

MITSUBISHI

A956WGOT-TBD

User's Manual

(Hardware)

Thank you for choosing the MELSEC-GOT Series.

To ensure correct use of this equipment, please read this manual carefully before operating it.



MODEL	A956WGOT-U-HW
MODEL CODE	1DM104
IB(NA)-0800184-G(0608)MEE	

● SAFETY PRECAUTIONS ●

(Always read before starting use)

When using Mitsubishi equipment, thoroughly read this manual and the associated manuals introduced in the manual. Also pay careful attention to safety and handle the module properly.

These precautions apply only to the installation of Mitsubishi equipment and the wiring with the external device. Refer to the user's manual of the CPU module to be used for a description of the PLC system safety precautions.


These ● SAFETY PRECAUTIONS ● classify the safety precautions into two categories: "DANGER" and "CAUTION".



Procedures which may lead to a dangerous condition and cause death or serious injury if not carried out properly.



Procedures which may lead to a dangerous condition and cause superficial to medium injury, or physical damage only, if not carried out properly.

Depending on circumstances, procedures indicated by  **CAUTION** may also be linked to serious results.

In any case, it is important to follow the directions for usage.

Store this manual in a safe place so that you can take it out and read it whenever necessary. Always forward it to the end user.

[DESIGN PRECAUTIONS]

DANGER

- Depending on the GOT main unit, communication board, communication module or cable fault, the output from the GOT interface module may remain ON or may remain 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 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.

[DESIGN PRECAUTIONS]

DANGER

- 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 display section turns black and causes the monitor screen to appear blank, while the input of the touch switch(s) still 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 monitor screen disappears even when the screensaver is not set.
 - The monitor screen will not come back on by touching the display section, even if the screensaver is set.

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.

[MOUNTING PRECAUTIONS]

DANGER

- Before installing or removing the GOT main unit to or from an enclosure, always turn the GOT power OFF before installing or removing the GOT main unit to or from an enclosure.
Not doing so can cause a module failure or malfunction.
- Before loading or unloading the communication board, communication module, external I/O interface module or memory card interface module to or from the GOT, always turn the GOT power OFF before loading or unloading the communication board, communication module, external I/O interface module or memory card interface module to or from the GOT.
Not doing so can cause a module failure or malfunction.

CAUTION

- Use the GOT within the general specifications' environment given in this User's Manual.
Not doing so can cause an electric shock, fire, malfunction or product damage or deterioration.
- When mounting the GOT main unit to an enclosure, tighten the mounting screws in the specified torque range.
Undertightening can cause a drop, short circuit or malfunction.
Overtightening can cause a drop, short circuit or malfunction due to the damage of the screws or module.
- When loading the communication module to the GOT main unit, fit it to the connection interface of the GOT and tighten the mounting screws in the specified torque range.
Undertightening can cause a drop, failure or malfunction.
Overtightening can cause a drop, failure or malfunction due to the damage of the screws or module.

[WIRING PRECAUTIONS]

DANGER

- Before starting wiring, always turn the GOT power OFF before starting wiring.
Not doing so may cause an electric shock, product damage or malfunction.

[WIRING PRECAUTIONS]

CAUTION

- Please make sure to ground FG terminal of the GOT power supply unit 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 power supply module on the GOT 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 module.
- Exercise care to avoid foreign matter such as chips and wire offcuts entering the module.
Not doing so can cause a fire, failure or malfunction.
- Plug the bus connection cable by inserting it into the connector of the connected module 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 module 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 module.

[TEST OPERATION PRECAUTIONS]

DANGER

- Before performing test operation (bit device on/off, word device's present value changing, timer/counter's set value and present value changing, buffer memory's present value changing) for a user-created monitor screen, or system monitoring, read the manual carefully to fully understand how to operate the equipment.
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 opening the panel on which the GOT is installed, always power off the GOT.
Not doing so can cause the GOT to fail or malfunction.
- When power is on, do not touch the terminals.
Doing so can cause an electric shock or malfunction.
- Do not change the extension number setting switch and I/O slot setting switch setting during power-on.
Doing so can cause a malfunction.
- Before starting cleaning or terminal screw retightening, always turn the power OFF before starting cleaning or terminal screw retightening.
Not switching the power off in all phases can cause a module 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 module.
- When touching the GOT, communication unit, and/or option unit, or before touching the panel with the GOT installed, touch a grounded metal object to discharge the static electricity from the human body.
Failure to do so may cause the unit to fail or malfunction.

CAUTION

- Do not disassemble or modify the module.
Doing so can cause a failure, malfunction, injury or fire.
- Do not touch the conductive and electronic parts of the module directly.
Doing so can cause a module malfunction or failure.
- The cables connected to the module must be run in ducts or clamped.
Not doing so can cause the module 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 module, do not hold and pull the cable portion.
Doing so can cause the module or cable to be damaged or can cause a malfunction due to a cable connection fault.

[DISPOSAL PRECAUTIONS]

CAUTION

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

Revisions

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

Print Date	*Manual Number	Revision
Feb.,2001	IB(NA)-0800184-A	First edition
May.,2001	IB(NA)-0800184-B	Partial correction Section 2.1 Partial addition Section 3.2
Feb., 2002	IB(NA)-0800184-C	Partial correction SAFETY PRECAUTIONS
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Aug.,2004	IB(NA)-0800184-E	Partial corrections Manuals, Section 3.1, 3.2, 6.2.3, Appendix1 Addition Section 5.4, 5.5, 5.6 MODEL CODE change Changed from 13JT56 to 1DM104
Dec.,2005	IB(NA)-0800184-F	Partial corrections Section 3.2
Aug.,2006	IB(NA)-0800184-G	Partial corrections Section 2.1, 3.2, 3.3, 6.1.1, 6.3.2 Partial additions SAFETY PRECAUTIONS, Manuals, Section 6.2.4, 6.3.1, 6.3.2, 6.3.3

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Manuals

The following manuals are related to this product.

Refer to the following list and request the required manuals.

Detailed Manual

Manual Name	Manual Number (Type Core)
A950GOT/A951GOT/A953GOT/A956GOT User's Manual (Sold separately)	SH-080018 (1DM103)

Relevant Manuals

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

1. Overview

This user's manual describes the system configuration, specifications, part names, handling and outline dimensions of the A956WGOT Graphic operation terminal (Referred to as GOT, hereafter).

1.1 Packing List

After unpacking, confirm that you have received the following products.

Product	Quantity
GOT main unit	1
Mounting fixture	4
Communication module securing fixture	3
Seal (For use when closing the bus connection board setting switch confirmation hole).	1

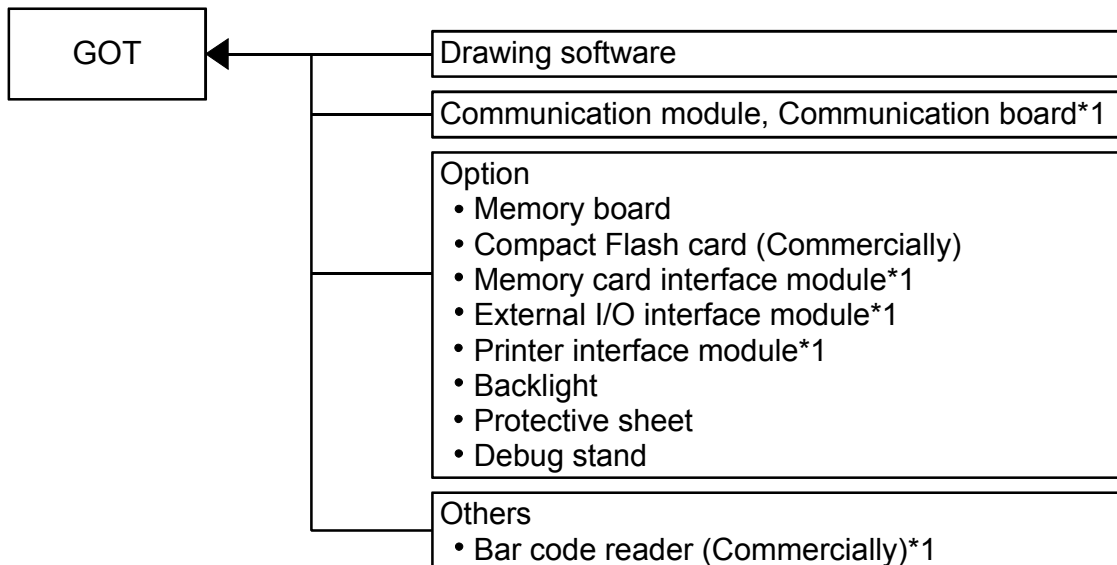
* If the protective sheet needs to be replaced, please obtain the one that is to be purchased separately.

2. System Configuration

POINT

If A956WGOT is applicable to the EMC directive, note that there are restrictions for the connection conditions.
For details, refer to "Chapter 6 EMC Directive."

2.1 Overall Configuration



*1: For details of the system configuration, refer to the GOT-A900 Series User's Manual (Connection System Manual).

2.2 Component List

Item	Type	Remarks
A956WGOT	A956WGOT-TBD	256color, 1M byte Built-in memory (Possible to expand to a maximum of 9M bytes by using a memory board), 24VDC
Debug stand	A9GT-50WSTAND	Debug stand for A956WGOT
Protective sheet	A9GT-50WPSC	Transparent protective sheet for A956WGOT
Bus connection board	A9GT-50WQBUSS	For A956WGOT bus connection, small connector type (For QCPU (Q mode))
	A9GT-50WBUSS	For A956WGOT bus connection, small connector type (For A/QnA/Motion controller CPU)
Bus connection unit	A9GT-QBUS2SU	For Multi-drop bus connection, small connector type (For QCPU (Q mode))
	A9GT-BUSSU	For bus connection, small connector type (For A/QnA/Motion controller CPU)
	A9GT-BUS2SU	For Multi-drop bus connection, small connector type (For A/QnA/Motion controller CPU)
Serial communication board	A9GT-50WRS2	For A956WGOT Direct connection to CPU/ Computer link connection/ Microcomputer connection and RS-232C connection
	A9GT-50WRS4	For A956WGOT Direct connection to CPU/ Computer link connection/ Microcomputer connection and RS-422 connection

Item	Type	Remarks	
Data link module	A7GT-J71AP23	For MELSECNET(II) optical link connection	
	A7GT-J71AR23	For MELSECNET(II) coaxial link connection	
	A7GT-J71AT23B	For MELSECNET/B connection	
Network module	A7GT-J71LP23	For MELSECNET/10 optical loop network connection	
	A7GT-J71BR13	For MELSECNET/10 coaxial bus network connection	
Control Communication link (CC-Link) module	A8GT-J61BT13	For CC-Link connection, for use as intelligent device station	
	A8GT-J61BT15	For CC-Link connection, for use as remote device station	
Ethernet Communication module	A9GT-J71E71-T	For Ethernet connection	
Memory board	A9GT-FNB	Exclusively used for optional function OS storage	
	A9GT-FNB1M	For optional function OS storage + expansion memory, 1M byte	
	A9GT-FNB2M	For optional function OS storage + expansion memory, 2M byte	
	A9GT-FNB4M	For optional function OS storage + expansion memory, 4M byte	
	A9GT-FNB8M	For optional function OS storage + expansion memory, 8M byte	
	A9GT-QFNB	Exclusively used for optional function OS storage	
	A9GT-QFNB4M	For optional function OS storage + expansion memory, 4M byte	
	A9GT-QFNB8M	For optional function OS storage + expansion memory, 8M byte	
Compact flash card	-	Commercially available Compact Flash PC card (Compliant with Flash™*1)	
Memory card interface module	A1SD59J-MIF	For loading memory card	
PC card (SRAM type)	-	PC cards that can be used with memory card interface module Compliant with PCMCIA Ver.2.1 or later.	
Memory card cable	A85GT-C05H	Cable length 2.0m	For connection between GOT and memory card I/F module
External I/O module	A8GT-50KBF	For external I/O connection	
Printer interface module	A9GT-50PRF	For Printer connection	
Printer	-	Printer compliant with ESC/P24-J84 (ESC/P command compatible)	
		Hewlett Packard Printers (PLC command compatible)	
Printer cable	AC30PIO-20P	Cable length 3.0m	
Bus extension connector box	A9GT-QCNB	Used for connection of the QCPU (Q mode) long-distance bus	
Bus connector conversion box	A7GT-CNB	For conversion from large type connector to small type connector (Used for connection of the A/Q A/Motion controller CPU long-distance bus)	

*1: Compact Flash TMisa trademark of Sun disk.

3. Specifications

3.1 General Specifications

Item	Specifications					
Operating ambient temperature	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	Conforms to JIS B3502 and IEC 61131-2.		Frequency	Acceleration	Amplitude	Sweep Count
		In case of intermittent vibration	10 to 57Hz	—	0.075mm	10 times in each of X, Y and Z directions (for 80 minutes)
			57 to 150Hz	9.8m/s ²	—	
		In case of continuous vibration	10 to 57Hz	—	0.035mm	
57 to 150Hz	4.9m/s ²		—			
Shock resistance	Conforms to JIS B3502 and IEC 61131-2 (147m/s ² , 3 times in each of X, Y and Z directions)					
Operating atmosphere	No corrosive gas					
Operating altitude	2000m max.					
Installation site	Inside control box					
Overvoltage category*1	II or less					
Contamination level*2	2 or less					

- *1: Indicates the element in the distribution system between the public electricity grid and the mechanical equipment inside the premises that the relevant device is assumed to be connected to.
Category II applies to devices such as those that draw their power supply from fixed installations.
The surge voltage withstand capability of devices with ratings up to 300V is 2,500V.
- *2: This index gives a measure of the incidence of conductive materials in the environment in which the device is used.
A contamination level of 2 indicates an environment in which there is only contamination by non-conducting materials, but due to occasional condensation, conductivity may occur.
- *3: Please do not use or store GOT in an environment with atmospheric pressure greater than the atmospheric pressure at sea level (0m).
There is a possibility errors may occur if this point is not observed.

