

# MONITOUCH TECHNO SHOT TS107x OPERATING INSTRUCTIONS

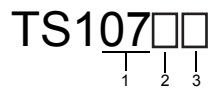
Make sure that the delivered unit conforms to your requirement, and also check for any missing or damaged parts.

Before using this TS107x, be sure to read this OPERATING INSTRUCTIONS as well as the TS Series Hardware Specifications manual thoroughly to ensure proper operation.

## Accessories

- TS107x OPERATING INSTRUCTIONS (This manual) ..... 1 copy
- Fixtures ..... 4 pcs.
- Mounting nuts ..... 4 pcs.
- Cable tie for securing USB cables ..... 1 pc.

## Model



1	Screen size	07	7.0 inch widescreen (WVGA) TFT color LCD (65,536 colors)
2	UL/c-UL	0	None
		1	UL508 (i type only)
3	Functional capabilities	i	Includes built-in LAN port
		Blank	No built-in LAN port

\* The touch switch specification is analog type only.

## Notes on Safe Usage

In this "TS107x OPERATING INSTRUCTIONS", you will find various notes categorized under the following two levels with the signal words "Danger" and "Caution."

	<b>DANGER</b>	Indicates an <u>imminently hazardous situation which, if not avoided, will result in death or serious injury.</u>
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	<b>CAUTION</b>	Indicates a <u>potentially hazardous situation which, if not avoided, may result in minor or moderate injury and could cause property damage.</u>
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Even some items indicated " CAUTION" may also result in serious accidents.

	<b>DANGER</b>
<ul style="list-style-type: none"> <li>• Never use the input functions of the TS Series unit, such as touch switches, for operations that may threaten human life or cause damage to the system, or as emergency switches for use in an emergency. Please design the system so that it can withstand touch switch malfunctions. Touch switch malfunctions may result in machine accidents or damage.</li> <li>• Turn off the power supply when you set up the unit, connect cables or perform maintenance and inspection. Otherwise, electrical shock or damage may occur.</li> <li>• Never touch any terminals while the power is on. Otherwise, electrical shock may occur.</li> <li>• The liquid crystal in the LCD panel is a hazardous substance. If the LCD panel is damaged, do not ingest the leaked liquid crystal. If the liquid crystal spills on your skin or clothing, use soap and wash off thoroughly.</li> <li>• Never disassemble, recharge, deform by pressure, short-circuit, or reverse the polarity of the lithium battery, and never dispose of the lithium battery in fire. Failure to follow these conditions may lead to explosion or ignition.</li> <li>• Never use lithium batteries that are deformed, leaking, or exhibit any other abnormalities. Failure to follow these conditions may lead to explosion or ignition.</li> </ul>	

