SR Mini HG SYSTEM

Operation Panel

OPC-H

**Hardware
Instruction Manual**

INTRODUCTION

Thank you for purchasing this **SR Mini HG SYSTEM Operation Panel (OPC-H)**. This manual describes on the information necessary for operating the **Operation Panel**. Please carefully read and fully understand the contents of this manual before starting operation. And please keep the manual somewhere around you so that you will know where it is when you need it.

USERS OF THIS MANUAL

This manual is written for all personnel who operate the **SR Mini HG SYSTEM Operation Panel.** It assumes that readers have a fundamental knowledge of electrical, control engineering and communication.

CAUTIONS

● This manual is subject to change without prior notice.

● Examples of figures, diagrams and numeric values used in this manual are only for a better understanding of the text, but not for assuring the result of operation.

● This manual may not be reproduced or copied in whole or in part without RKC′s prior written consent.

● This instrument and manual are manufactured, prepared, then shipped under strict quality control.
However, if any defect is found, please contact your nearest RKC sales office or agent from which you bought the system.

● RKC assumes no responsibility for any of the following damages which the user or third party may suffer.

(1) Damage incurred as a result of using this instrument.
(2) Damage caused by the failure of the instrument which cannot be predicted by RKC.
(3) Other indirect damages.

⚠ WARNING

WIRING PRECAUTIONS

- If failure or error of this instrument could result in a critical accident of the system, install an external protection circuit to prevent such an accident.

- In order to prevent instrument damage or failure, protect the power line and the input/output lines from high currents by using fuses with appropriate ratings.

POWER SUPPLY

- In order to prevent instrument damage or failure, supply power of the specified rating.

- In order to prevent electric shock or instrument failure, do not turn on the power supply until all of the wiring is completed.

INSTALLATION ENVIRONMENT

- In order to prevent fire, explosion or instrument damage, never use this instrument at a location where flammable or explosive gases or vapor exist.

- This is a Class A instrument. In a domestic environment this instrument may cause radio interference, in which case the user is required to take adequate measures.

NEVER TOUCH THE INSIDE OF THE INSTRUMENT

In order to prevent electric shock or burns, never touch the inside of the instrument. Only RKC service engineers can touch the inside of the instrument to check the circuit or to replace parts. High voltage and high temperature sections inside the instrument are extremely dangerous.

NEVER MODIFY THE INSTRUMENT

In order to prevent accident or instrument failure, never modify the instrument.

MAINTENANCE

- In order to prevent electric shock, burns or instrument failure, only RKC service engineers may replace parts.

- In order to use this instrument continuously and safely, conduct periodic maintenance. Some parts used in this instrument have a limited service life and may deteriorate over time.

INSTRUMENT SAFETY CAUTIONS

● This instrument is designed to be mounted on instrumentation panels. It is therefore manufactured as part of the final product to facilitate wiring. This means that unauthorized personnel can easily access the high-voltage sections in this instrument such as power terminals, etc.
Therefore, when this instrument is installed on the final product, the user should take the necessary measures for the final product to ensure that unauthorized personnel cannot access the high-voltage sections, etc.

● In order to use this instrument correctly and safely, always observe the cautions described in this manual when performing operetions and maintenance.
RKC assumes no responsibility for any injury or accident resulting from not following these cautions.

NOTES ON INDICATIONS

The following indications are used in this manual to ensure the safe, correct use of the **SR Mini HG SYSTEM Operation Panel.**

SIGNAL WORDS

WARNING : Where there are possible dangers such as electric shock, fire(burns), etc. which could cause loss of life or injury, precautions to avoid such dangers are described.

CAUTION : These describe precautions to be taken in case unit damage may result if operating procedures are not strictly followed.

NOTE : Extra notes or precautions are added to operating procedures and explanations.

SYMBOL MARKS

⚠ : This mark is used when great care is needed especially for safety.

✳ : This mark is used to add extra notes, precautions or supplementary explanations to table and figures.

OPERATING CAUTIONS

■ This instrument is intended to be used under the following environmental conditions. (**IEC1010**) [OVERVOLTAGE CATEGORY II, POLLUTION DEGREE 2]

■ In order to prevent electrical shock or instrument failure, do not switch on the power until all wiring is completed.

■ In order to prevent breakdown, electrical shock and fire when installing this device, read the precautions and installation method carefully and install with the correct method in a proper location.

■ In order to prevent instrument damage or failure, do not drop the instrument or do not give a strong shock to the instrument.

■ Have all wiring performed by personnel who have been educated in the necessary basics of electricity and who are experienced in the field work.

■ To the instrument with power supply of 24V, please be sure to supply the power from SELV circuit.

■ Before cleaning the instrument, check that the power is turned off.

■ Remove stains on the display unit using a soft cloth or tissue paper.

■ As the display unit is easily scratched, do not scrub or touch it with a hard object.

■ Press the touch switches lightly to avoid damaging them.

■ In order to prevent scratches and damage, do not press the touch switches with anything other than fingers.

■ The stains on the housing shall be wiped off by the cloth which is dipped into the neutral cleanser diluted by water and wrung tightly, and finish it by a dried cloth.

■ Do not spray insecticide or clean the operation panel with a volatile organic solvent (thinner or benzene), chemicals or chemical dustcloth to avoid damaging or discoloring the panel.

■ Avoid the following when selecting the mounting location:

   ● Ambient temperature of less than 0°C or more than 50 °C.
   ● Ambient humidity of less than 45% or more than 85% RH.
   ● Rapid changes in ambient temperature which may cause condensation.
   ● Corrosive or flammable geses.
   ● Direct vibration or shock to the mainframe.
   ● Water, oil, chemicals, vapor or steam splashes. *
   ● Excessive dust, salt or iron particles. *
   ● Excessive induction noise, static electricity, magnetic fields or noise.
   ● Direct air flow from an air conditioner.
   ● Outdoors where the system is exposed to direct sunlight.
   ● Heat to be accumulated due to radiation heat.

   * The front operation panel has a dustproof, splashproof construction equivalent to IP65 when the instrument is mounted on the panel, allowing it to be used safety even in harsh environments.

■ This instrument is protected from electric shock by reinforced insulation. So please arrange reinforced insulation to the wire for input signal against the wires for instrument power supply, source of power and loads as far as possible.

■ Separate the grounding of this instrument from that of high-voltage equipment. Ground this instrument separately from other equipment so that its grounding resistance is 100 Ω or less.

■ Take adequate measures to prevent noise affecting this instrument.

● As input signal wires may be easily affected by external noise, keep them as far from high-voltage wires for equipment and load wires as possible.

● If this instrument is considered to be affected by noise, use a noise filter if necessary.

■ In order to prevent damage or deformation of a memory card (optional) or loss of the data it contains, observe the following items and handle the memory card carefully.

● Use only memory cards meeting the specifications for this device.

● Do not bend or drop memory cards or subject them to strong mechanical shock.

● Protect memory cards from direct sunlight, high temperature, and high humidity.

Item	Specification
Usage ambient temperature	0 to 50 °C
Usage ambient humidity	45 to 85 % relative humidity (no condensation allowed)

● In order to avoid static electricity and dust, store the memory card in its case after use.

● Do not touch the connector section of the memory card with your hands and keep out pins or other foreign objects. Also, keep dust and dirt out of the connector section.

● Do not switch off the power or reset or remove the memory card while the memory card access lamp is lit.

● Be careful about the service life of the memory card (SRAM) battery. Environmental conditions can reduce the battery service life, so it is best to replace the battery a little earlier.

Name and number of this instruction manual :

Name : Operation Panel (OPC-H) Hardware Instruction Manual
Manual No. : IMSRM37-E3

■ **Revisions**

Date of Revision	Manual No.	Reason for Revision
JAN. 30, 1998	IMSRM37-E1	The first edition issue
OCT. 30, 1998	IMSRM37-E2	● Partial change of the content of previous text ● Revision of clerical errors
FEB. 18, 1999	IMSRM37-E3	● Partial change of the content of previous text ● Revision of clerical errors

CONTENTS

PREPARATIONS

1.1 Operation Procedure

Operate according to the procedure below.

