



# GT1455HS-QTBDE, GT1450HS-QMBDE

## GT14 Handy GOT General Description

GRAPHIC OPERATION TERMINAL <b>GOT1000</b>	Manual Number	JY997D52501B
	Date	April 2015

This manual describes the part names, dimensions, mounting, and specifications of the product. Before use, read this manual and manuals of relevant products fully to acquire proficiency in handling and operating the product. Make sure to learn all the product information, safety information, and precautions. And, store this manual in a safe place so that you can take it out and read it whenever necessary. Always forward it to the end user.

Registration

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Effective April 2015  
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(Read these precautions before using.)

Before using this product, please read this manual and the relevant manuals introduced in this manual carefully and pay full attention to safety to handle the product correctly.


The precautions given in this manual are concerned with this product.


In this manual, the safety precautions are ranked as "WARNING" and "CAUTION".


 <b>WARNING</b>	Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.
 <b>CAUTION</b>	Indicates that incorrect handling may cause hazardous conditions, resulting in medium or slight personal injury or physical damage.


Depending on circumstances, procedures indicated by "CAUTION" may also be linked to serious results.


In any case, it is important to follow the directions for usage.


DESIGN PRECAUTIONS	 <b>WARNING</b>
<ul style="list-style-type: none"> <li>Some failures of the GOT or cable may keep the outputs on or off. An external monitoring circuit should be provided to check for output signals which may lead to a serious accident.</li> <li>Not doing so can cause an accident due to false output or malfunction.</li> <li>If a communication fault (including cable disconnection) occurs during monitoring on the GOT, communication between the GOT and PLC CPU is suspended and the GOT becomes inoperative. A system where the GOT is used should be configured to perform any significant operation to the system by using the switches of a device other than the GOT on the assumption that a GOT communication fault will occur.</li> <li>Not doing so can cause an accident due to false output or malfunction.</li> <li>Do not use the GOT as the warning device that may cause a serious accident. An independent and redundant hardware or mechanical interlock is required to configure the device that displays and outputs serious warning.</li> <li>Failure to observe this instruction may result in an accident due to incorrect output or malfunction.</li> <li>Incorrect operation of the touch switch(s) may lead to a serious accident if the GOT backlight is gone out. When the GOT backlight goes out, the POWER LED flickers (green/orange) and the display section turns black and causes the monitor screen to appear blank, while the input of the touch switch(s) remains active. This may confuse an operator in thinking that the GOT is in "screensaver" mode, who then tries to release the GOT from this mode by touching the display section, which may cause a touch switch to operate.</li> <li>Note that the following occurs on the GOT when the backlight goes out. <ul style="list-style-type: none"> <li>The POWER LED flickers (green/orange) and the monitor screen appears blank</li> </ul> </li> <li>The display section is an analog-resistive type touch panel.</li> <li>If you touch the display section simultaneously in 2 points or more, the switch that is located around the center of the touched point, if any, may operate.</li> <li>Do not touch the display section in 2 points or more simultaneously.</li> <li>Doing so may cause an accident due to incorrect output or malfunction.</li> </ul>	


DESIGN PRECAUTIONS	 <b>WARNING</b>
<ul style="list-style-type: none"> <li>When programs or parameters of the controller (such as a PLC) that is monitored by the GOT are changed, be sure to reset the GOT or shut off the power of the GOT at the same time. Not doing so can cause an accident due to false output or malfunction.</li> </ul>	


DESIGN PRECAUTIONS	 <b>CAUTION</b>
<ul style="list-style-type: none"> <li>Do not bundle the control and communication cables with main-circuit, power or other wiring. Run the above cables separately from such wiring and keep them a minimum of 100mm (3.94in.) apart.Not doing so noise can cause a malfunction.</li> <li>Do not press the GOT display section with a pointed material as a pen or driver. Doing so can result in a damage or failure of the display section.</li> <li>When the GOT is connected to the Ethernet network, the available IP address is restricted according to the system configuration. <ul style="list-style-type: none"> <li>When multiple GOTs are connected to the Ethernet network: <ul style="list-style-type: none"> <li>Do not set the IP address (192.168.0.18) for the GOTs and the controllers in the network.</li> </ul> </li> <li>When a single GOT is connected to the Ethernet network: <ul style="list-style-type: none"> <li>Do not set the IP address (192.168.0.18) for the controllers except the GOT in the network.</li> </ul> </li> </ul> </li> <li>Doing so can cause the IP address duplication. The duplication can negatively affect the communication of the device with the IP address (192.168.0.18). The operation at the IP address duplication depends on the devices and the system.</li> </ul>	


MOUNTING PRECAUTIONS	 <b>WARNING</b>
<ul style="list-style-type: none"> <li>Be sure to shut off all phases of the external power supply used by the system before mounting or removing the GOT to/from the panel.</li> <li>Not doing so can cause the unit to fail or malfunction.</li> <li>Always turn off the power ON/OFF switch on the connector conversion box (GT16H-CNB-42S) before connecting or disconnecting the GOT to it.</li> <li>Connecting or disconnecting the GOT with the power being turned on may result in damage to the unit or malfunctions.</li> </ul>	


MOUNTING PRECAUTIONS	 <b>CAUTION</b>
<ul style="list-style-type: none"> <li>Use the GOT in the environment that satisfies the general specifications described in this manual. Not doing so can cause an electric shock, fire, malfunction or product damage or deterioration.</li> <li>Never drop cutting chips and electric wire chips into the ventilation window of the Handy GOT when you drill screw holes or perform wiring.</li> <li>Otherwise, fire, failure or malfunction may be caused.</li> <li>Connect connection cables securely to the specified connectors while the power is turned OFF.</li> <li>Imperfect connection may cause malfunction or failure.</li> <li>When inserting/removing a SD card into/from the GOT, turn the SD card access switch off in advance. Failure to do so may corrupt data within the SD card.</li> <li>When removing a SD card from the GOT, make sure to support the SD card by hand, as it may pop out. Failure to do so may cause the SD card to drop from the GOT and break.</li> <li>When installing a USB memory to the GOT, make sure to install the USB memory to the USB interface firmly.</li> <li>Failure to do so may cause a malfunction due to poor contact.</li> <li>Before removing the USB memory from the GOT, operate the utility screen for removal.</li> <li>After the successful completion dialog box is displayed, remove the memory by hand carefully.</li> <li>Failure to do so may cause the USB memory to drop, resulting in a damage or failure of the memory.</li> <li>Operate and store the GOT in environments without direct sunlight, high temperature, dust, humidity, and vibrations.</li> </ul>	

WIRING PRECAUTIONS	 <b>WARNING</b>
<ul style="list-style-type: none"> <li>Make sure to attach the back cover to the Handy GOT before turning on the power and starting operation after the installation or wiring work.</li> <li>Otherwise, electrical shock may be caused.</li> <li>Be sure to shut off all phases of the external power supply used by the system before wiring. Failure to do so may result in an electric shock, product damage or malfunctions.</li> <li>Please make sure to ground FG terminal of the GOT power supply section by applying 100 or less which is used exclusively for the GOT. Not doing so may cause an electric shock or malfunction.</li> <li>Correctly wire the GOT power supply section after confirming the rated voltage and terminal arrangement of the product. Not doing so can cause a fire or failure.</li> <li>Exercise care to avoid foreign matter such as chips and wire offcuts entering the GOT. Not doing so can cause a fire, failure or malfunction.</li> </ul>	


WIRING PRECAUTIONS	 <b>CAUTION</b>
<ul style="list-style-type: none"> <li>The cables connected to the unit must be run in ducts or clamped.</li> <li>Not doing so can cause the unit or cable to be damaged due to the dangling, motion or accidental pulling of the cables or can cause a malfunction due to a cable connection fault.</li> <li>When unplugging the cable connected to the unit, do not hold and pull the cable portion.</li> <li>Doing so can cause the unit or cable to be damaged or can cause a malfunction due to a cable connection fault.</li> <li>Plug the communication cable into the connector of the connected unit and tighten the mounting and terminal screws in the specified torque range.</li> <li>Undertightening can cause a short circuit or malfunction. Overtightening can cause a short circuit or malfunction due to the damage of the screws or unit.</li> </ul>	


TEST OPERATION PRECAUTIONS	 <b>WARNING</b>
<ul style="list-style-type: none"> <li>Before performing the test operations of the user creation monitor screen (such as turning ON or OFF bit device, changing the word device current value, changing the settings or current values of the timer or counter, and changing the buffer memory current value), read through the manual carefully and make yourself familiar with the operation method. During test operation, never change the data of the devices which are used to perform significant operation for the system. False output or malfunction can cause an accident.</li> </ul>	

STARTUP/MAINTENANCE PRECAUTIONS	 <b>WARNING</b>
<ul style="list-style-type: none"> <li>When power is on, do not touch the terminals.</li> <li>Doing so can cause an electric shock or malfunction.</li> <li>Connect the battery correctly. Do not discharge, disassemble, heat, short, solder or throw the battery into the fire. Incorrect handling may cause the battery to generate heat, burst or take fire, resulting in injuries or fires.</li> <li>Before starting cleaning or terminal screw retightening, always switch off the power externally in all phases. Not switching the power off in all phases can cause a unit failure or malfunction. Undertightening can cause a short circuit or malfunction. Overtightening can cause a short circuit or malfunction due to the damage of the screws or unit.</li> </ul>	

STARTUP/MAINTENANCE PRECAUTIONS	 <b>CAUTION</b>
<ul style="list-style-type: none"> <li>Do not disassemble or modify the unit.</li> <li>Doing so can cause a failure, malfunction, injury or fire.</li> <li>Do not touch the conductive and electronic parts of the unit directly.</li> <li>Doing so can cause a unit malfunction or failure.</li> <li>The cables connected to the unit must be run in ducts or clamped.</li> <li>Not doing so can cause the unit or cable to be damaged due to the dangling, motion or accidental pulling of the cables or can cause a malfunction due to a cable connection fault.</li> <li>When unplugging the cable connected to the unit, do not hold and pull the cable portion. Doing so can cause the unit or cable to be damaged or can cause a malfunction due to a cable connection fault.</li> <li>Replace battery with GT11-50BAT by Mitsubishi electric Co. only.</li> <li>Use of another battery may present a risk of fire or explosion.</li> <li>Dispose of used battery promptly.</li> <li>Keep away from children. Do not disassemble and do not dispose of in fire.</li> </ul>	

