

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

The 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}	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}
	CISPR16-2-1 Conducted noise ^{*1}	Electromagnetic emissions from the product to the power line is measured.	150K-500KHz QP:79dB, Mean: 66dB ² 500K-30MHz QP:73dB, Mean: 60dB ²
	IEC61000-4-2 Electrostatic immunity ³	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	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}	Immunity test in which burst noise is applied to the power line and signal lines.	Power cable: 2kV Digital I/O: 1kV Analog I/O: 1kV Signal cable: 1kV
	IEC61000-4-5 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) : $\pm$ 1kV Data communication port : $\pm$ 1kV DC power type Power line (between line and ground) : $\pm$ 0.5kV Power line (between lines) : $\pm$ 0.5kV Data communication port : $\pm$ 1kV
EN61000-4-6 Conducted RF immunity ^{*1}	IEC61000-4-6 Conducted RF immunity ^{*1}	Immunity test in which a noise induced on the power and signal lines is applied.	Power line: 10V Data communication port: 10V

Applied standard	Test standard	Test details	Standard value
EN61131-2 : 2007	IEC61000-4-8 Power supply frequency magnetic field immunity	Test for checking normal operations under the circumstance exposed to the ferromagnetic field noise of the power supply frequency (50/60Hz).	30 A/m
	IEC61000-4-11 Instantaneous power failure and voltage dips immunity	Test for checking normal operations at instantaneous power failure.	AC power type 0.5 cycle 0% (interval 1 to 10s) 250/300 cycle 0% 10/12 cycle 40% 25/30 cycle 70%

*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: QP (Quasi-Peak): 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

- 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

Ground and power supply wires for the GOT must be connected as described below.

- 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.

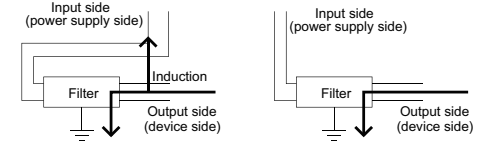
4.1.3 Noise filter (power supply line filter)

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.

(1) Do not install the input and output cables of the noise filter together to prevent the output side noise will be induced 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.
- (2) Connect 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

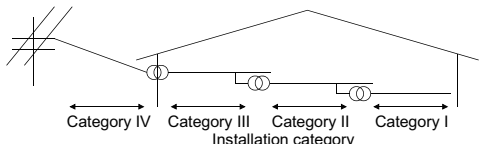
The Low Voltage Directive requires each device which operates with power supply ranging from 50VAC to 1000V and 75VDC to 1500V to satisfy necessary safety items. In the Sections from 4.2.1 to 4.2.5, cautions on installation and wiring of the GOT to conform to the Low Voltage Directive requires are described. 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

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.

- 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.
- Dustproof and waterproof features
The control panel also provides protection from dust, water and other 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 level 1: An environment where the air is dry and conductive dust does not exist.
- Pollution level 2: 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 level 3: An environment where conductive dust exists and conductivity may be generated due to the accumulated dust.
- Pollution level 4: An environment for a typical factory floor. Continuous conductivity may occur due to rain, snow, etc. An outdoor environment.

4.2.4 Grounding

The following are applicable ground terminals. Use them in the grounded state.
Be sure to ground the GOT for ensuring the safety and complying with the EMC Directive.

Functional grounding $\perp$: Improves the noise resistance.

4.2.5 External wiring

- 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

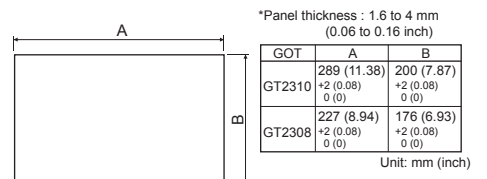
5. INSTALLATION

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.

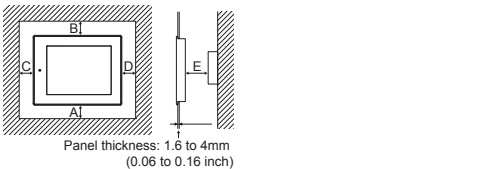
Point
Applicable cable Some cables may need to be longer than the specified dimensions when connecting to the GOT. Therefore, consider the connector dimensions and bending radius of the cable as well for installation.

5.2 Panel Cutting Dimensions



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).



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 55°C or lower.

