

HARDWARE MANUAL

F940GOT Handy Series (F94*GOT*BD-RH-E)

GOT-F900

Foreword

- This manual contains text, diagrams and explanations which will guide the reader in the correct installation and operation of the F940GOT Handy Series. It should be read and understood before attempting to install or use the unit.
- Further information can be found in the GOT-F900 Series Operation Manual, GOT-900 Series Hardware Manual and manual of the associated PLC.
- If in doubt at any stage of the installation of F940GOT Handy Series always consult a professional electrical engineer who is qualified and trained to the local and national standards which apply to the installation site.
- If in doubt about the operation or use of F940GOT Handy Series please consult the nearest Mitsubishi Electric distributor.
- This manual is subject to change without notice.

F940GOT Handy Series (F94*GOT-*BD-RH-E)

Hardware Manual

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Guidelines for the Safety of the User and Protection of the F940GOT Handy Series (F94*GOT*BD-RH-E)

This manual provides information for the use of the F940GOT Handy Series. The manual has been written to be used by trained and competent personnel. The definition of such a person or persons is as follows;

- a) Any engineer who is responsible for the planning, design and construction of automatic equipment using the product associated with this manual should be of a competent nature, trained and qualified to the local and national standards required to fulfill that role. These engineers should be fully aware of all aspects of safety with regards to automated equipment.
- b) Any commissioning or service engineer must be of a competent nature, trained and qualified to the local and national standards required to fulfill that job. These engineers should also be trained in the use and maintenance of the completed product. This includes being completely familiar with all associated documentation for the said product. All maintenance should be carried out in accordance with established safety practices.
- c) All operators of the completed equipment (see Note) should be trained to use this product in a safe manner in compliance to established safety practices. The operators should also be familiar with documentation which is associated with the operation of the completed equipment.

Note : The term 'completed equipment' refers to a third party constructed device which contains or uses the product associated with this manual.

Notes on the Symbols Used in this Manual

At various times throughout this manual certain symbols will be used to highlight points of information which are intended to ensure the users personal safety and protect the integrity of equipment. Whenever any of the following symbols are encountered its associated note must be read and understood. Each of the symbols used will now be listed with a brief description of its meaning.

Hardware Warnings



- 1) Indicates that the identified danger **WILL** cause physical and property damage.



- 2) Indicates that the identified danger could **POSSIBLY** cause physical and property damage.



- 3) Indicates a point of further interest or further explanation.

Software Warnings



- 4) Indicates special care must be taken when using this element of software.



- 5) Indicates a special point which the user of the associate software element should be aware of.



- 6) Indicates a point of interest or further explanation.

- Under no circumstances will Mitsubishi Electric be liable or responsible for any consequential damage that may arise as a result of the installation or use of this equipment.
- All examples and diagrams shown in this manual are intended only as an aid to understanding the text, not to guarantee operation. Mitsubishi Electric will accept no responsibility for actual use of the product based on these illustrative examples.
- Please contact a Mitsubishi Electric distributor for more information concerning applications in life critical situations or high reliability.

Abbreviations, Generic Names and Terms Used in This Manual

The table below shows abbreviations, generic names and terms used in this manual.

| Abbreviation/ generic name/term | Description | | | | | |
|------------------------------------|---|---|--|--|--------------------|---|
| Handy GOT | Generic name of F94□GOT-SBD-RH-E and F94□GOT-LBD-RH-E (□=0 or 3) | | | | | |
| F940 Handy GOT | Generic name of F940GOT-SBD-RH-E and F940GOT-LBD-RH-E | | | | | |
| F943 Handy GOT | Generic name of F943GOT-SBD-RH-E and F943GOT-LBD-RH-E | | | | | |
| QCPU (Q mode) | Generic name of Q02CPU, Q02HCPU, Q06HCPU, Q12HCPU and Q25HCPU CPU units | | | | | |
| QCPU (A mode) | Generic name of Q02CPU-A, Q02HCPU-A and Q06HCPU-A CPU units | | | | | |
| QCPU | Generic name of QCPU (Q mode) and QCPU (A mode) CPU units | | | | | |
| QnACPU (large type) | Generic name of Q2ACPU, Q2ACPU-S1, Q3ACPU, Q4ACPU and Q4ARCPU CPU units | | | | | |
| QnACPU (small type) | Generic name of Q2ASCPU, Q2ASCPU-S1, Q2ASHCPU and Q2ASHCPU-S1 CPU units | | | | | |
| QnACPU | Generic name of QnACPU (large type) and QnACPU (small type) CPU units | | | | | |
| ACPU (large type) | Generic name of AnUCPU, AnACPU and AnNCPU CPU units | | | | | |
| ACPU (small type) | Generic name of A2US(H)CPU, AnS(H)CPU and A1SJ(H)CPU CPU units | | | | | |
| ACPU | Generic name of ACPU (large type), ACPU (small type) and A1FXCPU CPU units | | | | | |
| FXCPU | Generic name of FX0, FX0S, FX1S, FX0N, FX1N, FX1, FX2, FX2N, FX2C and FX2NC Series CPU units | | | | | |
| GT Designer2 | Abbreviation of screen creation software for GOT-A900/GOT-F900 Series <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 20%;">GT Designer2</td> <td style="width: 40%;">SW□D5C-GTD2-E</td> <td style="width: 40%;">Screen creation software for GOT-900 Series (English version)</td> </tr> </table> | GT Designer2 | SW□D5C-GTD2-E | Screen creation software for GOT-900 Series (English version) | | |
| GT Designer2 | SW□D5C-GTD2-E | Screen creation software for GOT-900 Series (English version) | | | | |
| GT Designer | Abbreviation of screen creation software for GOT-A900/GOT-F900 Series <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td rowspan="2" style="width: 20%;">GT Designer</td> <td style="width: 40%;">SW□D5C-GOTR-PACKE</td> <td style="width: 40%;">Screen creation software for GOT900 Series SW□D5C-GOTR-PACKE (English version)</td> </tr> <tr> <td>SW□D5C-GOTR-PACKEV</td> <td>Software dedicated to version upgrade from conventional version to latest SW□D5C-GOTR-PACKE (English version)</td> </tr> </table> | GT Designer | SW□D5C-GOTR-PACKE | Screen creation software for GOT900 Series SW□D5C-GOTR-PACKE (English version) | SW□D5C-GOTR-PACKEV | Software dedicated to version upgrade from conventional version to latest SW□D5C-GOTR-PACKE (English version) |
| GT Designer | SW□D5C-GOTR-PACKE | | Screen creation software for GOT900 Series SW□D5C-GOTR-PACKE (English version) | | | |
| | SW□D5C-GOTR-PACKEV | Software dedicated to version upgrade from conventional version to latest SW□D5C-GOTR-PACKE (English version) | | | | |

Registration

- The company name and the product name to be described in this manual are the registered trademarks or trademarks of each company.

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Associated Manual Lists

Further information can be found in the following manuals.

| | Manual Title | Manual Number | Description |
|---|--|---|--|
| ○ | F940 Handy Series HARDWARE MANUAL (F94*GOT*BD-RH-E) | JY992D99901 | Describes the specifications, installation, setting, and operation switches of the F940 Handy graphic operation terminal (RH model). |
| ⊙ | GOT-F900 OPERATION MANUAL (describes GT Designer2) | JY992D09101 (separate volume) | Describes the operation and use of the GOT-F900 Series graphic operation terminals and GT Designer2. |
| ⊙ | GOT-F900 Series Operation Manual | JY992D94701 (separate volume) | Describes the operation and use of the GOT-F900 Series graphic operation terminals, GT Designer and FX-PCS-DU/WIN-E. |
| ⊙ | GOT-F900 Series Hardware Manual (connection diagram) | JY992D94801 (separate volume) | Describes wiring and installation of the GOT-F900 Series graphic operation terminals. |
| ○ | GT Designer2 Version1 Operating Manual | (PDF files on CD-ROM included with product) | Describes the operation of GT Designer2 (SW*D5C-GTD2-E) and data transfer to the GOT-900 Series. |
| ○ | GT Designer2 Version1 Reference Manual | (PDF files on CD-ROM included with product) | Describes the specifications and setting of object functions in GT Designer2 (SW*D5C-GTD2-E). |
| ○ | GT Designer Operating Manual | Included with the screen creation software | Describes the operation of GT Designer (SW*D5C-GOTR-PACKE) and data transfer to the GOT-900 Series. (Refer to the help file) |
| ○ | FX-PCS-DU/WIN-E SOFTWARE MANUAL | JY992D68301 (included with the screen creation software) | Describes the operation of FX-PCS-DU/WIN-E screen creation software. |

⊙: Indispensable manual

○: Either manual is necessary.

Refer to the manual of the connected programmable controller for details concerning that unit.

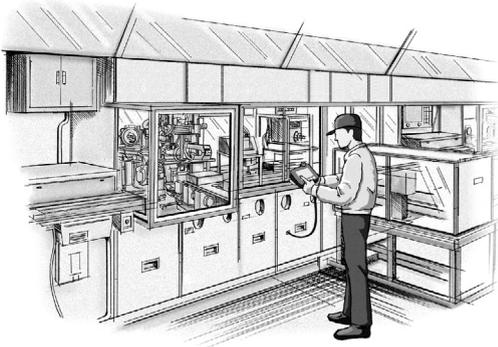
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1. Introduction

1.1 Introduction

The F940GOT Handy Series (hereafter called "Handy GOT") is an all-in-one type Handy GOT equipped with a touch key display unit (F94*GOT-*WD-E) and mechanical keys (operation switches) available for command input to the machine. The Handy GOT can connect to MELSEC FX, A, QnA and Q PLCs as well as a host of third party manufactured units.

Using Example

**Note:**

Screens displayed for the Handy GOT can be created using the programming software, GT Designer 2.