DISPOSAL PRECAUTIONS	 <b>CAUTION</b>
<ul style="list-style-type: none"> <li>When disposing of the product, handle it as industrial waste.</li> <li>When disposing of batteries, separate them from other wastes according to the local regulations.</li> <li>(For details of the battery directive in EU member states, refer GOT User's Manual.)</li> </ul>	

TOUCH PANEL PRECAUTIONS	 <b>CAUTION</b>
<ul style="list-style-type: none"> <li>For the analog-resistive film type touch panels, normally the adjustment is not required.</li> <li>However, the difference between a touched position and the object position may occur as the period of use elapses.</li> <li>When any difference between a touched position and the object position occurs, execute the touch panel calibration.</li> <li>When any difference between a touched position and the object position occurs, other object may be activated.</li> <li>This may cause an unexpected operation due to incorrect output or malfunction.</li> </ul>	

TRANSPORTATION PRECAUTIONS	 <b>CAUTION</b>
<ul style="list-style-type: none"> <li>When transporting lithium batteries, make sure to treat them based on the transport regulations.</li> <li>(Refer to User's Manual for details of the regurated models.)</li> <li>Before transporting the GOT, turn the GOT power on and check that the battery voltage status is normal on the Time setting &amp; display screen (utilities screen). In addition, confirm that the adequate battery life remains on the rating plate.</li> <li>Transporting the GOT with the low battery voltage or the battery the reached battery life may destabilize the backup data unstable during transportation.</li> <li>Make sure to transport the GOT main unit and/or relevant unit(s) in the manner they will not be exposed to the impact exceeding the impact resistance described in the general specifications of this manual, as they are precision devices. Failure to do so may cause the unit to fail.</li> <li>Check if the unit operates correctly after transportation.</li> </ul>	

### Certification of UL, cUL standards

UL, cUL Standards are recognized in use by the following combination.

<a>  

- GT14HANDY (GT1455HS-QTBDE series, GT1450HS-QMBDE series)\*1
- GT16H-CNB-42S\*2
- External cable (GT14H-C30-42P, GT14H-C60-42P, GT14H-C100-42P)\*3

<b>

- GT14HANDY (GT1455HS-QTBDE series, GT1450HS-QMBDE series)\*1
- GT16H-CNB-37S
- External cable (GT11H-C30-37P, GT11H-C60-37P, GT11H-C100-37P)\*4

Cable must be properly installed and routed to ensure protection of the Cable.

\*1 Hardware version B or later  
\*2 Hardware version D or later  
\*3 Version B or later  
\*4 Version D or later

### General notes on power supply

This equipment must be supplied by a UL Listed or Recognized 24 V dc rated power supply and UL Listed or Recognized fuse rated not higher than 4A, or a UL Listed Class 2 power supply.

### Compliance with EC directive (CE Marking)

This note does not guarantee that an entire mechanical module produced in accordance with the contents of this note will comply with the following standards. Compliance to EMC directive for the entire mechanical module should be checked by the user/manufacturer. For more details please contact the local Mitsubishi Electric sales site.

### Attention

- This product is designed for use in industrial applications.
- Authorized Representative in the European Community: Mitsubishi Electric Europe B.V. Gothaer Str. 8, 40880 Ratingen, Germany

### Requirement for Compliance with EMC directive

The following products have shown compliance through direct testing (to the identified standards) and design analysis (forming a technical construction file) to the European Directive for Electromagnetic Compatibility (2004/108/EC) when used as directed by the appropriate documentation.

Type: Programmable Controller (Open Type Equipment)

Standard		Remark
EN61131-2 : 2007 Programmable controllers-Equipment, requirement and tests	EMI	Compliance with all relevant aspects of the standard. (Radiated Emissions)
	EMS	Compliance with all relevant aspects of the standard. (ESD, RF electromagnetic field, EFTB, Surge, RF conducted disturbances and Power frequency magnetic field)

For more details please contact the local Mitsubishi Electric sales site.

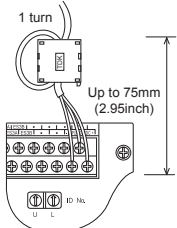
### Notes for compliance to EMC regulation

- General notes on the control panel
  - Make sure to combine the GT14 Handy GOT with the Connector Conversion Box to comply with the EMC directive. The Connector Conversion Box is an open type device (device installed to another device) and must be installed in a conductive control panel.
- General notes on the use of communication cables
  - External cable
    - GT14H-C30-42P, GT14H-C60-42P, GT14H-C100-42P
    - GT11H-C30-37P, GT11H-C60-37P, GT11H-C100-37P (Ver.C or later)

- Direct connection cable
- | Existing Cables                 | User Made Cables   |
|---------------------------------|--|
| GT01-C30R4-8P<br>GT11H-C30R2-6P | The cable need to be independently tested by the user to demonstrate EMC compatibility when they are used with the GOT, the PLC of MELSEC-Q series, MELSEC-L series, MELSEC-QnA, MELSEC-A series and MELSEC-FX series. |
- Ethernet connection cable  
Shielded twisted pair cable (STP)
- PLC (manufactured by other company), microcomputer, temperature controller, inverter, servo amplifier, CNC, MODBUS(R)/RTU or MODBUS(R)/TCP connection  
Produce the cable (RS-232 cable, RS-422 cable) for connecting the GOT to a controller with reference to the following manual.  
→ **GOT1000 Series Connection Manual for GT Works3 and a controller used**

3) General notes on Power supply

The Connector Conversion Box requires an additional ferrite filter to be attached to the 24V DC power supply cables. The filter should be attached in a similar manner as shown in the figure opposite, i.e. the power cables are wrapped around the filter. However, as with all EMC situations the more correctly applied precautions the better the systems Electro-magnetic Compatibility. The ferrite recommended is a TDK ZCAT3035-1330 or similar. The ferrite should be placed as near to the 24V DC terminals of the Connector Conversion Box as possible (which should be within 75mm of the GOT terminal).



Associated Manuals

The following manuals are relevant to this product. When these loose manuals are required, please consult with our local distributor.

Manual name	Contents	Manual Number (Model Code)
GT Designer3 Version1 Screen Design Manual (For GOT1000 Series) (Fundamentals) <sup>*1</sup> (sold separately)	Describes methods of the GT Designer3 installation operation, basic operation for drawing and transmitting data to GOT1000 series	SH-080866ENG (1D7MB9)
GT Designer3 Version1 Screen Design Manual (For GOT1000 Series) (Functions) 1/2, 2/2 (sold separately) <sup>*1</sup>	Describes specifications and settings of the object functions used in GT Designer3	SH-080867ENG (1D7MC1)
GT14 Handy GOT User's Manual (Hardware/Utility, Connection) 1/2, 2/2 (sold separately)	Describes the Handy GOT hardware-relevant content such as part names, external dimensions, mounting, power supply wiring, specifications, and introduction to option devices	JY997D50201 JY997D50202 (09R825)

<sup>\*1</sup> The manual in PDF-format is included in the GT Works3/GT Designer3 products.

For details of a PLC to be connected, refer to the PLC user's manual respectively.

Bundled Items

Product Name	Model Name	Specifications
GOT	GT1455HS-QTBDE	[320 × 240 dots], TFT color (65536 colors), built-in battery
	GT1450HS-QMBDE	[320 × 240 dots], TFT monochrome, built-in battery

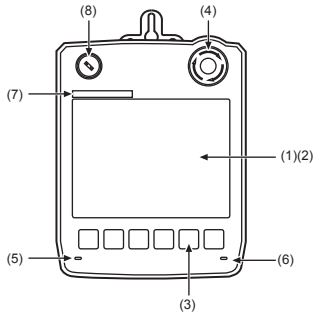
Bundled item	Quantity
Selector switch keys	2
GT14 Handy GOT General Description (This manual)	1

1. Features

- 1) Improved monitoring performance and connectivity to FA devices
- Multiple languages are displayed using the Unicode2.1-compatible fonts and beautiful characters are drawn using the TrueType and high quality fonts.
  - Two types of display modes are provided: 65536-color display and monochrome display.
  - A fine and beautiful full-color display which shows even small characters clearly, is enabled in the 65536-color display by adopting the high intensity, wide viewing angle and high definition TFT color liquid crystal display. (Also compatible with digital screen displays with 65536 colors, BMP, etc.)
  - In the monochrome display, 16 scales are used to improve the display.
  - High speed monitoring through high speed communication at maximum of 115.2kbps.
  - High speed display and high speed touch switch response.
  - The operation performance is improved by the analog touch panel.
- 2) More efficient GOT operations including screen design, startup, adjustment, management and maintenance works
- The 9MB built-in flash memory is included as standard.
  - SD card interface is included as standard.
  - RS-232 interface is included as standard.
  - RS-422 interface is included as standard.
  - USB interface (host/device) is included as standard.
  - Ethernet interface is included as standard.
  - System font types are increased by the adoption of the font installation system.
  - Four types of alarms (system alarm, user alarm, alarm history and alarm popup display) are integrated, and realizing an efficient alarm notification.
- 3) Enhanced support of FA device setup tools
- Transferring or monitoring the sequence programs using the personal computer connected to GOT is available, during direct connection to A, QnA, L, Q, or FX series PLC CPU (FA Transparent function).

2. Part Name

2.1 Front Panel

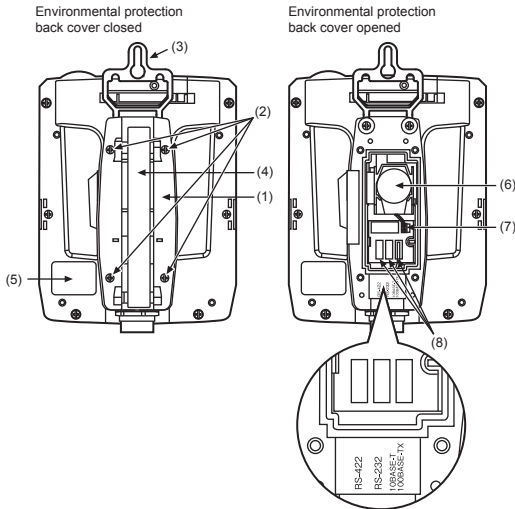


No	Name	Specifications
(1)	Display section	Displays the utility screen and the user creation screen.
(2)	Touch panel	For touch switch operation on the utility screen and the user creation screen.
(3)	Operation switch (6 switches)	Switch for external direct wiring (independent contact)
(4)	Emergency stop switch	Switch for external direct wiring (independent contact)
(5)	POWER LED	Lit in green: Power is correctly supplied. Lit in orange: Screen saving and backlight not lit. Blinks in orange/green: Blown back light bulb. Not lit: Power is not supplied.
(6)	Display LED for grip switch	Display LED for grip switch (green) (lighting control from display section)
(7)	Logo label	Removable
(8)	Keylock switch (2-position switch)	Switch for external direct wiring (independent contact)

For the PC connection, refer to the following.

