

MITSUBISHI

GT15

General Description

GT1595-XTBA GT1575-STBA GT1575-VNBA
GT1585-STBA GT1575-STBD GT1575-VNBD
GT1585-STBD GT1575-VTBA GT1572-VNBA
GT1575-VTBD GT1572-VNBD
GT1565-VTBA GT1562-VNBA
GT1565-VTBD GT1562-VNBD

Thank you for purchasing the GOT1000 Series.

Prior to use, please read both this manual and detailed manual thoroughly to fully understand the product.

MODEL	GT15-U(HW)
MODEL CODE	1D7M38
IB(NA)-0800322-C(0510)MEE	

GRAPHIC OPERATION TERMINAL

GOT1000

● SAFETY PRECAUTIONS ●

(Always read these precautions before using this equipment.)

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 "DANGER" and "CAUTION".




DANGER

Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.



CAUTION

Indicates that incorrect handling may cause hazardous conditions, resulting in medium or slight personal injury or physical damage.

Note that the  caution level may lead to a serious accident according to the circumstances.

Always follow the instructions of both levels because they are important to personal safety.

Please save this manual to make it accessible when required and always forward it to the end user.

[DESIGN PRECAUTIONS]



- Some failures of the GOT, communication unit 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.
Not doing so can cause an accident due to false output or malfunction.
- 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.
For bus connection : The CPU becomes faulty and the GOT becomes inoperative.
For other than bus connection : 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.
- 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.
- 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.
 - The POWER LED flickers (green/orange) and the monitor screen appears blank
- The display section of the GT1595-X 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.

[DESIGN PRECAUTIONS]

CAUTION

- 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 apart.
Not doing so noise can cause a malfunction.
- 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.

[MOUNTING PRECAUTIONS]

DANGER

- 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.
- Be sure to shut off all phases of the external power supply used by the system before mounting or removing the communication unit, option function board or multi-color display board onto/from the GOT.
Not doing so can cause the unit to fail or malfunction.
- When installing the multi-color display board, wear an earth band etc. to avoid the static electricity.
Not doing so can cause a unit corruption.

CAUTION

- 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.
- When mounting the GOT to the control panel, tighten the mounting screws in the specified torque range.
Overtightening 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 screws or the GOT.

[MOUNTING PRECAUTIONS]

CAUTION

- When loading the communication unit to the GOT, fit it to the connection interface of the GOT and tighten the mounting screws in the specified torque range.
Under tightening can cause the GOT to drop, short circuit or malfunction.
Overtightening can cause a drop, failure or malfunction due to the damage of the screws or unit.
- When mounting the multi-color display board onto the GOT, tighten the mounting screws within the specified torque range.
Loose tightening may cause the unit and/or GOT to malfunction due to poor contact.
Overtightening may damage the screws, unit and/or GOT; they might malfunction.
- Push the option function board onto the corresponding connector until it clicks, so that it will be secured firmly.
- Push the multi-color display board onto the corresponding connector so that it will be secured firmly.
- When inserting a CF card into the GOT, push it into the insertion slot until the CF card eject button will pop out.
Failure to do so may cause a malfunction due to poor contact.
- When inserting/removing a CF card into/from the GOT, turn the CF card access switch off in advance.
Failure to do so may corrupt data within the CF card.
- When removing a CF card from the GOT, make sure to support the CF card by hand, as it may pop out.
Failure to do so may cause the CF card to drop from the GOT and break.

[WIRING PRECAUTIONS]

DANGER

- 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.

[WIRING PRECAUTIONS]

CAUTION

- Please make sure to ground FG terminal and LG terminal of the GOT power supply section by applying Class D Grounding (Class 3 Grounding Method) or higher which is used exclusively for the GOT.
Not doing so may cause an electric shock or malfunction.
- Terminal screws which are not to be used must be tightened always at torque 0.5 to 0.8 N•m.
Otherwise there will be a danger of short circuit against the solderless terminals.
- Use applicable solderless terminals and tighten them with the specified torque.
If any solderless spade terminal is used, it may be disconnected when the terminal screw comes loose, resulting in failure.
- 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.
- Tighten the terminal screws of the GOT power supply section 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 the GOT.
- 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.
- The module has an ingress prevention label on its top to prevent foreign matter, such as wire offcuts, from entering the module during wiring.
Do not peel this label during wiring.
Before starting system operation, be sure to peel this label because of heat dissipation.
- Plug the bus connection cable by inserting it into the connector of the connected unit until it "clicks".
After plugging, check that it has been inserted snugly.
Not doing so can cause a malfunction due to a contact fault.
- 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.

[TEST OPERATION PRECAUTIONS]

DANGER

- 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.

[STARTUP/MAINTENANCE PRECAUTIONS]

DANGER

- When power is on, do not touch the terminals.
Doing so can cause an electric shock or malfunction.
- 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
- 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.

[STARTUP/MAINTENANCE PRECAUTIONS]

CAUTION

- Do not disassemble or modify the unit.
Doing so can cause a failure, malfunction, injury or fire.
- Do not touch the conductive and electronic parts of the unit directly.
Doing so can cause a unit malfunction or failure.
- 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.
- 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.
- Do not drop the module or subject it to strong shock. A module damage may result.
- Do not drop or give an impact to the battery mounted to the unit.
Doing so may damage the battery, causing the battery fluid to leak inside the battery.
If the battery is dropped or given an impact, dispose of it without using.

[STARTUP/MAINTENANCE PRECAUTIONS]

CAUTION

- 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.

[BACKLIGHT CHANGING PRECAUTIONS]

DANGER

- Before changing the backlight, always switch off the GOT power externally in all phases (when the GOT is connected to the bus, the PLC CPU power must also be switched off externally in all phases) and remove the GOT from the control panel.

Not switching the power off in all phases may cause an electric shock.

Not removing the unit from the control panel can cause injury due to a drop.

CAUTION

- When replacing the backlight, use the gloves.
Otherwise, it may cause you to be injured.
- Start changing the backlight more than 5 minutes after switching the GOT power off.

Not doing so can cause a burn due to the heat of the backlight.

[DISPOSAL PRECAUTIONS]

CAUTION

- When disposing of the product, handle it as industrial waste.

[TRANSPORTATION PRECAUTIONS]

CAUTION

- When transporting lithium batteries, make sure to treat them based on the transport regulations.
(Refer to GT15 User's Manual for details of the regulated models.)
- 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 the GT15 User's Manual, as they are precision devices.
Failure to do so may cause the unit to fail.
Check if the unit operates correctly after transportation.

REVISIONS

* The manual number is noted at the lower right of the top cover.

Print Date	*Manual Number	Revision
Apr., 2005	IB(NA)-0800322-A	First edition
Jul., 2005	IB(NA)-0800322-B	<p>Partial corrections Section 2.1, 2.2, 2.3, 3.2, 5.5, 6.1, 6.5, 7.3.4</p> <p>Partial additions SAFETY PRECAUTIONS, Section 4.3.2, 4.4.2, 5.3, 7.3.2, 7.3.3</p>
Oct., 2005	IB(NA)-0800322-C	<p>Partial corrections Chapter 1, Section 2.1 to 2.3 → 2.2 to 2.4, Section 3.2, 3.3, 3.4, 4.4.1, 5.2, 5.3, 5.5, 7.3.3</p> <p>Partial additions Product Components, Section 3.4, 4.3.2, 4.3.3, 4.4.1, 7.2</p> <p>Additions Section 2.1, 3.2.1 to 3.2.4, 3.3.1, 3.3.2</p>

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CONTENTS

1. Features	1
2. Part Names	2
2.1 Part Names and Settings of the GT1595	2
2.2 Part Names and Settings of the GT1585	4
2.3 Part Names and Settings of the GT157□	6
2.4 Part Names and Settings of the GT156□	8
3. Specifications	10
3.1 General Specifications	10
3.2 Performance Specifications	12
3.2.1 GT1595-X	12
3.2.2 GT1585-S	15
3.2.3 GT1575-S, GT1575-V, GT1575-VN, GT1572-VN	18
3.2.4 GT1565-V, GT1562-VN	21
3.3 Power Supply Specifications	24
3.3.1 For GOTs powered from the 100 to 240VAC power supply	24
3.3.2 For GOTs powered from the 24VDC power supply	25
3.4 External Dimensions	26
4. EMC and Low Voltage Directive	30
4.1 Requirements to meet EMC Directive	30
4.1.1 EMC Directive	31
4.1.2 Control panel	33
4.1.3 Noise filter (power supply line filter)	35
4.2 Requirements for compliance with the Low Voltage Directive	36
4.2.1 Standard subject to GOT	36
4.2.2 Power supply	36
4.2.3 Control panel	37
4.2.4 Grounding	37
4.2.5 External wiring	38
4.3 EMC Directive-compliant system configuration	39
4.3.1 GOT	39
4.3.2 Connection method	39
4.3.3 When the communication unit is used	40
4.3.4 Cables	40

4.4 Precautions for wiring/connecting the EMC Directive-compliant product	41
4.4.1 Power and ground wires wiring method	41
4.4.2 Processing connection cables	42
4.4.3 Grounding the cable	47
5. Installation	48
5.1 Control Panel Inside Dimensions for Mounting GOT	48
5.2 Panel Cutting Dimensions	48
5.3 Mounting Position	49
5.4 Control Panel Inside Temperature and Mounting Angle	50
5.5 Installation Procedure	51
6. Wiring	52
6.1 Wiring Precautions	52
6.2 Power Supply Wiring	54
6.3 Wiring of Connection Cables	55
6.4 Grounding	56
6.5 Power Terminal Connection	58
7. Maintenance and Inspection	59
7.1 Daily Inspection	59
7.2 Periodic Inspection	60
7.3 Battery Voltage Low Detection and Battery Replacement	61
7.3.1 Applicable Battery	61
7.3.2 Battery Specifications	61
7.3.3 Battery Replacement Procedure	61
7.3.4 Battery Life	62

Manuals

The following shows manuals relevant to this product.

Detailed Manual

Manual name	Manual Number (Type code)
GT15 User's Manual (Option)	SH-080528ENG (1D7M23)

Relevant Manual

For relevant manuals, refer to the PDF manual stored within the drawing software used.

