

HARDWARE MANUAL

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



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-H-E)

Hardware Manual

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FAX BACK

Mitsubishi has a world wide reputation for its efforts in continually developing and pushing back the frontiers of industrial automation. What is sometimes overlooked by the user is the care and attention to detail that is taken with the documentation. However, to continue this process of improvement, the comments of the Mitsubishi users are always welcomed. This page has been designed for you, the reader, to fill in your comments and fax them back to us. We look forward to hearing from you.

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and this manual easy to use.



Guidelines for the Safety of the User and Protection of the F940GOT Handy Series (F94*GOT-*BD-H-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-H-E and F94□GOT-LBD-H-E (□=0 or 3)		
F940 Handy GOT	Generic name of F940GOT-SBD-H-E and F940GOT-LBD-H-E		
F943 Handy GOT	Generic name o	of F943GOT-SBD-H-E ar	nd F943GOT-LBD-H-E
QCPU (Q mode)	Generic name of Q02CPU, Q02HCPU, Q06HCPU, Q12HCPU and Q25HCPU CPU units		
QCPU (A mode)	Generic name o	of Q02CPU-A, Q02HCPU	U-A and Q06HCPU-A CPU units
QCPU	Generic name o	of QCPU (Q mode) and (QCPU (A mode) CPU units
QnACPU (large type)	Generic name o		1, Q3ACPU, Q4ACPU and
QnACPU (small type)	Generic name o Q2ASHCPU-S1	of Q2ASCPU, Q2ASCPU CPU units	J-S1, Q2ASHCPU and
QnACPU	Generic name of	f QnACPU (large type) a	nd 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 FX ₀ , FX ₀ s, FX ₁ s, FX ₀ N, FX ₁ N, FX ₁ , FX ₂ , FX ₂ N, FX ₂ C and FX ₂ NC Series CPU units		
	Abbreviation of screen creation software for GOT-A900/GOT-F900 Se		e for GOT-A900/GOT-F900 Series
GT Designer2	GT Designer2	SW□D5C-GTD2-E	Screen creation software for GOT- 900 Series (English version)
	Abbreviation of	screen creation software	e for GOT-A900/GOT-F900 Series
GT Designer		SW□D5C-GOTR-PACKE	Screen creation software for GOT900 Series SWID5C-GOTR- PACKE (English version)
		SWID5C-GOTR- PACKEV	Software dedicated to version upgrade from conventional version to latest SWID5C-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
0	F940 Handy Series HARDWARE MANUAL (F94*GOT-*BD-H-E)	JY992D86901	Describes the specifications, installation, setting, and operation switches of the F940 Handy graphic operation terminal.
•	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.
0	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.
0	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).
0	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)
0	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

O: Either manual is necessary.

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

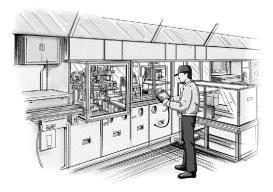
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1. Introduction

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.

F940GOT Handy Series Introduction 1

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 name label offered as accessories. (Refer to Chapter 4)

2) Display unit

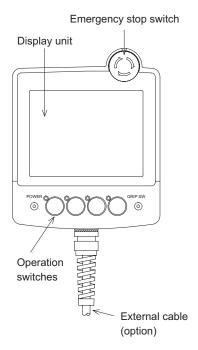
The display unit is touch-key type LCD equivalent to that of a standard F940GOT.

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 such 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-H-E	Handy GOT main unit
F940GOT-LBD-H-E	This type uses RS-422 communication for connecting to PLC SBD type is 8 Colors - LBD type is White and black
F943GOT-SBD-H-E	Handy GOT main unit
F943GOT-LBD-H-E	This type uses RS-232C communication for connecting to PLC SBD type is 8 Colors - LBD type is White and black

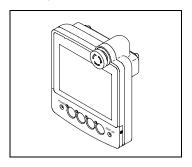
1.2.1 Model Name

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

Table 1.2: Notes on Model Name

Table 1121 Notice on inicael Name		
		Description
Α	0	RS-422 communication for connecting to PLC
_ ^	3	RS-232C communication for connecting to PLC
В	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 (All model)

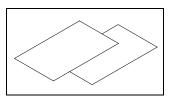
A transparent sheet and a mount sheet are offered as accessories so that operation switch names can be changed.

