MITSUBISHI

Changes for the Better

GRAPHIC OPERATION TERMINALS

MELSEC-GOT

HARDWARE MANUAL

A953 HANDY GOT

TARGET MODELS (FOR RS-232C CONNECTION)
 A953GOT-LBD-M3-H
 A953GOT-SBD-M3-H

A950 HandyGOT

Foreword

- This manual contains text, diagrams and explanations which will guide the reader in the correct installation and operation of the GOT-A900. It should be read and understood before attempting to install or use the unit.

- Further information can be found in the GOT-900 Series Operating Manual (Introductory Manual), GOT-A900 Series Operating Manual, GOT-A900 Series User's Manual

- If in doubt at any stage of the installation of GOT-A900 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 GOT-A900 please consult the nearest Mitsubishi Electric distributor.

- This manual is subject to change without notice.

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A953 HANDY GOT

HARDWARE MANUAL

Manual number	: JY992D99801
Manual revision	: C
Date	: September 2008

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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Thank you for taking the time to fill out this questionnaire. We hope you found both the product and this manual easy to use.

Guidelines for the Safety of the User and Protection of the A953 HANDY GOT

This manual provides information for the use of the A953 HANDY GOT. 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 that 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 through out 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 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

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

Abbreviation/ generic name/term	Description
Handy GOT	Generic name of A953GOT-LBD-M3-H and A953GOT-SBD-M3-H
A953 Handy GOT	Generic name of A953GOT-LBD-M3-H and A953GOT-SBD-M3-H
A950GOT	Generic name of A95*GOT
Built-in memory	Abbreviation of memory (flush ROM) built in GOT
OS	Abbreviation of GOT system software
External I/O unit	Abbreviation of external I/O interface unit A8GT-50KBF
Printer interface unit	Abbreviation of printer interface unit A9GT-50PRF
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
AnUCPU	Generic name of A2UCPU, A2UCPU-S1, A3UCPU and A4UCPU CPU units
AnACPU	Generic name of A2ACPU, A2ACPU-S1 and A3ACPU CPU units
AnNCPU	Generic name of A1NCPU A2NCPU, A2NCPU-S1 and A3NCPU CPU units
ACPU (large type)	Generic name of AnUCPU, AnACPU and AnNCPU CPU units
A2US(H)CPU	Generic name of A2USCPU, A2USCPU-S1 and A2USHCPU-S1 CPU units
AnS(H)CPU	Generic name of A1SCPU, A1SHCPU, A2SCPU and A2SHCPU CPU units
A1SJ(H)CPU	Generic name of A1SJCPU-S3 and A1SJHCPU 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
FX1S Series	Generic name of FX1S Series CPU units
FX1N Series	Generic name of FX1N Series CPU units
FX2N Series	Generic name of FX2N Series CPU units
FX2NC Series	Generic name of FX2NC Series CPU units
FXCPU	Generic name of FX1S, FX1N, FX2N and FX2NC Series CPU units
Motion controller CPU	Generic name of A373UCPU, A373UCPU-S3, A273UCPU, A273UHCPU, A273UHCPU-S3, A171SCPU-S3, A171SHCPU, A172SHCPU and A173UHCPU

Abbreviation/ generic name/term	Description		
FA controller	Generic name of LM610, LM7600 and LM8000		
PLC by Omron	Generic name of C200HS, C200H, C200HX, C200HG, C200HE, CQM1, C1000H, C2000H and CV1000		
PLC by Yaskawa Electric	Generic name of GL60S, GL60H, GL70H, GL120, GL130, CP-9200SH, CP-9300MS, MP-920 and MP-930		
PLC by Allen-Bradley	Generic name of SLC 5/03 and SLC 5/04		
PLC by Siemens	Generic name of SIMATIC S7-300 and SIMATIC S7-400		
PLC by Sharp	Generic name of JW-21CU, JW-22CU, JW-31CUH, JW-32CUH, JW-33CUH, JW-50CUH, JW-70CUH and JW-100CUH		
PLC by Toshiba	Generic name of T3 and T3H		
PLC by another company	Generic name of PLC by Omron, PLC by Yaskawa Electric, PLC by Allen-Bradley, PLC by Siemens, PLC by Sharp and PLC by Toshiba		
GT Designer2	GT Works2	SW□D5C-GTWK2-E	Integrated screen development software for GOT-900 Series (SW□D5C-GTD2-E + GT Simulator 2 + GT Soft GOT2) (English version)
		SW□D5C-GTWS-E	Integrated screen development software for GOT-900 Series (SW□D5C-GTWK2-E + A9GTSOFT-LKEY-P) (English version)
	GT Designer2	SW□D5C-GTD2-E	Screen creation software for GOT-900 Series (English version)
SW□D5C-GOTR-PACKE	GT Works	SW□D5C-GTWORKS-E	Integrated screen development software for GOT900 Series (SW□D5C-GOTR-PACKE + GT Simulator) (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)
Screen creation software	Abbreviation of GOT Screen Designer (screen creation software for GOT900)		
Data conversion software	Abbreviation of GOT Converter (data conversion software for GOT900)		
Debugging software	Abbreviation of GOT Debugger (software for debugging function)		
Object	Set data to be made into dynamic images		
Windows 95	Microsoft® Windows® 95 Operating system English version		
Windows 98	Microsoft® Windows® 98 Operating system English version		
Windows Me	Microsoft® Windows® Millennium Edition Operating system English version		
Windows NT 4.0	Microsoft® Windows NT® 4.0 Workstation Operating system English version		
Windows 2000	Microsoft® Windows® 2000 Operating system English version		

Abbreviation/ generic name/term	Description
Windows	Generic name of Windows95, Windows98, Windows Me, WindowsNT4.0 and Windows2000
Personal computer	Personal computer to Install the GT Designer or GT Designer 2 application software

Associated Manuals

The configuration of manuals related to this Handy GOT is as shown below.

Explanation on specifications, installation, wiring and switches

A manual of the used Handy GOT is required.

- A953 HANDY GOT HARDWARE MANUAL
  Describes the specifications, wiring, installation, etc. of the A953GOT-SBD-M3-H/A953GOT-LBD-M3-H.
  Manual No.: JY992D99801

Explanation on the display unit

Separate manual (Ask the sales agency from which you have purchased the Handy GOT.)

- A950GOT/A951GOT/A953GOT/A956GOT USERS MANUAL (DETAILED)
  Describes the specifications of the A95*GOT, outline system configuration, components, name of each part, unit attaching method, installation/wiring method, maintenance/ inspection method and error codes.

- GOT-A900 SERIES OPERATING MANUAL (EXTENTION FUNCTIONS/OPTIONAL FUNCTIONS)
  Describes the specifications of the utility function, system monitoring function, circuit monitoring function, special function, unit monitoring function, network monitoring function and list edition function which are provided in the A953 Handy GOT and available in the A953GOT as well as the operation method of the dedicated monitor screen.
  In the A953 Handy GOT, the PC card interface, external I/O interface and printer interface are not available. Any bar code reader cannot be connected.

- GOT900 SERIES OPERATING MANUAL (INTRODUCTION)
  Describes how to create monitor screens using the GT Designer, transfer the monitor data to the GOT and display the screens for those who use the GOT for the first time.

Screen creation software

- GT Works2/GT Designer2 OPERATING MANUAL (STARTUP)
  Describes how to install the GT Works2/GT Designer2 to a personal computer and how to refer to the online manual.

- GT Designer2 (SW□D5C-GTD2-E) REFERENCE MANUAL -separate manual-
  Describes how to install and start up the screen creation software (GT Designer2).

- GT Designer2 (SW□D5C-GTD2-E) OPERATING MANUAL -separate manual-
  Describes how to operate the screen creation software (GT Designer2).

- GT Works Version 5/GT Designer Version 5 OPERATING MANUAL (STARTUP)
  Describes how to install the GT Works Version 5/GT Designer Version 5 to a personal computer and how to refer to the online manual.
  (This manual is packed together with the GT Works Version 5/GT Designer Version 5.)

- GT Works Version 5/GT Designer Version 5 REFERENCE MANUAL -separate manual-
  Describes the system configuration of the GT Works Version 5/GT Designer Version 5, the screen configuration of the GT Designer, various monitoring functions, procedures up to displaying the monitor screen in the GOT and the help function use method.

- GT Simulator Version 5 OPERATING MANUAL -separate manual-
  Describes the system configuration, screen configuration and use method of the GT Simulator.

Registration

Microsoft® Windows®, Windows® 95, Windows® 98, Windows® Millennium Edition, Windows NT® 4.0 Workstation and Windows® 2000 are either registered trademarks or trademarks of Microsoft Corporation in United States and/or other countries.
The company name and the product name to be described in this manual are the registered trademarks or trademarks of each company.

Wiring procedure

The work procedures from starting up to making ready the Handy GOT using this manual are explained below.

| **Outline** | Reference page |

1

1.2 Product configuration 1-3

Introduces the model name expression of the Handy GOT and accessories.

1.3 Introduction of cables and screen creation software (options) and their applications 1-4

Introduces optional products (cables and connector conversion box) and explains their easy applications.

1.4 Part identification 1-5

Explains the name and function of switches, lamps and connectors of the Handy GOT.

1.5 Applicable versions of OS and screen creation software 1-7

Explains versions of the system program (OS) and the screen creation software which are compatible with the Handy GOT and to be prepared.

| **Outline of connection** | Reference page |

2

2.2.1 Outline of connection 2-5

Introduces configurations in accordance with applications.

2.2.2 Cable selection 2-7

Introduces combinations of cables between the Handy GOT and the PLC.

2.2.3 Pin arrangement and signal names of cables and connectors 2-8

Explains signal names of external cables and connector conversion box.

| **Installation** | Reference page |

3

2.1 Installation method 2-1

Introduces how to fix or hold by hand the Handy GOT.

2.2.4 Connection of external cable 2-9

Explains how to let an external cable go through the cable mounting slot of the Handy GOT and fix it with screws.

2.3 Panel face processing 2-12

Introduces cables and connector box and explains the panel cut size for cases in which the Handy GOT is attached to and detached from the panel face.

Wiring	Reference page

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Table of Contents

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1. Introduction

This section describes the product configuration and the system configuration of the A95□ handy graphic operation terminal (abbreviated as "Handy GOT" in the text).

1.1 Outline of product

The Handy GOT is used as an operation terminal connected to a controller such as the MELSEC FX/QnA/Q Series PLC and a PLC manufactured by another company.
The Handy GOT is an all-in-one type graphic operation terminal equipped with a display unit with touch switches and mechanical keys (operation switches) available to input commands to the machine.
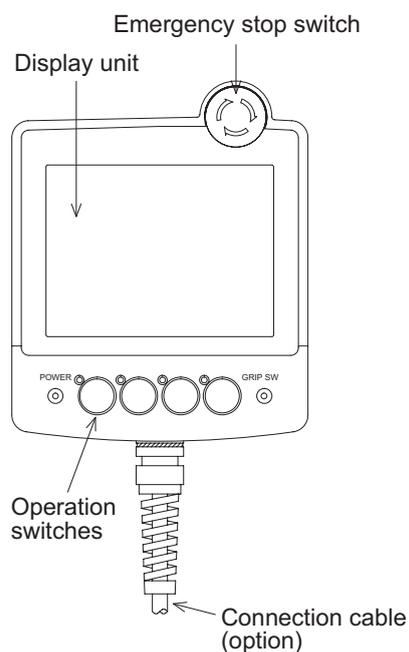
Use example:
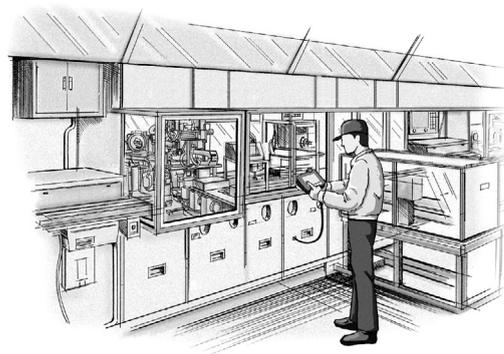
Operation switches:

They are mechanical keys directly connected to inputs of the PLC.
Because they give commands directly to inputs of the PLC, they can be used for inputs requiring immediate responses to the machine such as inputs for operation and stop.
These switches are offered for the operator who gives operation commands to the machine.

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

* You can arbitrarily change the name of these operation switches using a transparent sheet and a mount sheet offered as accessories.

Display unit:

The display unit is an LCD with touch switches equivalent to that of the graphic operation terminal A950GOT.
The operator can easily monitor the ON/OFF status of bit devices of the PLC, set such bit devices to ON or OFF, monitor the set value and the present value of word devices of the PLC, and change such values of word devices.
This display unit can be used to change the setup, change the set values, and perform troubleshooting by the engineer, as well as give guidance to the operator.

- Selection of individual operation
- Independent operation
- One-cycle operation
- Monitoring
- Forcedly turning ON/OFF
- Change of set values
- Troubleshooting

(You can create screens displayed on the display unit using the screen creation software which runs in a personal computer.)

Connection cable:

An optional connection cable is offered to connect the PLC.

1.2   Product configuration

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

A95□GOT-□BD-M3-H
       1)   2)

1) 3: RS-232C communication type

2) S: STN type eight-color liquid crystal
   L: STN type black-and-white liquid crystal

1.2.1   Handy GOT

The handy graphic operation terminal consists of the following components.

Handy GOT
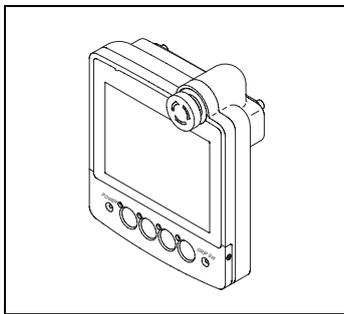
Accessories: The following accessories are attached to the Handy GOT (in each model).

A transparent sheet 1) and a mount sheet 2) are offered as accessories so that the operation switch names can be changed.
For the switch name changing procedure, refer to section 3.5.

1) Transparent sheet

2) Mount sheet

3) Manual (this manual)
   Explains how to connect the PLC and the power supply.
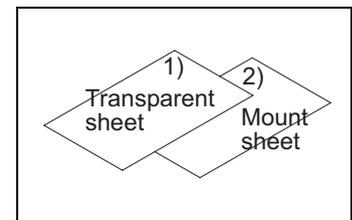
1.3   Introduction of cables and screen creation software (options) and their applications

Order the following options in accordance with the connected PLC configuration.

1.3.1   Common options

1) Screen creation software

For the details of versions applicable in the Handy GOT and the software working environment, refer to 1.5.

- Screen creation system startup software SW□D5C-GOTR-PACKE (V)
"V" at the end of the model name indicates that this software is for version upgrade.

- Screen creation system startup software SW□D5C-GTD2-E
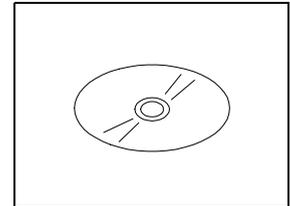
2) Protective sheets F9GT-40PSC (5 sheets in 1 set)

Each of these sheets protects the display unit against dirt when adhered on the display unit.
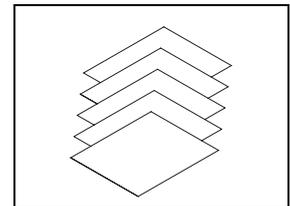
1.3.2   Options dedicated to A953 Handy GOT

External cable

- External cable F9GT-HCAB-3M (with a 25-pin D-Sub connector on one side) (3m, 9' 10")

This cable connects the Handy GOT and an external equipment (such as communication unit, power supply unit, operation switches and emergency stop switch).
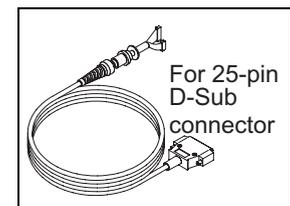
- External cable F9GT-HCAB1-3M (with untied wires on one side) (3m, 9' 10")

This cable connects the Handy GOT and an external equipment (such as communication unit, power supply unit, operation switches and emergency stop switch).
Use this cable when connecting an external equipment to the PLC directly or through a relay connector.
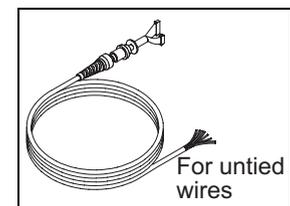
PLC connection cable

- Relay cable F9GT-HCAB5-150 (1.5m, 4' 11") for PLC connection

This cable is equipped with the 6-pin MINI DIN connector to directly connect the Q Series PLC and untied wires to connect the power supply, the operation switches and the emergency stop switch.
Use this cable together with the external cable F9GT-HCAB-3M (with 25-pin D-Sub connector).

For 25-pin D-Sub connector

For untied wires

To PLC

For power supply and operation switches
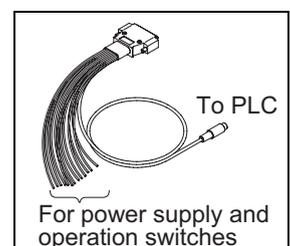
1.4   Part identification

This section roughly explains the name and function of each part of the Handy GOT.

1.4.1   Front panel

The name and function of each part of the front panel of the Handy GOT are described below.

When the operation switch cover is removed

Operation switch cover
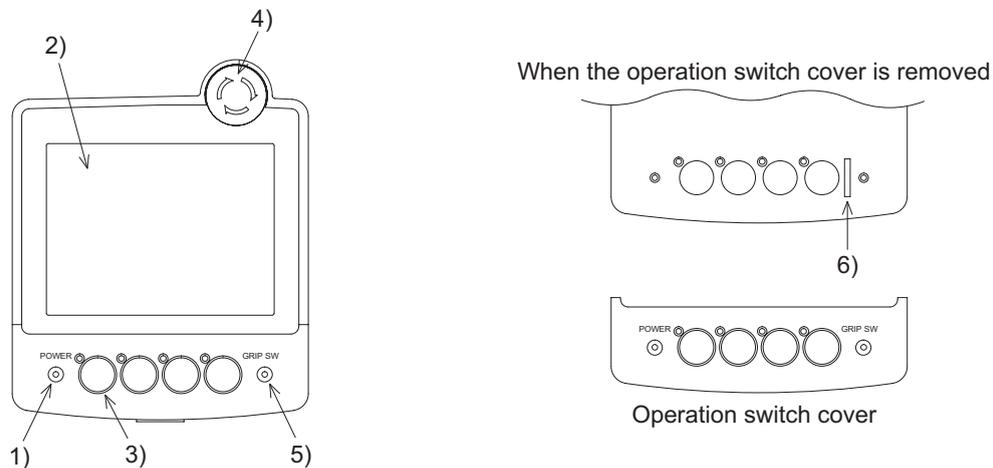
1) POWER LED
    Lit while 24V DC power is supplied to the Handy GOT.

2) LC display unit with touch switches
    Offers 8 colors in the A953GOT-SBD-M3-H or 2 colors (black and white) in the A953GOT-LBD-M3-H.
    This display unit offers the functions equivalent to those offered by the display unit of the graphic operation terminal A950GOT.
      Display size: 320 × 240 dots
      Effective display size: 115(4.53") W × 86(3.39") H mm

3) Operation switches (Refer to section 3.2.)
    Directly connected to inputs of the PLC.
    Each of these four switches is equipped with a green LED which indicates the pressing status. The information on the green LED lighting command is transferred between the PLC through serial communication.
    The operator can arbitrarily set the display control using a PLC program.
    The operator can arbitrarily change the name of these four switches using sheets offered as accessories. (Refer to section 3.5.)

4) Emergency stop switch (Refer to section 3.3.)
    Is a switch with independent contact of 24V DC specification.

5) Grip switch LED (Refer to section 3.4.)
    Lit while the grip switch provided on the side is pressed and held.

6) Operation switch name sheet insertion slot (Refer to section 3.5.)
    Can be seen when the operation switch cover is removed from the lower portion of the Handy GOT.

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1.4.2 Rear panel

The name and function of each part of the rear panel of the Handy GOT are described below. When the rear cover is removed, diversified connectors can be seen.

When the rear cover is removed (enlarged view)
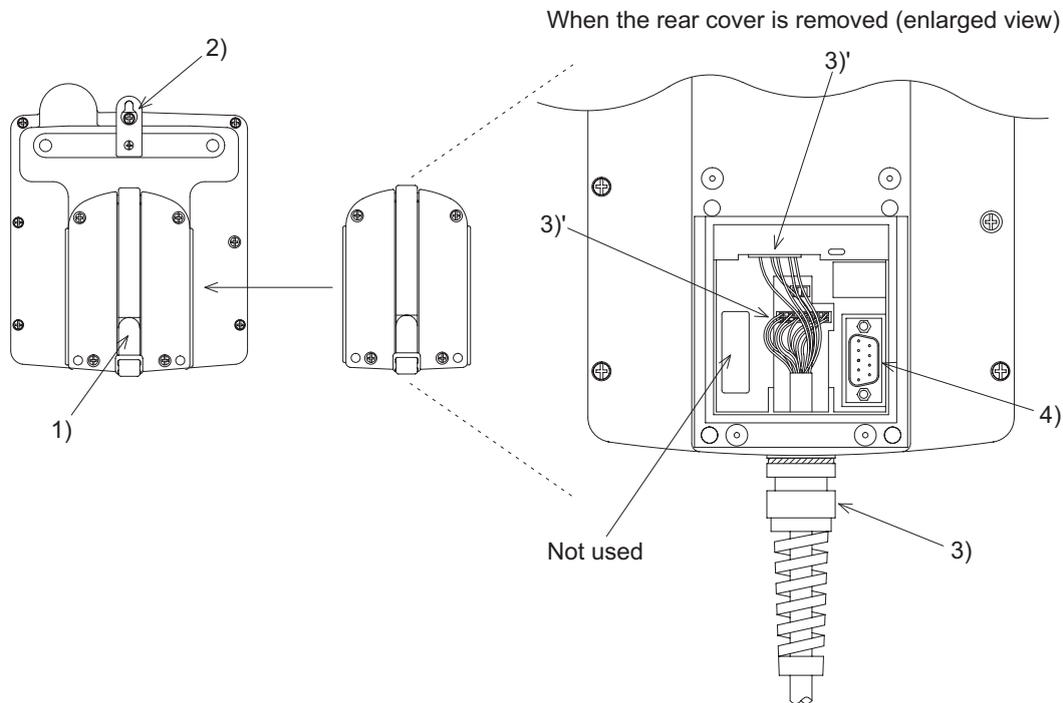
1) Hand strap
   Is a strap whose length is adjustable to allow the operator to comfortably hold the Handy GOT.

2) Metal hook for mounting on the wall
   Is offered to mount the Handy GOT on the wall for operation and accommodation.

3) External cable (Refer to section 2.2.)
   Is offered as an option to connect a PLC (for RS-232C communication), power supply and operation switches, and connected to the connectors 3)' in two positions.

4) Port for personal computer (9-pin D-Sub, male) (for RS-232C communication) (Refer to chapter 5.)
   Is offered to transfer the screen data created using the screen creation software.

1.5 Applicable versions of OS and screen creation software

When using the Handy GOT, make sure to prepare the OS and the screen creation software of the version shown below.

1.5.1 Applicable OS versions

Handy GOT	Applicable BIOS	OS version
A95□GOT-SBD-M3-H A95□GOT-LBD-M3-H	version M	version 7.1.0 or later

Because the BIOS is already assembled in the Handy GOT at the time of shipment, you do not have to transfer it using the screen creation software.
Transfer the OS to the Handy GOT in accordance with the operating procedure described in the manual of the screen creation software shown below.
(The PLC card interface and the printer interface are not available.)

1.5.2 Applicable screen creation software versions

GT Designer2	SW□D5C-GTD2-E	Screen creation software for GOT-900 Series
GT Works2	SW□D5C-GTWK2-E	Integrated screen development software for GOT-900 Series (SW□D5C-GTD2-E + GT Simulator2 + GT SoftGOT2)
	SW□D5C-GTWS-E	Integrated screen development software for GOT-900 Series (SW□D5C-GTWK2-E + A9GTSOFT-LKEY-P)
GT Designer	SW□D5C-GOTR-PACKE(V)	Screen creation software for GOT-900 Series □: 4 or larger (version F or later) Product shipped in May, 2000 or later
GT Works	SW□D5C-GTWORKS(-E)	Integrated screen development software for GOT-900 Series "SW□D5C-GOTR-PACKE + GT Simulator" is packed together.

"V" at the end of the model name indicates that the software is for version upgrade.

For connection of the screen creation software (personal computer) and the Handy GOT, refer to chapter 5.

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2. Installation Wiring

This section describes installation of the Handy GOT and wiring of the power supply and the operation switches.
Thoroughly understand the specifications before performing installation and wiring.

2.1 Installation method

⚠ Cautions on installation

- Use the Handy GOT in the general specifications environment described in this manual.
  Do not use the Handy GOT in a place with dusts, soot, conductive dusts, corrosive gas or flammable gas, place exposed to high temperature, dew condensation, direct sunlight, wind and rain, or place exposed to vibration or impact.
  If the Handy GOT is used in such a place, electrical shock, fire, malfunction, product damage or deterioration may caused.

- Never drop cutting chips and electric wire chips into the ventilation window of the Handy GOT when you drill screw holes or perform wiring.
  Otherwise, fire, failure or malfunction may be caused.

- Connect connection cables securely to the specified connectors while the power is turned OFF.
  Imperfect connection may cause malfunction or failure.

- When connecting cables, pay attention to the contents described in this section.
  Especially, attach the rear cover so that PCBs inside the Handy GOT are not interfered with connection cables.

⚡ Cautions on wiring

- Make sure to attach the rear cover to the Handy GOT before turning on the power and starting operation after the installation or wiring work.
  Otherwise, electrical shock may be caused.

- Make sure to shut down all phases of the power outside the Handy GOT before starting the installation or wiring work.
  Otherwise, electrical shock and damage of Handy GOT may be caused.

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⚠️ **Cautions on wiring**

- The Handy GOT has the DC power specifications. Connect the DC power cable to the dedicated terminals described in this manual.
  If the AC power is supplied to the power supply, operation switches or emergency stop switches, the Handy GOT may be burnt.

- Correctly connect the 24V DC power cable (terminals) of the Handy GOT to [+][-] of the DC power supply unit as described in this manual.
  If reversing the terminals will seriously damage the Handy GOT.

- Perform the groundings to the drain wire (FG) of the Handy GOT. Never perform common grounding with the strong power system.

- When processing a cable or executing the wiring work, pay attention so that cutting chips and wire chips do not enter the inside of the Handy GOT.
  Such chips may cause fire, failure or malfunction.

Note

Even if the power is interrupted for less than 1 ms, the Handy GOT continues operation. If the power is interrupted for a long time or the voltage is dropped, the Handy GOT stops operation. When the power is restored, however, the GOT automatically restarts operation.

2.1.1 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.

Hand strap
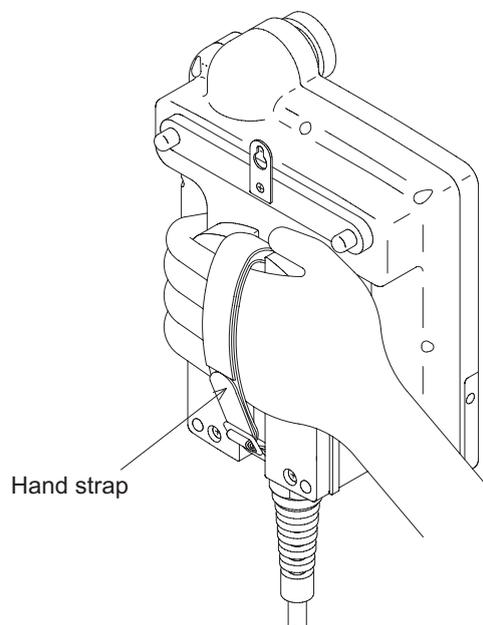
2.1.2 Hanging on wall

When operating the Handy GOT while keeping it hung on the wall, use the metal fixture for wall hanging provided on the rear face of the Handy GOT.
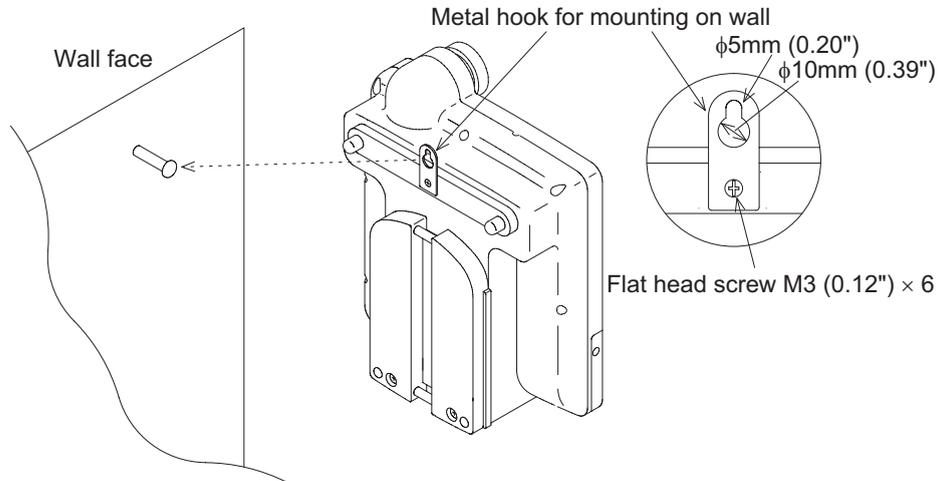
On the wall face, the weight of the main unit (approximately 0.79 kg/1.74 lbs) and a load of approximately 1 ~ 3 kg (2.20 ~ 6.61 lbs) which varies depending on the communication cable length are applied. While taking this into consideration, attach a suitable metal fixture on the wall.

2.1.3 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 and, fix the communication cable to the desk.
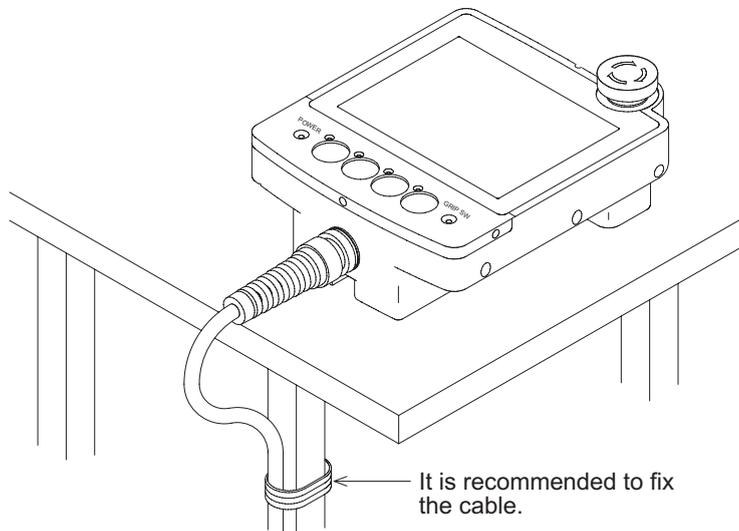
2.2   Wiring

Cautions on wiring

- Make sure to shut down all phases of the power supply outside the Handy GOT before starting the installation or wiring work.
  If any phase is not shut down, you may get electrical shock or the Handy GOT may be damaged.

- Before turning on the power or starting operation after the installation or wiring work, make sure to attach the rear cover to the Handy GOT.
  If the rear cover is not attached, you may get electrical shock.

- The Handy GOT is designed for DC power. Correctly connect the DC power supply as described in this manual.
  If the AC power supply is connected to the I/O terminals, the power terminals or the emergency stop switch, the Handy GOT may be burnt.

- Never drop cutting chips or electric wire chips into the inside of the Handy GOT while processing connection cables or performing the wiring work. Such chips may cause fire, failure or malfunction.

- Perform Class D grounding to the drain wire (FG) of the Handy GOT. However, never perform common grounding with a strong power system.

Note:

Even if instantaneous power interruption of less than 1ms occurs, the Handy GOT continues its operation.
If long power interruption or voltage drop occurs, the Handy GOT stops its operation. And when the power is recovered, the Handy GOT automatically restarts its operation.

2.2.1   Outline of connection

When attaching and detaching the Handy GOT or directly wiring the Handy GOT, perform connection in either of the following methods.