1.1.1 Product Components

1) Operation switches

These switches can be connected to the inputs on the PLC, when immediate response from the machine such as operation and stop is required.

Application Examples:

- Start/stop
- Preparation for operation
- Setup change
- Error reset
- Mode selection between automatic and manual

Note:

The name of these operation switches can be personalized using a transparent sheet and a label sheet offered as accessories.
(Refer to Chapter 4)

2) Display unit

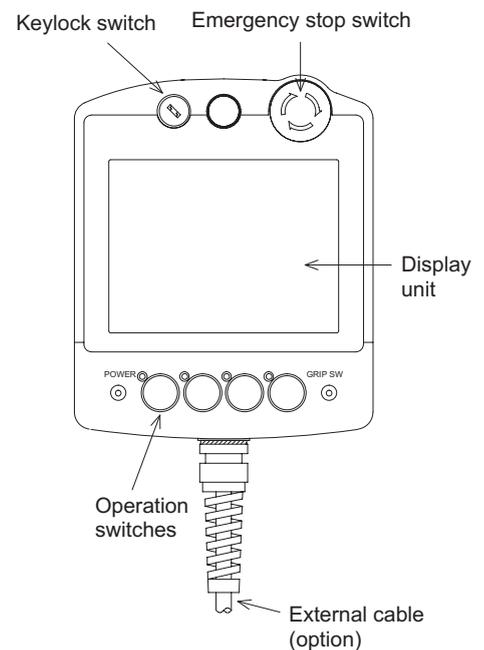
The display unit is touch-key type LCD equivalent to that of a standard F940GOT.

All functions offered in the standard F940GOT are available in the Handy GOT. The operator can easily monitor the ON/OFF status of bit devices in the PLC, set bit devices to ON/OFF, monitor the set value and the current value of word devices, and change such values of word devices.

This display unit can be used to change the setup, or set values, and perform troubleshooting, as well as give system information to the operator.

Application Examples:

- Manual operation
- One-cycle operation
- Monitoring
- Forcing devices ON and OFF
- Change of set values
- Troubleshooting



1.2 Product Lists

Table 1.1: Product Lists

| Production Name | Description |
|------------------|---|
| F940GOT-SBD-RH-E | Handy GOT main unit This type uses RS-422 communication for connecting to PLC. - SBD type is 8 Colors - LBD type is White and black |
| F940GOT-LBD-RH-E | |
| F943GOT-SBD-RH-E | Handy GOT main unit This type uses RS-232C communication for connecting to PLC. - SBD type is 8 Colors - LBD type is White and black |
| F943GOT-LBD-RH-E | |

1.2.1 Model Name

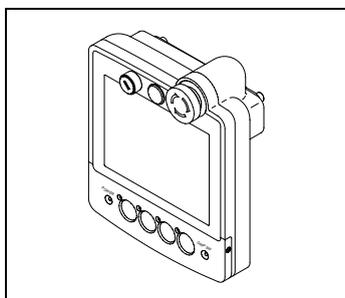
The model name of the Handy GOT is read as follows.

F94*_GOT-*_BD-RH-E
A B

Table 1.2: Notes on Model Name

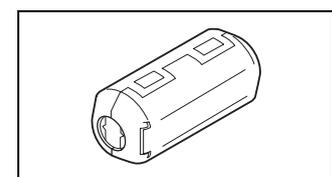
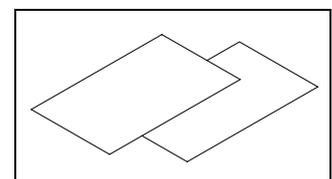
| | | Description |
|---|---|---|
| A | 0 | RS-422 communication for connecting to PLC |
| | 3 | RS-232C communication for connecting to PLC |
| B | S | STN type 8 colors liquid crystal |
| | L | STN type black and white liquid crystal |

1.2.2 Handy GOT Main Unit



Accessories:

- Sheets to change switch names
A transparent sheet and a mount sheet are offered as accessories so that operation switch names can be changed.
For the name changing procedure, see section 3.4.5.
- Ferrite filter for CE EMC
For compliance to CE EMC regulations it is necessary to add a ferrite filter on the external cable for F940GOT-*BD-RH-E or F943GOT-*BD-RH-E.
Further information can be found in the Notification of CE marking sheet in the product box and section 3.3.1 of this manual.
This ferrite filter model name/number is TDK ZCAT2436-1330A-M-BK.



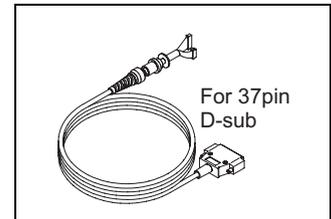
1.3 Options

1.3.1 External Cable

These external cables contain dedicated wires for communications, DC power supply, operation switches, grip switch, keylock switch and the emergency stop switch. One of the cables below is always necessary.

Table 1.3: External Cable

| Model Name | Description |
|----------------|--|
| F9GT-RHCAB-3M | 37-pin D-sub connector on one side, |
| F9GT-RHCAB-6M | - 3M: Cable length is 3m (9' 10") |
| F9GT-RHCAB-10M | - 6M: Cable length is 6m (19' 8") - 10M: Cable length is 10m (32' 9") |



Note:

When using F9GT-RHCAB-*M external cable, one of the following relay cables is necessary.

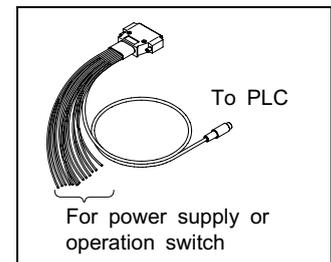
1.3.2 Other Options

Order the following options upon necessity.

1) Relay cable for PLC

- F9GT-RHCAB2-150

This cable connects to an FX₀/FX_{0S}/FX_{0N}/FX_{1S}/FX_{1N}/FX_{2N}/FX_{2NC} (with 8-pin MINI DIN connector), and is equipped with an external cable (with 37-pin D-Sub connector) for power supply, operation switch and emergency switch. Cable length is 1.5 m (4' 11").

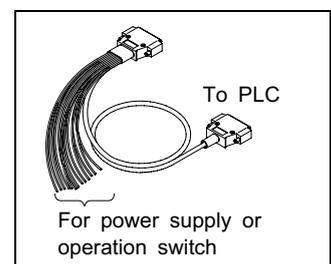


Note:

This cable cannot be used for the F943GOT-*BD-RH-E (RS-232C communication type Handy GOT).

- F9GT-RHCAB3-150

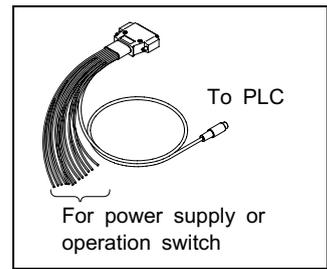
This cable connects to an FX/FX_{2C}/A/QnA Series PLC or motion controller (with 25-pin D-Sub connector), and is equipped with an external cable (with 37-pin D-Sub connector) for power supply, operation switch and emergency switch. Cable length is 1.5 m (4' 11").



Note:

This cable cannot be used for the F943GOT-*BD-RH-E (RS-232C communication type Handy GOT).

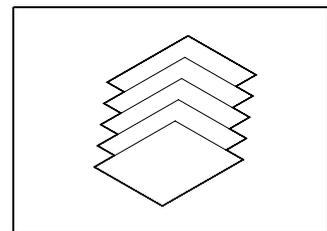
- F9GT-RHCAB5-150
This cable connects to a Q Series PLC or motion controller (with 6-pin MINI DIN connector), and is equipped with an external cable (with 37-pin D-Sub connector) for power supply, operation switch and emergency switch
Cable length is 1.5 m (4' 11").



Note:

This cable cannot be used for the F940GOT-*BD-RH-E (RS-422 communication type Handy GOT).

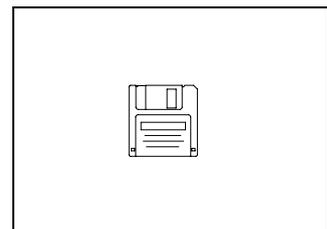
- 2) Protective sheets F9GT-40PSC (5 sheets in 1 set)
Adhere one disposable sheet to the display screen for protection against dirt and abrasion.



- 3) Screen creation software

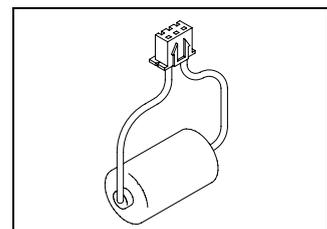
Table 1.4: Screen creation software

| Model Name | Description |
|-----------------|--|
| GT Designer2 | SW1D5C-GTD2-E V1.00 or more (CD-ROM) |
| FX-PCS-DU/WIN-E | SW0PC-FXDU/WIN-E Version V2.52 or more (3.5 FD) |
| GT Designer | SW5D5C-GOTR-PACKE Version 5.05F or more (CD-ROM) |



1.3.3 Spare Parts

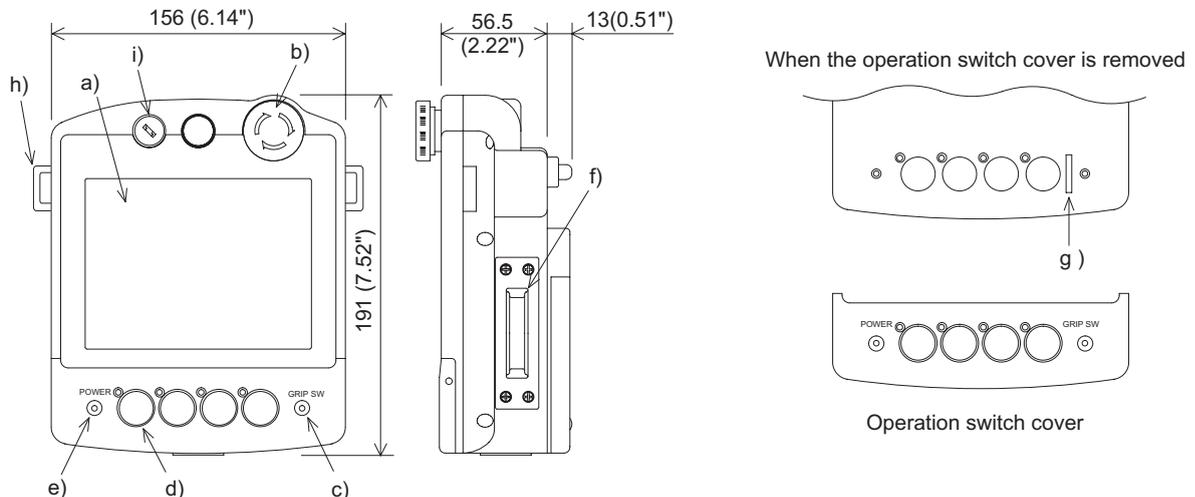
- 1) FX₂NC-32BL Battery
This battery is used to back up the alarm history, sampling and the current time data.
For replacement instructions, refer to chapter 4.