3.2 Performance Specifications

Item		Specifications
Display section *1 *2 *3	Type	TFT color liquid crystal
	display size [Type]	7 (18)
	Resolution [pixels]	480 × 234
	Display size [mm] (inch)	155.52(6.12)(W) × 87.75(3.45)(H)
	Display color [color]	256
Memory *4	Type	Flash ROM
	Application	For monitor screen data storage, for OS storage
	Capacity	1M byte built-in (user area) (A maximum of 8Mbytes can be extended)
	Reference value for data transmission time (For RS-232C communication)	When installing OS: 640 to 760 seconds (For basic functions, BUS driver and system monitor (approx. 1.3Mbytes)) When downloading screen data: 330 to 570 seconds (For approx. 30 screens (approx. 600kbytes))
RS-232C Interface		For connection of personal computer, for bar-code reader connection 1 channel
Option module interface		For option module loading, 1 channel
Communication module interface*5		For communication module loading, 1 channel
Communication board slot*5		For communication board loading, 1 slot
Memory board slot		For Memory board loading, 1 slot
Compact flash card slot		For Compact flash card loading, 1 slot
Buzzer output		Single tone (tone length adjustable)
Backlight*6		Cold cathode fluorescent tube backlight (Backlight OFF/screen saving time setting allowed)
Life*7	Display section [Hr]*8	50,000 (Operating ambient temperature: 25°C)
	Backlight [Hr]*8	50,000 (Time when display luminance reaches 50% at the operating ambient temperature of 25°C)
	Touch key	1 million times or more (operating force 0.98N max.)
	Built-in memory	Number of write times: 100,000 times
Environmental protective structure		Front section : Equivalent to IP67/NEMA4 Panel inside : IP2X
Outline dimensions [mm] (inch)		215(8.46)(W) × 133(5.24)(H) × 70.8(2.79)(D)
Panel cutting dimensions [mm] (inch)		205.5(8.09)(W) × 123.5 (4.86)(H)
Weight [kg] (lb)		1.05 (2.31)
Compatible software package		SW5D5C-GTWORKS-E Version K or later SW5D5C-GOTR-PACKE Version K or later

- *1: If you run the monitor with A956WGOT, the screen may flicker depending on the type of object/shape fill pattern used when creating images. This is due to the specifications of the LCD panel and is not a malfunction. Be sure to check the combination of the type of pattern and color on the machine before using.
For patterns likely to flicker and countermeasures against flickers, refer to the reference manual of GT Designer or GT Designer 2.
- *2: Depending on the display color combination, the visibility of the screen may be lower from certain viewpoints.
Before using, check the color combination with the machine installed in the usage environment.
By designating bright colors for the basic color types, you can decrease the chances of this phenomenon occurring.
- *3: With the LCD panel, situations with luminous points (points that stay lit up) and dark points (points that do not light up) may occur.
This is a feature of the LCD panel and is not a malfunction.
- *4: The built-in FLASH ROM memory allows old data be overwritten by new data. (Data backup power supply is not needed.)
- *5: Note that either of the communication board slot and communication module interface may only be used.
- *6: The A956WGOT backlight cannot be replaced by the user.
- *7: When parts must be changed, consult your sales representative.
- *8: The screen saving/back light OFF function of GOT is extended, thus reducing burn-in of the display panel and extending longevity of the back light.

3.3 Power Supply Specifications

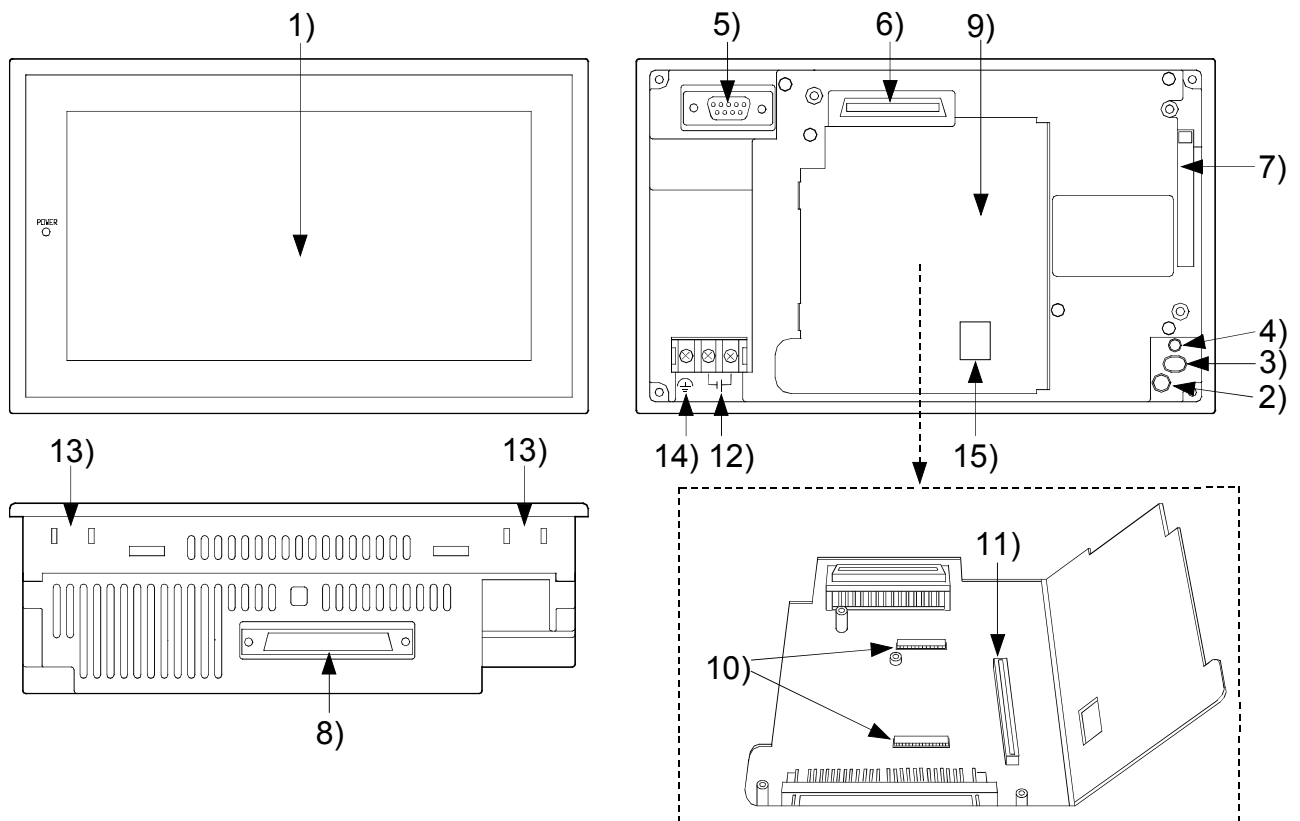
Item	Specifications
Input power supply voltage	24VDC(+10%, 15%)
Input max. power [W]	22
Inrush current [Ap]	61 max. (30VDC, max. load)
Permissible instantaneous power failure time [ms]	1 (19.2VDC or more)
Noise immunity	By noise simulator of 500Vp-p noise voltage, 1 μ s noise width and 25 to 60Hz noise 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[mm ²]	0.75 to 2
Applicable solderless terminal	RAV1.25-3, V2-S3.3, V2-N3A, FV2-N3A
Applicable tightening torque [N•cm] (Terminal block terminal screw)	59 to 88

Remarks

When an instantaneous power failure occurs for the time exceeding the permissible instantaneous power failure time in the 24VDC power supply, the GOT may be reset. In such a case, the GOT will automatically return and start communicating.

As the communication between the GOT and PLC is stopped when an instantaneous power failure occurs, some object functions may not be performed normally.

4. Names of the Parts



No.	Name	Description
1)	Display section	Shows the screen
2)	Reset button	Used to reset the hardware of the GOT (invalid for bus connection)
3)	Compact flash card access switch	Used to set the condition of access to the compact flash card when it is loaded during power-on (Factory-set to OFF) OFF :Access from GOT to compact flash card inhibited ON :Access from GOT to compact flash card enabled (When a memory card interface unit is used, a compact flash card cannot be used. Therefore, turn this switch OFF.)
4)	Compact flash card LED	Indicates whether the compact flash card may be loaded/unloaded or not Off : Compact flash card may be loaded/unloaded (When switch 3 is OFF) On : Compact flash card must not be loaded/unloaded (When switch 3 is ON)
5)	RS-232C interface	For connection of personal computer For connecting the bar code reader
6)	Communication module interface	Interface for communication module loading

No.	Name	Description
7)	Compact flash card slot	Slot for Compact flash card loading
8)	Option module interface	For connection Printer I/F module, Memory card I/F module, External I/O module
9)	Slot cover	Cover of the memory board slot and the communication board slot
10)	Memory board slot *	Slot for memory board loading
11)	Communication board slot *	Slot for communication board loading
12)	Terminal block	For power input
13)	Mounting fixture fitting portion	For mounting fixture fitting
14)	Ground terminal	For earthing (For safety, please make sure to ground this terminal.)
15)	Bus connection board setting switch confirmation hole	For confirming the extension number of the I/O slot number set with the bus connection board (If you are not using the A9GT-50WBUSS, it is possible to attach the seal included with the GOT main unit to cover the hole.)

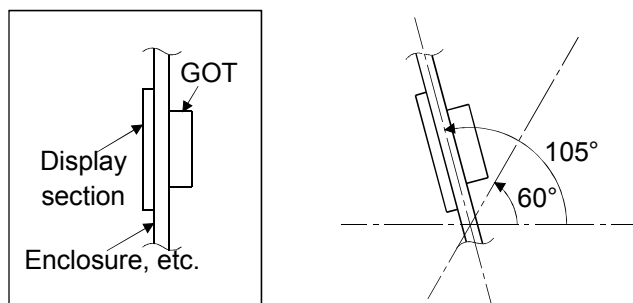
* Be careful not to touch the board inside the GOT main body by hand when mounting the memory board and the communication board.

5. Handling

5.1 Handling Instructions

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

When the temperature inside the enclosure 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 enclosure should be within 40°C.

Tighten the screws in the following specified range.

Screw Location	Tightening Torque Range
Ground terminal screw (M3 screw)	59 to 88N•cm
Terminal block terminal screw (M3 screw)	
Mounting fixture screw (M4 screw)	36 to 48N•cm
Communication board mounting screw (M3 screw)	
Communication module mounting screw (M3 screw)	
Option module mounting screw (M3 screw)	
Case fixing screw (M3 screw)	20 to 28N•cm
RS-232C connector mounting screw (#4-40 UNC (inch screw))	
Memory board mounting screw (M2.6 screw)	
	25 to 35N•cm

5.2 Installation Method

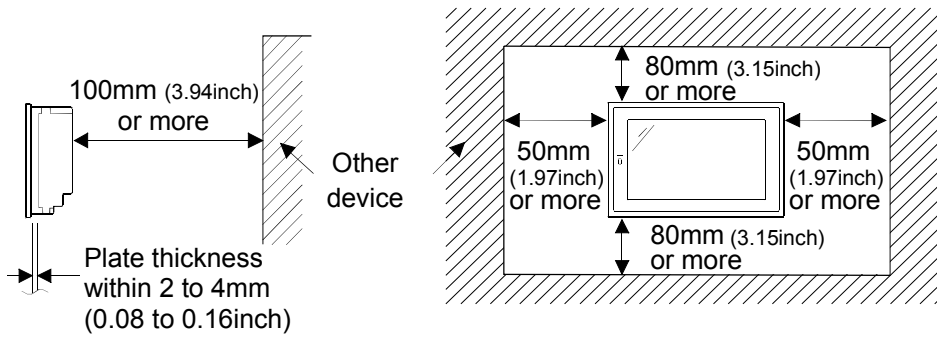
(1) Mounting panel cutting dimensions

When mounting the GOT on a control box door, user-made mounting base or the like, the door or mounting base must be cut as indicated below.

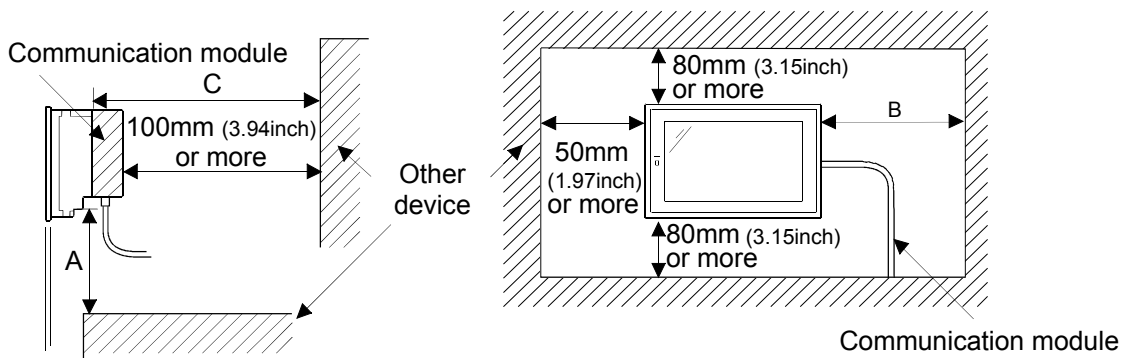
Item	A [mm](inch)	B [mm](inch)
A956WGOT	205.5 (8.09) [+1.0 (0.04), -0 (0)]	123.5 (4.86) [+1.0 (0.04), -0 (0)]

(2) Mounting position

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



(a) When a communication module or a connection cable is installed
 When a communication module or a connection cable is installed on the GOT, their mounting positions should be as shown in the figures below.



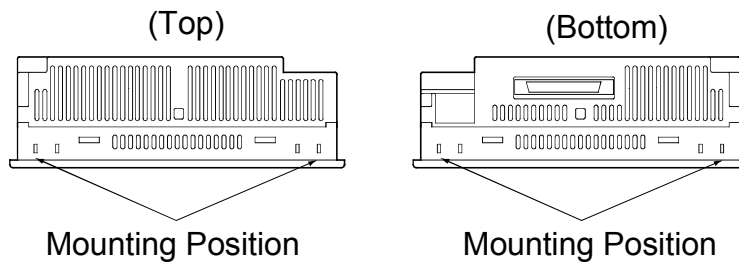
Mounting Communication module, Connection cable		Dimension(mm)
A ^{*1}	Option cable (Connect to option module interface)	114
	A9GT-BUSSU, A9GT-BUS2SU	105
	A7GT-J71AP23, A7GT-J71LP23	MAX 185 MIN 80
	A7GT-J71AR23, A7GT-J71BR13	80
B ^{*2}	A9GT-50WRS2, A9GT-50WRS4	103
	A9GT-50WQBUSS	55
	A9GT-50WBUSS	74
C	RS-232C cable for connecting the personal computer and the bar code reader. (Connect to interface RS-232C)	135

*1: At least 80 mm is necessary for the A section measurement.
 Varies depending on the connection cable's curve radius.

