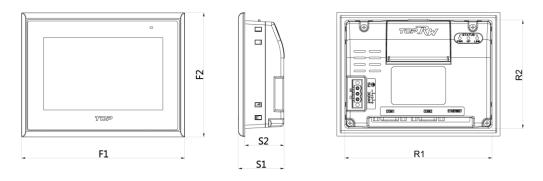
Model Name	TOPRW0500WD TOPRW0700WD		TOPRW0700WD NE	TOPRW1000WD	
Weight(Kg)	0.4	0.72	0.7	1.7	
Cooling System	Natural Air Circulation				
Case Material	Plastic				

Chapter 4 Part Names and General Specifications

4.1 TOPRW0500WD

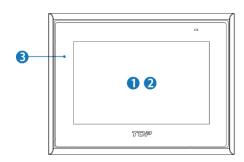


4.1.1 External Dimension



Model	F1(mm)	F2(mm)	S1 (mm)	S2 (mm)	R1(mm)	R2(mm)
TOPRW0500WD	150	114	41.8	35.8	135	99

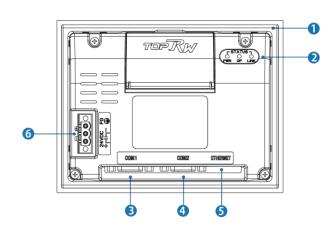
4.1.2 Front Part Names and Specifications

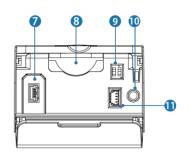


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No.	Part	Description
1	LCD	TFT 16M Color LCD
2	Touch Panel	Analog Touch
3	Front Sheet	Front Cover Sheet for Damp Proof and Dust Proof

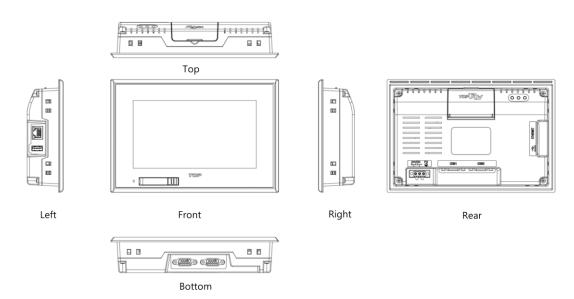
4.1.3 Rear Part Names and Specifications





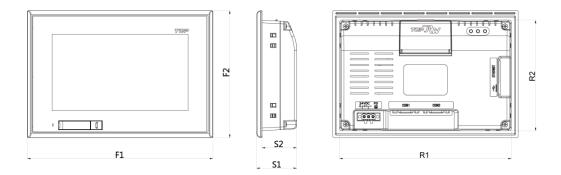
No.	Part	Form	Description			
	Rubber Packing		Silicone Gasket for Impact Buffering and IP Securing for Wall			
1		1	Mounting			
2	Status LED	3ea	Status of Power, Communication and CPU			
3	COM1 Connector	DSUB9	RS-232C Serial Comm. with PLC			
	COM2 Connector	DSUB9	RS-232C/422/485 Serial Comm. with PLC			
	4	D20B3	(Switchable the Comm. Via Software)			
(5)	ETHERNET Connector	RJ-45	10BASE-T/100BASE-TX, Auto-MDIX			
6	Power Input Terminal	TB 5mm 3P	Power Supply of Main Unit(DC 24V)			
7	USB Connector	MINI USB AB Type	USB Connectors for Storage Options			
8	SD Card Slot	SD Card Slot	SD Card Insert Connector			
9	Mode Switch	DIP Switch 2	Set Up System Switch			
10	Reset Switch	Tact Switch	System Reset Switch			
11)	Diagnose Connector	2mm 4P	Diagnose System (Manufacturer Use Only)			

4.2 TOPRW0700WD / TOPRW0700WD NE



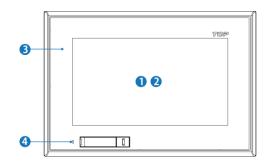
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4.2.1 External Dimension



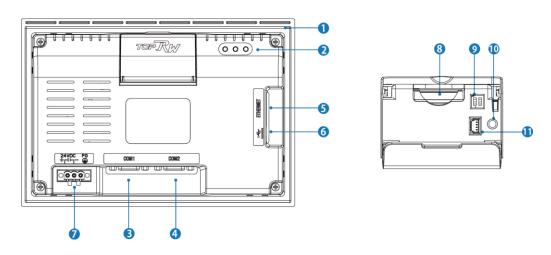
Model	F1(mm)	F2(mm)	S1 (mm)	S2 (mm)	R1(mm)	R2(mm)
TOPRW0700WD	212	1.45	AE C	39.6	196	126
TOPRW0700WD NE	212	145	45.6	39.0	190	126