→ **GT14 Handy GOT User's Manual**

2.2 Back Panel



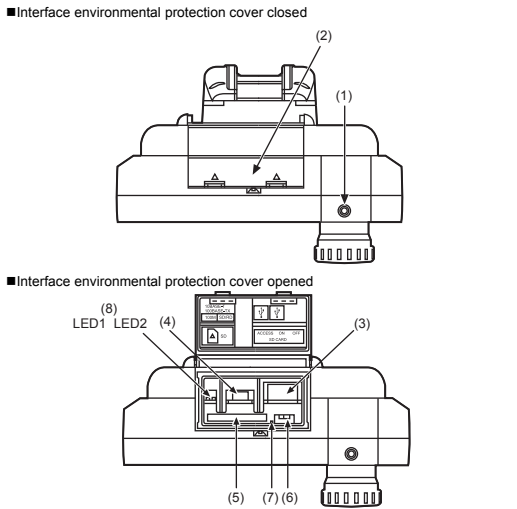
No	Name	Specifications
(1)	Environmental protection back cover	Opened and closed when the PLC communication type is changed (Ethernet ↔ RS-422 ↔ RS-232, before shipping: Ethernet), or the battery is replaced.
(2)	Environmental protection back cover screw	For opening and closing the environmental protection back cover (drop prevention screw)
(3)	Hook for hanging on walls	Hook when the Handy GOT is used hanging on walls.
(4)	Hand strap	Used to hold the Handy GOT in hand by putting a hand under the strap. Length adjustable.
(5)	Rating plate	The following contents are described. The model name, current consumption, product number, H/W version, F/W version, and MAC address, and "G" (G indicates the ROHS correspondence.)
(6)	Battery	For clock data, alarm history, recipe data, time action setting value, advanced alarm, advanced recipe, logging, hard copy, and SRAM user area backups
(7)	Connector for battery connection	For battery connection
(8)	RS-422 connector RS-232 connector Ethernet connector	Connector for PLC communication using RS-422 <sup>*1</sup> Connector for PLC communication using RS-232 <sup>*1</sup> Connector for PLC communication using Ethernet <sup>*1</sup>

<sup>\*1</sup> Set either of the RS-422 connector, RS-232 connector, or Ethernet connector. The Ethernet connector is set at factory shipment.

For the connection to the controller, microcomputer board or PC, refer to the following.

→ **GT14 Handy GOT User's Manual**

2.3 Top Face (Interface)



No	Name	Specifications
(1)	Emergency stop switch guard cover installing hole	Threaded hole for mounting the GT14H-50ESCOV type emergency stop switch guard (option) (M3)
(2)	Interface environmental protection cover	Opened and closed when the USB port is used or the SD card is inserted.
(3)	USB interface (Host)	For data transfer, data storage (connector type: TYPE-A)
(4)	USB interface (Device)	For PC connection (connector type: MINI-B)
(5)	SD card interface	For installing the SD card to the GOT
(6)	SD card access switch	Prohibits accessing the SD card removing the card from the Handy GOT. ON: SD card being accessed (SD card removal prohibited) OFF: SD card not accessed (SD card removal possible)
(7)	SD card access LED	Lit: SD card being accessed, Not lit: SD card is not accessed.
(8)	Ethernet communication status LED	LED1: Turns on in green during 100Mbps transmission. LED2: Turns on in green during data communication.

3. Specifications

3.1 General Specifications

Item	Specifications					
Operating ambient temperature	0 to 40°C					
Storage ambient temperature	-20 to 60°C					
Operating ambient humidity	10 to 90% RH, non-condensing					
Storage ambient humidity	10 to 90% RH, non-condensing					
Vibration resistance	Conforms to JIS B3502 and IEC61131-2		Frequency	Acceleration	Half-amplitude	Sweep Count
		Under intermittent vibration	5 to 8.4Hz	--	3.5mm	10 times each in X, Y and Z directions
			8.4 to 150Hz	9.8m/s²	--	
		Under continuous vibration	5 to 8.4Hz	--	1.75mm	
			8.4 to 150Hz	4.9m/s²	--	
Shock resistance	Conforms to JIS B3502, IEC 61131-2 (147 m/s², 3 times each in X, Y and Z directions)					
Operating atmosphere	Must be free of lamp black, corrosive gas, flammable gas, or excessive amount of electroconductive dust particles and must be no direct sunlight. (Same as for saving)					
Operating altitude* <sup>1</sup>	2000 m (6562 ft) max.					
Overvoltage category <sup>2</sup>	II or less					
Pollution degree* <sup>3</sup>	2 or less					
Cooling method	Self-cooling					

- <sup>\*1</sup> Do not use or store the GOT under pressure higher than the atmospheric pressure of altitude 0m (0ft.). Failure to observe this instruction may cause a malfunction. When the air inside the control panel is purged by pressurization, the surface sheet may be lifted by high pressure. As a result, the touch panel may be difficult to press, and the sheet may be peeled off.
- <sup>\*2</sup> This indicates the section of the power supply to which the equipment is assumed to be connected between the public electrical power distribution network and the machinery within the premises. Category II applies to equipment for which electrical power is supplied from fixed facilities. The surge voltage withstand level for up to the rated voltage of 300 V is 2500 V.
- <sup>\*3</sup> 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.

3.2 Performance Specifications

Item		Specifications	
		GT1455HS-QTBDE	GT1450HS-QMBDE
Display section <sup>*1</sup>	Type	TFT color liquid crystal display	
	Screen size	5.7"	
	Resolution	320 × 240 dots	
	Display size	115 (W) × 86 (H) [mm]	
	Display character	16-dot standard font: 20 characters × 15 lines, 12-dot standard font: 26 characters × 20 lines	
	Display color	65536 colors	Monochrome (black/white), 16 scales
	Display angle <sup>*2</sup>	Left/Right: 80 degrees, Top: 80 degrees, Bottom:60 degrees	Left/Right: 80 degrees, Top: 80 degrees, Bottom: 60 degrees
	Intensity of LCD only	400 [cd/m²]	230 [cd/m²]
	Intensity adjustment	8-level adjustment	
Backlight	Life	Approx. 50,000h. (Time for contrast to become 1/5 at operating ambient temperature of 25°C)	
		LED type Backlight off/screen saving time can be set. <sup>*3</sup>	
Touch panel <sup>*4</sup>	Life	Approx. 70,000h or longer. (Time for display intensity reaches 50% at operating ambient temperature of 25°C)	
	Type	Analog resistive film	
	Key size	Minimum 2 × 2 dots (per key)	
	Number of points touched simultaneously	Simultaneous presses not allowed. (Only 1 point can be touched.)	
Switch	Life	1 million times or more (operating force 0.98N max.)	
	Operation switch	6 switches (6 contacts/common), N/O contact, Maximum rating 10mA/24VDC, Life: 1,000,000 times	
	Grip switch	1 switch (single wiring) (IDEC HE3B-M2PB)	
		Enable switch (deadman switch) 3-position system of OFF ⇄ ON ⇄ OFF 2 N/O contacts Maximum rating 1A/24VDC (resistance load), Maximum rating 0.3A/24VDC (induction load), Life: 100,000 times	
	Emergency stop switch	1 switch (single wiring) (IDEC XA1E-BV303R) 3 N/C contacts Maximum rating 1A/24VDC (resistance load), Maximum rating 0.3A/24VDC (induction load), Life: 100,000 times	
	Keylock switch (2-position switch)	1 switch (single wiring) (IDEC AS6M-2KT1PB) 2-notch type (Manual stop at each position/A key can be inserted and removed on only the left side./On the right side, a key cannot be removed./Two keys are provided.) 2-position, Maximum rating 1A/24VDC (resistance load), Maximum rating 0.3A/24VDC (induction load), Life: 100,000 times	
	SD card access switch	Prohibits accessing the SD card removing the card from the GOT. ON: SD card being accessed (SD card removal prohibited) OFF: SD card not accessed (SD card removal possible)	

Item		Specifications	
		GT1455HS-QTBDE	GT1450HS-QMBDE
LED	POWER LED	1 LED Lit in green: Power is correctly supplied. Lit in orange: Screen saving and backlight not lit. Blinks in orange/green: Blown back light bulb. Not lit: Power is not supplied.	
		LED for grip switch display	
	SD card access LED	Lit (Green): SD card being accessed, Not lit: SD card is not accessed.	
	Ethernet communication status LED	LED1: Turns on in green during 100Mbps transmission. LED2: Turns on in green during data communication.	
Memory	C drive <sup>*5</sup>	Flash memory (Internal), 9Mbytes (for storing project data) Life (Number of write times): 100,000 times	
	D drive	SRAM (internal), 512Kbytes (battery backup)	
		GT11-50BAT lithium battery	
Battery	Backup target	Clock data, alarm history, recipe data, time action setting value, advanced alarm, advanced recipe, logging, hard copy and SRAM user area	
	Life	Approx. 5 years (Operating ambient temperature of 25°C)	
Built-in interface	RS-422 RS-232	RS-232, RS-422, 1ch each (When you use, select any of channels including Ethernet. Ethernet is set at factory shipment.) Transmission speed : 115200/57600/38400/19200/9600/4800bps Connector shape : Round type 32pins (Male) Application : For communicating with a controller Terminating resistor : 330Ω (Fixed)	
	Ethernet		Data transfer method: 100BASE-TX, 10BASE-T 1ch Connector shape : Round type 32pins (Male) Application : For communicating with a controller, or using the gateway function, connecting a PC (project data upload/download, OS installation, FA transparent function)
	USB	Host	USB (Full Speed 12Mbps) Host 1ch Connector shape : TYPE-A Application : Data transfer, data storage
		Device	USB (Full Speed 12Mbps) Device 1ch Connector shape : Mini-B Application : For connecting a personal computer (Project data upload/download, OS installation, FA transparent function <sup>*7</sup> )
	SD card		SD standard, 1ch Supported memory card: SDHC memory card, SD memory card Application : For uploading/downloading project data, OS installation, storing logging data
	Buzzer output		Single tone (tone length adjustable)
Protective structure <sup>*6</sup>		IP65f (valid when the external cable is connected, except for the connector conversion box side)	
Weight		Approx. 0.79kg (GT14 Handy main unit only)	
Compatible software package (GT Designer3 version)		Version1.71Z or later	

<sup>\*1</sup> Bright dots (always lit) and dark dots (unlit) may appear on a liquid crystal display panel. It is impossible to completely avoid this symptom, as the liquid crystal display comprises of a great number of display elements. Flickers may be observed depending on the display color. Please note that these dots appear due to its characteristic and are not caused by product defect. Flickers and partial discoloration may be generated on the liquid crystal display panel due to the display contents or the contrast adjustment. However, please note that these phenomena appear due to its characteristic and are not caused by product defect. There is a difference in the display brightness and the color tones between liquid crystal display panels. When using multiple liquid crystal display panels, please note that there is an individual difference between them. A crosstalk (shadow as an extension of the display) may appear on the liquid crystal display panel. Please note that it appears due to its characteristic. When the display section is seen from the outside of the display angle, the display color seems like it has changed. Please note that it is due to its characteristic. Please note that the response time, brightness and color of the liquid crystal display panel may vary depending on the usage environmental temperature. (Especially, the response time of liquid crystal display is slower in the lower temperature due to its characteristic. Please use the display after checking the response time.) When the same screen is displayed for a long time, an incidental color or partial discoloration is generated on the screen due to heat damage, and it may not disappear. To prevent heat damage, the screen saver function is effective. For details on the screen saver function, refer to the following.