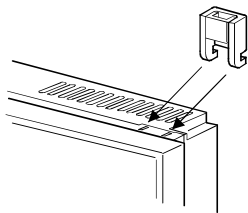
*2: At least 50 mm is necessary for the A section measurement.

(3) Mounting method

- (a) Put the GOT main unit into the panel opening, with its front facing outward.
- (b) Mount the GOT in the following four locations on its top and bottom.

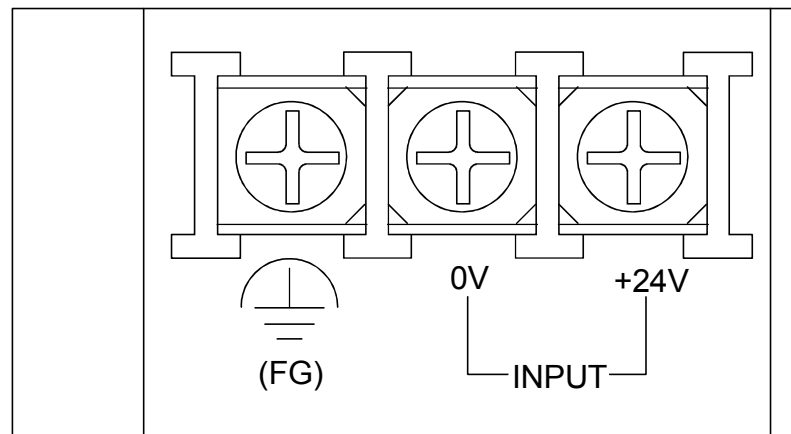


- (c) How to mount and fix the mounting fixture is given below.



- 1) Insert the mounting fixture into the fixture fitting portion of the GOT main unit.
- 2) Tighten and fix the mounting screw within the specified torque range.

5.3 Wiring diagram



POINT

Note that the terminals of the A956WGOT are arranged in the reverse order of the terminals of the A950GOT/A951GOT/A953GOT/A956GOT.

5.4 The Precautions on the Wiring

DANGER

- Completely turn off the externally supplied power used in the system when installing or placing wiring. Not completely turning off all power could result in electric shock, damage to the product.

CAUTION

- Be sure to ground the FG terminal and LG terminal of the GOT power supply section to the protective ground conductor. Not doing so could result in electric shock or erroneous operation.
- When wiring in the GOT power section, be sure that it is done correctly by checking the product's rated voltage and the terminal layout. Connecting a power supply that is different from the rating or incorrectly wiring the product could result in fire or erroneous operation.
- Tighten the terminal screws of the GOT power supply section within the specified torque range.
If the terminal screws are loose, it could result in short circuits, erroneous operation or erroneous operation.
Tightening the terminal screws too far may cause damages to the screws and/or the module, resulting in fallout, short circuits, or erroneous operation.
- Be sure there are no foreign substances such as sawdust or wiring debris inside the module GOT main unit.

- General view of noise countermeasures

There are two types of noise: radiated noise, which is transmitted through the air, and conducted noise, which is transmitted through a connection wire. 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) Block noise

- (a) Keep signal wires away from a possible noise source as power wires or high-power driving circuits.
- (b) Shield signal wires.

(2) Reduce generated noise

- (a) Reduce the noise generated from high-power motor drive circuits.

(3) Ground noise without fail

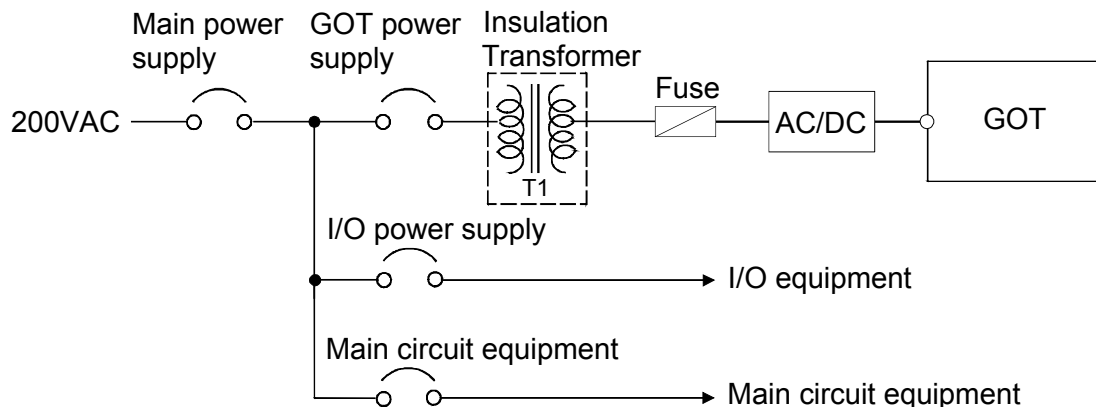
- (a) Earth the grounding wire to the ground without fail.
- (b) Use a grounding wire as thick and short as possible to ensure low grounding impedance.
- (c) Separate the grounding between power and control systems.

(1) Power supply wiring

- Separate the GOT's power supply line from the lines for I/O devices and power devices as shown below.

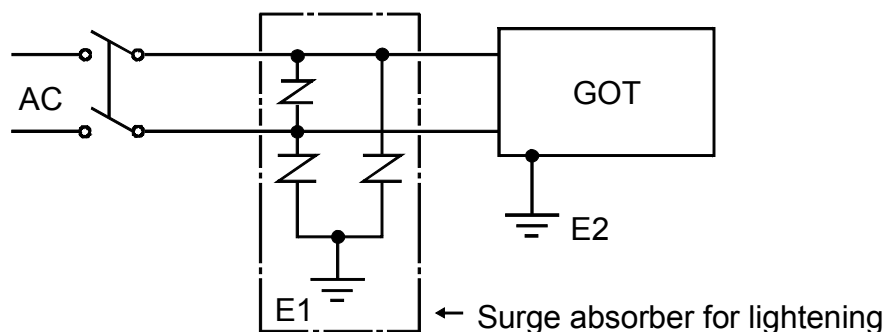
When there is much noise, connect an insulation transformer.

Power supply wiring diagram



- 24VDC wires should be twisted as dense as possible. Connect the modules with the shortest distance. Also, to reduce the voltage drop to the minimum, use the thickest wires possible (0.75 to 2mm²). Use a solderless terminal for M3 screw. Also, be sure to tighten the M3 screw within tightening torque 0.55 to 0.88 N•m in order not to cause trouble.
- Do not bundle the 24VDC wires with, or run them close to, the main circuit (high voltage, large current) and I/O signal lines. Reserve a distance of at least 100 mm from adjacent wires.
- As a countermeasure to power surge due to lightening, connect a surge absorber for lightening as shown below.

Lightening surge absorber connection diagram

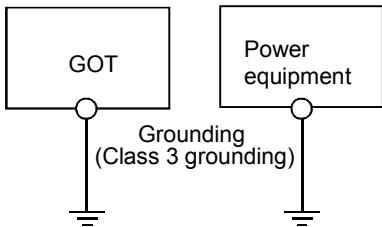


POINT

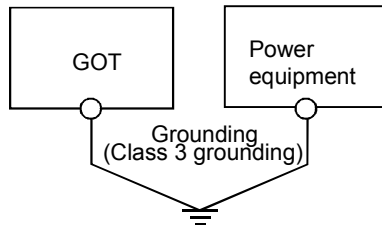
- (1) Separate the ground of the surge absorber for lightening (E1) from that of the GOT (E2).
- (2) Select a surge absorber for lightening whose power supply voltage does not exceed the maximum allowable circuit voltage even at the time of maximum power supply voltage elevation.

(2) Grounding

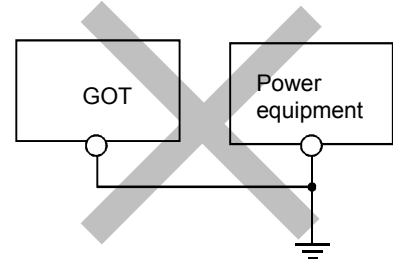
- For grounding, perform the following:
Use a dedicated grounding wire as far as possible. (Grounding resistance of 100Ω or less.)
- When a dedicated grounding cannot be performed, use (2) Common Grounding shown below.
Also, be sure to take noise countermeasures other than grounding.



(1) Independent grounding…… Best



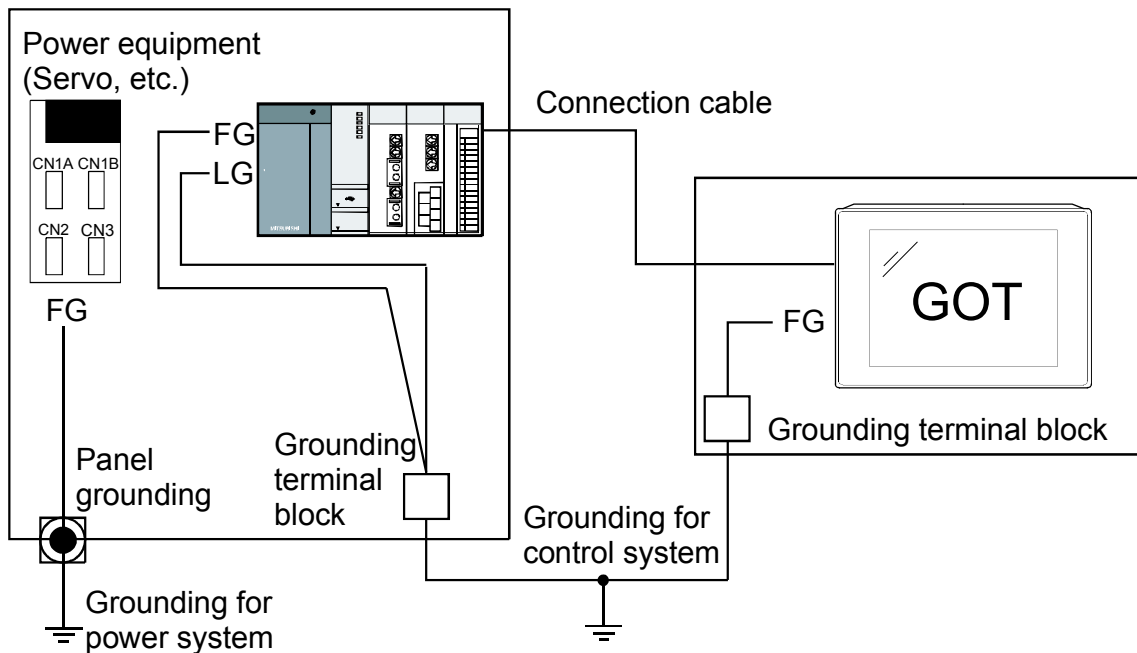
(2) Common grounding…… Good



(3) Joint grounding…… Not allowed

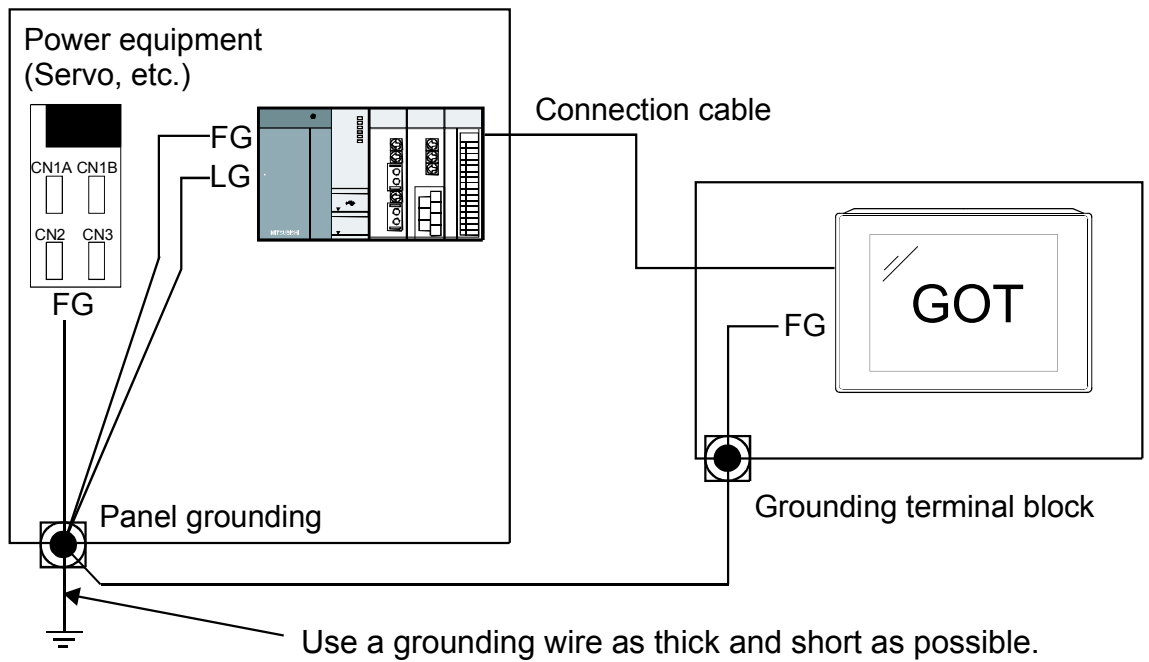
- For grounding a cable, use the cable of 2 mm² or more.
Position the ground-contact point as closely to the sequencer as possible, and reduce the length of the grounding cable as much as possible.

(a) An example of independent grounding



- * For control system grounding, apply single-point grounding for one system.
Especially for the devices communicating each other, be sure to earth the grounding wire at one point.