Product Components

The GOT product package includes the following:

Model name	Item name	Quantity
GT1595-X	GOT	1
	Installation fitting	8
GT1585-S, GT1575-S, GT1575-V, GT1575-VN, GT1572-VN, GT1565-V, GT1562-VN	GOT	1
	Installation fitting	4

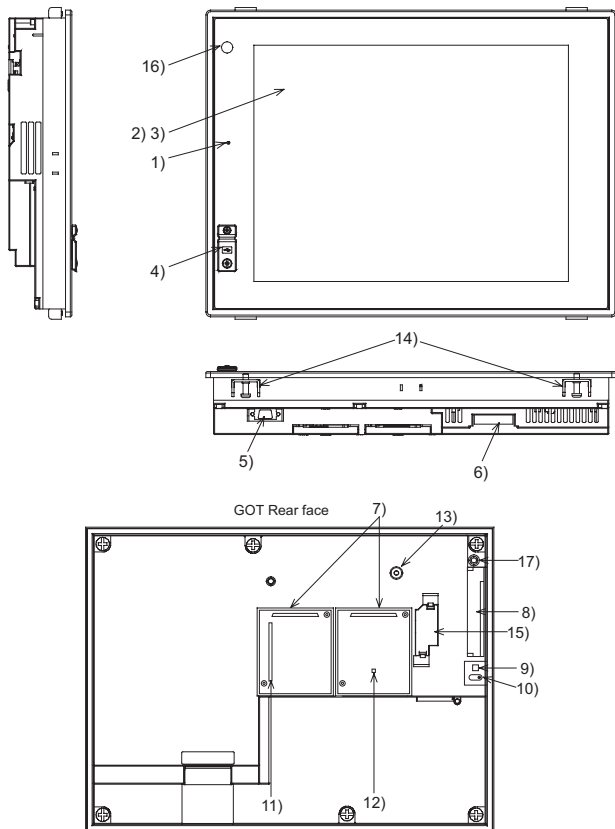
1. Features

- (1) Improved monitoring performance and connectivity to FA devices
 - Using of TFT color liquid crystal display (high intensity, wide angle view and high definition type) provides clear full-color display and displays small characters clearly. (Displays digital images of BMP and other formats in 65536 colors.)^{*1}
 - Provides multi-language display function based on Unicode2.1 True Type font and high-speed drawing of beautiful text.
 - High speed monitoring through high speed communication at maximum of 115.2kbps.
 - High speed display and high speed touch switch response.
- (2) More efficient GOT operations including screen design, startup, adjustment, management and maintenance works
 - 9MB user memory is included as standard. (Memory capacity can be expanded up to 57MB by increasing the option memory)^{*1}
 - CF card interface is included as standard
 - Font installation is available to increase the system fonts.
 - Combined use of 4 types of alarms (system alarm, user alarm list, alarm history, alarm popup display) realizes more efficient alarm notification.
 - Maintenance report function is available that measures the back-light energization time and notifies of maintenance time.
- (3) Enhanced support of FA device setup tools
 - Transferring or monitoring the sequence programs using the personal computer connected to GOT, during direct connection to Q, QnA, A or FX series PLC CPU, or computer link connection to A, QnA or Q series (FA Transparent function).
 - The USB connector is positioned on the GOT front. This enables the system startup to be performed more efficiently using FA device startup tool, and eliminates the necessity of indirect works (opening and closing the control panel, cable replacement, cable rewiring) in order to improve the working efficiency.

*1 For GT1595-X, GT1585-S, GT1575-S, GT1575-V, GT1565-V

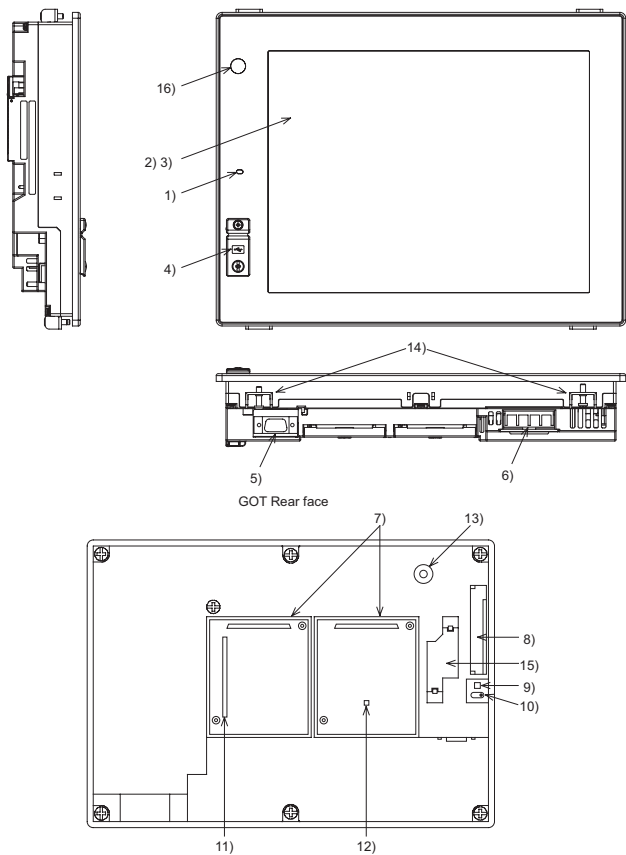
2. Part Names

2.1 Part Names and Settings of the GT1595



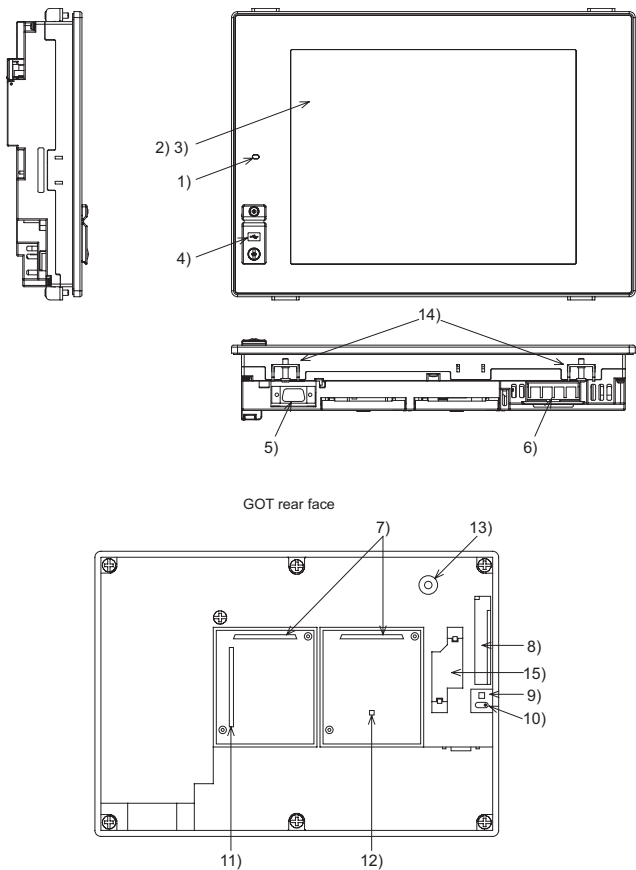
No.	Name	Description
1)	POWER LED	Lit in green: Power is correctly supplied Lit in orange: Screen saving Blinks in orange/green: Blown back light bulb Not lit: Power is not supplied
2)	Display screen	Displays the Utility and the user creation screen.
3)	Touch key	For operating touch switches in the Utility and the user creation screen
4)	USB interface	For connecting a personal computer (Connector type: MINI-B)
5)	RS-232 interface	For communicating with a controller or connecting a personal computer (Connector type: D sub 9-pin)
6)	Power terminal	Power input terminal, LG terminal, FG terminal
7)	Extension module interface	For installing a communication module
8)	CF card interface	For installing a CF card
9)	CF card access LED	Lit: CF card accessed Not lit: CF card not accessed
10)	CF card access switch	Used for stopping the access to the CF card before removing the CF card from the GOT ON: CF card being accessed (CF card removal prohibited) OFF: CF card not accessed (CF card removal possible)
11)	Optional function board interface	For installing the optional function board
12)	Multi-color display board interface	For installing the multi-color display board
13)	Reset switch	Hardware reset switch (Inoperative for bus connection)
14)	Hole for unit installation fitting	Hole for inserting the unit installation fitting
15)	Battery holder	Houses the battery
16)	Human sensor	Sensor that detects human movement
17)	Installation switch	Used for OS installations at the GOT startup

2.2 Part Names and Settings of the GT1585



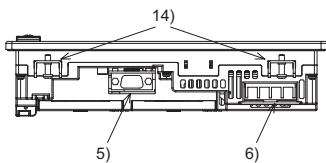
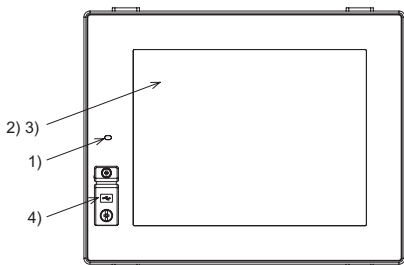
No.	Name	Description
1)	POWER LED	Lit in green: Power is correctly supplied Lit in orange: Screen saving Blinks in orange/green: Blown back light bulb Not lit: Power is not supplied
2)	Display screen	Displays the Utility and the user creation screen
3)	Touch key	For operating touch switches in the Utility and the user creation screen
4)	USB interface	For connecting a personal computer (Connector type: MINI-B)
5)	RS-232 interface	For communicating with a controller or connecting a personal computer (Connector type: D sub 9-pin)
6)	Power terminal	Power input terminal, LG terminal, FG terminal
7)	Extension module interface	For installing a communication module
8)	CF card interface	For installing a CF card
9)	CF card access LED	Lit: CF card accessed Not lit: CF card not accessed
10)	CF card access switch	Used for stopping the access to the CF card before removing the CF card from the GOT ON: CF card being accessed (CF card removal prohibited) OFF: CF card not accessed (CF card removal possible)
11)	Optional function board interface	For installing the optional function board
12)	Multi-color display board interface	For installing the multi-color display board
13)	Reset switch	Hardware reset switch (Inoperative for bus connection)
14)	Hole for unit installation fitting	Hole for inserting the unit installation fitting
15)	Battery holder	Houses the battery
16)	Human sensor	Sensor that detects human movement

2.3 Part Names and Settings of the GT157□

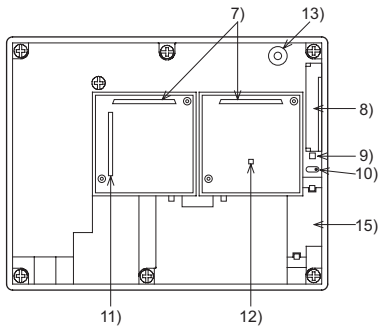


No.	Name	Description
1)	POWER LED	Lit in green: Power is correctly supplied Lit in orange: Screen saving Blinks in orange/green: Blown back light bulb Not lit: Power is not supplied
2)	Display screen	Displays the Utility and the user creation screen
3)	Touch key	For operating touch switches in the Utility and the user creation screen
4)	USB interface	For connecting a personal computer (Connector type: MINI-B)
5)	RS-232 interface	For communicating with a controller or connecting a personal computer (Connector type: D sub 9-pin)
6)	Power terminal	Power input terminal, LG terminal, FG terminal
7)	Extension module interface	For installing a communication module
8)	CF card interface	For installing a CF card
9)	CF card access LED	Lit: CF card accessed Not lit: CF card not accessed
10)	CF card access switch	Used for stopping the access to the CF card before removing the CF card from the GOT ON: CF card being accessed (CF card removal prohibited) OFF: CF card not accessed (CF card removal possible)
11)	Optional function board interface	For installing the optional function board
12)	Multi-color display board interface	For installing the multi-color display board (For GT1575-VN and GT1572-VN, 65536 color display is not supported even with the multi-color display board installed.)
13)	Reset switch	Hardware reset switch (Inoperative for bus connection)
14)	Hole for unit installation fitting	Hole for inserting the unit installation fitting
15)	Battery holder	Houses the battery

2.4 Part Names and Settings of the GT156□



GOT rear face



No.	Name	Description
1)	POWER LED	Lit in green: Power is correctly supplied Lit in orange: Screen saving Blinks in orange/green: Blown back light bulb Not lit: Power is not supplied
2)	Display screen	Displays the Utility and the user creation screen
3)	Touch key	For operating touch switches in the Utility and the user creation screen
4)	USB interface	For connecting a personal computer (Connector type: MINI-B)
5)	RS-232 interface	For communicating with a controller or connecting a personal computer (Connector type: D sub 9-pin)
6)	Power terminal	Power input terminal, LG terminal, FG terminal
7)	Extension module interface	For installing a communication module
8)	CF card interface	For installing a CF card
9)	CF card access LED	Lit: CF card accessed Not lit: CF card not accessed
10)	CF card access switch	Used for stopping the access to the CF card before removing the CF card from the GOT ON: CF card being accessed (CF card removal prohibited) OFF: CF card not accessed (CF card removal possible)
11)	Optional function board interface	For installing the optional function board
12)	Multi-color display board interface	For installing the multi-color display board (For GT1575-VN and GT1572-VN, 65536 color display is not supported even with the multi-color display board installed.)
13)	Reset switch	Hardware reset switch (Inoperative for bus connection)
14)	Hole for unit installation fitting	Hole for inserting the unit installation fitting
15)	Battery holder	Houses the battery

3. Specifications

3.1 General Specifications

Item		Specifications					
Operating ambient temperature	Display section	0 to 50°C					
	Other than display section	0 to 55°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*1		Conforms to JIS B3502 and IEC61131-2		Frequency	Acceleration	Half-amplitude	Sweep Count
			Under intermittent vibration	5 to 9Hz	-	3.5mm	10 times each in X, Y and Z directions
				9 to 150Hz	9.8m/s ²	-	
			Under continuous vibration	5 to 9Hz	-	1.75mm	
9 to 150Hz	4.9m/s ²	-					
Shock resistance		Conforms to JIS B3502, IEC 61131-2 (147 m/s ² , 3 times each in X, Y and Z directions)					
Operating atmosphere		No corrosive gas					
Operating altitude*2		2000 m (6562 ft) max.					
Installation location		Inside control panel					
Overvoltage category*3		II or less					
Pollution degree*4		2 or less					
Cooling method		Self-cooling					

- *1 When using the MELSECNET/10 communication unit (GT15-75J71LP23-Z, GT15-75J71BR13-Z) or CC-Link communication unit (GT15-75J61BT13-Z), refer to the manual of the communication unit you use. (Differs with the specification of GOT.)
- *2 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.
- *3 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.
- *4 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

The performance specifications of the GT15 is as follows.