	<b>CAUTION</b>
<ul style="list-style-type: none"> <li>• Check the appearance of the unit when it is unpacked. Do not use the unit if any damage or deformation is found. Failure to do so may lead to fire, damage or malfunction.</li> <li>• For use in a facility or for a system related to nuclear energy, aerospace, medical, traffic equipment, or mobile installations, please consult your local distributor.</li> <li>• Operate (and store) the TS Series unit under the environmental conditions indicated in the general specifications of this manual and related manuals. Failure to do so could result in fire, malfunction, physical damage, or deterioration.</li> <li>• Understand the following environmental limits for use and storage of the TS Series. Otherwise, fire or damage to the unit may result. <ul style="list-style-type: none"> <li>- Avoid locations where there is a possibility that water, corrosive gas, flammable gas, solvents, grinding fluids or cutting oil can come into contact with the unit.</li> <li>- Avoid high temperature, high humidity, and outside weather conditions, such as wind, rain or direct sunlight.</li> <li>- Avoid locations where excessive dust, salt, and metallic particles are present.</li> <li>- Avoid installing the unit in a location where vibration or physical shock may be transmitted.</li> </ul> </li> <li>• Equipment must be correctly mounted so that the main terminal of the TS Series unit will not be touched inadvertently. Failure to do so may result in electric shock or accidents.</li> <li>• Periodically check that the terminal screws on the power supply terminal block and mounting nuts are firmly tightened. Using the unit with loose screws may result in fire or malfunction.</li> <li>• Tighten the terminal screws on the TS Series power supply terminal block to an equal torque of 0.5 to 0.6 N·m (5 to 6 kgf·cm). Failure to tighten these screws properly may result in fire, malfunction, or damage to the system.</li> <li>• Tighten the mounting nuts on the TS Series unit to equal torque within the specified range. Note that excessive tightening may distort the panel surface. Failure to tighten these nuts properly may cause the TS Series to fall, malfunction, or short-circuit.</li> <li>• The TS Series features a glass screen. Do not drop or impart physical shocks to the unit. Such handling may damage the unit.</li> <li>• Connect the cables correctly to the terminals of the TS Series unit in accordance with the specified voltage and wattage. Failure to supply the correct voltage or wattage, or improper cable connection may cause fire, malfunction, or damage to the unit.</li> <li>• Always ground the TS Series unit. Ground the FG terminal of the TS Series unit with an independent D class grounding (ground resistance of 100 Ω or less). Failure to do so may result in electric shock or fire.</li> <li>• Prevent any conductive particles from entering into the TS Series unit. Failure to do so may lead to fire, damage, or malfunction.</li> <li>• Do not attempt to repair, overhaul, or modify the TS Series unit. Contact Hakko Electronics Co., Ltd. or the designated contractor for repairs. Attempting to repair the unit yourself will result in damage.</li> <li>• Hakko Electronics Co., Ltd. is not responsible for any damages resulting from the repair, overhaul, or modification of TS Series units performed by unauthorized personnel.</li> <li>• Do not use a sharp-pointed tool when pressing a touch switch. Doing so may damage the screen.</li> <li>• Only experts are authorized to set up the unit, connect the cables or perform maintenance and inspection.</li> <li>• The combustible materials such as lithium or organic solvent contained in the battery may generate heat, explode, or catch fire, resulting in personal injury or fire. Read related manuals carefully and handle the lithium battery correctly as instructed.</li> <li>• Do not press two or more points on the screen at the same time. If there is a switch between the two pressed points, it may be activated.</li> </ul>	

	<b>CAUTION</b>
<ul style="list-style-type: none"> <li>• Take safety precautions during such operations as setting change during running, forced output, start, and stop. Any misoperation may cause unexpected machine motions, resulting in machine accident or damage.</li> <li>• In facilities where TS Series unit failure could lead to accidents that threaten human life or result in other serious damage, make sure that such facilities are equipped with adequate safeguards.</li> <li>• TS Series units must be disposed of as industrial waste.</li> <li>• Before touching the TS Series unit, discharge any static electricity from your body by touching grounded metal. Excessive static electricity may cause malfunction or damage to the unit.</li> </ul>	

## Notes on LCD

- Tiny spots (dark or luminescent) may appear on the display due to the liquid crystal characteristics. Please note that this is not a fault or malfunction of the TS Series.

## CE Marking

- TS107x complies with EMC Directives, EN61000-6-2, EN61000-6-4.
- TS107x is identified as a class-A product in an industrial environment. In the case of the use in a domestic environment, TS107x is likely to cause electromagnetic interference. Preventive measures should thereby be taken appropriately.

## UL/c-UL Approval

The TS1071i is UL/cUL-approved. (File No.: E313548 (UL508))

The TS1071i conforms to the following two standards.

- UL508 : Industrial Control Equipment
- CSA-C22.2 No. 142-M1987 : Process Control Equipment

## UL Listing Application for a System Equipped with MONITOUCH

- The back panel of MONITOUCH is not approved as an enclosure. For UL listing application, build MONITOUCH in the system, and configure an enclosure so that the entire system will be UL-approved.
- Use MONITOUCH indoors only.
- For use on a flat surface of a type 1 enclosure
- Use a bare cable for wiring of the power supply.