→ GT14 Handy GOT User's Manual

<sup>\*2</sup> Gradation inversion is a characteristic of liquid crystal displays. Please be forewarned that depending on the displayed color, the visualization may be difficult even within the described view angle.

<sup>\*3</sup> The GOT screen saving/backlight off function prevents images from becoming permanently etched on the display screen and increases the backlight life. → GT14 Handy GOT User's Manual

<sup>\*4</sup> The touch panel is analog resistive film-type. If you touch the panel simultaneously in 2 points or more, the switch that is located around the center of the touched point, if any, may operate. Do not touch the panel in 2 points or more simultaneously. Do not press the GOT display section with a pointed material as a pen or driver. Doing so can result in a damage or failure of the display section. An analog resistive film-type touch panel does not require adjustment usually. However, misalignment between object position and actual touched position may be caused as usage time passes. If misalignment between object position and actual touched position may occur, adjust the touch panel position. Misalignment between object position and actual touched position may operate an unintended object, which causes unintended operation by mis-output and mis-operation.

<sup>\*5</sup> ROM in which new data can be written without deleting the written data.

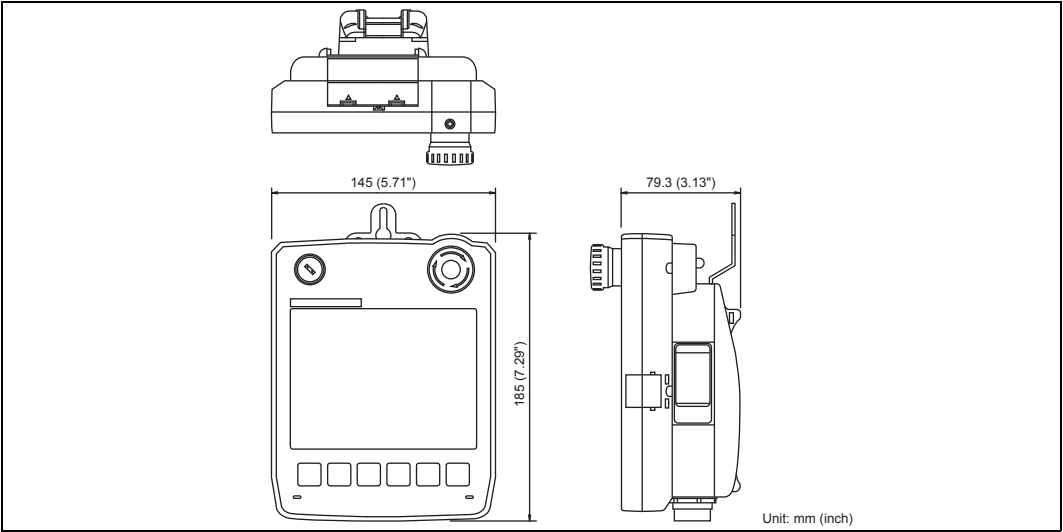
<sup>\*6</sup> Note that this does not guarantee all user's operation environment. The protection is not applied when the interface environment protection cover is removed. In addition, the product may not be used in environments under exposition of oil or chemicals for a long period of time, or in environments filled with oil-mist.

<sup>\*7</sup> The USB cable that connects the GOT and a personal computer is connected to the USB interface (device) in the interface environmental protection cover of the GOT. Since the Handy GOT is used with the interface environment protection cover opened, it is out of the warranty for protective structure (IP65F).

3.3 Power Supply Specifications

Item	Specifications	
	GT1665HS-VTBD	
Input power supply voltage	24V DC (+10% -15%)	
Power consumption	8.4W or less (350mA/DC24V)	7.5W or less (310mA/DC24V)
	At backlight off	7.0W or less (290mA/DC24V)
Inrush current	30A or less (maximum load) 2ms	
Permissible instantaneous power failure time*1	Within 5ms	
Noise immunity	Noise voltage: 1000Vp-p, Noise width: 1μs (by noise simulator of 30 to 100Hz noise frequency)	
Dielectric withstand voltage	500V DC for 1 minute (across power supply terminals and earth)	
Insulation resistance	10MΩ or larger by insulation resistance tester (across power supply terminals and earth)	

3.4 External Dimensions



4. Maintenance and Inspection

The GOT does not include consumable components that will cause the shorten life. However, the battery, liquid crystal display screen and backlight have each life length.

It is recommended to replace the battery periodically. (For the replacement of the liquid crystal screen, please consult your nearest sales office or FA Center.)

4.1 Daily Inspection

Daily inspection items

No.	Inspection Item		Inspection Method	Criterion	Action
1	Installation status of GOT		Check for loose mounting screws.	Securely mounted	Retighten screws within the specified torque range.
2	Connection status	Loose terminal screws	Retighten screws with screwdriver.	Not loose	Retighten terminal screws.
		Proximate solderless terminals	Visual check	Proper intervals	Correct.
		Loose connectors	Visual check	Not loose	Retighten connector fixing screws.
3	Usage status	Dirt on protection sheet	Visual check	Not outstanding	Replace with new one
		Foreign material attachment	Visual check	No foreign matter sticking	Remove clean

Refer to the following for the model names of the protection sheet or the replacement procedure.

→ GT14 Handy GOT User's Manual

4.2 Periodic Inspection

Yearly or half-yearly inspection items

The following inspection should also be performed when equipment has been moved or modified or the wiring changed.

No.	Inspection Item		Inspection Method	Criterion	Action
1	Surrounding environment	Ambient temperature	Make measurement with thermometer or hygrometer	0 to 40°C	For use in control panel, temperature inside control panel is ambient temperature
		Ambient humidity	Measure corrosive gas	10 to 90%RH	
		Atmosphere		No corrosive gas	
2	Power supply voltage check		24V DC Measure voltage across terminals.	20.4 to 26.4V DC	Change supply power
3	Mounting status	Looseness	Move module.	Should be mounted firmly.	Retighten screws.
		Foreign material attachment	Visual check	No foreign matter sticking	Remove, clean
4	Connection status	Loose terminal screws	Retighten screws with screwdriver.	Not loose	Retighten terminal screws.
		Proximate solderless terminals	Visual check	Proper intervals	Correct.
		Loose connectors	Visual check	Not loose	Retighten connector fixing screws.
5	Battery		Check GOT internal battery voltage status in [Time Setting & Display] of the Utility.	No alarm displayed	Replace with new battery when the current battery has reached the specified life span, even if battery voltage is not displayed.

4.3 Battery Replacement

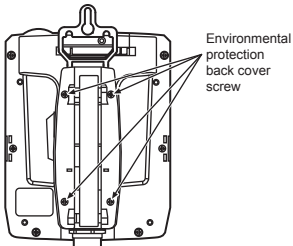
The battery backs up clock data and data stored in the built-in RAM (D drive) including alarm history, recipe data, time action setting value, advanced alarm, advanced recipe, logging, hard copy, and SRAM user area.

- Battery model name  
Handy GOT is shipped with the following battery.  
Use it at replacement.

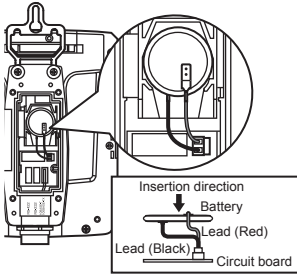
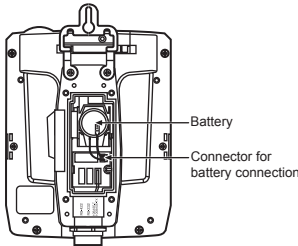
Product name	Model name
Battery	GT11-50BAT

- Battery replacement procedure

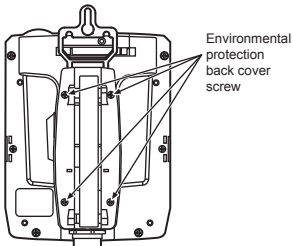
- After keeping the GOT turned ON more than 10 minutes, turn OFF the GOT.
- Loosen the environmental protection back cover screws at four points on GOT rear face to remove the cover.



- Remove the old battery from the holder and disconnect the connector.
- Disconnect the old battery connector and insert the new battery connector within 30s.
- Install the battery to the GOT.



- Attach the environmental protection back cover and tighten the screws.  
Tightening torque: 0.36 to 0.48 N·m
- Turn the GOT power on.
- Check if the battery condition is normal with the utility.  
Refer to the following for the details of battery status display.  
→ GT14 Handy GOT User's Manual



- Battery life  
Approximate battery life:  
5 years (ambient temperature: 25°C)  
Battery replacement: In 4 to 5 years

The battery is susceptible to natural discharge. Order one when necessary.

Battery status can be confirmed on a GOT utility screen.  
For details of battery status or how to output alarm, refer to the following:  
→ GT14 Handy GOT User's Manual

5. Precautions

5.1 Cautions on Using Emergency Stop Switch

- When using the emergency stop switch in the handy GOT, judge the validity to use the emergency stop switch in accordance with the risk assessment in your system.
- When using the parallel circuit (which disables the emergency stop status while the handy GOT is removed), the system may not conform to the safety standards. Check the safety standards required in the system, and then judge the validity to use the emergency stop switch.
- If a shock which exceeds the general specifications of the Handy GOT is applied, a chattering may occurs in the emergency stop switch due to the structure of the switch. Check your usage condition and decide whether to use or not.