When attaching/detaching the Handy GOT (using only an external cable)

Handy GOT	External cable	PLC connection cable

Wiring outside panel   Wiring inside panel

F9GT-HCAB   RS-232C   F9GT-HCAB5

To PLC

For power supply and operation switches

When using a connector prepared by user

F9GT-HCAB1   Prepared by user

For untiled cable

PLC

24V DC supplied from external power supply unit or service power supply of PLC

When directly wiring the Handy GOT

Handy GOT	External cable

Wiring outside panel   Wiring inside panel

F9GT-HCAB1   Prepared by user

For untiled cable

PLC

24V DC supplied from external power supply unit or service power supply of PLC

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2.2.2 Cable selection

The figure below shows the outline of connection to the PLC.
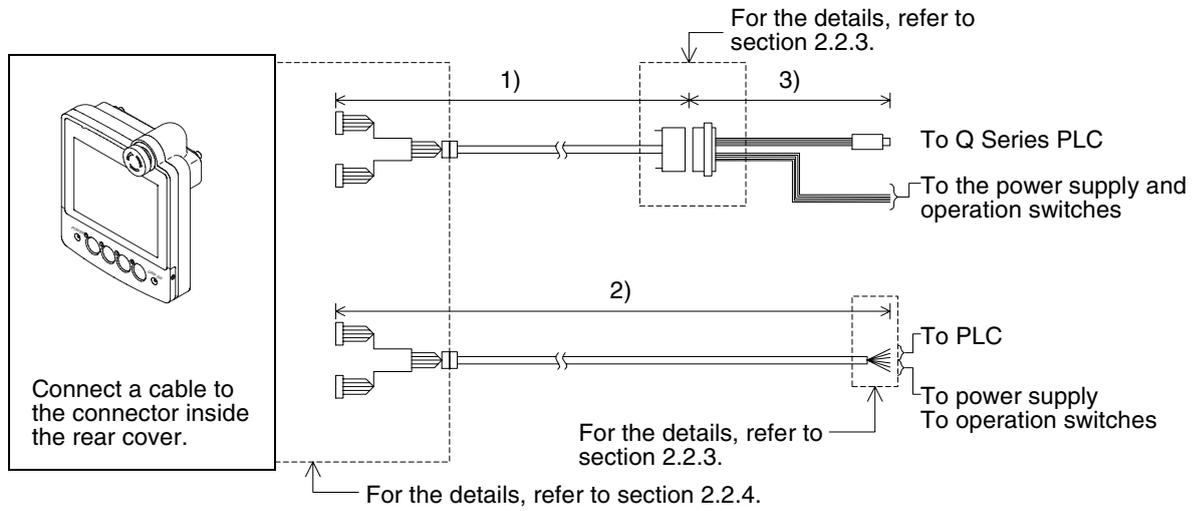
Name		Model name	Remarks
1)	External cable (with 25-pin D-Sub connector on one side)	F9GT-HCAB-3M(3m, 9' 10")	
2)	External cable (with untied 20-core wires on one side)	F9GT-HCAB1-3M(3m, 9' 10")	
3)	Relay cable for PLC connection (with 6-pin MINI DIN connector on PLC side)	F9GT-HCAB5-150(1.5m, 4' 11")	For Q Series Cable for any other series is to be prepared by user.

Note:

The connection distance between the handy graphic operation terminal and the PLC ("1) + 3)" or "2)") should be within 6m (19' 8").

2.2.3   Pin arrangement and signal names of cables and connectors

1) External cable F9GT-HCAB□-3M
   The figure and the table below show the pin arrangement of untied wires and connectors of
   external cables F9GT-HCAB-3M and F9GT-HCAB1-3M.

F9GT-HCAB-3M
25-pin D-Sub, male connector

F9GT-HCAB1-3M
Untied wires (20-core type)

Distinguished
by color
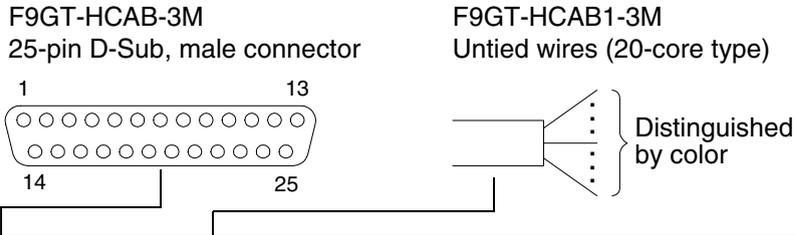
External cable		Communication/power supply/ operation switch signal name		Application	Reference
F9GT-HCAB-3M	F9GT-HCAB1-3M	A950 Handy GOT	A953 Handy GOT		
D-Sub pin number	Untied wire color	RS-422	RS-232C		
1	Drain wire	FG (shield)		Frame ground	
2	Black	TXD+(SDA)	SD(TXD)	Signal wires for communication with PLC (For connection to the PLC, refer to chapter 6 and later.)	Chapter 6 and later
3	White	TXD-(SDB)	ER(DTR)		
4	Red	RTS+(RSA)	RD(RXD)		
5	Green	RTS-(RSB)	DR(DSR)		
6	Yellow	RXD+(RDA)	RS(RTS)		
7	Brown	RXD-(RDB)	CS(CTS)		
8	Blue	CTS+(CSA)	CD(DCD)		
9	Gray	CTS-(CSB)	NC		
10	Orange	SG		Signal ground	
11	–	NC		Unused	
12	Purple	DC24V G		Minus side of 24V DC power supply of Handy GOT	2.2.3
13	Pink				
14	Fresh green	Switch common		For operation switches	3.1
15	Sky blue	SW1			
16	Black/white	SW2			
17	Red/white	SW3			
18	Green/white	SW4			
19	–	NC		Unused	
20	–	NC			
21	Brown/white	ES1		For emergency stop switch (Both ends of the switch contact are exposed.)	
22	Yellow/white	ES1			
23	–	NC		Unused	
24	Blue/white	DC24V+		Plus side of 24V DC power supply of Handy GOT	2.2.3
25	Gray/white				

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2.2.4   Connection of external cable

This section explains how to connect an optional external cable and the Handy GOT.

1) Remove the rear cover.

Rear face of Handy GOT

a) Loosen four mounting screws, and open the rear cover.

Note:
Remove only the mounting screws. Do not remove other seven screws provided around the edge of the Handy GOT. If such screws are removed, the waterproof ability may be deteriorated or the Handy GOT may fail.

Note

a)
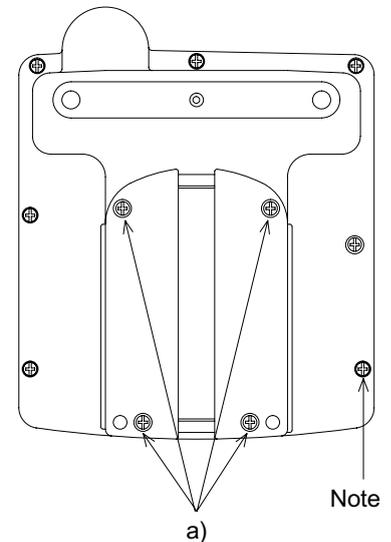
When the rear cover is open

(A) Power connector (8-pin)
(B) Connector for communication/operation switch (20-pin)
(C) Mounting slot
(D) Packing
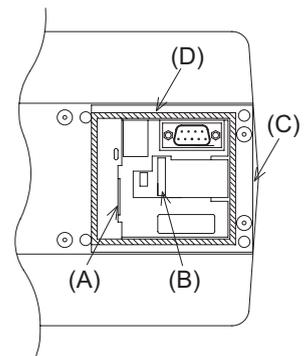
2) Connect an external cable.

a) Let an external cable go through the mounting slot (C) in the Handy GOT, and connect it to the connectors (A) and (B).

External cable
F9GT-HCAB-□M:
With 25-pin D-Sub connector on one side
F9GT-HCAB1-□M:
With untied 20-core wires on one side

When letting the cable go through, make each connector face downward.
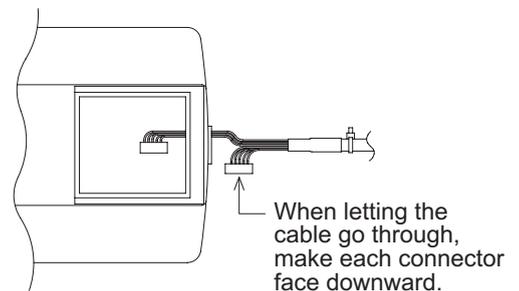
b) Tighten the hexagon nut for mounting of the external cable to the Handy GOT.

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

Packing
Hexagon nut for mounting
Hexagon nut for tightening

22mm (0.87")
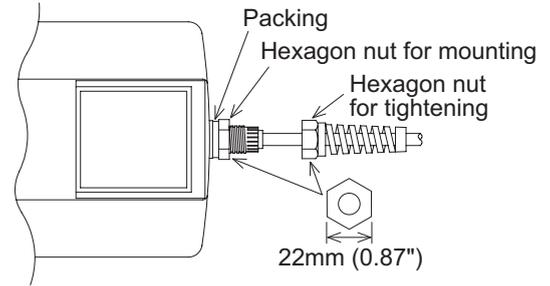
c) Pull lightly the cable, and tighten lightly the hexagon nut for tightening in the position in which the cable is naturally stopped.

Pulling direction
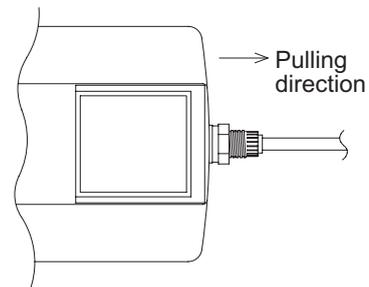
d) Tighten securely the hexagon nut for tightening so that the cable will not come off or the waterproof ability will not be deteriorated.

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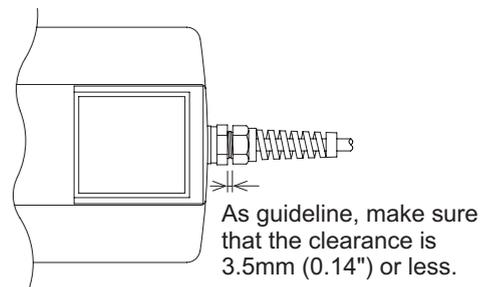
3) Attach the rear cover.

a) When closing the rear cover, make sure that the packing (D) has not come off.

b) Attach the rear cover.

c) Tighten the four mounting screws.
Make sure that the tightening torque is 0.49 to 0.68 N•m.

2.2.5   Wiring of power supply

To the Handy GOT, the power is supplied from the PLC or an external power supply unit.
The current consumption of the Handy GOT is 400mA/24V DC.

Example when the power is supplied from an external power supply

Connect a 24V DC external power supply unit to the power supply line (pin) of the external cable (untied or with a connector) of the Handy GOT.
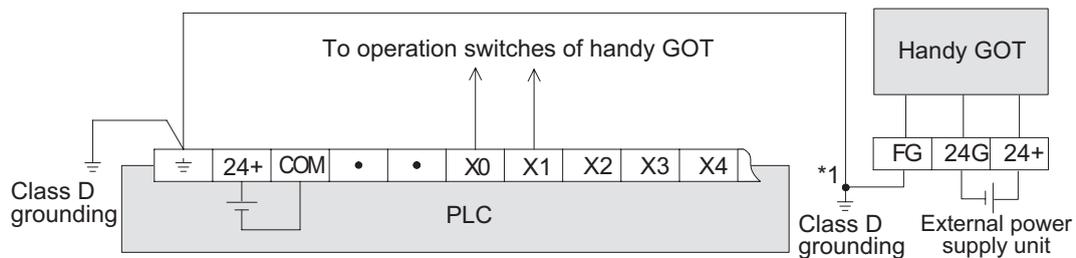
*1 Cautions on Class D grounding according to the input power

a) When the input power is equivalent

When the input power for the PLC is equivalent to the input power for the external power supply (24V DC), perform grounding by connecting the frame ground wire of the Handy GOT to the ground terminal (⏚) of the PLC.
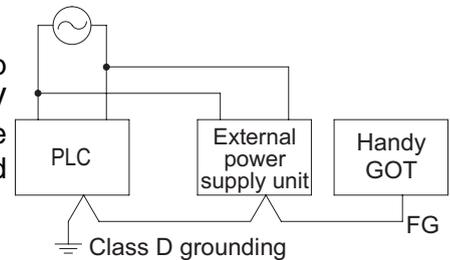
b) When the input power is different

When the input power is different between the PLC and the external power supply unit (PLC: 200V AC, external power supply: 100V AC), perform dedicated grounding to each of the ground terminal (⏚) of the PLC and the frame ground wire of the Handy GOT.
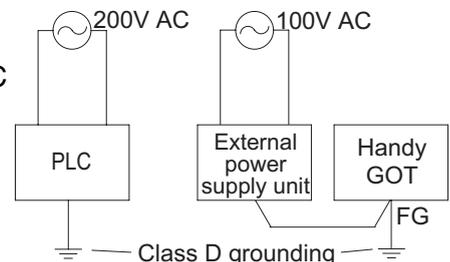
Pin arrangement

Signal name	External cable	
	F9GT-HCAB-3M	**F9GT-HCAB1-3M**
24+	24,25	Blue/white, gray/white
24G	12,13	Purple, pink
FG	1	Drain wire

2.3   Panel face processing

This section explains how to process the panel face when the Handy GOT is attached and detached through a connector.

2.3.1   A953 Handy GOT

1) Attaching the connector on the panel face

    a) External cable (with 25-pin D-Sub, male connector)
       F9GT-HCAB-3M (3m, 9' 10")

    b) Relay cable for PLC connection
       For QCPU:
       F9GT-HCAB5-150 (1.5m, 4' 11")
       Any relay cable other than the above for the Q Series is to be prepared by the user.
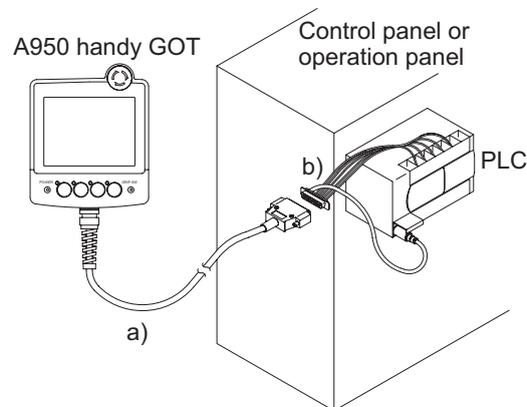
When using a connector in accordance with your specifications together with the external cable F9GT-HCAB1-□□M (with untied wires), refer to section 2.2.

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2.3.2 Appearance of relay cables

The panel cut size is as shown in section 2.3.3.

Appearance of the relay cable F9GT-HCAB5-150 (dedicated to the Q Series PLC)
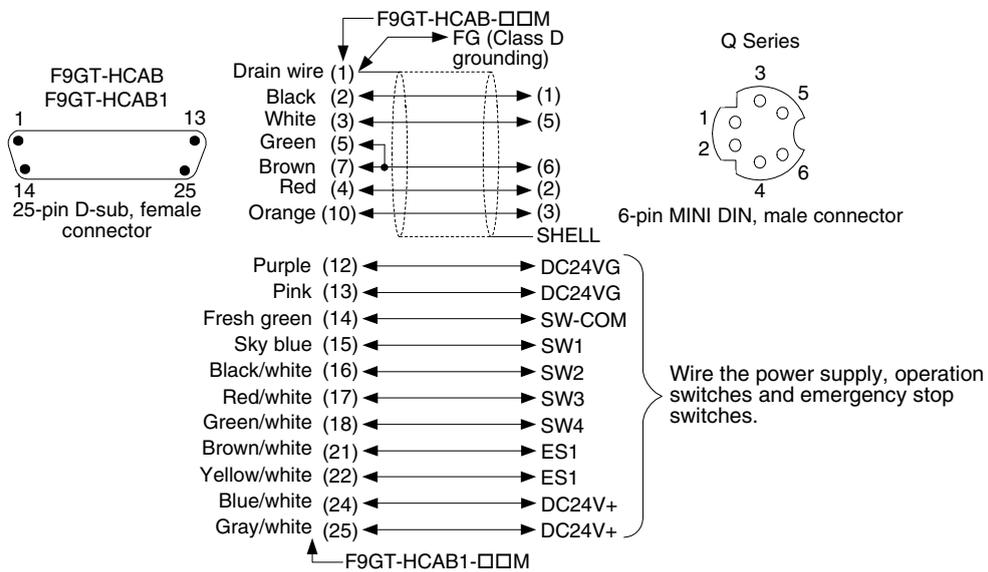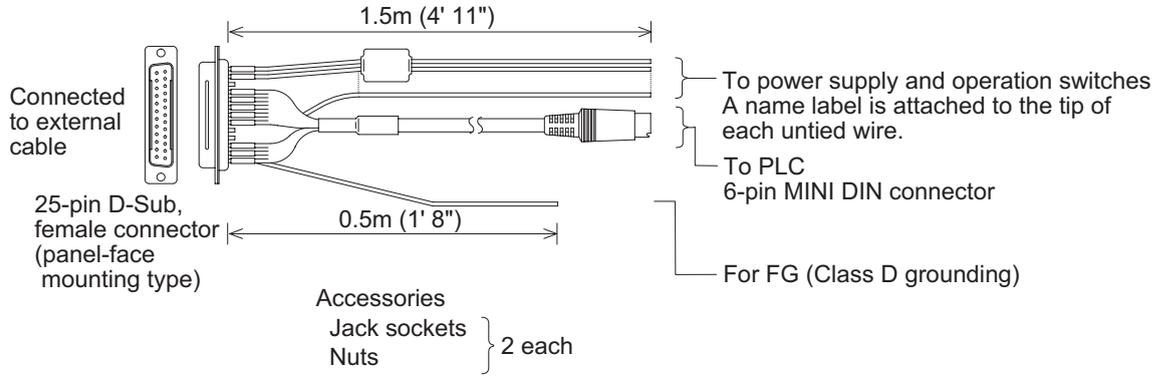
2.3.3   **Panel cut size for relay cable**

When attaching the connector of a relay cable on the panel face so that the Handy GOT can be attached and detached, process the panel face as shown below.

(Panel thickness: 0.8 to 1.3mm, 0.03" to 0.05")
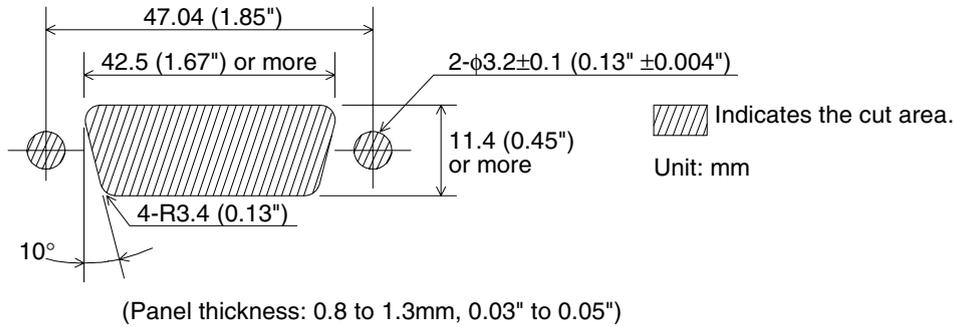
	Handy GOT
Connector shape	25-pin D-sub
Cable model name	F9GT-HCAB5-150

Insert a jack socket into a hole shown above, and tighten it with a nut (M3, 0.12")).
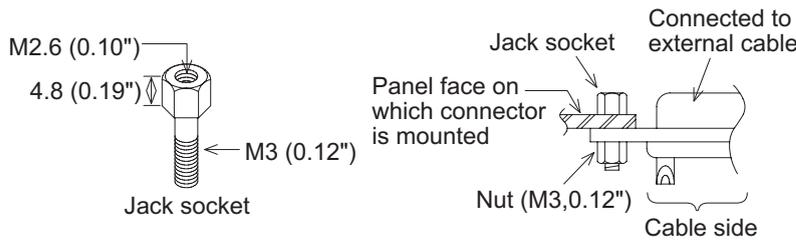
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3.   Wiring and Handling of Switches

This chapter explains wiring and handling of the operation switches and the grip switch as well as control of the LEDs for confirming the switch pressing status.

Cautions on installation

- Use the Handy GOT in the general specifications environment described in this manual. Do not use the Handy GOT in a place with dusts, soot, conductive dusts, corrosive gas or flammable gas, place exposed to high temperature, dew condensation, direct sunlight, wind and rain, or place exposed to vibration or impact.
  If the Handy GOT is used in such a place, electrical shock, fire, malfunction, product damage or deterioration may caused.

- Never drop cutting chips and electric wire chips into the ventilation window of the Handy GOT when you drill screw holes or perform wiring.
  Otherwise, fire, failure or malfunction may be caused.

- Connect connection cables securely to the specified connectors while the power is turned OFF.
  Imperfect connection may cause malfunction or failure.

- When connecting cables, pay attention to the contents described in Chapter 2.
  Especially, attach the rear cover so that PCBs inside the Handy GOT are not interfered with connection cables.

Cautions on wiring

- Make sure to attach the rear cover to the Handy GOT before turning on the power and starting operation after the installation or wiring work.
  Otherwise, electrical shock may be caused.

- Make sure to shut down all phases of the power outside the Handy GOT before starting the installation or wiring work.
  Otherwise, electrical shock and damage of Handy GOT may be caused.

Cautions on wiring

- The Handy GOT has the DC power specifications. Connect the DC power cable to the dedicated terminals described in this manual.
  If the AC power is supplied to the power supply, operation switches or emergency stop switches, the Handy GOT may be burnt.

- Correctly connect the 24V DC power cable (terminals) of the Handy GOT to [+][-] of the DC power supply unit as described in this manual.
  If reversing the terminals will seriously damage the Handy GOT.

- Perform the groundings to the drain wire (FG) of the Handy GOT. Never perform common grounding with the strong power system.

- When processing a cable or executing the wiring work, pay attention so that cutting chips and wire chips do not enter the inside of the Handy GOT.
  Such chips may cause fire, failure or malfunction.

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3.1   Outline of switches

The Handy GOT is equipped with the following switches and indicator LEDs.

1) Switch assignment

The figure below shows assignment of the switches. Each switch is abbreviated as shown in the table below.
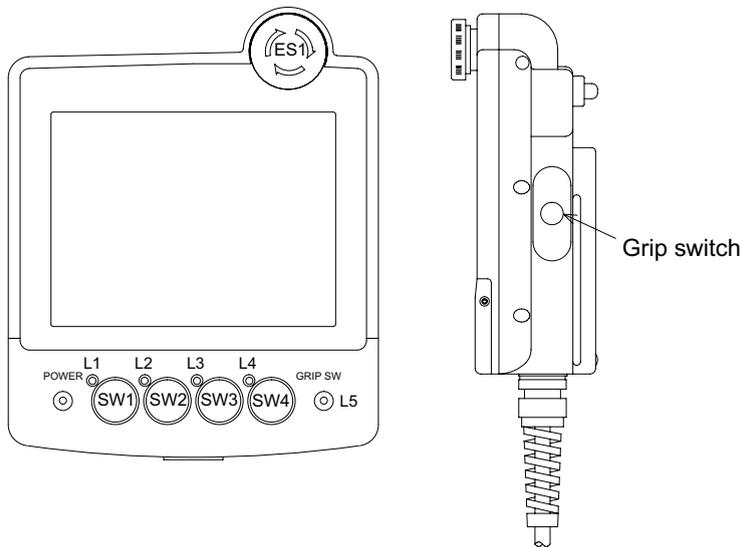
Grip switch

Abbreviation	Name	Reference
SW1 to SW4	Operation switches	3.2
ES1	Emergency stop switch	
L1 to L4	Indicator LEDs for operation switches	3.3
L5	Indicator LED grip stop switch	3.4
–	Grip switch	

Switches requiring external wiring

The following switches are required to be connected to the PLC or an external input equipment by way of a connector for operation switches.

- Operation switches
- Emergency stop switch

Switch and LEDs not requiring external switches

The following switch and LEDs are connected to the display unit CPU, and perform serial communication with the PLC by way of the communication connector. Accordingly, wiring is not required.

- Grip switch
- Operation indicator LEDs

2) Switch internal wiring

Connection of each switch is as shown below inside the Handy GOT.
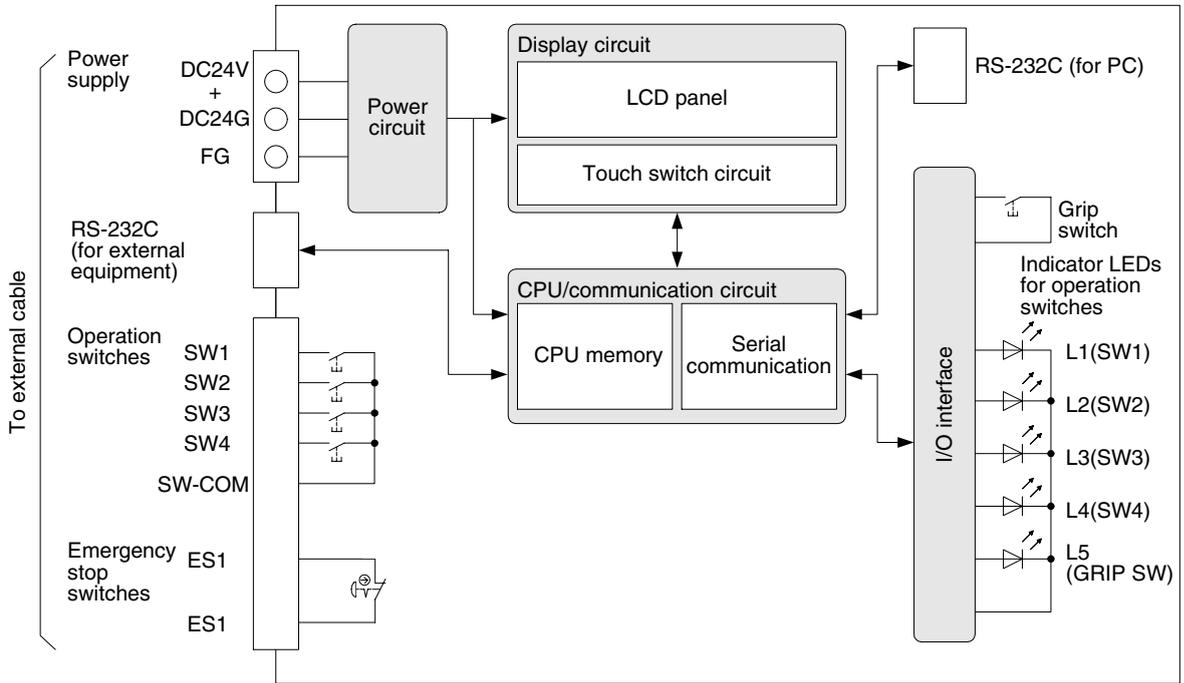
3) Connection diagram of external cables and connected equipment

| | | Handy GOT internal wiring | 25pin D-Sub | Untied cable | Connected equipment (PLC) |

```
Handy GOT          25pin D-Sub      Untied cable      Connected
internal wiring                                       equipment
                                                      (PLC)
SW-COM                 14        Fresh green  COM
SW1                    15          Sky blue   X0
SW2                    16        Black/white  X1      Inputs
SW3                    17         Red/white   X2
SW4                    18        Green/white  X3
ES1                    21        Brown/white  Wire them for
                                              emergency
ES1                    22       Yellow/white  stop switches.
Power circuit                                 Wiring of power supply
DC24VG                 12          Purple
DC24VG                 13           Pink      24V DC
DC24V+                 24         Blue/white
DC24V+                 25        Gray/white
FG                      1        Drain wire   Class D grounding
```

Cables for Handy GOT

F9GT-HCAB1-3M

F9GT-HCAB-3M   The untied cables above are distinguished by the color. On these cables, a signal name (SW1 to SW4, ES1) label is adhered for distinction.

3.2 Wiring of operation switches

The operation switches are assigned as shown below, and connected to the PLC through an external cable.

Connection example
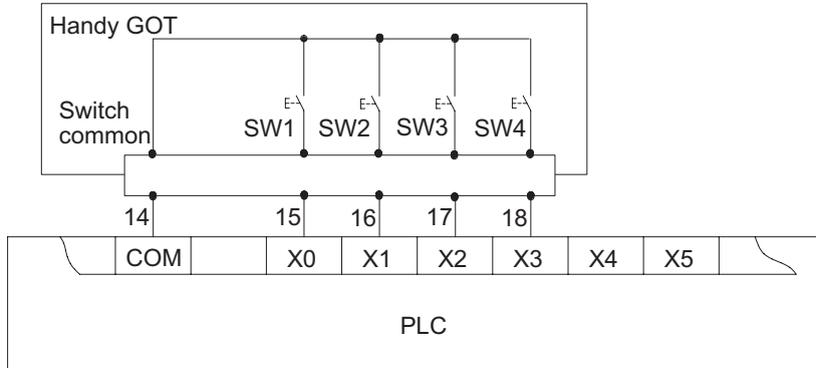
Pin arrangement

Signal name	External cable	
	F9GT-HCAB-3M	**F9GT-HCAB1-3M**
SW COM	14	Fresh green
SW1	15	Sky blue
SW2	16	Black/white
SW3	17	Red/white
SW4	18	Green/white

In the wire color of the F9GT-HCAB1-3M, "color 1/color2" indicates stripes of the two colors.

3.2.1 Inputs of operation switches

Use the operation switches provided on the Handy GOT as follows.

Operation switch operating procedure

The operation switches SW1 to SW4 are directly connected to inputs of the PLC. Accordingly, the operation switches can be arbitrarily controlled in a sequence program in the same way as general inputs.

- The operation switches are received as momentary type a-contact switches by the PLC.

Example: When an operation switch is wired to X0 of PLC
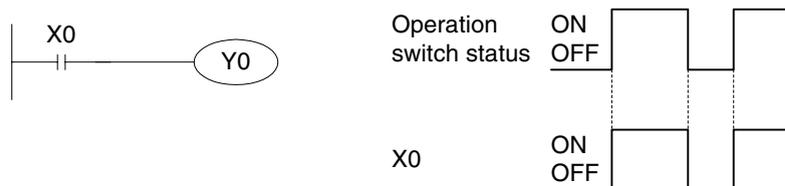
- When the operation switches are to be handled as b-contacts or alternate type switches, create in a sequence program accordingly.

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3.2.2 Lighting of operation indicator LEDs

Each of the four operation switches SW1 to SW4 is equipped with a green LED which indicates the pressing status of the switch.
Each LED is assigned to the bit 0 to the bit 3 of a word device. When the bit value is "1", the corresponding LED is lit. When the bit value is "0", the corresponding LED is extinguished.

1) Assigning a device which controls the LEDs

   Assign a device to control the LEDs using the screen creation software. When "System Information" of "Read device" in "Common" is set to 2 points, the set "Read device" +1 (the output information storage area of the external I/O function) is assigned to LED control.
   The figure below shows the relationship between each bit in the output information storage area and the LEDs. When the bit value is "1", the corresponding LED is lit. When the bit value is "0", the corresponding LED is extinguished.

   Output information storage area of the external I/O function

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
												SW4	SW3	SW2	SW1

   For example, when "Read device" of "System Information" is set to "D100", the value of each bit of the D101 is reflected on lighting/extinction of an LED.

   b0 of D101 → LED of SW1
   b1 of D101 → LED of SW2
   b2 of D101 → LED of SW3
   b3 of D101 → LED of SW4

2) Setting in the screen creation software

   Set "Read Device" in "System Information" as follows according to the screen creation software.