4.2.2 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	Project Upload / Download

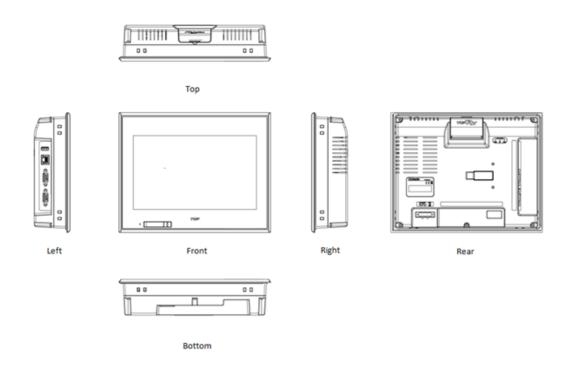
4.2.3 Rear Part Names and Specifications



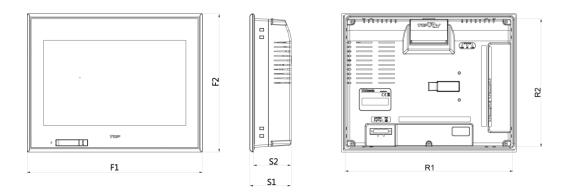
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No.	Part	Form	Description	Adoptive Model
	Rubber Packing	-	Silicone Gasket for Impact Buffering and	Common
1			IP Securing for Wall Mounting	Common
2	Status LED	3	Status of Power, Communication and CPU	Common
3	COM1 Connector	DSUB9	RS-232C Serial Comm. with PLC	Common
	COM2 Connector DSUB9		RS-232C/422/485 Serial Comm. with PLC Common	
4			(Switchable the Comm. Via Software)	Common
(5)	ETHERNET Connector	RJ45 1ch	10BASE-T/100BASE-TX, Auto-MDIX	TOPRW0700WD
6	USB Connector	Type A	USB Connectors for Storage Options	Common
7	Power Input Terminal	TB 5mm 3P	Power Supply of Main Unit(DC 24V)	Common
8	SD Card Slot	SD Card Slot	SD Card Insert Connector	Common
9	Mode Switch	DIP Switch 2 Digit	Set Up System Switch	Common
10	Reset Switch	Tact Switch	System Reset Switch	Common
11)	Diagnose Connector	2mm 4P	Diagnose System (Manufacturer Only)	Common

4.3 TOPRW1000WD

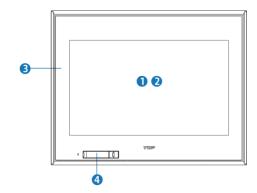


4.3.1 External Dimension



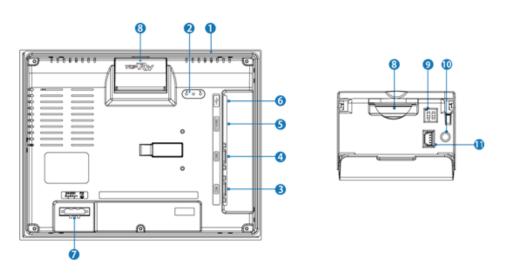
Model	F1(mm)	F2(mm)	S1 (mm)	S2 (mm)	R1(mm)	R2(mm)
TOPRW1000WD	274	216	64.7	58.7	260	202

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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	Project Upload / Download

4.3.3 Rear Part Names and Specifications



No.	Part	Form	Description
1	Rubber Packing		Silicone Gasket for Impact Buffering and IP Securing for Wall Mount
2	Status LED	3	Status of Power, Communication and CPU
3	COM1 Connector	DSUB9	RS-232C Serial Comm. with PLC
4	COM2 Connector	DSUB9	RS-232C/422/485 Serial Comm. with PLC
			(Switchable the Comm. Via Software)
(5)	ETHERNET Connector	RJ45 1ch	10BASE-T/100BASE-TX, Auto-MDIX
6	USB Connector	Type A	USB Connectors for Storage Options
7	Power Input Terminal	TB 7.6mm 3P	Power Supply of Main Unit(DC 24V)
8	SD Card Slot	SD Card Slot	SD Card Insert Connector
9	Mode Switch	DIP Switch 2ea	Set Up System Switch
10	Reset Switch	Tact Switch	System Reset Switch
11)	Diagnose Connector	2mm 4P	Diagnose System (Manufacturer Only)

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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 Communication Specifications