1.4 Dimensions and Part Names

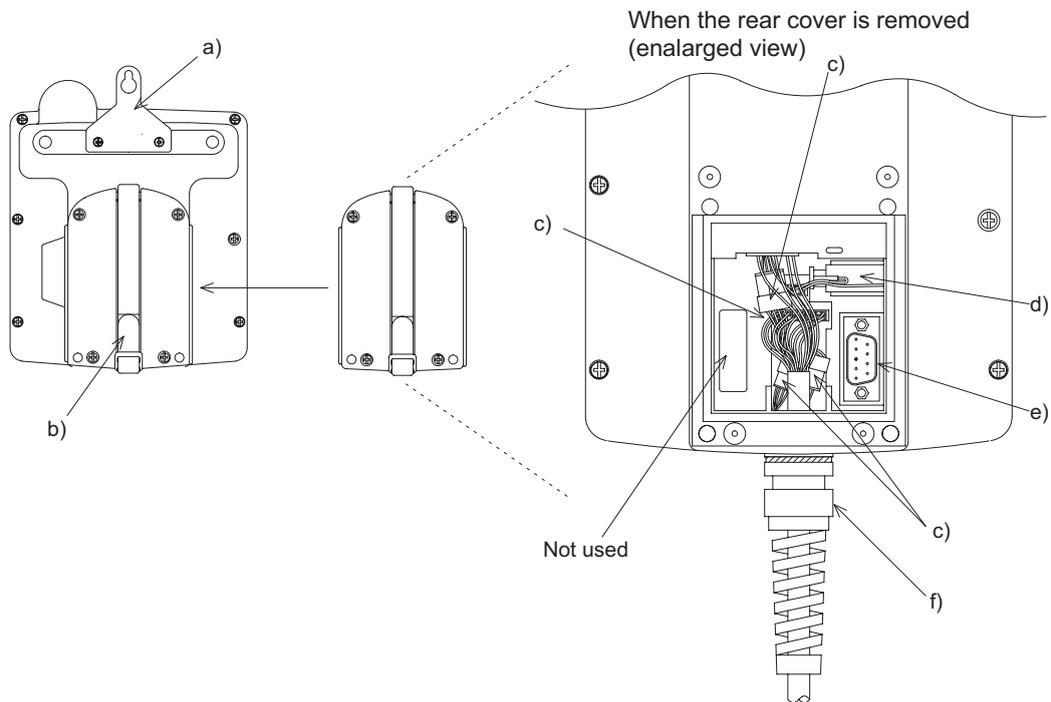
1.4.1 Dimensions and Part Names of Front Panel

Dimensions: mm (inches) MASS: 0.87 kg (1.91 lbs)



- a) Touch key LCD unit
This display unit offers the functions equivalent to those offered by the F940GOT series display unit. Further information on the standard F940GOT series can be found in the GOT-F900 Series Operation Manual.
- b) Emergency stop switch
Independent contact, 24V DC specification.
- c) Grip switch LED
LED for confirming ON/OFF status of the grip switch. The parameters for controlling the LED can be set in the screen creation software and PLC program.
- d) Operation switches
Direct connection to inputs on the PLC.
The name of these operation switches can be personalized using a transparent sheet and a label sheet offered as accessories.
Each of these switches is equipped with a green LED which indicates its status. The green LED lighting command is transferred between the PLC through serial communication.
These LEDs can be controlled the by the user program in the PLC.
- e) POWER LED
Lit while 24V DC power is supplied to the Handy GOT.
- f) Grip switch
A grip switch is provided on the side of the Handy GOT. The 3-position switch (OFF/ON/OFF) turns ON when pressed halfway and turns OFF when pressed all the way or when released.
- g) Operation switch name sheet insertion slot
Can be seen when the operation switch cover is removed from the lower portion of the Handy GOT.
- h) Strap holders
Loops for the strap
- i) Keylock switch
2-position switch. A key can be inserted or removed to lock the switch position.

1.4.2 Rear Panel



- a) Metal hook for mounting on a wall
Offered to mount the Handy GOT on a wall.
- b) Hand strap
Adjustable length strap allowing comfortable holding of the Handy GOT.
- c) Port for communications signals, the DC power supply, the operation switches and the emergency switch
- d) FX₂NC-32BL Battery
Built in to back up data.
For replacement instructions, refer to chapter 4.
- e) Port for a personal computer (9-pin D-Sub, male) (for RS-232C communication)
Offered to transfer screen data created using the programming software or using the two-port interface function.
- f) External cable
Offered to connect to a PLC, power supply and operation switches.

MEMO

2. Specifications



Caution

During a communication error (including cable break) while monitoring devices with the Handy GOT, communication between the Handy GOT and programmable controller CPU is interrupted and it is impossible to operate the switches or devices in the PLC through the Handy GOT.

Communication and operation resumes when the Handy GOT system is correctly configured.

DO NOT configure the emergency stop or safety features to operate through the Handy GOT, and be sure that there is no adverse consequences in the event of a Handy GOT - PLC communications malfunction.

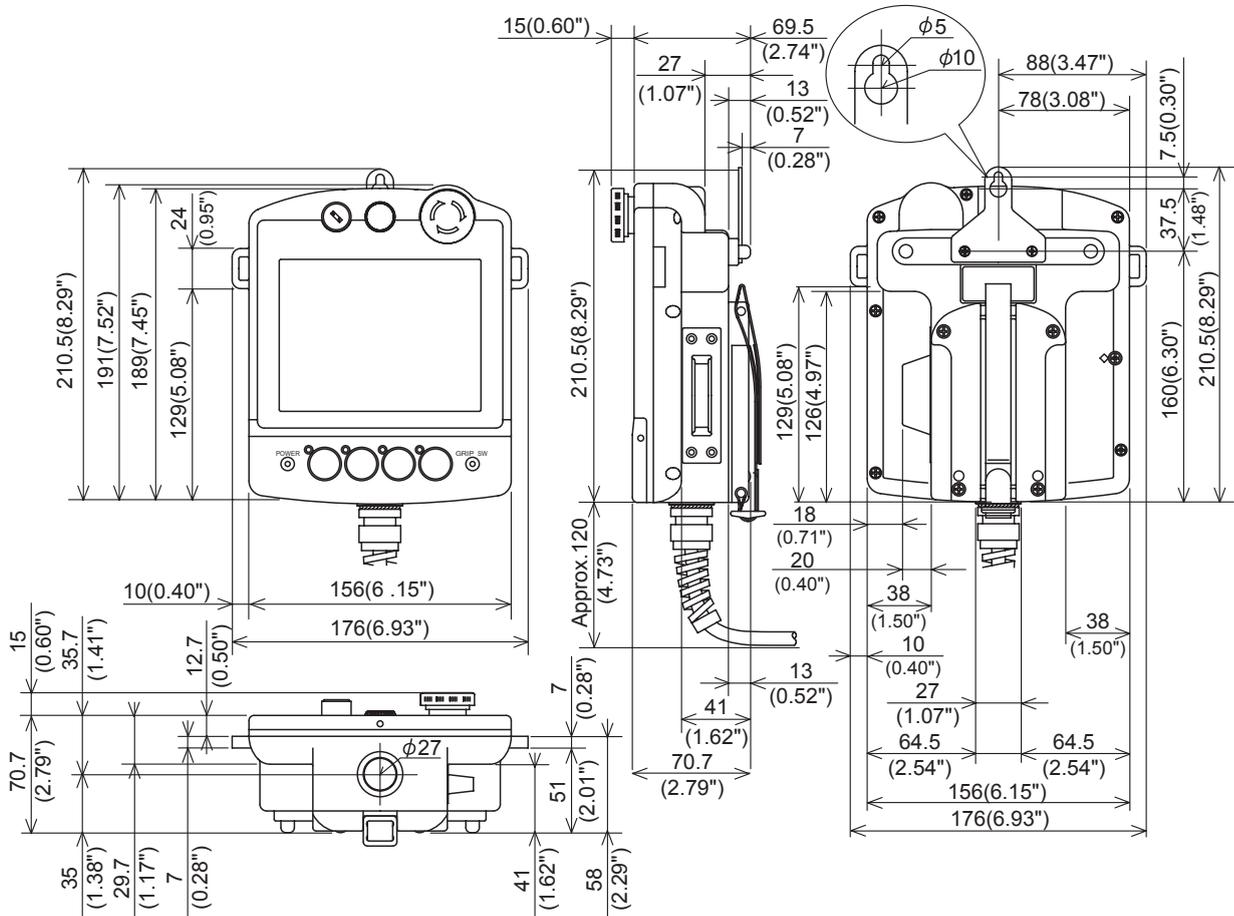


Note:

- Do not lay signal cables near to high voltage power cables or allow them to share the same trunking duct as noise effects or surge induction are likely to take place. Keep a safe distance of more than 100 mm from these wires.
- Operate touch switches on the display screen by hand.
DO NOT use excessive force, or attempt operate them with hard or pointed objects. The tip of a screw driver, pen or similar object, for example, may break the screen.