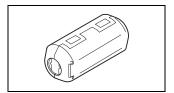
For the name changing procedure, refer to chapter 4.

Ferrite filter for CE EMC (F943GOT-*BD-H-E model only)
 For compliance to CE EMC regulations it is necessary to add a ferrite filter on the external cable for F943GOT-SBD-H-E or F943GOT-LBD-H-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 ZCAT2035-0930A-BK.







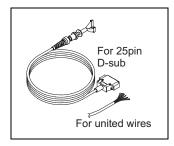
1.3 Options

1.3.1 External Cable

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

Table 1.3: External Cable

Table 1.6. External Cable		
Model Name	Description	
F9GT-HCAB-3M	25-pin D-sub connector on one side,	
F9GT-HCAB-10M	- 3M: Cable length is 3m (9' 10") - 10M: Cable length is 10m (32' 9")	
F9GT-HCAB1-3M	United wires on one side,	
F9GT-HCAB1-10M	- 3M: Cable length is 3m (9' 10") - 10M: Cable length is 10m (32' 9")	





Note:

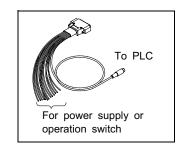
When using F9GT-HCAB-*M external cable, one of the following relay cables or an F9GT-HCNB conversion box is necessary.

1.3.2 Other Options

Order the following options upon necessity.

- 1) Relay cable for PLC
 - F9GT-HCAB2-150

This cable connects to an FXo/FXos/FXon/FX1s/FX1n/FX2n/FX2n/ (with 8-pin MINI-DIN connector), and is equipped with an external cable (with 25-pin D-sub connector) for power supply, operation switch and emergency switch. Cable length is 1.5 m (4' 11").





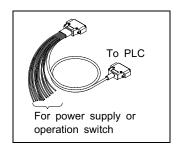
Note:

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

• F9GT-HCAB3-150

This cable connects to an FX/FX₂C/A/QnA Series PLC or motion controller (with 25-pin D-sub connector), and is equipped with an external cable (with 25-pin D-sub connector) for power supply, operation switch and emergency switch

Cable length is 1.5 m (4' 11").



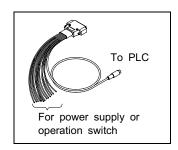


Note:

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

• F9GT-HCAB5-150

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 25-pin D-sub connector) for power supply, operation switch and emergency switch Cable length is 1.5 m (4' 11").



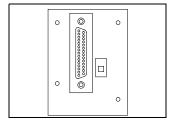


Note:

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

2) F9GT-HCNB conversion box

This box converts a 25-pin D-sub connector of an external cable into a port for PLC connection and separate terminals for power supply, operation switch and emergency switch.





Note:

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

3) Communication cables

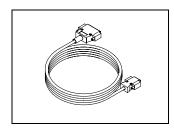
FX-40DU-CAB

This cable connects the F9GT-HCNB to a CPU port (programming port) of an FX/FX2c/A Series PLC via CPU port connection setting.

Cable length is 3.0 m (9' 10")

This cable is not available when a Handy GOT is connected via a communication port (communication unit).

Further information can be found in the GOT-F900 Series Hardware Manual.



FX-50DU-CAB0 /-1M

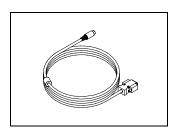
Either of these cables connects the F9GT-HCNB and an FX $_0$ /FX $_0$ S/FX $_0$ N/FX $_1$ S/FX $_1$ N/FX $_2$ N/FX $_2$ NC Series PLC by CPU port connection setting.