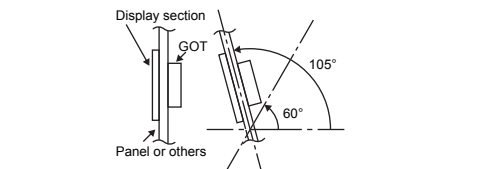
Unit : mm(inch)			
Item		GT2310	GT2308
A		48(1.89) or more [18(0.71) or more]	
B		78(3.07) or more [18(0.71) or more]	
C	When the SD card is used	50(1.97) or more [20(0.79) or more]	50(1.97) or more
	When the SD card is not used	50(1.97) or more [20(0.79) or more]	
D		50(1.97) or more [20(0.79) or more]	
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.

When installing the GOT with the installation angle between 60 to 105°, the temperature inside the control panel must be within 55°C. When installing the GOT with the installation angle other than between 60 to 105°, the temperature inside the control panel must be within 40°C.



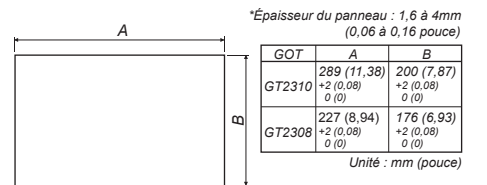
5. INSTALLATION

5.1 Dimensions intérieures du tableau de commande pour le montage du GOT

Installez le GOT sur le tableau de commande en laissant de l'espace pour le dispositif à l'intérieur du tableau de commande. N'installez pas le GOT et le module dans des zones où l'installation est interdite.

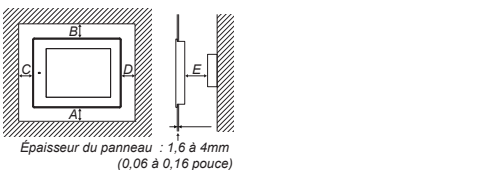
Point
Câble applicable Certains câbles peuvent être plus longs que les dimensions spécifiées lors de la connexion au GOT. Par conséquent, prenez également en compte les dimensions du connecteur et le rayon de courbure du câble pour l'installation.

5.2 Cotes de découpe du panneau



5.3 Position de montage

Lors du montage du GOT, laissez les espaces suivants pour les autres structures et dispositifs.
Certains câbles peuvent être plus longs que les dimensions spécifiées lors de la connexion au GOT.
Par conséquent, prenez également en compte les dimensions du connecteur et le rayon de courbure du câble pour l'installation.
Pour connaître l'espace à laisser pour les câbles sous le GOT, référez-vous au manuel GOT2000 Series User's Manual (Hardware).



Laissez les espaces entre le GOT et les autres dispositifs en fonction des dimensions contenues dans le tableau suivant. Les valeurs entre parenthèses s'appliquent au cas où aucun dispositif générant des émissions sonores (comme un contacteur) ou de la chaleur n'est installé près du GOT. Toutefois, maintenez la température ambiante du GOT à 55°C ou moins.

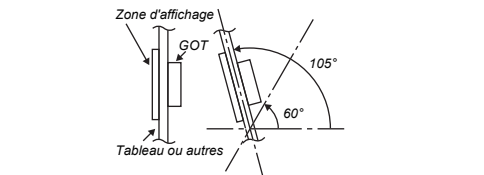
Unité : mm (pouce)		
Article	GT2310	GT2308
A	48 (1,89) ou plus [18 (0,71) ou plus]	
B	78 (3,07) ou plus [18 (0,71) ou plus]	
C	Quand la carte SD est utilisée 50 (1,97) ou plus [20 (0,79) ou plus]	50 (1,97) ou plus
	Quand la carte SD n'est pas utilisée 50 (1,97) ou plus [20 (0,79) ou plus]	
D	50 (1,97) ou plus [20 (0,79) ou plus]	
E ^{*1}	100 (3,94) ou plus [20 (0,79) ou plus]	

*1: Pour ouvrir ou fermer le couvercle de la batterie : 72 (2,83) ou plus

5.4 Température intérieure et angle d'installation du tableau de commande

Lors de l'installation du GOT sur un panneau, réglez la zone d'affichage comme indiqué ci-dessous.
Si l'angle d'installation est différent de celui indiqué, le GOT se détériore plus tôt.

Lors de l'installation du GOT avec un angle d'installation compris entre 60 et 105°, la température à l'intérieur du tableau de commande doit être d'environ 55°C.
Lors de l'installation du GOT avec un angle d'installation non compris entre 60 et 105°, la température à l'intérieur du tableau de commande doit être d'environ 40°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.