Checking the product	**See Chapter 1 "1.2 Checking the Product"** (Page 1-3).
↓	
Checking the model code	**See Chapter 1 "1.3 Checking the Model Code"** (Page 1-5).
↓	
Mounting and Wiring	**See Chapter 2 "MOUNTING AND WIRING"** (Page 2-1).
↓	
Communications settings	**See Chapter 3 "OPERATIONS"** (Page 3-1).
↓	
User screen transfer	*** See Chapter 4 "4.4 User Screens"** (Page 4-17).
↓	
Switching on the power	**See Chapter 3 "OPERATIONS"** (Page 3-1).
↓	
Operations	**Refer to the Operation Panel Screen Operation Manual [IMSRM38-E□].**

* Option

● Always observe the applicable precautions when carrying out the operations above.

1.2 Checking the Product

Check that you have everything shown below. If the package had something insufficient, defective, missing, incorrect, etc., please contact the marketing person you dealt with at RKC, your nearest RKC sales office, or the agent from which you purchased this product.
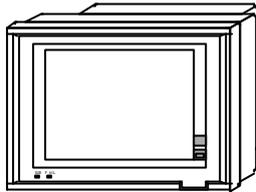
SR Mini HG System
operation panel
OPC-H (1)
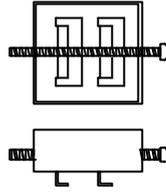
Operation panel
mounting brackets (6)

Operation Panel Hardware
Instruction Manual **[IMSRM37-E●]**
Operation Panel Screen Operation
Manual **[IMSRM38-E●]**
(1 each)

CN1 connection connector
for PLC connection/screen
data transfer
DSUB 25-pin (male) (1)

CN6 DI/DO connection
connector MR20 pin
(male) (1)
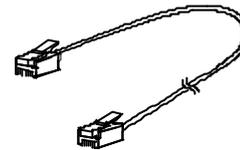
Modular cable (sold separately)
For connecting SR Mini HG
control unit

Option
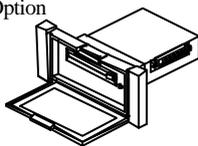
Option

Option

Memory card unit (sold
separately)
EMU-01
Used when the system has the
external storage (memory card)
function
Comes with 1 dedicated
connection cable.

Memory card (sold separately)
(SRAM 256 Kbytes to 1
Mbytes)
Used with memory card unit if
your system has the external
storage (memory card) function

CN7 host communications
connector DSUB 9-pin (female)
One comes with your system if it
has the host computer
connection communications
level.

● **Programmable controller connection cable**

The customer must provide a programmable controller (PLC) communications cable that fits with the equipment to be connected to.

■ Other peripherals and accessories

● **Panel Designer II screen creating tool**

This software is for making screen data for the OPC-H operation panel. Use it to produce PLC monitor screens and the like when a programmable controller (PLC) is connected.

● **Screen transfer cable**

Used to connect the OPC-H and a PC.
    W-BF-19-2000

● **Protective sheets (DHP-SH)**

Sheets (set of 5) for protecting the surface of the operating panel

● **Waterproof protective cover (DHP-WP)**

Waterproof protective cover for front of this device.

● **Online editing automatic switcher (EAD-01)**

Automatically switches between PLC and PC during screen debugging.

● **ACPU/QCPU dual port interface (EMD-01)**

This unit is for connecting Mitsubishi Electric ACPU/QCPU programmer connectors to two ports. It is used when connecting directly to a Mitsubishi Electric ACPU/QCPU programmer.

1.3 Checking the Model Code

Check the model code as below to make sure that you have received the product you wanted.

$$OPC - HC1 * \underset{(1)}{\Box} - \underset{(2)}{\Box\Box} / \underset{(3)}{\Box}$$

(1) External storage function (memory card)

> N : None
> M : External storage function (memory card)

(2) Host computer connection communications level/printer interface

> 6N : Printer interface (no host communications function)
> 61 : Host communications RS-232C with printer interface
> 64 : Host communications RS-422A with printer interface
> 65 : Host communications RS-485 with printer interface

(3) Language

> J : Japanese
> E : English

* The communication level for connection with the control units must be RS-422A. Either the external storage (memory card) function or host communications function can be selected, but not both.

1.4 Names of the Parts and their Functions
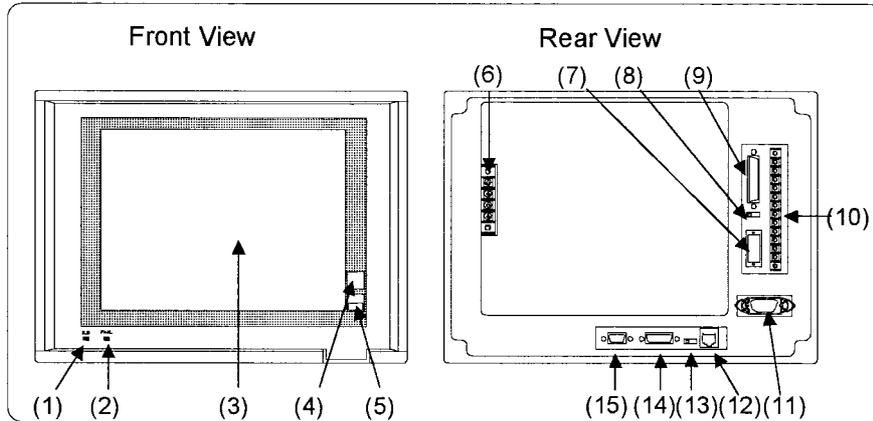
	Name	Function
(1)	SUB output display lamp (green/red LED)	The green LED lights up when the power is on for the operation panel. The red LED only lights up for SUB1 or SUB2 output.
(2)	Fail output display lamp (red LED)	Lights up for an operation panel failure
(3)	Display/touch panel	Displays and sets data
(4)	Print screen switch	Executes screen printing
(5)	DISPLAY ON/OFF switch	Switches the display on/off.
(6)	Terminal Base 1 (TB1)	Terminals for connecting the ground and power.
(7)	Digital input/output connector (CN6)	Connector for connecting the Fail output, SUB1 output and SUB2 output.
(8)	PLC terminal resistance ON/OFF switch	When using multi-drop PLC connections, switch this ON and OFF as necessary.
(9)	PLC screen data transfer connector (CN1)	This connector is used for connecting with a PLC or for connecting with the host computer to transfer screen data.
(10)	Terminal Base 2 (TB2)	This terminal is for connecting DI/DO and PLC.
(11)	Printer connector (CN2)	Connector for connecting with Centronics interface printer
(12)	Control unit modular connector (CN3)	Modular connector for connection with control unit
(13)	Control unit terminal resistance ON/OFF switch	Switch ON/OFF as necessary according to the length of the cable connecting with the control unit.
(14)	Memory card unit connector (CN4)	Connector for connection with memory card unit
(15)	Host communications connector (CN7)	Connector for connection with host computer (RS-232C, 422A, or 485 specified)

* You cannot use both (14) and (15)

1.5 OPC-H System Configuration

Memory card unit *

Host computer

Host communications interface *
RS-232C, 422A, or 485 specified

Printer interface *
(Centronics)

Printer

For NEC PC-201 series or
Epson ESC/P series

Control unit

RS-422A
communications interface

(8 control units max.)