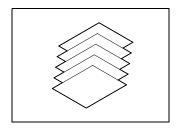
Cable length;

Normal type: 3m (9' 10")

- -1M type: 1m (3' 3")

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





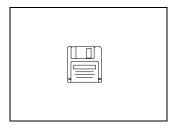


F940GOT Handy Series Introduction 1

5) Screen creation software

Table 1.4: Screen creation software

Model Name Description		
GT Designer2	SW1D5C-GOT2-E V1.00 or more (CD-ROM)	
GT Designer	SW1D5C-GOTR-PACKE Version 40E or more (CD-ROM)	
FX-PCS-DU/WIN-E	SW0PC-FXDU/WIN-E Version V2.10 or more (3.5 FD)	





Note:

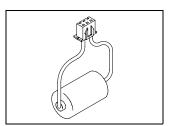
This unit cannot be used for the F943GOT-*BD-H-E (RS-232C communication type Handy GOT).

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.

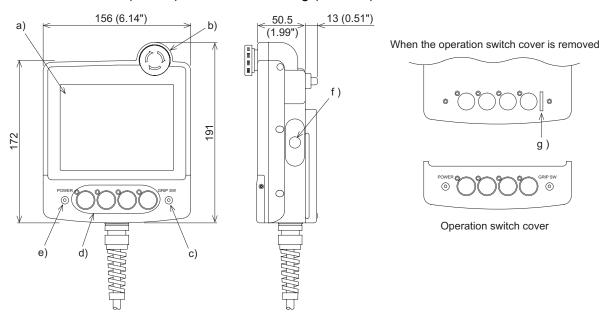
For replacement instructions, refer to chapter 5.



1.4 Dimensions and Part Names

1.4.1 Dimensions and Part Names of Front Panel

Dimensions: mm (inches) MASS: 0.79 kg (1.74 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
 Lit while the grip switch provided on the side is being pressed.
- 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. (Refer to Chapter 4)

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 by the user program in the PLC. Further information can be found in the GOT-F900 Series Hardware Manual.

e) POWER LED

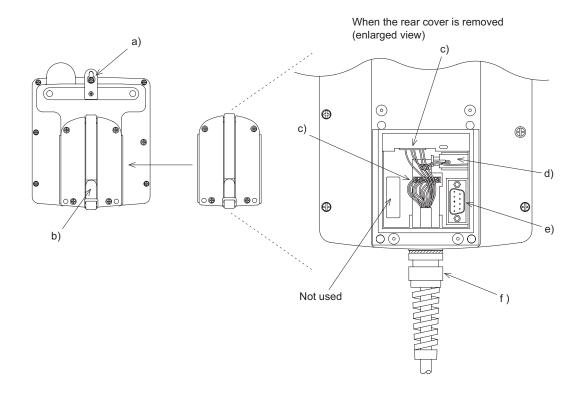
Lit while 24V DC power is supplied to the Handy GOT.

f) Grip switch

A grip switch is provided on the side of the Handy GOT. While the grip switch is pressed, manipulation of the touch keys on the screen is effective. Further information can be found in the GOT-F900 Series Hardware Manual.

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.

1.4.2 Rear face



- a) Metal hook for wall mounting 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 5.
- 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.

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.

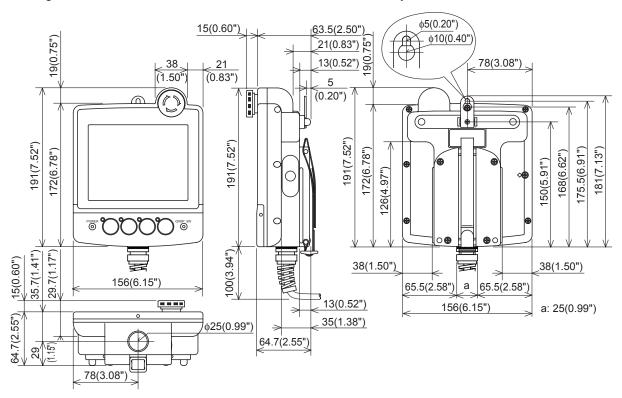


Note:

