

4. EMC AND LOW VOLTAGE DIRECTIVE

For electromagnetic compatibility (EMC) and electrical safety, regulatory standards are established in each country.

Especially, for the products to be sold in European countries, conformance to the EMC Directive, which is one of the European Directives, has been mandatory as the EMC standards since 1996. In addition, conformance to the Low Voltage Directive, another European Directive, has also been mandatory as the electrical safety standards since 1997.

In European countries, if a product meets the requirements of the EMC Directive or the Low Voltage Directive, the product's manufacturer must declare conformity of the product and affix the CE mark to the product. In some countries or regions other than European countries, the product's manufacturer also must declare conformity of the product and affix a designated mark to the product (example: UKCA mark in the UK).

- Authorized representative in the EU and the UK is shown below.
- Name : Mitsubishi Electric Europe BV
- Address : Mitsubishi-Electric-Platz 1, 40882 Ratingen, Germany

This section describes the EMC Directive and Low Voltage Directive as examples for conformance to EMC and electrical safety standards. EMC and electrical safety standards in each country are stipulated to be consistent with the corresponding international standards. When the requirements are consistent with the same standards, common measures are taken to conform to the standards in different countries. For the EMC Directive, regulatory compliance with equivalent EMC standards are required for example in the UK and Korea. For the Low Voltage Directive, regulatory compliance with equivalent electrical safety standards are required for example in the UK.

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 not influenced by the electromagnetic wave from the external. Immunity (electromagnetic sensitivity)".

Items 4.1.1 through 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 Electric, they do not completely guaranteed that all mechanical unit manufactured according to the data do not always match the above.

4.1.1 EMC directive

The standards of the EMC Directive are shown below.

Applied standard	Test standard	Test details	Standard value
EN61131-2 : 2007	CISPR16-2-3 Radiated noise ^{1)*2}	Electromagnetic emissions from the product are measured.	30M-230MHz QP : 30dB μ V/m (30m in measurement range) ^{3)*4} 230M-1000MHz QP : 37 dB μ V/m (30m in measurement range) ^{3)*4}
	IEC61000-4-2 Electrostatic immunity ^{1)*2}	Immunity test in which static electricity is applied to the cabinet of the equipment.	\pm 4kV Contact discharge \pm 8kV Aerial discharge
	IEC61000-4-3 Radiated electromagnetic field AM modulation ^{1)*2}	Immunity test in which field is irradiated to the product.	80-1000MHz: 10V/m 1.4-2GHz: 3V/m 2.0-2.7GHz: 1V/m 80%AM modulation@1kHz
	IEC61000-4-4 Fast transient burst noise ^{1)*2}	Immunity test in which burst noise is applied to the power line and signal lines.	Power line: 2kV Digital I/O: 1kV Analog I/O: 1kV Signal lines: 1kV
	IEC61000-4-5 Surge immunity ^{1)*2}	Immunity test in which lightning surge is applied to the product.	Power line (between line and ground): \pm 0.5kV Power line (between lines): \pm 0.5kV Data communication port: \pm 1kV
	IEC61000-4-6 Conducted RF immunity ^{1)*2}	Immunity test in which a noise induced on the power and signal lines is applied.	Power line: 10V Data communication port: 10V
IEC61000-4-8 Power supply frequency magnetic field immunity ^{1)*2}	Test for checking normal operations under the circumstance exposed to the ferromagnetic field noise of the power supply frequency (50/60Hz).	30 A/m	

*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 Electric PLC.

*2: When using the sound output cable, the cable length must be 30 m (118.1 in.) or shorter.

*3: QP (Quasi-Peak): Quasi-peak value, Mean: Average value

*4: 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

- The control panel must be conductive.
- 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.
- 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.
- Ground the control panel using a thick grounding cable in order to ensure the low impedance under high frequency.
- 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.

Paste the EMI gasket directly on the painted surface to seal the space so that the leak of electric wave can be suppressed. Our test has 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

- 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 (11.81in.) 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.
- 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.