Alarm 2   Alarm 1

Programmable controller
(PLC)

Fail output (1)

PLC communications interface

*Option
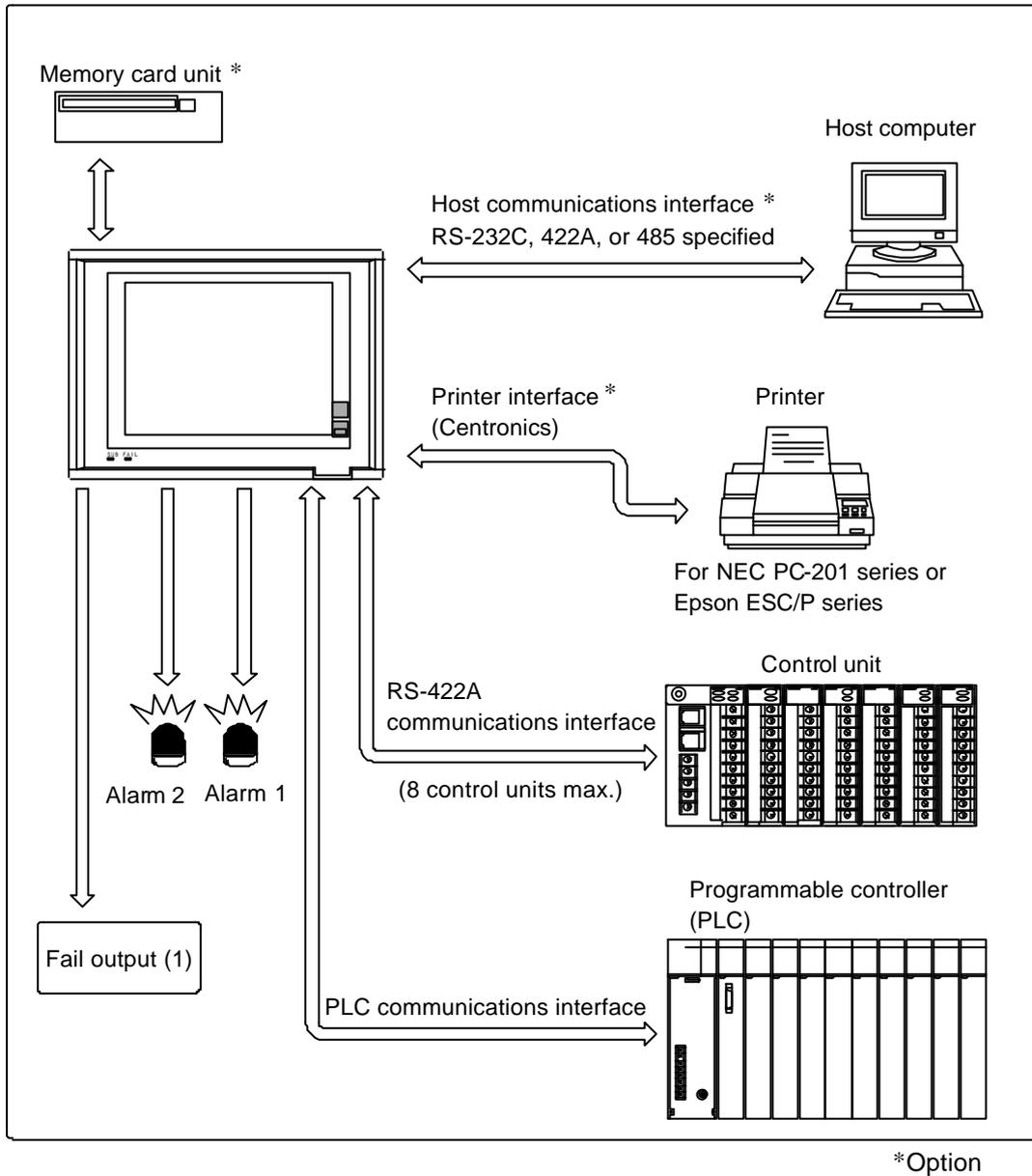
When connecting a programmable controller (PLC), it is necessary to make the programmable controller settings, monitor screens, etc. with the Panel Designer II screen creating tool.

MEMO

MOUNTING AND WIRING

2

2.1 Mounting Precautions

> ⚠ **WARNING**
>
> In order to prevent electric shock or instrument failure, always turn off the power before mounting or removing the operation panel.

(1) Mounting environment

This instrument is intended to be used under the following environmental conditions. (**IEC1010**)
[OVERVOLTAGE CATEGORY II, POLLUTION DEGREE 2]

■ Avoid mounting this device in any of the following locations.

- Locations where the ambient temperature is out of the range 0 to 50°C
- Locations where the ambient humidity is out of the range 45 to 85% relative humidity
- Locations with drastic temperature changes causing condensation
- Locations where corrosive gas or combustible gas is generated
- Locations that will directly transmit vibration or shock to the main body of this device
- Locations where water, oil, chemicals, steam, or vapor will get on or in this device   *1
- Locations with excessive dust, salt, or iron powder   *1
- Locations with major inductive interference where static electricity, magnetism, and noise are easily generated
- Locations subject to direct air flow from cooling and heating equipment
- Locations subject to direct sunlight
- Locations where heat can build up, for example due to radiant heat

*1   When the operation panel's front panel section has been mounted on the mounting panel, this provides a dustproof and splashproof structure equivalent to IP65, so this operation panel can be used reliably even in severe environments.

(2) Mounting precautions

Take the following points into consideration when mounting this device in the panel.

● Provide adequate ventilation space so that heat does not build up. At least 50 mm is necessary on the left and right and at least 80 mm on the top and bottom.

: Top of panel, wiring ducts, other equipment, etc.
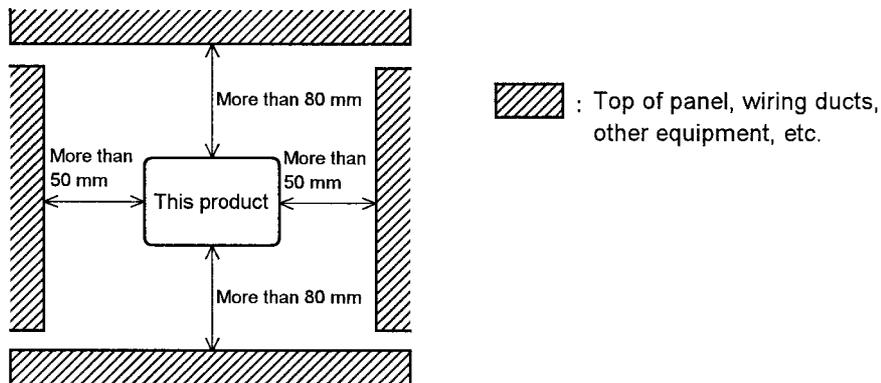
● Do not mount this device directly above equipment that generates large amount of heat (heaters, transformers, semi-conductor functional devices, large-wattage resistors).

● If the ambient temperature rises above 50°C , cool this device with a forced air fan, cooler, or the like. However, do not allow cooled air to blow this device directly.

● In order to improve safety and the immunity to withstand noise, mount this device as far away as possible from high-voltage equipment, power lines, and motors.

High-voltage equipment : Do not mount within the same panel.

Power lines : Separate at least 200 mm

Motors : Separate as far as possible.

(3) Mounting angle

Mount the operation panel tilted no more than 45° forward, 90° back, or 45° to the left or right. If you mount it tilted more than these angles, this can cause malfunctioning.
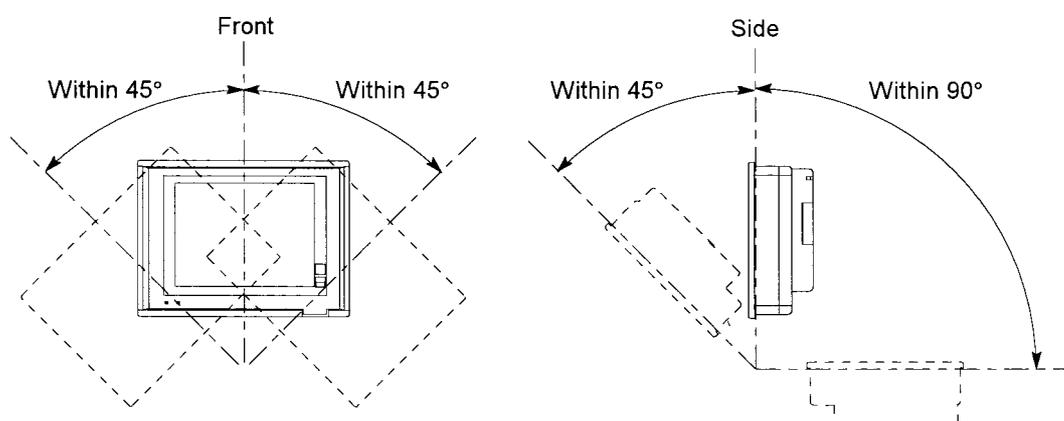
(4) Mounting depth

This operation panel is connected to the host computer, PLC, printer, etc. with cable connectors. Therefore, when mounting this operation panel, keep enough depth behind this operation panel to provide space for these cable connectors (about 100 mm). For improving operability and safety, make the installation depth as great as possible.