   - GT Designer2 (SW☐D5C-GTD2-E)

     a) Select "Common"-"System Environment" to open the "System Environment" window.
     b) Select "System Information".
     c) Set "Read Device" (System Signal 1).
     d) Click the "External I/O Function Output Information" check box to give a check mark.
     e) Click the "OK" button to close the "System Environment" window.
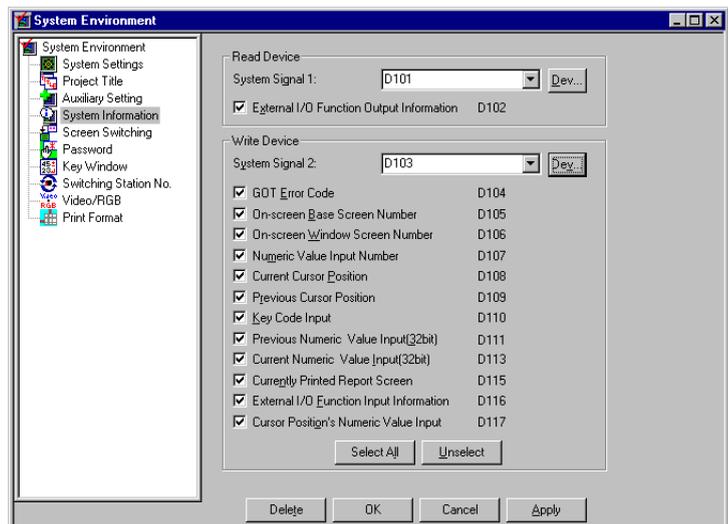
- GT Designer (SW□D5C-GOTR-PACKE)

a) Select "Common"-"System Information" to open the "System Information Setting" dialog box.

b) Set "Read Device" (System Signal 1).

c) Click the "External I/O Function Output Information" check box to give a check mark.

d) Click the "OK" button to close the "System Information" dialog box.
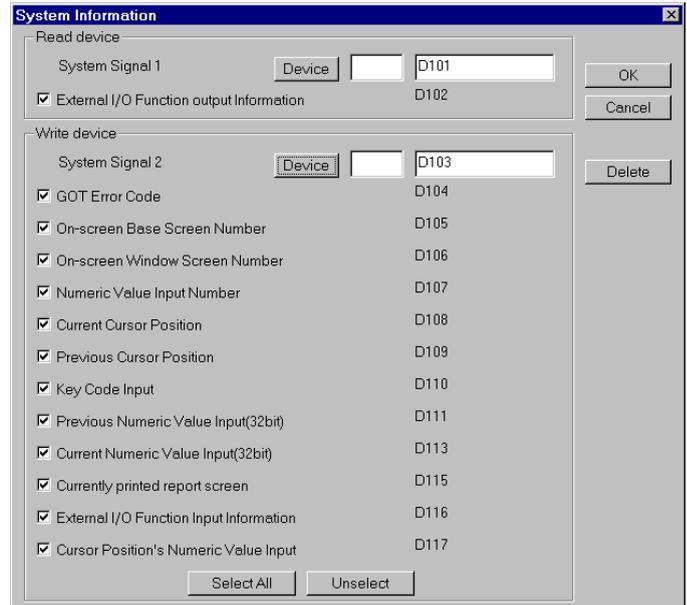
3) Program example

The operation switch SW1 is wired to X0, SW2 to X1, SW3 to X2, and SW4 to X3.
In the screen creation software, "Read device" of "System Information" is set to "D100".
In a sequence program, assign LED control to M10 and later.

X0 ──┤├── (M10) ····· When the SW1 is pressed, the corresponding green LED lights.

X3 ──┤├── (M13) ····· When the SW4 is pressed, the corresponding green LED lights.

M8000 ──┤├── [MOV K1M10 D101] ····· Transfers the M10 to the M13 to the set "Read device" +1.

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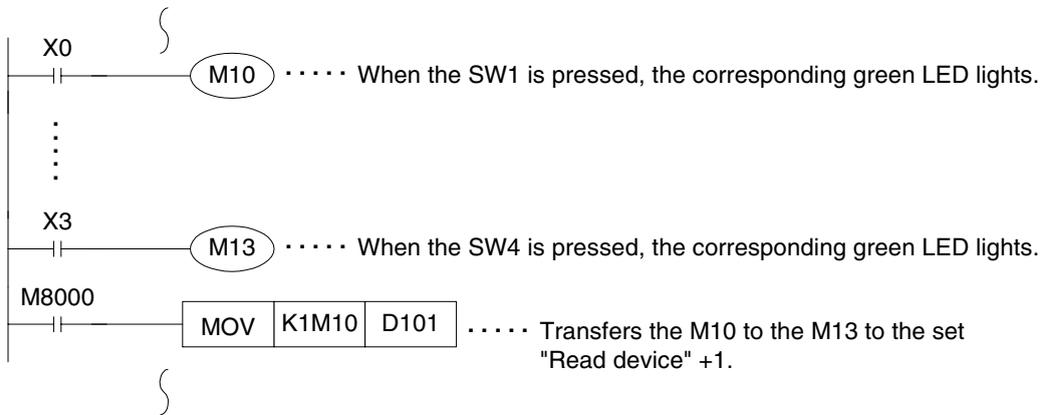
3.3   Wiring of emergency stop switch

The emergency stop switch is assigned as shown below, and connected to the PLC through an external cable.

Connection example
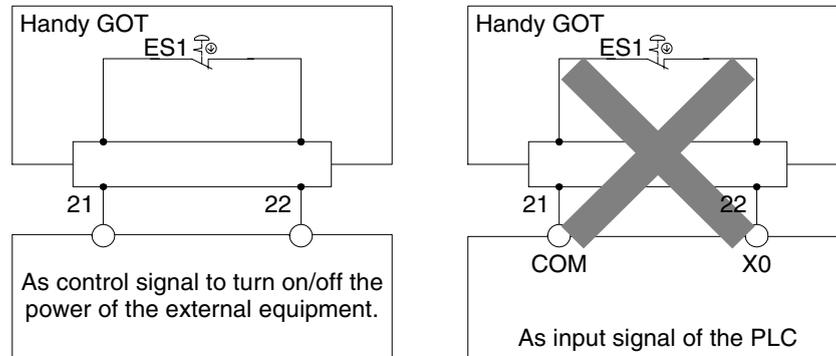
When turning on/off the power of the external equipment, make sure that the load is not more than 24V DC, 1A (contact specifications).
Make sure to construct the emergency stop circuit outside the PLC.

Pin arrangement

Signal name	External cable		Connector conversion box
	F9GT-HCAB-□M	**F9GT-HCAB1-□M**	**F9GT-HCNB**
ES1	21	Brown/white	ES1
ES1	22	Yellow/white	ES1

In the wire color of the F9GT-HCAB1-□M, "color 1/color 2" indicates stripes of the two colors.

3.4   Setting of grip switch

The grip switch is provided on the side of the Handy GOT. While the grip switch (a-contact) is pressed and held, manipulation of the touch switches on the screen is effective.
The ON/OFF status of the grip switch can be monitored in the PLC.
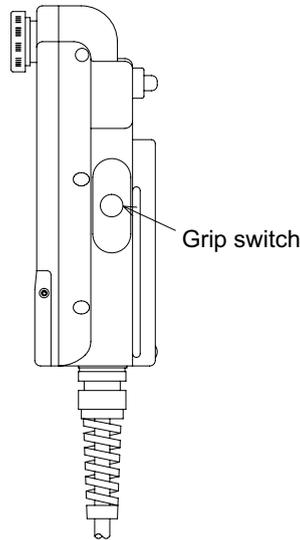
Grip switch

3.4.1   Effectiveness/ineffectiveness of grip switch

In order to set the grip switch effective or ineffective, use the utility function in the Handy GOT. (In the default, the grip switch is effective.)
When the grip switch is set effective, the OFF operation of the touch switches can be changed by the grip switch by setting "If it is released" described in the next chapter. (For the details, refer to the next chapter.)

1) Setting in the Handy GOT

Set the grip switch effective or ineffective in "Setup" of the utility function of the Handy GOT.

1st page   2nd page

BUZZER VOLUME	NONE SHOT LONG
SCREEN SAVE TIME	0 2 MIN. (0:FREE)
SCREEN SAVE LIGHT	OFF ON
LANGUAGE	日本語 ENGLISH
REVERS DISPLAY	NO YES
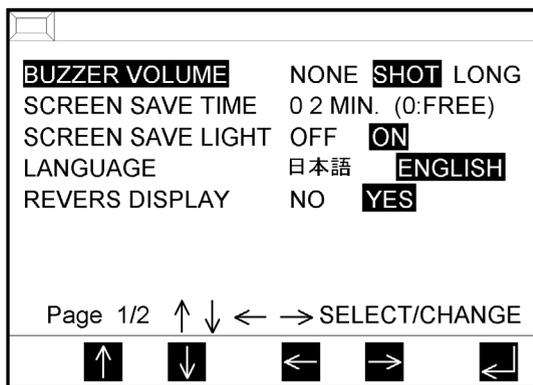
Page 1/2 ↑ ↓ ← → SELECT/CHANGE
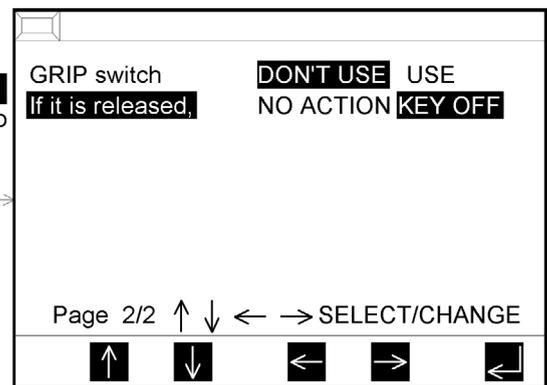
Click the ↑ or ↓ key to display the next page.

| GRIP switch | DON'T USE USE |
| If it is released, | NO ACTION KEY OFF |

Page 2/2 ↑ ↓ ← → SELECT/CHANGE

Select "USE" or "DON'T USE" using the ← or → key, and click the ↵ key.

2) Setting in the screen creation software (SW□D5C-GOTR-PACKE)

Setting is not available. (Only the Handy GOT is available for the setting.)

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3.4.2 Grip switch operation timing

1) Effective screens

When the grip switch is set effective, manipulate touch switches while pressing and holding the grip switch.
However, on the setup screen, the self-diagnosis screen and the screen & OS copy screen, touch switches are always enabled without regard to effectiveness of the grip switch.

2) Touch switch effective timing

a) Basic operation

When the grip switch is set effective in the Handy GOT, the grip switch controls the operations of touch switches, numeric value inputs and ASCII inputs (In the description below, touch switches are picked up as representatives.).
While the grip switch is pressed and held (ON status), touch switch operations are enabled as shown below.
However, while the grip switch is released (OFF status), touch switches are disabled and cannot be manipulated from the touch panel.

Grip switch	ON / OFF
Indicator LED for grip switch	ON / OFF
Touch switch pressing status	ON / OFF
Touch switch ON/ OFF operation	ON / OFF

Cannot turn ON or OFF.
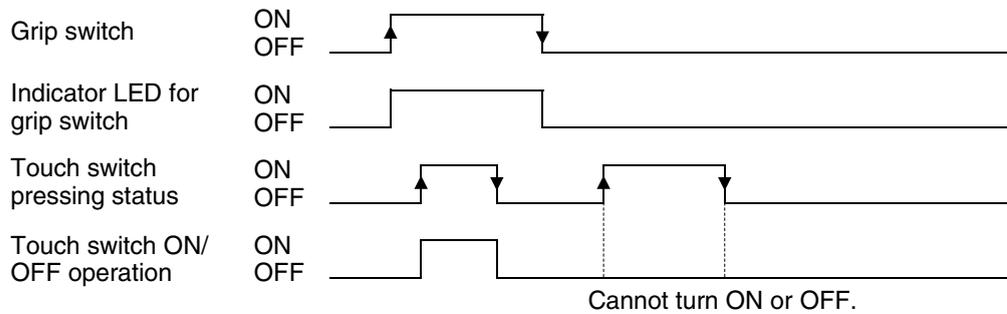
b) ON/OFF operation timing

<u>When "If it is released" is set to "KEY OFF"</u>

While the grip switch is in the ON status, a touch switch turns ON when pressed, and turns OFF when released.

Grip switch	ON / OFF
Indicator LED for grip switch	ON / OFF
Touch switch pressing status	ON / OFF
Touch switch ON/ OFF operation	ON / OFF

Refer to the description in "Point" below.

Cannot turn ON or OFF.
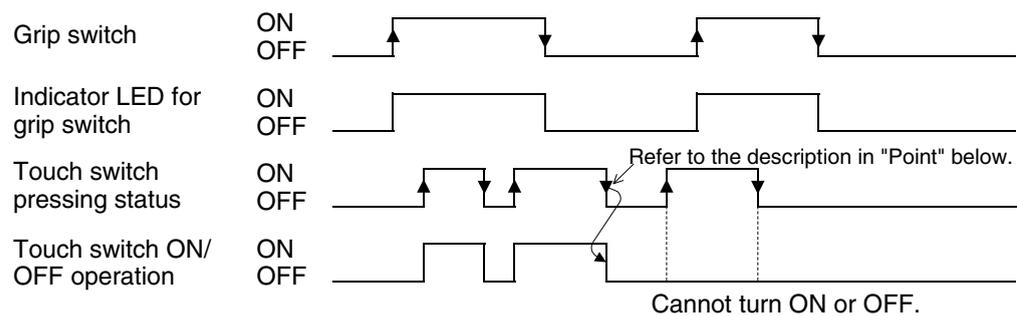
[Point]
Once a touch switch is pressed (set to ON), the ON status of the touch switch is not affected by releasing (set to OFF) of the grip switch. When the touch switch is released (set to OFF), the control target bit device turns OFF.

When "If it is released" is set to "NO ACTION"

While the grip switch is in the ON status, a touch switch turns ON when pressed, and turns OFF when released or when the grip switch is released (set to OFF).

Cannot turn ON or OFF.
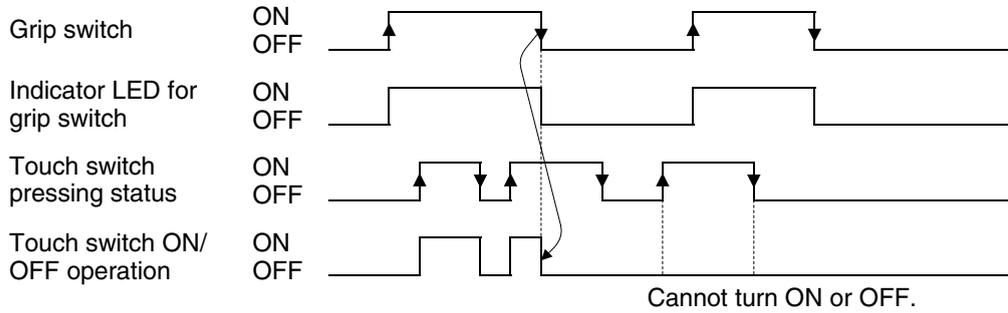
[Point]
Even while a touch switch is pressed and held (ON status), it turns OFF and the control target bit device turns OFF if the grip switch is released (set to OFF).

c) Others

When the grip switch is pressed while the screen is black by the screen save function, the screen save function is released and the screen becomes active.

3.4.3   Communication with PLC

In the PLC, the ON/OFF status of the grip switch can be confirmed using the bit device set as follows.
In the Handy GOT, the green GRIP SW LED provided on the front face lights when the grip switch is pressed.

1) Assigning a device used to confirm the grip switch ON/OFF status

   The device used to confirm the grip switch ON/OFF status can be assigned using the screen creation software.
   When "Common" is selected then "System Information" is set, the set "Write device" +0 (the system signal 2 area) is assigned to the grip switch.
   The figure below shows the relationship between the bits in the system signal area and the grip switch.
   When the bit value is "1", the grip switch is ON. When the bit value is "0", the grip switch is OFF.

   System signal 2 area

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0

   ↑
   Grip switch
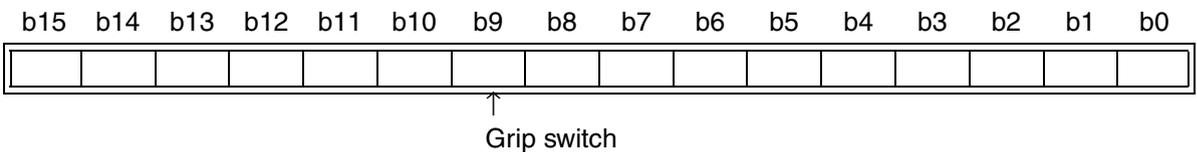
2) Setting in the screen creation software

   When the grip switch is set to ON or OFF, the 10th bit of "Write Device" (System Signal 2) in "System Information" turns ON or OFF.
   Set "Write Device" in "System Information" as follows according to the screen creation software.

   - GT Designer2 (SW□D5C-GTD2-E)

     a) Select "Common"-"System Environment" to open the "System Environment" window.
     b) Select "System Information".
     c) Set "Write Device" (System Signal 2).
     d) Click the "OK" button to close the "System Environment" window.
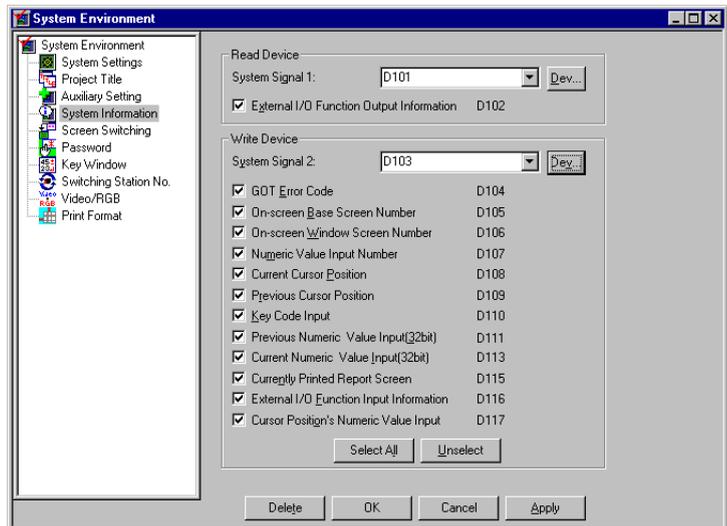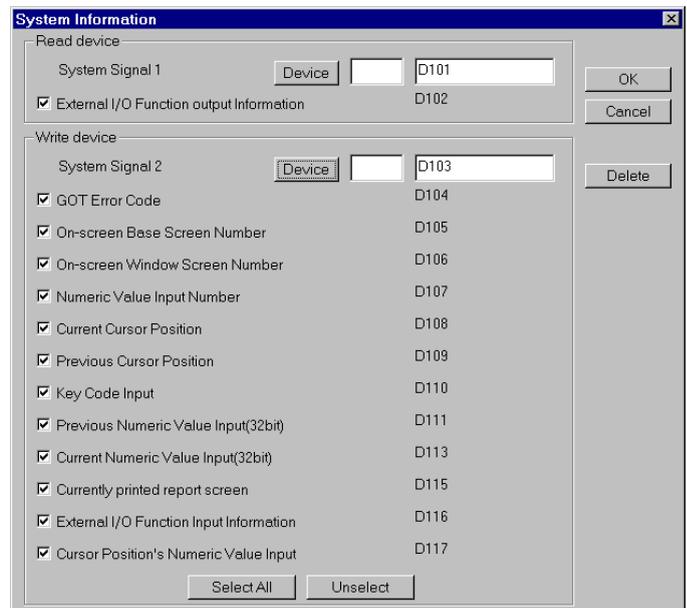
3.5   Creation of operation switch name sheet

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

3.5.1   Creation of name sheet

1) Prepare a mount sheet and an OHP sheet (transparent sheet) offered as accessories.

2) Write arbitrary switch names on the name sheet mount.
The mount is of actual dimensions.
If making another sheet, make it in the following dimensions.
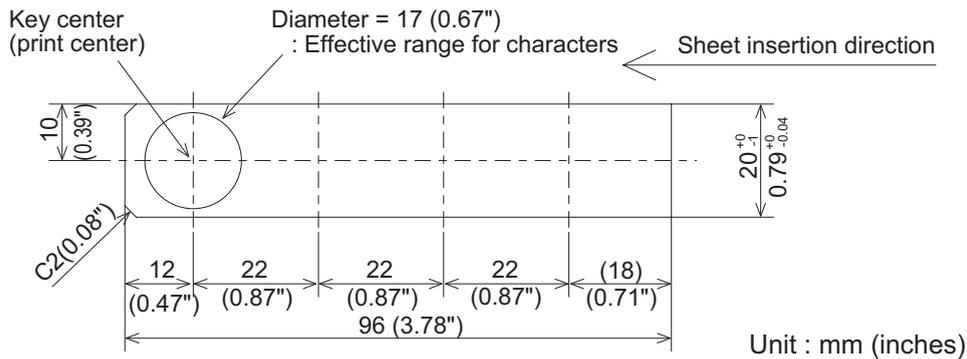
3) When the work in the step 2) is finished, copy the contents of the mount sheet on the OHP sheet in the actual dimensions (100%) using a copy machine. The OHP sheet is as double as the mount sheet. If you have made a mistake in copy, use the other half of the OHP sheet.
If you would like to prepare another OHP sheet, use the following one which can be copied.

Recommended OHP sheet: VF-5 (A4 × 20 sheets) manufactured by KOKUYO
Material: Polyester film
Thickness: 0.1 mm

3.5.2 Attachment of sheet

1) Removing the operation switch cover
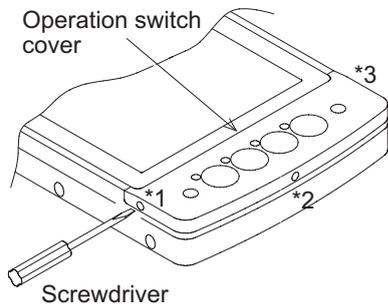
Insert a screwdriver into the clearance *1 or *3 between the operation switch cover and the main body, and push up slowly the operation switch cover with the screwdriver.
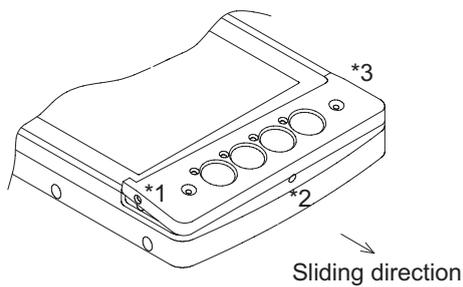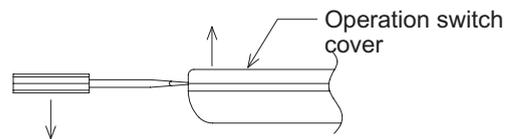
When the either side *1 or *3 comes off, pull the operation switch cover in the sliding direction to remove it.

2) Inserting the sheet

Insert the name sheet into the following position of the Handy GOT.

Name sheet insertion slot
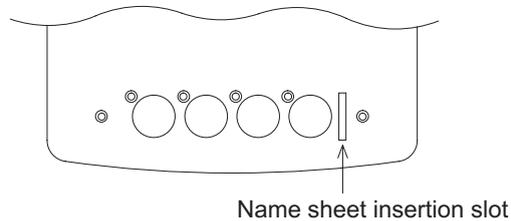
3) Attaching the operation switch cover

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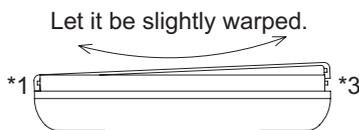
Align the operation switch cover with the protrusion *1 or *3 shown in the figure in the step 1), then attach the operation switch cover while letting it be slightly warped.

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4.   Specifications

Caution on design

- While executing monitoring in the GOT (GOT-F900), if a communication error (including disconnection of a cable) occurs, communication between the GOT and the PLC CPU is interrupted and the GOT is disabled.
  When establishing the system configuration using the GOT, make sure that a switch which gives a significant operation to the system is executed from any equipment other than the GOT while postulating communication error in the GOT. Otherwise, accidents may be caused by incorrect output and malfunction.

Cautions on design

- Do not bind the control cable and the communication cable together with the main circuit and the power line. Keep such cables off the main circuit and the power line by 100mm (3.94") or more.
  Otherwise, malfunction may be caused by noise.

- Make sure to press touch keys on the display screen with hand. If touch keys are subject to an excessive force or pressed by a hard or sharp object, they may fail.

Cautions on startup/maintenance

- Do not touch connectors while the power is ON.
  If a connector is touched, electrical shock or malfunction may be caused.

- Set to OFF the power before cleaning the Handy GOT or tightening a terminal.
  If the Handy GOT is cleaned or a terminal is tightened while the power is ON, you may get electrical shock.

Cautions on startup/maintenance

- Do not disassemble or modify the Handy GOT.
  Disassembly or modification may cause failure, malfunction or fire.

- For replacement or repair of the backlight, consult with a Mitsubishi Electric distributor.

- Turn OFF the power before connecting or disconnecting a cable.
  Connecting or disconnecting a cable while the power is ON may cause failure or malfunction.

Caution on disposal

- When disposing of the Handy GOT, treat it as industrial waste.

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4.1 General specifications

4.1.1 Outside dimensions

The figure below shows the outside dimensions of the Handy GOT.
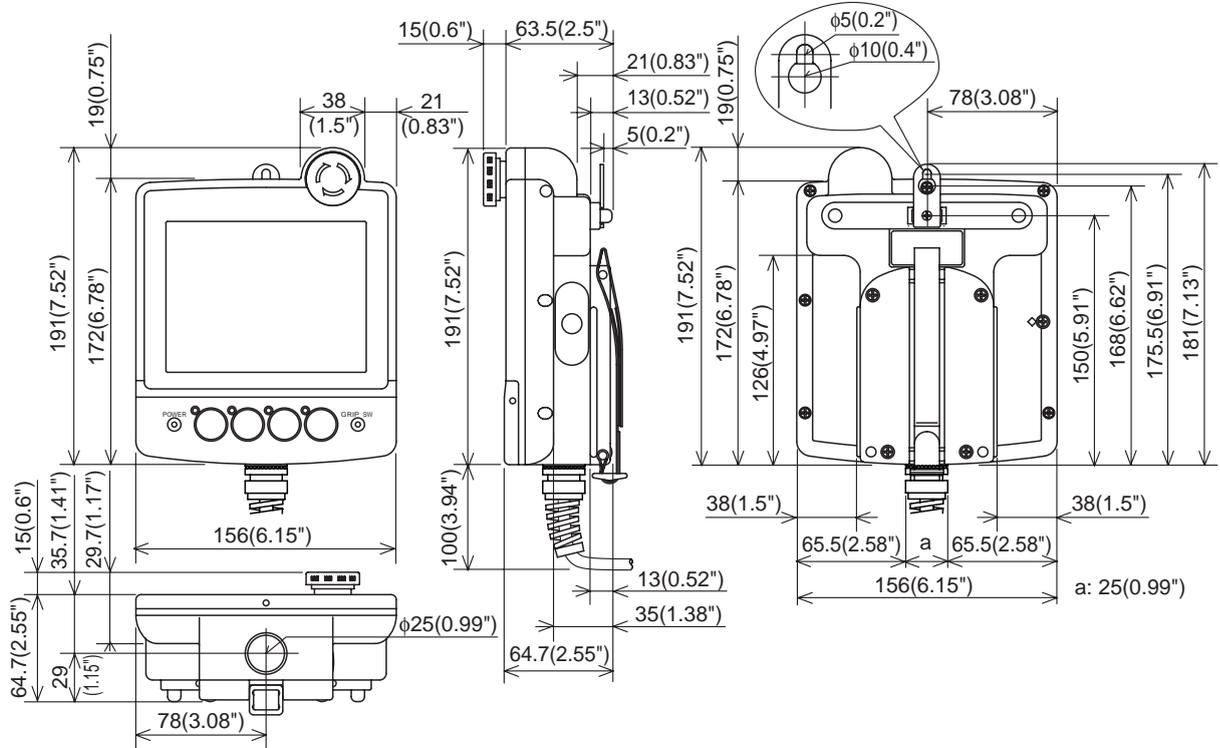
Unit: mm (inches)
Mass: 0.8kg (1.76lbs) (excluding cable)

4.1.2   Power unit specifications

The table below shows the specifications of the power unit of the Handy GOT.

Power unit specifications

Item	Specifications
	Handy GOT
Supply voltage	24V DC $^{+10\%}_{-15\%}$
Power ripple	200mV or less
Fuse	1.0A (built in)
Current consumption	400mA/24V DC (300mA/24V DC while backlight is turned off)
Allowable instantaneous power interruption period	Operation is continued against instantaneous power interruption of not more than 1ms.

4.1.3   General specifications

- General specifications

Item	Handy GOT				
Ambient temperature	0 to +40°C during operation, -20 to +60°C during storage				
Ambient humidity	35 to 85%RH during operation (Dew condensation shall not be allowed.)				
Vibration resistance		Frequency	Acceleration	Amplitude	10 times in each of X, Y and Z directions (for 80 min)
	When intermittent vibrations are applied	10 to 57Hz	–	0.075mm	
		57 to 150Hz	9.8m/s^2	–	
	When continuous vibrations are applied	10 to 57Hz	–	0.035mm	
		57 to 150Hz	4.9m/s^2	–	
Impact resistance	147 m/s^2, 3 times in each of X, Y and Z directions				
Noise resistance	By noise simulator of noise voltage 1,000 Vp-p, noise width 1μs and cycle 30 to 100 Hz				
Withstand voltage	500V AC for 1 min	Between all power terminals as a whole and ground terminal			
Insulation resistance	10MΩ or more by 500V DC Megger				
Grounding	Class D grounding (100 Ω or less)				
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)				

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• Performance specifications

Item		A953GOT-LBD-M3-H	A953GOT-SBD-M3-H
Operation switch (for input to PLC)		4 points, a-contact 10mA/24V DC Operation life: 1,000,000 times	
Emergency stop switch		1 points, b-contact 1A/24V DC, independent wiring (AH165-VR01 manufactured by Fuji Electric Co., Ltd.)	
Grip switch		1 points, Assigned as switch in display unit	
Display unit		Equivalent to A953GOT-LBD-M3	Equivalent to A953GOT-SBD-M3
	Display element	STN type black-and-white liquid crystal	STN type 8-color liquid crystal
	Angle of visibility	Leftward: 50°, rightward: 50°, upward: 45°, downward: 60°	Leftward: 30°, rightward: 30°, upward: 20°, downward: 30°
	Display size	320×240 dots, 115(4.53") $\times$ 86(3.39") mm	
	Number of displayed characters	40 characters $\times$ 15 lines	
	Life	Approximately 50,000 hours or more	
	Backlight	Cold cathode (life: 40,000 hours or more)	
	Touch switch	300 switches maximum/screen, 20×15 matrix, size: 16×16 dots (minimum)	
Memory		Built-in flush ROM (user area: 3MB)	
Built-in interface	For PLC	RS-232C 1 channel	
	For personal computer	RS-232C 1 channel (under rear cover of Handy GOT)	

• Make sure to handle the Handy GOT by hand.
  If the Handy GOT is handled by a hard article or article with protrusions, the Handy GOT may fail.

• 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 in, and it may not disappear.
  To prevent heat damage, the screen saver function is effective. For details on the screen saver function, refer to the following.
  GOT-A900 Series Operating Manual (Extended · Option Functions Manual)

• The screen save and back light OFF functions of the GOT are used to prolong the service life of the back light. For details on the screen saver function, refer to the following.
  GOT-A900 Series Operating Manual (Extended · Option Functions Manual)

4.2 PLC CPU which can be monitored

Whether or not a PLC CPU can be monitored in the Handy GOT is determined by the system (connection form) up to the monitored PLC CPU.

4.2.1 In case of A953 Handy GOT

The table below shows the PLC CPU of each connection form which can be monitored.
(The A953 Handy GOT can be connected to a PLC equipped with the RS-232C interface.)

Connectable PLC list

PLC CPU which can be monitored		CPU direct connection	Reference	Computer link connection	Reference
QCPU (Q mode)		✓	Chapter 6	✓	Chapter 7
QCPU (A mode)		✓	Chapter 6	✓	Chapter 7
QnACPU		✗	–	✓	Chapter 7
ACPU	Except A1FXCPU	✗	–	▲ *1*2*3	Chapter 7
	A1FXCPU	✗	–	✗	–
FXCPU		✓ *4		✗	–
FA controller		✗	–	✗	–
Motion controller CPU		✗	–	✓ *3	Chapter 7
PLC by Omron		✗	–	✓	Chapter 8
PLC by Yaskawa Electric		✗	–	✓	Chapter 9
PLC by Allen-Bradley		✓	Chapter 10	✗	–
PLC by Sharp		✓	Chapter 11	✗	–
Microcomputer board		✓	Chapter 12	✗	–
PLC by Siemens		✓	Chapter 13	✗	–
PLC by Toshiba		✗	–	✗	–

*1 When the AnNCPU (S1), the A2SCPU, the A0J2HCPU or the A2CCPU is monitored, data cannot be written to the CPU whose version is former than the following version.
    AnNCPU (S1): version L (with link), version H (without link)
    A2SCPU: version H
    A0J2HCPU: version E
    A2CCPU: version H

*2 Computer link connection is not available in the A2CCPU.

*3 When connecting a computer link unit to the A2SCPU, the A2SHCPU-S1, the A2SHCPU, the A1SHCPU, the A1SJHCPU, the A0J2HCPU, the A171SHCPU or the A172SHCPU, use the computer link unit software version U or later.
    The A0J2-C214-S1 (computer link unit dedicated to the A0J2HCPU) is not available.

*4 The FX1S/FX1N/FX2N/FX2NC Series PLC can be connected by way of a expansion board for RS-232C communication or communication adapter.