2.1 Outside dimensions

The figure below shows the external dimensions of the Handy GOT.



Unit: mm (inches)
 Color: Munsell System 0.20G5.17/0.69
 Mass: 0.87 kg (1.92 lbs) not including the cable

2.2 Power Supply Specifications

Table 2.1: Power Supply Specifications

| Items | Specifications |
|--|--|
| Power Supply Voltage | 24V DC, +10% -15% |
| Power Supply Ripple | 200 mV or less |
| Current Consumption | Ratings: 300 mA at 24V DC (200 mA at 24V DC when backlight is turned OFF) |
| Fuse | 1.0 A built-in fuse (impossible to change) |
| Max. Allowable Momentary Power Supply Failure period | 5 ms; If less than 5 ms, the Handy GOT will continue operation. If 5 ms or more, the Handy GOT will shut down. |
| Battery | Built-in, FX2NC-32BL type lithium battery. (Approximately 3 years life) |

2.3 General Specifications

Table 2.2: General Specifications

| Item | Specifications |
|---|--|
| Operating Temperature | 0 ~ 40 °C (32 ~ 104 °F) |
| Storage Temperature | -20 ~ 60 °C (-4 ~ 140 °F) |
| Humidity | 35 ~ 85% Relative Humidity, No condensation |
| Vibration Resistance - intermittent vibration | 10 ~ 57 Hz: 0.075 mm Half Amplitude 57 ~ 150 Hz: 9.8 m/s ² Acceleration Sweep Count for X, Y, Z: 10 times (80 min. in each direction) |
| Vibration Resistance - Continuous vibration | 10 ~ 57 Hz: 0.035 mm Half Amplitude 57 ~ 150 Hz: 4.9 m/s ² Acceleration Sweep Count for X, Y, Z: 10 times (80 min. in each direction) |
| Shock Resistance | 147m/s ² Acceleration, 3 times in each direction X, Y, and Z |
| Noise Immunity | 1000 Vp-p, 1micro second, 30 ~ 100 Hz, tested by noise simulator |
| Dielectric Withstand Voltage | 500 V AC > 1 min., tested between power terminals and ground |
| Insulation Resistance | 5 MΩ > at 500 V DC, tested between power terminals and ground |
| Ground | Grounding register 100 Ω or less (Class D) |
| Operating atmosphere | Must be free of lamp black, corrosive gas, flammable gas, or excessive amount of electroconductive dust particles and must be no direct sunlight. (Same as for saving) |
| Protection | IP 54 |

2.4 Screen Hardware Specifications

Table 2.3: Screen Hardware Specifications

| Items | | F94*GOT-SBD-RH-E | F94*GOT-LBD-RH-E |
|------------------------|------------------------|---|------------------|
| Display Device | | STN color liquid crystal display | |
| Resolution | | 320 × 240 (dot), 40 characters × 15 lines | |
| Dot Pitch | | 0.36 mm (0.014") Horizontal × 0.36 mm (0.014") Vertical. | |
| Effective Display Size | | 115 mm (4.53") × 86 mm (3.39"); 6 (5.7 inch) type | |
| Number of Colors | | 8 colors | White and Black |
| Life of liquid crystal | | Approximately 50,000 hours (Operating temperature: 25°C / 77°F) | |
| Backlight | | Cold cathode tube | |
| Life of Backlight | | 40,000 hours or more (Operating temperature: 25°C / 77°F) | |
| Touch Keys | | Maximum 50 touch keys / screen, 20 × 12 matrix | |
| Interface | With PLC | F940GOT*BD-RH-E: RS-422 F943GOT*BD-RH-E: RS-232C | |
| | With personal computer | RS-232C | |
| Number of Screens | | User screen: 500 screens or less System screen: Allocated screens No. 1001-1030. | |
| User Memory | | Flash memory 512 KB (built-in) | |

- Bright dots (always lit) and dark dots (unlit) may appear on a liquid crystal display panel. It is impossible to completely avoid this symptom, as the liquid crystal display comprises of a great number of display elements. Flickers may be observed depending on the display color. Please note that these dots appear due to its characteristic and are not caused by product defect.
- When the same screen is displayed for a long time, an incidental color or partial discoloration is generated on the screen due to heat damage, and it may not disappear.
- Using the GOT Backlight OFF function can prolong the life of the backlight. For details on the Backlight OFF function, refer to the following.
GOT-F900 Series OPERATION MANUAL/GOT-F900 Series OPERATION MANUAL
[GT Designer2 Version]

2.5 Switch Specifications

Table 2.4: Switch Specifications

| Item | Description |
|-----------------------|---|
| Operation switch | N/O contact × 4 points, 10mA/24V DC (Operation life time: Approximately 1,000,000 times) |
| Emergency stop switch | 2 N/C contacts, 1A/24V DC (resistive load), independent wiring (Operation life time: Approximately 100,000 times) |
| Keylock switch | 2-position, 1A/24V DC (resistive load), independent wiring (Operation life time: Approximately 100,000 times) |
| Grip switch | 3-position (OFF/ON/OFF), 2 N/O contacts, independent wiring 1A/24V DC (resistive load) (Operation life time: Approximately 500,000 times) |

3. Installation

This section describes the installation of the Handy GOT.

All the specifications should be thoroughly understood before performing the installation.

Further information about selecting and wiring the cables can be found in the GOT-F900 SERIES HARDWARE MANUAL (CONNECTION).



Caution:

Rewire all phases of the power source, before installation or wiring work in order to avoid electric shock or damage to the product.

3.1 Installation Method

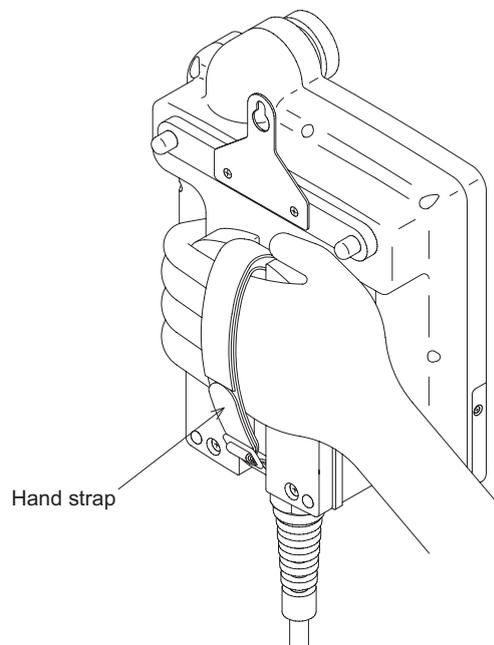


Note:

- Do not mount the GOT in an environment that contains dust, soot, corrosive or conductive dust, corrosive or flammable gas, or expose the unit to high temperatures, dew condensation, direct sunlight, rain and wind or impact and vibration. If the GOT is used in such an environment, electrical shock, fire, malfunction, damage or deterioration of the unit may occur.
- Make sure that the power is turned off, before connecting any cables. Connections should be made securely. Poor connections may cause malfunction.

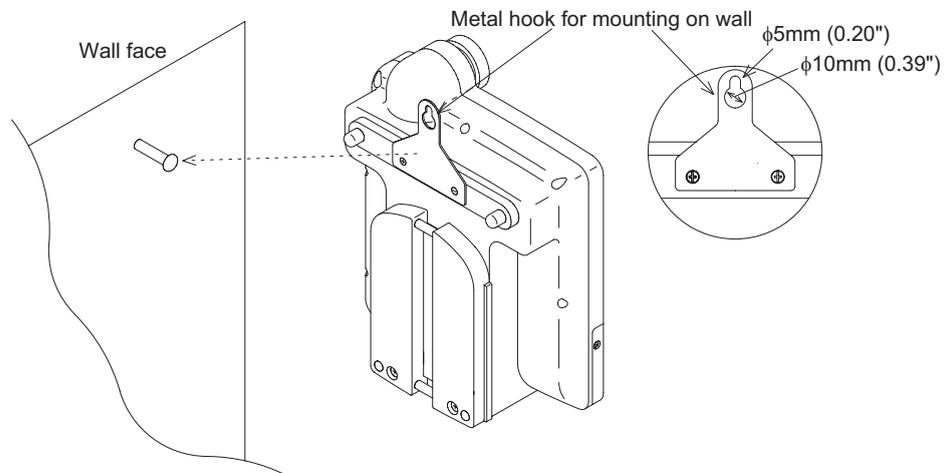
3.1.1 Holding

When holding the Handy GOT for operation, place your hand through the hand strap provided on its rear face. You can adjust the length of the hand strap.