- 3.2.1 GT1595-X
- 3.2.2 GT1585-S
- 3.2.3 GT1575-S, GT1575-V, GT1575-VN, GT1572-VN
- 3.2.4 GT1565-V, GT1562-VN

3.2.1 GT1595-X

Item		Specifications
		GT1595-XTBA
Display section *1	Type	TFT color liquid crystal display (High intensity and wide angle view)
	Screen size	15"
	Resolution	1,024 × 768 dots
	Display size	304.1(12.0)(W) × 228.1(8.98)(H) [mm](inch)
	Display character	16-dot standard font : 64 characters × 48 lines
		12-dot standard font : 85 characters × 64 lines
	Display color	256color/65536color*2
	Display angle	Left/Right : 75 degrees Top : 50 degrees Bottom : 60 degrees
	Intensity of LCD only	450 [cd/m ²]
	Intensity adjustment	8-level adjustment
Life	Approx. 52,000 h (Operating ambient temperature : 25°C)	
Backlight		Cold cathode fluorescent tube (replaceable) backlight shutoff detection function is included Backlight off/screen saving time can be set.
	Life*3	Approx. 50,000 h or longer (Time when display luminance reaches 50% at the operating ambient temperature of 25°C)
Touch panel	Number of Touch key	3,072 objects/screen (48 lines × 64 columns)
	Key size	Minimum 16 x 16 dots (per key)
	Number of objects that can be simultaneously touched	Simultaneous presses not allowed (Only 1 point can be touched)
	Life	1 million times or more (operating force 0.98N max.)

(Continued to next page)

Item		Specifications
		GT1595-XTBA
Human sensor	Detection length	1(39.37) [m](inch)
	Detection range	Left/Right/Top/Bottom: 70 degrees
	Detection delay time	0 to 4s
Memory ^{*4}	C drive	Built-in flash memory 9Mbytes (for storing project data and OS)
	Life (Number of write times)	100,000 times
Battery		GT15-BAT lithium battery (Option)
	Backup target	Clock data and maintenance time notification data
	Life	Approx. 5 years (Operating ambient temperature of 25°C)
Built-in interface	RS-232	RS-232, 1ch Transmission speed : 115,200/57,600/38,400/19,200/9,600/4,800 bps Connector shape : D-sub 9-pin (Male) Application : For communicating with a controller or connecting a personal computer (Project data upload/doxload, OS installation, transparent function)
	USB	USB (Full Speed 12Mbps), 1ch Connector shape: Mini-B Application: PC communicationn (screen data upload/download, OS installation and FA transparent function))
	CF card	Compact flash slot, 1ch Connector shape : TYPE I Application : Data transfer, data storage
	Option function board	For option function board mounting, 1ch
	Multi-color display board	For multi-color display board mounting, 1ch
	Communication unit/Option unit	For communication unit/option unit mounting, 2ch
Buzzer output		Single tone (tone length adjustable)
Protective structure		Inside the enclosure: IP67 ^{*5} Outside the enclosure: IP2X
External dimension (Excluding USB environmental protection cover)		397(15.6)(W) x 296(11.7)(H) × 61(2.40)(D)[mm](inch)
Panel cutting dimensions		383.5(15.1)(W) × 282.5(11.1)(H)[mm](inch)
Weight		4.9kg (mounting fixtures are not included)
Compatible software package (GT Designer2 Version)		2.17T or later

- *1 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. Please note that these dots appear due to its characteristic and are not caused by product defect.
- *2 Full-color display (66536 colors) is available when the multi-color display board is mounted.
- *3 The GOT screen saving/backlight off function prevents images from becoming permanently etched on the display screen and increases the backlight life.
- *4 ROM in which new data can be written without deleting the written data.
- *5 Compliant with IP67 when the USB environmental protection cover is attached. Compliant with IP2X at the USB interface only when a USB cable is connected. Note that this does not guarantee all users' operation environment.

3.2.2 GT1585-S

Item		Specifications	
		GT1585-STBA	GT1585-STBD
Display section *1	Type	TFT color liquid crystal display (High intensity and wide angle view)	
	Screen size	12.1"	
	Resolution	800 × 600 dots	
	Display size	246(9.69)(W) × 184.5(7.26)(H) [mm](inch)	
	Display character	16-dot standard font : 50 characters × 37 lines 12-dot standard font : 66 characters × 50 lines	
	Display color	256color/65536color*2	
	Display angle	Left/Right : 60 degrees Top : 40 degrees Bottom : 50 degrees	
	Intensity of LCD only	350 [cd/m ²]	
	Intensity adjustment	8-level adjustment	
	Life	Approx. 50,000 h (Operating ambient temperature : 25°C)	
Backlight		Cold cathode fluorescent tube (replaceable) backlight shut-off detection function is included. Backlight off/screen saving time can be set.	
	Life*3	Approx. 50,000 h or longer (Time when display luminance reaches 50% at the operating ambient temperature of 25°C)	
Touch panel	Number of touch keys	1,900 objects/screen (Matrix structure of 38 lines × 50 columns)	
	Key size	Minimum 16 × 16 dots (per key)	
	Number of objects that can be simultaneously touched	Maximum of 2 objects	
	Life	1 million times or more (operating force 0.98N max.)	
Human Sensor	Detection length	1(39.37) [m](inch)	
	Detection range	Left/Right/Top/Bottom: 70 degrees	
	Detection delay time	0 to 4s	
Memory *4	C drive	Built-in flash memory 9Mbytes (for storing project data and OS)	
	Life (Number of write times)	100,000 times	

(Continued to next page)

Item	Specifications	
	GT1585-STBA	GT1585-STBD
Battery	GT15-BAT lithium battery (Option)	
Backup target	Clock data and maintenance time notification data	
Life	Approx. 5 years (Operating ambient temperature of 25°C)	
Built-in interface	RS-232	RS-232, 1ch Transmission speed:115,200/57,600/38,400/19,200/9,600/4,800 bps Connector shape:D-sub 9-pin (Male) Application:For communicating with a controller or connecting a personal computer (Project data upload/download, OS installation, transparent function)
	USB	USB (Full Speed 12Mbps), 1ch Connector shape:Mini-B Application:PC communication (screen data upload/download, OS installation and FA transparent function)
	CF card	Compact flash slot, 1ch Connector shape:TYPE I Application:Data transfer, data storage
	Option function board	For option function board mounting, 1ch
	Multi-color display board	For multi-color display board mounting, 1ch
	Communication unit/Option unit	For communication unit/option unit mounting, 2ch
Buzzer output	Single tone (tone length adjustable)	
Protective structure	Inside the enclosure: IP67 *5 Outside the enclosure: IP2X	
External dimensions (Excluding USB environmental protection cover)	316(12.44)(W) × 242(9.53)(H) × 52(2.05)(D) [mm](inch)	
Panel cutting dimensions	302(11.89)(W) × 228(8.98)(H)[mm](inch)	
Weight	2.8 kg (mounting fixtures are not included)	
Compatible software package (GT Designer2 Version)	2.04E or later	2.17T or later

- *1 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. Please note that these dots appear due to its characteristic and are not caused by product defect.
- *2 Full-color display (66536 colors) is available when the multi-color display board is mounted.
- *3 The GOT screen saving/backlight off function prevents images from becoming permanently etched on the display screen and increases the backlight life.
- *4 ROM in which new data can be written without deleting the written data.
- *5 Compliant with IP67 when the USB environmental protection cover is attached. Compliant with IP2X at the USB interface only when a USB cable is connected. Note that this does not guarantee all users' operation environment.

3.2.3 GT1575-S, GT1575-V, GT1575-VN, GT1572-VN

Item		Specifications			
		GT1575-STBA, GT1575-STBD	GT1575-VTBA, GT1575-VTBD	GT1575-VNBA, GT1575-VNBD	GT1572-VNBA, GT1572-VNBD
Display section 1	Type	TFT color liquid crystal (LCD of high intensity and wide angle view)		TFT color liquid crystal	
	Screen size	10.4"			
	Resolution	800×600dots	640×480dots		
	Display size	211(8.31)(W)×158(6.22)(H)[mm](inch)			
	Display character	16-dot standard font: 50 characters × 37 lines 12-dot standard font: 66 characters × 50 lines	16-dot standard font:40 characters × 30 lines 12-dot standard font:53 characters × 40 lines		
	Display color	256color/65536color*2		256color	16color
	Display angle	Left/Right:50 degrees Top:35 degrees Bottom:45 degrees	Left/ Right/Top/ Bottom: 85 degrees	Left/Right:45 degrees Top:30 degrees Bottom:20 degrees	
	Intensity of LCD only	280[cd/m ²]	380[cd/m ²]	200[cd/m ²]	
	Intensity adjustment	8-level adjustment		4-level adjustment	
Life	Approx. 50,000 h (Operating ambient temperature: 25°C)	Approx. 41,000 h (Operating ambient temperature:25°C)			
Backlight		Cold cathode fluorescent tube (replaceable) backlight shutoff detection function is included. Backlight off/screen saving time can be set.			
	Life*3	Approx. 40,000 h or longer (Time when display luminance reaches 50% at the operating ambient temperature of 25°C)			
Touch panel	Number of touch keys	1,900 objects/ screen (Matrix structure of 38 lines × 50 columns)	1,200 objects/screen (Matrix structure of 30 lines × 40 columns)		
	Key size	Minimum 16 × 16 dots (per key)			

(Continued to next page)