- 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 please. 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: 0.79 kg (1.74 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	$5 \text{ M}\Omega$ > 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-SWD-E	F94*GOT-LWD-E
Display Device STN color liquid crystal display			
Resolution	1	320×240 (dot), 40 characters \times 15 lin	nes
Dot Pitch		0.36 mm (0.014") Horizontal × 0.36 m	m (0.014") Vertical.
Effective D	Display Size	115 mm (4.53") × 86 mm (3.39"); 6 (5.	7 inch) type
Number of	f Colors	8 colors	White and Black
Life of liqu	id crystal	Approximately 50,000 hours (Operating	ng temperature: 25 °C / 77 °F)
Backlight		Cold cathode tube	
Life of Bad	klight	40,000 hours or more (Operating temperature: 25 °C / 77 °F)	
Touch Key	'S	Maximum 50 touch keys / screen, 20 × 12 matrix	
With PLC		F940GOT-*DB-H-E: RS-422 F943GOT-*DB-H-E: RS-232C	
Interface	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 Emergency and Operation Switch Specifications

Table 2.4: Emergency and Operation Switch Specifications

Item	Description	
Operation switch a-contact × 4 points, 10 mA/24V DC (Operation life time: appraxinately1,000,000 times)		
Emergency stop switch b-contact × 1 point, 1 A/24V DC, independent wiring (AH165-VR01 manufactured by Fuji Electric)		

3. Installation

This section describes the installation of the Handy GOT.

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).

3.1 Installation Method

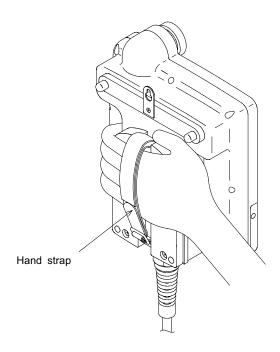


Note:

- Do not mount the GOT in an environment that contains dust, soot corrosive, conducive 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 a place, electrical shock, fire, malfunction, damage or deterioration may occur.
- Make sure that the power is turned off, before connecting any cables. Connections should be made securely. Poor connections may cause malfunction.

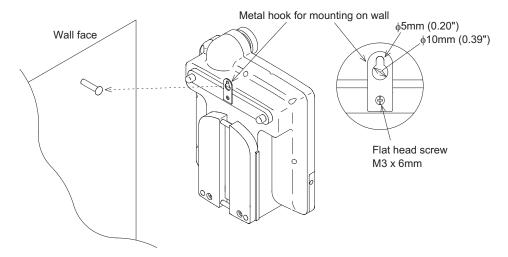
3.1.1 Holding

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

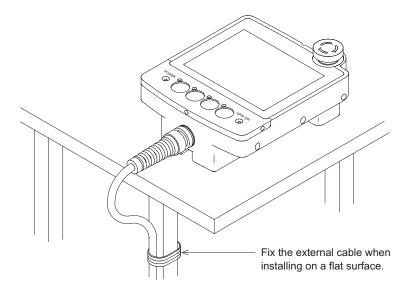
When mounting the Handy GOT on a wall, use the metal hook provided on its rear face.



The wall fixture should be able to support, the weight of the main unit (approximately 0.79 kg/ 1.74 lbs) and a load of approximately $1 \sim 3 \text{ kg}$ ($2.20 \sim 6.61 \text{ lbs}$) 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

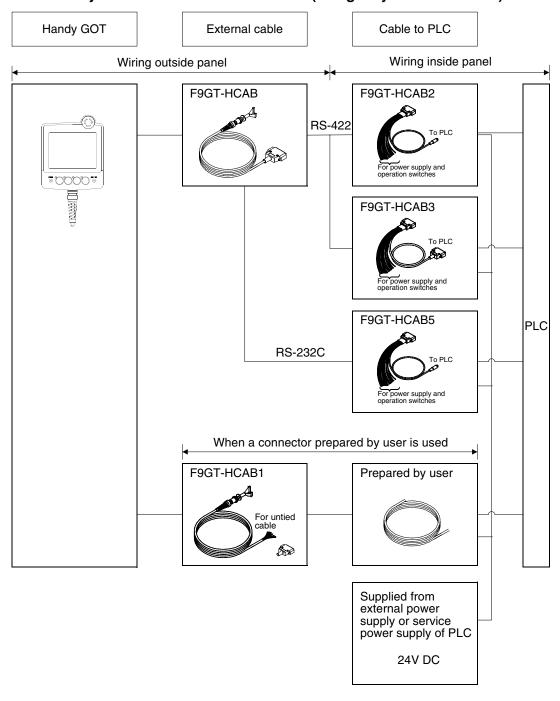
When using the Handy GOT on a flat surface, such as a desk or shelf, keep the Handy GOT parallel to the surface so that it does not drop. Also, fix the communication cable to the desk.