97

(Unit: mm)

7.

More than 160
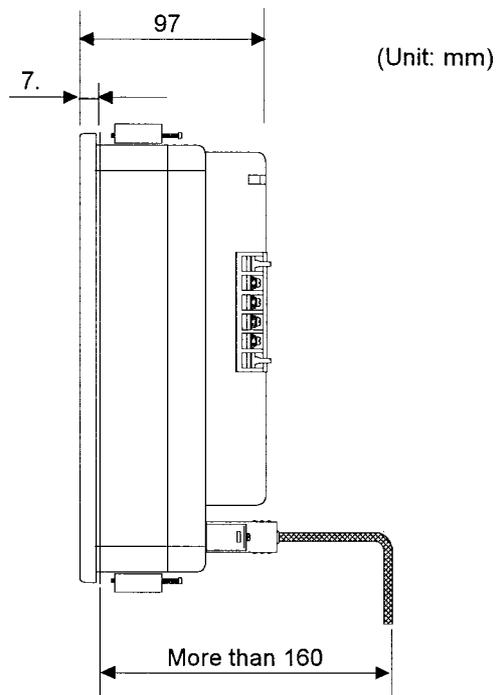
2.2 Mounting

(1) External dimensions and panel cut dimensions diagram

(Unit: mm)

316

328

240

7.3

97

228

(251)

External dimensions

$317\ ^{+1}_{0}$

More than 50

$229\ ^{+1}_{0}$

More than 80

(Unit: mm)
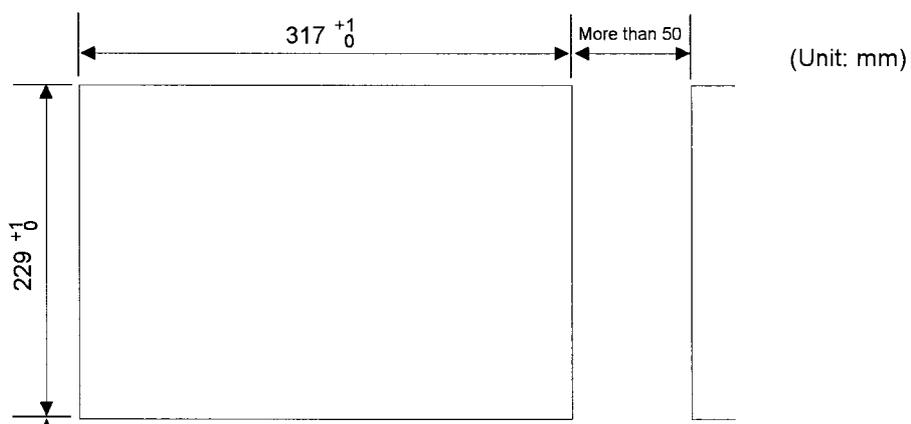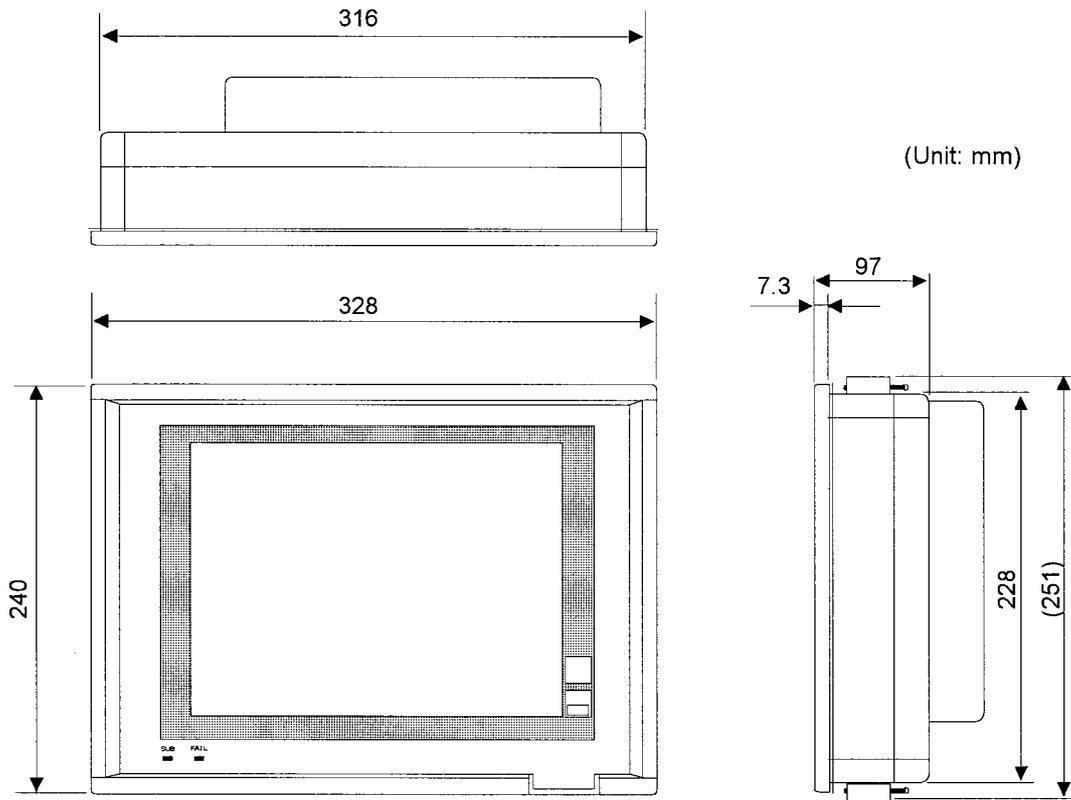
Mounting panel thickness: 4 mm max.

Panel cut dimensions

(2) Mounting method

| CAUTION |

The maximum mountable panel thickness (the range that the mounting brackets can be fitted) is 4 mm. However, for safety and improved splashproofing and dustproofing effect, mount on as thick a panel as possible.

1. Prepare four of the mounting brackets that came with the operation panel.

Mounting brackets : 6
(Operation panel accessories)

Tightening screws
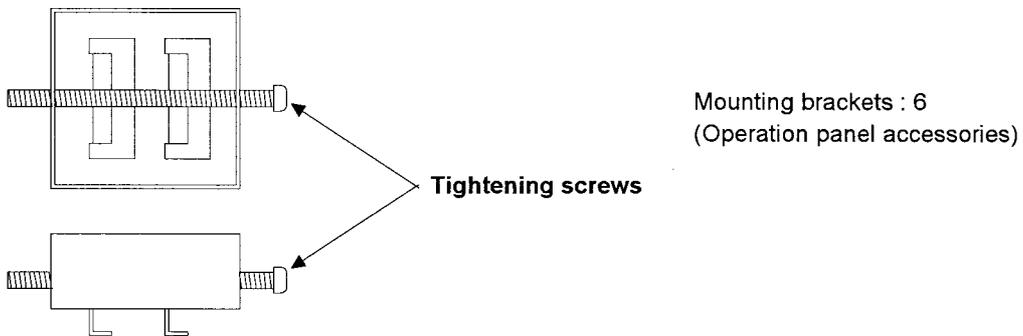
2. Make a rectangular hole in the mounting panel referring to the panel cut dimensions.
3. Insert the operation panel main unit from the front of the mounting panel.
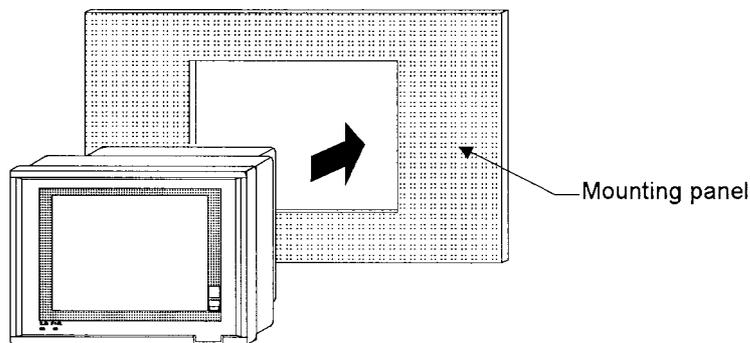
Mounting panel

4. Insert the mounting brackets into the mounting bracket insertion holes (two each top and bottom, excluding the middle).