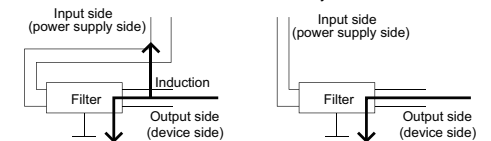
4.1.3 Noise filter (power supply line filter)

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	FN343-3/05	FN660-6/06	RSHN-2003
Manufacturer	SCHAFFNER	SCHAFFNER	TDK
Rated current	3A	6A	3A
Rated voltage	250V		

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

- 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.



- Installing the input and output cables together will cause noise induction.
 - Separate the input cable from the output cable.
- Connect the noise filter's ground terminal to the control panel with the shortest cable as possible (approx. 10cm (3.94 in.) or less).

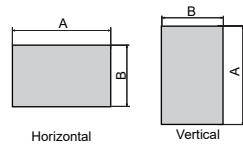
5. INSTALLATION

5.1 Control Panel Inside Dimensions for Mounting GOT

Install the GOT on the control panel out of the way for the equipment inside the control panel. Do not install the GOT and the unit in prohibited areas for the installation.

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



Model	A	B	Panel thickness
GT2507T-WTSD	197(7.76) +1(0.04) 0(0)	141(5.55) +1(0.04) 0(0)	1.6(0.06) to 4(0.16)

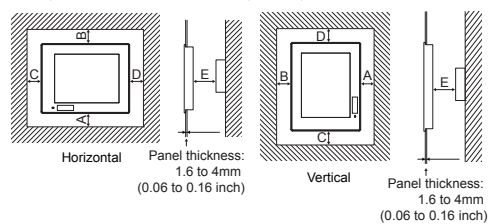
5.3 Mounting Position

When mounting the GOT, the following clearances must be maintained from other structures and devices.

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.

For the lead-in allowance for cables at the bottom of the GOT, refer to the GOT2000 Series User's Manual (Hardware).

For the vertical installation, install the GOT so that the vertical installation arrow printed on the GOT rear face points upward.



According to the dimensions in the following table, leave clearances between the GOT and the other devices. The values enclosed in square brackets apply to the case where no other equipment generating radiated noise (such as a contactor) or heat is installed near the GOT. However, keep the ambient temperature of the GOT to 65°C or lower.

Item	GT2507T-W
A	64(2.52) or more
B	Horizontal: 81(3.19) or more [23(0.91) or more] Vertical: 53(2.09) or more [23(0.91) or more]
C	53(2.09) or more [32(1.26) or more]
D	Horizontal: 53(2.09) or more [23(0.91) or more] Vertical: 81(3.19) or more [23(0.91) or more]
E ¹⁾	100(3.94) or more [20(0.79) or more]

*1: When opening or closing the battery cover: 72(2.83) or more

5.4 Control Panel Inside Temperature and Installation Angle

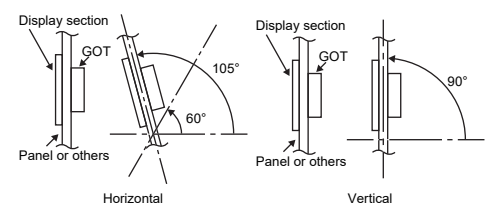
When installing the GOT to a panel, set the display section as shown below. Using the GOT with the installation angle other than the following deteriorates the GOT earlier.

Installing the GOT horizontally

When installing the GOT with the installation angle between 60 to 105°, the temperature inside the control panel must be within 65°C. When installing the GOT with the installation angle other than between 60 to 105°, the temperature inside the control panel must be within 50°C.

Installing the GOT vertically

When the GOT is installed a 90° angle, the control panel inside temperature must be within 65°C. When the GOT is installed at any angle other than 90°, the control panel inside temperature must be within 50°C.



6. MAINTENANCE AND INSPECTION

Refer to the GOT2000 Series User's Manual (Hardware) for maintenance and inspection for the GOT.

Warranty

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

For safe use

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

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