This manual confers no industrial property rights or any rights of any other kind, nor does it confer any patent licenses. Mitsubishi Electric Corporation cannot be held responsible for any problems involving industrial property rights which may occur as a result of using the contents noted in this manual.

Warranty

Mitsubishi will not be held liable for damage caused by factors found not to be the cause of Mitsubishi; opportunity loss or lost profits caused by faults in the Mitsubishi products; damage, secondary damage, accident compensation caused by special factors unpredictable by Mitsubishi; damages to products other than Mitsubishi products; and to other duties.

⚠ For safe use

- This product has been manufactured as a general-purpose part for general industries, and has not been designed or manufactured to be incorporated in a device or system used in purposes related to human life.
- Before using the product for special purposes such as nuclear power, electric power, aerospace, medicine or passenger movement vehicles, consult with Mitsubishi Electric.
- This product has been manufactured under strict quality control. However when installing the product where major accidents or losses could occur if the product fails, install appropriate backup or failsafe functions in the system.

MITSUBISHI ELECTRIC CORPORATION

HEAD OFFICE : TOKYO BUILDING, 2-7-3 MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN





## GT1455HS-QTBDE, GT1450HS-QMBDE

## GT14 Handy GOT General Description

GRAPHIC OPERATION TERMINAL	Manual Number	JY997D52501B
<b>GOT1000</b>	Date	April 2015

This manual describes the part names, dimensions, mounting, and specifications of the product. Before use, read this manual and manuals of relevant products fully to acquire proficiency in handling and operating the product. Make sure to learn all the product information, safety information, and precautions. And, store this manual in a safe place so that you can take it out and read it whenever necessary. Always forward it to the end user.

Registration  
Ethernet is a trademark of Xerox Corporation in the United States. MODBUS is a trademark of Schneider Electric SA. Unicode is a trademark or registered trademark of Unicode, Inc. in the United States and other countries. The company name and the product name to be described in this manual are the registered trademarks or trademarks of each company.

Effective April 2015  
Specifications are subject to change without notice.  
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### Safety Precaution (Read these precautions before using.)

Before using this product, please read this manual and the relevant manuals introduced in this manual carefully and pay full attention to safety to handle the product correctly.  
The precautions given in this manual are concerned with this product.  
In this manual, the safety precautions are ranked as "WARNING" and "CAUTION".

<b>WARNING</b>	Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.
<b>CAUTION</b>	Indicates that incorrect handling may cause hazardous conditions, resulting in medium or slight personal injury or physical damage.

Depending on circumstances, procedures indicated by "CAUTION" may also be linked to serious results.  
In any case, it is important to follow the directions for usage.

DESIGN PRECAUTIONS	WARNING
<ul style="list-style-type: none"> <li>Some failures of the GOT or cable may keep the outputs on or off. An external monitoring circuit should be provided to check for output signals which may lead to a serious accident.</li> <li>Not doing so can cause an accident due to false output or malfunction.</li> <li>If a communication fault (including cable disconnection) occurs during monitoring on the GOT, communication between the GOT and PLC CPU is suspended and the GOT becomes inoperative. A system where the GOT is used should be configured to perform any significant operation to the system by using the switches of a device other than the GOT on the assumption that a GOT communication fault will occur.</li> <li>Not doing so can cause an accident due to false output or malfunction.</li> <li>Do not use the GOT as the warning device that may cause a serious accident. An independent and redundant hardware or mechanical interlock is required to configure the device that displays and outputs serious warning. Failure to observe this instruction may result in an accident due to incorrect output or malfunction.</li> <li>Incorrect operation of the touch switch(s) may lead to a serious accident if the GOT backlight is gone out. When the GOT backlight goes out, the POWER LED flickers (green/orange) and the display section turns black and causes the monitor screen to appear blank, while the input of the touch switch(s) remains active. This may confuse an operator in thinking that the GOT is in "screensaver" mode, who then tries to release the GOT from this mode by touching the display section, which may cause a touch switch to operate. Note that the following occurs on the GOT when the backlight goes out. <ul style="list-style-type: none"> <li>The POWER LED flickers (green/orange) and the monitor screen appears blank</li> </ul> </li> <li>The display section is an analog-resistive type touch panel. If you touch the display section simultaneously in 2 points or more, the switch that is located around the center of the touched point, if any, may operate. Do not touch the display section in 2 points or more simultaneously. Doing so may cause an accident due to incorrect output or malfunction.</li> </ul>	

DESIGN PRECAUTIONS	WARNING
<ul style="list-style-type: none"> <li>When programs or parameters of the controller (such as a PLC) that is monitored by the GOT are changed, be sure to reset the GOT or shut off the power of the GOT at the same time. Not doing so can cause an accident due to false output or malfunction.</li> </ul>	

DESIGN PRECAUTIONS	CAUTION
<ul style="list-style-type: none"> <li>Do not bundle the control and communication cables with main-circuit, power or other wiring. Run the above cables separately from such wiring and keep them a minimum of 100mm (3.94in.) apart.Not doing so noise can cause a malfunction.</li> <li>Do not press the GOT display section with a pointed material as a pen or driver. Doing so can result in a damage or failure of the display section.</li> <li>When the GOT is connected to the Ethernet network, the available IP address is restricted according to the system configuration. <ul style="list-style-type: none"> <li>When multiple GOTs are connected to the Ethernet network: Do not set the IP address (192.168.0.18) for the GOTs and the controllers in the network.</li> <li>When a single GOT is connected to the Ethernet network: Do not set the IP address (192.168.0.18) for the controllers except the GOT in the network.</li> </ul> </li> <li>Doing so can cause the IP address duplication. The duplication can negatively affect the communication of the device with the IP address (192.168.0.18). The operation at the IP address duplication depends on the devices and the system.</li> </ul>	

MOUNTING PRECAUTIONS	WARNING
<ul style="list-style-type: none"> <li>Be sure to shut off all phases of the external power supply used by the system before mounting or removing the GOT to/from the panel.</li> <li>Not doing so can cause the unit to fail or malfunction.</li> <li>Always turn off the power ON/OFF switch on the connector conversion box (GT16H-CNB-42S) before connecting or disconnecting the GOT to it. Connecting or disconnecting the GOT with the power being turned on may result in damage to the unit or malfunctions.</li> </ul>	

MOUNTING PRECAUTIONS	CAUTION
<ul style="list-style-type: none"> <li>Use the GOT in the environment that satisfies the general specifications described in this manual. Not doing so can cause an electric shock, fire, malfunction or product damage or deterioration.</li> <li>Never drop cutting chips and electric wire chips into the ventilation window of the Handy GOT when you drill screw holes or perform wiring. Otherwise, fire, failure or malfunction may be caused.</li> <li>Connect connection cables securely to the specified connectors while the power is turned OFF. Imperfect connection may cause malfunction or failure.</li> <li>When inserting/removing a SD card into/from the GOT, turn the SD card access switch off in advance. Failure to do so may corrupt data within the SD card.</li> <li>When removing a SD card from the GOT, make sure to support the SD card by hand, as it may pop out. Failure to do so may cause the SD card to drop from the GOT and break.</li> <li>When installing a USB memory to the GOT, make sure to install the USB memory to the USB interface firmly. Failure to do so may cause a malfunction due to poor contact.</li> <li>Before removing the USB memory from the GOT, operate the utility screen for removal. After the successful completion dialog box is displayed, remove the memory by hand carefully. Failure to do so may cause the USB memory to drop, resulting in a damage or failure of the memory.</li> <li>Operate and store the GOT in environments without direct sunlight, high temperature, dust, humidity, and vibrations.</li> </ul>	

WIRING PRECAUTIONS	WARNING
<ul style="list-style-type: none"> <li>Make sure to attach the back cover to the Handy GOT before turning on the power and starting operation after the installation or wiring work. Otherwise, electrical shock may be caused.</li> <li>Be sure to shut off all phases of the external power supply used by the system before wiring. Failure to do so may result in an electric shock, product damage or malfunctions.</li> <li>Please make sure to ground FG terminal of the GOT power supply section by applying 100 or less which is used exclusively for the GOT. Not doing so may cause an electric shock or malfunction.</li> <li>Correctly wire the GOT power supply section after confirming the rated voltage and terminal arrangement of the product. Not doing so can cause a fire or failure.</li> <li>Exercise care to avoid foreign matter such as chips and wire offcuts entering the GOT. Not doing so can cause a fire, failure or malfunction.</li> </ul>	

WIRING PRECAUTIONS	CAUTION
<ul style="list-style-type: none"> <li>The cables connected to the unit must be run in ducts or clamped. Not doing so can cause the unit or cable to be damaged due to the dangling, motion or accidental pulling of the cables or can cause a malfunction due to a cable connection fault.</li> <li>When unplugging the cable connected to the unit, do not hold and pull the cable portion. Doing so can cause the unit or cable to be damaged or can cause a malfunction due to a cable connection fault.</li> <li>Plug the communication cable into the connector of the connected unit and tighten the mounting and terminal screws in the specified torque range. Undertightening can cause a short circuit or malfunction. Overtightening can cause a short circuit or malfunction due to the damage of the screws or unit.</li> </ul>	

TEST OPERATION PRECAUTIONS	WARNING
<ul style="list-style-type: none"> <li>Before performing the test operations of the user creation monitor screen (such as turning ON or OFF bit device, changing the word device current value, changing the settings or current values of the timer or counter, and changing the buffer memory current value), read through the manual carefully and make yourself familiar with the operation method. During test operation, never change the data of the devices which are used to perform significant operation for the system. False output or malfunction can cause an accident.</li> </ul>	

STARTUP/MAINTENANCE PRECAUTIONS	WARNING
<ul style="list-style-type: none"> <li>When power is on, do not touch the terminals. Doing so can cause an electric shock or malfunction.</li> <li>Connect the battery correctly. Do not discharge, disassemble, heat, short, solder or throw the battery into the fire. Incorrect handling may cause the battery to generate heat, burst or take fire, resulting in injuries or fires.</li> <li>Before starting cleaning or terminal screw retightening, always switch off the power externally in all phases. Not switching the power off in all phases can cause a unit failure or malfunction. Undertightening can cause a short circuit or malfunction. Overtightening can cause a short circuit or malfunction due to the damage of the screws or unit.</li> </ul>	