Mounting bracket insertion hole

Mounting bracket

Front
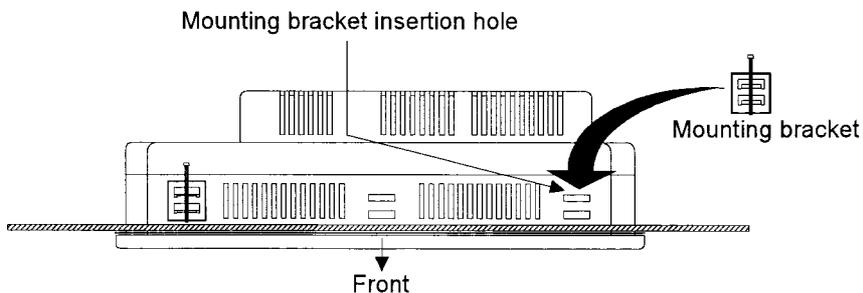
5. Tighten the tightening screws with a Phillips screwdriver to fasten the operation panel.

CAUTION

Tighten the mounting brackets in such a way that the dustproof gasket thickness becomes uniform. If the dustproof gasket is thicker in one section than in another, the dustproof and splashproof effects may not be obtained.
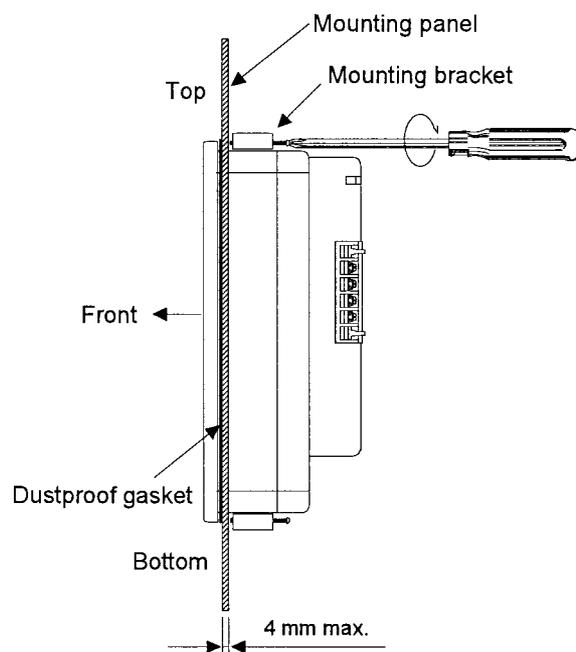
Tightening torque (recommended value): 0.3 to 0.5 N·m (3 to 5 kgf·cm)

NOTE

When mounting the optional waterproof protective cover (DHP-WP), use the mounting brackets in all six locations.

2.3 Wiring Precautions

⚠ **WARNING**

In order to prevent electric shock or instrument failure, do not turns on the power until all the wiring is finished.

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(1) Considerations about noise

Electric noise adversely affects electronic instruments and damage them, there by losing productivity, time and profit. Therefore, it is necessary to prevent the generation of noise as much as possible at points likely to generate noise.

<Power supply section noise countermeasures>

If a noise source is nearby and equipment is thought likely to be effected by noise, use a noise filter. (In selecting a noise filter, check the equipment power supply voltage etc.*) Adding an insulation transformer too increases the effectiveness.

* For some filters, an adequate filtering effect cannot be obtained, so check the filter frequency characteristic when selecting a noise filter.
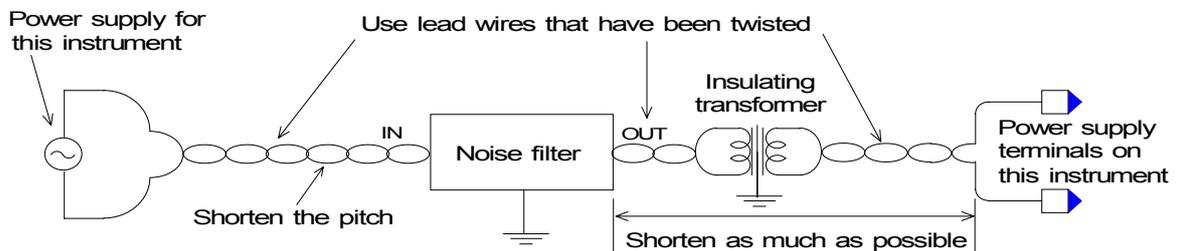
CAUTIONS

● **When wiring the equipment power supply, if problems with noise are considered possible, braid the lead wires to reduce the influence of noise. The shorter the distance between twists, the more effective against noise. Also, always ground noise filters and insulating transformers.**

● **When installing a noise filter, always install it on a grounded panel or the like. Also, make the wiring between the noise filter output side and the equipment power supply terminals as short as possible. If this is too long, the filter effect will be lost.**

● **Do not install a fuse, switch, etc. on the noise filter output side. Doing so can reduce the filter effect.**

<Input/output line noise countermeasures>
● Make wiring the input/output signal lines through a separate duct from motor power both inside and outside of the panel.
● If wiring through the same duct with motor power is unavoidable, use shielded wire. Ground shielded wire to prevent the generation of noise by the ground electropotential difference and the floating capacitance between the shield and the cable core.

[Example: Signal source grounded]   Grounded at signal source side.
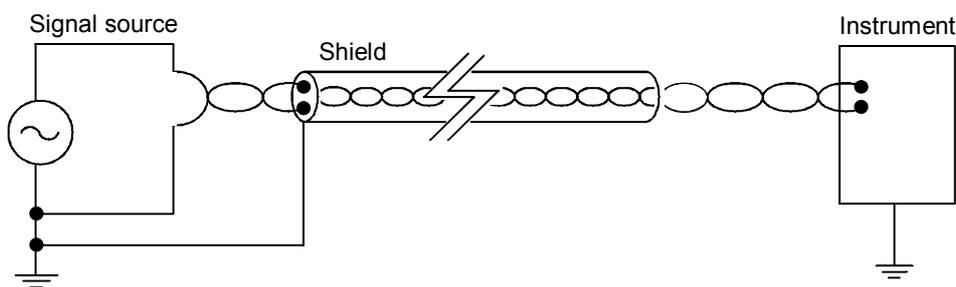
[Example: Signal source not grounded]   Grounded at instrument side.
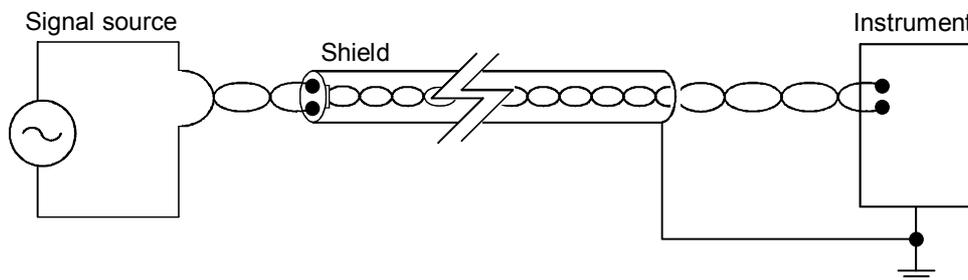
(2) Power supply wiring

● Use a power supply within the following power supply voltage fluctuation range.
   Power supply voltage: 85 to 265 VAC (including power supply voltage fluctuation), both 50/60 Hz (rated 100 to 240 VAC)
● For power supply wires, use twisted wires with low voltage drop.
● It is recommended that noise on the power line be dealt with by processing through an insulating transformer to reduce the noise component before supplying the power to equipment.
● Separate the power line for providing power to this product, the input/output circuit the motor power supply system, and the operating circuit from each other.

(3) Wiring ground lines

- Do not share ground lines with other devices. Also, some grounding methods do not provide adequate effect, so check the ground carefully.