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4.3   Devices names which can be monitored

1) In the case of QCPU (A mode) and ACPU

Device name			Available set monitor range
Bit devices	Input (X)		X0~X1FFF
	Output (Y)		Y0~Y1FFF
	Internal relay (M)		M0~M8191
	Annunciator (F)		F0~F2047
	Link relay (B)		B0~B1FFF
	Special internal relay (M)		M9000~M9255
	Latch relay (L)		L0~L8191
	Timer	Contact (TT)	TT0~TT2047
		Coil (TC)	TC0~TC2047
	Counter	Contact (TT)	CT0~CT1023
		Coil (TC)	CC0~CC1023
	Special relay for link (SB)		SB0~SB7FF
	Bit of word device		Specified bits of word devices shown below (excluding index register and buffer memory)
	GOT bit register (GB)		GB64~GB1023
Word devices	Data register (D)		D0~D8191
	Special data register (D)		D9000~D9255
	Link register (W)		W0~W1FFF
	Timer (present value)(TN)		TN0~TN2047
	Counter (present value)(CN)		CN0~CN1023
	Link special register (SW)		SW0~SW7FF
	File register (R)		R0~R8191
	Extension file register (ER)	Block	1~255
		Device	R0~R8191
	Index register [2]	(Z)	Z0~Z6(Z0=Z)
		(V)	V0~V6(V0=V)
	Accumulator (A)		A0~A1
	Buffer memory (special function unit)(BM)		BM0~BMn [1]
	Bit device handled as word device [3][4]		Bit devices shown above (excluding timer and counter) handled as word devices
	GOT data register (GD)		GD64~GD1023

[1] Only special units of stations connected to the GOT can be specified.
Set the buffer memory in the address range of the buffer memory existing in the target special function units.

[2] In computer link connection, write to index registers (using the touch switch function, the numeric input function, etc.) is disabled.

[3] Set the device number in a multiple of 16.

[4] When using the special internal relay (M) as bit device handled as word device, set the device number "9000 + multiple of 16".
Examples: M9000, M9016 and M9240

2) In the case of QCPU (Q mode) and QnACPU

Device name		Available set monitor range
Bit devices	Input (X)	X0~X1FFF
	Output (Y)	Y0~Y1FFF
	Internal relay (M)	M0~M32767
	Latch relay (L)	L0~L32767
	Annunciator (F)	F0~F32767
	Link relay (B)	B0~B7FFF
	Special internal relay (M)	M9000~M9255
	Timer — Contact (TT)	TT0~TT32767
	Timer — Coil (TC)	TC0~TC32767
	Counter — Contact (TT)	CT0~CT32767
	Counter — Coil (TC)	CC0~CC32767
	Special relay (SM)	SM0~SM2047
	Retentive timer — Contact (SS)	SS0~SS32767
	Retentive timer — Coil (SC)	SC0~SC32767
	Step relay (S)	S0~S32767
	Special relay for link (SB)	SB0~SB7FF
	Bit of word device	Specified bits of word devices shown below (excluding index register and buffer memory)
	GOT bit register (GB)	GB64~GB1023
Word devices	Data register (D)	D0~D32767
	Special data register (SD)	SD0~SD2047
	Link register (W)	W0~W7FFF
	Timer (present value)(TN)	TN0~TN32767
	Counter (present value)(CN)	CN0~CN32767
	Retentive timer (present value) (SN)	SN0~SN32767
	Link special register (SW)	SW0~SW7FF
	File register (R)	R0~R32767 [*1]
	Extension file register (ER) — Block	1~31
	Extension file register (ER) — Device	R0~R32767
	Extension file register (ZR)	ZR0~ZR1042431 [*2]
	Index register (Z)	Z0~Z15
	Buffer memory (special function unit)(BM)	BM0~BMn [*3]
	Bit device handled as word device [*4]	Bit devices shown above (excluding timer and counter) handled as word devices
	GOT data register (GD)	GD64~GD1023

*1 File registers of a block changed over by the RSET instruction are regarded as targets.

*2 File registers of a block changed over by the QDRSET instruction are regarded as targets.

*3 Only special function units of stations connected to the GOT can be specified.
Set the buffer memory in the address range of the buffer memory existing in target special function units.

*4 Set the device number in a multiple of 16.

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3) In the case of MELSEC-FXCPU

Device name		Available set monitor range	Device number expression
Bit devices	Input (X)	X0000~X0377	Octal
	Output (Y)	Y0000~Y0377	
	Auxiliary relay (M)	M0000~M3071	Decimal
	State (S)	S0000~S0999	
	Special auxiliary relay (M)	M8000~M8255	
	Timer contact (T)	T000~T255	
	Counter contact (C)	C000~C255	
	Bit of word device [*1]	–	–
	GOT bit register (GB)	GB64~GB1023	
Word devices	Timer (present value)(T)	T000~T255	Decimal
	Counter (present value)(C)	C000~C255	
	Data register (D)	D000~D0999	
	RAM file register (D)	D1000~D7999	
	Special data register (D)	D8000~D8255	
	Word of bit device [*2*3]	–	
	GOT data register (GD)	GD64~GD1023	

*1 When executing the touch switch function for which bits of a word device are set as monitor devices, do not write the word device in the sequence program.

*2 Among bit devices, the timer contact (T) and the counter contact (C) cannot be handled as word devices.

*3 Set the device number in a multiple of 16.

4) In the case of PLC by Omron

Device name		Available set monitor range
Bit devices	I/O relay	..0000~51115
	Internal auxiliary relay	
	Data link relay (LR)	LR0000~LR6315
	Auxiliary memory relay (AR)	AR0000~AR2715
	Holding relay (HR)	HR0000~HR9915
	Timer contact (TIM) [1]	TIM000~TIM511
	Counter contact (CNT) [1]	CNT000~CNT511
	Data memory (DM) [2]	DM0000~DM9999
	Timer (present value)(TIM) [2]	TIM000~TIM511
	Counter (present value)(CNT) [2]	CNT000~CNT511
	GOT bit register	GB64~GB1023
Word devices	I/O relay	..000~511
	Data link relay (LR)	LR0000~LR0063
	Auxiliary memory relay (AR)	AR0000~AR0027
	Holding relay (HR)	HR0000~HR0099
	Data memory (DM)	DM0000~DM9999
	Timer (present value)(TIM)	TIM000~TIM511
	Counter (present value)(CNT)	CNT000~CNT511
	GOT data register	GD64~GD1023

[1] When the CV1000 is used, write is disabled.

[2] When executing the touch switch function for which bits of a word device are set as monitor devices, do not write the word device in the sequence program.

5) In the case of PLC by Yaskawa Electric

a) When the GL60, the GL60H, the GL70H, the GL120 or the GL130 is used

Device name		Available set monitor range
Bit devices	Coil	O01~O63424
	Input relay	I1~I63424
	Link coil	D1~D2048
		D10001~D12048 D20001~D22048
	GOT bit register	GB64~GB1023
Word devices	Input register	Z1~Z31840 [1]
	Holding register	W1~W28291 [2]
	Link register	R1~R2048
		R10001~R12048 R20001~R22048
	Constant register	K1~K4096 [3]
	GOT data register	GD64~GD1023

[1] In setting, change input registers 30001 to 30512 to Z1 to Z512 (when the setting is the default).

[2] In setting, change holding registers 40001 to 49999 to W1 to W9999(when the setting is the default).

[3] In setting, change constant registers 31001 to 35096 to K1 to K4096 (when the setting is the default).

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b) When the CP-9200SH, the MP-920 or the MP-930 is used

Device name		Available set monitor range
Bit devices	Coil	MB0~MB4095F
	Input relay	IB0000~IBFFFF
	GOT bit register	GB64~GB1023
Word devices	Input register	IW0~IW7FFF
	Holding register	MW0~MW32767
	GOT data register	GD64~GD1023

c) When the CP-9300MS is used

Device name		Available set monitor range
Bit devices	Coil	MB0~MB3071F
	Input relay	IB0000~IB3FF
	GOT bit register	GB64~GB1023
Word devices	Input register	IW0~IW3F
	Holding register	MW0~MW3071
	GOT data register	GD64~GD1023

6) In the case of PLC by Allen-Bradley

Device name		Available set monitor range	Device number expression
Bit devices	Bit (B)	B0030000~B003255F B0100000~B255255F	Decimal
	Timer (timing bit) (TT)	TT0040000~TT0042550 TT0100000~TT2552550	
	Timer (timing bit) (TN)	TN0040000~TN0042550 TN0100000~TN2552550	
	Counter (up-counter) (CU)	CU0050000~CU0052550 CU0100000~CU2552550	
	Counter (down-counter) (CD)	CD0050000~CD0052550 CD0100000~CD2552550	
	Counter (completion bit) (CN)	CN0050000~CN0052550 CN0100000~CN2552550	
	Integer (N)	N0070000~N007255F N0100000~N255255F	
	Bit register inside GOT (GB)	GB64~GB1023	
Word devices	Bit (B)	B003000~B003255 B010000~B255255	Decimal
	Timer (set value) (TP)	TP004000~TP004255 TP010000~TP255255 *1	
	Timer (present value) (TA)	TA004000~TA004255 TA010000~TA255255 *1	
	Counter (set value) (CP)	CP005000~CP005255 CP010000~CP255255 *1	
	Counter (present value) (CA)	CA005000~CA005255 CA010000~CA255255 *1	
	Integer (N)	N007000~N007255 N010000~N255255 *1	
	Data register inside GOT (GD)	GD64~GD1023	

*1 32-bit data cannot be written to devices.

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7) In the case of PLC by Sharp

Device name	Available set monitor range	Device number expression
I/O relay	0~15777 20000~75777	Octal
Timer/counter (contact)	T/C0000~T/C1777	
Timer/counter (present value)	T/C0000~T/C1777 (b0000~b3776)	
Register	09000~09776 19000~19776 29000~29776 39000~39776 49000~49776 59000~59776 69000~69776 79000~79776 89000~89776 99000~99776 E0000~E0776 E1000~E1776 E2000~E2776 E3000~E3776 E4000~E4776 E5000~E5776 E6000~E6776 E7000~E7776	
File register	1000000~1177776 2000000~2177776 3000000~3177776 4000000~4177776 5000000~5177776 6000000~6177776 7000000~7177776	

8) In the case of microcomputer

Device name		Available set monitor range
Bit devices	GOT bit register (GB)	GB64~GB1023 [1]
	Data register (D)	D0~D2047
	Specified bits of word devices	– [1]
Word devices	Data register (D)	D0~D2047
	GOT data register (GD)	GD64~GD1023 [1]

[1] Devices GB and GD cannot be written or read from the host.

9) In the case of PLC by Toshiba

Device name		Available set monitor range
Bit devices	External input (X)	X0000~X511F
	External output (Y)	Y0000~Y511F
	Internal relay (R)	R0000~R999F
	Special relay (S)	S0000~S255F
	Link register relay (Z)	Z0000~Z999F
	Link relay (L)	L0000~L255F
	Timer (contact) (T) [*4]	T000~T999
	Counter (contact) (C) [*4]	C000~C511
	Bit of word device [*5]	Specified bits of word devices shown below (excluding timer (present value) and counter (present value))
	GOT bit register (GB)	GB64~GB1023
Word devices	External input (X)	XW000~XW511
	External output (Y)	YW000~YW511
	Internal relay (R)	RW000~RW999
	Special relay (S)	SW000~SW255
	Link register relay (Z)	– [*3]
	Link relay (L)	LW000~LW255
	Timer (present value) (T) [*4]	T000~T999
	Counter (present value) (C) [*4]	C000~C511
	Data register (D) [*2]	D0000~D8191
	Link register (W)	W0000~W2047
	File register (F)	F0000~F32467 [*1]
	Bit device handled as word device	Bit devices shown above (excluding link register relay, timer (contact) and counter (contact)) handled as word devices
	GOT data register (GD)	GD64~GD1023

*1 Extension file registers are not supported.

*2 When the mode switch in the CPU module is set to "P-RUN", D0000 to D4095 cannot be written.

*3 The link register relay (Z) corresponds to one bit in 1,000 words from the link register W000 to W999.

*4 When the present value of the timer contact/counter contact is written, the present value is read once at first. During the processing, do not change the present value using a program in the PLC.

*5 When bits of a word device are specified, the word device is read once at first. During the processing, do not change the word device using a program in the PLC.

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5. Connection to Peripheral Equipment

This section explains connection of the Handy GOT to the peripheral equipment.

5.1 Connection to peripheral equipment for Handy GOT

The figure below shows connection to the peripheral equipment for the Handy GOT.

- Handy GOT

Connect the cable to the 9-pin D-Sub, RS-232C connector (for personal computer) provided on the rear face.
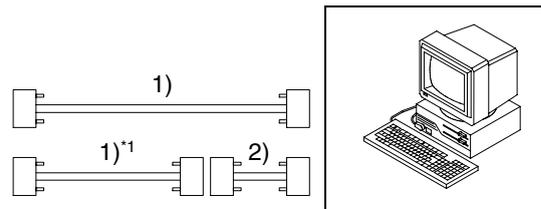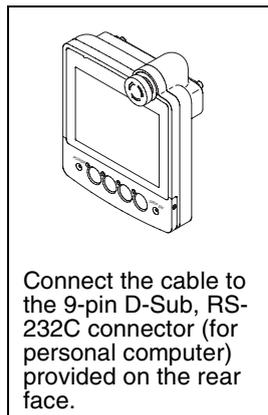
· General-purpose personal computer (screen creation software)
· Screen creation software for GOT-900 Series

* The PLC card, the external I/O interface unit and the printer interface unit cannot be connected to the Handy GOT.

Data transfer cable

FX-232CAB-1 (3m, 9' 10") AC30R2-9SS	When the RS-232C port of the personal computer is the 9-pin type
F2-232CAB-1 (3m, 9' 10") AC30R2-9P	When the RS-232C port of the personal computer is the 25-pin type

5.2 Cable connection procedure

1) Connecting the cable to the personal computer

   Connect one side of the data transfer cable 1) to the RS-232C interface port of the personal computer. (Select a proper data transfer cable in accordance with the port shape of the personal computer while referring to the table above.)

2) Connecting the cable to the Handy GOT

   The outline of the method to remove the rear cover is described below. For the details, refer to section 2.2.4.
   a) Remove four screws which fix the rear cover of the Handy GOT.
   b) Open the rear cover.
   c) Connect the other end of the data transfer cable 1) to the 9-pin D-Sub connector.

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5.3   Connection diagram

1) Transfer cable FX-232CAB-1
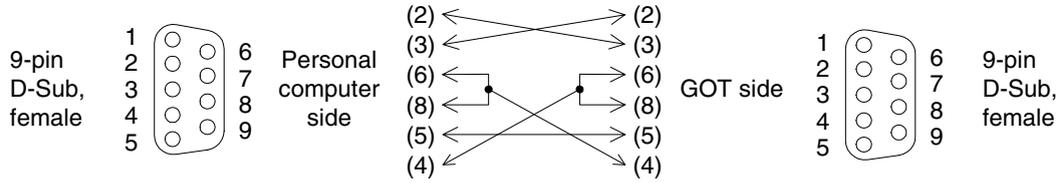
2) Transfer cable F$_2$-232CAB-1
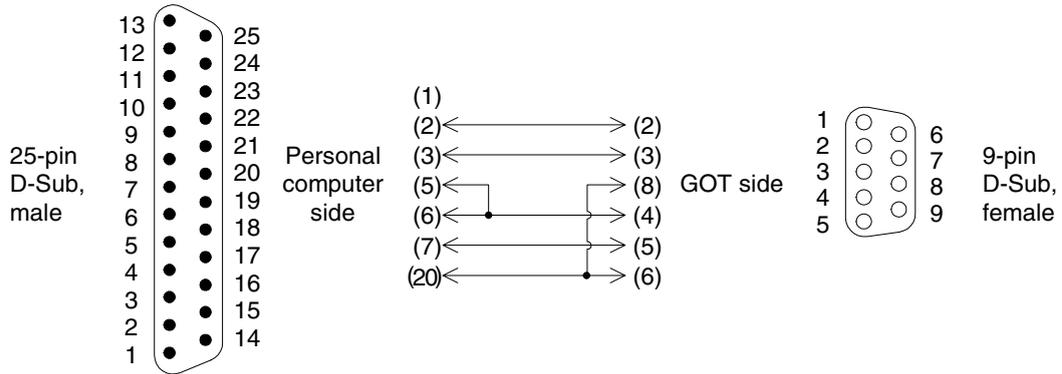
3) Transfer cable AC30R2-9SS
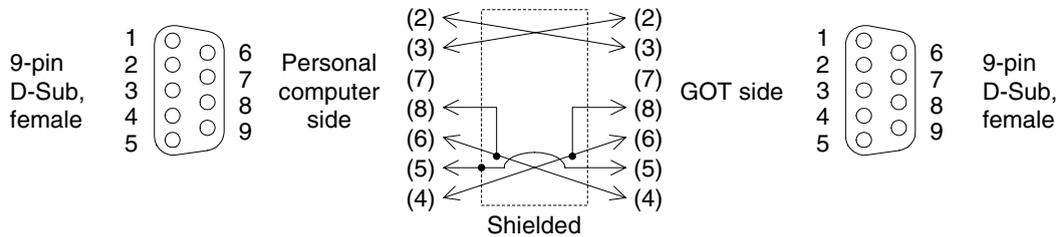
4) Transfer cable AC30R2-9S
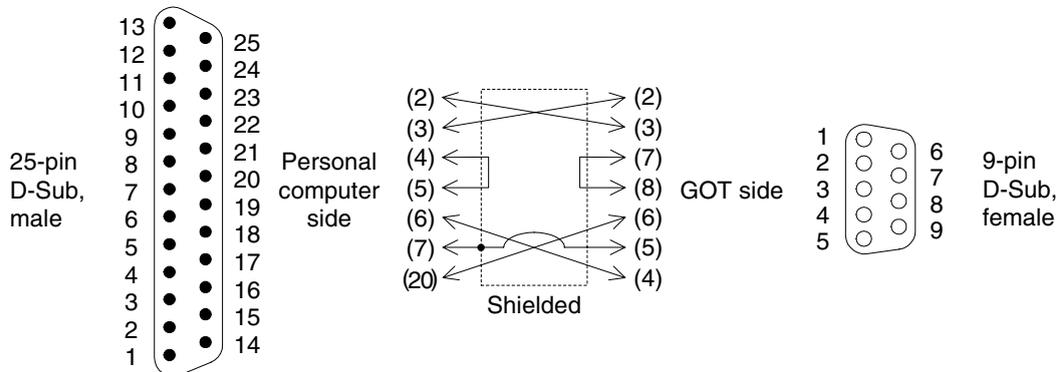
6.   CPU Direct Connection

6.1   System configuration

6.1.1   Connection to QCPU
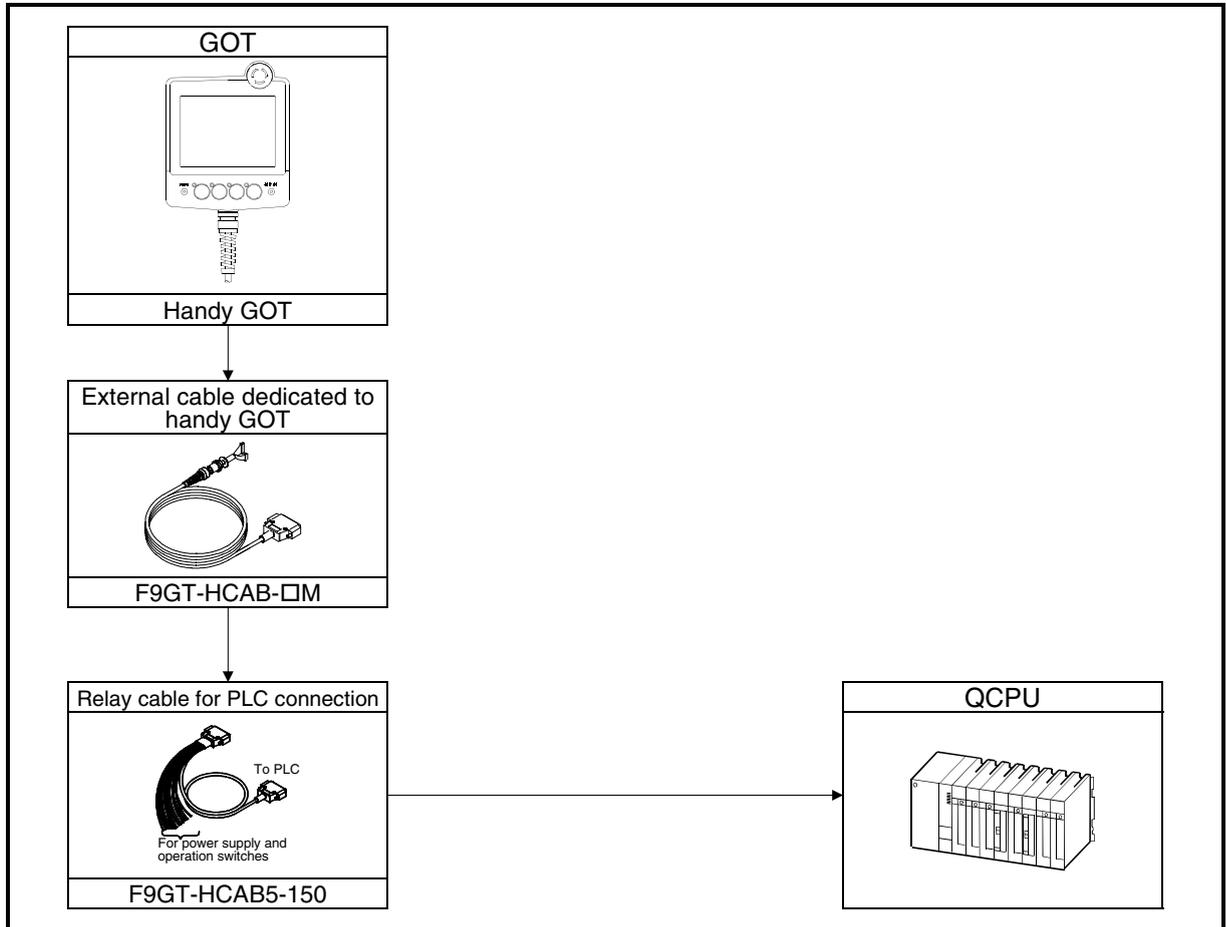
6.1.2   Connection to FXCPU

1) When the FX1S/FX1N/FX2N/FX2NC Series PLC is connected

Execute communication through RS-232C with the FX1S/FX1N/FX2N/FX2NC Series PLC. For communication, the following option (function extension board or special adapter for RS-232C communication) is required.
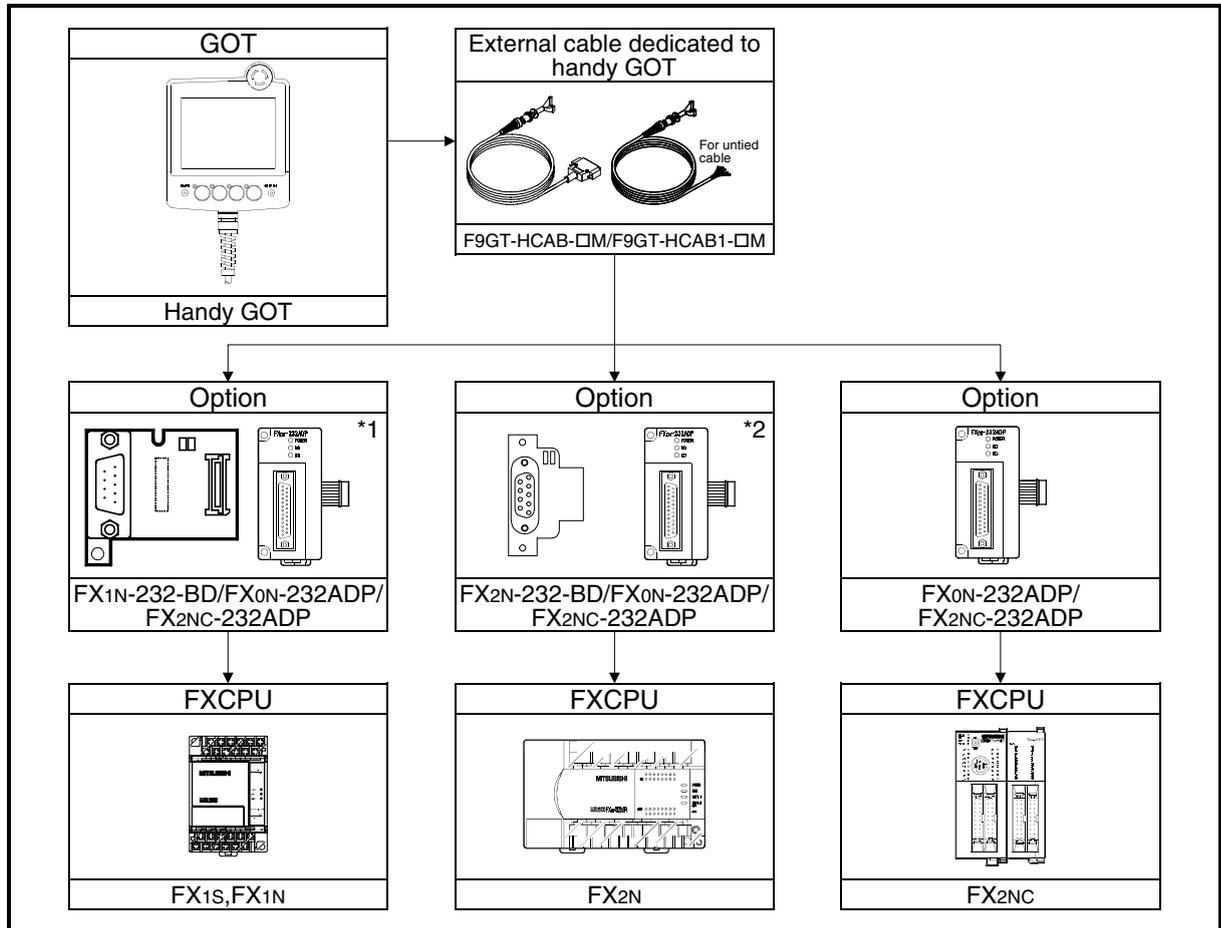
*1 When attaching the FX0N-232ADP or FX2NC-232ADP, the FX1N-CNV-BD is required.

*2 When attaching the FX0N-232ADP or FX2NC-232ADP, the FX2N-CNV-BD is required.

6.2   Connection cable

The user should prepare the RS-232C cable which connects the GOT and the PLC CPU (CPU direct connection).
The connection diagram, the connector, etc. of RS-232C cables are shown below.

1) Connection diagram

   a) When the QCPU is connected

      F9GT-HCAB5-150

GOT side (F9GT-HCAB□-3M) (□ = none or 1)			Cable connection and signal direction	QCPU side (6-pin MINI DIN)	
Signal name	Untied wire color	Pin number		Pin number	Signal name
			Class D grounding	–	FG
–	Drain wire	1			
–	Black	2		1	–
–	White	3		5	–
–	Green	5			–
–	Brown	7		6	–
–	Red	4		2	–
–	Orange	10		3	–
				–	SHELL
–	Purple	12		–	DC24VG
–	Pink	13		–	DC24VG
–	Fresh green	14		–	SW COM
–	Sky blue	15		–	SW1
–	Black/white	16		–	SW2
–	Red/white	17		–	SW3
–	Green/white	18		–	SW4
–	Brown/white	21		–	ES1
–	Yellow/white	22		–	ES1
–	Blue/white	24		–	DC24V+
–	Gray/white	25		–	DC24V+

F9GT-HCAB
25-pin D-Sub, female connector

Q Series
6-pin MINI DIN, male connector

b) When the port of the connected FX1N-232-BD, FX2N-232-BD or FX2NC-232ADP is the 9-pin D-Sub type

GOT side (F9GT-HCAB□-3M) (□ = none or 1)			Cable connection and signal direction	FXCPU side (9-pin D-Sub, male, #4-40UNC inch-thread type)	
Signal name	Untied wire color	Pin number		Pin number	Signal name
CD(DCD)	Blue	8		1	CD(DCD)
RD(RXD)	Red	4		2	RD(RXD)
SD(TXD)	Black	2		3	SD(TXD)
ER(DTR)	White	3		4	ER(DTR)
SG(GND)	Orange	10		5	SG(GND)
DR(DSR)	Green	5		6	DR(DSR)
RS(RTS)	Yellow	6		7	RS(RTS)
CS(CTS)	Brown	7	SHIELD	9	CS(CTS)
FG (SHIELD)	Drain wire	1	Class D grounding	–	FRAME

c) When the port of the connected FX0N-232ADP is the 25-pin D-Sub type

GOT side (F9GT-HCAB□-3M) (□ = none or 1)			Cable connection and signal direction	FXCPU side (25-pin D-Sub, male, milli-thread type)	
Signal name	Untied wire color	Pin number		Pin number	Signal name
CD(DCD)	Blue	8		8	CD(DCD)
RD(RXD)	Red	4		3	RD(RXD)
SD(TXD)	Black	2		2	SD(TXD)
ER(DTR)	White	3		20	ER(DTR)
SG(GND)	Orange	10		7	SG(GND)
DR(DSR)	Green	5		6	DR(DSR)
RS(RTS)	Yellow	6		4	RS(RTS)
CS(CTS)	Brown	7	SHIELD	5	CS(CTS)
FG (SHIELD)	Drain wire	1	Class D grounding	–	FRAME

2) Used connectors and connector covers

 - Connector on the side of the cable dedicated to the GOT
   The connector of the cable dedicated to the GOT (F9GT-HCAB-□□M) has the following model name. Use a counterpart connector compatible with this connector.
   17JE-23250-02 (D8A2)
   25-pin D-Sub, male connector manufactured by DDK Ltd. (DDK)
   The cable dedicated to the GOT (F9GT-HCAB1-□□M) is the untied wire type.

 - Port on the PLC CPU side
   The table below shows the model name of the connector of each option. Use a counterpart connector compatible with this connector.

Option	Connector model name	Manufacturer
FX1N-232-BD FX2N-232-BD FX2NC-232ADP	SDEB-9P 9-pin D-Sub, male connector (lock metal, inch-thread)	HIROSE ELECTRIC CO., LTD.
	JES-9P-2A3A 9-pin D-Sub, male connector	JST Mfg Co., Ltd.
FX0N-232ADP	17L-10250-27 (D3A) 25-pin D-Sub, female connector	DDK Ltd. (DDK)

3) Caution on cable preparation

Make sure that the maximum cable length does not exceed the value shown in the table below.

Connection destination PLC CPU	Maximum cable length (m)	Remarks
QCPU	6	Total of F9GT-HCAB-3M and F9GT-HCAB5 (4.5m, 14' 9")
		Total of F9GT-HCAB1-3M and cable prepared by user
		When F9GT-HCAB1-10M is cut
FXCPU	6	Total of F9GT-HCAB-3M and cable prepared by user
		When F9GT-HCAB1-10M is cut

Remarks

The table below shows the points of contact of the used connectors and connector covers.

Manufacturer	Address	Phone No.
DDK Ltd. (DDK)	(Daimei-Fujikura Bldg.) 2-11-20, Nishigotanda, Shinagawa-Ward, Tokyo 141-0031, Japan	(03)3494-6611
JST Mfg Co., Ltd. (JST)	2-6-8, Kamono-nishi, Joto-ku, Osaka City, Osaka 536-0014, Japan	(06)6968-2722

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7.   Computer Link Connection

Computer link connection (RS-232C communication) has the following features.

- Because a computer link unit and the GOT can be connected on the one-to-one basis, two or more GOT units can be connected in accordance with the number of computer link units connected to the PLC CPU.
- When peripheral equipment having the GPP function is connected to the PLC CPU, sequence programs can be debugged while monitoring is performed in the GOT.