Screw Size	Tightening Torque	Power Cable
M3	5 - 6 inch-lbf	AWG18 - AWG14, Rated temperature 60 °C Use copper conductor only.

- Use the Class 2 power supply for the 24-VDC power unit.

## General Specifications

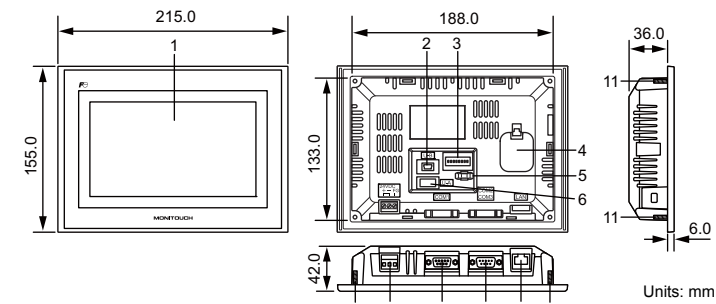
Item	Specification	
	TS1070 / TS1070i	TS1071i
Conformance Standards	CE (EN61000-6-2, EN61000-6-4), KC UL508	
Rated Voltage	24 VDC	
Acceptable Voltage Range	24 VDC ± 10 %	
Acceptable Duration of Momentary Power Failure	Within 1 ms	
Power Consumption (Maximum Rating)	16 W or less	
Rush Current	22 A or less (within 2 ms)	
Withstand Voltage	DC external terminals to FG: 500 VAC for 1 minute	
Insulation Resistance	DC external terminals to FG: 500 VDC, 10 MΩ or more	
Surrounding Air Temperature	0 °C to +50 °C *1	
Storage Surrounding Air Temperature	-10 °C to +60 °C *1	
Surrounding Air Humidity	85 % RH or less (without dew condensation) *1	
Storage Surrounding Air Humidity	85 % RH or less (without dew condensation) *1	
Altitude	2000 m or lower	
Atmosphere	No corrosive gas, no excessive dust, and no conductive dust	
Vibration Resistance	JIS B 3502 (IEC61131-2) compliant Vibration frequency: 5 to 9 Hz Half-amplitude: 3.5 mm, Vibration frequency: 9 to 150 Hz Constant acceleration: 9.8 m/s <sup>2</sup> (1 G), 3 directions of X, Y, and Z: 10 times	
Shock Resistance	JIS B 3502 (IEC61131-2) compliant Peak acceleration: 147 m/s <sup>2</sup> (15 G), 3 directions of X, Y, and Z: 3 times each	
Noise Resistance	1000 Vp-p (pulse width 1 μs, rising time: 1 ns)	
Static Electricity Discharge Resistance	Compliant with IEC61000-4-2, Contact: 6 kV, Air: 8 kV	
Pollution Degree *2	For use in Pollution Degree 2	
Grounding	Less than 100 Ω, FG/SG separated	
Structure	Protection structure : front panel complies with IP65 *3 : rear case complies with IP20 Form : in a body Mounting procedure : inserted in a mounting panel Sheet metal thickness : 1.5 to 5 mm	
Cooling System	Cooling naturally	
Weight	Approx. 0.9 kg	
Dimensions W × H × D	215.0 × 155.0 × 42.0 mm	
Panel Cut-out Dimensions	189.0 <sup>+0.5</sup> × 134.0 <sup>+0.5</sup> mm	
Material	PC/PS	

\*1 Wet-bulb temperature 39 °C or less

\*2 This index indicates the degree to which conductive material is generated in the environment where the equipment is used. In pollution degree 2, only non-conductive pollution occurs but temporary conductivity may be produced due to condensation.

\*3 The gasket (TS1070-WP) (optional) is required to make the protective structure of the unit compliant with IP65. Without the gasket, the protective structure of the unit is only compliant with IP40.