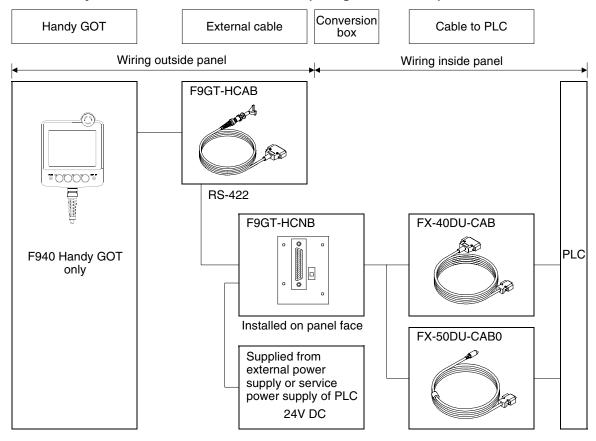
3.2 Outline of Connection

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

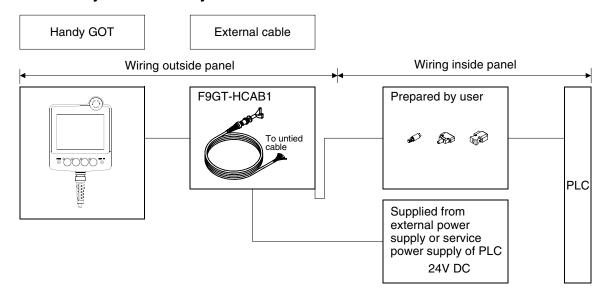
When Handy GOT is attached and removed (using only external cables)



When Handy GOT is attached and removed (using F9GT-HCNB)



When Handy GOT is directly wired



3.2.1 **Signal Allocation of Connector and Untied Wires**

The signal allocation within connector and untied wires of an external cable are shown below.

United wires (20-core) 25-pin D-sub, male connector Distingushed by color

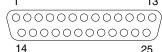


Table 3.1: Name of communication, lines, power supply and operation switches

External Cable			Name	nd operation switches
Pin No. (F9GT- HCAB-*M)	Color of United wires (F9GT- HCAB1-*M)	F940GOT Handy (RS-422)	F943GOT Handy (RS-232C)	Description
1	Drain wire	FG (s	hield)	Frame ground
2	Black	TXD+ (SDA)	SD (TXD)	
3	White	TXD- (SDB)	ER (DTR)	
4	Red	RTS+ (RSA)	RD (RXD)	
5	Green	RTS- (RSB)	DR (DSR)	Note 1
6	Yellow	RXD+ (RDA)	RS (RTS)	Note i
7	Brown	RXD- (RDB)	CS (CTS)	
8	Blue	CTS+ (CSA)	NC	
9	Gray	CTS- (SCB)	NC	
10	Orange	SG		Signal ground
11	-	NC		Not used
12	Purple	DC 24V G		24V DC power supply "-"
13	Pink			
14	Light green	SW-COM		COM for Operation switches
15	Sky blue	SW1		
16	Black/white	SW2		Operation switches
17	Red/white	SW3		Operation switches
18	Green/white	SW4		
19	-	NO		Not used
20	-	NC		Not used
21	Brown/white	ES1		Emergency stop switch
22	Yellow/white	ES1		Lineigency stop switch
23	-	NC		Not used
24	Blue/white	DC 24V +		24V DC power supply "+"
25	Gray/white			24 DO POWEI Supply +

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

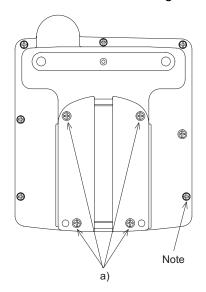
Connect an optional external cable to the Handy GOT main unit.

