



**MITSUBISHI ELECTRIC**

# GT21

## General Description

GT2105-QTBDS GT2105-QMBDS

Thank you for purchasing Mitsubishi Electric Graphic Operation Terminal.

MODEL	GT2105-Q-U-GD-JE
Model code	1D7MT4
IB(NA)-0800591-F(2109)MEE	

**GOT2000**

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 registered trademark of Xerox Corporation in the United States. The company name and the product name to be described in this manual are the registered trademarks or trademarks of each company.

Effective: Sep. 2021

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. Some failures of a touch panel may cause malfunction of the input objects such as a touch switch. An external monitoring circuit should be provided to check for output signals which may lead to a serious accident. 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. Not doing so can cause an accident due to false output or malfunction.</li> <li>When the GOT detects its backlight failure, the GOT disables the input operation on the touch switch(es). Thus, operators cannot operate the GOT with touches. The GOT backlight failure can be checked with a system signal of the GOT.</li> <li>Incorrect operation of the touch switch(es) may lead to a serious accident if the GOT backlight is gone out.</li> <li>When the GOT backlight goes out, the POWER LED blinks (blue/orange) and the display section dims, while the input of the touch switch(es) 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>The display section of the GOT is an analog-resistive type touch panel. Simultaneous pressing of two or more areas on the display section may activate the switch between those areas. Do not press two or more areas simultaneously on the display section. Doing so may cause an accident due to incorrect output or malfunction.</li> <li>When programs or parameters of the controller (such as a PLC) that is monitored by the GOT are changed, be sure to shut off the power of the GOT promptly and power on the GOT again. 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. Not doing so can cause an accident due to false output or malfunction.</li> </ul>	

### [DESIGN PRECAUTIONS]

WARNING	
<ul style="list-style-type: none"> <li>To maintain the security (confidentiality, integrity, and availability) of the GOT and the system against unauthorized access, DoS<sup>1</sup> attacks, computer viruses, and other cyberattacks from unreliable networks and devices via network, take appropriate measures such as firewalls, virtual private networks (VPNs), and antivirus solutions. Mitsubishi Electric shall have no responsibility or liability for any problems involving GOT trouble and system trouble by unauthorized access, DoS attacks, computer viruses, and other cyberattacks.</li> <li>*1 DoS: A denial-of-service (DoS) attack disrupts services by overloading systems or exploiting vulnerabilities, resulting in a denial-of-service (DoS) state.</li> </ul>	

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 100 mm apart. Not doing so may 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>Turn on the controllers and the network devices to be ready for communication before they communicate with the GOT. Failure to do so can cause a communication error on the GOT.</li> <li>When the GOT is subject to shock or vibration, or some colors appear on the screen of the GOT, the screen of the GOT might flicker.</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 main unit to/from the panel. Not doing so can cause the unit to fail or malfunction.</li> </ul>	

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>When mounting the GOT to the control panel, tighten the mounting screws in the specified torque range (0.3 N·m to 0.5 N·m) can cause the GOT to drop, short circuit or malfunction. Overtightening can cause a drop, short circuit or malfunction due to the damage of the GOT.</li> <li>Remove the protective film of the GOT. When the user continues using the GOT with the protective film, the film may not be removed.</li> <li>Operate and store the GOT in environments without direct sunlight, high temperature, dust, humidity, and vibrations.</li> <li>Do not use the GOT in an environment with oil or chemicals. Doing so may cause failure or malfunction due to the oil or chemical entering into the GOT.</li> </ul>	

### [WIRING 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 wiring. Failure to do so may result in an electric shock, product damage or malfunctions.</li> </ul>	

CAUTION	
<ul style="list-style-type: none"> <li>Please make sure to ground FG terminal of the GOT power supply section by applying 100 Ω 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>Tighten the terminal screws of the GOT power supply section in the specified torque range (0.5 N·m to 0.8 N·m). Overtightening can cause a short circuit or malfunction. Overtightening can cause a short circuit or malfunction due to the damage of the screws or the GOT.</li> <li>For a terminal processing of a wire to the GOT power supply section, connect a stranded wire or a single wire directly, or use a rod terminal with an insulation sleeve. 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> <li>Plug the communication cable into the GOT interface or the connector of the connected unit, and tighten the mounting screws and the terminal screws in the specified torque range. Overtightening 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>Before starting cleaning or terminal screw retightening, always switch off the power externally in all phases. Not doing so can cause the unit to fail or malfunction. Overtightening 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>	

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 from 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>Do not drop the module or subject it to strong shock. A module damage may result.</li> <li>Before touching the unit, always touch grounded metals, etc. to discharge static electricity from human body, etc. Not doing so can cause the unit to fail or malfunction.</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.</li> <li>Keep away from children. Do not disassemble and do not dispose of in fire.</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>	