## Names of Components and Dimensions



1. Display
2. USB mini-B connector (U-B)
3. DIP switches
4. Battery holder
5. USB cable securing hole
6. USB-A connector (U-A)
7. Power supply terminal block
8. D-sub 9-pin connector (COM1) for RS-422/RS-485 communication
9. D-sub 9-pin connector (COM2/COM3) for RS-232C/RS-485 communication
10. LAN connector (LAN)
11. Mounting screws

## Interface

### D-sub 9-pin (COM1/COM2/COM3)

This connector is used for serial communication (RS-232C/RS-422/RS-485) with an external device.

Pin No.	COM1 (female, inch screw threads)		COM2/COM3 *2 (male, inch screw threads)	
	RS-422 (4-wire)/RS-485 (2-wire) *1		RS-232C/RS-485 (2-wire)	
1	+RD	Receive data (+)	-SD/RD	RS-485 send/receive data (-)
2	-RD	Receive data (-)	RD	RS-232C receive data
3	-SD	Send data (-)	TD	RS-232C send data
4	+SD	Send data (+)	NC	Not used
5	SG	Signal ground	SG	Signal ground
6			+SD/RD	RS-485 send/receive data (+)
7			RTS	RS-232C request to send
8			CTS	RS-232C clear to send
9			SG	Signal ground

\*1 Change between RS-422 (4-wire) and RS-485 (2-wire) using DIP switches 2 and 3.

\*2 This unit supports communication with the RS-232C and RS-485 (2-wire) ports using the same connector. The RS-232C (COM2) and RS-485 (COM3) ports can be used at the same time.

\* FG is the chassis ground.

### LAN Connector (LAN) TS107xi Only

This port is for Ethernet connections (10BASE-TX, 10BASE-T).  
Specification: IEEE802.3 (u) compliant, UDP/IP and TCP/IP support, Auto-MDIX support  
For more information on the LAN connector and LAN cables, refer to the separate "TS Series Hardware Specifications".

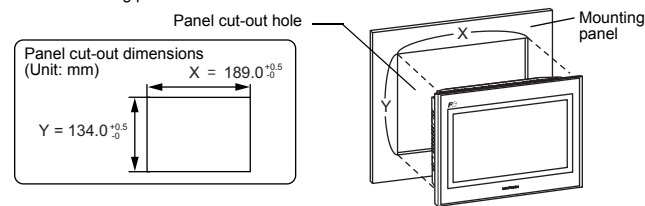
### USB Port (U-A/U-B)

These ports are used for connecting USB devices and a printer or transferring screen programs (USB mini-B only).  
Specification: Compliant with USB version 2.0  
For more information on using USB ports and securing cables, refer to the separate "TS Series Hardware Specifications".

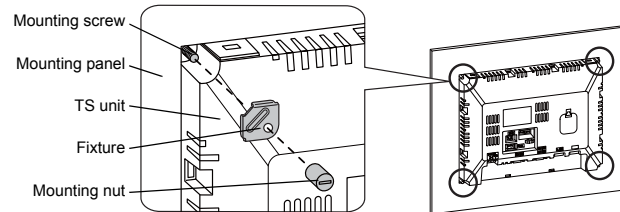
## Mounting Procedure

### Mounting Procedure

1. Insert the unit into the mounting panel (max. thick: 5 mm).
  - \* Insert the optional gasket (TS1070-WP) so that it is securely sandwiched between the TS107x and the mounting panel.

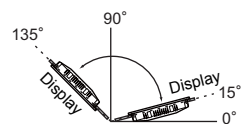


2. Mount the four provided fixtures onto the mounting screws on the TS107x and tighten the TS107x in place using the four provided mounting nuts. (Tightening torque: 0.3 to 0.4 N·m)
  - \* The fixtures connect with the unit's frame grounds (FG) when mounting the unit onto a mounting panel.



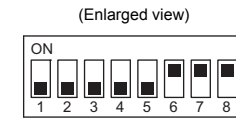
### Mounting Angle

The TS shall be installed within the angle of 15 to 135 degrees.



## DIP Switches

Setting of DIP switches is as follows. (The following figure shows the DIP switch setting upon delivery.) Before setting the DIP switch, turn the power off.