5.1.1 RS-232C

[tems	Contents			
Pr	otocol	Full Duplex			
S	Synch	Asynchronous			
Communic	cation Distance	About 15m			
Type of Connection		1:1			
Cont	trol Code	ASCII Code or HEXA Code			
Transmi	ssion Speed	2400,4800,9600,19200,38400,57600,76800,115200 bps			
	Data Bit	7, 8 bit			
Data Type	Parity Bit	NONE, ODD, EVEN Parity			
	Stop Bit	1, 2 bit			
Mod	lular Jack	DSUB 9Pin			

5.1.2 RS-422/485

lte	ems	Contents			
Pro	tocol	Full Duplex/Half Duplex			
Sy	rnch	Asynchronous			
Communica	ation Distance	About 500m			
Type of 0	Connection	1:N (N ≤ 31)			
Contr	ol Code	ASCII Code or HEXA Code			
Transmis	sion Speed	2400,4800,9600,19200,38400,57600,76800,115200 bps			
	Data Bit	7, 8 bit			
Data Type	Parity Bit	NONE, ODD, EVEN Parity			
	Stop Bit	1, 2 bit			
Modu	ılar Jack	DSUB 9Pin			

5.1.3 COM1 Connector pin number and Signal name

Туре	Pin No.	Signal	Direction	Contents
	1	NC	=	N/A
	2	RD(RxD)	Input	RS-232C Data Receive
ODia Famala	3	SD(TxD)	Output	RS-232C Data Send
9Pin Female	4	NC	=	N/A
		SG	-	Signal Ground
	6	NC	-	N/A
	7	1) 전원	-	+5V, 0.2A
	8	²⁾ GND	-	Power Ground
	9	NC	-	N/A

^{1), 2)} When you 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	Contents
	1	RDA(RD+)	Input	RS-422/485Data Receive(+)
	2	RD(RxD)	Input	RS-232C Data Receive
	3	SD(TxD)	Output	RS-232C Data Send
9Pin Female	4	RDB(RD-)	Input	RS-422/485Data Receive(-)
	5	SG	-	Signal Ground
	6	SDA(SD+)	Output	RS-422/485Data Send(+)
0	7	NC	-	N/A
	8	NC	-	N/A
	9	SDB(SD-)	Output	RS-422/485Data Send(-)

^{*} 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 Communication Specifications

5.2.1 Ethernet

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

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+
h H	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.

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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 Communication Specifications

5.3.1 USB Host

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

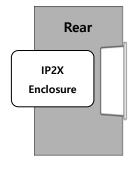
5.3.2 USB OTG

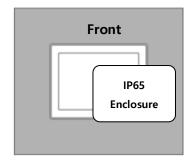
Туре	Items	Specifications	
	USB Interface	USB 2.0	
	Communication Method	Interrupt/Bulk/Isochronous	
[naaraan]	Transfer Speed Max. 480Mb/s		Max. 480Mb/s
(00000)	Supporting OS	Windows 98	8SE/2000/XP/VISTA/7/10 (32/64bit)
	Cable Length	1.5M(recom	mended to use M2I's Option Cable)
	Connect Type	N	INI USB Type B, Female
	Carrage at Martha al	TOPRW05	Connected via USB terminal inside SD cover
Connect Metho	Connect Method	TOPRW07/10	Connect Via USB Front of Display Module

Chapter 6 Installation \triangle ^{Warning}

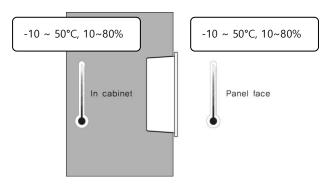


6.1 Installation Requirement





- (1) It should be installed within -10 ~ 50°C and 10~80% 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
- (3) In order to minimize external mechanical hazards, please control the mechanical hazards of the surrounding environment.



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6.2 Installation Procedure



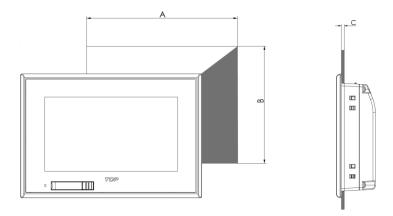
In order to install this product, please follow the following procedure.

6.2.1 Panel Cut

Make a panel cut which product is mounted and insert the product to the panel form the front side.

(1) The Size of Panel Cut

Making the Panel Cut (Mounting Size) per each TOPRW Series as below Table, Before Installation.

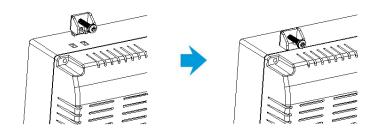


Model	A (mm)	B (mm)	C (mm)
TOPRW0500WD	136(+1.0/0)	100(+1.0/0)	
TOPRW0700WD	107/.10/0	127(, 1.0 /0)	1~5
TOPRW0700WD NE	197(+1.0/0)	127(+1.0/0)	
TOPRW1000WD	260(+1.0/0)	202(+1.0/0)	

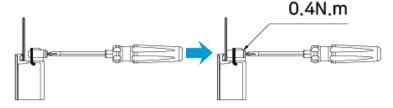
(2) Clamp Fixing Marning

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

a. Insert the clamp into the slot of the product.



b. 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.