### [PRECAUTIONS WHEN THE DATA STORAGE IS IN USE]

WARNING	
<ul style="list-style-type: none"> <li>If the SD card mounted on drive A of the GOT is removed while the GOT is accessed, processing for the GOT might be interrupted about for 20 seconds. The GOT cannot be operated during this period. The functions that run in the background including a screen updating, alarm, logging, scripts, and others are also interrupted. Since this interruption makes an impact to the system operation, it might cause failure. After inhibiting access to the SD card on the GOT utility screen, check that the SD card access LED is off and remove the SD card.</li> </ul>	

CAUTION	
<ul style="list-style-type: none"> <li>Do not remove the data storage from the GOT while the data storage is being accessed by the GOT or the data storage and files may be damaged. Before removing the data storage, check the SD card access LED, relevant system signal, or others to make sure that the data storage is not being accessed.</li> <li>Turning off the GOT while it accesses the SD card results in damage to the SD card and files.</li> <li>After inserting an SD card into the SD card unit, make sure to enable the SD card access in the GOT utility.</li> <li>Not doing so causes the data not to be read or written.</li> <li>When removing the SD card from the GOT, make sure to support the SD card by hand as it may pop out.</li> <li>Not doing so may cause the SD card to drop from the GOT, resulting in a failure or break.</li> <li>Before removing the data storage from the GOT, follow the procedure for removal on the utility screen of the GOT.</li> <li>After the successful completion dialog is displayed, remove the data storage by hand carefully.</li> <li>Not doing so may cause the data storage to drop from the GOT, resulting in a failure or break.</li> </ul>	

### [PRECAUTIONS FOR USE]

CAUTION	
<ul style="list-style-type: none"> <li>Do not touch the edges of the touch panel (display section) repeatedly. Doing so may result in a failure.</li> <li>Do not turn off the GOT while data is being written to the storage memory (ROM) or SD card. Doing so may corrupt the data, rendering the GOT inoperative.</li> </ul>	

## 1. GOT SERIES USER'S MANUAL SPECIFICATIONS

### 1.1 General Specifications

Item	Specifications					
Operating ambient temperature <sup>1</sup>	0 to 55°C <sup>2</sup> (When mounted horizontally), 0 to 50°C (When mounted vertically)					
Storage ambient temperature	-20 to 60°C					
Operating ambient humidity	10% RH to 90% RH, non-condensing <sup>2</sup>					
Storage ambient humidity	10% RH to 90% RH, non-condensing <sup>2</sup>					
Vibration resistance	Compliant with JIS B3502 and IEC61131-2	Under intermittent vibration	Frequency 5 to 8.4 Hz 8.4 to 150 Hz	Acceleration - 9.8m/s <sup>2</sup>	Half amplitude 3.5 mm -	Sweep Count 10 times in each X, Y, or Z direction -
		Under continuous vibration	5 to 8.4 Hz 8.4 to 150 Hz	- 4.9m/s <sup>2</sup>	1.75 mm -	-
Shock resistant	Compliant with JIS B3502 and IEC61131-2 147m/s <sup>2</sup> (15G) Three times in each X, Y, or Z direction					
Operating atmosphere	No greasy fumes, corrosive gas, flammable gas, excessive conductive dust, and direct sunlight (as well as at storage)					
Operating altitude <sup>3</sup>	2000 m or less					
Installation location	Inside control panel					
Overvoltage category <sup>4</sup>	II or less					
Pollution degree <sup>5</sup>	2 or less					
Cooling method	Self-cooling					
Grounding	Grounding with a ground resistance of 100 Ω or less by using a ground cable that has a cross-sectional area of 2 mm <sup>2</sup> or more. If impossible, connect the ground cable to the control panel.					

<sup>1</sup> The operating ambient temperature indicates the temperature inside the enclosure of the control panel to which the GOT is installed.

<sup>2</sup> If the ambient temperature exceeds 40°C, the absolute humidity must not exceed 90% at 40°C.

<sup>3</sup> Do not use or store the GOT under pressure higher than the atmospheric pressure of altitude 0 m. Doing so may cause a malfunction. When an air purge is made inside the control panel by adding pressure, there may be a clearance between the surface sheet and the screen, making you difficult to use the touch panel, or the sheet may come off.

<sup>4</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 withstand surge voltage for the equipment with the rated voltage up to 300 V is 2500 V.

<sup>5</sup> This indicates the occurrence rate of conductive material in an environment where a device is used. Pollution degree 2 indicates an environment where only non-conductive pollution occurs normally and a temporary conductivity caused by condensation shall be expected depending on the conditions.