STARTUP/MAINTENANCE PRECAUTIONS	CAUTION
<ul style="list-style-type: none"> <li>Do not disassemble or modify the unit. Doing so can cause a failure, malfunction, injury or fire.</li> <li>Do not touch the conductive and electronic parts of the unit directly. Doing so can cause a unit malfunction or failure.</li> <li>The cables connected to the unit must be run in ducts or clamped. Not doing so can cause the unit or cable to be damaged due to the dangling, motion or accidental pulling of the cables or can cause a malfunction due to a cable connection fault.</li> <li>When unplugging the cable connected to the unit, do not hold and pull the cable portion. Doing so can cause the unit or cable to be damaged or can cause a malfunction due to a cable connection fault.</li> <li>Replace battery with GT11-50BAT by Mitsubishi electric Co. only. Use of another battery may present a risk of fire or explosion.</li> <li>Dispose of used battery promptly. Keep away from children. Do not disassemble and do not dispose of in fire.</li> </ul>	

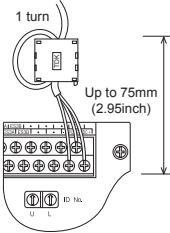
DISPOSAL PRECAUTIONS	CAUTION
<ul style="list-style-type: none"> <li>When disposing of the product, handle it as industrial waste.</li> <li>When disposing of batteries, separate them from other wastes according to the local regulations. (For details of the battery directive in EU member states, refer GOT User's Manual.)</li> </ul>	

TOUCH PANEL PRECAUTIONS	CAUTION
<ul style="list-style-type: none"> <li>For the analog-resistive film type touch panels, normally the adjustment is not required. However, the difference between a touched position and the object position may occur as the period of use elapses. When any difference between a touched position and the object position occurs, execute the touch panel calibration.</li> <li>When any difference between a touched position and the object position occurs, other object may be activated. This may cause an unexpected operation due to incorrect output or malfunction.</li> </ul>	

- Direct connection cable
- | Existing Cables                 | User Made Cables   |
|---------------------------------|--|
| GT01-C30R4-8P<br>GT11H-C30R2-6P | The cable need to be independently tested by the user to demonstrate EMC compatibility when they are used with the GOT, the PLC of MELSEC-Q series, MELSEC-L series, MELSEC-QnA, MELSEC-A series and MELSEC-FX series. |
- Ethernet connection cable  
Shielded twisted pair cable (STP)
  - PLC (manufactured by other company), microcomputer, temperature controller, inverter, servo amplifier, CNC, MODBUS(R)/RTU or MODBUS(R)/TCP connection  
Produce the cable (RS-232 cable, RS-422 cable) for connecting the GOT to a controller with reference to the following manual.  
→ **GOT1000 Series Connection Manual for GT Works3 and a controller used**

#### 3) General notes on Power supply

The Connector Conversion Box requires an additional ferrite filter to be attached to the 24V DC power supply cables. The filter should be attached in a similar manner as shown in the figure opposite, i.e. the power cables are wrapped around the filter. However, as with all EMC situations the more correctly applied precautions the better the systems Electro-magnetic Compatibility. The ferrite recommended is a TDK ZCAT3035-1330 or similar. The ferrite should be placed as near to the 24V DC terminals of the Connector Conversion Box as possible (which should be within 75mm of the GOT terminal).



### Associated Manuals

The following manuals are relevant to this product. When these loose manuals are required, please consult with our local distributor.

Manual name	Contents	Manual Number (Model Code)
GT Designer3 Version1 Screen Design Manual (For GOT1000 Series) (Fundamentals) (sold separately)*1	Describes methods of the GT Designer3 installation operation, basic operation for drawing and transmitting data to GOT1000 series	SH-080866ENG (1D7MB9)
GT Designer3 Version1 Screen Design Manual (For GOT1000 Series) (Functions) 1/2, 2/2 (sold separately)*1	Describes specifications and settings of the object functions used in GT Designer3	SH-080867ENG (1D7MC1)
GT14 Handy GOT User's Manual (Hardware/Utility, Connection) 1/2, 2/2 (sold separately)	Describes the Handy GOT hardware-relevant content such as part names, external dimensions, mounting, power supply wiring, specifications, and introduction to option devices	JY997D50201 JY997D50202 (09R825)

\*1 The manual in PDF-format is included in the GT Works3/GT Designer3 products.

For details of a PLC to be connected, refer to the PLC user's manual respectively.

### Bundled Items

Product Name	Model Name	Specifications
GOT	GT1455HS-QTBDE	[320 × 240 dots], TFT color (65536 colors), built-in battery
	GT1450HS-QMBDE	[320 × 240 dots], TFT monochrome, built-in battery

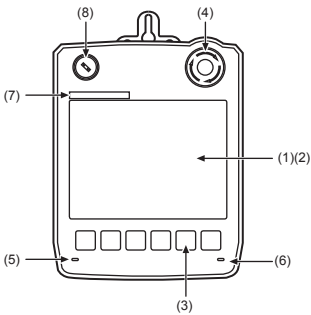
Bundled Item	Quantity
Selector switch keys	2
GT14 Handy GOT General Description (This manual)	1

### 1. Features

- Improved monitoring performance and connectivity to FA devices
  - Multiple languages are displayed using the Unicode2.1-compatible fonts and beautiful characters are drawn using the TrueType and high quality fonts.
  - Two types of display modes are provided: 65536-color display and monochrome display.
  - A fine and beautiful full-color display which shows even small characters clearly, is enabled in the 65536-color display by adopting the high intensity, wide viewing angle and high definition TFT color liquid crystal display. (Also compatible with digital screen displays with 65536 colors, BMP, etc.)
  - In the monochrome display, 16 scales are used to improve the display.
  - High speed monitoring through high speed communication at maximum of 115.2kbps.
  - High speed display and high speed touch switch response.
  - The operation performance is improved by the analog touch panel.
- More efficient GOT operations including screen design, startup, adjustment, management and maintenance works
  - The 9MB built-in flash memory is included as standard.
  - SD card interface is included as standard.
  - RS-232 interface is included as standard.
  - RS-422 interface is included as standard.
  - USB interface (host/device) is included as standard.
  - Ethernet interface is included as standard.
  - System font types are increased by the adoption of the font installation system.
  - Four types of alarms (system alarm, user alarm, alarm history and alarm popup display) are integrated, and realizing an efficient alarm notification.
- Enhanced support of FA device setup tools
  - Transferring or monitoring the sequence programs using the personal computer connected to GOT is available, during direct connection to A, QnA, L, Q, or FX series PLC CPU (FA Transparent function).

### 2. Part Name

#### 2.1 Front Panel

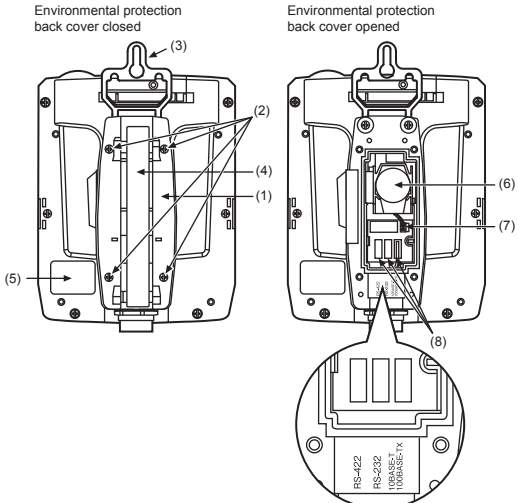


No	Name	Specifications
(1)	Display section	Displays the utility screen and the user creation screen.
(2)	Touch panel	For touch switch operation on the utility screen and the user creation screen.
(3)	Operation switch (6 switches)	Switch for external direct wiring (independent contact)
(4)	Emergency stop switch	Switch for external direct wiring (independent contact)
(5)	POWER LED	Lit in green: Power is correctly supplied. Lit in orange: Screen saving and backlight not lit. Blinks in orange/green: Blown back light bulb. Not lit: Power is not supplied.
(6)	Display LED for grip switch	Display LED for grip switch (green) (lighting control from display section)
(7)	Logo label	Removable
(8)	Keylock switch (2-position switch)	Switch for external direct wiring (independent contact)

For the PC connection, refer to the following.

→ **GT14 Handy GOT User's Manual**

#### 2.2 Back Panel



No	Name	Specifications
(1)	Environmental protection back cover	Opened and closed when the PLC communication type is changed (Ethernet ↔ RS-422 ↔ RS-232, before shipping: Ethernet), or the battery is replaced.
(2)	Environmental protection back cover screw	For opening and closing the environmental protection back cover (drop prevention screw)
(3)	Hook for hanging on walls	Hook when the Handy GOT is used hanging on walls.
(4)	Hand strap	Used to hold the Handy GOT in hand by putting a hand under the strap. Length adjustable.
(5)	Rating plate	The following contents are described. The model name, current consumption, product number, H/W version, F/W version, and MAC address, and "G" (G indicates the ROHS correspondence.)
(6)	Battery	For clock data, alarm history, recipe data, time action setting value, advanced alarm, advanced recipe, logging, hard copy, and SRAM user area backups
(7)	Connector for battery connection	For battery connection
(8)	RS-422 connector	Connector for PLC communication using RS-422*1
	RS-232 connector	Connector for PLC communication using RS-232*1
	Ethernet connector	Connector for PLC communication using Ethernet*1

\*1 Set either of the RS-422 connector, RS-232 connector, or Ethernet connector. The Ethernet connector is set at factory shipment.

For the connection to the controller, microcomputer board or PC, refer to the following.

→ **GT14 Handy GOT User's Manual**

TRANSPORTATION PRECAUTIONS	CAUTION
<ul style="list-style-type: none"> <li>When transporting lithium batteries, make sure to treat them based on the transport regulations. (Refer to User's Manual for details of the regulated models.)</li> <li>Before transporting the GOT, turn the GOT power on and check that the battery voltage status is normal on the Time setting &amp; display screen (utilities screen). In addition, confirm that the adequate battery life remains on the rating plate. Transporting the GOT with the low battery voltage or the battery the reached battery life may destabilize the backup data unstable during transportation.</li> <li>Make sure to transport the GOT main unit and/or relevant unit(s) in the manner they will not be exposed to the impact exceeding the impact resistance described in the general specifications of this manual, as they are precision devices. Failure to do so may cause the unit to fail. Check if the unit operates correctly after transportation.</li> </ul>	

### Certification of UL, cUL standards

UL, cUL Standards are recognized in use by the following combination.

<a>

- GT14HANDY (GT1455HS-QTBDE series, GT1450HS-QMBDE series)\*1
- GT16H-CNB-42S\*2
- External cable (GT14H-C30-42P, GT14H-C60-42P, GT14H-C100-42P)\*3

<b>

- GT14HANDY (GT1455HS-QTBDE series, GT1450HS-QMBDE series)\*1
- GT16H-CNB-37S
- External cable (GT11H-C30-37P, GT11H-C60-37P, GT11H-C100-37P)\*4

Cable must be properly installed and routed to ensure protection of the Cable.