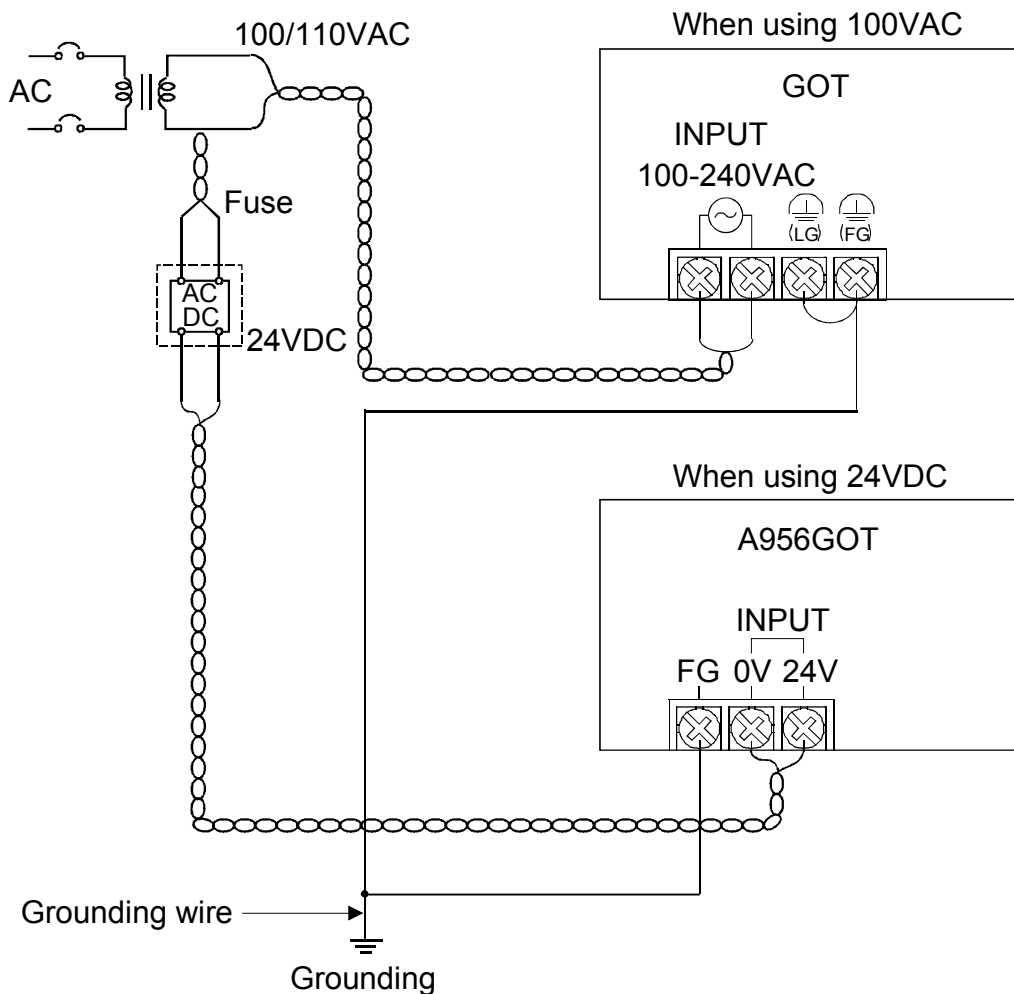
(b) An example of common grounding



* Apply single-point grounding for one system.

5.5 Connecting to the GOT Power Section

The following diagram shows the wiring example of power lines, grounding lines, etc. to the GOT power section.



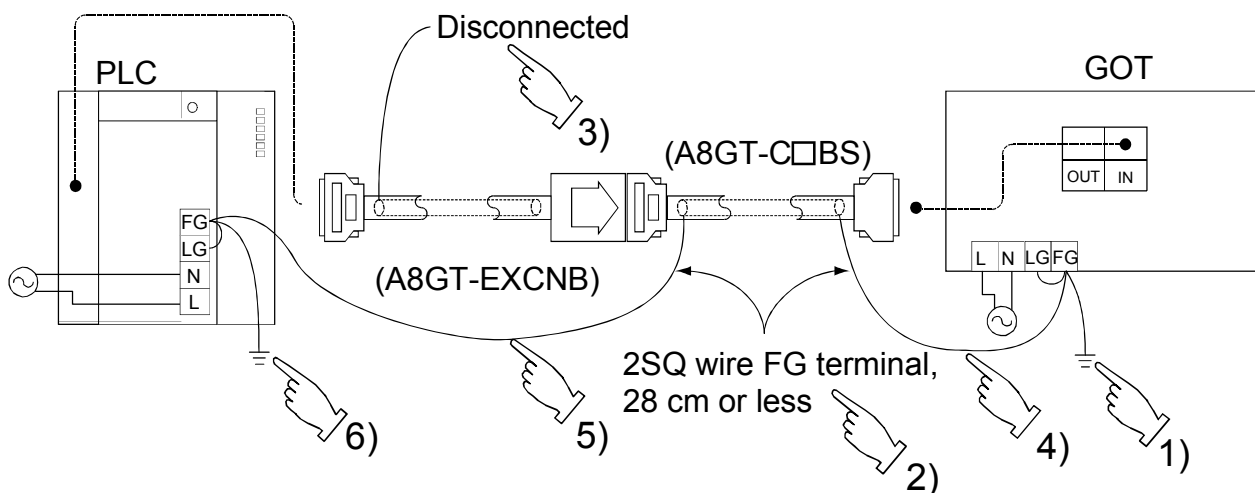
POINT

- (1) Use the thickest possible (max. 2 mm² (14 AWG)) wires for the 100/200 VAC and 24 VDC power cables. Be sure to twist these wires starting at the connection terminals. To prevent a short-circuit should any screws loosen, use solderless terminals with insulation sleeves.
- (2) When the LG terminals and FG terminals are connected, be sure to ground the wires. Do not connect the LG terminals and FG terminals to anything other than ground. If LG terminals and FG terminals are connected without grounding the wires, the PLC may be susceptible to noise.
In addition, since the LG terminals have potential, the operator may receive an electric shock when touching metal parts.

5.6 Connection Cable Wiring

- Do not bind connection cables with the main circuit (high voltage, heavy current) or I/O signal cables, or lay them close to each other.
- When using A8GT-C□EXSS-1 or A8GT-C□BS, ground wires as below.

(1) When using A8GT-C□EXSS-1 cable



- 1) Connect the LG and FG terminals of GOT unit power to the ground through the terminal block with one wire.
 - 2) Use FG wires of 28 cm or less for the A8GT-C□BS cable.
 - 3) Do not connect the FG grounding wire of A8GT-EXCNCB cable.
 - 4) Connect the A8GT-C□BS cable's FG wire to FG of the GOT unit power terminal block.
 - 5) Connect the A8GT-C□BS cable's FG wire on the PLC side to FG of the PLC power supply module.
 - 6) Connect the LG and FG terminals of the terminal block on the PLC to ground with one wire.
- (2) When using A8GT-C□BS cable
Connect the A8GT-C□BS cable's FG wires on the both sides to the FG terminals on the power terminal block of the both side GOTs.

6. EMC 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 Directives required to declare that their products conform to these Directives and put a "CE mark" on their products.

POINT

Products that the EMC directive applies to are marked with the CE mark logo.
--

6.1 Requirements for conformance to EMC Directive

The EMC Directive specifies that products placed on the market must "be so constructed that they do not cause excessive electromagnetic interference (emissions) and are not unduly affected by electromagnetic interference (immunity)".

The applicable products are requested to meet these requirements. The sections 6.1.1 through 6.3.3 summarize the precautions on conformance to the EMC Directive of the machinery constructed using the GOT.

The details of these precautions has been prepared based on the requirements and the applicable standards control. However, we will not assure that the overall machinery manufactured according to these details conforms to the above-mentioned directives. The method of conformance to the EMC directive and the judgment on whether or not the machinery conforms to the EMC Directive must be determined finally by the manufacturer of the machinery.

6.1.1 Standards applicable to the EMC Directive

Specification	Test item	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 measurement range) ^{*2,*3} 230M-1000MHz QP: 37dB μ V/m(30m measurement range) ^{*2,*3}
	EN55011 Conducted noise ^{*1}	Electromagnetic emissions from the product to the power line are measured.	150k-500kHz QP: 79db, Mean: 66dB ^{*2} 500k-30MHz QP: 73dB, 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 more): 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.	DC power type Power line (between line and ground): \pm 0.5kV Data communication port: \pm 0.5kV
	EN61000-4-6 Conducted RF immunity ^{*1}	Immunity test in which a noise inducted on the power and signal lines is applied.	Power line: 3V Data communication port: 3V
	Instantaneous power failure and voltage dips immunity	Test for checking normal operations at instantaneous power failure	DC power type 10ms (interval 1s or more)
	Radiated RF immunity	Test for checking normal operations when the power supply unit input voltage is fluctuated	DC power type 20.4V, 28.8V
	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	DC power type 20.4V, 26.4V

- *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.
 - 30-230MHz QP :40dB μ V/m (10m in measurement range)
 - 230-1000MHz QP:47dB μ V/m (10m in measurement range)

6.1.2 Control cabinet

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

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 cabinet

- (a) Use a conductive control cabinet.
- (b) When attaching the control cabinet's top plate or base plate, mask painting and weld so that good surface contact can be made between the cabinet and plate.
- (c) To ensure good electrical contact with the control cabinet, mask the paint on the installation bolts of the inner plate in the control cabinet so that contact between surfaces can be ensured over the widest possible area.
- (d) Earth the control cabinet with a thick wire so that a low impedance connection to ground can be ensured even at high frequencies. (22mm² wire or thicker is recommended.)
- (e) Holes made in the control cabinet must be 10 cm (3.94in.) diameter or less. If the holes are 10cm (3.94in.) or larger, radio frequency noise may be emitted.
In addition, because radio waves leak through a clearance between the control panel door and the main unit, reduce the clearance as much as practicable.
The leakage of radio waves can be suppressed by the direct application of an EMI gasket on the paint surface.
Our tests have been carried out on a panel having the damping characteristics of 37 dB max. and 30 dB mean (measured by 3 m method with 30 to 300 MHz).

(2) Connection of power and ground wires

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

- (a) Provide an earthing point near the GOT. Earth the power supply's FG terminal (FG: Frame Ground) with the thickest and shortest wire possible. (The wire length must be 30cm (11.18in.) or shorter.)
The FG terminal function is to pass the noise generated in the GOT 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.

(3) Electrical shock prevention

In order to such as the operators from electric shocks, the control box must have the following functions :

- (a) The control cabinet must be equipped with a lock so that only skilled or qualified personnel.
- (b) The control cabinet must be fitted with advice which automatically stops the power supply when the cabinet is opened.

(4) Dustproof and waterproof features

The control box also has the dustproof and waterproof functions. Insufficient dustproof and waterproof features lower the insulation withstand voltage, resulting in insulation destruction. The insulation in our 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 box 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.

An environment for a typical factory floor.

Pollution level 4 : Continuous conductivity may occur due to rain, snow, etc. An outdoor environment.

6.1.3 Grounding

It is necessary to use the GOT grounding terminal only when it is in the grounded condition.

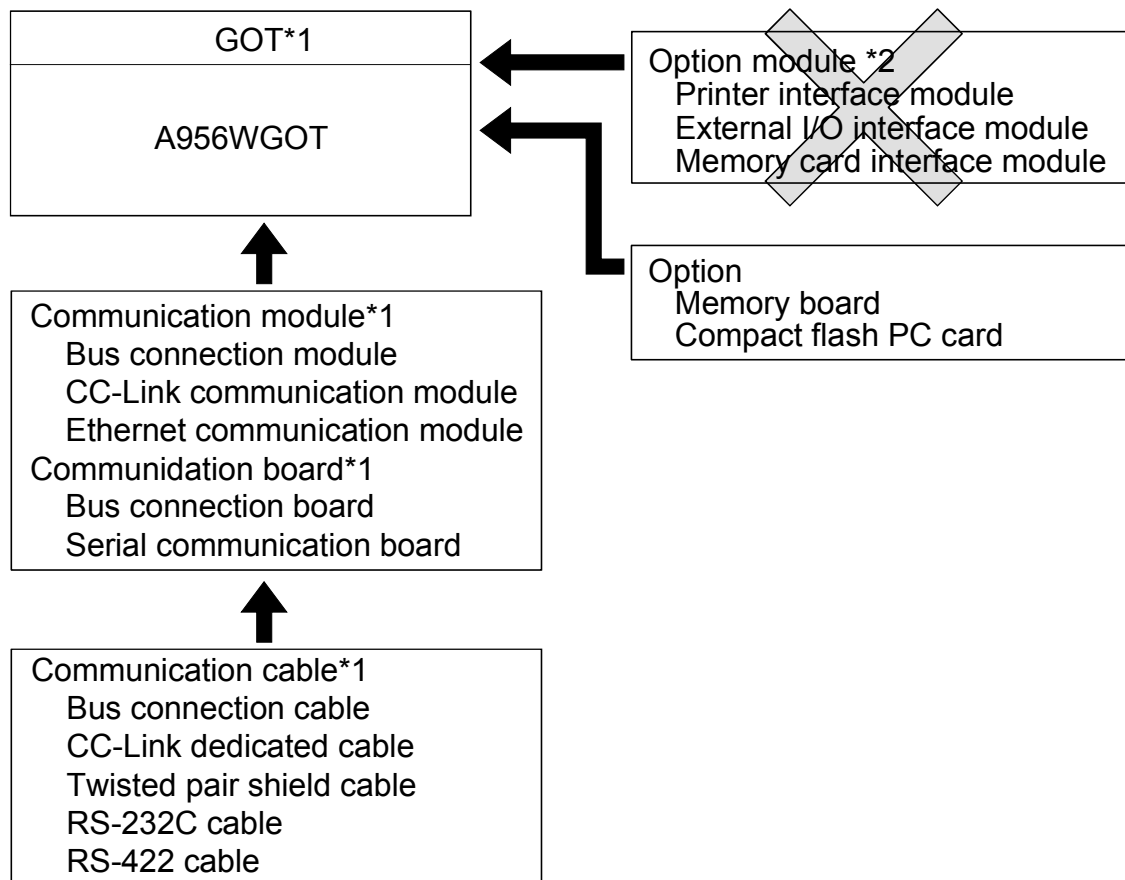
Be sure to ground the grounding for the safety reasons and EMC Directives.

Functional grounding  : Improves the noise resistance.

6.2 System Configuration when EMC Directive is Applicable

Connection conditions and models where the EMC directive is applicable are shown below. (Available August, 2006)

6.2.1 Overall Configuration



*1 See section 6.2.2 or section 6.2.3 for information about models and hardware versions that are applicable to the EMC directive.

*2 EMC directive is not applicable when using an option module.

6.2.2 Connection Format

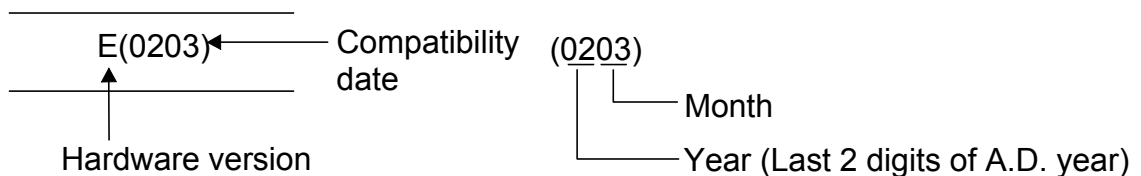
Connection conditions where the A956WGOT is applicable to the EMC directive are shown below.