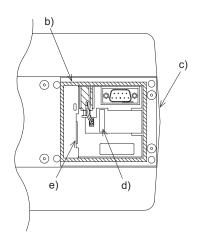
Table 3.2: External Cable

Table CIE! External Cable			
Model Name	Length	Description	
F9GT-HCAB-3M	3m (9' 10")	25-pin D-sub connector on one side	
F9GT-HCAB-10M*1	10m (32' 9")		
F9GT-HCAB1-3M	3m (32' 9")	Untied 20-core wires on one side	
F9GT-HCAB1-10M*1	10m (9' 10")		

^{*1} The cable cannot be used for the F943GOT Handy type (RS-232C communication type Handy GOT).

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





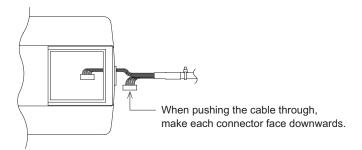
- a) Rear cover mounting screws, (M3 × 8mm, 4 screws)
- b) Packing seal
- c) Mounting slot
- d) Connector for communication or power switch (20-pin type)
- e) Power connector (8-pin type)



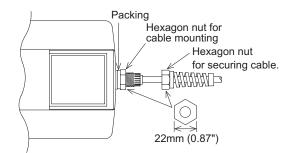
Note:

- 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 the tighten 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 through hole "c)" of the Handy GOT main unit, and connect it to "e)" and "d)".



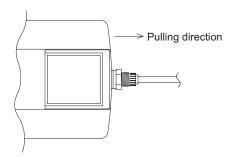
3) Tighten the hexagon nut.



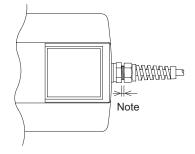
Make sure to tighten the hexagon nut for cable mounting with sufficient force to avoid loosening.

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 dawn from inside the unit.



5) Securely tighten the hexagon nut for 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.

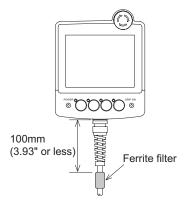
3.3.1 Caution for CE EMC



For compliance to CE EMC regulations it is necessary to add a ferrite filter on the external cable for F943GOT-SBD-H-E or F943GOT-LBD-H-E.

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

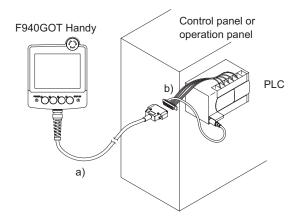
The recommended ferrite filter is the TDK ZCAT2035-0930A-BK or equivalent.



3.4 Processing Panel for a Control Box or Cabinet

3.4.1 Using the F940GOT Handy

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



a) External cable (with 25-pin D-sub male connector)

Table 3.3: External Cable

Model Name	Length
F9GT-HCAB-3M	3m (9' 10")
F9GT-HCAB-10M	10m (32' 9")

b) Relay cable for connection to PLC

Table 3.4: Relay Cable

Model Name	Length	Applicable
F9GT-HCAB2-150	l 1.5m (4' 11")	FX Series (FX0, FX0s, FX0n, FX1s, FX1n, FX2n, FX2nc)
F9GT-HCAB3-150		FX (FX, FX2C), A, QnA Series

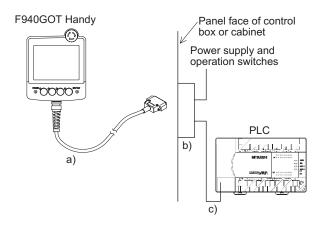


Note:

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. Or use F9GT-HCAB1-**M external cable. For allocation of Handy GOT communication signals, refer to section 3.2.