Item		Specifications			
		GT1575-STBA, GT1575-STBD	GT1575-VTBA, GT1575-VTBD	GT1575-VNBA, GT1575-VNBD	GT1572-VNBA, GT1572-VNBD
Touch panel	Number of objects that can be simultaneously touched	Maximum of 2 objects			
	Life	1 million times or more (operating force 0.98 max.)			
Human sensor	Detection length	None			
	Detection range	None			
	Detection delay time	None			
Memory ⁴	C drive	Built-in flash memory 9Mbytes (for storing project data and OS)		Built-in flash memory 5Mbytes (for storing project data and OS)	
	Life (Number of write times)	100,000 times			
Battery		GT-15BAT lithium battery (Option)			
	Backup target	Clock data and maintenance time notification data			
	Life	Approx. 5 years (Operating ambient temperature of 25°C)			
Built-in interface	RS-232	RS-232, 1ch Transmission speed:115,200/57,600/38,400/19,200/9,600/4,800 bps Connector shape:D-sub 9-pin (Male) Application:For communicating with a controller or connecting a personal computer (Project data upload/download, OS installation, FA transparent function)			
	USB	USB (Full Speed 12 Mbps), 1ch Connector shape:Mini-B Application:For connecting a personal computer (Project data upload/download, OS installation and FA transparent function)			
	CF card	Compact flash slot, 1ch Connector shape: TYPE I Application: Data transfer, data storage			
	Option function board	For option function board mounting, 1ch			

(Continued to next page)

Item		Specifications			
		GT1575-STBA, GT1575-STBD	GT1575-VTBA, GT1575-VTBD	GT1575-VNBA, GT1575-VNBD	GT1572-VNBA, GT1572-VNBD
Built-in interface	Multi-color display board	For multi-color display board mounting, 1ch		Cannot be used. (Even installed, 65536 colors will not be displayed.)	
	Communication unit/ Option unit	For communication unit/option unit mounting, 2ch			
Buzzer output		Single tone (tone length adjustable)			
Protective structure		Outside the enclosure: IP67 ^{*5} Inside the enclosure: IP2X			
External dimensions (Excluding USB environmental protective cover)		303(11.93)(W)×214(8.43)(H)×49(1.93)(D)[mm](inch)			
Panel cutting dimensions		289(11.38)(W)×200(7.87)(H)[mm](inch)			
Weight		2.4 kg (mounting fixtures are not included)	2.3 kg (mounting fixtures are not included)		
Compatible software package (GT Designer2 Version)		GT1575-STBA: 2.04E or later GT1575-STBD: 2.17T or later	GT1575-VTBA: 2.04E or later GT1575-VTBD: 2.17T or later	2.17T or later	

- *1 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. Please note that these dots appear due to its characteristic and are not caused by product defect.
- *2 Full-color display (66536 colors) is available when the multi-color display board is mounted.
- *3 The GOT screen saving/backlight off function prevents images from becoming permanently etched on the display screen and increases the backlight life.
- *4 ROM in which new data can be written without deleting the written data.
- *5 Compliant with IP67 when the USB environmental protection cover is attached. Compliant with IP2X at the USB interface only when a USB cable is connected. Note that this does not guarantee all users' operation environment.

3.2.4 GT1565-V, GT1562-VN

Item		Specifications	
		GT1565-VTBA, GT1565-VTBD	GT1562-VNBA, GT1562-VNBD
Display section *1	Type	TFT color liquid crystal (LCD of high intensity and wide angle view)	TFT color liquid crystal
	Screen size	8.4"	
	Resolution	640x480dots	
	Display size	171(6.73)(W)x128(5.04)(H)[mm](inch)	
	Display character	16-dot standard font: 40 characters x 30 lines 12-dot standard font: 53 characters x 40 lines	
	Display color	256color/65536color*2	16color
	Display angle	Left/Right : 65degrees Top : 50 degrees Bottom : 60 degrees	Left/Right : 45degrees Top : 20 degrees Bottom : 20 degrees
	Intensity of LCD only	380[cd/m ²]	150[cd/m ²]
	Intensity adjustment	8-level adjustment	4-level adjustment
	Life	Approx. 41,000 h (Operating ambient temperature: 25°C)	
Backlight		Cold cathode fluorescent tube (replaceable) backlight shutoff detection function is included. Backlight off/screen saving time can be set.	
	Life*3	Approx. 40,000 h or longer (Time when display luminance reaches 50% at the operating ambient temperature of 25°C)	
Touch panel	Numbers of touch key	1,200 objects/screen (Matrix structure of 30 lines x 40 columns)	
	Key size	Minimum 16 x 16 dots (par key)	
	Number of objects that can be simultaneously touched	Maximum of 2 objects	
	Life	1 million times or more (operating force 0.98N max.)	
Human sensor	Detection length	None	
	Detection range	None	
	Detection delay time	None	
Memory*4	C drive	Built-in flash memory 9Mbytes (for string project data and OS)	Built-in flash memory 5Mbytes (for string project data and OS)
	Life (Number of write times)	100,000 times	

(Continued to next page)

Item	Specifications		
	GT1565-VTBA, GT1565-VTBD	GT1562-VNBA, GT1562-VNBD	
Battery	GT-15BAT lithium battery (Option)		
Backup target	Clock data and maintenance time notification data		
Life	Approx. 5 years (Operating ambient temperature of 25°C)		
Built-in interface	RS-232	RS-232, 1ch Transmission speed:115,200/57,600/38,400/19,200/9,600/4,800 bps Connector shape:D-sub 9-pin (Male) Application: For communicating with a controller or connecting a personal computer (Project data upload/download, OS installation and FA transparent function)	
	USB	USB (Full Speed 12 Mbps), 1ch Connector shape:Mini-B Application:For communicating a personal computer (Project data upload/download, OS installation and FA transparent function)	
	CF card	Compact flash slot, 1ch Connector shape: TYPE 1 Application: Data transfer, data storage	
	Option function board	For option function board mounting, 1ch	
	Option function board	For option function board mounting, 1ch	
	Multi-color display board	For multi-color display board mounting, 1ch	Cannot be used. (Even installed, 65536 colors will not be displayed.)
	Communication unit/Option unit	For communication unit/option unit mounting, 2ch	
	Buzzer output	Single tone (tone length adjustable)	
Protective structure	Outside the enclosure: IP67 ⁵ Inside the enclosure: IP2X		
External dimensions (Excluding USB environmental protective cover)	241(9.49)(W)×190(7.48)(H)×52(2.05)(D)[mm](inch)		
Panel cutting dimensions	227(8.94)(W)×176(6.93)(H)[mm](inch)		
Weight	1.9 kg (mounting fixtures are not included)		
Compatible software package (GT Designer2 Version)	GT1565-VTBA:2.04E or later, GT1565-VTBD:2.17T or later	2.17T or later	

- *1 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. Please note that these dots appear due to its characteristic and are not caused by product defect.
- *2 Full-color display (66536 colors) is available when the multi-color display board is mounted.
- *3 The GOT screen saving/backlight off function prevents images from becoming permanently etched on the display screen and increases the backlight life.
- *4 ROM in which new data can be written without deleting the written data.
- *5 Compliant with IP67 when the USB environmental protection cover is attached. Compliant with IP2X at the USB interface only when a USB cable is connected. Note that this does not guarantee all users' operation environment.

3.3 Power Supply Specifications

The following describes the power supply specifications for the GT15.



- 3.3.1 For GOTs powered from the 100 to 240VAC power supply
- 3.3.2 For GOTs powered from the 24VDC power supply

Remarks

Operation at momentary failure

- If an instantaneous power failure occurs in the power supply and continues for more than the permissible period, the GOT will be reset.
- Make sure to power on the unit more than 5 seconds after power-off.

3.3.1 For GOTs powered from the 100 to 240VAC power supply

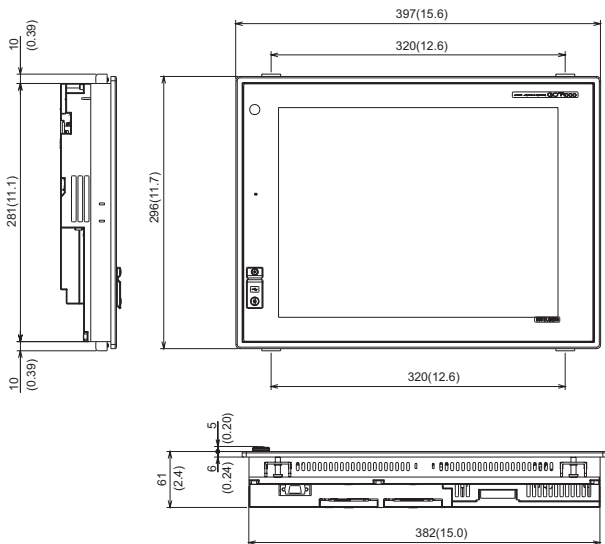
Item	Specifications		
	GT1595-XTBA	GT1585-STBA	GT1575-STBA, GT1575-VTBA, GT1575-VNBA, GT1572-VNBA, GT1565-VTBA, GT1562-VNBA
Input power supply voltage	100 to 240VAC (+10% -15%)		
Input frequency	50/60Hz \pm 5%		
Input max. apparent power	110VA (maximum load)	90VA (maximum load)	
Power consumption	51W or less	28W or less	26W or less
At backlight off	28W or less	20W or less	
Inrush current	50A or less (4ms) (maximum load)	45A or less (4ms) (maximum load)	40A or less (4ms) (maximum load)
Permissible instantaneous power failure time	20ms (100VAC or longer)		
Noise immunity	1,500Vp-p noise voltage, 1 μ s noise width (when measuring with a noise simulator under 25 to 60Hz noise frequency)		
Dielectric withstand voltage	1500VAC for 1 minute across AC external terminals and earth		
Insulation resistance	10M Ω or larger by insulation resistance tester		
Applicable wire size	0.75 to 2 [mm ²]		
Applicable solderless terminal	Solderless terminal for M3 screw RAV1.25-3, V2-S3.3, V2-N3A, FV2-N3A		
Applicable tightening torque (Terminal block terminal screw)	0.5 to 0.8 [N•m]		

3.3.2 For GOTs powered from the 24VDC power supply

Item	Specifications	
	GT1585-STBD	GT1575-STBD, GT1575-VTBD, GT1575-VNBA, GT1572-VNBA, GT1565-VTBD, GT1562-VNBA
Input power supply voltage	24VDC (+25%, -20%)	
Power consumption	31W or less	26W or less
	At backlight off	20W or less
Inrush current	115A or less (1ms) (maximum load)	
Permissible instantaneous power failure time	10 ms or less	
Noise immunity	500Vp-p noise voltage, 1 μ s noise width (when measuring with a noise simulator under 25 to 60Hz noise frequency)	
Dielectric withstand voltage	500VAC for 1 minute across DC external terminals and earth	
Insulation resistance	10M Ω or larger by insulation resistance tester	
Applicable wire size	0.75 to 2 [mm ²]	
Applicable solderless terminal	Solderless terminal for M3 screw RAV1.25-3, V2-S3.3, V2-N3A, FV2-N3A	
Applicable tightening torque (Terminal block terminal screw)	0.5 to 0.8 [N•m]	