Connection Format		A956WGOT
Bus connection	QCPU	×
	QnA/ACPU	E(0203)
CPU Direct connection	QCPU(RS-232C)	E(0203)
	QnA/ACPU(RS-422)	E(0203)
Computer link connection	RS-232C	E(0203)
	RS-422	E(0203)
MELSECNET connection		×
CC-link connection	Intelligent device	E(0203)
	Remote device	×
Ethernet connection		E(0203)

<How to read the table>

The table indicates the GOT-compatible hardware version for each connection pattern and the compatibility date.

Please use the GOT whose hardware version is later than that described.



× indicates the product is not compliant with the EMC Directive.

POINT
If connecting to a PLC not from this company (MELSEC-Q series, MELSEC-QnA series, MELSEC-A series), refer to the manual of the connected device (PLC, microcomputer) for information about the applicability of the EMC directive.

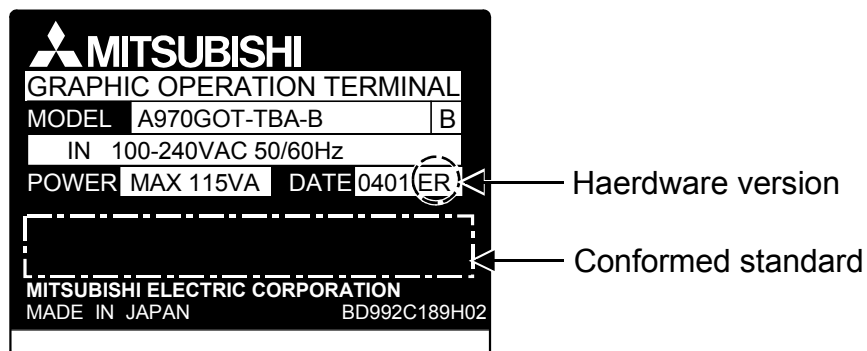
6.2.3 When the communication board/module is used

Be sure to use the communication boards/communication modules shown below with A956WGOT. If communication modules/communication boards other than those shown below are used, they are not applicable to the EMC directive.

Connection Format		Communication board/module
Bus connection		A9GT-50WBUSS (Hardware version B or later) A9GT-BUSSU (Hardware version B or later) A9GT-BUS2SU (Hardware version B or later)
CPU Direct connection	RS-232C	A9GT-50WRS2 (Hardware version B or later)
	RS-422	A9GT-50WRS4 (Hardware version B or later)
Computer link connection	RS-232C	A9GT-50WRS2 (Hardware version B or later)
	RS-422	A9GT-50WRS4 (Hardware version B or later)
CC-Link connection		A8GT-J61BT13 (Hardware version E or later)
Ethernet connection		A9GT-J71E71-T (Hardware version C or later)

POINT

Confirm the hardware version with the products rating plate.
(Products that the EMC directive applies to are marked with the CE mark logo.)



6.2.4 About the Cable Used

If making the GOT applicable to the EMC directive, be sure to use the cables shown below.

○: EMC directive applicable ×: EMC directive not applicable

Connection format		Cable	EMC Directive
Bus connection	A/QnACPU	AC06/12/30/50B, AC12/30/50B-R, A1SC07/12/30/50B, A1SC05/07/30/50NB, A8GT-C12/30/50NB, A370C12/25B, A9GT-J2C10B, A8GT-C100/200/300EXSS, A8GT-C100/200/300BS, A8GT-C100/200/300EXSS-1	○
	QCPU (Q mode)	QC06/12/30/50/100B, A9GT-QC150/200/250/300/350BS	×
CPU direct connection	RS-232C communication	QC30R2	○
	RS-422 communication	AC30/100/300R4-25P	○
Computer link connection	RS-232C communication	User created cable	○
	RS-422 communication	AC30/100/300R4-25P User created cable	○
CC-Link connection		CC-Link dedicated cable	○
Ethernet connection		Category 5 twisted pair shield cable (10BASE-T)	○

POINT

To make applicable to the EMC directive, each cable (including user created cables) must be manufactured.

Refer to section 6.3.2. for the cable manufacturing method.

6.3 Wiring precautions the part which matches the EMC Directives

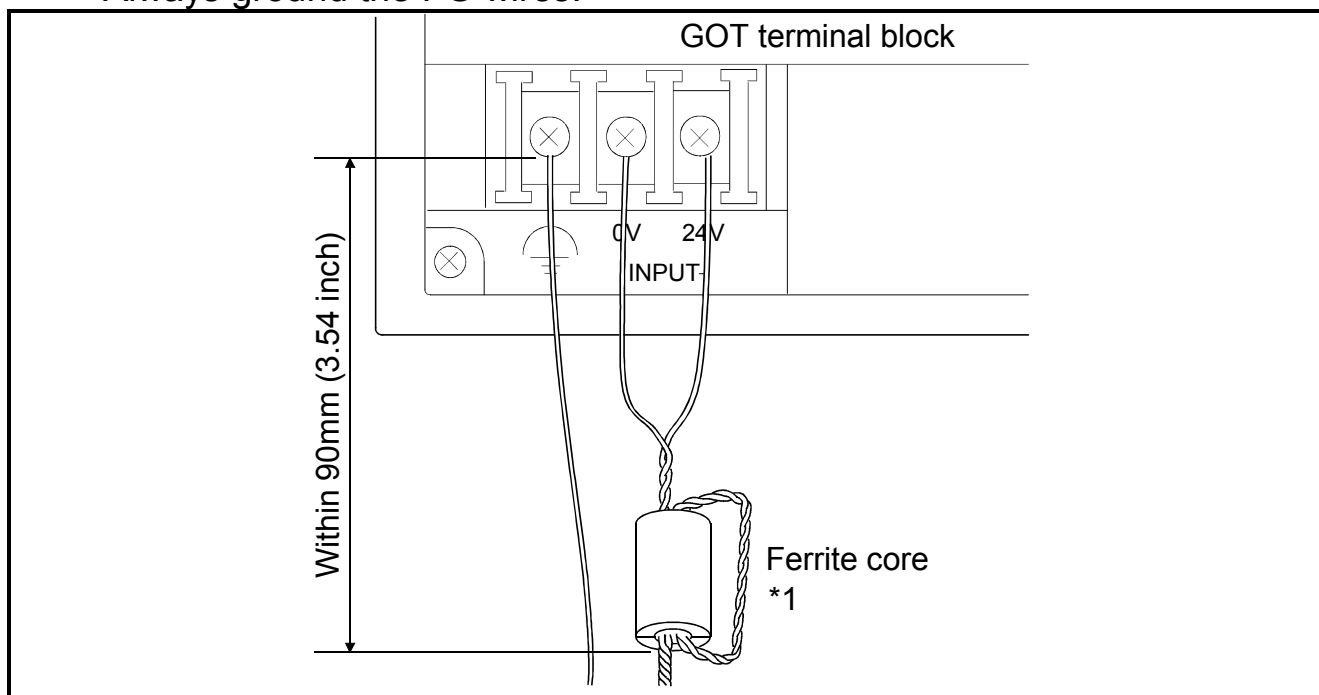
Connect and wire GOT equipment as instructed below.

If the GOT equipment is configured in a way that differs from the following instructions then the system will not comply with EMC directives.

6.3.1 Method to connect the power wire and ground wire

(1) With the power wire, be sure to attach the ferrite core (TDK type ZCAT3035-1330) within 90 mm of the GOT terminal module.

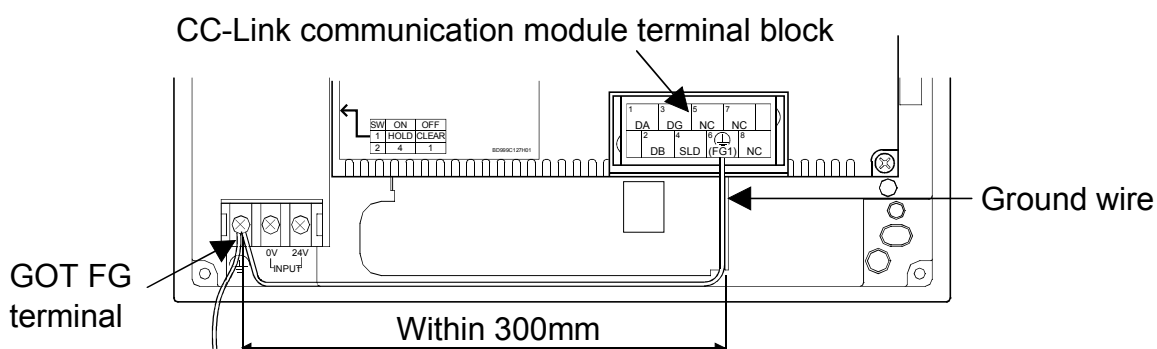
Lead the power wire and ground wire as shown in Section 6.1.2 (2). Always ground the FG wires.



*1 Wrap the power wire around the ferrite core.

(a) When connecting CC-Link, use the grounding wire of the FG1 terminal on the CC-Link communication module to connect to the FG terminal of the GOT power section.

Use a grounding wire of 300 mm or less.



POINT

Use a CE compatible product for 24 V DC external common power source for GOT.

The EMC test run by our company was confirmed with the same panel components as the DENSEI-LAMBDA type JWS 50-24 or DLP120-24-1 installed.

6.3.2 Grounding the ground cable

Manufacture the cable used with the GOT with the following method. When manufacturing the cable, a ferrite core, cable clamp and cable shielding material are required.

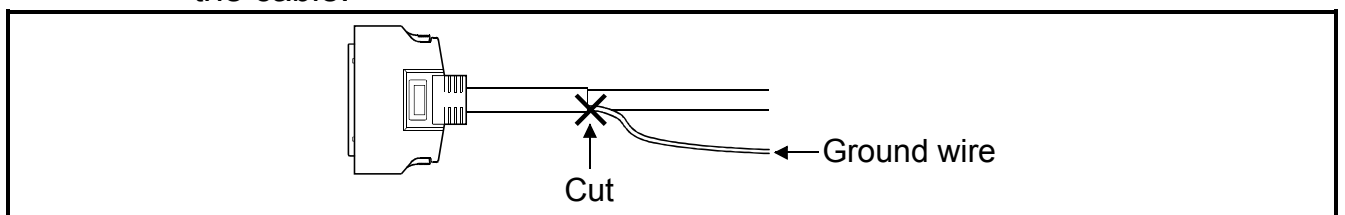
The cable clamp used by Mitsubishi Electric for the EMC specification compatibility test is shown below.

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

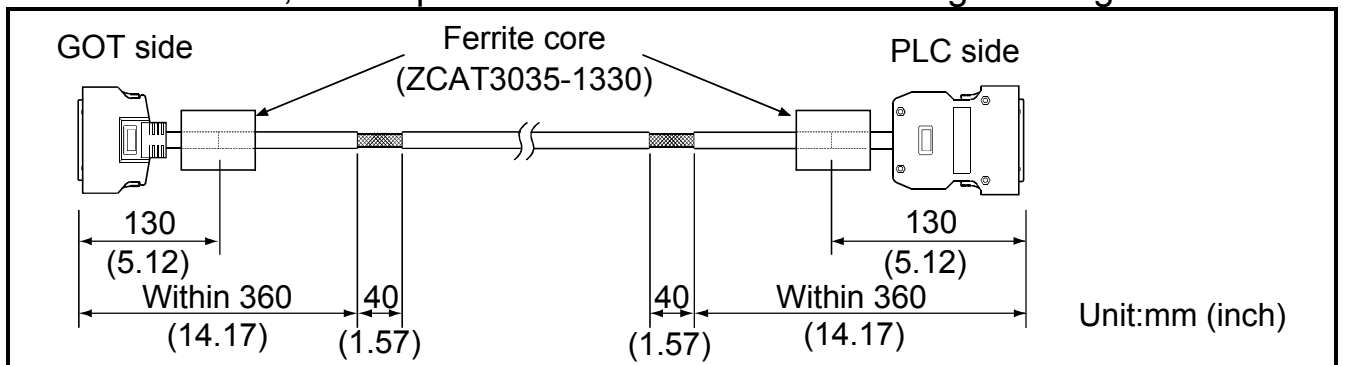
(1) Bus Connection

(a) For A8GT-C100/200/300EXSS

- Cut the ground wire from the core where it protrudes from both ends of the cable.

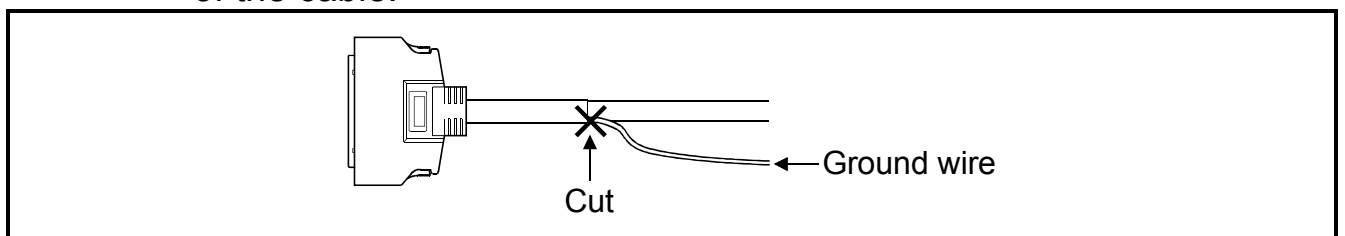


- Peel the sheath (with the length shown below) at both ends of the cable, and expose the shield braided wire for grounding.