* Caution: If the clamp is screwed less than 0.4N.m, IP performance is not working well.

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7.1 Power Cable Wiring Marning

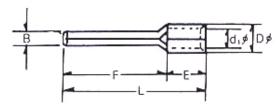
(1) The Power cable should have the following specification. \triangle Warning

Power Cable Specification	0.75~2.5mm ² (18~12AWG)		
F.G Cable Specification	Over 2mm²(14AWG)		
Conductor Type	Simple or Standard Wire		
Bolt tightening force	≥ 0.4 N.m W arning		
Conductor Length	7mm		
Temperature rating of the field installed conductors	65°C or less		

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

Marning

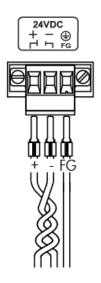
To Prevent wearing of cable and to enhance electronic transmission, please use a pin type conductor for power cable and ground wiring.



 B
 L
 F
 E
 D
 d

 1.8~2.0
 22~18
 12~14
 5
 3.3~3.8
 2~2.5

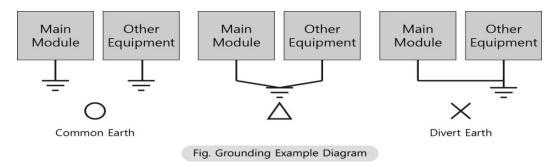
(3) Wiring of power cable is as follows. Marning



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7.2 Ground Wiring Marning

- (1) The product has enough anti-noise measure, so except that there are many noises. Especially the ground is 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 the exclusive ground cannot be set, 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 Marning



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



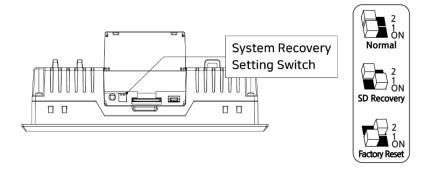
- a. If there is a problem during operation, stop using it and contact the A/S department of M2I Corporation, which is indicated on the product label.
- b. Only the authorized worker from M2I Corporation can check and repair problems related to malfunction of the machine.
- c. If the problem cannot be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

M2I Corporation 17 / 19 by the use conditions of the user beyond the installation and use standards described in the manual.

- e. If there is a high electromagnetic noise, put ferrite core on main power cable and field cable. The noise of power cable and communication cables can be high under the installation circumstances.
- f. When the USB device does not work well by a noise, put ferrite core on each end side of cable to improve an endurance against it.

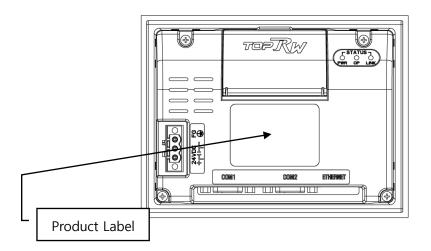
8.4 Setting System Recovery Mode

- a. 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.
- b. 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".
- c. When the recovery is completed, the buzzer sounds, then turn off the power and reset to "Normal" state.



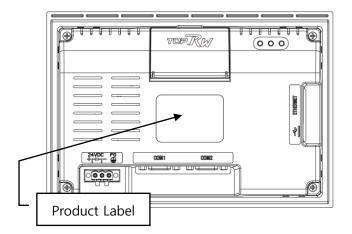
Chapter 9 Products Label / Warning Label

9.1 TOPRW0500WD



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9.2 TOPRW0700WD / TOPRW0700WD NE / TOPRW1000WD







Manufacture (AS): M2I Corporation

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

Tel: 82-31-465-3366

Product Type: Industrial HMI Touch Panel Model Names and Power Specifications:

- TOPRW0500WD: 24Vdc, 12W or less, Class 2 should be used
- TOPRW0700WD: 24Vdc, 12W or less, Class 2 should be used
- TOPRW0700WD NE: 24Vdc, 12W or less, Class 2 should be used
- TOPRW1000WD: 24Vdc, 15W or less, Class 2 should be used.

Operating Temp: -10 °C ≤ Ta ≤ +50 °C

KC Certificate No: Product No:

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www.m2i.co.kr

- Please read related contents in this manual when you use M2I product, and operate the product staying safe with appropriate handling.
- This manual should be stored in secured and appointed place so that it can be read in any needs.

User Guide

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

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