7.1   System configuration
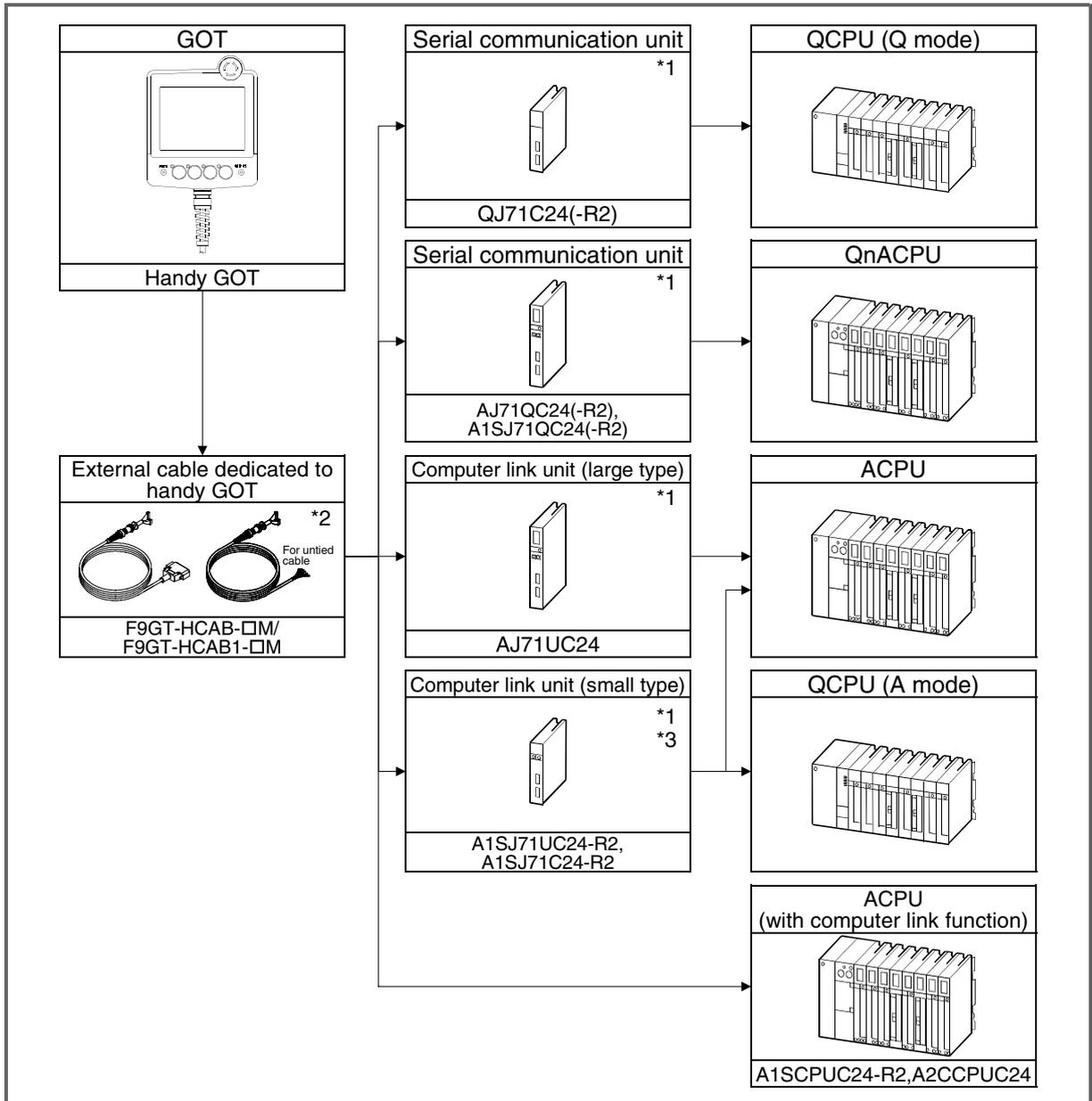
*1 For the system configuration on the computer link unit/serial communication unit side, refer to the USER'S MANUAL of the used computer link unit/serial communication unit.

*2 The RS-232C cable is to be prepared by the user.
   For the details of the preparation method, refer to section 7.4.

*3 When the A1SJ71C24-R2 is used and the connection destination PLC CPU is the AnUCPU, the access range for monitoring is equivalent to the range in the AnACPU.

7.2   Initial setting

7.2.1   Setting in communication link unit and serial communication unit

When connecting the GOT to a computer link unit or serial communication unit for monitoring, set the switches of the computer link unit or the serial communication unit as shown below.

1) When the QJ71C24(-R2) is connected

Set the switches of the QJ71C24(-R2) using the I/O assignment setting of the GPPW. For the details of the setting method, refer to the GPPW OPERATING MANUAL.
The contents of setting vary depending on the CH (interface number) of the serial communication unit connected to the GOT.
Set the switches in accordance with the connected CH as follows.

CH connected to GOT	Contents of setting
CH1	Switch setting for I/O and intelligent functional module — Input format: HEX |	Slot	Type	Model name	Switch 1	Switch 2	Switch 3	Switch 4	Switch 5
0	PLC	PLC					
1	0(*-0)	Intelli.	QJ71C24(-R2)	0966	0005			0000
2	1(*-1)							
3	2(*-2)								
CH2	Switch setting for I/O and intelligent functional module — Input format: HEX |	Slot	Type	Model name	Switch 1	Switch 2	Switch 3	Switch 4	Switch 5
0	PLC	PLC					
1	0(*-0)	Intelli.	QJ71C24(-R2)			0966	0006	0000
2	1(*-1)							
3	2(*-2)								

Point

When the GOT is connected, the CH1 and the CH2 of the serial communication unit cannot be used at the same time. Accordingly, have in mind that both the GOT and peripheral equipment having the GPP function cannot be connected at the same time to one serial communication unit and that two GOT units cannot be connected to one serial communication unit at the same time.

2) When the AJ71QC24(-R2) is connected

CH1

Mode selector switch
(for CH1)

Transmission
specifications setting
switches (for CH1)

When the
transmission speed
is set to 38400 bps

When the
transmission speed
is set to 19,200 bps
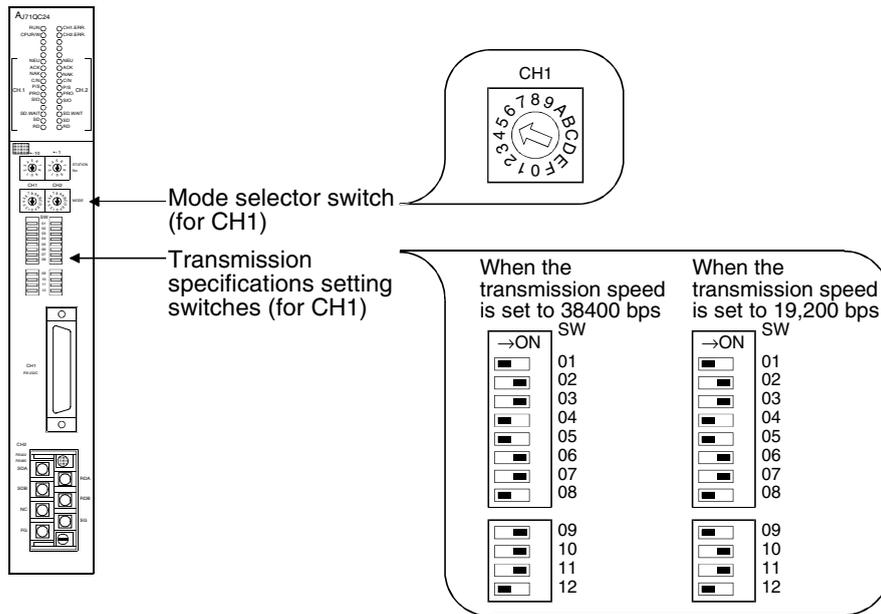
Point

When the AJ71QC24N(-R2) is connected and the transmission speed is set to 38,400 bps,
the transmission speed on the GOT side should be set again.
For the details of the setting method, refer to section 7.2.2.

3) When the A1SJ71QC24(N)(-R2) is connected

Mode selector switch

Transmission
specifications setting
switches

When the
transmission speed
is set to 38400 bps

When the
transmission speed
is set to 19,200 bps
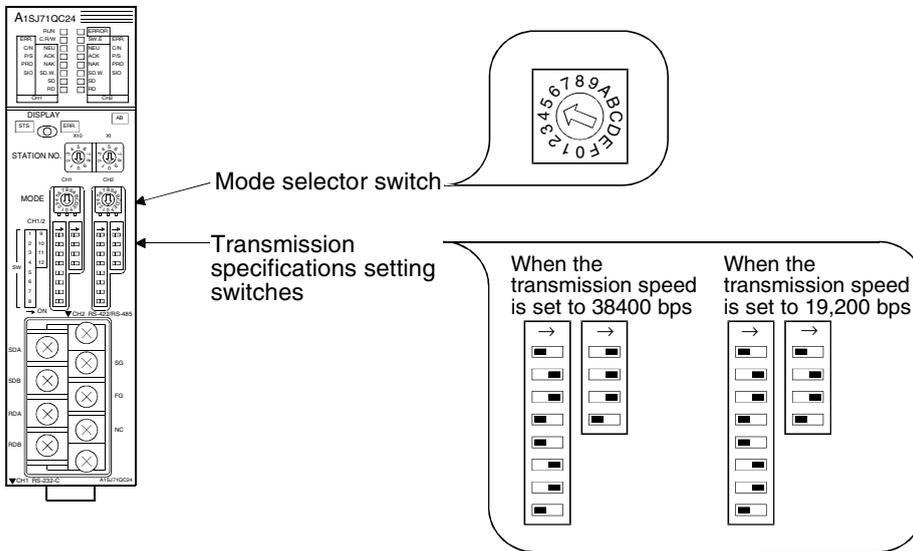
Point

When the A1SJ71QC24N(-R2) is connected and the transmission speed is set to 38,400
bps, the transmission speed on the GOT side should be set again.
For the details of the setting method, refer to section 7.2.2.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 A

4) When the AJ71UC24 is connected

Mode selector switch

Station No. setting switches

×10

×1

Transmission specifications setting switches

→ ON

SW11
SW12
SW13
SW14
SW15
SW16
SW17
SW18

→ ON

SW21
SW22
SW23
SW24
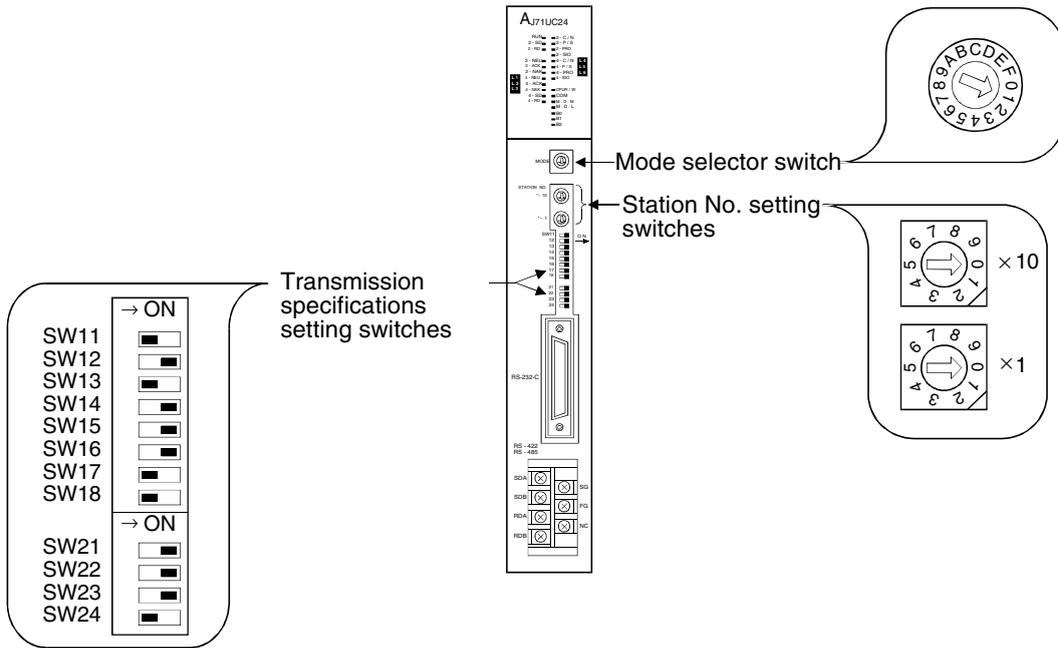
5) When the A1SJ71UC24-R2 or the A1SJ71C24-R2 is connected

Mode selector switch

Transmission specifications setting switches

SW

ON ←

03
04

ON ←

05
06
07
08
09
10
11
12
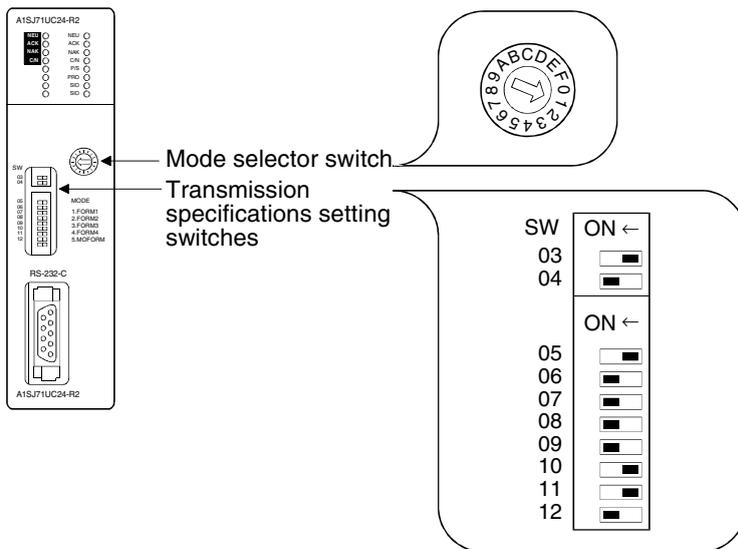
6) When the A1SCPUC24-R2 is connected

Mode selector switch

Transmission specifications setting switches

When the cover is open
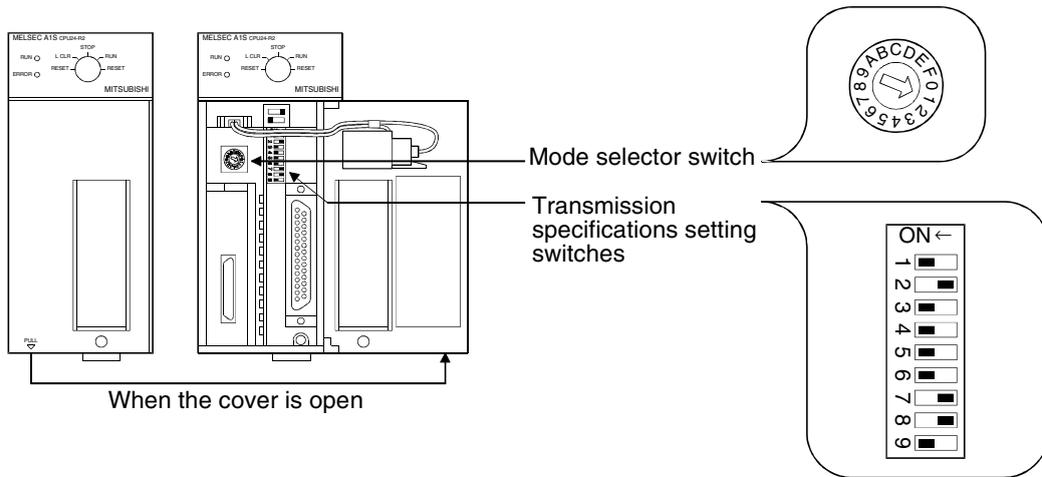
7) When the A2CCPUC24 is connected

Mode selector switch

Station No. setting switches

When the cover is open

Transmission specifications setting switches
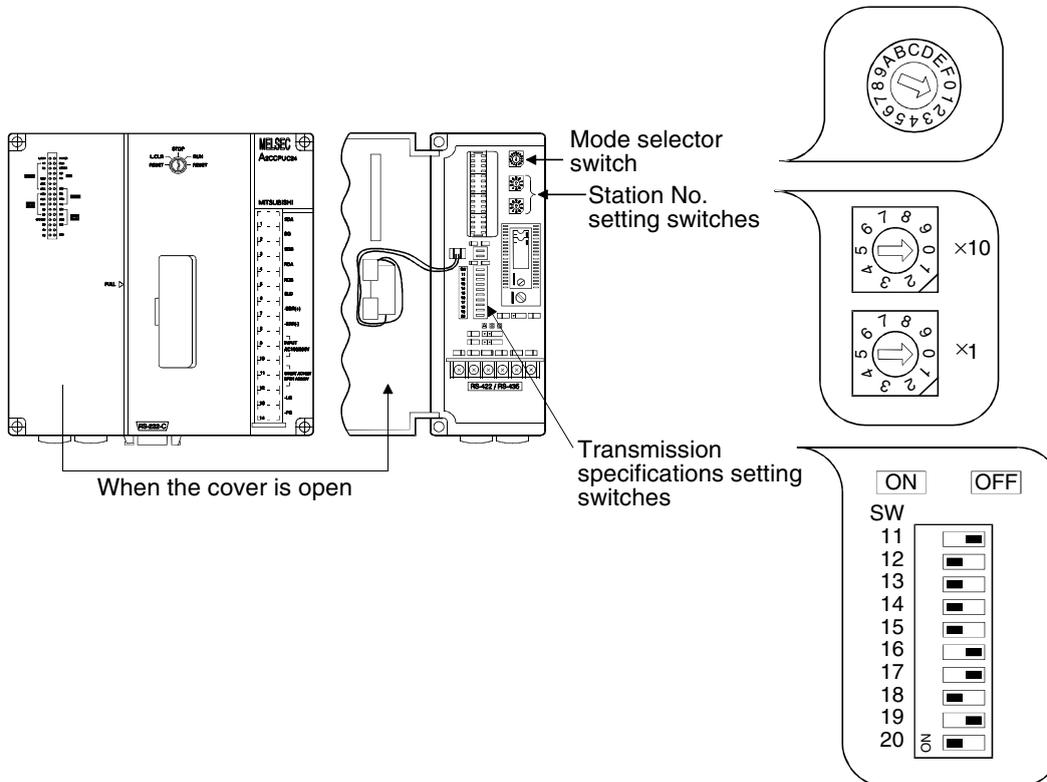
7.2.2   Setting in GOT

When the GOT is connected to the computer link unit or the serial communication unit for monitoring, setting is not required on the GOT side in principle.
However, when the AJ71QC24N(-R2) or the A1SJ71QC24N(-R2) is connected and data transmission at 38,400 bps is required, the transmission speed on the GOT side should be set to 38,400 bps.
Set the transmission speed in "Setup" of the utility function of the GOT.
For the details of the utility function, refer to the GOT-A900 SERIES OPERATING MANUAL (EXTENSION FUNCTION/OPTIONAL FUNCTION FOR SW☐D5C-GOTR-PACKE).

```
┌──┬──────────────────────────────┐
│□ │ セットアップ                    │
├──┴──────────────────────────────┤
│                                  │
│ BUZZER VOLUME      NONE SHOT LONG│
│ OUTSIDE SPEAKER    OFF   ON      │
│ SCREEN SAVE TIME   0 0 MIN. (0:FREE)│
│ SCREEN SAVE LIGHT  OFF   ON      │
│ LANGUAGE           日本語  ENGLISH │
│ QC24 Baud rate     19200   38400 │◄─── QC24 Baud rate
│                                  │
│  Page  1/2  ↑ ↓ ← → SELECT/CHANGE│
│   ⬆    ⬇      ⬅  ➡      ↵       │
└──────────────────────────────────┘
```
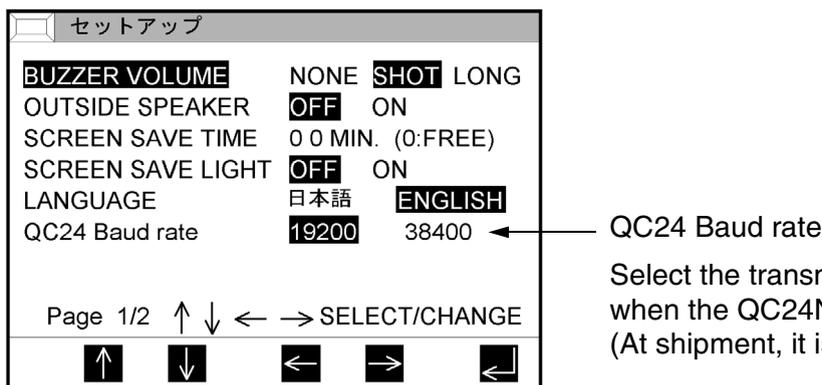
Select the transmission speed to be used when the QC24N is connected.
(At shipment, it is set to "19200".)

Point

After the system program (such as the basic OS and the communication driver) is installed in the GOT, then the power of the GOT is turned off once and turned on again, the utility function can be started up.
After starting up the GOT, touch the "Setup" icon to display the "Setup" screen, then perform the settings related to computer link connection.

7.3   Transmission specifications

The table below shows the transmission specifications used for communication between the GOT and the computer link unit or the serial communication unit.

Item	Contents of setting		
	When QJ71C24(-R2) is connected	When AJ71QC24N(-R2) or A1SJ71QC24N(-R2) is connected	When any other unit is connected
Transmission speed	38400bps	19200bps/38400bps	19200bps
Data length	8 bits		
Stop bit	1 bit		
Parity bit	Provided (odd)		
Sum check	Provided		

7.4   Connection cable

The user is to prepare the RS-232C cable which connects the GOT and the PLC CPU (serial communication unit, computer link unit or PLC CPU having the computer link function).
The connection diagrams, connectors, etc. of the RS-232C cables are shown below.

1) Connection diagram

   a) When the connector on the PLC CPU side is the 9-pin D-Sub type
      (QJ71C24(-R2), A1SJ71QC24(-R2), A1SJ71UC24-R2, A1SJ71C24-R2, A1SCPUC24-R2
      or A2CCPUC24)

GOT side (F9GT-HCAB□-3M) (□ = none or 1)			Cable connection and signal direction	PLC CPU side	
Signal name	Untied wire color	Pin number		Pin number	Signal name
CD(DCD)	Blue	8		1	CD(DCD)
RD(RXD)	Red	4		2	RD(RXD)
SD(TXD)	Black	2		3	SD(TXD)
ER(DTR)	White	3		4	ER(DTR)
SG(GND)	Orange	10		5	SG(GND)
DR(DSR)	Green	5		6	DR(DSR)
RS(RTS)	Yellow	6		7	RS(RTS)
CS(CTS)	Brown	7		8	CS(CTS)
FG (SHIELD)	Drain wire	1	Class D grounding	9	FG

*1 If monitoring cannot be executed normally due to noise from the outside while the A1SJ71QC24(-R2) is connected, connect each signal except SG and FG of the connection cable together with the SG as follows.

```
RD ──────┐    ┌────── SD
SD ──────┤    ├────── RD
DTR ─────┤    ├────── DSR
DSR ─────┘    └────── DTR

SG ─────────────────── SG
```

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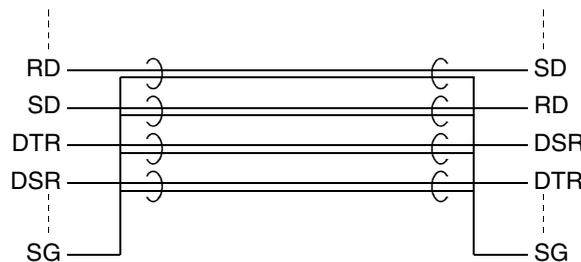
b) When the port on the PLC CPU side is the 25-pin D-Sub type
   (AJ71QC24(-R2) or AJ71UC24)

GOT side (F9GT-HCAB☐-3M) (☐ = none or 1)			Cable connection and signal direction	PLC CPU side	
Signal name	Untied wire color	Pin number		Pin number	Signal name
CD(DCD)	Blue	8		1	FG
RD(RXD)	Red	4		2	SD(TXD)
SD(TXD)	Black	2		3	RD(RXD)
ER(DTR)	White	3		4	RS(RTS)
SG(GND)	Orange	10		5	CS(CTS)
DR(DSR)	Green	5		6	DR(DSR)
RS(RTS)	Yellow	6		7	SG(GND)
CS(CTS)	Brown	7		8	CD(DCD)
FG (SHIELD)	Drain wire	1	Class D grounding	20	ER(DTR)

2) Used connectors and connector covers

- Connector on the side of the cable dedicated to the GOT
  The connector of the cable dedicated to the GOT (F9GT-HCAB-☐☐M) has the following
  model name. Use a counterpart connector compatible with this connector.
  17JE-23250-02 (D8A2)
  25-pin D-Sub, male connector manufactured by DDK Ltd. (DDK)
  The cable dedicated to the GOT (F9GT-HCAB1-☐☐M) is the untied wire type.

- Port on the PLC CPU side
  Refer to the USER'S MANUAL of the used PLC CPU unit.

3) Caution on cable preparation

Make sure that the maximum cable length does not exceed the value shown in the table below.

Connection destination PLC CPU	Maximum cable length (m)	Remarks
Computer link	6	Total of F9GT-HCAB-3M and cable prepared by user
		Total of F9GT-HCAB1-3M and cable prepared by user
		When F9GT-HCAB1-10M is cut

Remarks

The table below shows the point of contact of the used connectors and connector covers.

Manufacturer	Address	Phone No.
DDK Ltd. (DDK)	(Daimei-Fujikura Bldg.) 2-11-20, Nishigotanda, Shinagawa-Ward, Tokyo 141-0031, Japan	(03)3494-6611

8. Connection to PLC by Omron

8.1 System configuration

8.1.1 System configuration when C200H/C200HS/C200Hα Series PLC is connected
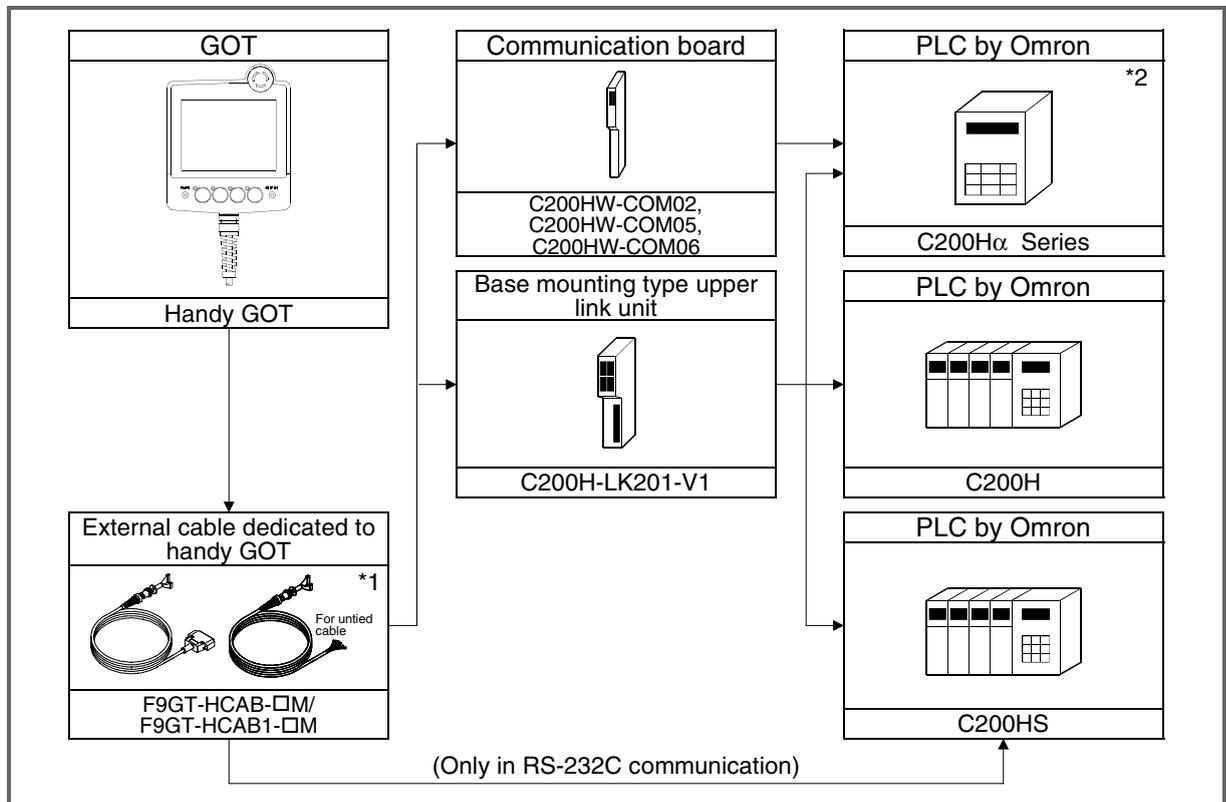
*1 The connection cable is to be prepared by the user.
   The pin arrangement is different between the communication board and the upper link unit.
   For the details of the cable preparation method, refer to section 8.3.

*2 The communication board cannot be attached to the C200HE-CPU11. Connect the C200HE-CPU11 to the Handy GOT by way of the upper link unit.

8.1.2 System configuration when CQM1 is connected
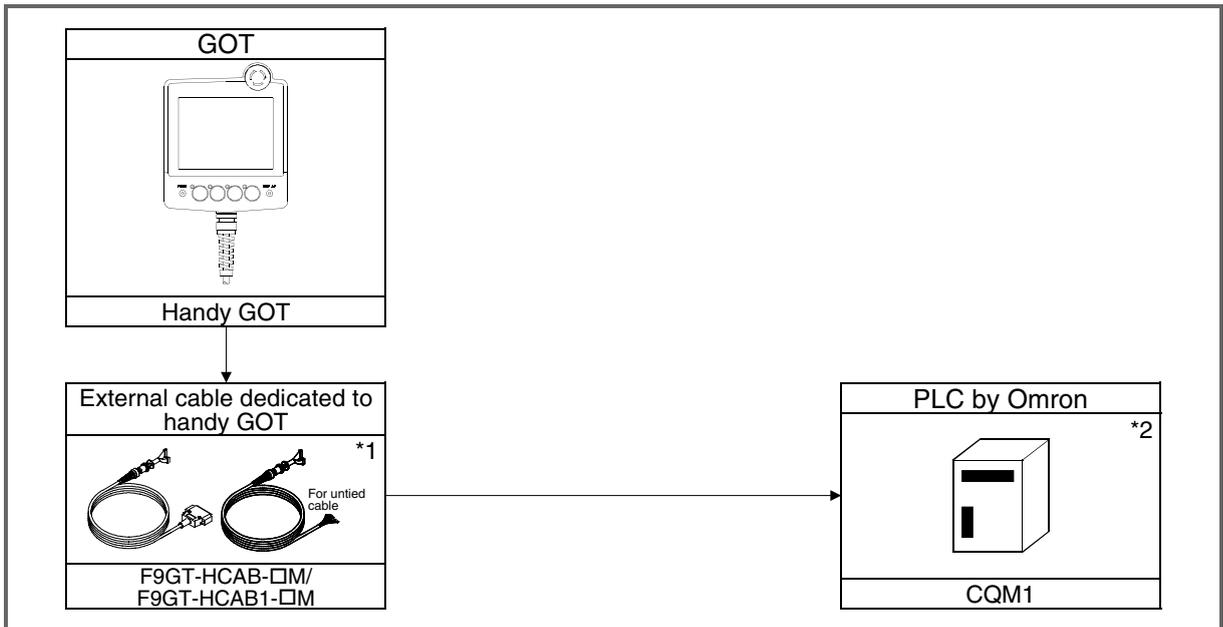
*1 The connection cable is to be prepared by the user.
   For the details of the cable preparation method, refer to section 8.3.

*2 Because the CQM1-CPU11 is not equipped with the RS-232C interface, it cannot be connected to the Handy GOT.

8.1.3 System configuration when C1000H/C2000H is connected
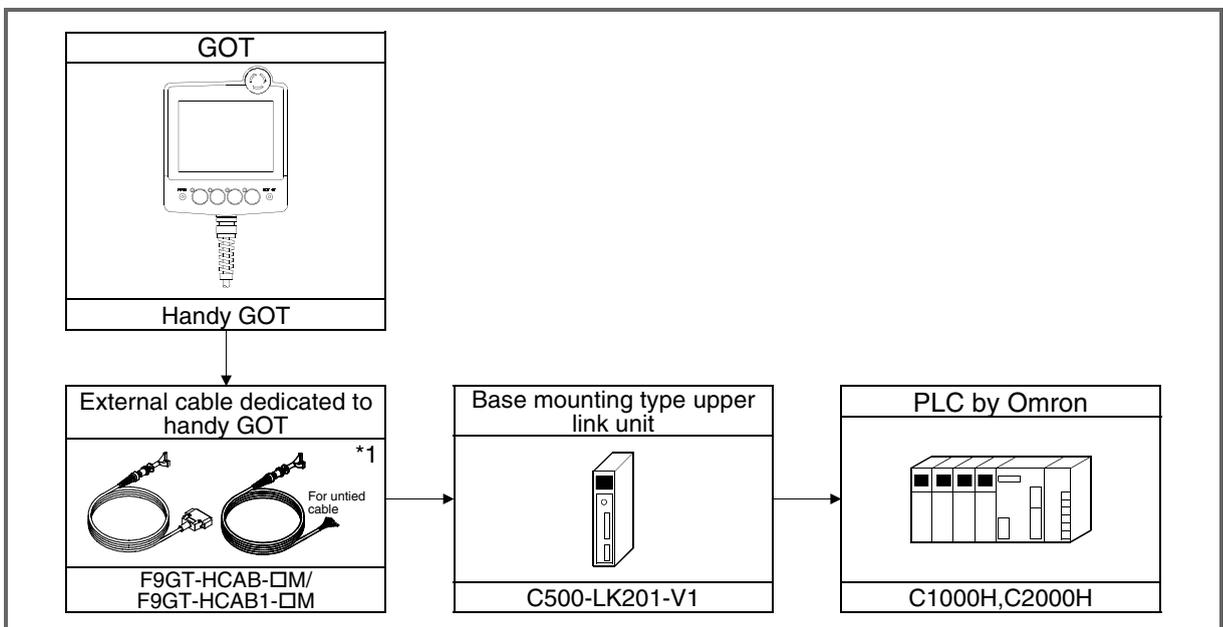
*1 The connection cable is to be prepared by the user.
   For the details of the cable preparation method, refer to section 8.3.