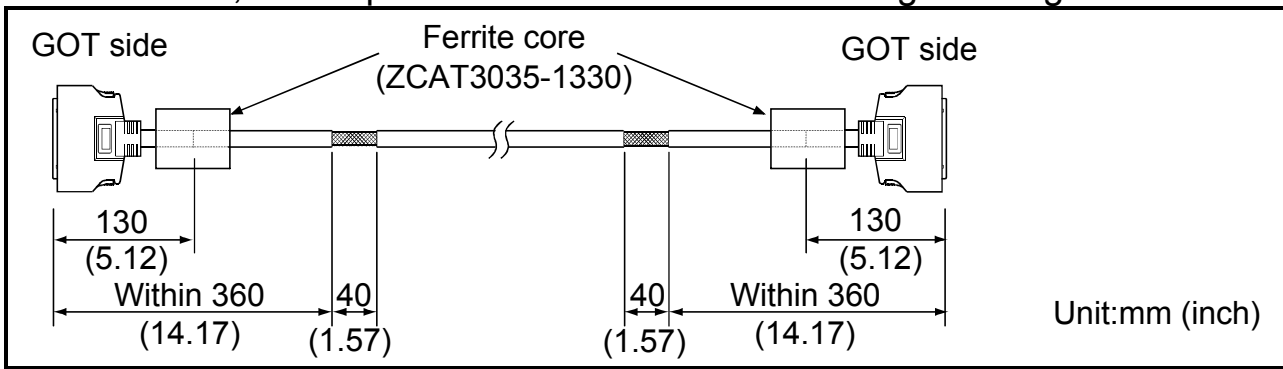


(b) For A8GT-C100/200/300BS

- Cut the ground wire from the core where it protrudes from both ends of the cable.



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

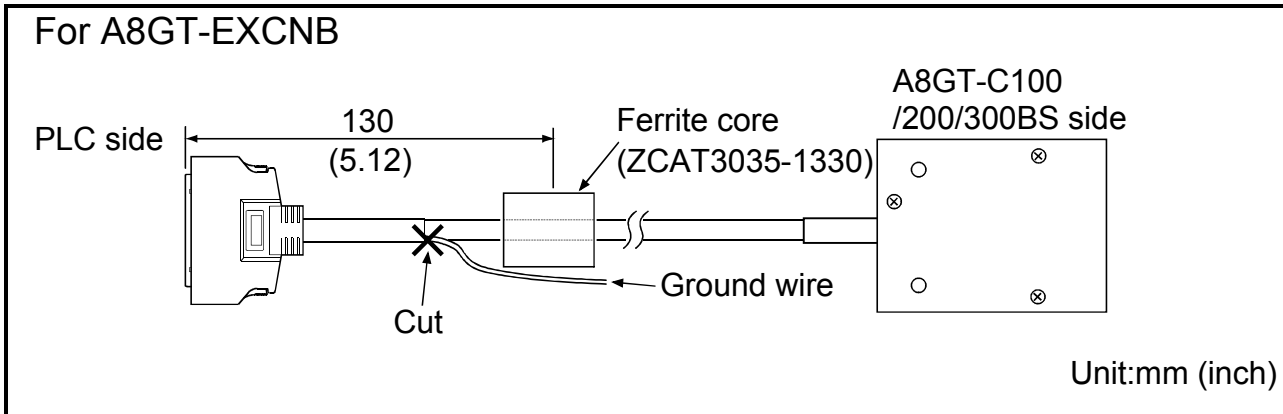


(c) For A8GT-C100/200/300EXSS-1

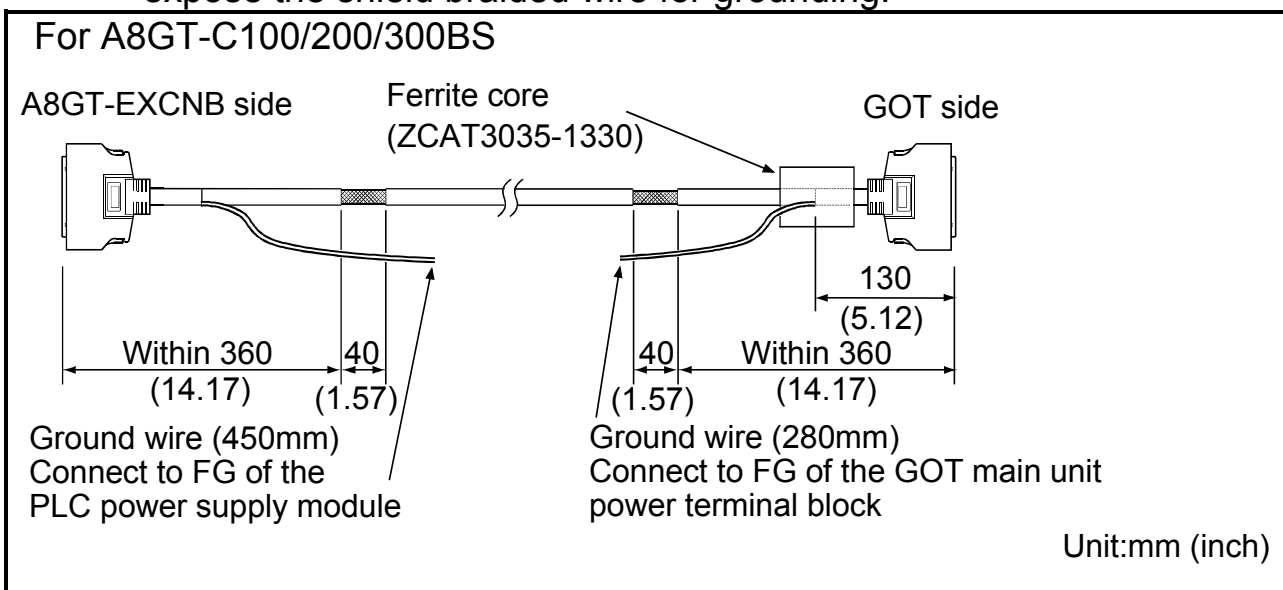
POINT

The A8GT-C100/200/300EXSS-1 is a combined product of the A8GT-EXCNCB and A8GT-C100/200/300BS.

- Cut the ground wire from the core where it protrudes from the A8GT-EXCNCB.

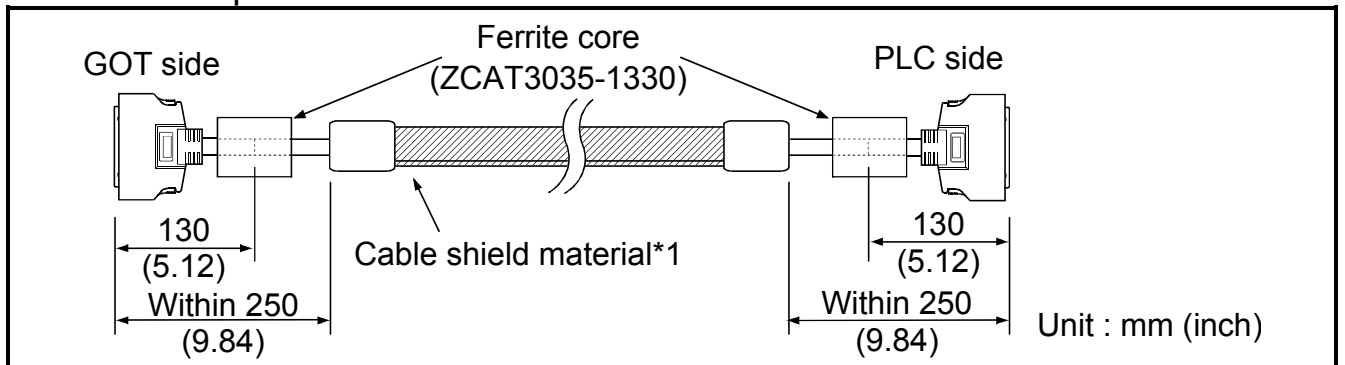


- Cut the ground wires protruding from both ends of the A8GT-C100/200/300BS with the length shown below.
- Peel the sheath (with the length shown below) at both ends, and expose the shield braided wire for grounding.

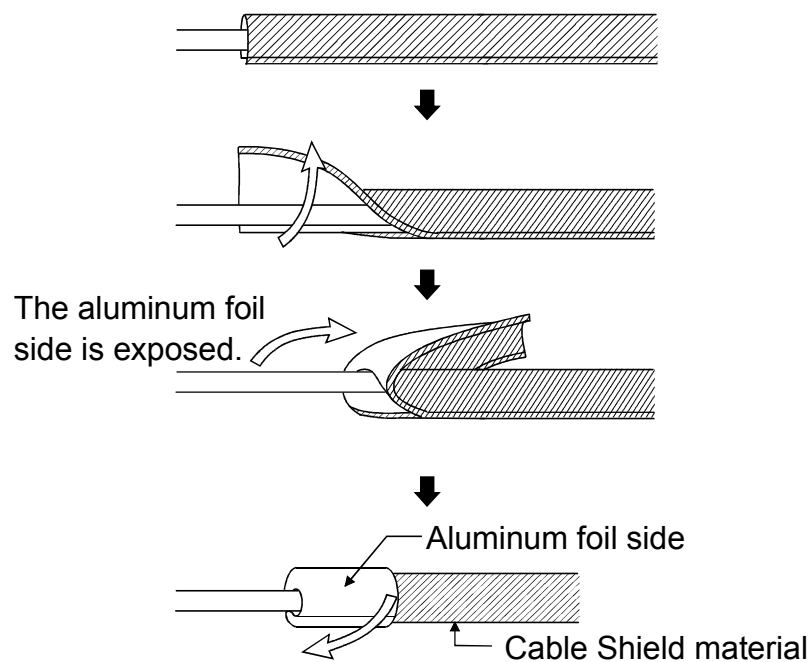


(d) For other Bus Connection cables

- Wrap the cable shield material around the cable, so that the back aluminum foil side (shield side) of the cable shield material is exposed at both ends of the cable.



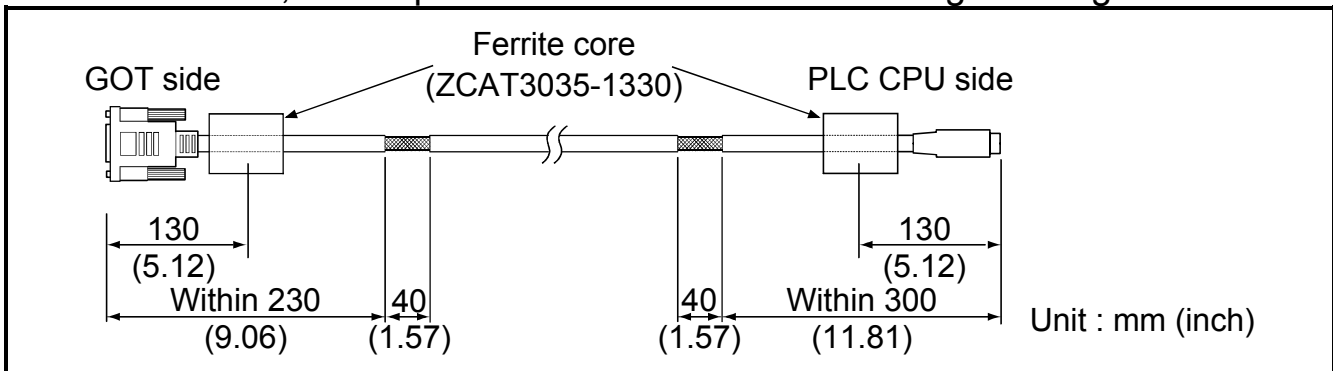
*1 The back aluminum foil side of the cable shield material (shield side) should be exposed.



(2) CPU Direct Connection

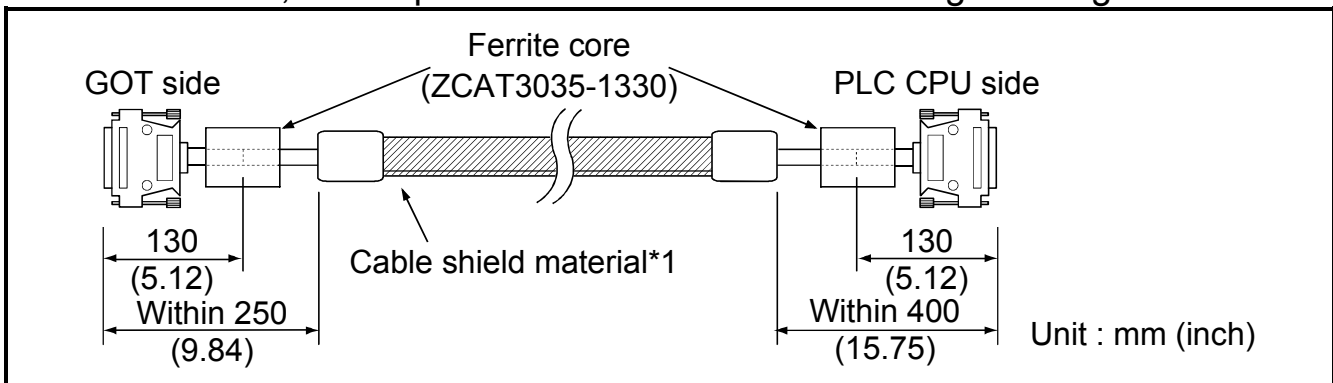
(a) For RS-232C cable (QC30R2)

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



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

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



*1 The back aluminum foil side of the cable shield material (shield side) should be exposed. (Refer to section 6.3.2 (1) (b))