2) Using the F9GT-HCNB

Connect to a FX/A/QnA Series PLC using the F9GT-HCNB as shown below. Further information concerning installation of the F9GT-HCNB can be found in F9GT-HCNB Hardware Manual.



a) External cable (with 25-pin D-sub male connector)

Table 3.5: External Cable

Model Name	Length
F9GT-HCAB-3M	3m (9' 10")
F9GT-HCAB-10M	10m (32' 9")

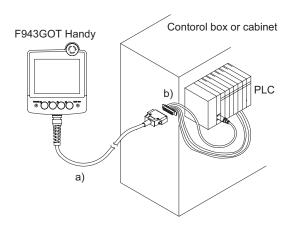
- b) F9GT-HCNB conversion box
- c) Communication cable for connection to PLC

Table 3.6: Communication Cable

Model Name	Length	Applicable
FX-50DU-CAB0	3m (9' 10")	FX Series (FXo, FXos, FXon, FX1s, FX1n, FX2n,
FX-50DU-CAB0-1M	1m (3' 3")	FX2NC)
FX-40DU-CAB	3m (9' 10")	FX (FX, FX2C), A, QnA Series

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 for connection to PLC as shown below. Connect to a FX/A/QnA Series PLC using the F9GT-HCAB1-**M external cable for connection to these PLCs. Further information about applicable PLC can be found in GOT-F900 Series Hardware Manual.



- a) External cable (with 25-pin D-sub male connector) F9GT-HCAB-3M (3m /9' 10")
- b) Relay cable for connection to Q series PLC F9GT-HCAB5-150 (1.5m /4' 11") for Q series PLC



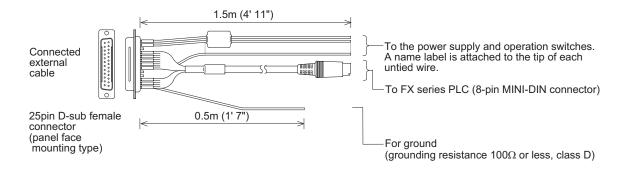
Note:

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. Or use F9GT-HCAB1-**M external cable. For allocation of Handy GOT communication signals, refer to section 3.2.

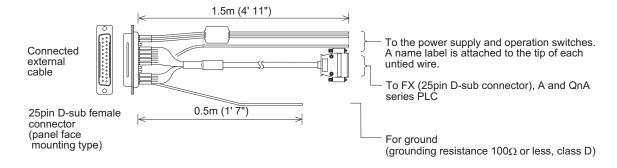
3.4.3 Pin Outs for Relay Cables

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

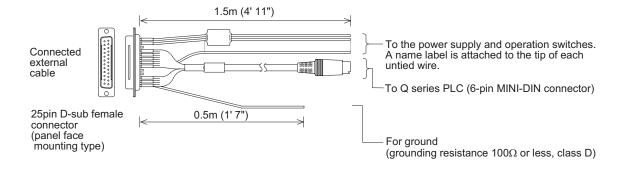
1) F9GT-HCAB2-150 relay cable for FX Series (FX₀, FX_{0S}, FX_{0N}, FX_{1S}, FX_{1N}, FX_{2N}, FX_{2NC}) PLC



2) F9GT-HCAB3-150 relay cable for FX (FX, FX2c), A, QnA series PLC



3) F9GT-HCAB5-150 relay cable for Q series PLC

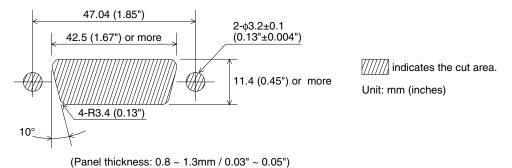


F940GOT Handy Series Installation 3

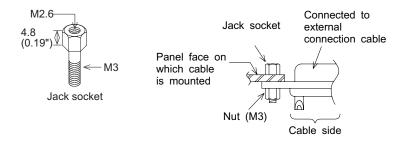
3.4.4 Panel Cut Dimensions for the Relay Cable

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.



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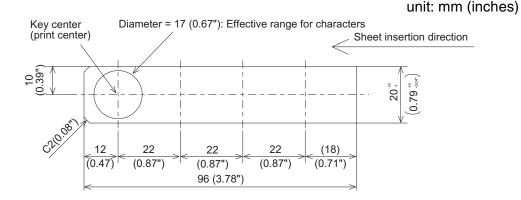


4. Preparation of the Operation Switch Name Sheet

This paragraph describes how to create the operation switch name sheet.

4.1 Preparing the name sheet

- 1) Use a name sheet and 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 names sheets, refer to the following dimensions.



3) When the work in the step 2) is finished, copy the contents of the name sheet on to the 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.