3.1.2 Wall Mounting

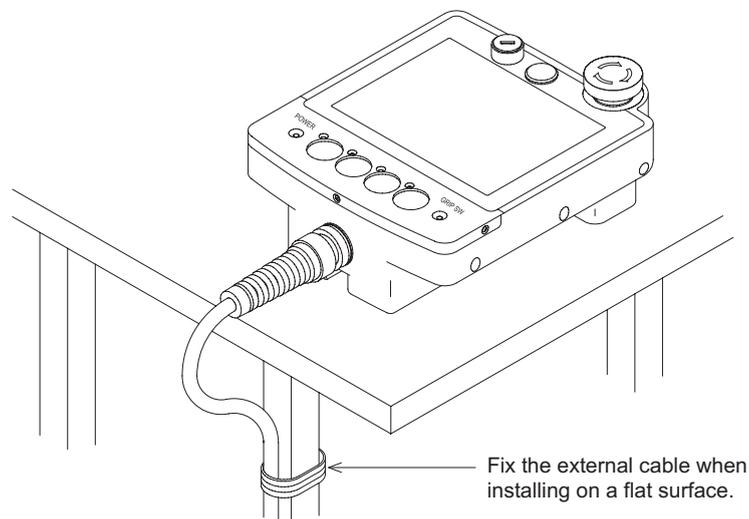
When mounting the Handy GOT on a wall, use the metal hook provided on its rear face.



The wall fixture should be able to support the weight of the main unit (approximately 0.87 kg/ 1.91 lbs) and a load of approximately 1 ~ 3 kg (2.20 ~ 6.61 lbs) which varies depending on the communication cable length. Take this into consideration and attach a suitable metal fixture on the wall.

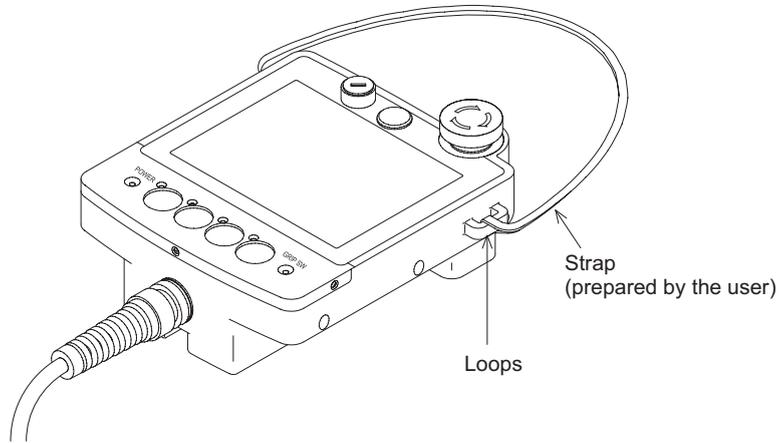
3.1.3 Flat Surface Mounting

When using the Handy GOT on a flat surface, such as a desk or shelf, keep the Handy GOT parallel to the surface so that it does not drop. Also, fix the communication cable to the desk.

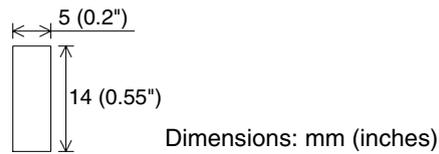


3.1.4 Hand/Shoulder Strap

A hand/shoulder strap (prepared by the user) to help prevent accidental drops can be attached to the loops.

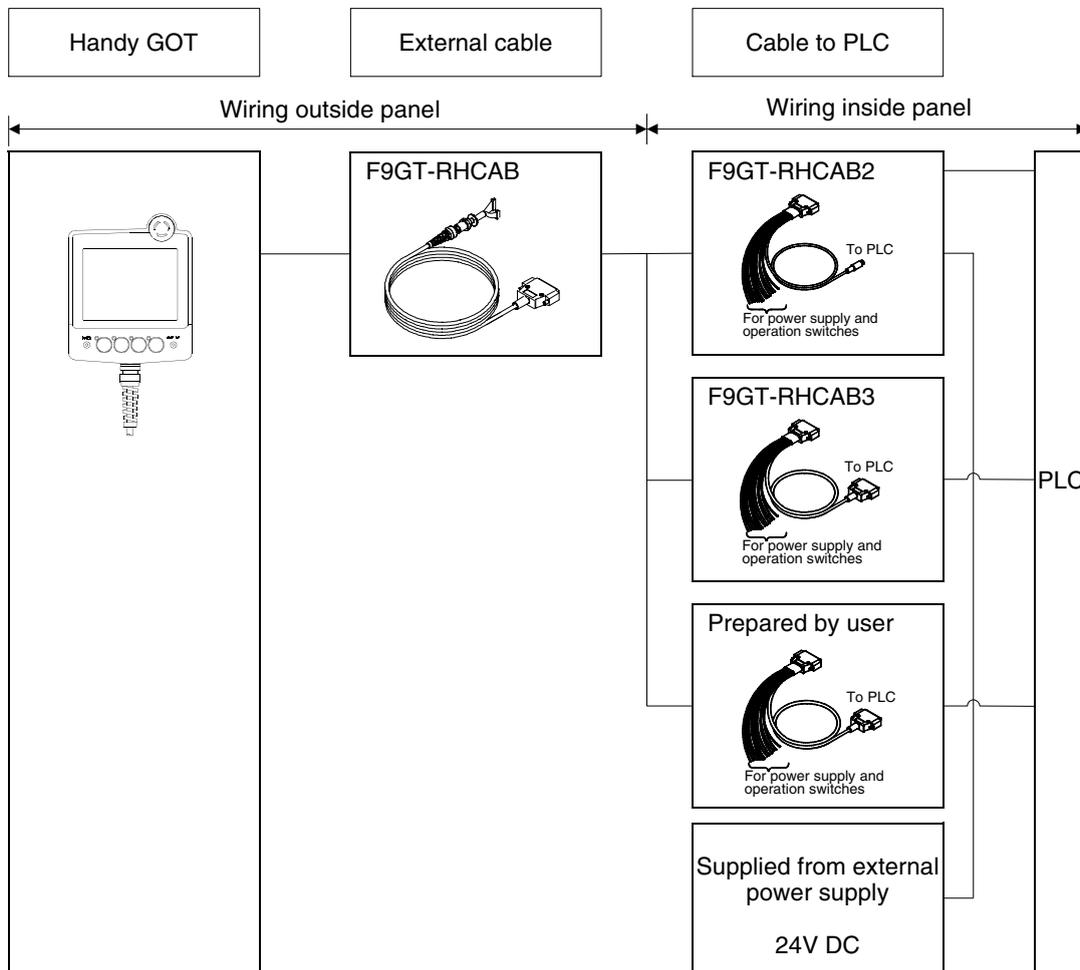


Dimensions of the loop



3.2 Outline of Connection

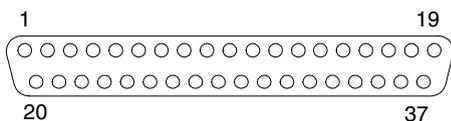
This section explains the connection configurations for the Handy GOT. Further information can be found in GOT-F900 SERIES HARDWARE MANUAL (CONNECTION).



3.2.1 Signal Allocation of Connector

The signal allocation within the connector of the external cable are shown below.

F9GT-RHCAB-□M
37-pin D-Sub, male



Arrangement of color

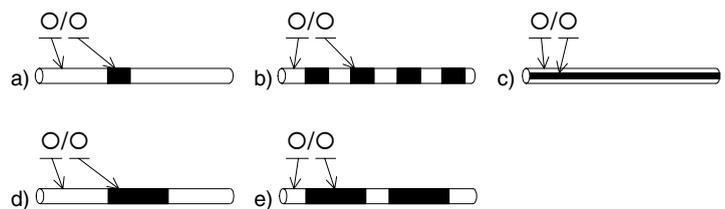


Table 3.1: Name of communication lines, power supply and switches

| External Cable (F9GT-RHCAB-*M) | | | Signal Name | | Description |
|--------------------------------|---------------|----------------------|-----------------------|------------------------|----------------------------|
| Pin No. | Color of wire | Arrangement of color | F940GOT Handy (RS422) | F943GOT Handy (RS232C) | |
| 1 | Shield | | FG (shield) | | Frame ground |
| 2 | Yellow/Blue | a) | TXD+ (SDA) | SD (TXD) | Note 1 |
| 3 | Yellow/Red | a) | TXD- (SDB) | ER (DTR) | |
| 4 | White/Blue | a) | RTS+ (RSA) | RD (RXD) | |
| 5 | White/Red | a) | RTS- (RSB) | DR (DSR) | |
| 6 | Gray/Blue | a) | RXD+ (RDA) | RS (RTS) | |
| 7 | Gray/Red | a) | RXD- (RDB) | CS (CTS) | |
| 8 | Orange/Blue | a) | CTS+ (CSA) | NC | |
| 9 | Orange/Red | a) | CTS- (CSB) | NC | |
| 10 | Orange/Red | c) | SG | | |
| 11 | – | – | NC | | Not used |
| 12 | White/Red | b) | SW-COM | | COM for Operation switches |
| 13 | Gray/Blue | b) | SW1 | | Operation switches |
| 14 | Gray/Red | b) | SW2 | | |
| 15 | Orange/Blue | b) | SW3 | | |
| 16 | Orange/Red | b) | SW4 | | |
| 17 | – | – | NC | | Not used |
| 18 | Gray/Blue | d) | DC24V G | | 24V DC power supply "-" |
| 19 | Gray/Red | d) | | | |
| 20 | Pink/Red | d) | ES1-1 | | Emergency stop switch |
| 21 | Pink/Blue | d) | ES1-1 | | |
| 22 | Orange/Red | e) | ES1-2 | | |
| 23 | Orange/Blue | e) | ES1-2 | | |
| 24 | White/Red | d) | DSW-1 | | Grip switch |
| 25 | White/Blue | d) | DSW-1 | | |
| 26 | Yellow/Red | d) | DSW-2 | | |
| 27 | Yellow/Blue | d) | DSW-2 | | |
| 28 | White/Blue | b) | KSW-C | | Common for keylock switch |
| 29 | Yellow/Red | b) | KSW-1 | | Keylock switch |
| 30 | Yellow/Blue | b) | KSW-2 | | |
| 31 | Pink/Red | b) | Spare SW | | Spare |
| 32 | Pink/Blue | b) | Spare SW | | |
| 33,34,35 | – | – | NC | | Not used |
| 36 | Orange/Blue | d) | DC 24V+ | | 24V DC power supply "+" |
| 37 | Orange/Red | d) | | | |