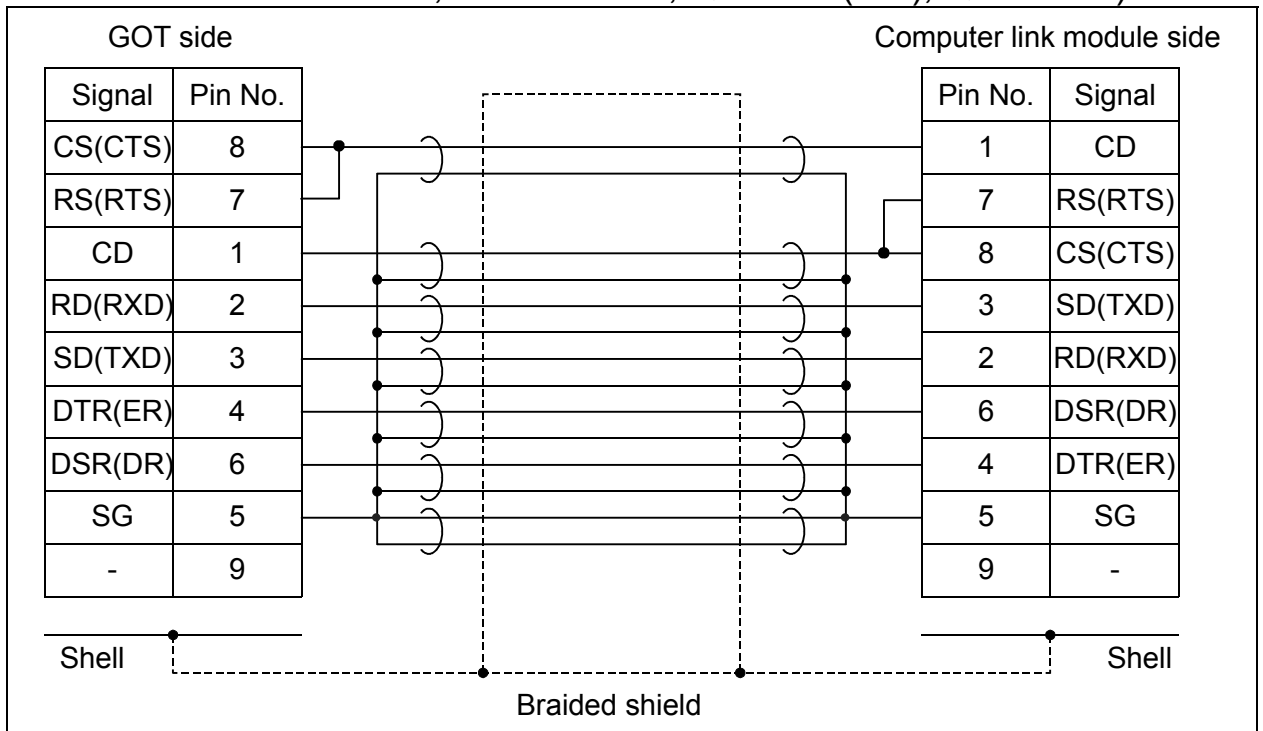
(3) Computer Link Connection

(a) For RS-232C cable

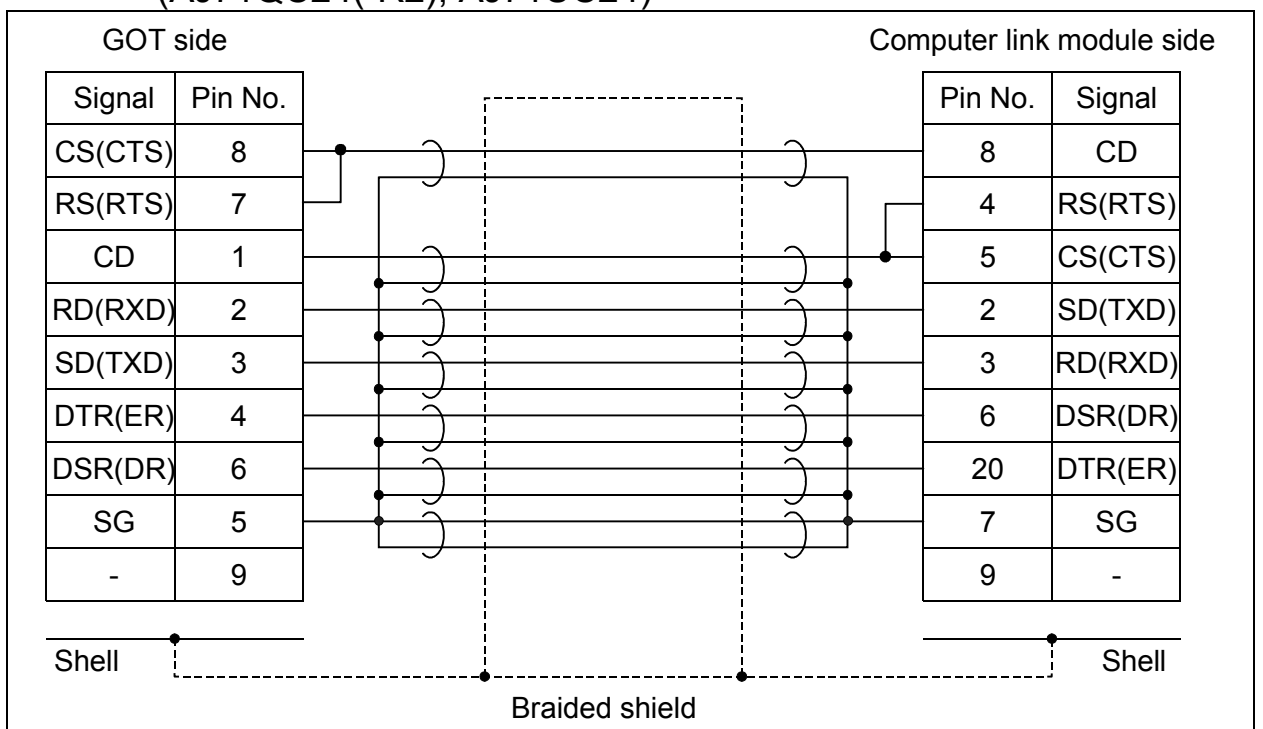
The user needs to fabricate the RS-232C cable which is used to connect the GOT and Computer link unit side (serial communication, computer link module or PLC CPU with computer link function). The RS-232C cable connection diagram and the connector are as follows.

1) Connection diagram

- If D-sub 9-pin is used for the connector of the computer link unit.
(A1SJ71QC24(-R2), A1SJ71UC24-R2, A1SJ71C24-R2, A1SCPUC24-R2, A2CCPUC24, QJ71C24(-R2), QJ71CMO)



- If D-sub 25-pin is used for the connector of the computer link unit.
(AJ71QC24(-R2), AJ71UC24)



2) Precautions for manufacturing cable

- Make a twisted pair for each signal and SG.
- Connect the braided shield to the connector shell (both ends).
- The cable used for the Mitsubishi EMC Directive compatibility test had the following specifications.

Item	Specification
Cable type	Twisted pair shield cable
Conductor section area (mm ²)	0.2

3) Connector (connector cover)

- GOT connector

Use the connector matching the following model for the GOT.

9-pin D-sub (male) inch screw type

manufactured by DDK

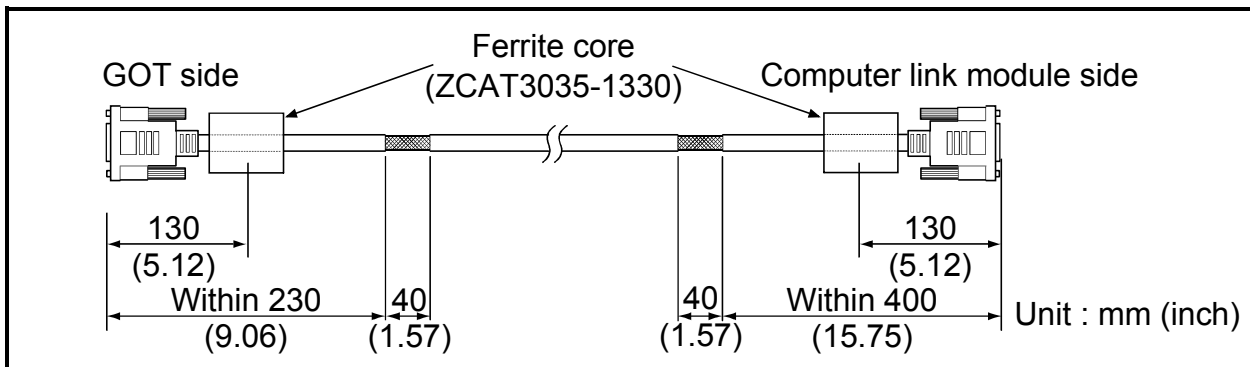
17JE-23090-27 (D3CC)

- Connector of computer link unit

Refer to the user's manual of the serial communication, computer link module or PLC CPU with computer link function.

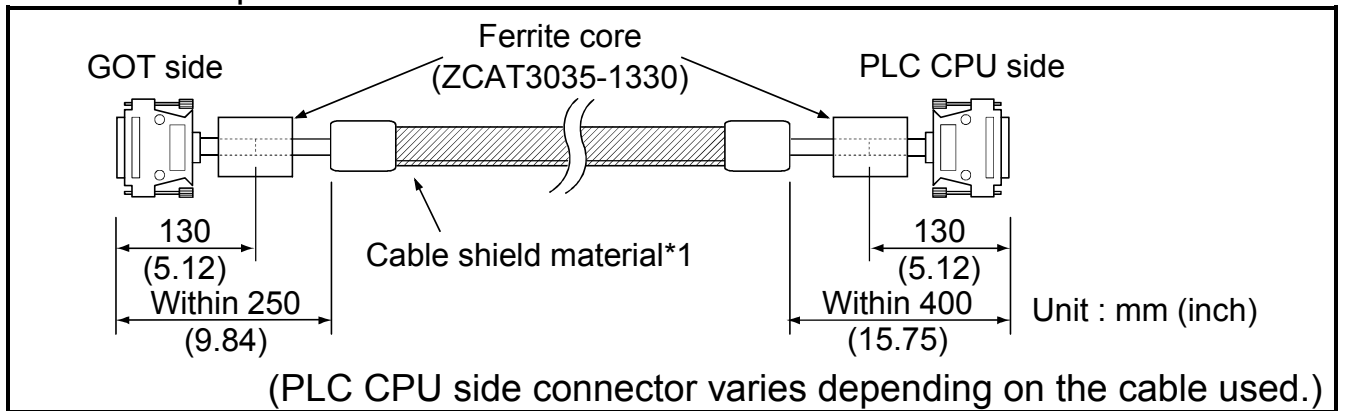
4) Cable production method

- Peel the sheath (with the length shown below) at both ends of the cable, and expose the shield braided wire for grounding.
- The cable must be 15m or shorter.



(b) For RS-422 cable (AC30/100/300R4-25P, User created cable)
 Refer to the GOT-A900 series User's Manual (Connection System Manual) for information about the cable creation method.

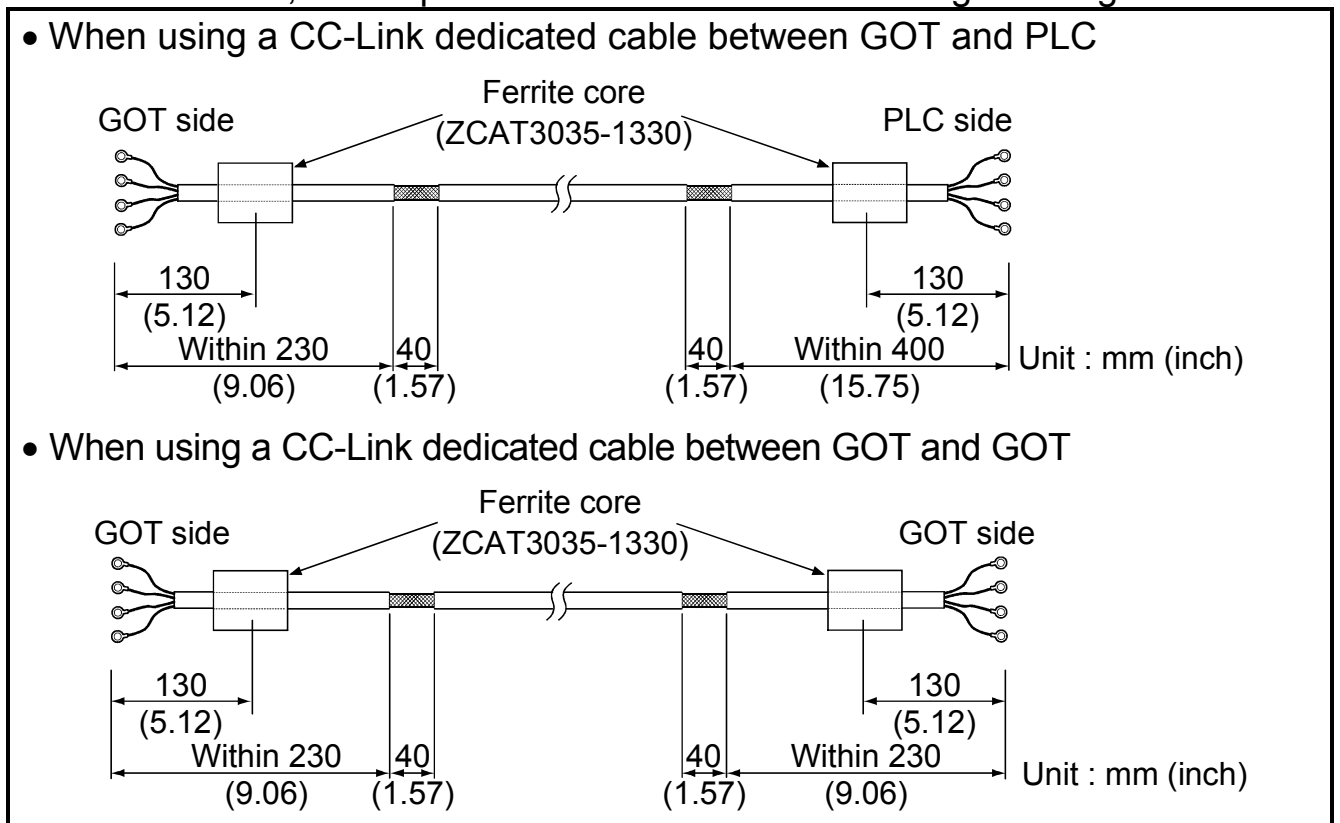
- Wrap the cable shield material around the cable, so that the back aluminum foil side (shield side) of the cable shield material is exposed at both ends of the cable.



*1 The back aluminum foil side of the cable shield material (shield side) should be exposed. (Refer to section 6.3.2 (1) (b))

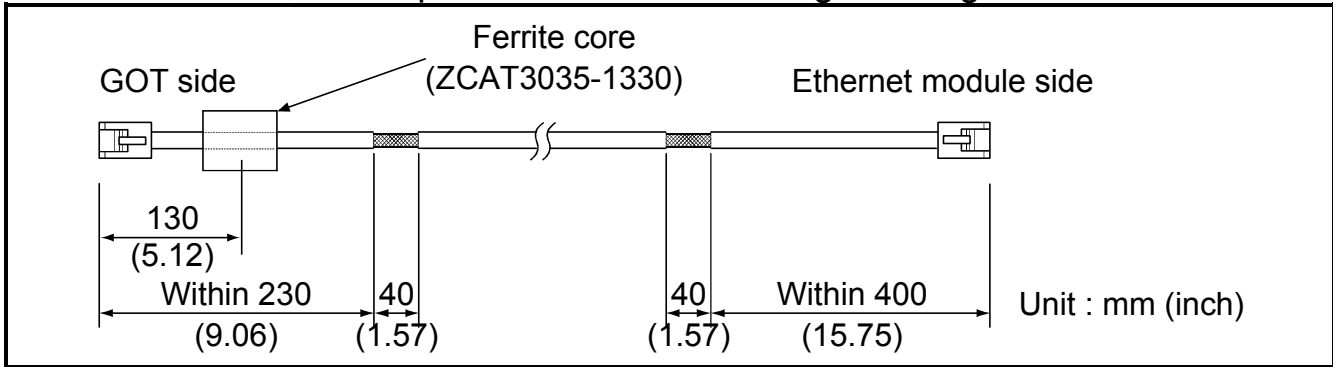
(4) CC-Link Connection (CC-Link dedicated cable)

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



(5) Ethernet Connection (Twisted pair shield cable)

- Peel the sheath (with the length shown below) at both ends of the cable, and expose the shield wire for grounding.