Dedicated ground: OK   **Shared ground**: NG
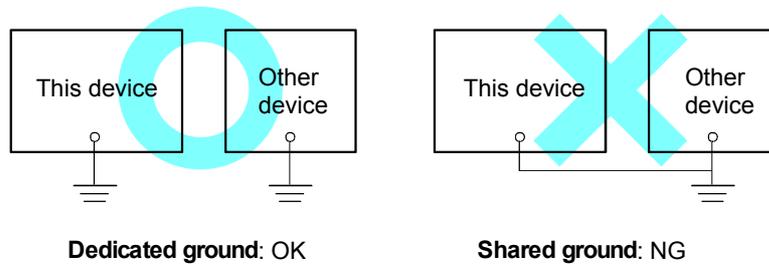
- Ground no other devices to the location where you ground this device.
- Avoid sharing ground lines with electric motors, motorized equipment, and other equipment that uses large amounts of electricity.
- In the ground system, be careful to ground each point and not to create a ground loop.
- Connect so that the ground resistance is no greater than 100 Ω.
- Use wire of at least 2.0 mm^2 for grounding lines.

(4) Fail output wiring

Connect the fail output (DI/DO connector: Pin No. 12) to an external relay to form an emergency stop circuit so that breakdown or abnormality in this device does not lead to abnormal operations of the entire system.

2.4 Wiring

(1) TB1 terminal configuration
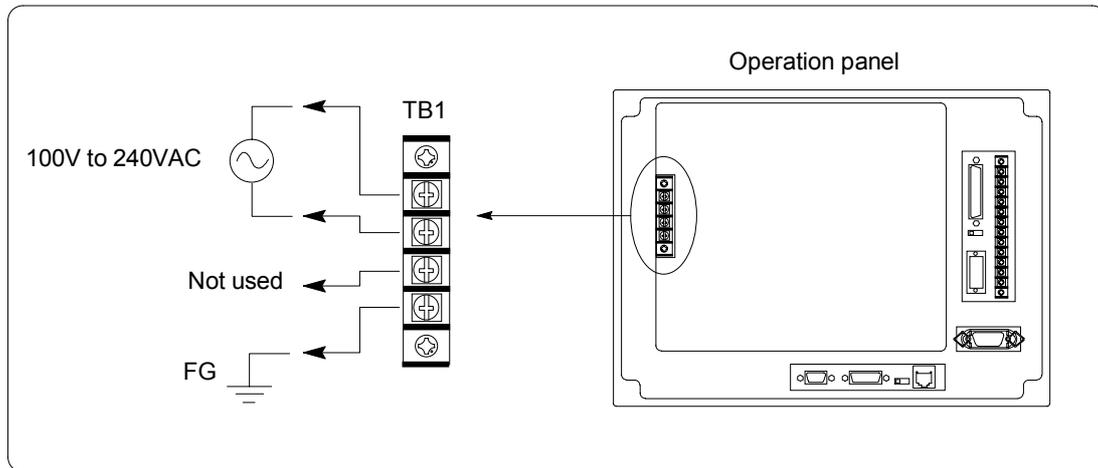
TB1 is the terminal base for power input. The two top terminals are the power supply input terminals and the terminal at the bottom is the ground terminal. The third terminal from the top is not used.

● Use a power supply within the power supply voltage fluctuation range.

Power supply voltage: 85 to 265 VAC (including power supply voltage fluctuation)

● Terminal screw tightening

Screw size: M3.5

Tightening torque (recommended value): 0.5 N·m (5 kgf·cm)

(2) TB2 terminal configuration
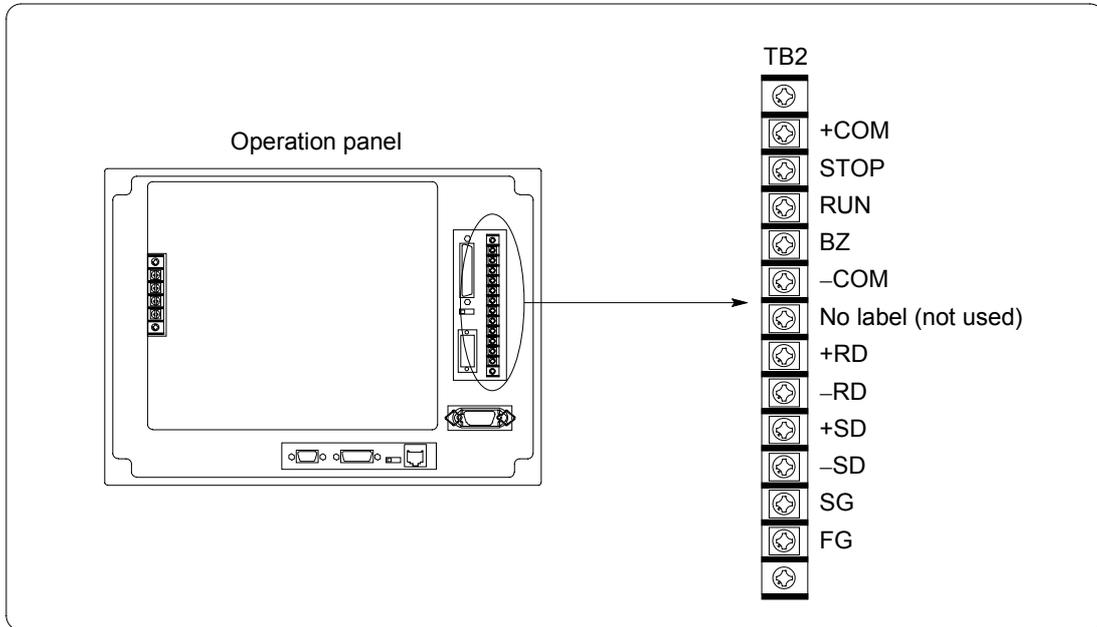
TB2 is the terminals for RS-422A communications with the PLC and DI/DO.

● **Below are the details for each terminal.**

Signal	Direction	Function
+COM		Input common
STOP	Input	RUN/PRG switch *1
RUN	Output	Operation status signal *2
BZ	Output	Switch buzzer signal *3
–COM		Output common
No label		Not used
+RD	Input	RS-422A receive data (+)
–RD	Input	RS-422A receive data (-)
+SD	Output	RS-422A send data (+)
–SD	Output	RS-422A send data (-)
SG		Signal ground

For communications with PLC

*1:Stop when power on.

*2:When the operation mode is Run, on while the operation panel is operating normally.

*3:Outputs the same signal as the buzzer in the operation panel. This signal is used when the operation panel buzzer sound is too weak and an external buzzer is used.

● The RS-422A signal lines are connected inside with the connector (CN1) as follows.

TB2	CN1 Pin No.
+SD	12
−SD	13
+RD	24
−RD	25

● Terminal screw tightening

Screw size: M3

Tightening torque (recommended value): 0.5 N·m (5 kgf·cm)

NOTE

For details on RS-422A communications with PLCs, see **"2.6 Connecting with PLCs"** (Page 2-24).

2.5 Connections

> ⚠ **WARNING**
>
> In order to prevent electric shock or instrument failure, turn off the power for instrument and peripheral equipment before connecting or disconnecting.

