

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 Directive, 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.

- Authorized representative in Europe
- Authorized representative in Europe is shown below.

Name : Mitsubishi Electric Europe BV
Address : Gothaer strasse 8, 40880 Ratingen, Germany

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, 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
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 ¹	Immunity test in which static electricity is applied to the cabinet of the equipment.	± 4kV Contact discharge ± 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 800AM modulation@1KHz
EN61131-2 : 2007	IEC61000-4-4 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
	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): ± 0.5kV Power line (between lines): ± 1kV Data communication port: ± 1kV DC power type Power line (between line and ground): ± 0.5kV Power line (between lines): ± 0.5kV Data communication port: ± 1kV
	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
	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
EN61000-4-11 EN61000-4-29	Test for checking normal operations at instantaneous power failure and voltage dips immunity	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 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_μV/m (10m in measurement range)
230M-1000MHz QP : 47dB_μV/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.
Paste the EMI gasket directly on the painted surface to seal the space so that the leak of electric wave can be suppressed.

Manufacturer	Series model name
KITAGAWA INDUSTRIES CO., LTD.	UC series (Recommended Product)

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.
 - (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 (11.81in.) 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.
 - (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.

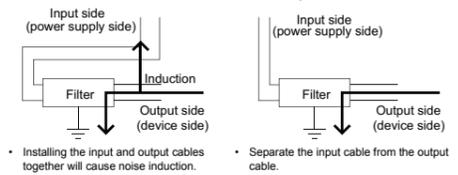
4.1.3 Noise filter (power supply line filter)

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 induced into the input side cable where noise has been eliminated by the noise filter.



- (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

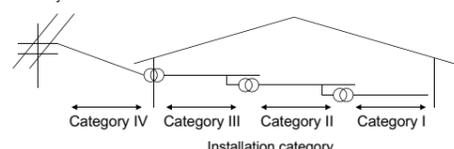
The Low Voltage Directive requires each device which operates with power supply ranging from 50VAC to 1000V and 75VDC to 1500V to satisfy necessary safety items. In the Sections from 4.2.1 to 4.2.5, cautions on installation and wiring of the GOT to conform to the Low Voltage Directive requires are described. 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
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 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 ↓: 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 (1.2/50μs)
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.

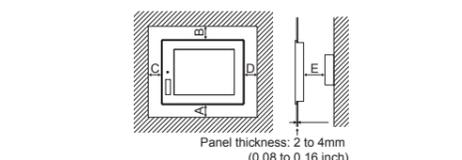
5.2 Panel Cutting Dimensions

Make an installation hole on the control panel with the dimensions shown below.
Make space of 10mm above and below the hole respectively for the installation fittings.

GOT	Panel thickness : 2 to 4 mm (0.08 to 0.16 inch)	
	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)
GT155□	153 (6.02) +2 (0.08) 0 (0)	121 (4.76) +2 (0.08) 0 (0)

5.3 Mounting Position

When mounting the GOT, the following clearances must be maintained from other structures and devices.
Depending on the units and cables connected to the GOT, clearances more than the described dimensions can be required.
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 GT15 User's Manual.



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.

Item	Unit : mm (inch)				
	GT1595	GT1585	GT157□	GT156□	GT155□
GOT only			50 (1.97) or more [20 (0.79)]	50 (1.97) or more [21 (0.83)]	49 (1.92) or more
Bus connection unit is fitted	50 (1.97) or more [20 (0.79)]	50 (1.97) or more [35 (1.38)]	50 (1.97) or more [40 (1.57)]	50 (1.97) or more [40 (1.57)]	50 (1.97) or more
Serial communication unit fitted		50 (1.97) or more [38 (1.54)]	50 (1.97) or more [21 (0.83)]	50 (1.97) or more [21 (0.83)]	49 (1.92) or more
RS-422 Conversion unit is fitted	50 (1.97) or more [20 (0.79)]	50 (1.97) or more [38 (1.54)]	53 (2.09) or more	58 (2.28) or more	
Ethernet communication unit is fitted	50 (1.97) or more [20 (0.79) or more]				
MELSECNET/10 communication unit (coaxial) is fitted	50 (1.97) or more [20 (0.79) or more]				
CC-Link communication unit (GT15-J61BT13-Z) fitted	50 (1.97) or more [20 (0.79) or more]				
CC-Link communication unit (GT15-J61BT13) 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)]	50 (1.97) or more [26 (1.02)]	50 (1.97) or more [43 (1.69)]	50 (1.97) or more [48 (1.89)]	
MELSECNET/H communication unit (coaxial) fitted	50 (1.97) or more [20 (0.79)]	50 (1.97) or more [30 (1.18)]	50 (1.97) or more [35 (1.38)]	50 (1.97) or more [35 (1.38)]	64 (2.52) or more
MELSECNET/H communication unit (optical) fitted	50 (1.97) or more [20 (0.79)]	50 (1.97) or more [37 (1.46)]	50 (1.97) or more [42 (1.65)]	50 (1.97) or more [42 (1.65)]	79 (3.11) or more
CC-Link IE Controller Network Module	50 (1.97) or more [20 (0.79)]	50 (1.97) or more [23 (0.91)]	50 (1.97) or more [23 (0.91)]	50 (1.97) or more [28 (1.10)]	57 (2.24) or more
CC-Link IE Field Network Module	50 (1.97) or more [20 (0.79)]	50 (1.97) or more [23 (0.91)]	50 (1.97) or more [23 (0.91)]	50 (1.97) or more [28 (1.10)]	57 (2.24) or more
Printer unit fitted	50 (1.97) or more [20 (0.79) or more]				
Video input unit fitted		61 (2.40) or more ¹	75 (2.95) or more ²		
RGB input unit fitted		50 (1.97) or more ³			
Video/RGB input unit fitted		61 (2.40) or more ^{2,3}	75 (2.95) or more ^{2,3}		
RGB output unit fitted		50 (1.97) or more ³			
CF card unit	50 (1.97) or more [20 (0.79) or more]				
CF card extension unit	50 (1.97) or more [20 (0.79)]	50 (1.97) or more [49 (1.93)]	63 (2.48) or more	68 (2.68) or more	97 (3.82) or more
Output/Input unit	50 (1.97) or more [20 (0.79)]	50 (1.97) or more [24 (0.94)]	50 (1.97) or more [29 (1.14)]	50 (1.97) or more [29 (1.14)]	58 (2.28) or more
Sound Interface Unit	50 (1.97) or more [20 (0.79) or more]				
B (When the CF card is not used)	80 (3.15) or more [20 (0.79) or more]				
C (When the CF card is used)	50 (1.97) or more [20 (0.79) or more]				
D	50 (1.97) or more [20 (0.79) or more]				
E	100 (3.94) or more [20 (0.79) or more]				