No.	Description
1	Automatic storage upload
2	Switch from 4-wire mode to 2-wire mode for COM1 (+)
3	Switch from 4-wire mode to 2-wire mode for COM1 (-)
4	Terminating resistor for Siemens PPI/MPI (-RD/SG)
5	Terminating resistor for Siemens PPI/MPI (+RD/5V)
6	Terminating resistor for COM1 +SD/-SD
7	Terminating resistor for COM1 +RD/-RD
8	Terminating resistor for COM3

For details, refer to the separate TS Series Hardware Specifications manual.

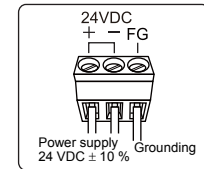
## Electrical Wiring and Grounding

	<b>DANGER</b>	Electric shock hazard Shut the power off before connecting the power supply cable.
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## Cable Specifications

	<b>CAUTION</b>	<ul style="list-style-type: none"> <li>• Do not solder the end sections of power cable wires. Soldering may result in bad electrical contacts.</li> <li>• When using stranded wire for the power cable, make sure the strands are sufficiently twisted. Failure to do so may cause shorting between stray strands or adjacent electrodes.</li> </ul>
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Tightening Torque		0.5 to 0.6 N·m (5 to 6 kgf·cm)
Cable Size	Power cable	AWG18 to AWG14 Stranded wire/solid wire (1.0 to 1.6 mm diameter) *
	Ground cable	AWG20 to AWG14 Stranded wire/solid wire (0.8 to 1.6 mm diameter) *
Core wire length		6.5 mm



\* Rod terminals can also be used. For more information, refer to the separate "TS Series Hardware Specifications".

## Power Supply Cable Connection

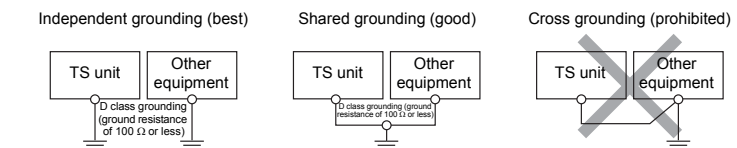
	<b>DANGER</b>	Avoid applying excessive force to the power supply cable. This may lead to unintentional disconnection of the cable and cause serious accidents such as electric shock.
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- The power source must be within the allowable voltage fluctuation.
- Use a power source with low noise between the cables or between the ground and the cable.
- Use the thickest power supply cable possible to minimize drops in voltage, and twist.
- Keep power supply cables away from high-voltage, large-current carrying cables.

## Grounding

	<b>CAUTION</b>	Be sure to establish a ground of the TS Series. (The level of grounding resistance should be less than 100 Ω.)
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- An independent earth pole must be used for the TS Series.
- Use AWG20 to AWG14 size wiring for the grounding cable.
- Set the grounding point near the TS Series to shorten the distance of grounding cables.



## Notes on Usage of Lithium Battery

The battery is used for the user memory area (non-volatile memory \$L and \$LD, storing sampling data, etc.) in SRAM, or backup battery for the built-in clock.

	<b>CAUTION</b>	The TS Series is delivered with inserting the battery in the socket.
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For more information on the battery specifications, procedure of battery replacement or disposal of the used battery, refer to the separate TS Series Hardware Specifications manual.

## Note on the Directive 2006/66/EC

- The symbol mark on the right is valid for countries in the European Union only.
- The symbol mark on the right is according to the Directive 2006/66/EC Article 20 Information for end-users and Annex II.
- The symbol mark on the right means that battery, at the end-of-life, should be disposed of separately from your household waste.
- If a chemical symbol is printed beneath the symbol on the right, this chemical symbol means that the battery contains a heavy metal at a certain concentration. This will be indicated as follows: Hg: mercury (0.0005 %), Cd: cadmium (0.002 %), Pb: lead (0.004 %)
- In the European Union, there are separate collection systems for used batteries. Please dispose of batteries correctly at your local community waste collection/recycling center.



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