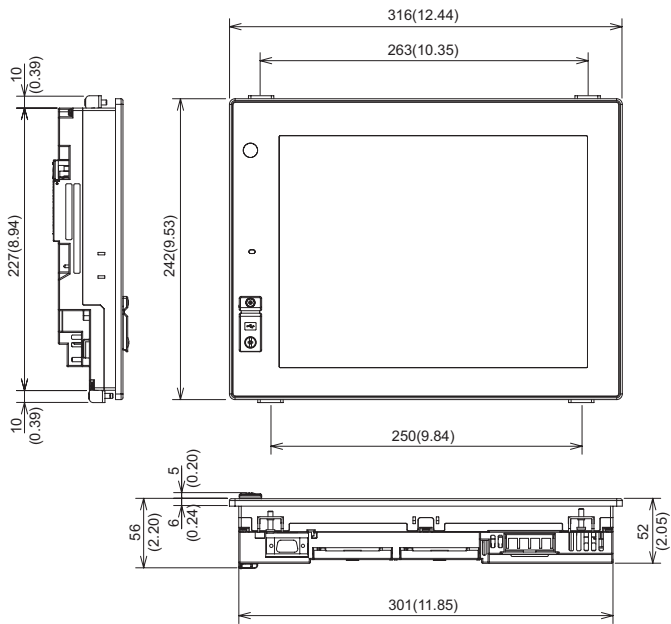
3.4 External Dimensions

(1) GT1595



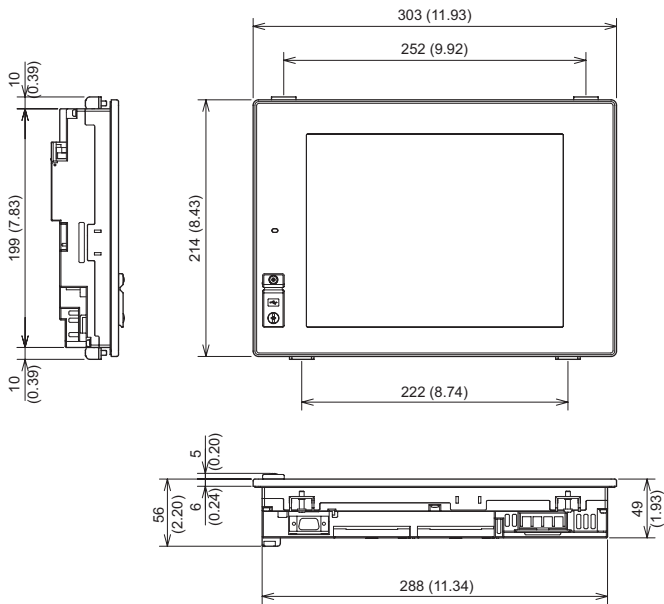
Unit:mm(inch)

(2) GT1585



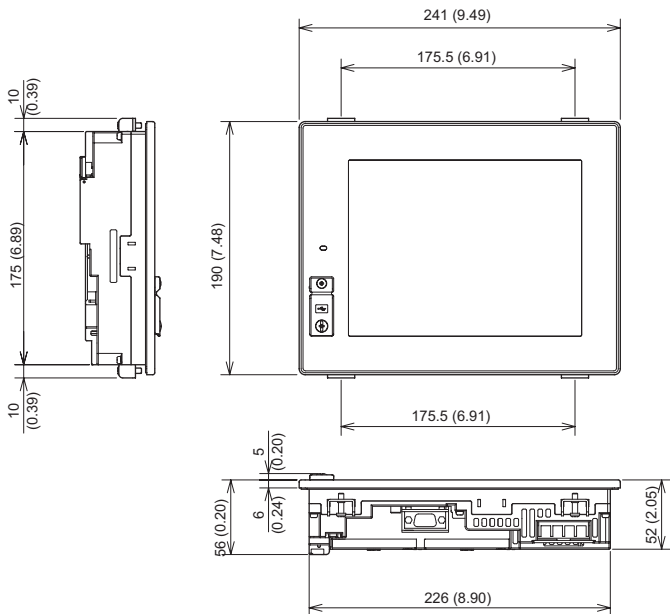
Unit: mm (inch)

(3) GT157□



Unit: mm (inch)

(4) GT156□



Unit: mm (inch)

4. EMC and Low Voltage Directive

For the products sold in European countries, the conformance to the EMC Directive, which is one of the European Directives, has been a legal obligation since 1996. Also, conformance to the Low Voltage Directive, another European Directives, has been a legal obligation since 1997.

Manufacturers who recognize their products must conform to the EMC and Low Voltage Directive are required to declare that their products conform to these Directives and put a "CE mark" on their products.

4.1 Requirements to meet EMC Directive

EMC Directives are those which require "any strong electromagnetic force is not output to the external.: Emission (electromagnetic interference)" and "It is influenced by the electromagnetic wave from the external.: Immunity (electromagnetic sensitivity)".

Items 4.1.1 thru 4.1.3 summarize the precautions to use GOT and configure the mechanical unit in order to match the EMC directives. Though the data described herein are produced with our best on the basis of the requirement items and standards of the restrictions gathered by Mitsubishi, they do not completely guaranteed that all mechanical unit manufactured according to the data do not always match the above directives. The manufacturer itself which manufactures the mechanical unit must finally judge the method and others to match the EMC directives.

4.1.1 EMC Directive

The standards of the EMC Directive are shown below.

Applied standard	Test standard	Test details	Standard value
EN61000-6-4 :2001	EN55011 Radiated noise ^{*1}	Electromagnetic emissions from the product are measured.	30M-230MHz QP: 30dB μ V/m (30m in measurement range) ^{*2, *3} 230M-1000MHz QP: 37dB μ V/m(30m in measurement range) ^{*2, *3}
	EN55011 Conducted noise ^{*1}	Electromagnetic emissions from the product to the power line is measured.	150k-500kHz QP:79dB, Mean:66dB ^{*2} 500k-30MHz QP:3dB, Mean:60dB ^{*2}
EN61131-2 :2003	EN61000-4-2 Electrostatic immunity ^{*1}	Immunity test in which static electricity is applied to the cabinet of the equipment.	\pm 4kV Contact discharge \pm 8kV Aerial discharge
	EN61000-4-3 Radiated field AM modulation ^{*1}	Immunity test in which field is irradiated to the product.	80-1000MHz :10V/m 1.4-2GHz :10V/m 80%AM modulation@1kHz
	EN61000-4-4 Fast transient burst noise ^{*1}	Immunity test in which burst noise is applied to the power line and signal lines.	Power line:2kV Digital I/O(24V or higher):1kV (Digital I/O(24V or less)) > 250V (Analog I/O, signal lines) > 250V
	EN61000-4-5 Surge immunity ^{*1}	Immunity test in which lightning surge is applied to the product.	AC power type Power line (between line and ground): \pm 2kV Power line (between lines): \pm 1kVA Data communication port: \pm 1kV DC power type Power line (between line and ground): \pm 0.5kVA Power line (between lines): \pm 1kVA Data communication port : \pm 1kVA
	EN61000-4-6 Conducted RF immunity ^{*1}	Immunity test in which a noise induced on the power and signal lines is applied.	Power line: 3V Data communication port: 3V

Applied standard	Test standard	Test details	Standard value
EN61131-2 :2003	Instantaneous power failure and voltage dips immunity	Test for checking normal operations at instantaneous power failure	AC power type 0.5 cycle (interval 1s or more) DC power type 10 ms (interval 1s or more)
	Radiated RF immunity	Test for checking normal operations when the power supply unit input voltage is fluctuated.	AC power type 47Hz: 85V, 264V 63Hz: 85V, 264V DC power type 20.4V, 28.8V
	Third harmonic immunity	Test for checking normal operations when the AC power waveform mixed with third harmonic wave is input.	47Hz: 85V (phase 180°, distortion rate 10%) 63Hz: 132V (phase 0°, distortion rate 10.9%)
	External power supply fluctuation immunity	Test for checking if the unit becomes faulty with a transient voltage of the internal and external input sides of the power supply unit or unit power supply.	AC power type 47Hz: 85V 63Hz: 264V DC power type 19.2V, 30V

*1: The GOT is an open type device (device installed to another device) and must be installed in a conductive control panel.

The above test items are conducted in the condition where the GOT is installed on the conductive control panel and combined with the Mitsubishi PLC.

*2: QP: Quasi-peak value, Mean : Average value

*3: The above test items are conducted in the following conditions.

30M-230MHz QP: 40dB μ V/m (10m in measurement range)

230M-1000MHz QP: 47dB μ V/m (10m in measurement range)

4.1.2 Control panel

The GOT is an open type device (device installed to another device) and must be installed in a conductive control panel. It not only assure the safety but also has a large effect to shut down the noise generated from GOT, on the control panel.

- 1) Control panel
 - a) The control panel must be conductive.
 - b) When fixing a top or bottom plate of the control panel with bolts, do not coat the plate and bolt surfaces so that they will come into contact.
And connect the door and box using a thick grounding cable in order to ensure the low impedance under high frequency.
 - c) When using an inner plate to ensure electric conductivity with the control panel, do not coat the fixing bolt area of the inner plate and control panel to ensure conductivity in the largest area as possible.
 - d) Ground the control panel using a thick grounding cable in order to ensure the low impedance under high frequency.
 - e) The diameter of cable holes in the control panel must be 10cm (3.94in.). In order to reduce the chance of radio waves leaking out, ensure that the space between the control panel and its door is small as possible.
Attach some EMI gaskets to fill up the space and suppress the leakage of radio waves.
Out test have been carried out on a panel having the damping characteristics of 37dB max. and 30dB mean (measured by 3m method with 30 to 300MHz).

- 2) Connection of power and ground wires
Ground and power supply wires for the GOT must be connected as described below.
- a) Provide a grounding point near the GOT. Short-circuit the LG and FG terminals of the GOT (LG: line ground, FG: frame ground) and ground them with the thickest and shortest wire possible (The wire length must be 30cm (11.18in.) or shorter.) The LG and FG terminals function is to pass the noise generated in the PC system to the ground, so an impedance that is as low as possible must be ensured. As the wires are used to relieve the noise, the wire itself carries a large noise content and thus short wiring means that the wire is prevented from acting as an antenna.
- Note) A long conductor will become a more efficient antenna at high frequency.
- b) The earth wire led from the earthing point must be twisted with the power supply wires. By twisting with the earthing wire, noise flowing from the power supply wires can be relieved to the earthing. However, if a filter is installed on the power supply wires, the wires and the earthing wire may not need to be twisted.

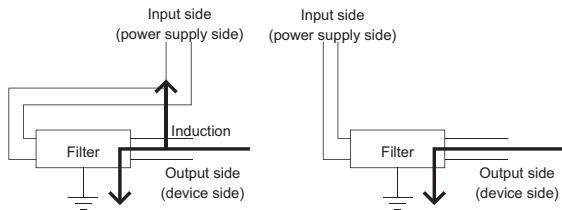
4.1.3 Noise filter (power supply line filter)

The noise filter (power supply line filter) is a device effective to reduce conducted noise. Except some models, installation of a noise filter onto the power supply lines is not necessary. However conducted noise can be reduced if it is installed. (The noise filter is generally effective for reducing conducted noise in the band of 10MHz or less.) Usage of the following filters is recommended.

Model name	FN343-3/01	FN660-6/06	ZHC2203-11
Manufacturer	SCHAFFNER	SCHAFFNER	TDK
Rated current	3A	6A	3A
Rated voltage	250V		

The precautions required when installing a noise filter are described below.

- 1) Do not install the input and output cables of the noise filter together to prevent the output side noise will be inducted into the input side cable where noise has been eliminated by the noise filter.



- (a) Installing the input and output cables together will cause noise induction.
 - (b) Separate the input cable from the output cable.
- 2) Cannot the noise filter's ground terminal to the control panel with the shortest cable as possible (approx. 10cm (3.94 in.) or less).

4.2 Requirements for compliance with the Low Voltage Directive

The Low Voltage Directive requires each device which operates with power supply ranging from 50VAC to 1000V and 75VDC to 1500V to satisfy necessary safety items.

In the Sections from 4.2.1 to 4.2.5, cautions on installation and wiring of the GOT to conform to the Low Voltage Directive requires are described. We have put the maximum effort to develop this material based on the requirements and standards of the Directive that we have collected. However, compatibility of the devices which are fabricated according to the contents of this manual to the above Directive is not guaranteed. Each manufacturer who fabricates such device should make the final judgement about the application method of the Low Voltage Directive and the product compatibility.