8.1.4   System configuration when CV1000 is connected

*1 The connection cable is to be prepared by the user.
   For the details of the cable preparation method, refer to section 8.3.

*2 The CV1000 version 1 or later is applicable.

8.2   Initial setting

8.2.1   Setting of switches in upper link unit

When using the upper link unit (C200H-LK201-V1 or C500H-LK201-V1), set the switches as shown below.

1) When the C200H-LK201-V1 is used

Setting of switches on the front face

LK201-V1

RUN   XM

RCV

ERROR

SW1   SW2

SW3   SW4
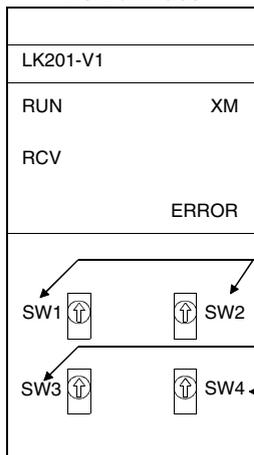
a) Setting of the SW1 and the SW2
   (setting of the unit No.)
   Set "SW1: 0, SW2: 0" (to set the unit No. 00).

b) Setting of the SW3
   (setting of the transmission speed)
   Set "SW3: 6" (to set 19,200 bps).

c) Setting of the SW4
   (setting of the command level, the parity and
   the transmission code)
   Set "SW4: 2"
   (to set even parity, 7 ASCII bits and 2 stop bits).

d) Setting of the 5 V supply SW
   When using the optical interface Z3RN-A-5, set
   this switch to ON (5V supply provided).
   When not using the optical interface, make sure
   to set it to OFF.

Setting of switches on the rear face

SW No.	ON	OFF
1	Not used	
2	(To be set to OFF.)	
3	"1:N" procedure	"1:1" procedure
4	5 V supply provided	5 V supply not provided
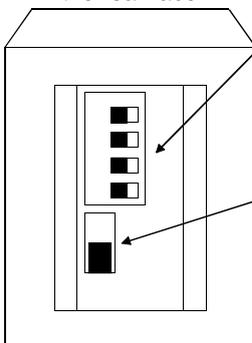
e) CTS selector SW
   Set this switch to the "0 V" side to always keep
   the CTS at ON. Set this switch to the "external"
   side to receive signal from the outside.
   Usually, set this switch to the "0 V" side.

2) When the C500H-LK201-V1 is used

Setting of switches on
the front face

| Operating |
| Reciving |
| Sending |
| Transmission error |

Mode setting
Upper-level link
Local

Setting of switches
on the rear face

b)

c)

d)

e)

f)

g)

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3
2
1

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2
1
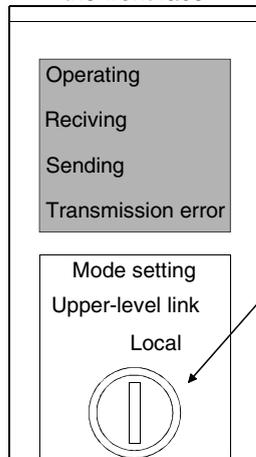
a) Setting of upper link/local
   Set "upper link".

b) Setting of the RS-232C/RS-422 selector switch
   For RS-422 communication, set "RS-422"
   (upper side).
   For RS-232C communication, set "RS-232C"
   (lower side).

c) Setting of the internal clock/external clock
   selector switch
   Set "internal clock" (upper side).

d) Setting of the terminal resistor connection
   selector switch
   Set "terminal resistor provided" (lower side).

e) Setting of the CTS selector switch
   Set "0 V" (upper side).
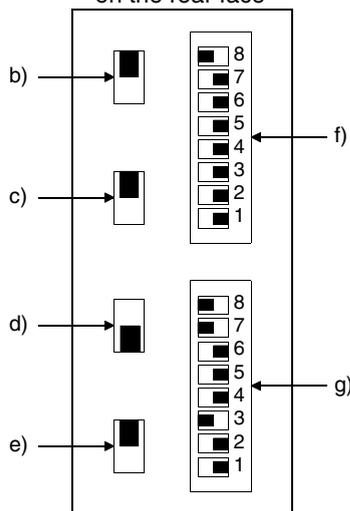
f) Setting of the SW1
   (setting of the unit No. and run/stop)
   Set as follows.

1	2	3	4	5	6	7	8
OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON

Unit No. 00   Run

g) Setting of the SW2 (setting of the transmission
   speed, the "1:1"/"1:N" procedure and the level)

1	2	3	4	5	6	7	8
OFF	OFF	ON	OFF	OFF	OFF	ON	ON

19.2kbps   "1:N"   Levels 1, 2 and 3
        procedure   are effective.

8.2.2   Setting in CV1000

1) Setting of switches

In the CPU (CV1000), set the switches shown below.

Setting of switches on the front face

HOST   LINK

RS-232

RS-422

Cover

a) Setting of the RS-232C/RS-422 selector switch
For RS-422 communication, set "RS-422" (lower side).
For RS-232C communication, set "RS-232C" (upper side).

b) Setting of the DIP switch
Set this switch as follows.

1	2	3	4	5	6
OFF	OFF	OFF	OFF	OFF	ON

▨ :Setting cannot be omitted.
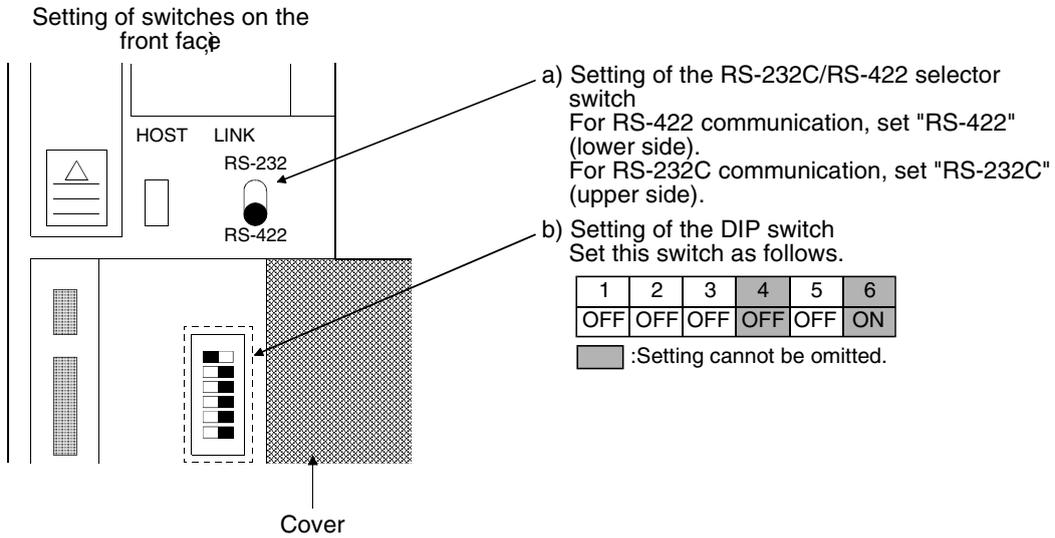
2) Setting by a peripheral tool

Using a peripheral tool, set the following contents to the CPU (CV1000).

Item	Set value
Transmission speed	19200 bps
Stop bit	2 stop bits
Parity	Even parity
Data length	7 bits
Unit No.	Unit No. 00

8.2.3   Initialization of CQM1

When using the RS-232C port of the CQM1, write numeric values to the devices shown below, and initialize the RS-232C port of the CQM1 using a peripheral tool or the DM monitor.
For the details, refer to the CQM1 INSTRUCTION MANUAL.

Device name	Written value	Device name	Written value
DM6645	0001H	DM6646	0304H
DM6647	0000H	DM6648	0000H
DM6649	0000H	–	

8.2.4   Communication board initialization program

When using a communication board, write numeric values to the devices shown below, and initialize the port A of the communication board.
For the use of each device and the initialization program, refer to the INSTRUCTION MANUAL of the used communication board.

Device name	Written value	Device name	Written value
DM6550~DM6654	–	DM6555	0001H
DM6556	0304H	DM6557	0000H
DM6558	0000H	DM6559	0000H

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8.3   Connection cable

The connection diagram and the connector of RS-232C cables which connect the upper link unit, the communication board, the CPU (CV1000 or CQM1) and the GOT are shown below.

1) Connection diagram

    a) Upper link unit

GOT side (F9GT-HCAB□-3M) (□ = none or 1)			Cable connection and signal direction	Omron PLC side (25-pin D-Sub, male, milli-thread type)	
Signal name	Untied wire color	Pin number		Pin number	Signal name
CD(DCD)	Blue	8		1	FG
RD(RXD)	Red	4		2	SD(TXD)
SD(TXD)	Black	2		3	RD(RXD)
ER(DTR)	White	3		4	RS(RTS)
SG(GND)	Orange	10		5	CS(CTS)
DR(DSR)	Green	5		6	–
RS(RTS)	Yellow	6		7	SG(GND)
CS(CTS)	Brown	7		8	–
FG (SHIELD)	Drain wire	1	Class D grounding	20	ER(DTR)

    b) Communication board

GOT side (F9GT-HCAB□-3M) (□ = none or 1)			Cable connection and signal direction	Omron PLC side (9-pin D-Sub, male, milli-thread type)	
Signal name	Untied wire color	Pin number		Pin number	Signal name
CD(DCD)	Blue	8		1	FG
RD(RXD)	Red	4		2	SD(TXD)
SD(TXD)	Black	2		3	RD(RXD)
ER(DTR)	White	3		4	RS(RTS)
SG(GND)	Orange	10		5	CS(CTS)
DR(DSR)	Green	5		6	5V
RS(RTS)	Yellow	6		7	DR(DSR)
CS(CTS)	Brown	7		8	ER(DTR)
FG (SHIELD)	Drain wire	1	Class D grounding	9	SG(GND)

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c) CPU (CV1000 or CQM1)

GOT side (F9GT-HCAB□-3M) (□ = none or 1)			Cable connection and signal direction	Omron PLC side (9-pin D-Sub, male, milli-thread type)	
Signal name	Untied wire color	Pin number		Pin number	Signal name
CD(DCD)	Blue	8		1	FG
RD(RXD)	Red	4		2	SD(TXD)
SD(TXD)	Black	2		3	RD(RXD)
ER(DTR)	White	3		4	RS(RTS)
SG(GND)	Orange	10		5	CS(CTS)
DR(DSR)	Green	5		6	–
RS(RTS)	Yellow	6		7	–
CS(CTS)	Brown	7		8	–
FG (SHIELD)	Drain wire	1	Class D grounding	9	SG(GND)
–	–	–		SHELL	FG

2) Used connectors and connector covers

- Connector on the side of the cable dedicated to the GOT
  The connector of the cable dedicated to the GOT (F9GT-HCAB-□□M) has the following model name. Use a counterpart connector compatible with this connector.
  17JE-23250-02 (D8A2)
  25-pin D-Sub, male connector manufactured by DDK Ltd. (DDK)
  The cable dedicated to the GOT (F9GT-HCAB1-□□M) is the untied wire type.

- Use the connected offered as an accessory of the upper link unit, the communication board and the CPU (CV1000, CQM1).

3) Caution on cable preparation

The maximum cable length varies depending on the specifications of the used PLC by Omron. For the details, refer to the INSTRUCTION MANUAL of the PLC by Omron.
However, make sure that the maximum cable length does not exceed the shorter one between the specifications of the PLC by Omron and the value shown in the table below.

Connection destination PLC CPU	Maximum cable length (m)	Remarks
PLC by Omron	6	Total of F9GT-HCAB-3M and cable prepared by user
		Total of F9GT-HCAB1-3M and cable prepared by user
		When F9GT-HCAB1-10M is cut

Remarks
The table below shows the point of contact of the used connectors and connector covers.

Manufacturer	Address	Phone No.
DDK Ltd. (DDK)	(Daimei-Fujikura Bldg.) 2-11-20, Nishigotanda, Shinagawa-Ward, Tokyo 141-0031, Japan	(03)3494-6611

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9. Connection to PLC by Yaskawa Electric

9.1 System configuration
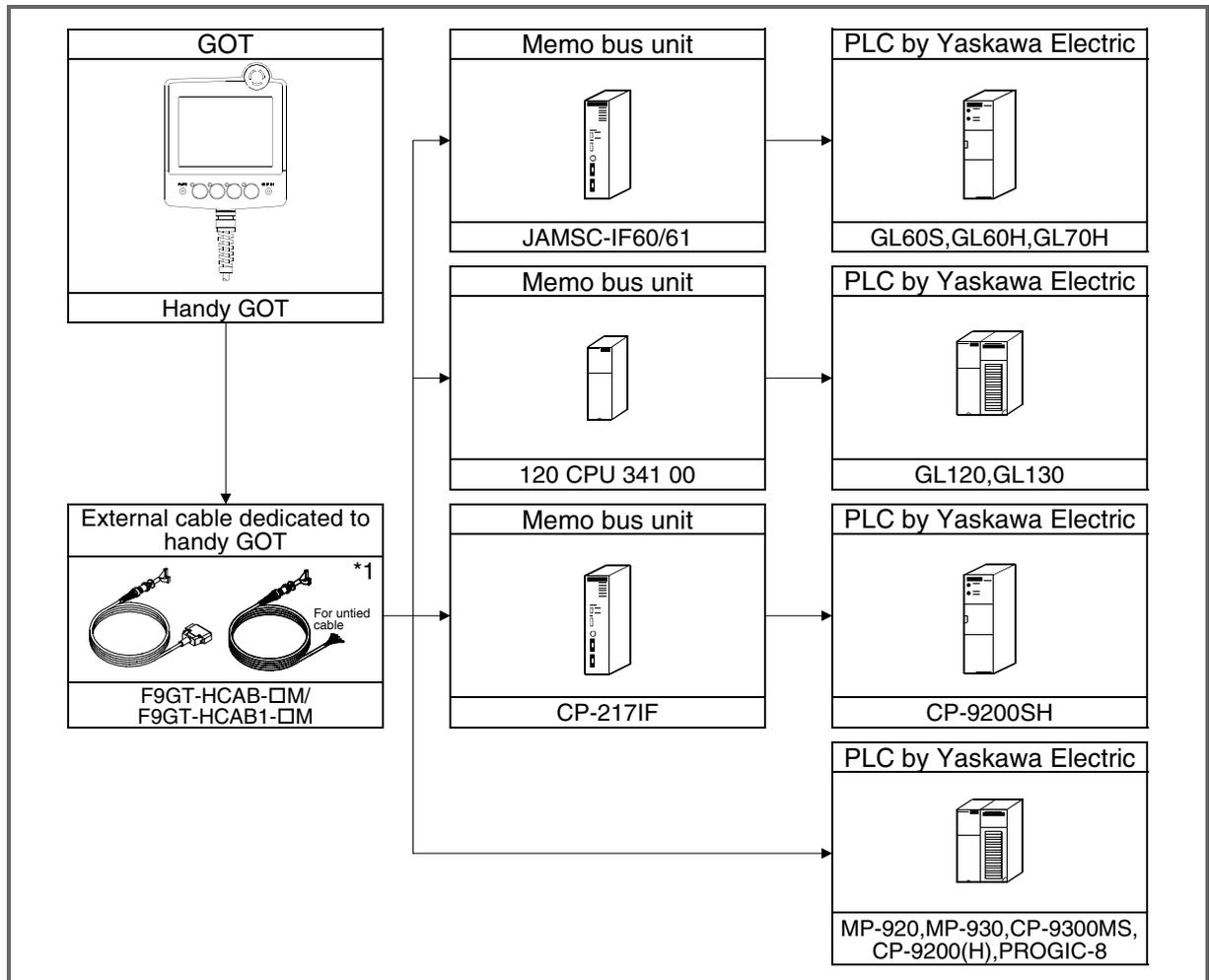
*1 The connection cable is to be prepared by the user.
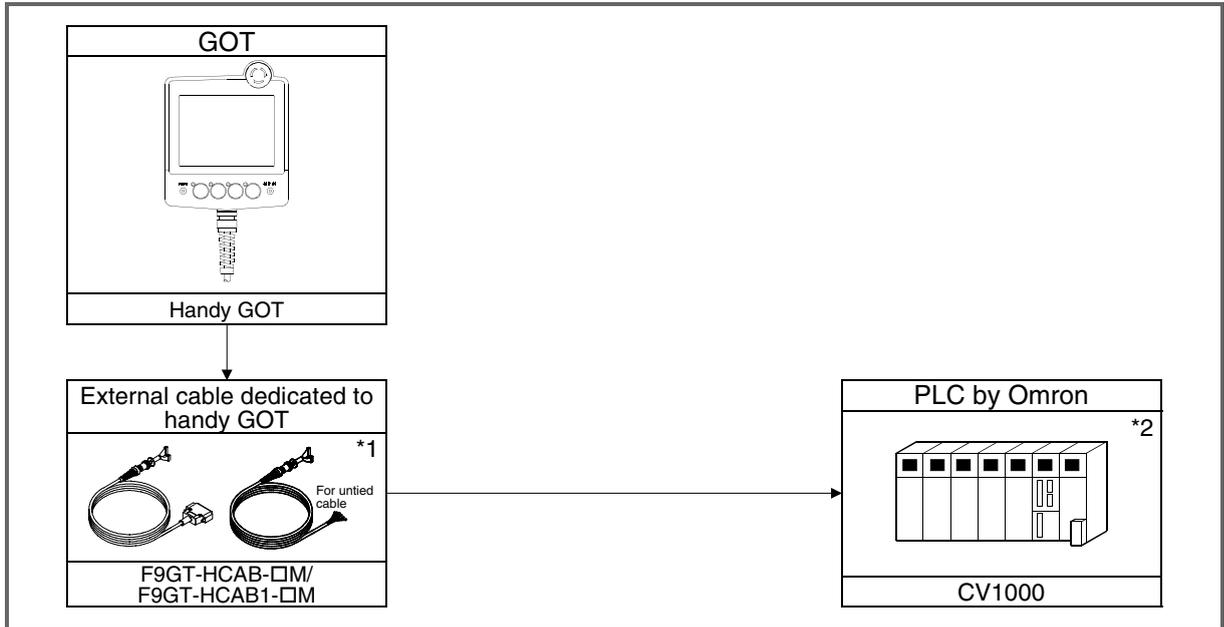For the details of the cable preparation method, refer to section 9.3.

9.2   Initial setting

1) Setting in the PLC by Yaskawa Electric

   When connecting the GOT to the PLC by Yaskawa Electric, set the communication and the port shown below using a peripheral tool.
   For the details of the setting method, refer to the INSTRUCTION MANUAL of the PLC by Yaskawa Electric.

Item	Set value
Address	1
Protocol	MEMOBUS
Mode	RTU
Data length	8 bits
Parity	EVEN
Stop bit	1 bit
Communication speed (transmission speed)[*1]	4800bps/9600bps/19200bps/38400bps

   *1 The allowable upper limit varies depending on the connected PLC by Yaskawa Electric.