Note 1:

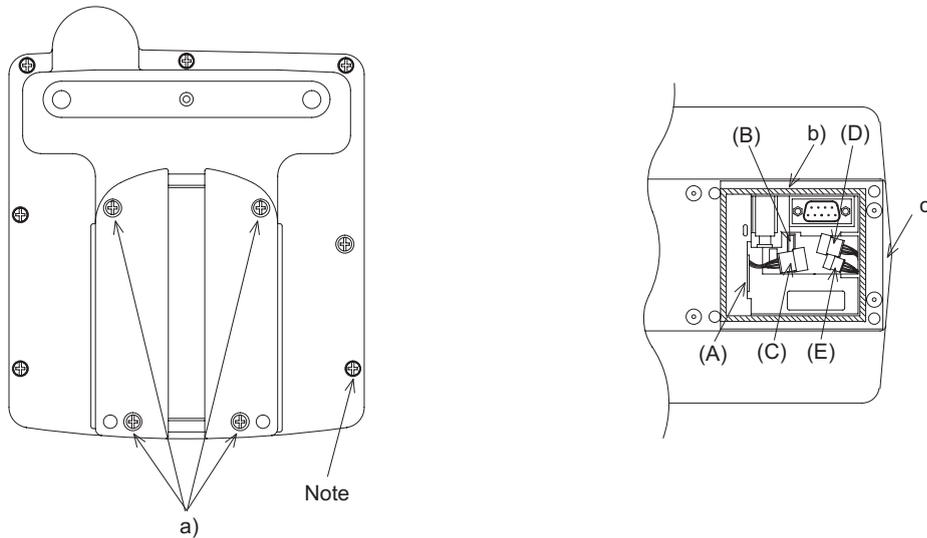
These are signals for communication with the PLC. When connecting to a port other than the programming port of the FX, A, QnA or Q series PLC, refer to the manual of the connected module. Also use a relay cable. For relay cable details, refer to section 1.3.2.

3.3 Installation of External Cable

This section explains the installation procedure for the optional external cable to the Handy GOT main unit.

1) Remove the rear cover

Remove the mounting screws "a)", and open the rear cover.



a) Rear cover mounting screws, (M3 × 8mm, 4 screws)

b) Packing

c) Installation hole

(A) Port for power supply (CN1; 8-pin type)

(B) Port for communication and operation switches (CN2; 20-pin type)

(C) Connector for grip switch (CN4; 5-pin type)

(D) Connector for emergency stop switch (CN5; 4-pin type)

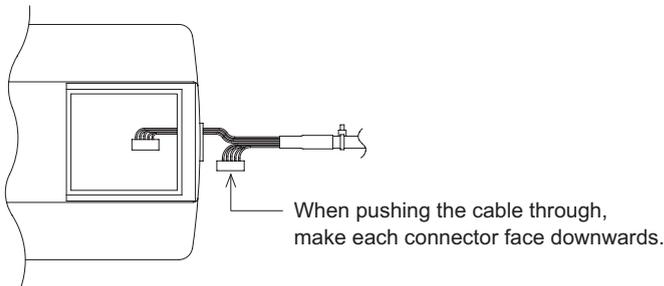
(E) Connector for keylock switch (CN6; 3-pin type)



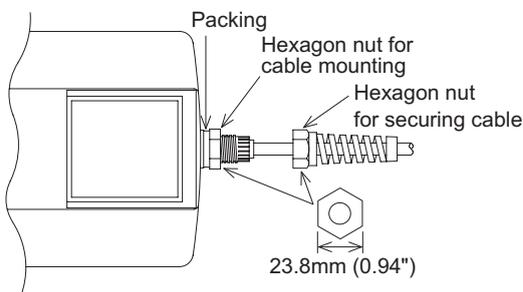
Note:

- Never remove any screw (among seven screws located around the rear face of the Handy GOT) other than the mounting screws "a)".
If such a screw is removed, the waterproof ability may deteriorate or failure may occur.
- When installing the rear cover, securely tighten the mounting screws with a torque of 0.49 ~ 0.68 N·m. If tightened more than this, the rear cover may crack, and the water and dustproof properties may be lost.
- Before closing the rear cover, make sure that the packing "b)" has not come off.

- 2) Connect the external cable
 Insert the external cable into the installation hole "c)" of the Handy GOT, and connect it to "(A)", "(B)", "(C)", "(D)" and "(E)".

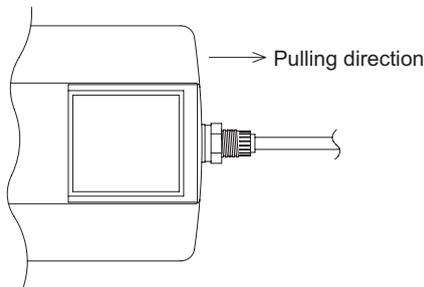


- 3) Tighten the hexagon nut.

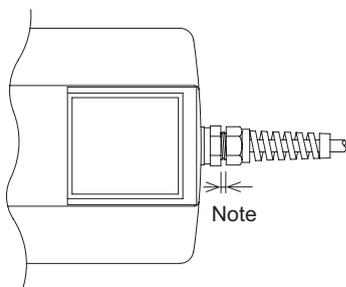


Make sure to tighten the hexagon nut for cable mounting with a sufficient force to avoid loosening.
 As guideline, tighten it until the packing is crushed by 0.5 mm (0.02") or more.

- 4) Pull lightly on the cable until excess cable is with drawn from inside the unit.



- 5) Securely tighten the hexagon nut so that the cable will not come out and the waterproof integrity is maintained.



Note:

As guideline, make sure that the clearance is 3.5 mm (0.14") or less.

6) Attach the rear cover

a) Before replacing the rear cover, make sure that the packing b) has not come off.

b) Attach the rear cover.

c) Tighten the four mounting screws.

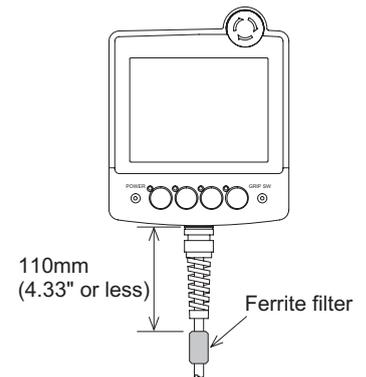
Make sure the tightening torque is 0.49 to 0.68 N·m.

3.3.1 Caution for CE EMC

For compliance to CE EMC regulations it is necessary to add a ferrite filter on the external cable for F940GOT-*BD-RH-E or F943GOT-*BD-RH-E.

The filter should be attached as shown with the filter surrounding the external cable.

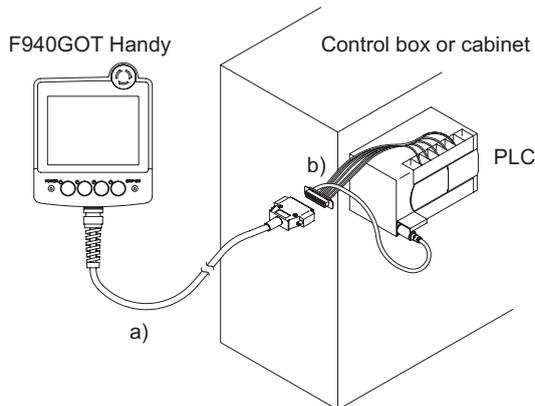
The recommended ferrite filter is the TDK ZCAT2436-1330A-M-BK or equivalent.



3.4 Processing Panel for a Control Box or Cabinet

3.4.1 Using the F940GOT Handy

- 1) Installing a connector on the panel of a control box or cabinet.
Connect to an FX/A/QnA Series PLC using a relay cable as shown below. Further information regarding applicable PLCs can be found in GOT-F900 Series Hardware Manual.



- a) External cable (with 37-pin D-Sub, male connector)

Table 3.2: External Cable

| Model Name | Length |
|----------------|--------------|
| F9GT-RHCAB-3M | 3m (9' 10") |
| F9GT-RHCAB-6M | 6m (19' 10") |
| F9GT-RHCAB-10M | 10m (32' 9") |

- b) Relay cable for connection to PLC

Table 3.3: Relay Cable

| Model Name | Length | Applicable |
|-----------------|---------------|--|
| F9GT-RHCAB2-150 | 1.5m (4' 11") | FX Series (FX0, FX0S, FX0N, FX1S, FX1N, FX2N, FX2NC) |
| F9GT-RHCAB3-150 | | FX (FX, FX2C), A, QnA Series |

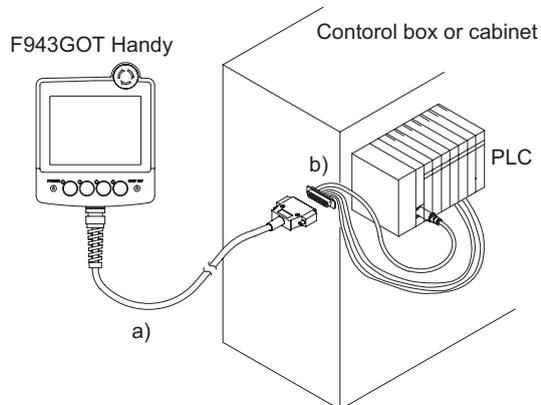


Note:

When connecting to a port or unit other than the programming port of an FX, A or QnA series PLC, make a cable corresponding to the configuration of the communications port in question. For allocation of Handy GOT communication signals, refer to section 3.2.

3.4.2 Using the F943GOT Handy

Installing a connector on the panel of a control box or cabinet
Connect a Q Series PLC using a relay cable as shown below.