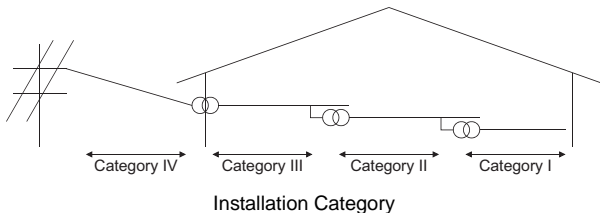
4.2.1 Standard subject to GOT

Standard applied to GOT: EN61131-2 Programmable controllers -
Equipment requirements and tests
EN60950-1 Safety of Information
Technology Equipment

4.2.2 Power supply

The insulation specification of the GOT was designed assuming installation category II. Be sure to use the installation category II power supply to the GOT.

The installation category indicates the durability level against surge voltage generated by lightning strike. Category I has the lowest durability; category IV has the highest durability.



Category II indicates a power supply whose voltage has been reduced by two or more levels of isolating transformers from the public power distribution.

4.2.3 Control panel

Because the GOT is open type equipment (device designed to be stored within another device), be sure to use it only when installed in a control panel.

1) Shock protection

In order to prevent those who are unfamiliar with power facility, e.g., an operator, from getting a shock, make sure to take the following measures on the control panel.

- a) Store the GOT within the control panel locked, and allow only those who are familiar with power facility to unlock the panel.
- b) Build the structure in order that the power supply will be shut off when the control panel is opened.

2) Dustproof and waterproof features

The control panel also provides protection from dust, water and ether substances. Insufficient ingress protection may lower the insulation withstand voltage, resulting in insulation destruction. The insulation in the GOT is designed to cope with the pollution level 2, so use in an environment with pollution level 2 or better.

Pollution level1 :An environment where the air is dry and conductive dust does not exist.

Pollution level2 :An environment where conductive dust does not usually exist, but occasional temporary conductivity occurs due to the accumulated dust.

Generally, this is the level for inside the control panel equivalent a control room or on the floor of a typical factory.

Pollution level3 :An environment where conductive dust exists and conductivity may be generated due to the accumulated dust.

An environment for a typical factory floor.

Pollution level4 :Continuous conductivity may occur due to rain, snow, etc. An outdoor environment.

4.2.4 Grounding

The following ground terminal is applicable. Use it in the grounded status.

Be sure to ground the grounding for the safety reasons and EMC Directives.

Functional grounding : Improves the noise resistance.

4.2.5 External wiring

1) External devices

When a device with a hazardous voltage circuit is externally connected to the GOT, select a model which complies with the Low Voltage Directive's requirements for isolation between the primary and secondary circuits.

2) Insulation requirements

Dielectric withstand voltages are shown in the following table.

Reinforced Insulation Withstand Voltage
(Installation Category II, source : IEC664)

Rated voltage of hazardous voltage area	Surge withstand voltage (1.2/50 μ s)
150 VAC or below	2500V
300 VAC or below	4000V

4.3 EMC Directive-compliant system configuration

The information of the EMC Directive-compliant models is obtained from MELFANSweb homepage (http://www.f2.mitsubishielectric.co.jp/melfansweb/english/index_e.htm).

4.3.1 GOT

Use a GOT with CE mark logo printed on the rating plate.

4.3.2 Connection method

Use the following methods to connect with the GOT to ensure compliance with the EMC Directive.

○ : Compliant with EMC Directive × : Not compliant with EMC Directive

Connection method ¹	GT15
Bus connection	○
Direct connection to CPU	○
Computer link connection	○
MELSECNET/10 connection (PLC to PLC network)	×
CC-Link connection (intelligent device station)	×
CC-Link connection (via G4)	×
Ethernet connection	○
Other connections	○ ^{*2}

*1: For details about each connection method, refer to the GOT1000 Series Connection Manual.

*2: When connecting the GOT to other controllers as a PLC manufactured by other company, create the cable (by the user) and configure the system to meet the EMC Directive specifications for the connected device. (refer to Section 4.4.2 4))

POINT

● Connected devices

If connecting to the PLC or microcomputer other than Mitsubishi products (MELSEC-Q series, MELSEC-QnA series or MELSEC-A series) please refer to the EMC Directive compliance manual for that specific device.

4.3.3 When the communication unit is used

Use the following communication unit with the GOT to ensure compliance with the EMC Directive.

The GOT does not comply with the EMC Directive when connected with other than followings.

Connection method	Communication unit used	Hardware version of the communication unit (Production year and month)
Bus connection	GT15-QBUS	Version D or later (Ocr., 2005)
	GT15-QBUS2 GT15-ABUS GT15-ABUS2	Version C or later (Ocr., 2005)
	GT15-75QBUSL GT15-75QBUS2L GT15-75ABUSL GT15-75ABUS2L	Version G or later (Mar., 2005)
Direct connection to CPU	GOT RS-232 interface GT15-RS2T4-9P	Version A or later
Computer link connection	GOT RS-232 interface GT15-RS2T4-9P	Version A or later
Ethernet connection	GT15-J71E71-100	Version B or later (Mar., 2005)
Microcomputer connection	GOT RS-232 interface GT15-RS2T4-9P	Version A or later
Third party PLC connection	GOT RS-232 interface GT15-RS2T4-9P	Version A or later

The GOT does not comply with the EMC Directive when it is used with the following unit.

Product name	Model name
MELSECNET/10 communication unit	GT15-75J71LP23-Z, GT15-75J71BR13-Z
CC-Link communication unit	G15-75J61BT13-Z

4.3.4 Cables

- 1) Applicable cables
Refer to the GOT1000 Series Connection Manual for the applicable cables for connecting a GOT and PLC.
- 2) Adjusting a cable for the EMC Directive compliance
Modify the cables (including user-produced cable) to ensure compliance with the EMC Directive.
For details, refer to Section 4.4.2.

4.4 Precautions for wiring/connecting the EMC Directive-compliant product

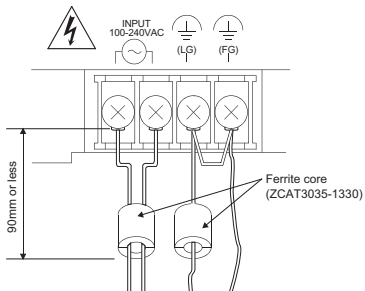
Wire and connect GOT1000 series equipments as instructed below. If the GOT1000 series equipments are configured in a way different from the following instructions, the system may not comply with EMC directives.

4.4.1 Power and ground wires wiring method

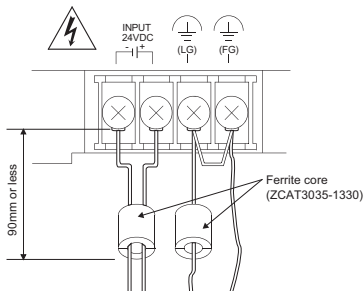
1) Power and ground wires wiring method

Connect the power wire and connection cable as shown in the illustration, and be sure to attach a ferrite core (TDK Corporation type ZCAT3035-1330) within the range shown below. Lead the power wire and ground wire as shown in Section 4.1.2 (2). Always ground the LG and FG wires.

a) 100-240VDC GOT power section



b) 24VDC GOT power section



4.4.2 Processing connection cables

Process the cable used with the GOT with the following method. When processing the cable, ferrite core, cable clamp and shielding material are required.

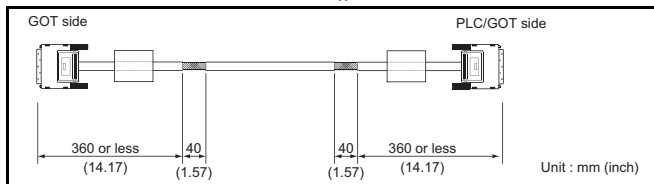
The cable clamp used by Mitsubishi Electric for the EMC specification compatibility test is shown below.

- TDK corporation brand ZCAT3035-1330 Ferrite Core
- Mitsubishi Electric Model AD75CK cable clamp
- Japan Zipper Tubing Co., Ltd. Zipper tube SHNJ type

1) BUS connection cable

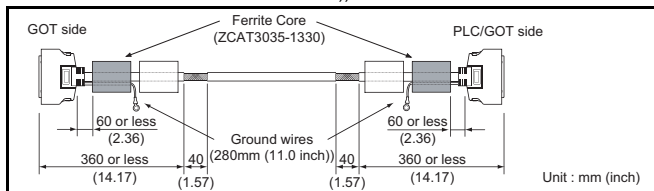
a) For GT15-QC□B, GT15-QC□BS

- Peel the sheath (with the length shown below) at both ends of the cable, and expose the shield braided wire for grounding. (For grounding with cable clamps. (refer to Section 4.4.3.))



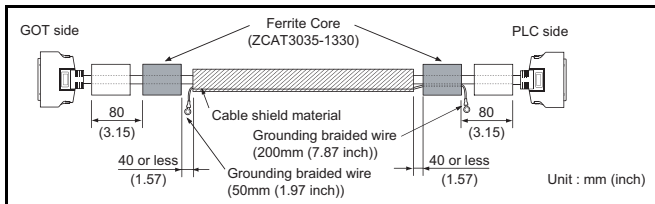
b) For GT15-C□BS

- Cut the connection wire protruding from both ends of the cable to the lengths shown below.
- Attach the ferrite core to the cable in the position as illustrated below and insert the ground wire into the ferrite core.
- Peel the sheath (with the length shown below) at both ends of the cable, and expose the shield braided wire for grounding. (For grounding with cable clamps. (refer to Section 4.4.3.))



c) For other bus connection cables

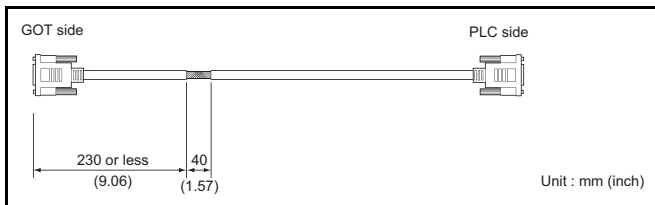
- Wind cable shield material around the cable, and pull out the grounding braided wire of the cable shield material with the length shown below.
- Attach the ferrite core to the cable in the position as illustrated below and insert the braided wire for grounding into the ferrite core.



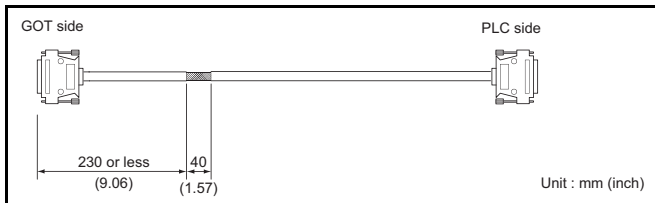
2) CPU direct connection and computer link connection

- Peel the sheath (with the length shown below) of the cable to expose the shield braided wire for grounding. (For grounding with cable clamps (refer to Section 4.4.3))

a) For RS-232 cable

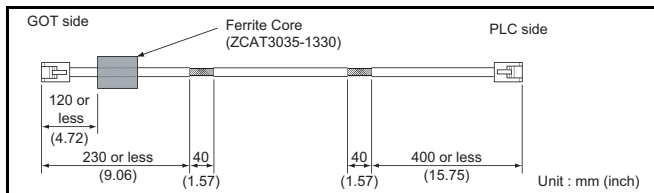


b) RS-422 cable (For AC30/100/300R4-25P)



3) Ethernet Connection

- Strip the outer insulation layer at both ends of the cable by the length shown below to expose the braided shield for grounding. (For grounding with cable clamps. (refer to Section 4.4.3.))
- Attach the ferrite core to the cable in the position as illustrated below.



4) PLC(manufactured by other company), microcomputer, temperature controller, inverter, servo amplifier or CNC connection

Produce the cable (RS-232 cable, RS-422 cable) for connecting the GOT to a controller with reference to the GOT1000 Series Connection Manual.