(6) Other PLC and Microcomputer connection

It is necessary for the user to create the cable used to connect GOT with a PLC or a microcomputer from another company (RS-422 cable or RS-232C cable).

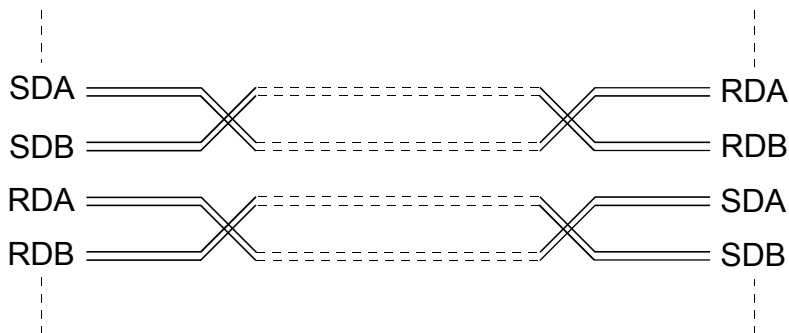
Refer to the GOT-A900 series User's Manual (Connection System Manual) for information about the cable creation method.

POINT

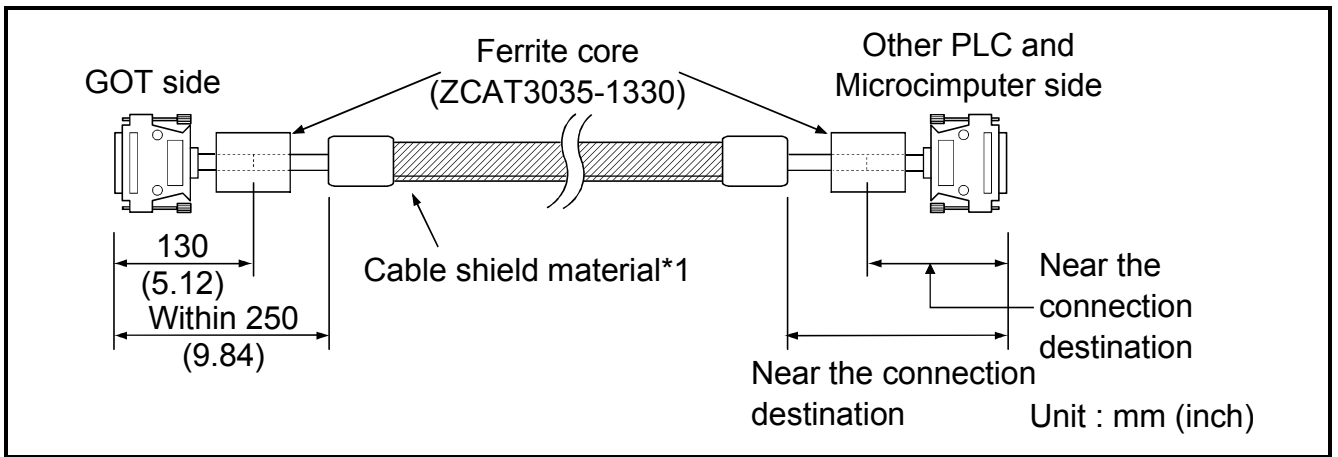
When connecting GOT to a PLC or microcomputer from another company, configure the system so that the EMC directive specifications from the connection destination are applicable. The contents shown below are a collection of the contents that should be enforced when made applicable to the EMC directive; however, the final decision to make the device applicable to the EMC directive and how to make it applicable must be made by the manufacturer of the machine device.

(a) For RS-422 cable

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



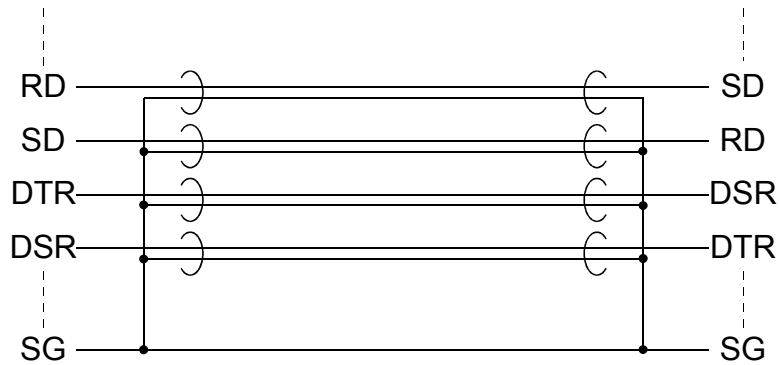
- Make the SG wire more than two wires and connect.
- Wrap the cable shield material around the cable, so that the back aluminum foil side (shield side) of the cable shield material is exposed at both ends of the cable.



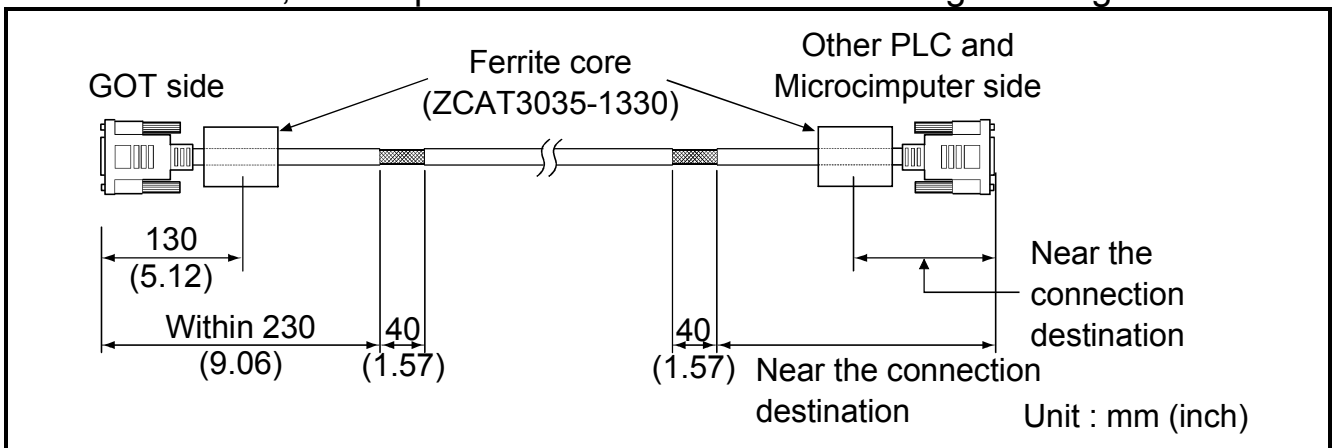
*1 The back aluminum foil side of the cable shield material (shield side) should be exposed. (Refer to section 6.3.2 (1) (b))

(b) For RS-232C cable

- Each signal wire (excluding SG, FG) is twisted with SG.

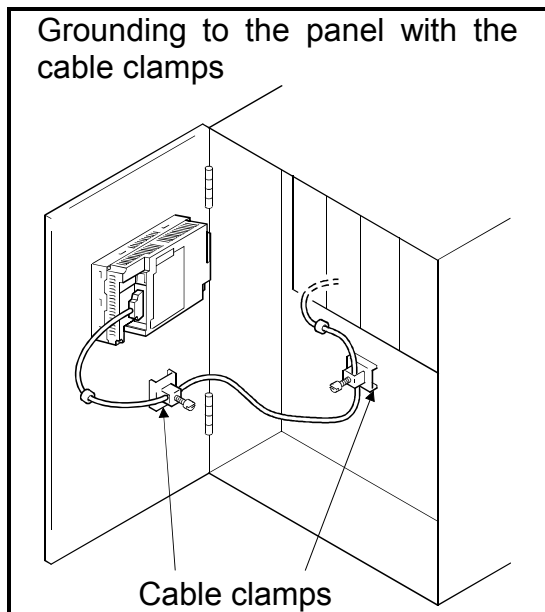


- Peel the sheath (with the length shown below) at both ends of the cable, and expose the shield braided wire for grounding.



6.3.3 Grounding the cable

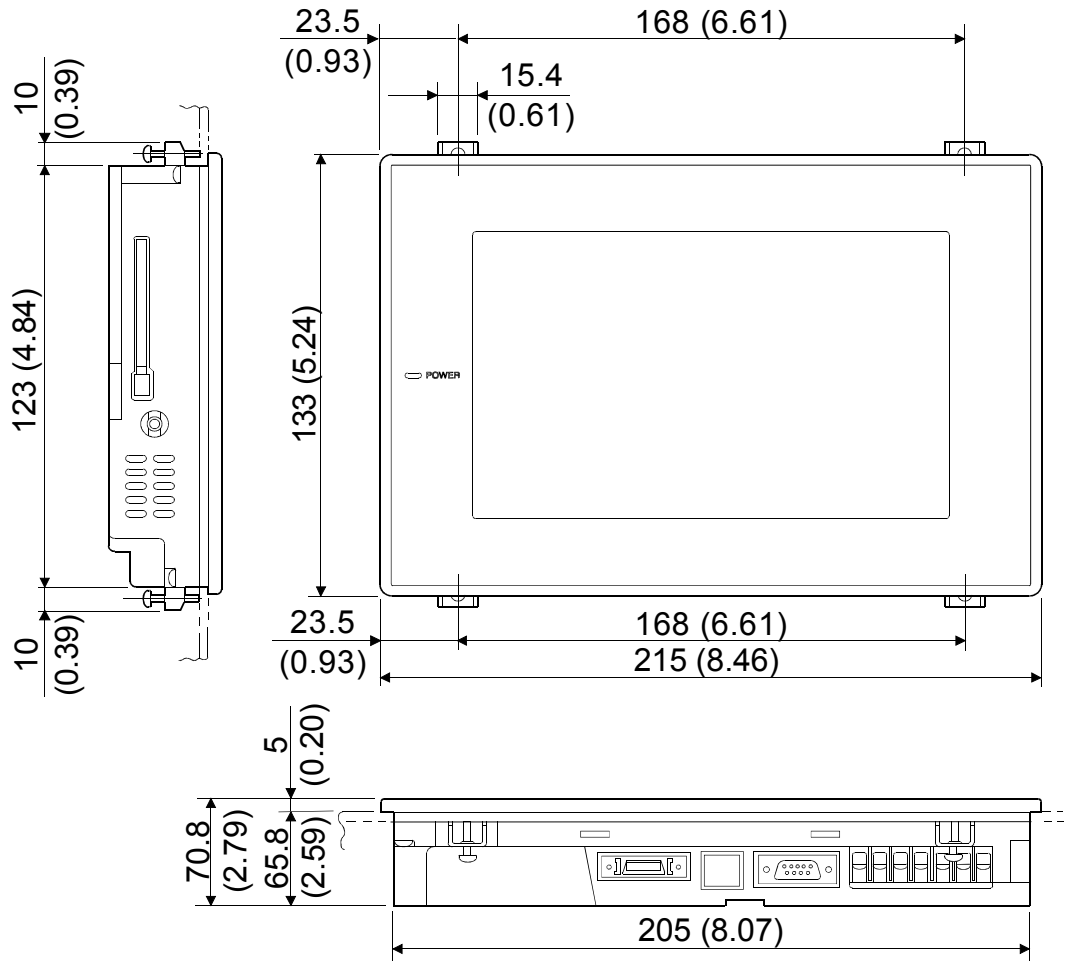
Ground the cable grounding sections and grounding wire to the control panel where the GOT and base unit are grounded.



- Bus connection cable (For A8GT-C100/C200/300EXSS, A8GT-C100/200/300EXSS-1, A8GT-C100/200/300BS), RS-232C cable, CC-Link dedicated cable and Twisted pair shield cable ground the shield braided wire and grounding wire to the panel with a cable clamp (AD75CK).
- For another bus cable or RS-422 cable, ground the shield side of the cable shield material to the panel with a cable clamp (AD75CK).

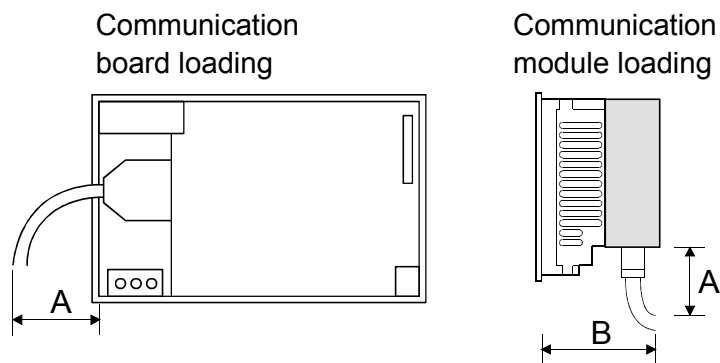
Appendices

Appendix1 External Dimensions



Unit: mm(inch)

Appendix2 Depth Dimensions when Mounting Various Modules



Installed communication module		A[mm] (inch)	B[mm] (inch)
Communication board	A9GT-50WQBUISS	55 (2.17)	-
	A9GT-50WBUSS	74 (2.91)	-
	A9GT-50WRS2□A9GT-50WRS4	103 (4.06)	-
Communication module	A9GT-QBUS2SU, A9GT-BUSSI, A9GT-BUS2SU	105 (4.13)	99.8 (3.93)
	A7GT-J71AP23, A7GT-J71LP23	*1	99.8 (3.93)
	A7GT-J71AR23, A7GT-J71BR13	*2	99.8 (3.93)
	A7GT-J71AT23B	-	121.8 (4.80)
	A8GT-J61BT13, A8GT-J61BT15	-	104.8 (4.13)
	A9GT-J71E71-T	-	96.0 (3.78)

*1: This dimension is between 185mm (7.28) maximum and 80mm (3.15) minimum depending on the optional fiber cable and connector connected.

*2: This dimension is between 80mm (3.15) maximum and 53mm (2.09) minimum depending on the coaxial cable connected.

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