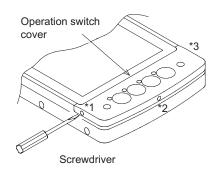
OHP sheet specification

Table 4.1: OHP Sheet Specification

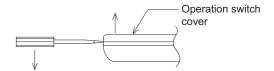
Table 4.1. Offi Sheet Specification		
Item		Specifications
Material		Polyester film
Thickness		0.1 mm (0.004")

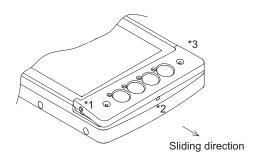
4.2 Attachment of sheet

1) Remove the operation switch cover



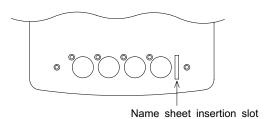
Insert a screwdriver into the gap *1 or *3 between the operation switch cover and the main unit, then slowly push the operation switch cover up.



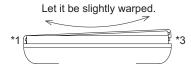


When either side *1 or *3 comes off, pull the operation switch cover in the sliding direction to remove it.

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 OFF the power, before connecting/disconnecting cables. If you connect/disconnect cables while the power is turned on, failure or malfunction may be caused.

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.

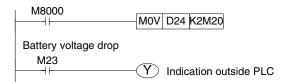
For details of control devices, refer to the GOT-F900 SERIES OPERATION MANUAL.

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

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.

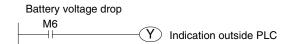


Example: FX-PCS-DU/WIN-E is used

Top control device No. is set to M0

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

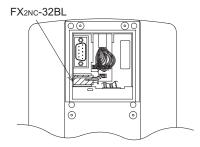
Use M6 in a PLC program as follows.



2) Procedure for Replacing the Battery

For approximately one month after the control device for the battery voltage drop turns ON, the battery can back up the alarm history, sampling and the current time. 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.
- 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.

5.2 Diagnostics

5.2.1 Preliminary Check

2.2)

- 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, it is recommended to replace the backlight. Please contact a service representative for move information. (Refer to chapter
- 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, relay cable and conversion box shown in the table below.

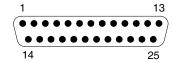
If no conduction is confirmed, wire breakage or poor contact may be present in the external cable or relay cable, or the circuits inside the Handy GOT may be damaged.

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

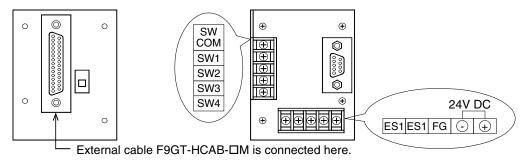
	Signals whose conductivity can be checked					
Switch name	Signal name	Extern	al cable*1	External cable F9GT- HCAB-□M + Relay cable*2 F9GT-HCAB2-150 F9GT-HCAB3-150 F9GT-HCAB5-150	External cable F9GT- HCAB-□M + Conversion box* ³ F9GT-HCNB	
		F9GT-HCAB-3M F9GT-HCAB-10M	F9GT-HCAB1-3M F9GT-HCAB1-10M			
SW1	SW-COM and SW1	14 and 15	Light green and light blue	SW-COM and SW1	SWCOM and SW1	
SW2	SW-COM and SW2	1/1 and 16	Light green and black/ white	SW-COM and SW2	SWCOM and SW2	
SW3	SW-COM and SW3	14 and 17	Light green and red/white	SW-COM and SW3	SWCOM and SW3	
SW3	SW-COM and SW4	14 and 18	Light green and green/white	SW-COM and SW4	SWCOM and SW4	
ES1	ES1 and ES1	21 and 22	Brown/white and yellow/white	ES1 and ES1	ES1 and ES1	

^{*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 25-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 the wires.
- *3 Connect an external cable and connector conversion box F9GT-HCNB to the Handy GOT, press and hold each switch, then check the conduction between the indicated pair of terminals in the conversion box. The conversion box is only used with F940GOT-SBD-H-E and F940GOT-LBD-H-E.



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 Massages

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 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) goes 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.



MEMO



HARDWARE MANUAL

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



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

MODEL	F940H-HW-E	
MODEL CODE	09R810	