2) Setting in the GOT

   When connecting the GOT to the PLC by Yaskawa Electric, the transmission speed should be set in the GOT in accordance with the setting in the used PLC by Yaskawa Electric.
   Set the transmission speed using the utility function of the GOT.
   For the details of the utility function, refer to the GOT-A900 SERIES OPERATING MANUAL (EXTENSION FUNCTION/OPTIONAL FUNCTION FOR SW□D5C-GOTR-PACKE).

```
┌─────────────────────────────────────┐
│ ▭       SET UP                        │
│                                       │
│ BUZZER VOLUME      NONE SHOT LONG     │
│ OUTSIDE SPEAKER    OFF   ON           │
│ SCREEN SAVE TIME   0 0 MIN. (0:FREE)  │
│ SCREEN SAVE LIGHT  OFF   ON           │
│ LANGUAGE           日本語  ENGLISH     │
│ Baud rate          19200 (↑↓ CHANGE)  │
│ START UP TIME      0 1 6 sec (0~255)  │
│ SEND MESSAGE DELAY 0 0 ×10ms (0~30)   │
│                                       │
│      ↑ ↓ ← → SELECT/CHANGE            │
│   [↑]  [↓]    [←]  [→]      [↵]       │
└─────────────────────────────────────┘
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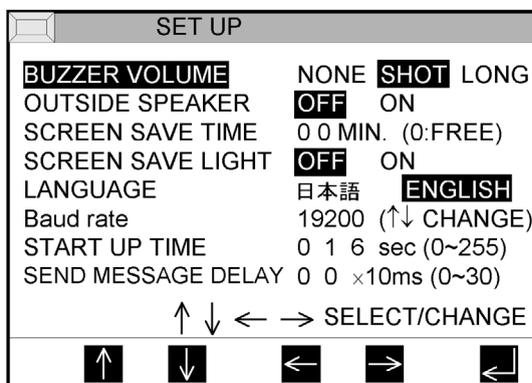
Setting item	Description	Factory setting
Baud rate	Choose the transmission speed (4800, 9600, 19200, 38400).	19200
START UP TIME	Set how many seconds after GOT power-on the communication with the PLC CPU will be started.	1
SEND MESSAGE DELAY	Set the waiting time from when the GOT has received data from the PLC CPU until it sends next data to the PLC CPU.	0

Point

After the system program (such as the basic OS and the communication driver) is installed in the GOT, then the power of the GOT is turned off once and turned on again, the utility function can be started up.
After starting up the GOT, touch the "Setup" icon to display the "Setup" screen, then perform the settings related to connection of the PLC by Yaskawa Electric.

9.3 Connection cable

9.3.1 RS-232C cable

1) Connection diagram

   a) When the GL60S, the GL60H, the GL70H, the GL120, the GL130, the MP-920, the MP-930, the CP-9200(H) or the PROGGIC-8 (when 9-pin D-Sub port is used) is used

GOT side (F9GT-HCAB□-3M) (□ = none or 1)			Cable connection and signal direction	Yaskawa Electric PLC side (9-pin D-Sub, male, milli-thread type)	
Signal name	Untied wire color	Pin number		Pin number	Signal name
CD(DCD)	Blue	8		1	FG
RD(RXD)	Red	4		2	TXD
SD(TXD)	Black	2		3	RXD
ER(DTR)	White	3		4	RTS
SG(GND)	Orange	10		5	CTS
DR(DSR)	Green	5		6	DSR
RS(RTS)	Yellow	6		7	GND
CS(CTS)	Brown	7		8	EST
FG (SHIELD)	Drain wire	1	Class D grounding	9	DTR

   b) When the CP-9200SH is used

GOT side (F9GT-HCAB□-3M) (□ = none or 1)			Cable connection and signal direction	Yaskawa Electric PLC side (25-pin D-Sub, male, milli-thread type)	
Signal name	Untied wire color	Pin number		Pin number	Signal name
CD(DCD)	Blue	8		1	FG
RD(RXD)	Red	4		2	TXD
SD(TXD)	Black	2		3	RXD
ER(DTR)	White	3		4	RS
SG(GND)	Orange	10		5	CS
DR(DSR)	Green	5		6	DSR
RS(RTS)	Yellow	6		7	SG
CS(CTS)	Brown	7		8	CD
FG (SHIELD)	Drain wire	1	Class D grounding	20	DTR

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c) When the CP-9300MS is used

GOT side (F9GT-HCAB□-3M) (□ = none or 1)			Cable connection and signal direction	Yaskawa Electric PLC side (9-pin D-Sub, male, milli-thread type)		
Signal name	Untied wire color	Pin number		Pin number	Signal name	
					CN2	CN3
CD(DCD)	Blue	8		1	FG	Not used
RD(RXD)	Red	4		2	TXD	
SD(TXD)	Black	2		3	RXD	
ER(DTR)	White	3		4	RTS	
SG(GND)	Orange	10		5	OP	CTS
DR(DSR)	Green	5		6	DSR	Not used
RS(RTS)	Yellow	6		7	GND	
CS(CTS)	Brown	7		8	PWR	Not used
FG (SHIELD)	Drain wire	1	Class D grounding	9	DTR	Not used

d) When the PROGIC-8 is used (when the 15-pin D-Sub port is used)

GOT side (F9GT-HCAB□-3M) (□ = none or 1)			Cable connection and signal direction	Yaskawa Electric PLC side (15-pin D-Sub, male, milli-thread type)	
Signal name	Untied wire color	Pin number		Pin number	Signal name
CD(DCD)	Blue	1		1	FG
RD(RXD)	Red	4		2	TXD
SD(TXD)	Black	2		3	RXD
ER(DTR)	White	3		4	RTS
SG(GND)	Orange	10		5	CTS
DR(DSR)	Green	5		6	DSR
RS(RTS)	Yellow	6		7	GND
CS(CTS)	Brown	7		8	NC
FG (SHIELD)	Drain wire	1	Class D grounding	9	DTR

2) Used connectors and connector covers

- Connector on the side of the cable dedicated to the GOT
  The connector of the cable dedicated to the GOT (F9GT-HCAB-□□M) has the following model name. Use a counterpart connector compatible with this connector.
  17JE-23250-02 (D8A2)
  25-pin D-Sub, male connector manufactured by DDK Ltd. (DDK)
  The cable dedicated to the GOT (F9GT-HCAB1-□□M) is the untied wire type.
- Port on the side of the PLC by Yaskawa Electric
  Use a connector compatible with the PLC by Yaskawa Electric.

3) Caution on cable preparation

The maximum cable length varies depending on the specifications of the used PLC by Yaskawa Electric. For the details, refer to the INSTRUCTION MANUAL of the PLC by Yaskawa Electric.

However, make sure that the maximum cable length does not exceed the shorter one between the specifications of the PLC by Yaskawa Electric and the value shown in the table below.

Connection destination PLC CPU	Maximum cable length (m)	Remarks
PLC by Yaskawa Electric	6	Total of F9GT-HCAB-3M and cable prepared by user
		Total of F9GT-HCAB1-3M and cable prepared by user
		When F9GT-HCAB1-10M is cut

Remarks

The table below shows the point of contact of the used connectors and connector covers.

Manufacturer	Address	Phone No.
DDK Ltd. (DDK)	(Daimei-Fujikura Bldg.) 2-11-20, Nishigotanda, Shinagawa-Ward, Tokyo 141-0031, Japan	(03)3494-6611

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10.   Connection to PLC by Allen-Bradley

10.1   System configuration

*1 The connection cable is to be prepared by the user.
For the details of the cable preparation method, refer to section 10.4.

10.2   Communication setting in PLC by Allen-Bradley

When connecting the GOT to the PLC by Allen-Bradley for monitoring, set the communication and the port shown below using a peripheral tool.
For the details, refer to the INSTRUCTION MANUAL of the PLC by Allen-Bradley.

Setting in PLC by Allen-Bradley	
Band Rate	19200 bps
–	
–	
Parity	EVEN
–	
–	
Communication Driver	DF1 HALF-DUPLEX SLAVE
Duplicate Packet Detection	DISABLE
Error Detection	BCC
Control Line	NO HANDSHAKING
Station Address	0

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10.3   Transmission specifications

The table below shows the transmission specifications for communication between the GOT and the PLC by Allen-Bradley.

Item	Contents of setting
Transmission speed	19200 bps
Data length	8 bits
Stop bit	1 bit
Parity bit	EVEN
Control method	Not provided

10.4   Connection cable

1) Connection diagram

GOT side (F9GT-HCAB□-3M) (□ = none or 1)			Cable connection and signal direction	Allen-Bradley PLC side (9-pin D-Sub, female, inch-thread type)	
Signal name	Untied wire color	Pin number		Pin number	Signal name
CD(DCD)	Blue	8		1	CD(DCD)
RD(RXD)	Red	4		2	RD(RXD)
SD(TXD)	Black	2		3	SD(TXD)
ER(DTR)	White	3		4	ER(DTR)
SG(GND)	Orange	10		5	SG(GND)
DR(DSR)	Green	5		6	DR(DSR)
RS(RTS)	Yellow	6		7	RS(RTS)
CS(CTS)	Brown	7		8	CS(CTS)
FG (SHIELD)	Drain wire	1		9	FG
			Class D grounding	−	Shell

2) Used connectors and connector covers

- Connector on the side of the cable dedicated to the GOT
  The connector of the cable dedicated to the GOT (F9GT-HCAB-□□M) has the following model name. Use a counterpart connector compatible with this connector.
  17JE-23250-02 (D8A2)
  25-pin D-Sub, male connector manufactured by DDK Ltd. (DDK)
  The cable dedicated to the GOT (F9GT-HCAB1-□□M) is the untied wire type.

- Port on the side of the PLC by Allen-Bradley
  Use a connector compatible with the PLC by Allen-Bradley.

3) Caution on cable preparation

The maximum cable length varies depending on the specifications of the used PLC by Allen-Bradley. For the details, refer to the INSTRUCTION MANUAL of the PLC by Allen-Bradley.

However, make sure that the maximum cable length does not exceed the shorter one between the specifications of the PLC by Allen-Bradley and the value shown in the table below.

Connection destination PLC CPU	Maximum cable length (m)	Remarks
PLC by Allen-Bradley	6	Total of F9GT-HCAB-3M and cable prepared by user
		Total of F9GT-HCAB1-3M and cable prepared by user
		When F9GT-HCAB1-10M is cut

Remarks

The table below shows the point of contact of the used connectors and connector covers.

Manufacturer	Address	Phone No.
DDK Ltd. (DDK)	(Daimei-Fujikura Bldg.) 2-11-20, Nishigotanda, Shinagawa-Ward, Tokyo 141-0031, Japan	(03)3494-6611

1 2 3 4 5 6 7 8 9 10 11 12 13 14 A
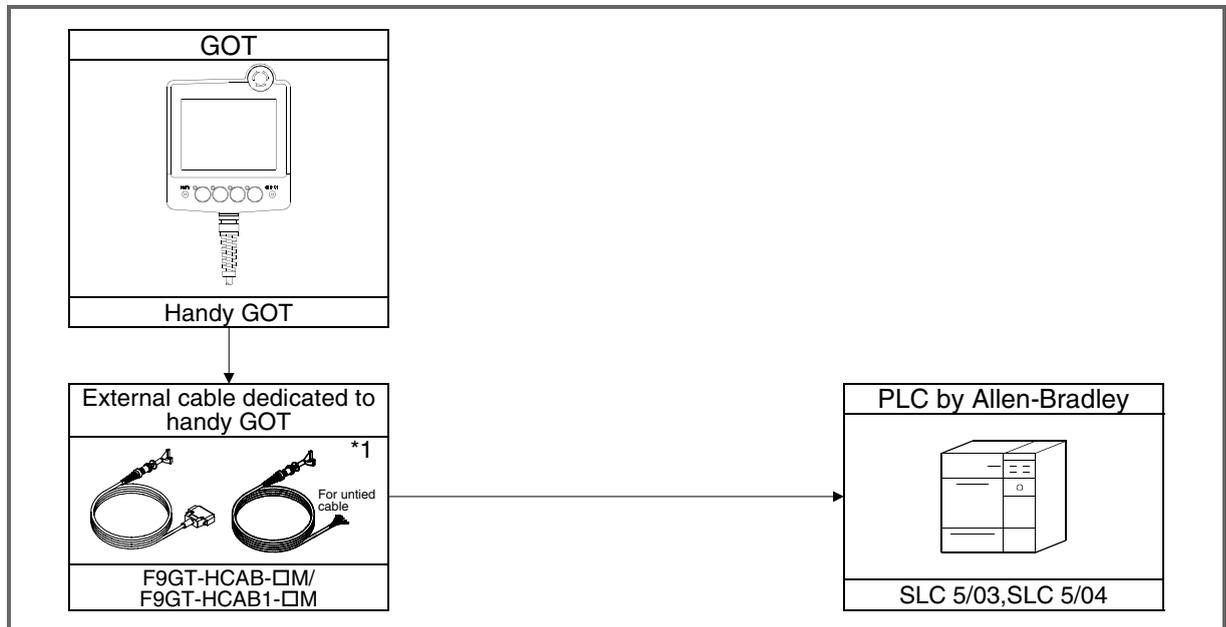
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11.   Connection to PLC by Sharp

11.1   System configuration
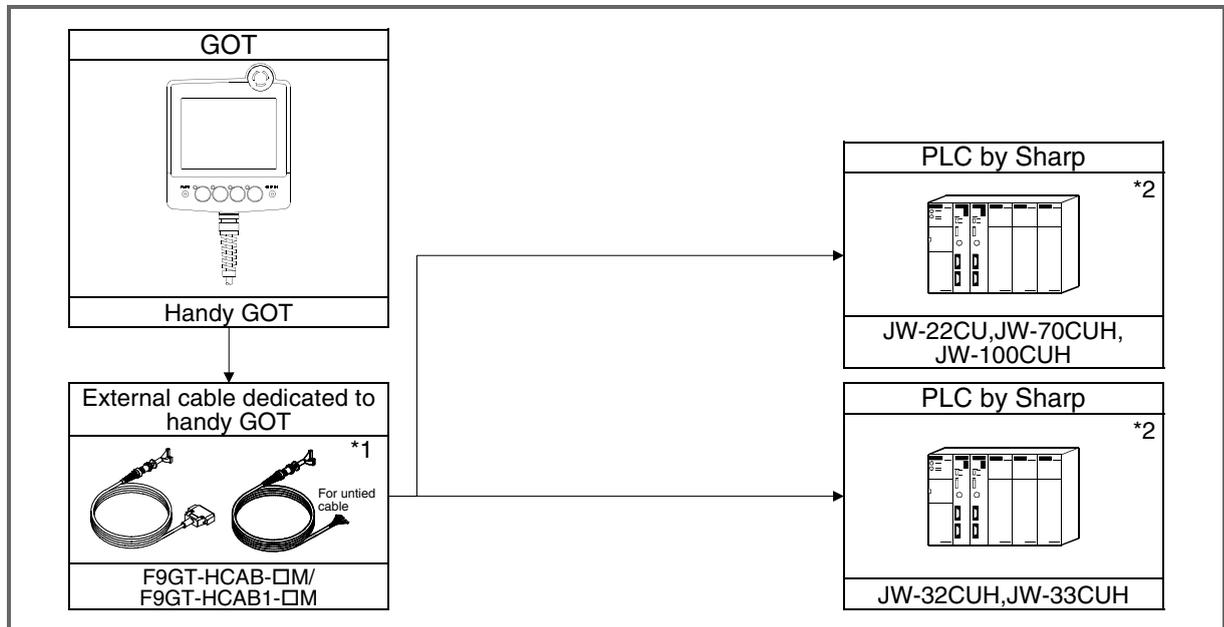
*1 The connection cable is to be prepared by the user.
    For the details of the cable preparation method, refer to section 11.4.

*2 For communication with the GOT, the communication setting is required.
    For the details of the contents of setting, refer to section 11.2.

11.2 Initial setting

11.2.1 When GOT is directly connected to PLC CPU

When connecting the GOT directly to the PLC CPU, the communication setting is required at first for the communication port. Using a peripheral tool, set as shown below to the system memory in the PLC CPU.

For the details of the setting method, refer to the INSTRUCTION MANUAL of the PLC by Sharp.

1) When the JW-22CU, the JW-70CUH or the JW-100CUH is used

Setting item	System memory address	Contents of setting
Setting of communication port	#236	Set the transmission speed, the parity and the stop bit using bits D0 to D5 as shown below. D7 D6 D5 D4 D3 D2 D1 D0 #236 − − 1 1 0 0 0 1 Transmission specifications (9600 bps) Parity (even) Stop bit (2 bits)
	#237	Set the station No. as shown below. #237 1 Station No. (1)

2) When the JW-32CUH or the JW-33CUH is used

Setting item	System memory address	Contents of setting
Setting of communication port 1	#234	Set the transmission speed, the parity and the stop bit using bits D0 to D5 as shown below. D7 D6 D5 D4 D3 D2 D1 D0 #234 [− − 1 1 0 0 0 0] — Transmission specifications (19200 bps) — Parity (even) — Stop bit (2 bits)
	#235	Set the station No. as shown below. #235 [1] — Station No. (1)
Setting of communication port 2	#236	Set the transmission speed, the parity and the stop bit using bits D0 to D5 as shown below. D7 D6 D5 D4 D3 D2 D1 D0 #236 [− − 1 1 0 0 0 0] — Transmission specifications (19200 bps) — Parity (even) — Stop bit (2 bits)
	#237	Set the station No. as shown below. #237 [1] — Station No. (1)

11.2.2 When link unit is connected

When connecting the GOT to the link unit, the initial communication setting is required.
Set the switches in the link unit as shown below.
For the details of the setting method, refer to the INSTRUCTION MANUAL of the link unit.

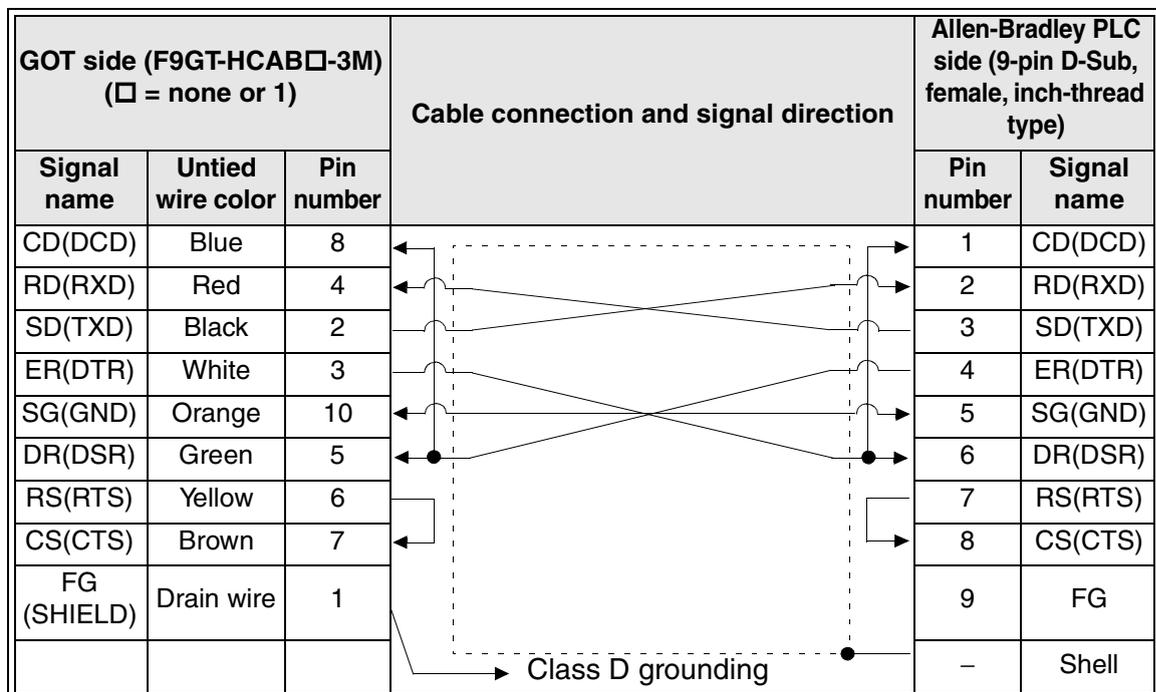| Switch No.		Setting item	Contents of setting
SW3	2	2-wire/4-wire method	ON (4-wire method)
	4	Parity	ON (even)
SW4		Transmission speed	0 (19,200 bps)

11.3   Transmission specifications

The table below shows the transmission specifications for communication between the GOT and the PLC by Sharp.

1) JW-22CU, JW-70CUH or JW-100CUH (in direct connection to the PLC CPU)

Item	Contents of setting
Transmission speed	9600 bps
Data length	7 bits
Stop bit	2 bits
Parity bit	EVEN
Control method	Not provided

2) JW-32CUH or JW-33CUH (in direct connection to the PLC CPU)

Item	Contents of setting
Transmission speed	19200 bps
Data length	7 bits
Stop bit	2 bits
Parity bit	EVEN
Control method	Not provided

3) JW-22CU, JW-32CUH, JW-33CUH, JW-70CUH or JW-100CUH
   (in connection by way of a link unit)

Item	Contents of setting
Transmission speed	19200 bps
Data length	7 bits
Stop bit	2 bits
Parity bit	EVEN
Control method	Not provided

11.4   Connection cable

The connection diagram and the connector of RS-232C cables which connect the PLC CPU and the GOT are shown below.

1) Connection diagram

a) PLC CPU (JW-22CU, JW-70CUH or JW-100CUH)

GOT side (F9GT-HCAB□-3M) (□ = none or 1)			Cable connection and signal direction	Sharp PLC side (15-pin D-Sub, male, milli-thread type)	
Signal name	Untied wire color	Pin number		Pin number	Signal name
CD(DCD)	Blue	8		1	FG
RD(RXD)	Red	4		2	SD(TXD)
SD(TXD)	Black	2		3	RD(RXD)
ER(DTR)	White	3		4	RS(RTS)
SG(GND)	Orange	10		5	CS(CTS)
DR(DSR)	Green	5		7	SG(GND)
RS(RTS)	Yellow	6		12	
CS(CTS)	Brown	7		14	
FG (SHIELD)	Drain wire	1	Class D grounding		

b) PLC CPU (JW-32CUH or JW-33CUH)

GOT side (F9GT-HCAB□-3M) (□ = none or 1)			Cable connection and signal direction	Sharp PLC side (15-pin D-Sub, male, milli-thread type)	
Signal name	Untied wire color	Pin number		Pin number	Signal name
CD(DCD)	Blue	8		FG	1
RD(RXD)	Red	4		SD(TXD)	2
SD(TXD)	Black	2		RD(RXD)	4
ER(DTR)	White	3		RS(RTS)	8
SG(GND)	Orange	10		CS(CTS)	12
DR(DSR)	Green	5		SG(GND)	7
RS(RTS)	Yellow	6			
CS(CTS)	Brown	7			
FG (SHIELD)	Drain wire	1	Class D grounding		

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12
13
14
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2) Used connectors and connector covers

- Connector on the side of the cable dedicated to the GOT
  The connector of the cable dedicated to the GOT (F9GT-HCAB-☐☐M) has the following model name. Use a counterpart connector compatible with this connector.
  17JE-23250-02 (D8A2)
  25-pin D-Sub, male connector manufactured by DDK Ltd. (DDK)
  The cable dedicated to the GOT (F9GT-HCAB1-☐☐M) is the untied wire type.

- Port on the side of the PLC by Sharp
  Use a connector compatible with the PLC by Sharp.

3) Caution on cable preparation

The maximum cable length varies depending on the specifications of the used PLC by Sharp. For the details, refer to the INSTRUCTION MANUAL of the PLC by Sharp.
However, make sure that the maximum cable length does not exceed the shorter one between the specifications of the PLC by Sharp and the value shown in the table below.

Connection destination PLC CPU	Maximum cable length (m)	Remarks
PLC by Sharp	6	Total of F9GT-HCAB-3M and cable prepared by user
		Total of F9GT-HCAB1-3M and cable prepared by user
		When F9GT-HCAB1-10M is cut

Remarks

The table below shows the point of contact of the used connectors and connector covers.

Manufacturer	Address	Phone No.
DDK Ltd. (DDK)	(Daimei-Fujikura Bldg.) 2-11-20, Nishigotanda, Shinagawa-Ward, Tokyo 141-0031, Japan	(03)3494-6611

12.   Connection to Microcomputer

The personal computer, the microcomputer board, the PLC, etc. (hereafter referred to as "host") can monitor virtual devices (D) in the GOT through data send/receive.

Device data area

D0	.
.	.
.	.
D100	000A
.	.
D163	0362
.	.
D2047	.

D0~D2047

Write/read command

Internal memory

| S T X | RW | 0100 | 000A | 0163 | 0362 | E T X | D3 |

Microcomputer board

Interrupt output

Remarks

Refer to a system configuration example (in which a sample program stored in the SW□D5C-GOTR-PACKE is used) shown in the Appendix.

12.1   System configuration

GOT

Handy GOT

External cable dedicated to handy GOT

*1

For untied cable

F9GT-HCAB-□M/
F9GT-HCAB1-□M

Host

PLC

Personal computer

Microcomputer board

*1 The connection cable is to be prepared by the user.
   For the details of the cable preparation method, refer to section 12.3.

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13
14
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12.2   Transmission specifications

The table below shows the transmission specifications for communication between the GOT and the host.

Item	Contents of setting
Data bit	7 bits
Parity bit	Provided (even)
Stop bit	1 bit
Sum check	Provided
Transmission speed	4,800, 9,600 or 19,200 bps (default: 19,200 bps)

12.3   Connection cable

12.3.1   When DTR is used

1) Connection diagram

GOT side (F9GT-HCAB□-3M) (□ = none or 1)			Cable connection and signal direction	Host	
Signal name	Untied wire color	Pin number		Pin number	Signal name
CD(DCD)	Blue	8			FG
RD(RXD)	Red	4			SD(TXD)
SD(TXD)	Black	2			RD(RXD)
ER(DTR)	White	3			RS(RTS)
SG(GND)	Orange	10			CS(CTS)
DR(DSR)	Green	5			5V
RS(RTS)	Yellow	6			DR(DSR)
CS(CTS)	Brown	7			ER(DTR)
FG (SHIELD)	Drain wire	1	Class D grounding		SG(GND)

Note: Write the "Pin number" column on the host side in accordance with the specifications of the connected host.

2) Used connectors and connector covers

- Connector on the side of the cable dedicated to the GOT
  The connector of the cable dedicated to the GOT (F9GT-HCAB-□□M) has the following model name. Use a counterpart connector compatible with this connector.
  17JE-23250-02 (D8A2)
  25-pin D-Sub, male connector manufactured by DDK Ltd. (DDK)
  The cable dedicated to the GOT (F9GT-HCAB1-□□M) is the untied wire type.

- Port on the host side
  Use a connector compatible with the used host.

3) Caution on cable preparation

Make sure that the maximum cable length does not exceed the value shown in the table below.

Connection destination PLC CPU	Maximum cable length (m)	Remarks
Microcomputer	6	Total of F9GT-HCAB-3M and cable prepared by user
		Total of F9GT-HCAB1-3M and cable prepared by user
		When F9GT-HCAB1-10M is cut

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12.3.2   When DTR is not used

1) Connection diagram

GOT side (F9GT-HCAB□-3M) (□ = none or 1)			Cable connection and signal direction	Host	
Signal name	**Untied wire color**	**Pin number**		**Pin number**	**Signal name**
CD(DCD)	Blue	8			FG
RD(RXD)	Red	4			SD(TXD)
SD(TXD)	Black	2			RD(RXD)
ER(DTR)	White	3			RS(RTS)
SG(GND)	Orange	10			CS(CTS)
DR(DSR)	Green	5			–
RS(RTS)	Yellow	6			DR(DSR)
CS(CTS)	Brown	7			–
FG (SHIELD)	Drain wire	1	Class D grounding		ER(DTR)

Note: Write the "Pin number" column on the host side in accordance with the specifications of the connected host.

2) Used connectors and connector covers

- Connector on the side of the cable dedicated to the GOT
  The connector of the cable dedicated to the GOT (F9GT-HCAB-□□M) has the following model name. Use a counterpart connector compatible with this connector.
  17JE-23250-02 (D8A2)
  25-pin D-Sub, male connector manufactured by DDK Ltd. (DDK)
  The cable dedicated to the GOT (F9GT-HCAB1-□□M) is the untied wire type.

- Connector on the host side
  Use a connector compatible with the used host.

3) Caution on cable preparation

Make sure that the maximum cable length does not exceed the value shown in the table below.

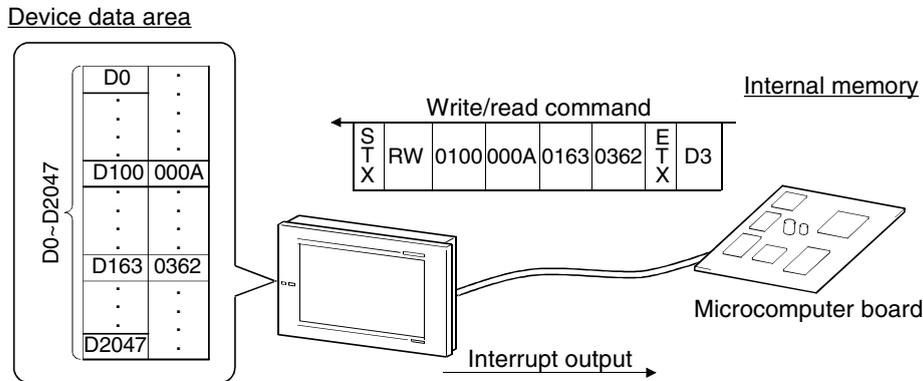| Connection destination PLC CPU	Maximum cable length (m)	Remarks
Microcomputer	6	Total of F9GT-HCAB-3M and cable prepared by user
		Total of F9GT-HCAB1-3M and cable prepared by user
		When F9GT-HCAB1-10M is cut

Remarks

The table below shows the point of contact of the used connectors and connector covers.

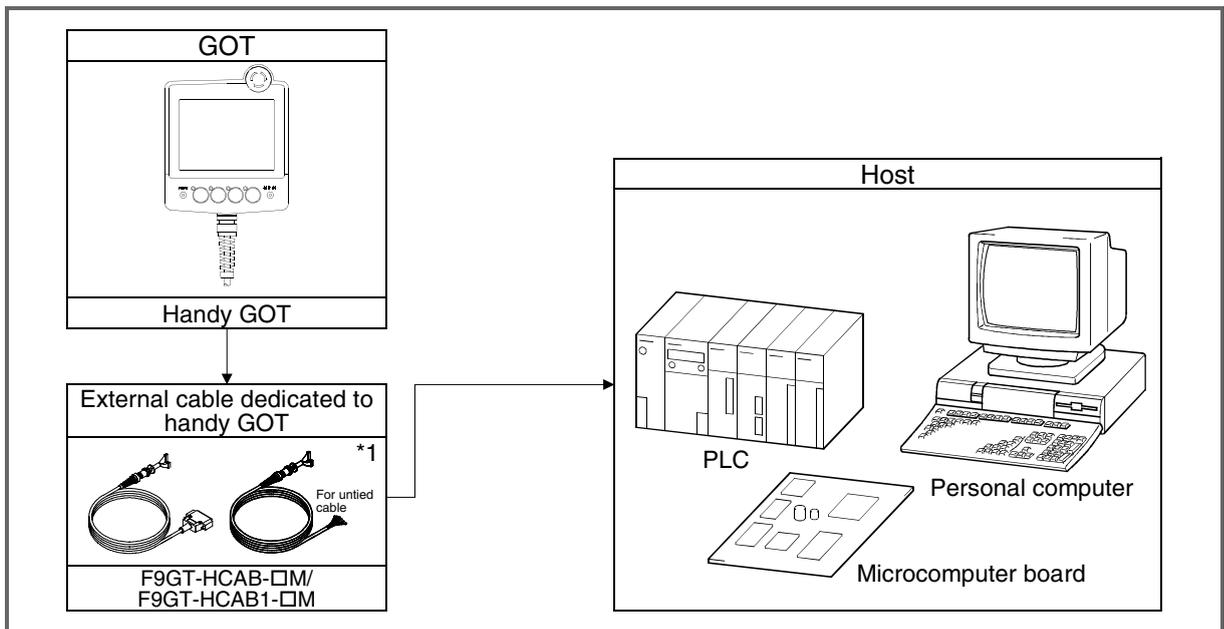| Manufacturer	Address	Phone No.
DDK Ltd. (DDK)	(Daimei-Fujikura Bldg.) 2-11-20, Nishigotanda, Shinagawa-Ward, Tokyo 141-0031, Japan	(03)3494-6611

12.4   Device data area

The table below shows the data area of virtual devices in the GOT.

Address (decimal)[1]	Description
D0~D2	Not used
D3	Communication error status The contents vary depending on the error status of the communication driver of the GOT. **Bit / Contents table:** 0 ~ 3 — Not used 4 — SI0 framing error 5 — SI0 parity error 6 — SI0 overrun error 7 — Send time error 8 — Cable disconnection error 9 ~ 15 — Not used

D3 Communication error status:

Bit	Contents
0 ~ 3	Not used
4	SI0 framing error
5	SI0 parity error
6	SI0 overrun error
7	Send time error
8	Cable disconnection error
9 ~ 15	Not used

D4[2] — Clock data (year)

Bit	
15 ~ 8	7 ~ 0
Not used	Stores the lower two digits of the year in two BCD digits.

D5[2] — Clock data (month)

Bit	
15 ~ 8	7 ~ 0
Not used	Stores the month data (01 to 12) in two BCD digits.

D6[2] — Clock data (day)

Bit	
15 ~ 8	7 ~ 0
Not used	Stores the day data (01 to 31) in two BCD digits.

D7[2] — Clock data (hour)

Bit	
15 ~ 8	7 ~ 0
Not used	Stores the hour data (00 to 23) in two BCD digits.

D8[2] — Clock data (minute)

Bit	
15 ~ 8	7 ~ 0
Not used	Stores the minute data (00 to 59) in two BCD digits.

D9~D12 — Not used

The clock data (year, month, day, hour or minute) is stored in each address (bits 0 to 7) in two BCD digits.

Example:
18:02, June 10, 1999

Address	Bits	
	15~8	7~0
D4	00	99
D5	00	06
D6	00	10
D7	00	18
D8	00	02

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Side tabs: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 A

Address (decimal)[1]	Description
D13	Interrupt output When data is written, the contents of the lower 8 bits are output as the interrupt code.
D14~D19	Not used
D20~D2031	User area
D2032~D2034	Not used
D2035	1-sec binary counter The counter counts up at every second after the power is turned on. The data format is binary.
D2036~D2047	Not used

[1] "D****" shown in this chapter indicates a virtual device of the GOT, and does not indicate any data register of the PLC.

[2] These addresses are not available because the Handy GOT is not equipped with the clock function.

12.5   Communication command

This section explains commands used in communication.

12.5.1   Command list

The table below shows commands used to transfer data between the GOT and the host.

Command	Command name	Description
RD	Batch read command	Consecutively reads data by as much as the specified number of points from the specified devices.
WD	Batch write command	Consecutively writes data by as much as the specified number of points to the specified devices.
RR	Random read	Reads data from two or more device addresses.
RW	Random write	Writes data to two or more device addresses.

12.5.2   Data transfer format

There are two types of data transfer formats executed by commands.
The table below shows each data transfer format.
The data transfer format can be changed over using the utility function in the GOT.
For the details of the utility function, refer to the GOT-A900 SERIES OPERATING MANUAL
(EXTENSION FUNCTION/OPTIONAL FUNCTION FOR SW☐D5C-GOTR-PACKE).

Selected protocol		Format 1	Format 2
Format while data is sent (host → GOT)			STX (02H) | Command | Data (64 points maximum) | ETX (03H) | Sum check — Sum check range
Format of response data in normal status (GOT → host)	When read command (RD or RR) is sent		STX (02H) | Data (64 points maximum) | ETX (03H) | Sum check — Sum check range
	When write command (WD or RW) is sent		ACK (06H)
Format of response data when error has occurred (GOT → host)		NAK (15H)	NAK (15H) | Error code *1
Format of interrupt output (GOT → host)		Interrupt output data	STX (02H) | Interrupt output data | ETX (03H) | Sum check — Sum check range

*1 When the format 2 is used, an error code is stored in the interrupt output.
     The table below shows the contents of each error code.

Error code	Contents of error	Action
06H	Sum check error An error occurred in the sum check after the communication packet was received.	Check the communication line and the send packet.
10H	Command error An unsupported request command was used.	Confirm the data of the sent request command.
11H	Message length error The data quantity is beyond the upper limit of the receive buffer.	Check whether the total number of bytes of the send data packet is not more than 518.
7BH	Point over error The range of read/written devices is exceeded.	Check the specified device range.
7AH	Address error The head address of the read/written devices is outside the allowable range.	Check the head address of the specified devices.
12H	Communication message error While a communication message was received, EXT was not found until the upper limit of the receive buffer was exceeded.	Check the communication message.

1 2 3 4 5 6 7 8 9 10 11 12 13 14 A

12.5.3   Caution on use

The sum check code indicates the numeric value of the lower 1 byte (8 bits) of the result (sum) obtained when the data in the sum check range is added as the binary data.

Example: When the RD command is executed for the addresses D100 and D101

Sum check range

Expression: 52H + 44H + 30H + 31H + 30H + 30H + 30H + 32H + 03H = 1BCH

12.5.4 Batch read command (RD)

The contents of the batch read command are shown below.

```
                              12 bytes
        1 byte                              1 byte
          ↓  2 bytes    4 bytes    2 bytes    ↓  2 bytes
        ┌─────┬──────┬──────────┬─────────┬─────┬───────┐
        │ STX │  RD  │ Address  │ Number  │ ETX │  Sum  │        ┌──────┐
        │     │      │          │of points│     │ check │  ⇒    │ NAK  │
        │(02H)│      │          │(1 to 64)│(03H)│       │ Error  │(15H) │
        └─────┴──────┴──────────┴─────────┴─────┴───────┘ occurred└──────┘
              └────── Sum check range ──────┘

                        ⇓ Check was
                          normally finished.

                              260 bytes maximum
        1 byte                                        1 byte
          ↓  ─── 4 × (1 to 64) bytes ───                 ↓  2 bytes
        ┌─────┬──────┬──────┬──────┬ ┄ ┄ ┄ ┬──────┬─────┬───────┐
        │ STX │Data 1│Data 2│Data 3│ ..... │Data n│ ETX │  Sum  │
        │(02H)│      │      │      │       │      │(03H)│ check │
        └─────┴──────┴──────┴──────┴ ┄ ┄ ┄ ┴──────┴─────┴───────┘
              └──────────── Sum check range ────────────┘
```
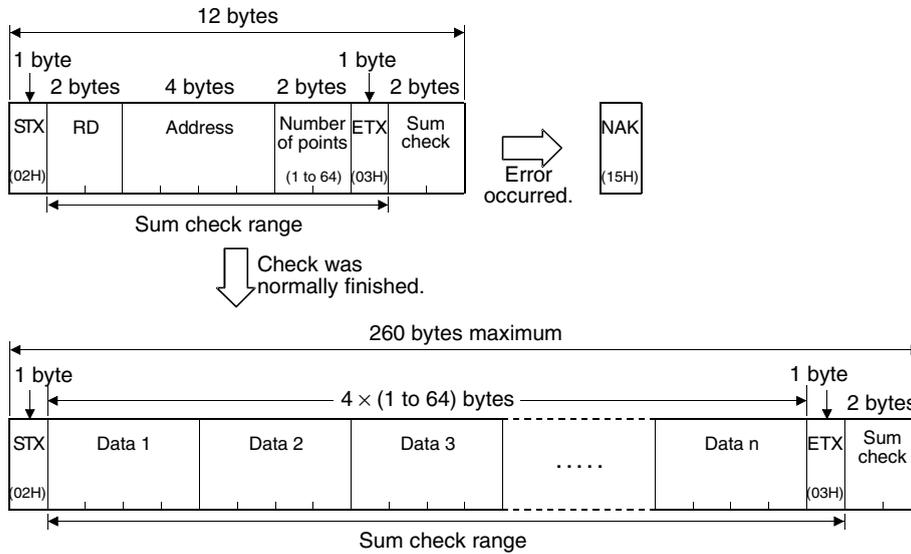
Use example

When virtual devices D100 to D102 of the GOT are read
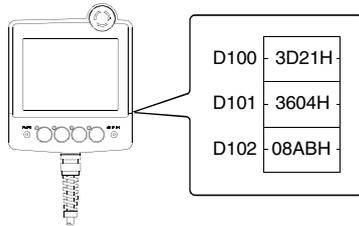
```
            D100 ─ 3D21H ─
            D101 ─ 3604H ─
            D102 ─ 08ABH ─
```

```
┌─────┬─────┬──────────────┬──────────┬─────┬────────┐
│ STX │ R  D│   Address    │ Number   │ ETX │  Sum   │
│     │     │              │of points │     │ check  │
│     │     │ 0   1  0   0 │  0    3  │     │  B   D │   Sent from the host to the GOT
│(02H)│     │ H   MH ML  L │  H    L  │(03H)│  H   L │
└─────┴─────┴──────────────┴──────────┴─────┴────────┘
```

```
        ⇓ Check was
          normally finished.
```

```
┌─────┬─────────────┬─────────────┬─────────────┬─────┬────────┐
│ STX │    D100     │    D101     │    D102     │ ETX │  Sum   │
│     │             │             │             │     │ check  │
│     │ 3  D  2  1  │ 3  6  0  4  │ 0  8  A  B  │     │  9  5  │  Sent from the GOT to the host
│(02H)│ H  MH ML  L │ H  MH ML  L │ H  MH ML  L │(03H)│  H  L  │
└─────┴─────────────┴─────────────┴─────────────┴─────┴────────┘
```

12.5.5   Batch write command (WD)

The contents of the batch write command are shown below.

268 bytes maximum

1 byte	2 bytes	4 bytes	2 bytes	4 × (1 to 64) bytes				1 byte	2 bytes
STX	WD	Address	Number of points	Data 1	Data 2	. . . . .	Data n	ETX	Sum check
(02H)			(1 to 64)					(03H)	

Sum check range

Check was normally finished.

```
ACX
(06H)
```

Error occurred.

```
NAK
(15H)
```
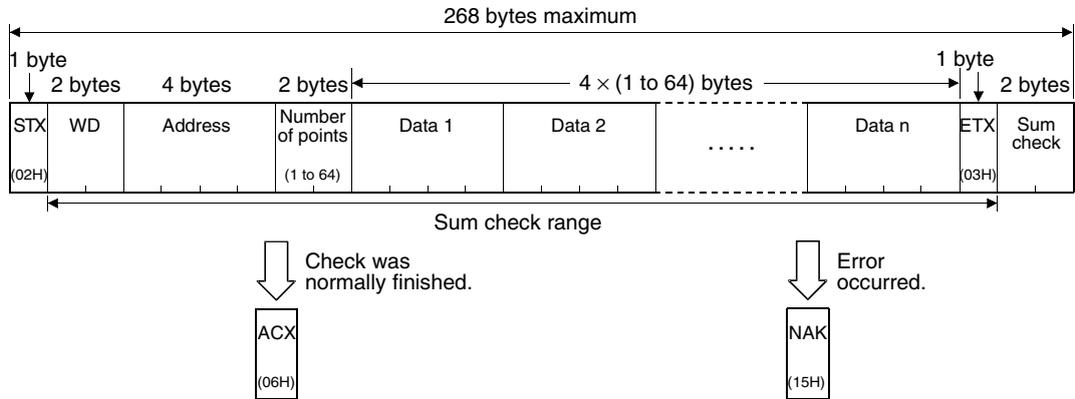
Use example

When "64H" and "65H" are written respectively to virtual devices D100 and D101 of the GOT

STX	W	D	Address				Number of points		D100				D101				ETX	Sum check	
			0	1	0	0	0	2	0	0	6	4	0	0	6	5		5	6
(02H)			H	MH	ML	L	H	L	H	MH	ML	L	H	MH	ML	L	(03H)	H	L

Sent from the host to the GOT

Check was normally finished.

```
ACX
(06H)
```

Sent from the GOT to the host

D100	0000H
D101	0000H
D102	0000H

Before execution

D100	0064H
D101	0065H
D102	0000H

After execution
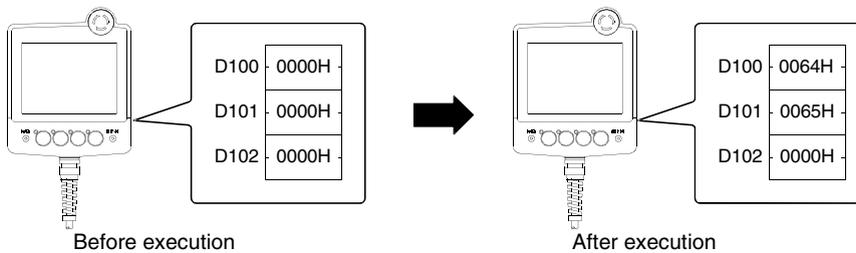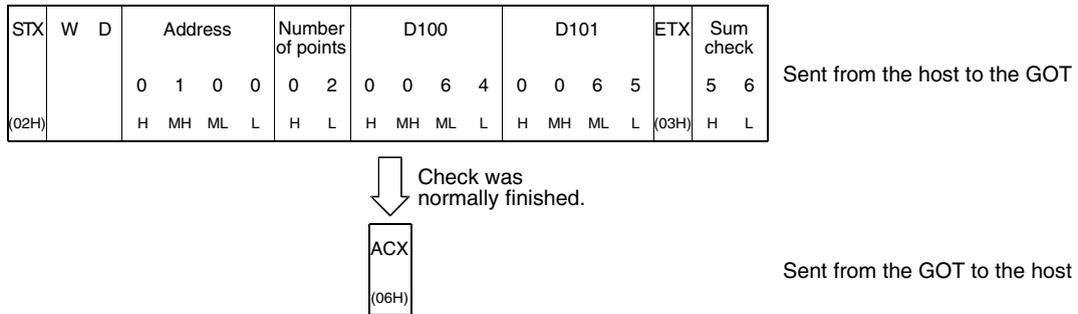
12.5.6 Random read command (RR)

The contents of the random read command are shown below.