CAUTIONS

- ● **Connect connectors correctly in the right position. If it is forcibly pushed in with pins in the wrong positions, the pins may be bent resulting in instrument failure.**

- ● **When connecting or disconnecting the connectors, do not force it too far to right and left or up and down, but move it as straight as possible. Otherwise, the connector pins may be bent, causing instrument failure.**

- ● **When disconnecting a connector, hold it by the connector itself. Disconnecting connectors by yanking on their cables can cause breakdowns.**
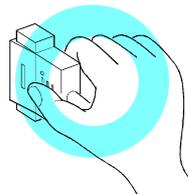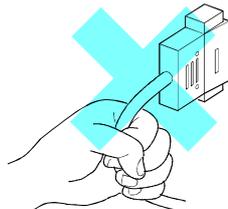
- ● **In order to prevent malfunction, never touch the contact section of a connector with bare hands or with hands soiled with oil or the like.**

- ● **In order to prevent malfunction, connect cable connectors securely, then firmly tighten the connector fastening screws.**

- ● **In order to prevent damage to cables, do not bend cables over with excessive force.**

(1) Connecting CN1
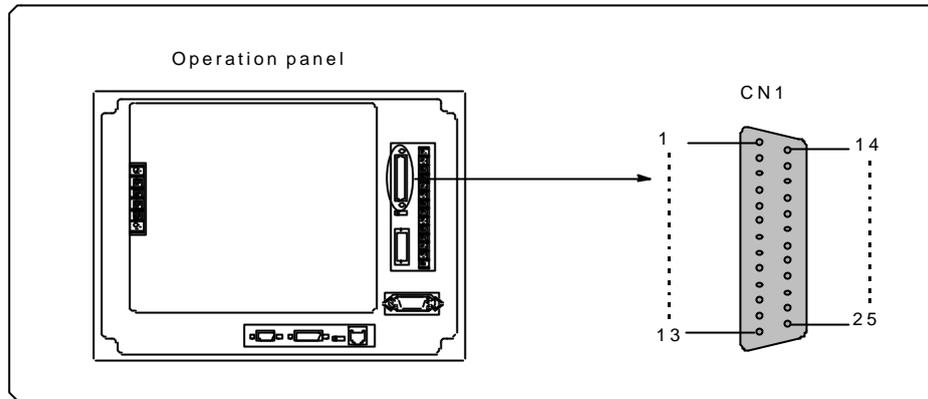
CN1 is the connector for communications with PLCs and for transferring screen data.

● The pin layout for connector CN1 is as follows.

Pin No.	Signal	Function
1	FG	Frame ground
2	SD	RS-232C send data
3	RD	RS-232C receive data
4	RTS	RS-232C request to send
5	CTS	RS-232C clear to send
7	SG	Signal ground
9	+5V	Recorder power
10	0V	Recorder power
12	+SD	RS-422A send data (+)
13	−SD	RS-422A send data (−)
14	+RTS	RS-422A request to send (+)
17	−RTS	RS-422A request to send (−)
18	−CTS	RS-422A clear to send (−)
19	+CTS	RS-422A clear to send (+)
24	+RD	RS-422A receive data (+)
25	−RD	RS-422A receive data (−)

● For the connector connected to CN1, use either the accessory D-SUB 25 pin connector or the connector equivalent to 17JE23250-02 (D8A) from DDK. Also, the customer needs to provide a cable that matches the connectors it will be connected to.

● Screen data transfer is used for transmitting screens such as those for PLCs made using **the Panel Designer II screen creating tool** to the operation panel. When transferring screen data, connect to the RS-232C communications port of a PC on which **the Panel Designer II screen creating tool** is installed.

<Cable for connecting to a PC>
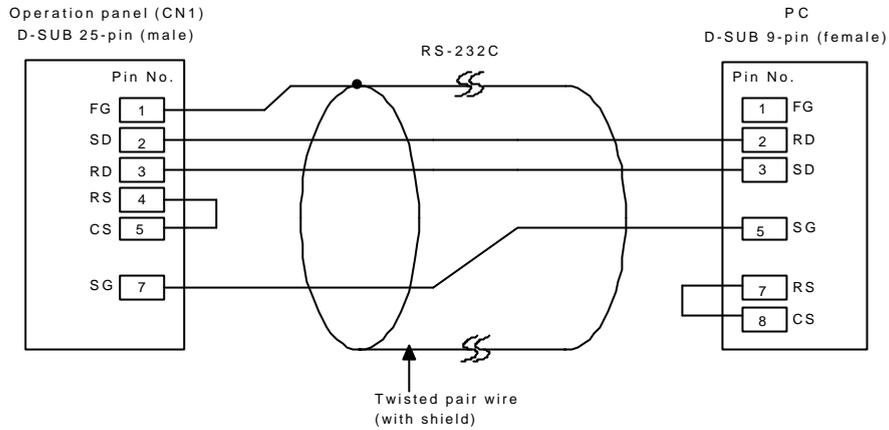
*   For the CN1 side connector, use a connector equivalent to the 17JE23250-02 (D8A) from DDK.

    For the PC side connector, use a connector equivalent to the 17JE13090-02 (D8A) from DDK.

| NOTES |

● For details on connections with PLCs, see **"2.6 Connections with PLCs"** (Page 2-24).

● For details on transferring screen data, see the instruction manual for **the Panel Designer II screen creating tool.**

(2) Connecting CN2
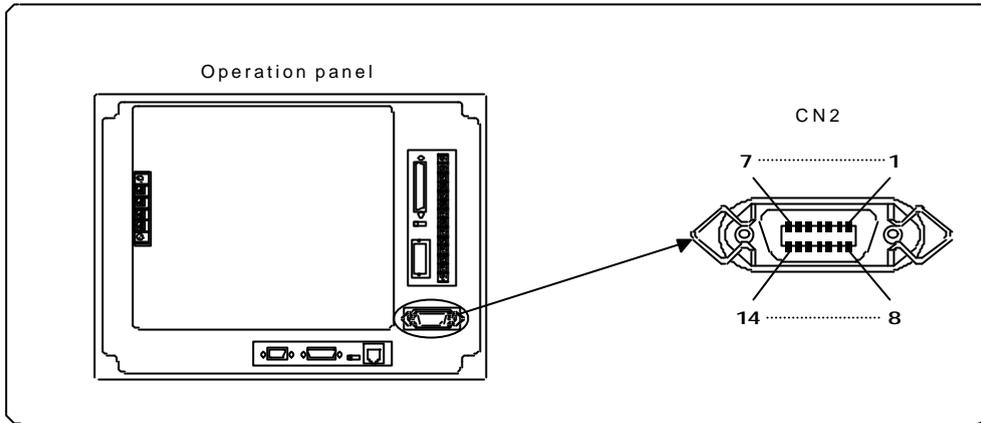
CN2 is the connector for connecting with the printer.

● This connector conforms to the Centronics interface.

● This connector supports either an NEC PC-PR201 series printer or Epson ESC/P series printer.

● The customer must provide a printer cable (cable with connectors) that matches the printer to be connected to.

<Printer cable signal contents>

Twisted pair wire
(with shield)