<sup>6</sup> When a protective cover for oil is mounted on the GOT, the maximum operating ambient temperature must be 5°C lower than the one described above.

### 1.2 Performance Specifications

Item	Specifications	
	GT2105-QTBDS	GT2105-QMBDS
Display device	TFT color display	TFT monochrome display
Screen size	5.7"	
Resolution	320 × 240 dots	
Display size	115(4.53) (W) × 86(3.39) (H) mm(inch)	
Displayed number of characters	16-dot standard font: 20 characters × 15 lines (two-byte characters) 12-dot standard font: 26 characters × 20 lines (two-byte characters)	
Display color	Color (65536 colors)	Monochrome (black/white) 32 shade grayscale
Brightness Adjustment	32 levels	
Backlight	LED (Not replaceable)	
Backlight life <sup>13</sup>	Approx. 65000 h (operating ambient temperature: 25°C, display intensity: 50%)	
Type	Analog resistive film	
Key size	Minimum 2 × 2 dots (per a key)	
Simultaneous press	Simultaneous press prohibited <sup>15</sup> (only 1 point can be pressed)	
Life	1 million times or more (Operating force: 0.98 N or less)	
User memory capacity	Memory for storage (ROM): 9 MB	
Life (number of write times)	100000 times	
Battery	GT11-50BAT lithium battery	
Life	Approx. 5 years (operating ambient temperature: 25°C)	
RS-232	1 channel Transmission speed: 115200/57600/38400/19200/9600/4800 bps Connector shape: D-sub 9-pin(male)	
RS-422/485	1 channel Transmission speed: 115200/57600/38400/19200/9600/4800 bps Connector shape: D-sub 9-pin(female) Terminating resistor <sup>16</sup> : OPEN/110 Ω/330 Ω (Switched with the terminating resistor setting switch)	
USB (Device)	1 ch Maximum transfer rate: Full-Speed 12 Mbps Connector shape: USB Mini-B	
SD card	1 channel SDHC card supported (max. 32 GB)	
Buzzer output	Single tone (tone length adjustable)	
Productive structure	Outside the enclosure: IP67 <sup>17</sup> Inside the enclosure: IP2X	
External dimensions	164(6.46) (W) × 135(5.32) (H) × 55(2.17) (D)	
Panel cut dimensions	153(6.03) (W) × 121(4.77) (H)	
Weight (excluding a fitting)	Approx. 0.7 kg	
Compatible software package	GT Works3 Version1.144A or later	

- Bright dots (always lit) and dark dots (unlit) may appear on a liquid crystal display panel due to its characteristics. It is impossible to completely avoid this symptom, as the liquid crystal display comprises of a great number of display elements. In addition, color tone difference, unevenness of brightness, or flickers may occur due to individual differences of liquid crystal display panels. Please note that these symptoms occur due to GOT's characteristic and are not caused by product defect.
- Flicker may occur due to vibration, shock, or display color.
- Settings the screen saving backlight to OFF prevents the display screen from burn-in and enables the backlight to lengthen its life.
- When using a stylus pen, it will be 100,000 times. (The specifications must be satisfied the following condition.)
  - Material: Polyacetal resin
  - Tip radius: 0.8 mm or more
- If you touch two points or more simultaneously on the touch panel, a switch in an unintended location may operate. Do not touch two or more points on the touch panel simultaneously.
- Set the terminating resistor selector switch of the GOT in accordance with the connection type when adopting GOT multidrop connection.
- Note that this does not guarantee all users' operation environment. In addition, the GOT may not be usable in the environment where oil or chemicals are splashed over for a long time or where oil mist is filled.
- The suffix "F" of IP67F is a symbol that indicates protection rate against oil. It is described in the Appendix of JIS C 0920 of the Japanese Industrial Standards.

### 1.3 Power Supply Specifications

Item	Specifications	
	GT2105-QTBDS	GT2105-QMBDS
Input power supply voltage	DC24 V (+10%, -15%)	
Power consumption	Under the maximum load	2.9 W or less
	At backlight off	2.2 W or less
Inrush current	27 A or less (2ms, 25°C, at the maximum load)	
Permissible instantaneous power failure time	Within 5ms	
Noise immunity	Noise voltage: 1000 Vp-p, Noise width: 1 μs (by noise simulator of 30 to 100 Hz noise frequency)	
Dielectric withstand voltage	500 VAC for 1 minute (between the GOT's power supply terminals and the GOT's grounding terminal)	
Insulation resistance	10 MΩ or larger by insulation resistance tester (between the GOT's power supply terminals and the GOT's grounding terminal)	
Electrical wire size	For power supply: 0.75[mm <sup>2</sup> ] or more, For grounding: 2[mm <sup>2</sup> ] or more	
Ferrules with plastic sleeve	Solderless terminal for M3 screw RAV1.25-3, V2-N3A, FV2-N3A	
Tightening torque (terminal screws)	0.5 to 0.8 N·m	