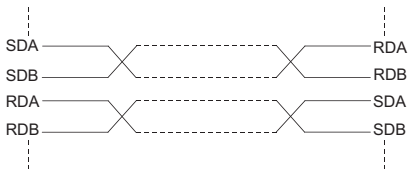
POINT

Configure the system to meet the EMC Directive specifications for the connected device when connecting the GOT to a controller.

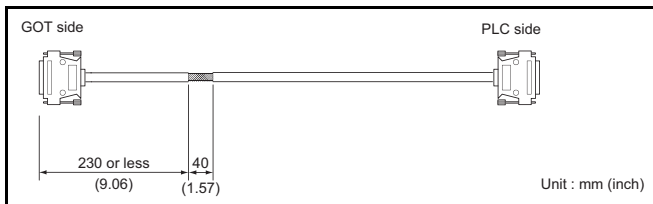
The following gives the instructions to ensure the machinery comply with the EMC Directive. However, the manufacturer of the machinery must finally determine how to make it comply with the EMC Directives: if it is actually compliant with the EMC Directives.

a) For RS-422 cable

- Each signal wire (excluding SG and FG) should be made into a two power wires and connected, then twisted.

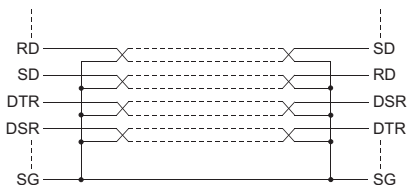


- Make the SG wire more than two wires and connect.
- Peel the sheath (with the length shown below) of the created cable to expose the shield braided wire for grounding. (For grounding with cable clamps (refer to Section 4.4.3))

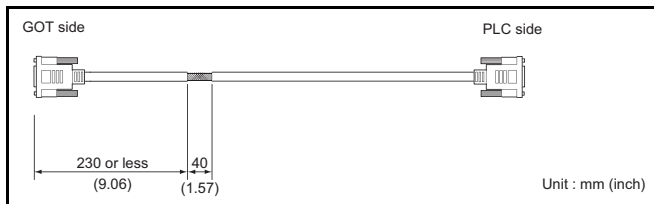


b) For RS-232 cable

- Use a twisted pair style for each signal wire (except SG, FG) with SG.



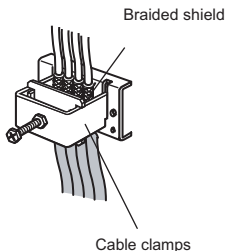
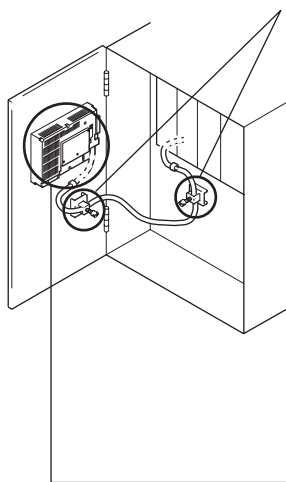
- Peel the sheath (with the length shown below) of the created cable to expose the shield braided wire for grounding. (For grounding with cable clamps (refer to Section 4.4.3))



4.4.3 Grounding the cable

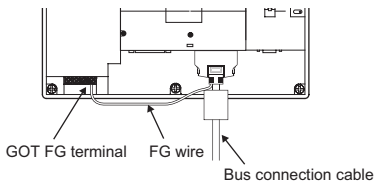
Ground the cable and grounding wire to the control panel where the GOT and base unit are installed.

- 1) Ground the braided shield portion of the cable to the control panel with the cable clamp (AD75CK).



For the cable clamp attaching details, refer to AD75CK-type Cable Clamping Instruction Manual <IB-68682>.

- a) For GT15-C□EXSS-1 and GT15-C□BS
Ground the ground wire to the FG terminal of the GOT power supply section.



- b) For other bus connection cables
Ground the braided wire for grounding to the control panel by tightening a screw.

5. Installation

5.1 Control Panel Inside Dimensions for Mounting GOT

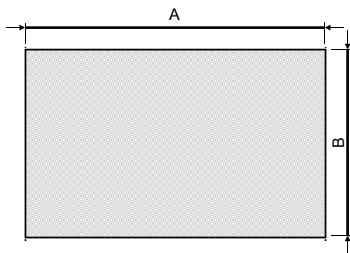
Mount the GOT onto the control panel while considering the control panel inside dimensions.

POINT
Applicable cable Some cables may need to be longer than the specified dimensions when connecting to the GOT. Therefore, consider the connector dimensions and bending radius of the cable as well for installation.

5.2 Panel Cutting Dimensions

Make holes in the panel according to the dimensions list below.

Also, ensure 10mm spaces in upper and lower parts of the panel for mounting fixtures.

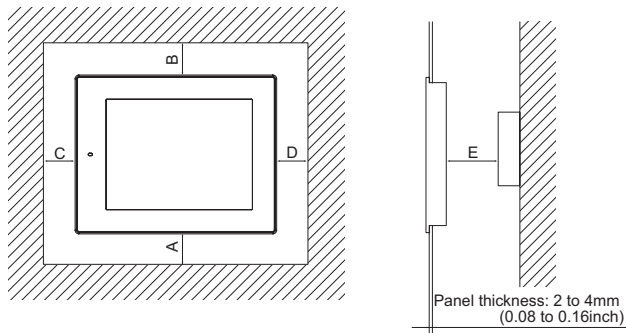


* Panel thickness: 2 to 4 mm or less

GOT	A [mm](inch)	B [mm](inch)
GT1595	383.5(15.10) (+2(0.08),0(0))	282.5(11.12) (+2(0.08),0(0))
GT1585	302(11.89) (+2(0.08),0(0))	228(8.98) (+2(0.08),0(0))
GT157□	289(11.38) (+2(0.08),0(0))	200(7.87) (+2(0.08),0(0))
GT156□	227(8.94) (+2(0.08),0(0))	176(6.93) (+2(0.08),0(0))

5.3 Mounting Position

When mounting the GOT, the following clearances must be left from the other device.



Type	GT1595	GT1585	GT157□	GT156□	
A	GOT or Bus connection unit*1 is fitted		50(1.97) or more [20(0.79) or more]	50(1.97) or more [31(1.22) or more] 50(1.97) or more [36(1.47) or more]	
	Bus connection unit*2 or serial communication unit fitted		50(1.97) or more [20(0.79) or more]	50(1.97) or more [31(1.22) or more] 50(1.97) or more [36(1.47) or more]	
	RS-422 Conversion unit is fitted	50(1.97) or more	51(2.01) or more	68(2.68) or more 73(2.87) or more	
	Ethernet communication unit, MELSECNET/10 communication unit (coaxial), CC-Link communication unit fitted		50 (1.97) or more [20 (0.79) or more]		
	MELSECNET/10 communication unit (optical) fitted		50(1.97) or more [20(0.79) or more]	50(1.97) or more [26(1.02) or more]	50(1.97) or more [43(1.69) or more] 50(1.97) or more [48(1.89) or more]
B	80(3.15) or more [20(0.79) or more]				
C, D	50(19.7) or more [20(0.79) or more]				
E	100(39.4) or more [20(0.79) or more]				

Unit: mm (inch)

*1 For GT15-75QBUSL, GT15-75QBUS2L, GT15-75ABUSL, or GT15-75ABUS2L only.

*2 For GT15-QBUS, GT15-QBUS2, GT15-ABUS, or GT15-ABUS2 only.

The values enclosed in parenthesis apply to the case where no other equipment generating radiated noise (such as a contactor) or heat is installed. However, keep the ambient temperature of the GOT to 55°C or lower even in such a case.

The required lead-in allowance for cables may be larger than the size of A above depending on the unit or cable used.

For the lead-in allowance for cables at the bottom of the GOT, refer to the following.

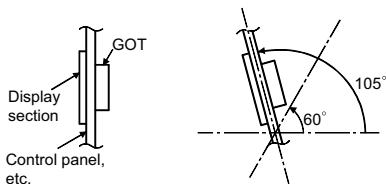


GT15 User's Manual

5.4 Control Panel Inside Temperature and Mounting Angle

When mounting the main unit to a control panel or similar, set the display section as shown below.

- When the temperature inside the control panel is 40 to 55°C or less, the mounting angle should be in the range 60 to 105 degrees.




- The GOT will be deteriorated earlier if it is used at the mounting angle other than the above. Therefore, the temperature inside the control panel should be within 40°C.

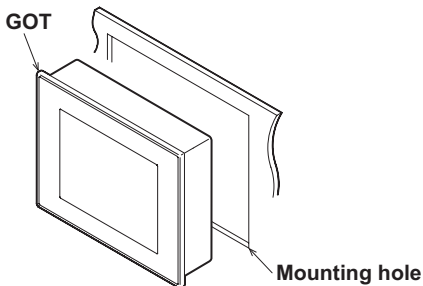
5.5 Installation Procedure

The GOT mounting procedure is as follows.

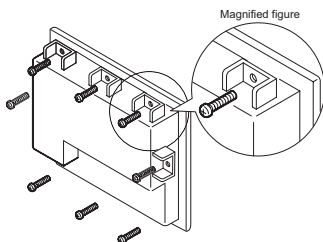
For the panel cutting dimension of each GOT, refer to the following.

 5.2 Panel Cutting Dimensions

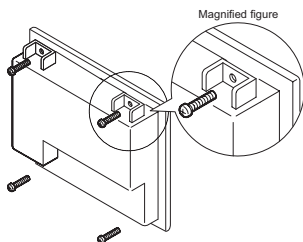
- (1) Insert the GOT into the panel opening from the front side.



- (2) Place the mounting fixtures (included with GOT) on the mounting fixture attaching part of the GOT, and fix them by tightening the mounting screws in the torque range of 0.36 to 0.48NÅm.
(Failure to do so may distort the panel and make a surface waviness on the protective sheet.)



- For GT1595-X: Fix the GOT with 8 mounting fixtures.



- For other than GT1595-X: Fix the GOT with 4 mounting fixtures.

- (3) A protection film is attached on the display section of GOT prior to shipment.

Remove the film when the installation is completed.

6. Wiring

6.1 Wiring Precautions

DANGER

- Before starting wiring, always switch off the GOT power externally in all phases.
Not doing so may cause an electric shock, product damage or malfunction.

CAUTION

- Please make sure to ground FG terminal and LG terminal of the GOT power supply section by applying Class D Grounding (Class 3 Grounding Method) or higher which is used exclusively for the GOT.
Not doing so may cause an electric shock or malfunction.
- 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.
- Tighten the terminal screws of the GOT power supply section 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 the GOT.
- 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.

This section describes wiring to the GOT power supply section.
For the connection to a controller, refer to the following manual.



GOT1000 Series Connection Manual

Remarks

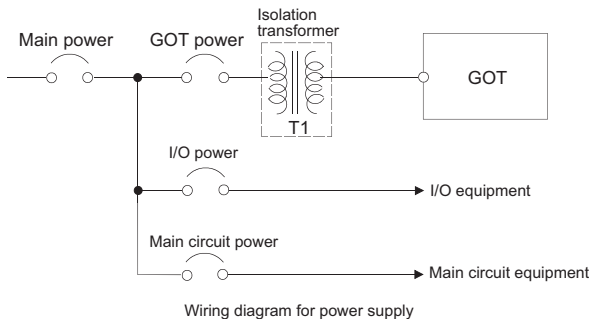
General preventive measures against noise

There are two kinds of noises: Radiated noise that is transmitted into the air and conductive noise that is directly transmitted through connected lines. In noise countermeasures, the both two types of noise should be taken into account. As the noise countermeasures, there are the following three methods.