\*1 Hardware version B or later

\*2 Hardware version D or later

\*3 Version B or later

\*4 Version D or later

### General notes on power supply

This equipment must be supplied by a UL Listed or Recognized 24 V dc rated power supply and UL Listed or Recognized fuse rated not higher than 4A, or a UL Listed Class 2 power supply.

### Compliance with EC directive (CE Marking)

This note does not guarantee that an entire mechanical module produced in accordance with the contents of this note will comply with the following standards. Compliance to EMC directive for the entire mechanical module should be checked by the user/manufacturer. For more details please contact the local Mitsubishi Electric sales site.

### Attention

- This product is designed for use in industrial applications.

- Authorized Representative in the European Community: Mitsubishi Electric Europe B.V. Gothaer Str. 8, 40880 Ratingen, Germany

### Requirement for Compliance with EMC directive

The following products have shown compliance through direct testing (to the identified standards) and design analysis (forming a technical construction file) to the European Directive for Electromagnetic Compatibility (2004/108/EC) when used as directed by the appropriate documentation.

Standard	Remark	
EN61131-2 : 2007 Programmable controllers-Equipment, requirement and tests	EMI	Compliance with all relevant aspects of the standard. (Radiated Emissions)
	EMS	Compliance with all relevant aspects of the standard. (ESD, RF electromagnetic field, EFTB, Surge, RF conducted disturbances and Power frequency magnetic field)

For more details please contact the local Mitsubishi Electric sales site.

### Notes for compliance to EMC regulation

#### 1) General notes on the control panel

Make sure to combine the GT14 Handy GOT with the Connector Conversion Box to comply with the EMC directive. The Connector Conversion Box is an open type device (device installed to another device) and must be installed in a conductive control panel.

#### 2) General notes on the use of communication cables

- External cable
  - GT14H-C30-42P, GT14H-C60-42P, GT14H-C100-42P
  - GT11H-C30-37P, GT11H-C60-37P, GT11H-C100-37P (Ver.C or later)

3. Specifications

3.1 General Specifications

Item		Specifications				
Operating ambient temperature		0 to 40°C				
Storage ambient temperature		-20 to 60°C				
Operating ambient humidity		10 to 90% RH, non-condensing				
Storage ambient humidity		10 to 90% RH, non-condensing				
Vibration resistance	Conforms to JIS B3502 and IEC61131-2		Frequency	Acceleration	Half-amplitude	Sweep Count
		Under intermittent vibration	5 to 8.4Hz	--	3.5mm	10 times each in X, Y and Z directions
			8.4 to 150Hz	9.8m/s <sup>2</sup>	--	
		Under continuous vibration	5 to 8.4Hz	--	1.75mm	
			8.4 to 150Hz	4.9m/s <sup>2</sup>	--	
Shock resistance		Conforms to JIS B3502, IEC 61131-2 (147 m/s <sup>2</sup> , 3 times each in X, Y and Z directions)				
Operating atmosphere		Must be free of lamp black, corrosive gas, flammable gas, or excessive amount of electroconductive dust particles and must be no direct sunlight. (Same as for saving)				
Operating altitude <sup>*1</sup>		2000 m (6562 ft) max.				
Overvoltage category <sup>*2</sup>		II or less				
Pollution degree <sup>*3</sup>		2 or less				
Cooling method		Self-cooling				

- <sup>\*1</sup> Do not use or store the GOT under pressure higher than the atmospheric pressure of altitude 0m (0ft.). Failure to observe this instruction may cause a malfunction. When the air inside the control panel is purged by pressurization, the surface sheet may be lifted by high pressure. As a result, the touch panel may be difficult to press, and the sheet may be peeled off.
- <sup>\*2</sup> This indicates the section of the power supply to which the equipment is assumed to be connected between the public electrical power distribution network and the machinery within the premises. Category II applies to equipment for which electrical power is supplied from fixed facilities. The surge voltage withstand level for up to the rated voltage of 300 V is 2500 V.
- <sup>\*3</sup> 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.

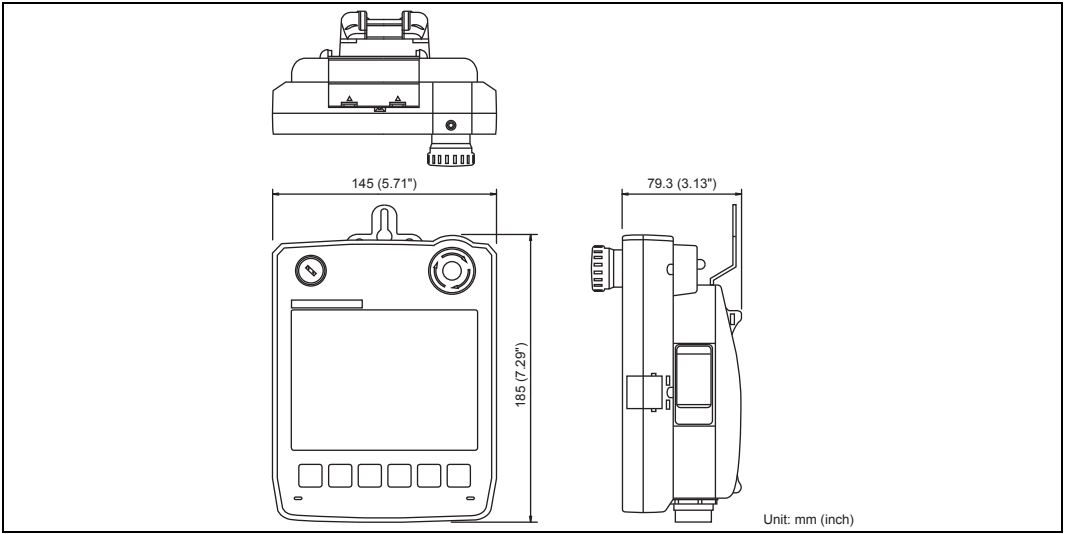
3.2 Performance Specifications

Item		Specifications	
		GT1455HS-QTBDE	GT1450HS-QMBDE
Display section <sup>*1</sup>	Type	TFT color liquid crystal display	
	Screen size	5.7"	
	Resolution	320 × 240 dots	
	Display size	115 (W) × 86 (H) [mm]	
	Display character	16-dot standard font: 20 characters × 15 lines, 12-dot standard font: 26 characters × 20 lines	
	Display color	65536 colors	Monochrome (black/white), 16 scales
	Display angle <sup>*2</sup>	Left/Right: 80 degrees, Top: 80 degrees, Bottom:60 degrees	Left/Right: 80 degrees, Top: 80 degrees, Bottom: 60 degrees
	Intensity of LCD only	400 [cd/m <sup>2</sup> ]	230 [cd/m <sup>2</sup> ]
	Intensity adjustment	8-level adjustment	
Backlight	Life	Approx. 50,000h. (Time for contrast to become 1/5 at operating ambient temperature of 25°C)	
		LED type Backlight off/screen saving time can be set. <sup>*3</sup>	
Touch panel <sup>*4</sup>	Life	Approx. 70,000h or longer. (Time for display intensity reaches 50% at operating ambient temperature of 25°C)	
	Type	Analog resistive film	
	Key size	Minimum 2 × 2 dots (per key)	
	Number of points touched simultaneously	Simultaneous presses not allowed. (Only 1 point can be touched.)	
Switch	Life	1 million times or more (operating force 0.98N max.)	
	Operation switch	6 switches (6 contacts/common), N/O contact, Maximum rating 10mA/24VDC, Life: 1,000,000 times	
	Grip switch	1 switch (single wiring) (IDEC HE3B-M2PB) Enable switch (deadman switch) 3-position system of OFF ⇄ ON ⇄ OFF 2 N/O contacts Maximum rating 1A/24VDC (resistance load), Life: 100,000 times Maximum rating 0.3A/24VDC (induction load), Life: 100,000 times	
	Emergency stop switch	1 switch (single wiring) (IDEC XA1E-BV303R) 3 N/C contacts Maximum rating 1A/24VDC (resistance load), Life: 100,000 times Maximum rating 0.3A/24VDC (induction load), Life: 100,000 times	
	Keylock switch (2-position switch)	1 switch (single wiring) (IDEC AS6M-2KT1PB) 2-notch type (Manual stop at each position/A key can be inserted and removed on only the left side./On the right side, a key cannot be removed./Two keys are provided.) 2-position, Maximum rating 1A/24VDC (resistance load), Maximum rating 0.3A/24VDC (induction load), Life: 100,000 times	
	SD card access switch	Prohibits accessing the SD card removing the card from the GOT. ON: SD card being accessed (SD card removal prohibited) OFF: SD card not accessed (SD card removal possible)	

3.3 Power Supply Specifications

Item		Specifications	
		GT1665HS-VTBD	
Input power supply voltage		24V DC (+10% -15%)	
Power consumption		8.4W or less (350mA/DC24V)	7.5W or less (310mA/DC24V)
	At backlight off	7.0W or less (290mA/DC24V)	
Inrush current		30A or less (maximum load) 2ms	
Permissible instantaneous power failure time <sup>*1</sup>		Within 5ms	
Noise immunity		Noise voltage: 1000Vp-p, Noise width: 1μs (by noise simulator of 30 to 100Hz noise frequency)	
Dielectric withstand voltage		500V DC for 1 minute (across power supply terminals and earth)	
Insulation resistance		10MΩ or larger by insulation resistance tester (across power supply terminals and earth)	

3.4 External Dimensions



4. Maintenance and Inspection

The GOT does not include consumable components that will cause the shorten life. However, the battery, liquid crystal display screen and backlight have each life length. It is recommended to replace the battery periodically. (For the replacement of the liquid crystal screen, please consult your nearest sales office or FA Center.)

4.1 Daily Inspection

Daily inspection items					
No.	Inspection Item		Inspection Method	Criterion	Action
1	Installation status of GOT		Check for loose mounting screws.	Securely mounted	Retighten screws within the specified torque range.
2	Connection status	Loose terminal screws	Retighten screws with screwdriver.	Not loose	Retighten terminal screws.
		Proximate solderless terminals	Visual check	Proper intervals	Correct.
		Loose connectors	Visual check	Not loose	Retighten connector fixing screws.
3	Usage status	Dirt on protection sheet	Visual check	Not outstanding	Replace with new one
		Foreign material attachment	Visual check	No foreign matter sticking	Remove clean

Refer to the following for the model names of the protection sheet or the replacement procedure.