- a) External cable (with 37-pin D-Sub, male connector)
F9GT-RHCAB-3M (3m /9' 10")
- b) Relay cable for connection to Q series PLC
F9GT-RHCAB5-150 (1.5m /4' 11") for Q series PLC



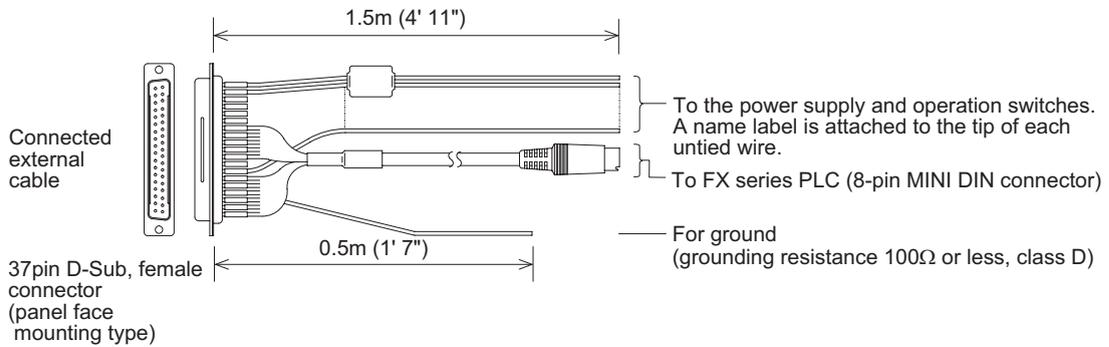
Note:

When connecting to a port or unit other than the programming port of a Q series PLC, make a cable corresponding to the configuration of the communications port in question. For allocation of Handy GOT communication signals, refer to section 3.2.

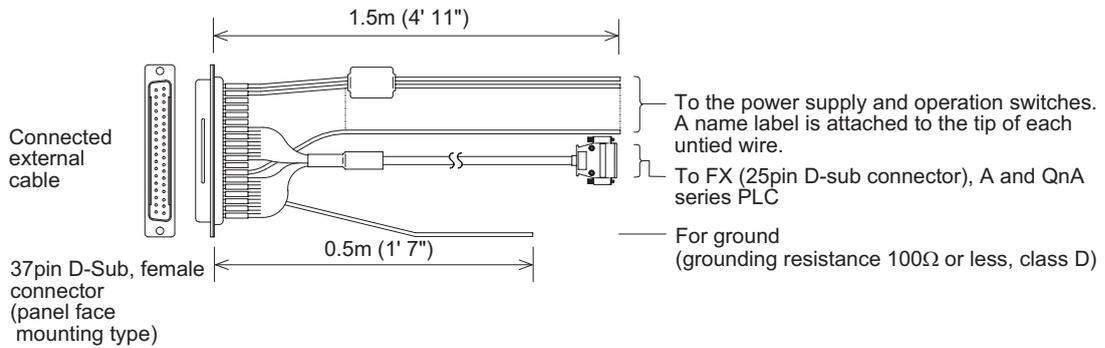
3.4.3 Pinouts for the Relay Cable

Refer to the GOT-F900 Serie **HARDWARE MANUAL [CONNECTION]**.

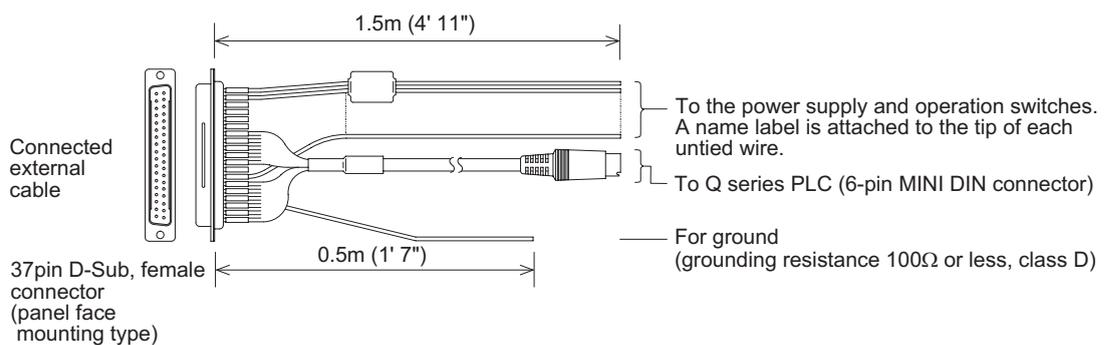
- 1) F9GT-RHCAB2-150 relay cable for the FX (FX₀, FX_{0S}, FX_{0N}, FX_{1S}, FX_{1N}, FX_{2N}, FX_{2NC}) Series PLC



- 2) F9GT-RHCAB3-150 relay cable for FX (FX, FX_{2C}), A, QnA series PLC



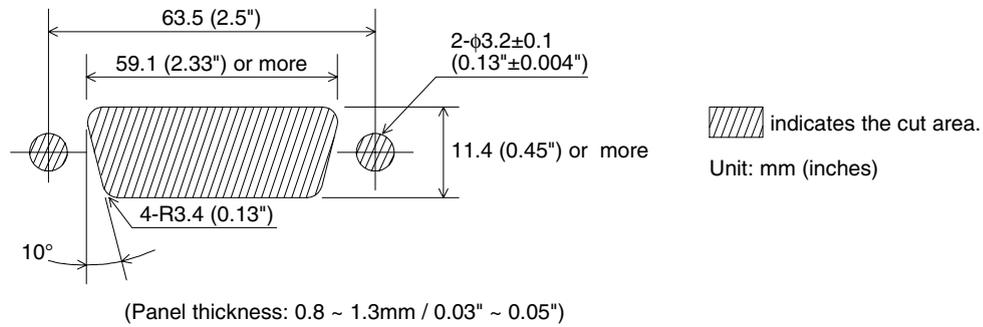
- 3) F9GT-RHCAB5-150 relay cable for Q series PLC



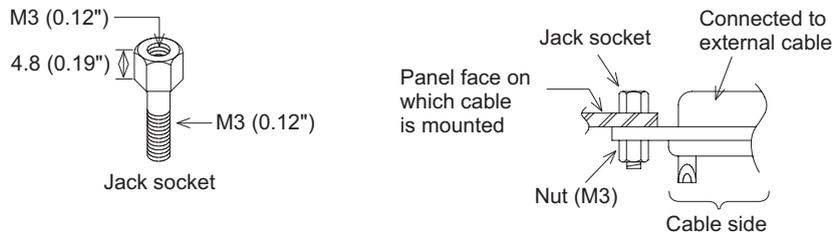
3.4.4 Panel Cut Dimensions for the Relay Cable

When mounting the relay cable connector on the panel of a control box or cabinet, prepare the panel of the control box or cabinet as follows.

Panel cut size



Insert a jack socket into the hole shown above, and tighten it with M3 (0.12") nuts.

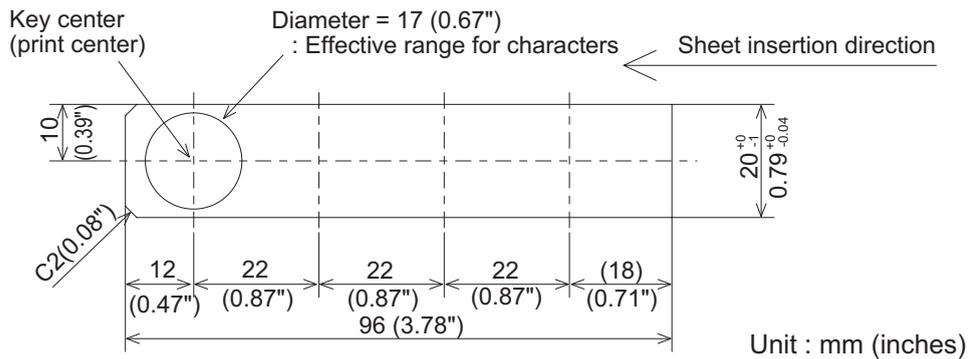


4. Preparation of the Operation Switch Name Sheet

This section explains how to prepare the operation switch name sheet.

4.1 Preparing the Name Sheet

- 1) Use a name sheet and an OHP sheet (transparent sheet) offered as accessories.
- 2) Write the switch names on the name sheet.
 The name sheet is of actual dimensions.
 If you would like to make additional name sheets, refer to the following dimensions.



- 3) When the work in step b) is completed, copy the contents of the name sheet on to an OHP sheet using a copy machine.
 When using a different OHP sheet, use the following type. Make sure that the selected OHP sheet can be used in a copy specification.

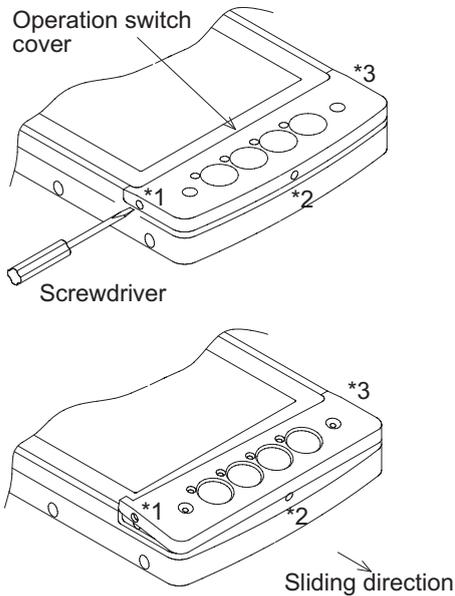
[Recommended OHP sheet]

Material: Polyester film

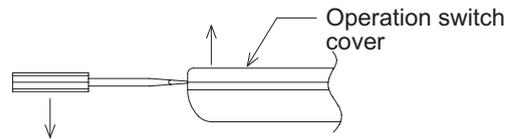
Thickness: 0.1mm (0.004")

4.2 Attaching the Sheet

1) Remove the operation switch cover



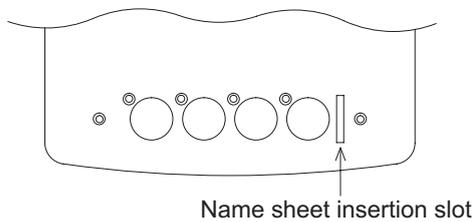
Insert a screwdriver into the gap *1 or *3 between the operation switch cover and the main unit, then slowly push the operation switch cover up.