- (1) Protecting against noise
 - (a) Keep signal lines away from possible noise sources such as power cables or high-power driving circuits.
 - (b) Shield signal lines.
- (2) Reducing generated noise
 - (a) Use a noise filter, etc. to reduce the noise generated from high-power motor drive circuits.
- (3) Releasing noise to the ground
 - (a) Make sure to connect the ground cable to the ground.
 - (b) Use a ground cable as short and thick as possible to lower its impedance.
 - (c) Separate the grounding between power and control systems.

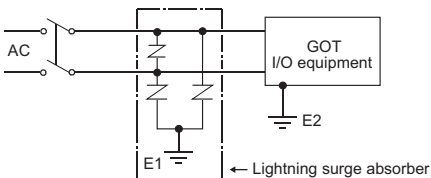
6.2 Power Supply Wiring

- Make wiring connections to the power supply, I/O equipment and power equipment separately by system as shown below. When frequent noise is identified, connect an isolation transformer.



- Twist 100V AC, 200V AC or 24V DC cable as closely as possible and connect the cable between modules at the minimum length. Also, use the thickest cable as possible (0.75 to 2mm²) to minimize the voltage drop. Use M3 solderless terminals and securely tighten them with a tightening torque of 0.5 to 0.8N•m so that no problem will result.
- Separate the 100V AC, 200V AC or 24V DC cable from the main circuit lines (high voltage, large current) and/or I/O signal lines. Keep a distance of 100mm or more.
- As measures against surge due to lightning, connect a lightning surge absorber as shown below.

Lightning surge absorber connection



POINT

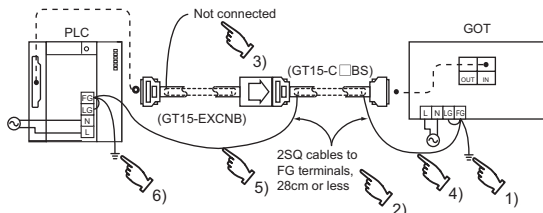
1. Separate the grounding of the lightning surge absorber (E1) from the grounding of the GOT (E2).
2. Select an appropriate lightning surge absorber so that the supply voltage does not exceed the maximum allowable circuit voltage of the surge absorber even when it rises to the maximum.

6.3 Wiring of Connection Cables

Keep the connection cables away from the main circuit lines (high voltage, large current) or I/O signal lines.

When using GT15-C □ EXSS-1 or GT15C □ BS, perform the grounding in the following steps.

- (1) When using GT15-C □ EXSS-1

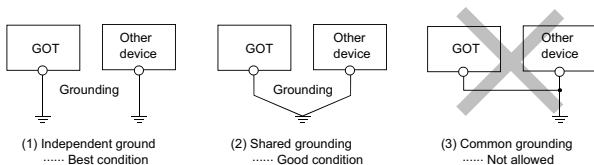


- 1) Connect the LG and FG terminals of the terminal block on the GOT unit power and ground them with a cable.
 - 2) Use the GT15-C □ BS's FG cable of 28cm or less.
 - 3) Do not connect the GT15-EXCNB's FG ground cable.
 - 4) Connect the GT15-C □ BS's FG cable on the GOT side to FG of the GOT unit power's terminal block.
 - 5) Connect the GT15-C □ BS's FG cable on the PLC side to FG of the PLC's power supply module.
 - 6) Connect the LG and FG terminals of the terminal block on the PLC and ground them with a cable.
- (2) When using GT15-C □ BS
For the both side GOTs, connect the LG and FG terminals of the terminal block on the GOT unit power and ground them with a cable.

6.4 Grounding

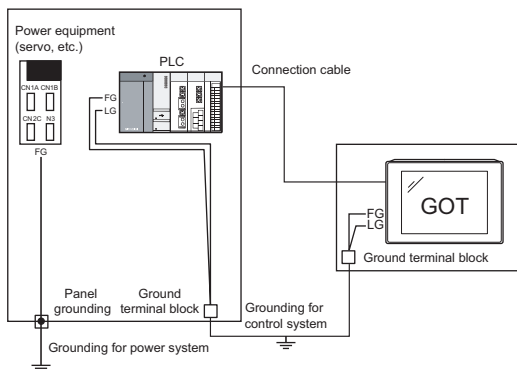
Make sure to carry out the followings for grounding.

- Carry out the independent grounding if possible.
- If the independent grounding is impossible, carry out the shared grounding as shown in fig.2) below.



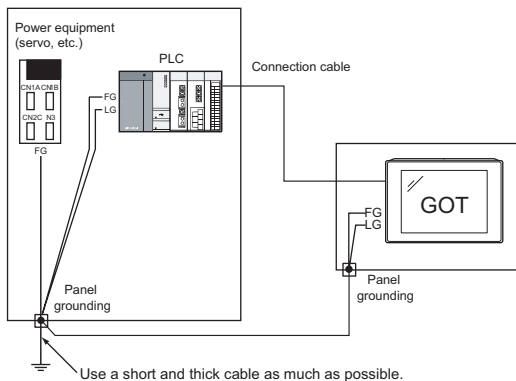
- Use the cable of 2mm^2 or more for grounding.
Set the grounding point closer to the GOT to make the grounding cable short as possible.

(1) Example of independent grounding



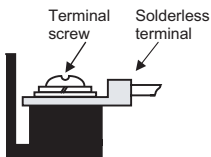
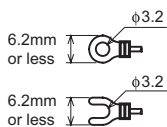
- * Ground the control system, especially modules communicating each other, to one end.

(2) Example of shared grounding

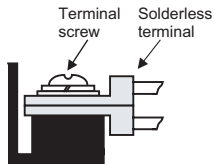


* Ground the system to one end.

Recommended terminal shape



When wiring one cable to one terminal



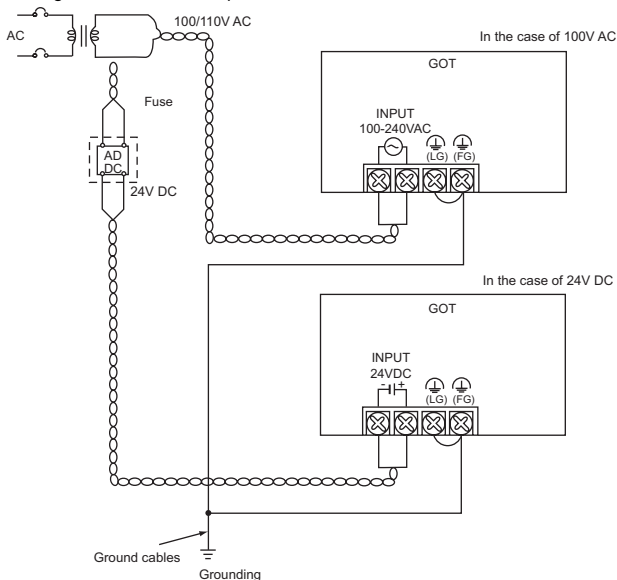
When wiring two cables to one terminal

Applicable solderless terminal

RAV1.25- 3, V2- S3.3, V2- N3A, FV2- N3A

6.5 Power Terminal Connection

This section provides an example for connecting power cables and ground cables to the power terminals situated on the back of the GOT.



POINT

1. For 100V AC, 200V AC or 24V DC cable, use the thickest cable as possible (0.75 to 2mm^2) and start twisting them at the position closest to the connected terminals.
To prevent a short circuit due to loose screws, use the solderless terminal with insulation sleeve.
2. When connection is made between LG and FG terminals, be sure to connect them to the ground.
Otherwise, the system becomes susceptible to noise.
Since the LG terminal has potential equal to a half of the input voltage, touching the terminal may lead to an electric shock.

7. Maintenance and Inspection

7.1 Daily Inspection

Daily inspection items

No.	Inspection Item		Inspection Method	Criterion	Action
1	GOT mounting status		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

For applicable protective sheet model or replacement procedure, refer to GT15 User's Manual.

7.2 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 Measure corrosive gas	Display section	0 to 40°C	For use in control panel, temperature inside control panel is ambient temperature
		Ambient humidity		Other portions	0 to 55°C	
		Atmosphere		10 to 90%RH		
				No corrosive gas		
2	GOT powered from 100-240VAC power	Power supply voltage check	Measure voltage across terminals of 100-240VAC power.	85AC to 242V		Change supply power
	GOT powered from 24VDC power	Input polarity of 24VDC power	Measure voltage across terminals of 24VDC power.	Left : - Right: +		Change wiring
3	Mounting status	Looseness	Move module	Should be mounted firmly		Retighten screws
		Dirt, foreign matter	Visual check	No dirt, 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. (Refer to the GT15 User's Manual.)	No alarm appears		Replace with new battery when the current battery has reached the specified life span, even if battery voltage low is not displayed.

7.3 Battery Voltage Low Detection and Battery Replacement

Battery is used to store the current time or maintenance time notification data.

It is recommended to replace battery periodically.

7.3.1 Applicable Battery

The following battery is applicable for GT15 □ □.

Model	Description
GT15-BAT	Battery for backup of clock data and maintenance time notification data.

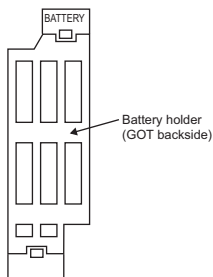
7.3.2 Battery Specifications

Item	Specifications
Type	Magnesium manganese dioxide lithium primary battery
Initial voltage	3.0V
Nominal current	1800mAh
Storage life	Approx.5 years (Operating ambient temperature of 25°C)
Total power stoppage time	Refer to Section 7.3.4.
Lithium content	0.49g
Application	For backup of clock data and maintenance time notification data.

7.3.3 Battery Replacement Procedure

Replace battery periodically by referring to Section 7.3.4 Battery Life.

- (1) Keep the GOT power supply on for 10 minutes or more, and turn it off.
(Executes step 2 to 6 within 5 minutes of powering the GOT power supply off.)
- (2) Remove the battery folder from the GOT backside.
- (3) Remove the old battery from the folder and disconnect the connector.
- (4) Connect the new battery to the connector.



- (5) Insert the battery into the folder and set it into the GOT backside.
- (6) Turn the GOT power supply on.
- (7) Check if the battery condition is normal within the utility.
For details, refer to the GT15 User's Manual.

POINT
<p>1. Precautions after battery replacement Make sure to turn on the GOT power supply once upon completion of battery replacement. Failure to do so may decrease the battery life.</p> <p>2. When the bus connection unit (GT15-QBUS2/GT15-ABUS2/GT15-75ABUSL/GT15-75ABUS2L) is connected to GT156□ Before installing or replacing the battery, disconnect the bus connection cable. (When connecting or disconnecting the bus connection cable, be sure to power off the GOT and PLC.)</p>

7.3.4 Battery Life

Life span of the battery set in the GOT is shown below.

Battery life		
Operating ambient temperature of 0 to 45°C	Operating ambient temperature of 45 to 55°C	Data backup time after detection of battery voltage low
5 years	3 years	14 days

*: In the following conditions, the data backup time is 5 minutes after the power supply is turned off.

- The battery connector is disconnected.
- The battery lead is disconnected.

POINT
<p>Battery life and replacement time</p> <ol style="list-style-type: none"> 1. Battery life reference: Approx.5 years in actual use (Operating ambient temperature of 25°C) Battery replacement time reference: 4 to 5 years Calculate the natural discharge amount of the battery, as necessary. 2. Check if the battery condition is normal within the utility. For details, refer to the GT15 User's Manual.

Warranty

Mitsubishi will not be held liable for damage caused by factors found not to be the cause of Mitsubishi; machine damage 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.
- 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.

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