→ GT14 Handy GOT User's Manual

4.2 Periodic Inspection

**Yearly or half-yearly inspection items**  
The following inspection should also be performed when equipment has been moved or modified or the wiring changed.

No.	Inspection Item		Inspection Method	Criterion	Action
1	Surrounding environment	Ambient temperature	Make measurement with thermometer or hygrometer	0 to 40°C	For use in control panel, temperature inside control panel is ambient temperature
		Ambient humidity	Measure corrosive gas	10 to 90%RH	
		Atmosphere		No corrosive gas	
2	Power supply voltage check		24V DC Measure voltage across terminals.	20.4 to 26.4V DC	Change supply power
3	Mounting status	Looseness	Move module.	Should be mounted firmly.	Retighten screws.
		Foreign material attachment	Visual check	No foreign matter sticking	Remove, clean
4	Connection status	Loose terminal screws	Retighten screws with screwdriver.	Not loose	Retighten terminal screws.
		Proximate solderless terminals	Visual check	Proper intervals	Correct.
		Loose connectors	Visual check	Not loose	Retighten connector fixing screws.
5	Battery		Check GOT internal battery voltage status in [Time Setting & Display] of the Utility.	No alarm displayed	Replace with new battery when the current battery has reached the specified life span, even if battery voltage is not displayed.

Item		Specifications	
		GT1455HS-QTBDE	GT1450HS-QMBDE
LED	POWER LED	1 LED Lit in green: Power is correctly supplied. Lit in orange: Screen saving and backlight not lit. Blinks in orange/green: Blown back light bulb. Not lit: Power is not supplied.	
		1 LED, green (lighting control from display unit part)	
	LED for grip switch display	Lit (Green): SD card being accessed, Not lit: SD card is not accessed.	
	SD card access LED	LED1: Turns on in green during 100Mbps transmission. LED2: Turns on in green during data communication.	
Memory	Ethernet communication status LED		
	Flash memory (Internal), 9Mbytes (for storing project data)		
	Life (Number of write times): 100,000 times		
Battery	C drive <sup>*5</sup>		SRAM (internal), 512Kbytes (battery backup)
	D drive		GT11-50BAT lithium battery
	Backup target		Clock data, alarm history, recipe data, time action setting value, advanced alarm, advanced recipe, logging, hard copy and SRAM user area
Built-in interface	Life		Approx. 5 years (Operating ambient temperature of 25°C)
	RS-422 RS-232	RS-232, RS-422, 1ch each (When you use, select any of channels including Ethernet. Ethernet is set at factory shipment.) Transmission speed : 115200/57600/38400/19200/9600/4800bps Connector shape : Round type 32pins (Male) Application : For communicating with a controller Terminating resistor : 330Ω (Fixed)	
		Data transfer method: 100BASE-TX, 10BASE-T 1ch Connector shape : Round type 32pins (Male) Application : For communicating with a controller, or using the gateway function, connecting a PC (project data upload/download, OS installation, FA transparent function)	
	USB	USB (Full Speed 12Mbps) Host 1ch Connector shape : TYPE-A Application : Data transfer, data storage	
		USB (Full Speed 12Mbps) Device 1ch Connector shape : Mini-B Application : For connecting a personal computer (Project data upload/download, OS installation, FA transparent function <sup>*7</sup> )	
SD card			SD standard, 1ch Supported memory card: SDHC memory card, SD memory card Application : For uploading/downloading project data, OS installation, storing logging data
Buzzer output		Single tone (tone length adjustable)	
Protective structure <sup>*6</sup>		IP65f (valid when the external cable is connected, except for the connector conversion box side)	
Weight		Approx. 0.79kg (GT14 Handy main unit only)	
Compatible software package (GT Designer3 version)		Version1.71Z or later	

- <sup>\*1</sup> Bright dots (always lit) and dark dots (unlit) may appear on a liquid crystal display panel. It is impossible to completely avoid this symptom, as the liquid crystal display comprises of a great number of display elements. Flickers may be observed depending on the display color. Please note that these dots appear due to its characteristic and are not caused by product defect. Flickers and partial discoloration may be generated on the liquid crystal display panel due to the display contents or the contrast adjustment. However, please note that these phenomena appear due to its characteristic and are not caused by product defect. There is a difference in the display brightness and the color tones between liquid crystal display panels. When using multiple liquid crystal display panels, please note that there is an individual difference between them. A crosstalk (shadow as an extension of the display) may appear on the liquid crystal display panel. Please note that it appears due to its characteristic. When the display section is seen from the outside of the display angle, the display color seems like it has changed. Please note that it is due to its characteristic. Please note that the response time, brightness and color of the liquid crystal display panel may vary depending on the usage environmental temperature. (Especially, the response time of liquid crystal display is slower in the lower temperature due to its characteristic. Please use the display after checking the response time.) When the same screen is displayed for a long time, an incidental color or partial discoloration is generated on the screen due to heat damage, and it may not disappear. To prevent heat damage, the screen saver function is effective. For details on the screen saver function, refer to the following.

→ GT14 Handy GOT User's Manual

- <sup>\*2</sup> Gradation inversion is a characteristic of liquid crystal displays. Please be forewarned that depending on the displayed color, the visualization may be difficult even within the described view angle.
- <sup>\*3</sup> The GOT screen saving/backlight off function prevents images from becoming permanently etched on the display screen and increases the backlight life.

→ GT14 Handy GOT User's Manual

- <sup>\*4</sup> The touch panel is analog resistive film-type. If you touch the panel simultaneously in 2 points or more, the switch that is located around the center of the touched point, if any, may operate. Do not touch the panel in 2 points or more simultaneously. Do not press the GOT display section with a pointed material as a pen or driver. Doing so can result in a damage or failure of the display section. An analog resistive film-type touch panel does not require adjustment usually. However, misalignment between object position and actual touched position may be caused as usage time passes. If misalignment between object position and actual touched position may occur, adjust the touch panel position. Misalignment between object position and actual touched position may operate an unintended object, which causes unintended operation by mis-output and mis-operation.

- <sup>\*5</sup> ROM in which new data can be written without deleting the written data.
- <sup>\*6</sup> Note that this does not guarantee all user's operation environment. The protection is not applied when the interface environment protection cover is removed. In addition, the product may not be used in environments under exposition of oil or chemicals for a long period of time, or in environments filled with oil-mist.
- <sup>\*7</sup> The USB cable that connects the GOT and a personal computer is connected to the USB interface (device) in the interface environmental protection cover of the GOT. Since the Handy GOT is used with the interface environment protection cover opened, it is out of the warranty for protective structure (IP65F).

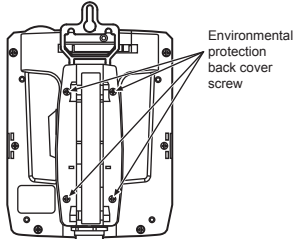
4.3 Battery Replacement

The battery backs up clock data and data stored in the built-in RAM (D drive) including alarm history, recipe data, time action setting value, advanced alarm, advanced recipe, logging, hard copy, and SRAM user area.

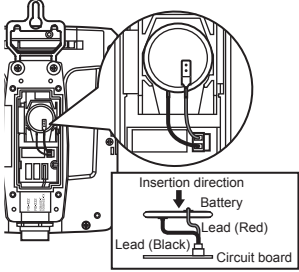
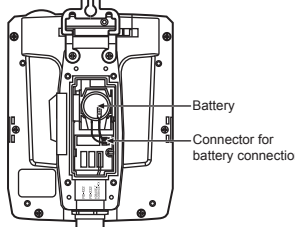
- Battery model name  
Handy GOT is shipped with the following battery.  
Use it at replacement.

Product name	Model name
Battery	GT11-50BAT

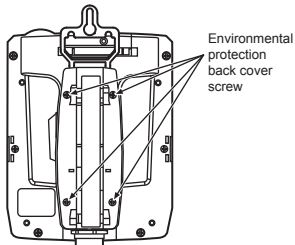
- Battery replacement procedure  
1) After keeping the GOT turned ON more than 10 minutes, turn OFF the GOT.  
2) Loosen the environmental protection back cover screws at four points on GOT rear face to remove the cover.



- Remove the old battery from the holder and disconnect the connector.
- Disconnect the old battery connector and insert the new battery connector within 30s.
- Install the battery to the GOT.



- Attach the environmental protection back cover and tighten the screws.  
Tightening torque: 0.36 to 0.48 N·m
- Turn the GOT power on.
- Check if the battery condition is normal with the utility.  
Refer to the following for the details of battery status display.  
→ GT14 Handy GOT User's Manual



- Battery life  
Approximate battery life:  
5 years (ambient temperature: 25°C)  
Battery replacement: In 4 to 5 years

The battery is susceptible to natural discharge. Order one when necessary.

Battery status can be confirmed on a GOT utility screen.  
For details of battery status or how to output alarm, refer to the following:  
→ GT14 Handy GOT User's Manual

5. Precautions

5.1 Cautions on Using Emergency Stop Switch

- When using the emergency stop switch in the handy GOT, judge the validity to use the emergency stop switch in accordance with the risk assessment in your system.
- When using the parallel circuit (which disables the emergency stop status while the handy GOT is removed), the system may not conform to the safety standards. Check the safety standards required in the system, and then judge the validity to use the emergency stop switch.
- If a shock which exceeds the general specifications of the Handy GOT is applied, a chattering may occurs in the emergency stop switch due to the structure of the switch. Check your usage condition and decide whether to use or not.

This manual confers no industrial property rights or any rights of any other kind, nor does it confer any patent licenses. Mitsubishi Electric Corporation cannot be held responsible for any problems involving industrial property rights which may occur as a result of using the contents noted in this manual.

**Warranty**  
Mitsubishi will not be held liable for damage caused by factors found not to be the cause of Mitsubishi; opportunity loss or lost profits caused by faults in the Mitsubishi products; damage, secondary damage, accident compensation caused by special factors unpredictable by Mitsubishi; damages to products other than Mitsubishi products; and to other duties.

**For safe use**

- This product has been manufactured as a general-purpose part for general industries, and has not been designed or manufactured to be incorporated in a device or system used in purposes related to human life.
- Before using the product for special purposes such as nuclear power, electric power, aerospace, medicine or passenger movement vehicles, consult with Mitsubishi Electric.
- This product has been manufactured under strict quality control. However when installing the product where major accidents or losses could occur if the product fails, install appropriate backup or failsafe functions in the system.