- ¹: This value differs depending on the cable used.
Please contact your local Mitsubishi Electric System & Service Co., Ltd. The value indicated in the table is a reference value.
- ²: This value is for use of the coaxial cable 3C-2V (JIS C 3501).
For specifications of the cable, refer to the MODEL GT15V-75V4R1 Video/RGB Input Unit MODEL GT15V-75V4 Video Input Unit MODEL GT15V-75R1 RGB Input Unit User's Manual.
- ³: This value differs depending on the cable used.
If the bending radius of the cable used is greater than the value specified above, apply the value of the cable used.

Point
Refer to GT15 User's Manual for details of the Control Panel Inside Temperature and Mounting Angle, Installation Procedure of each GOT.

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
Certaines 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.

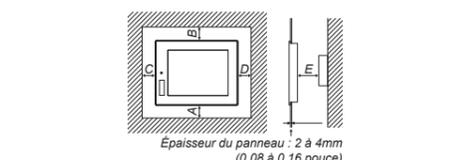
5.2 Cotes de découpe du panneau

Faites un trou d'installation sur le tableau de commande avec les dimensions indiquées ci-dessous.
Laissez un espace de 10mm au-dessus et sous le trou respectivement pour les attaches de montage.

GOT	Épaisseur du panneau : 2 à 4mm ou moins (0,08 à 0,16 pouce)	
	A [mm] (pouce)	B [mm] (pouce)
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)
GT155□	153 (6.02) +2 (0.08) 0 (0)	121 (4.76) +2 (0.08) 0 (0)

5.3 Position de montage

Lors du montage du GOT, laissez les espaces suivants pour les autres structures et dispositifs.
En fonction des modules et des câbles connectés au GOT, il peut être nécessaire de laisser des espaces plus importants que les dimensions indiquées.
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 GT15 User's Manual.



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.

Article	Unité : mm (pouce)				
	GT1595	GT1585	GT157□	GT156□	GT155□
GOT uniquement			50 (1.97) or plus [20 (0.79)]	50 (1.97) or plus [21 (0.83)]	49 (1.92) or plus
Unité de connexion de bus encastrée	50 (1.97) or plus [20 (0.79)]	50 (1.97) or plus [35 (1.38)]	50 (1.97) or plus [40 (1.57)]	50 (1.97) or plus [40 (1.57)]	50 (1.97) or plus
Module de communication série encastré		50 (1.97) or plus [39 (1.54)]	50 (1.97) or plus [21 (0.83)]	50 (1.97) or plus [21 (0.83)]	49 (1.92) or plus
Unité de conversion RS-422 encastrée	50 (1.97) or plus [20 (0.79)]	50 (1.97) or plus [39 (1.54)]	53 (2.09) or plus	58 (2.28) or plus	
Module de communication Ethernet encastré	50 (1.97) or plus [20 (0.79) or plus]				

Article	GT1595	GT1585	GT157□	GT156□	GT155□
Module de communication MELSECNET/10 (coaxial) encastré	50 (1.97) or plus [20 (0.79) or plus]				
Module de communication CC-Link (GT15-J61BT13-Z) encastré	50 (1.97) or plus [20 (0.79) or plus]				
Module de communication CC-Link (GT15-J61BT13) encastré	50 (1.97) or plus [20 (0.79) or plus]				
Module de communication MELSECNET/10 (optique) encastré	50 (1.97) or plus [20 (0.79)]	50 (1.97) or plus [26 (1.02)]	50 (1.97) or plus [43 (1.69)]	50 (1.97) or plus [48 (1.89)]	
Module de communication MELSECNET/H (coaxial) encastré	50 (1.97) or plus [20 (0.79)]	50 (1.97) or plus [30 (1.18)]	50 (1.97) or plus [35 (1.38)]	50 (1.97) or plus [35 (1.38)]	64 (2.52) or plus
Module de communication MELSECNET/H (optique) encastré	50 (1.97) or plus [20 (0.79)]	50 (1.97) or plus [37 (1.46)]	50 (1.97) or plus [42 (1.65)]	50 (1.97) or plus [42 (1.65)]	79 (3.11) or plus
Module réseau de contrôle CC-Link IE	50 (1.97) or plus [20 (0.79)]	50 (1.97) or plus [23 (0.91)]	50 (1.97) or plus [23 (0.91)]	50 (1.97) or plus [28 (1.10)]	57 (2.24) or plus
Module réseau de champ CC-Link IE	50 (1.97) or plus [20 (0.79)]	50 (1.97) or plus [23 (0.91)]	50 (1.97) or plus [23 (0.91)]	50 (1.97) or plus	