## 2. WIRING OF CONNECTION CABLE

- For details of the connection cable, refer to the following manual.
- GOT2000 Series Connection Manual (Mitsubishi Electric Products) For GT Works3 Version1
  - GOT2000 Series Connection Manual (Non-Mitsubishi Electric Products 1) For GT Works3 Version1
  - GOT2000 Series Connection Manual (Non-Mitsubishi Electric Products 2) For GT Works3 Version1
  - GOT2000 Series Connection Manual (Microcomputers, MODBUS/Fieldbus Products, Peripherals) For GT Works3 Version1

### Certification of UL, CUL standards

- Using GOT
- GOT is for use on a Flat Surface of a Type 1 Enclosure.

### Notification of CE marking

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 when used as directed by the appropriate documentation.

- This product is designed for use in industrial applications
  - Type: Graphic operation terminal
  - Models: GOT2000 series

Standard	Remark	
EN61131-2: 2007 Programmable controllers - Equipment, requirements 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 your local Mitsubishi Electric sales site.

For details of CE marking, refer to the following.

→GOT2000 Series User's Manual (Hardware)

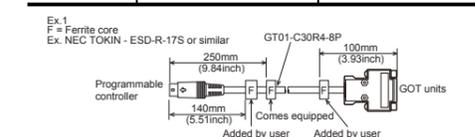
### Compliant with the UKCA marking

Requirements for compliance with the UKCA marking are the same with the EC Directives (CE marking).

### Notes for compliance to EMC regulation

- General notes on the use of communication cables
  - Any device which utilizes a data communication function is susceptible to the wider effects of local EMC noise. Therefore, when installing any communication cables care should always be taken with the routing and location of those cables. The GOT units identified on the previous chapter are compliant with the EMC requirement when the following communication cables are used.

GOT Unit	Existing Cables	User Made Cables
GT2105-QTBDS and GT2105-QMBDS	Ex. GT01-C30R4-8P (as shown in EX.1) A complete list of appropriate cables can be found in the GOT user's manual.	3rd party cables need to be independently tested by the user to demonstrate EMC compliance.



### [DISPOSAL PRECAUTIONS]

CAUTION	
<ul style="list-style-type: none"> <li>When disposing of this product, treat it as industrial waste.</li> <li>When disposing of batteries, separate them from other wastes according to the local regulations. (Refer to the GOT2000 Series User's Manual for details of the battery directive in the EU member states.)</li> </ul>	

### [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 the GOT2000 Series User's Manual (Hardware) for details of the regulated models.)</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> <li>When fumigants that contain halogen materials such as fluorine, chlorine, bromine, and iodine are used for disinfecting and protecting wooden packaging from insects, they cause malfunction when entering our products. Please take necessary precautions to ensure that remaining materials from fumigant do not enter our products, or treat packaging with methods other than fumigation (heat method). Additionally, disinfect and protect wood from insects before packing products.</li> </ul>	

### Manual

The following shows manuals relevant to this product.

#### Detailed Manual

Manual name	Manual number (Model code)
GOT2000 Series User's Manual (Hardware)	SH-081194ENG (1D7MJ5)
GOT2000 Series User's Manual (Utility)	SH-081195ENG (1D7MJ6)

For detailed manuals, refer to the PDF manuals stored in the DVD-ROM for the drawing software used.

#### Relevant Manuals

For relevant manuals, refer to the Help or the PDF manuals stored in the DVD-ROM for the drawing software used. The latest manuals are also available from MITSUBISHI ELECTRIC FA Global Website ([www.MitsubishiElectric.com/ifa](http://www.MitsubishiElectric.com/ifa)).

#### Before using the GOT

Refer to the GOT2000 Series User's Manual (Hardware) for the connection instructions. For details on the GOT specifications, installing instructions, wiring, maintenance and inspection, or checking procedure for the version and the compatible standard, refer to the GOT2000 Series User's Manual (Hardware).

#### Bundled Items

Model name	Remark
GT2105-QTBDS, GT2105-QMBDS	GOT main unit (The maintenance supplies below are packed with the product.)
Bundled item	
Bundled item	Quantity
Panel Mounting Bracket (with M4 × 35 screws)	4
Panel Mounting Packing	1
GT21 General Description (This manual)	1

#### Referenced Standard: GB/T15969.2 (Requirement of Chinese standardized law)