```
                      262 bytes maximum
   1 byte                                          1 byte
     2 bytes    4 × (1 to 64) bytes            2 bytes
 ┌───┬───┬───┬─────────┬─────────┬ ─ ─ ─ ┬─────────┬───┬──────┐
 │STX│ R │ R │Address 1│Address 2│ ..... │Address n│ETX│ Sum  │        ┌─────┐
 │   │   │   │         │         │       │         │   │check │        │ NAK │
 │(02H)          │         │     │       │         │(03H)     │        │(15H)│
 └───┴───────────┴─────────┴─────┴───────┴─────────┴───┴──────┘        └─────┘
     └──────────────── Sum check range ──────────────┘      Error
                                                            occurred.
```

Check was normally finished.

```
                    260 bytes maximum
 1 byte   4 bytes      4 bytes          4 bytes  1 byte 2 bytes
 ┌───┬─────────┬─────────┬ ─ ─ ─ ─ ┬─────────┬───┬──────┐
 │STX│ Data 1  │ Data 2  │  ..... │ Data n  │ETX│ Sum  │
 │   │         │         │        │         │   │check │
 │(02H)        │         │        │         │(03H)     │
 └───┴─────────┴─────────┴────────┴─────────┴───┴──────┘
     └──────────── Sum check range ──────────┘
```
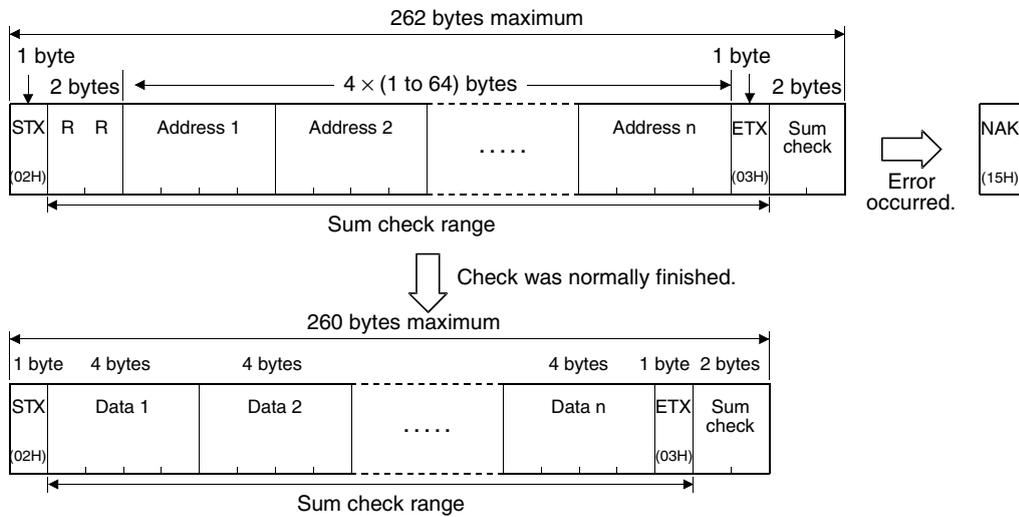
Use example

When virtual devices D100, D26 and D163 of the GOT are read

```
   D26  | 3D21H |
         |  ⋮    |
   D100 | 3604H |
         |  ⋮    |
   D163 | 08ABH |
```
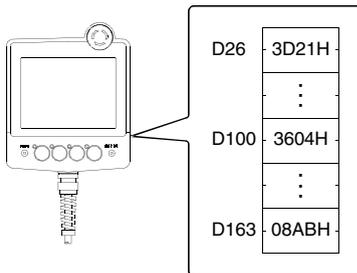
```
┌───┬───┬───┬───────────┬───────────┬───────────┬───┬──────┐
│STX│ R │ R │   D100    │    D26    │   D163    │ETX│ Sum  │
│   │   │   │           │           │           │   │check │
│   │   │   │ 0  1  0  0│ 0  0  2  6│ 0  1  6  3│   │ F  A │
│(02H)      │ H MH ML  L│ H MH ML  L│ H MH ML  L│(03H)│H  L │
└───┴───────┴───────────┴───────────┴───────────┴───┴──────┘
```
Sent from the host to the GOT

Check was normally finished.

```
┌───┬──────────────┬────────────┬──────────────┬───┬──────┐
│STX│Contents of D100│Contents of D26│Contents of D163│ETX│ Sum  │
│   │               │            │              │   │check │
│   │ 3  6 │ 0  4 │ 3  D │ 2  1 │ 0  8 │ A  B │  │ 9  9 │
│(02H)│ H L │ H L │ H L │ H L │ H L │ H L │(03H)│ H L │
└───┴──────────────┴────────────┴──────────────┴───┴──────┘
```
Sent from the GOT to the host

12.5.7   Random write command (RW)

The contents of the random write command are shown below.

	1 byte	2 bytes	← 8 × (1 to 64) bytes →				1 byte	2 bytes
STX (02H)	RW	Address 1	Data 1	Address 2	Data 2	Address n	Data n	ETX (03H)	Sum check

518 bytes maximum

Sum check range

Check was normally finished.

ACX (06H)

Error occurred.

NAK (15H)
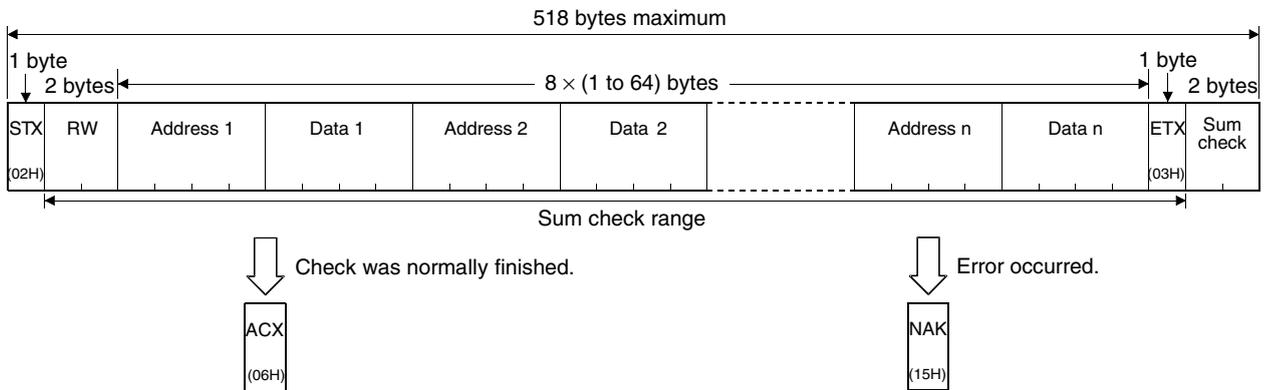
Use example

When "8BH" and "44H" are written respectively to virtual devices D30 and D100 of the GOT

STX	R W	D30				Data of D30				D100				Data of D100				ETX	Sum check	
		0	0	3	0	0	0	8	B	0	1	0	0	0	0	4	4		D	2
(02H)		H	MH	ML	L	H	MH	ML	L	H	MH	ML	L	H	MH	ML	L	(03H)	H	L

Sent from the host to the GOT

Check was normally finished.

ACK (06H)

Sent from the GOT to the host

D30   0000H
...
D100   0000H

➡

D30   008BH
...
D100   0044H

Before execution   After execution
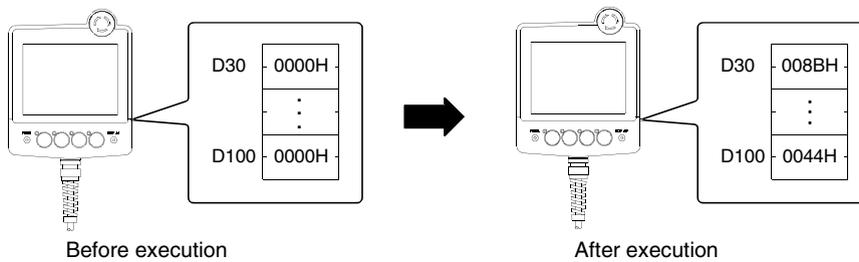
13.   Connection to PLC by Siemens

13.1   System configuration
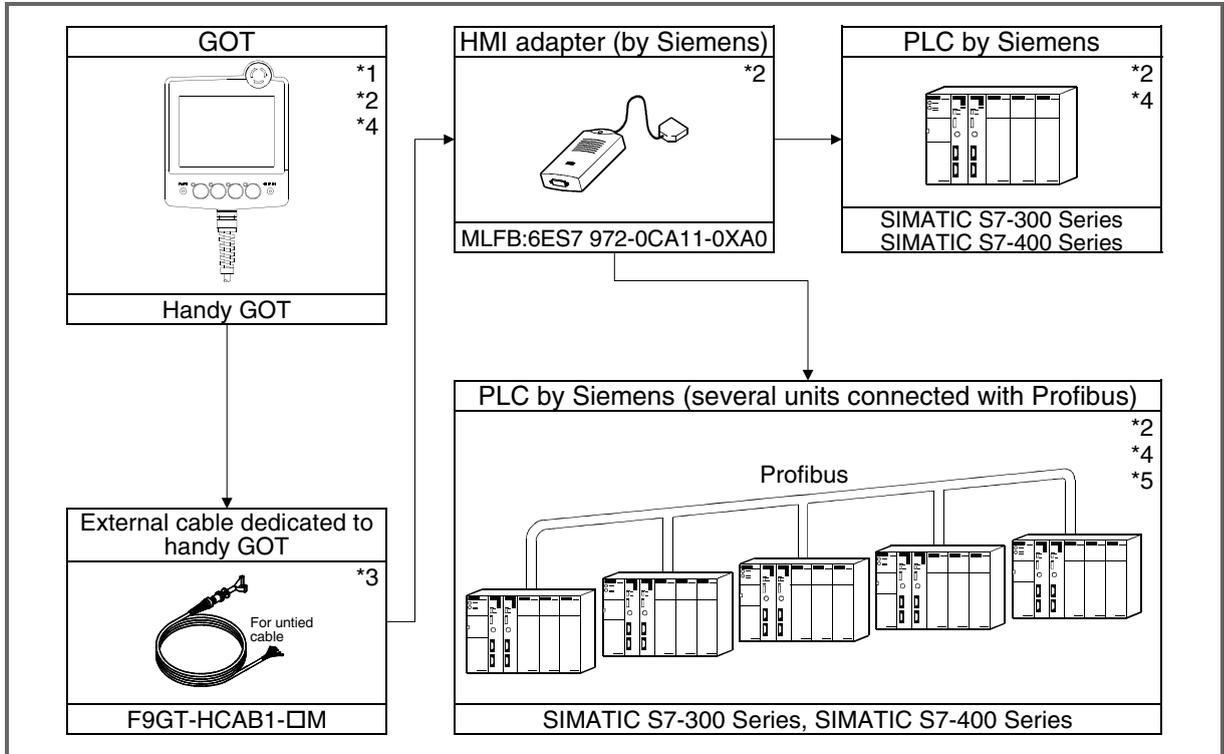
*1 Using the alarm list (system alarm) function, the GOT can monitor the error information in the PLC CPU. However, this monitoring is disabled when the PLC by Siemens is connected. For the details of the alarm list (system alarm) function, refer to the help function of the SW□D5C-GOTR-PACKE.

*2 In the GOT, the PLC CPU connected to the HMI adapter should be set to "FF".
For the details of the setting method, refer to section 13.2.

*3 The RS-232C cable is to be prepared by the user.
For the details of the cable preparation method, refer to section 13.3.

*4 At system startup (power ON), turn on the power of all PLC CPU units, then turn on the power of the GOT. If the power of the PLC CPU units is turned after the GOT has been started up, the GOT should be started up again.

*5 If the power of the PLC CPU not specified as "FF" (PLC CPU not connected to the HMI adapter) is turned off while the system is operating, monitoring in the GOT is stopped.
Even if the power of the PLC CPU is turned on again, monitoring in the GOT does not start automatically.
In order to start again monitoring in the GOT, the GOT should be started up again.

13.2   Initial setting

When connecting the GOT to the PLC by Siemens, set the contents shown below using "Setup" of the utility function of the GOT.

- Baud rate
  Set the transmission speed between the GOT and the PLC by Siemens.
  (At shipment, it is set to "19200".)

- ADAPTER ADDRESS
  Specify the MPI address in the Profibus assigned to the HMI adapter connected to the GOT.
  (At shipment, it is set to "1".)

- HOST (FF) ADDRESS
  Specify the MPI address in the Profibus assigned to the PLC CPU connected to the HMI adapter.
  The PLC CPU specified here is handled as "own station" when a monitor device is set in the screen creation software.
  For the details of monitor device setting, refer to the help function of the SW☐D5C-GOTR-PACKE. (At shipment, it is set to "2".)

For the details of the utility function, refer to the GOT-A900 SERIES OPERATING MANUAL (EXTENSION FUNCTION/OPTIONAL FUNCTION FOR SW☐D5C-GOTR-PACKE).

Baud rate
Select the transmission speed in the GOT.
(At shipment, it is set to "19200".)

ADAPTER ADDRESS
Specify the MPI address of the HMI adapter.
(At shipment, it is set to "1".)

HOST (FF) ADDRESS
Specify the MPI address of the PLC CPU connected to the HMI adapter.
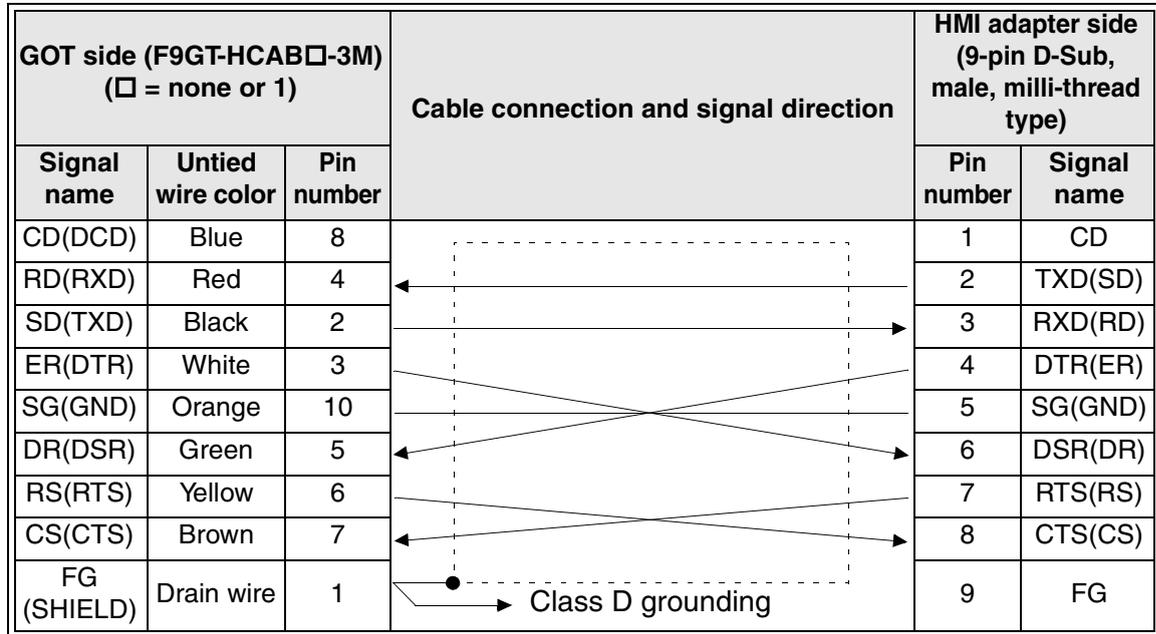(At shipment, it is set to "2".)

Point

After the system program (such as the basic OS and the communication driver) is installed in the GOT, then the power of the GOT is turned off once and turned on again, the utility function can be started up.
After starting up the GOT, touch the "Setup" icon to display the "Setup" screen, then perform the settings related to connection of the PLC by Siemens.

13.3   Connection cable

The connection diagram and the connector of RS-232C cables which connect the HMI adapter and the GOT are shown below.

1) Connection diagram

GOT side (F9GT-HCAB☐-3M) (☐ = none or 1)			Cable connection and signal direction	HMI adapter side (9-pin D-Sub, male, milli-thread type)	
Signal name	Untied wire color	Pin number		Pin number	Signal name
CD(DCD)	Blue	8		1	CD
RD(RXD)	Red	4		2	TXD(SD)
SD(TXD)	Black	2		3	RXD(RD)
ER(DTR)	White	3		4	DTR(ER)
SG(GND)	Orange	10		5	SG(GND)
DR(DSR)	Green	5		6	DSR(DR)
RS(RTS)	Yellow	6		7	RTS(RS)
CS(CTS)	Brown	7		8	CTS(CS)
FG (SHIELD)	Drain wire	1	Class D grounding	9	FG

2) Used connectors and connector covers
- Connector on the side of the cable dedicated to the GOT
  The connector of the cable dedicated to the GOT (F9GT-HCAB-☐☐M) has the following model name. Use a counterpart connector compatible with this connector.
  17JE-23250-02 (D8A2)
  25-pin D-Sub, male connector manufactured by DDK Ltd. (DDK)
  The cable dedicated to the GOT (F9GT-HCAB1-☐☐M) is the untied wire type.
- Port on the HMI adapter side
  Use a connector compatible with the HMI adapter.

3) Caution on cable preparation

The maximum cable length varies depending on the specifications of the used PLC by Siemens. For the details, refer to the INSTRUCTION MANUAL of the PLC by Siemens. However, make sure that the maximum cable length does not exceed the shorter one between the specifications of the PLC by Siemens and the value shown in the table below.

Connection destination PLC CPU	Maximum cable length (m)	Remarks
PLC by Siemens	6	Total of F9GT-HCAB-3M and cable prepared by user
		Total of F9GT-HCAB1-3M and cable prepared by user
		When F9GT-HCAB1-10M is cut

Remarks
The table below shows the point of contact of the used connectors and connector covers.

Manufacturer	Address	Phone No.
DDK Ltd. (DDK)	(Daimei-Fujikura Bldg.) 2-11-20, Nishigotanda, Shinagawa-Ward, Tokyo 141-0031, Japan	(03)3494-6611

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14. Diagnostics

This section explains troubleshooting during operation.

Cautions on startup/maintenance

- Do not touch connectors while the power is ON.
  If a connector is touched, electrical shock or malfunction may be caused.

- Set to OFF the power before cleaning the Handy GOT or tightening a terminal.
  If the Handy GOT is cleaned or a terminal is tightened while the power is ON, you may get electrical shock.

- Correctly connect the battery (for memory backup). Do not charge it, disassemble it, heat it, put it into fire or short-circuit it.
  Such handling may cause rupture or inflammation.

Cautions on startup/maintenance

- Do not disassemble or modify the Handy GOT.
  Disassembly or modification may cause failure, malfunction or fire.

- For replacement or repair of the backlight, consult with a Mitsubishi Electric distributor.

- Turn OFF the power before connecting or disconnecting a cable.
  Connecting or disconnecting a cable while the power is ON may cause failure or malfunction.

14.1 When POWER LED does not light

The POWER LED in the Handy GOT is lit by the internal 5V DC power supply. If it does not light, check the following points.
If there is no abnormality in the cable connection, wiring, supply voltage or power capacity, the circuits inside the Handy GOT may be damaged. Please consult with a Mitsubishi Electric distributor.

- Check whether the wiring related to the power supply is executed correctly. (Refer to 2.2.5.)

- Check whether the supply voltage satisfies the specifications.
  [Allowable power range: 20.4 to 26.4V DC, power ripple: 200 mV or less] (Refer to 4.1.2.)

- Check whether the power capacity of the DC power supply is sufficient.
  [Current consumption: 24V DC, 400 mA] (Refer to 4.1.2.)

- Check whether external cables are connected correctly to the Handy GOT. (Refer to 2.2.2.)

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14.2   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 2.2.2.)

- While pressing and holding an operation switch or emergency stop switch, check the conductivity between wires (pins) of the external cables, relay cable shown in the table below.
 If the conductivity is not given, wire breakage or poor contact is 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 is checked			
	Signal name	External cable*1		Relay cable*2 F9GT-HCAB5-150
		F9GT-HCAB-3M	F9GT-HCAB1-3M	
SW1	SW-COM and SW1	14 and 15	Fresh green and sky blue	SW-COM and SW1
SW2	SW-COM and SW2	14 and 16	Fresh green and black/white	SW-COM and SW2
SW3	SW-COM and SW3	14 and 17	Fresh green and red/white	SW-COM and SW3
SW3	SW-COM and SW4	14 and 18	Fresh green and green/white	SW-COM and SW4
ES1	ES1 and ES1	21 and 22	Brown/white and yellow/white	ES1 and ES1

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

F9GT-HCAB-☐M
25-pin D-sub (male) connector
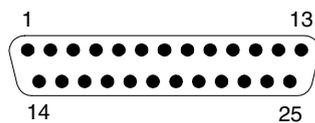
*2 Connect an external cable and relay cable to the Handy GOT, press and hold each switch, then check the conductivity between each pair of wires of the relay cable.

14.3   When LC screen is dark

When the display screen is dark, adjust the brightness using "Adjusting the brightness/contrast of the monitor screen" on the utility menu screen. 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).
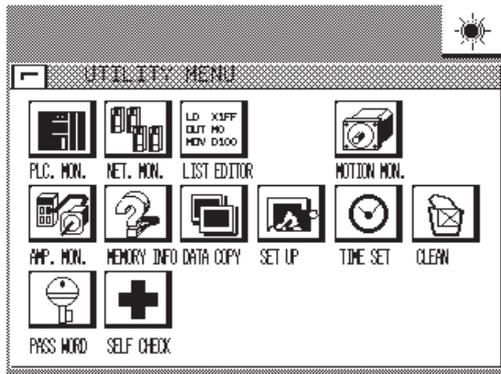
Adjust the brightness from the dedicated screen displayed when the utility function icon " " built in the GOT is touched.
For the details of the utility function, refer to the GOT-A900 SERIES OPERATING MANUAL (EXTENTION FUNCTIONS/OPTIONAL FUNCTIONS).

14.4   Error messages and error codes

For explanation of error messages and error codes displayed during manipulation or operation, refer to the A950GOT/A951GOT/A953GOT/A956GOT USERS MANUAL (DETAILED).
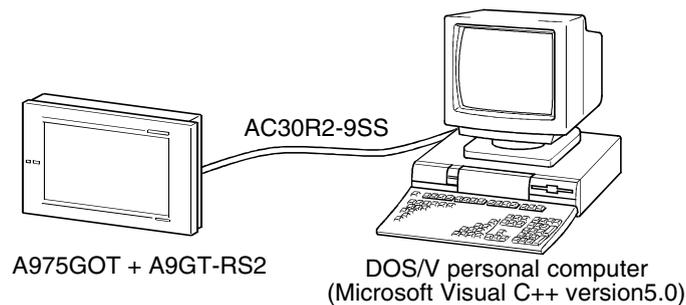
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Appendix A:

A-1:   System Configuration Example in Microcomputer Connection

A system configuration example in microcomputer connection is shown below.
Refer to it in constructing a system in microcomputer connection.

A-1-1:   System configuration

The figure below shows a system example using the A975GOT adopted in this system configuration.

AC30R2-9SS

A975GOT + A9GT-RS2   DOS/V personal computer
                            (Microsoft Visual C++ version5.0)

For connection of the Handy GOT, refer to chapter 12.

A-1-2:   Communication setting in GOT and contents of setting on monitor screen

1) Communication setting

The table below shows the communication setting in the GOT.
The communication setting in microcomputer connection can be executed using the utility function ("Setup").

Setting item	Contents of setting
Transmission speed in microcomputer connection	19200 bps
Protocol in microcomputer connection	Format 1

2) Contents of setting on monitor screen

The contents of setting on the monitor screen are described below.

a) Common setting

Screen changeover device (base screen): D20
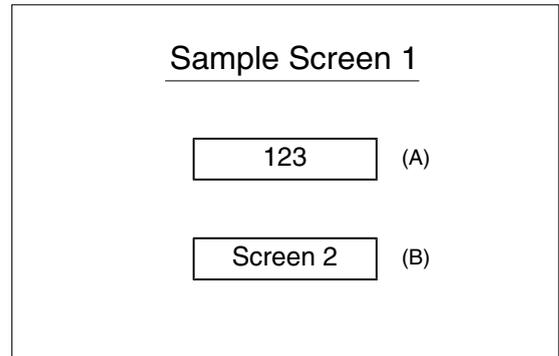
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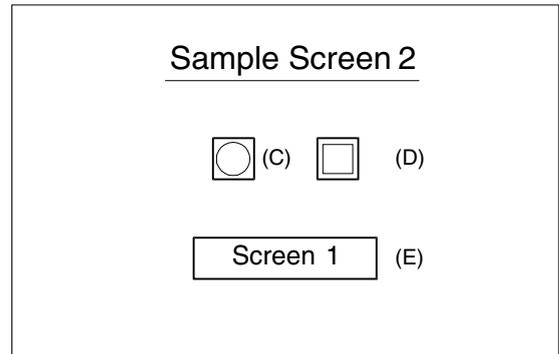
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b) Monitor screen image

Base screen 1

(A)Numeric display function
This function monitors and displays the device value of the D21.
Only while "Sample Screen 1" is displayed, the device value is incremented.

(B)Touch switch 1
This switch changes over the screen to "Sample Screen 2" when touched.

```
┌─────────────────────────────┐
│                             │
│      Sample Screen 1        │
│      ─────────────          │
│                             │
│      ┌───────────┐          │
│      │    123    │   (A)    │
│      └───────────┘          │
│                             │
│      ┌───────────┐          │
│      │ Screen 2  │   (B)    │
│      └───────────┘          │
│                             │
└─────────────────────────────┘
```

Base screen 2

(C)Lamp display function
This function indicates the device status of the D22-b0 in the lamp.

(D)Touch switch 2
This alternate switch changes the status of the D22-b0.

(E)Touch switch 3
This switch changes over the screen to "Sample Screen 1" when touched.

```
┌─────────────────────────────┐
│                             │
│      Sample Screen 2        │
│      ─────────────          │
│                             │
│     ┌──┐         ┌──┐        │
│     │○ │ (C)     │□ │  (D)   │
│     └──┘         └──┘        │
│                             │
│      ┌───────────┐          │
│      │ Screen 1  │   (E)    │
│      └───────────┘          │
│                             │
└─────────────────────────────┘
```

c) Numeric display function

No.	Basic setting	Display setting		
	Device	Display format	Display size	Number of display digits
(A)	D21 Binary without sign, 16 bits	16 bits without sign	Arbitrary	4

d) Touch switch function

No.	Basic setting	Display setting	Operation setting				
			Operation	Changeover destination	Device	Data format	Operation type
(B)	Arbitrary	Arbitrary	Base screen changeover	Fixed value "2"	–	–	–
			Word	–	D13	Binary with sign	Fixed value "01"
(D)	Arbitrary	Arbitrary	Bit	–	D22.b0	–	Bit alternate
(E)	Arbitrary	Arbitrary	Base screen changeover	Fixed value "1"	–	–	–
			Word	–	D13	Binary with sign	Fixed value "255"

e) Lamp display function

No.	Basic setting		Display method (bit)	
	Device	Display format	Display size	Number of display digits
(C)	D22.b0, bit	Basic image	Arbitrary	Arbitrary

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A-1-3: Sample program in host

Sample programs (C language) in the host are stored in the SW☐D5C-GOTR-PACKE.
By selecting a sample program for microcomputer connection as an option while installing the software package, the sample program is available.
For the operating procedure (about how to select the option) during installation, refer to the SW☐D5C-GOTR-PACKE(V)OPERATING MANUAL.

A-1-4: Outline of system operations

The table below explains the system operations while dividing them into processing in the host, display/processing in the GOT and data transfer packets.

Processing item	Contents of processing in host		Packet used in data transfer	Contents of display processing in GOT
Initial processing	Executes the port opening processing.		–	–
	Writes "1" to the screen changeover device (D20).		Batch write packet for changeover to screen 1 *1	Displays the base screen 1.
	Receives a response from the GOT.		–	–
	Judges whether there is an error in the response from the GOT.		–	–
	Writes the initial value to a device (D21).		Batch write packet for numeric display *2	Displays "0" in the numeric display on the base screen 1.
Receive of response/ interrupt from GOT	When receiving from the GOT a response to write to the device (D21)	Issues the request to acquire the present value of the device (D21).	Batch read packet for numeric display *3	Increments the numeric display on the base screen 1. (As far as the base screen 1 is displayed, the host executes the processing shown on the left repeatedly.)
	When receiving from the GOT a response to read from the device (D21)	Prepares the next device value (D21).	–	
		Calculates the sum check of the send packet.	–	
		Issues the request to update the device (D21).	Batch write packet for numeric display *2	
	When receiving the interrupt request to change over from the base screen 1 to the base screen 2	Sets the base screen status to the base screen 2.	Interrupt receive packet *6	Changes over to the base screen 2 when the touch switch 1 is touched. Notifies the host through interrupt.
	When receiving the interrupt request to change over from the base screen 2 to the base screen 1	Sets the base screen status to the base screen 1.	Interrupt receive packet *6	Changes over to the base screen 1 when the touch switch 3 is touched. Notifies the host through interrupt.
Termination processing (executed only when error response is received)	Executes the port closing processing.		–	–

*1 The table below shows the send packet structure of the batch write packet for changeover to screen 1.

Item	STX	WD		Address				Number of points		Data				ETX	Sum check	
Stored value	0x02	0x57	0x44	0x30	0x30	0x32	0x30	0x30	0x31	0x30	0x30	0x30	0x31	0x03	0x38	0x32
Description	–	"W"	"D"		D20				1		1				–	"8"	"2"

*2 The table below shows the send packet structure of the batch write packet for numeric display.

Item	STX	WD		Address				Number of points		Data				ETX	Sum check	
Stored value	0x02	0x57	0x44	0x30	0x30	0x32	0x31	0x30	0x31	–	–	–	–	0x03	–	–
Description	–	"W"	"D"		D20				1		–				–	–	–

*3 The table below shows the send packet structure of the batch read packet for numeric display.

Item	STX	WD		Address				Number of points		ETX	Sum check	
Stored value	0x02	0x52	0x44	0x30	0x30	0x32	0x31	0x30	0x31	0x03	0x42	0x44
Description	–	"W"	"D"		D20				1		–	"B"	"D"

*4 The tables below show the receive packet structure of the batch write response packet.

In normal status

Item	ACK
Stored value	0x06
Description	–

When an error has occurred

Item	NAK
Stored value	0x15
Description	–

*5 The tables below show the receive packet structure of the batch read response packet.

In normal status

Item	STX	Data				ETX	Sum check	
Stored value	0x02	–	–	–	–	0x03	–	–
Description	–			–		–	–	

When an error has occurred

Item	NAK
Stored value	0x15
Description	–

*6 The table below shows the receive packet structure of the interrupt receive packet.

Item	Data
Stored value	–
Description	Interrupt data

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1	**Introduction**

2	**Installation Wiring**

3	**Wiring and Handling of Switches**

4	**Specifications**

5	**Connection to Peripheral Equipment**

6	**CPU Direct Connection**

7	**Computer Link Connection**

8	**Connection to PLC by Omron**

9	**Connection to PLC by Yaskawa Electric**

10	**Connection to PLC by Allen-Bradley**

11	**Connection to PLC by Sharp**

12	**Connection to Microcomputer**

13	**Connection to PLC by Siemens**

14	**Diagnostics**

A	**Appendix A**

HARDWARE MANUAL

A953 HANDY GOT

MITSUBISHI ELECTRIC CORPORATION

MODEL	A953H-HW-E
MODEL CODE	09R812