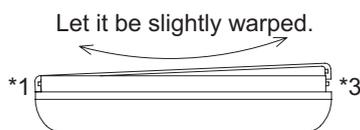
When either side *1 or *3 comes off, pull the operation switch cover in the sliding direction to remove it.

2) Insert the sheet

Insert the name sheet into the following position.



3) Attach the operation switch cover



Align the operation switch cover with the protrusion *1 or *3 shown in the figure in the step 1), then attach the operation switch cover while flexing it slightly.

5. Maintenance and Diagnostics



Cautions:

- Correctly install the battery for memory backup. Never charge, disassemble, heat, burn or short-circuit the battery. If the battery is handled in such a way, an explosion or fire may occur.
- Always power OFF and remove the Handy GOT from any mounting location before starting the replacement of the backlight and battery. Electric shock may occur if these precautions are not taken.
- Never disassemble or modify the Handy GOT. Disassembly or modification may cause failure, malfunction or fire. For repair, please contact a service representative.



Note:

Make sure to turn the power OFF before connecting/disconnecting cables. If you connect/disconnect cables while the power is turned ON, failure or malfunction may occur.

5.1 Maintenance

5.1.1 Replacement of the Battery

1) Notification of Low Battery Voltage

When the battery voltage drops, a control device (system information) assigned with the programming software turns ON. The control device interlocks with an auxiliary relay in the PLC. It is recommended to provide a lamp while utilizing the output of the PLC so that voltage drop can be monitored outside the Handy GOT.

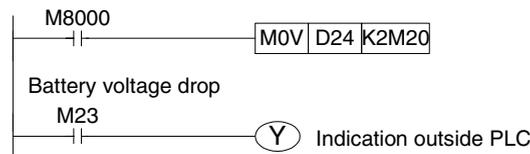
For details of control devices, refer to the GOT-F900 SERIES OPERATION MANUAL.

Example: SW□D5C-GOTR-PACKE or SW□D5C-GTD2-E is used

System information write device is set to D20

D24 b3: Battery voltage drop (which turns on when the battery voltage drops)

Use D24 in a PLC program as follows.

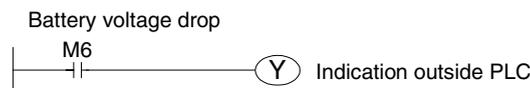


Example: FX-PCS-DU/WIN-E is used

Top control device No. is set to M0

M6: Battery voltage drop (which turns ON when the battery voltage drops)

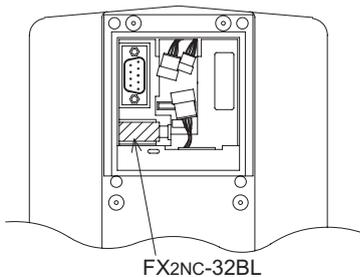
Use M6 in a PLC program as follows.



2) Procedure for Replacing the Battery

The battery can back up the alarm history, sampling and the current time for approximately one month after the control device for the battery voltage drop turns ON. When the control device (system information) turns ON, replace the battery (FX2NC-32BL) as soon as possible.

The screen data is stored in the flash memory. Even if the battery power is completely depleted, the screen data remains in the flash memory.



- a) Turn off the power of the Handy GOT.
- b) Open the small window of the rear panel.
- c) Remove the existing battery from the holder and disconnect it.
- d) Within 30 seconds, connect a new battery.
- e) Insert the new battery into the holder and close the small window.

Battery life: Approximately 3 years

5.2 Diagnostics

5.2.1 Preliminary Check

1) Check "POWER LED"

If the POWER LED is OFF, check cable(s), and check if the 24V DC power source capacity is sufficient. (Refer to chapter 2.2)

2) Check display

If the display screen is dark, adjust "LCD CONTRAST" in "SET-UP MODE".

If the display screen remains dark even after adjustment, replace the backlight. Please contact a service representative for more information. (Refer to chapter 2.2)

3) Check setting "PLC TYPE" in "SET-UP MODE"

If this setting is incorrect, Handy GOT cannot communicate with the PLC correctly. (Refer to chapter 3)

5.2.2 When an operation switch or emergency stop switch does not operate

When an operation switch or emergency stop switch does not operate, check the following points.

- Check whether external cables are connected correctly to the Handy GOT. (Refer to chapter 3)
- While pressing and holding an operation switch or emergency stop switch, check the conduction between the wires (pins or terminal blocks) of the external cables and relay cable in the table below.

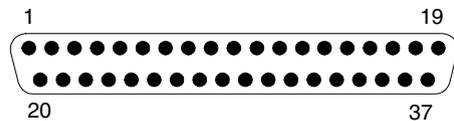
If no conduction is confirmed, wire breakage or poor contact may be present in the external cable or relay cable, or the circuits inside the Handy GOT may be damaged.

If it is suspected that the circuits inside the Handy GOT are damaged, consult with a Mitsubishi Electric distributor.

| Switch name | Signals whose conductivity can be checked | | |
|-------------|---|-------------------------------|---|
| | Signal name | External cable*1 | External cable F9GT-HCAB-□M + Relay cable*2 F9GT-HCAB2-150 F9GT-HCAB3-150 F9GT-HCAB5-150 |
| | | F9GT-HCAB-3M F9GT-HCAB-10M | |
| SW1 | SW-COM and SW1 | 12 and 13 | White/Red and Gray/Blue (B) ^{*3} |
| SW2 | SW-COM and SW2 | 12 and 14 | White/Red and Gray/Red (B) ^{*3} |
| SW3 | SW-COM and SW3 | 12 and 15 | White/Red and Orange/Blue (B) ^{*3} |
| SW3 | SW-COM and SW4 | 12 and 16 | White/Red and Orange/Red (B) ^{*3} |
| ES1-1 | ES1-1 and ES1-1 | 20 and 21 | Pink/Red and Pink/Blue (D) ^{*3} |
| ES1-2 | ES1-2 and ES1-2 | 22 and 23 | Orange/Red and Orange/Blue (D) ^{*3} |
| KSW-1 | KSW-COM and KSW-1 | 28 and 29 | White/Blue and Yellow/Red (B) ^{*3} |
| KSW-2 | KSW-COM and KSW-2 | 28 and 30 | White/Blue and Yellow/Blue (B) ^{*3} |

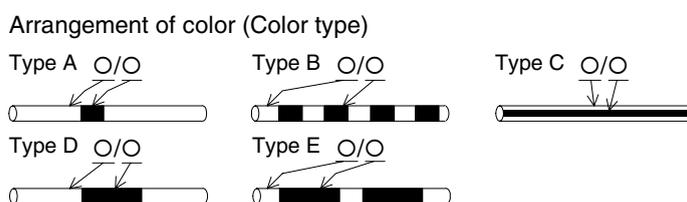
*1 Connect an external cable to the Handy GOT, press and hold each switch, then check the conduction between the pins or wires.

F9GT-HCAB-□M
37-pin D-sub, male connector



*2 Connect an external cable and relay cable to the Handy GOT, press and hold each switch, then check the conduction between wires.

*3 Arrangement of color type.



5.2.3 When the LCD screen is dark

When the display is dark, adjust the brightness selecting "MODE SELECT MENU SCREEN" - "OTHER MODE" - "SET-UP MODE" - "LCD CONTRAST". If the screen remains dark even after adjustment, it is recommended to replace the backlight. For replacement of the backlight, consult with a Mitsubishi Electric distributor.

For the details of the utility function, refer to the GOT-A900 SERIES OPERATING MANUAL (EXTENTION FUNCTIONS/OPTIONAL FUNCTIONS).

5.3 Check Error Messages

The table below shows the list of error messages displayed during manipulation or operation. Check the contents, and take proper action.

Table 5.1: Check Error Messages

| Error message | Description | Action |
|----------------------------------|--|---|
| CAN NOT WRITE PLC MEMORY. | The PLC is running in EPROM mode. Or the write-protect switch of the EEPROM is set to ON. | Run the PLC in RAM mode. Or set the write-protect switch of the EEPROM to OFF. |
| PLC IS RUNNING. | A personal computer is attempting to write a program using "DATA TRANSFER" in "OTHER MODE" while the PLC is running. Or an entry code has been registered. | Stop the PLC. Or enter the correct entry code. |
| DATA IS NOT FOUND. | There are no screen data or data files. | Create the data using the programming software. |
| DISPLAY SCREEN IS NOT AVAILABLE. | Screen No. 0 (FX-PCS-DU/WIN-E) or screen No. 1 (GT Designer) does not exist. When a screen is to be changed over, there is no destination screen. | Create screen No. 0 or 1. Or change the changeover destination screen, or create the corresponding screen. |

HARDWARE MANUAL

F940GOT Handy Series (F94*GOT*BD-RH-E)



HEAD OFFICE: TOKYO BUILDING, 2-7-3 MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310 JAPAN
HIMEJI WORKS: 840, CHIYODA CHO, HIMEJI, JAPAN

| | |
|------------|-------------|
| MODEL | F940RH-HW-E |
| MODEL CODE | 09R811 |

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Specifications are subject to change without notice.