Sales office/Tel
América Mitsubishi Electric Automation, Inc. 500 Corporate Woods Parkway, Vernon Hills, IL 60061, U.S.A. Tel: +1-847-478-2100 Mitsubishi Electric do Brasil Comercio e Servicos Ltda. Avenida Adelino Cardana, 293, 21 andar, Bethaville, Barueri SP, Brazil Tel: +55-11-4689-3000 Mitsubishi Electric Automation, Inc. Mexico Branch Boulevard Miguel de Cervantes Saavedra 301, Torre Norte Piso 5, Ampliación Granada, Miguel Hidalgo, Ciudad de Mexico, Mexico, C.P.11520 Tel: +52-55-3067-7512
Europe Mitsubishi Electric Europe B.V. German Branch Mitsubishi-Electric-Platz 1, 40882 Ratingen, Germany Tel: +49-2102-486-0 Mitsubishi Electric Europe B.V. UK Branch Travellers Lane, UK-Hatfield, Hertfordshire, AL10 8XB, U.K. Tel: +44-1707-28-8780 Mitsubishi Electric Europe B.V. Italian Branch Centro Direzionale Colosoni - Palazzo Sirio, Viale Colosoni 7, 20864 Agrate Brianza (MB), Italy Tel: +39-039-60531 Mitsubishi Electric Europe B.V. Spanish Branch Carretera de Rubí, 76-80-Appdo. 420, E-08190 Sant Cugat del Valles (Barcelona), Spain Tel: +34-935-65-3131 Mitsubishi Electric Europe B.V. French Branch 25, Boulevard des Bouvets, 92741 Nanterre Cedex, France Tel: +33-1-55-68-55-68 Mitsubishi Electric Europe B.V. Czech Branch Pekarska 62/17, 155 00 Praha 5, Czech Republic Tel: +420-255 719 200 Mitsubishi Electric Turkey A.S. Umranıye Branch Serifali Mahallesi Nispetiye Sokak No:5, TR-34775 Umranıye / Istanbul, Turkey Tel: +90-216-525-3590 Mitsubishi Electric Europe B.V. Polish Branch ul. Krakowska 48, 32-063 Balice, Poland Tel: +48-12-347-65-60
Africa Adroit Technologies 20 Waterford Office Park, 189 Witkoppen Road, Fourways, South Africa Tel: +27-11-658-8100
Asia-Pacific Mitsubishi Electric Automation (China) Ltd. Mitsubishi Electric Automation Center, No.1386 Hongqiao Road, Shanghai, China Tel: +86-21-2322-3030 SETSUYO ENTERPRISE CO., LTD. 6F, No.105, Wuping 3rd Road, Wugu District, New Taipei City 24889, Taiwan Tel: +886-2-2299-2499 Mitsubishi Electric Automation Korea Co., Ltd. 7F to 9F, Gangseo Hangang Xi-tower A, 401, Yangcheon-ro, Gangseo-Gu, Seoul 07528, Korea Tel: +82-2-3660-9599 Mitsubishi Electric Asia Pte. Ltd. 307 Alexandra Road, Mitsubishi Electric Building, Singapore 159943 Tel: +65-6473-2308 Mitsubishi Electric Factory Automation (Thailand) Co., Ltd. 12th Floor, SV City Building, Office Tower 1, No. 999/19 and 20 Rama 3 Road, Kwaeng Bangongpang, Khet Yamma, Bangkok 10120, Thailand Tel: +66-2682-6522 to 31 PT. Mitsubishi Electric Indonesia Gedung Jaya 8th Floor, JL. MH. Thamrin No.12, Jakarta Pusat 10340, Indonesia Tel: +62-21 3192-6461 Mitsubishi Electric Vietnam Company Limited 11th & 12th Floor, Viettel Tower B, 285 Cach Mang Thang 8 Street, Ward 12, District 10, Ho Chi Minh City, Vietnam Tel: +84-28-3910-5945 Mitsubishi Electric India Pvt. Ltd. Pune Branch Emerald House, EL-3, J Block, M.I.D.C., Bhosari, Pune - 411026, Maharashtra, India Tel: +91-20-2710-2000 MITSUBISHI ELECTRIC AUSTRALIA PTY. LTD. 348 Victoria Road, P.O. Box 11, Rydalmere, N.S.W 2116, Australia Tel: +61-2-9684-7777
MITSUBISHI ELECTRIC AUTOMATION MANUFACTURING (CHANGSHU) CO.,LTD. No.1181 Southeast Road, Changshu New & Hi-tech Industrial Development Zone of Jiangsu, 215500 China
When exported from Japan, this manual does not require application to the Ministry of Economy, Trade and Industry for service transaction permission. Specifications subject to change without notice.