(3) Connecting CN3

Operation panel

Control units

RS-422A

Connected to operation panel CN3

Connected to COM.PORT1 of the PCP module

Connection cable model : W-BF-02-3000 (sold separately)
[Standard cable length : 3 m]
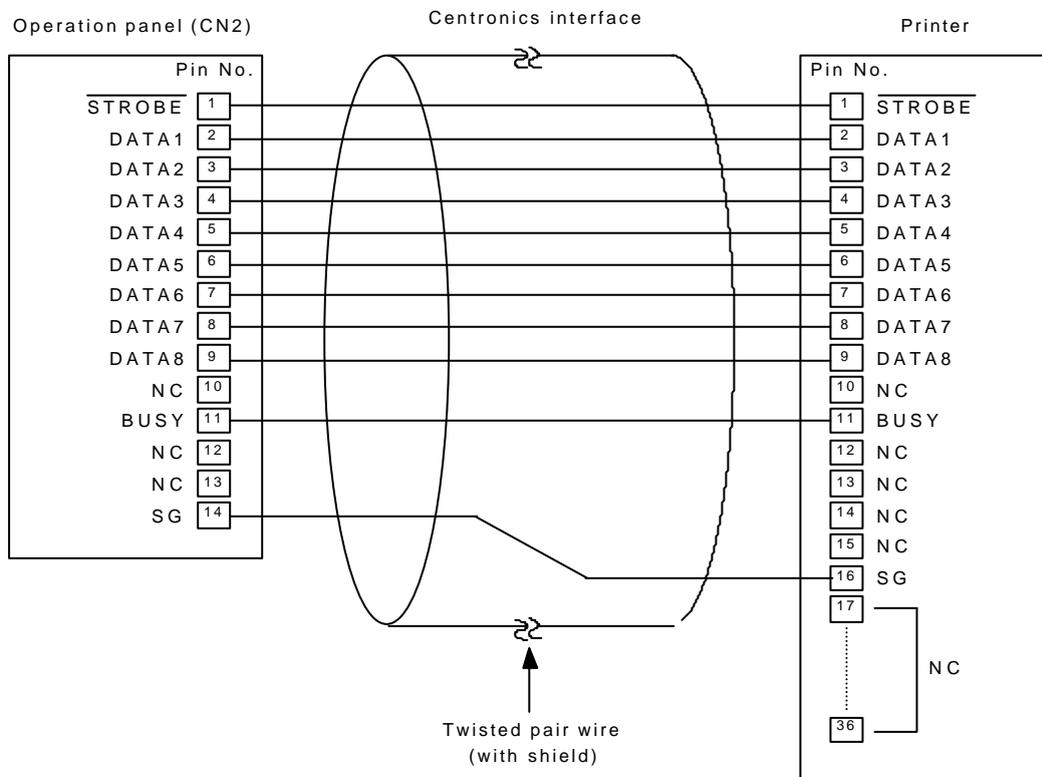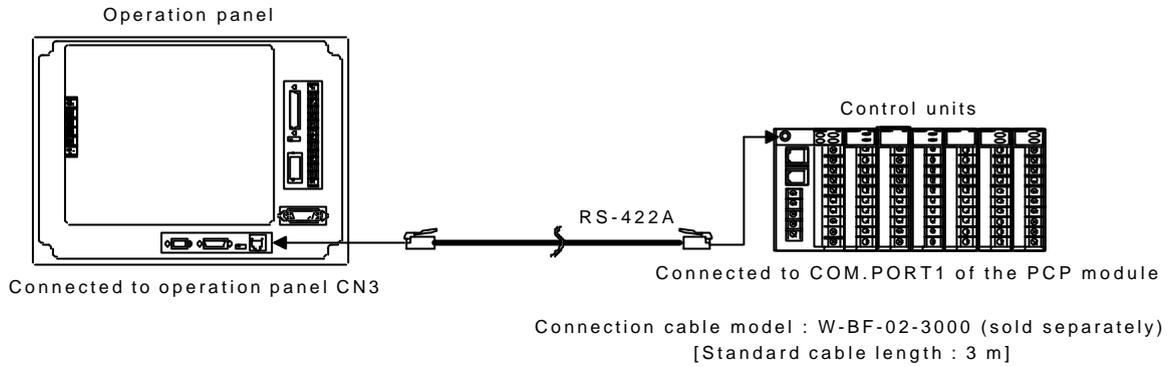
CN3 is the connector for connecting with SR Mini HG System control units.

● For the connection cable, use the special RKC cable (sold separately).

Model: W-BF-02-3000 (cable length : 3 m)

● If the connection cable is specially ordered (with a different cable length), the model is different.

● The connector pin layout is as follows.

1 - - - - - - 6
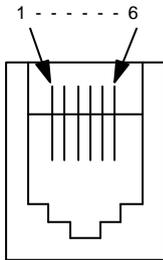
Pin No.	Signal	Function
1	TA (-SD)	RS-422A send data (-)
2	TB (+SD)	RS-422A send data (+)
3	SG	Signal ground
4	RB (+RD)	RS-422A receive data (+)
5	RA (-RD)	RS-422A receive data (-)
6	FG	Frame ground

(4) Connecting CN4

Operation Panel

CN4
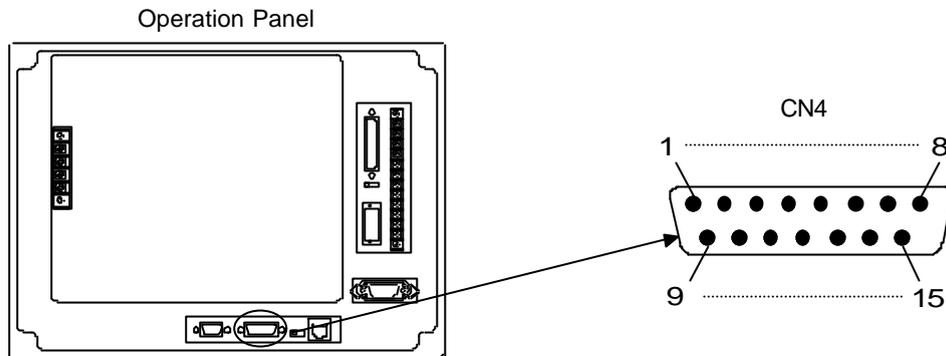
CN4 is the connector for connecting a memory card unit.

● Only use the memory card unit designed for RKC (sold separately).

Model No.: EMU-01

● For the connection cable, use the special memory card unit connection cable that comes with the memory card unit.

● The connector pin arrangement is as shown below

Pin No.	Signal	Function
1	+SD	RS-422A send data (+)
2	NC	Not used
3	NC	Not used
4	+RD	RS-422A receive data (+)
5	+DTR	RS-422A data terminal ready (+)
6	+DSR	RS-422A data set ready (+)
7	GND (SG)	Signal ground
8	+5V	Power supply
9	−SD	RS-422A send data (−)
10	NC	Not used
11	−RD	RS-422A receive data (−)
12	−DTR	RS-422A data terminal ready (−)
13	−DSR	RS-422A data set ready (−)
14	GND (SG)	Signal ground
15	+5V	Power supply

(5) Connecting CN6

Operation Panel

CN6
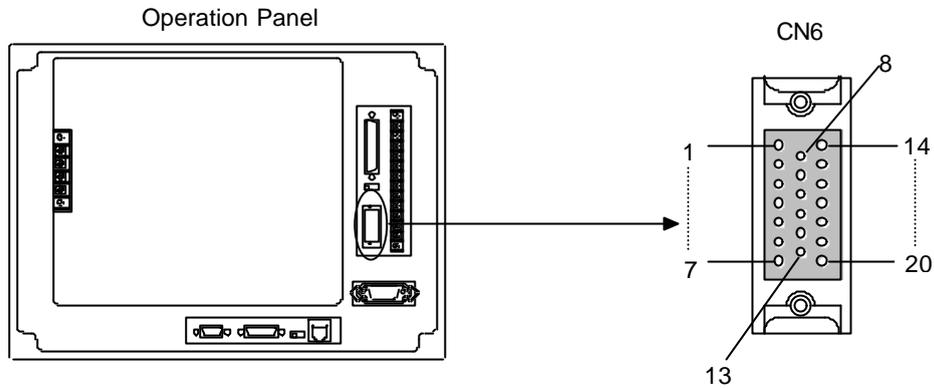
CN6 is the connector for digital input/output.

● For the connector connected to CN6, use the accessory MR-20 from Honda Tsushin Kogyo.

● The connector pin arrangement is as follows.

Pin No.	Signal	Function
1	Input common	+24V
2	Input Signal 0	Not used
3	Input Signal 1	Not used
4	Input Signal 2	Not used
5	Input Signal 3	Not used
6	Input Signal 4	Not used
7	Input Signal 5	Not used
8	Input Signal 6	Not used
9	Input Signal 7	Not used
10	NC	—
11	NC	—
12	Output Signal 0	Fail output
13	Output Signal 1	SUB1 output
14	Output Signal 2	SUB2 output
15	Output Signal 3	Not used
16	Output Signal 4	Not used
17	Output Signal 5	Not used
18	Output Signal 6	Not used
19	Output Signal 7	Not used
20	Output common	0V

● The Fail output is output when the operation panel main unit is in an abnormal state. Use it when you want to take out a signal for an error circuit or the like.

Output type: Open collector output

Output ratings: 24 V DC, 50 mA max. (resistance load)

● The SUB output are set up so that when the **SR Mini HG system** control unit outputs an alarm, there is also output at the operation panel side. For the SUB outputs, ALM1, ALM2, AI ALM1, AI ALM2, burnout, HBA, LBA, temperature rise, etc. can be selected. (Multiple signals can be selected.)

Output type: Open collector output

Output ratings: 24 V DC, 50 mA max. (resistance load)

Open collector wiring example

Input circuit

Input voltage : 24 V DC
Input impedance : 3 kΩ
Input current : 3 to 7 mA

Output circuit

Output drive current :
    50 mA (24 V DC)
Residual voltage : 1.7 V

(6) Connecting CN7

Operation Panel
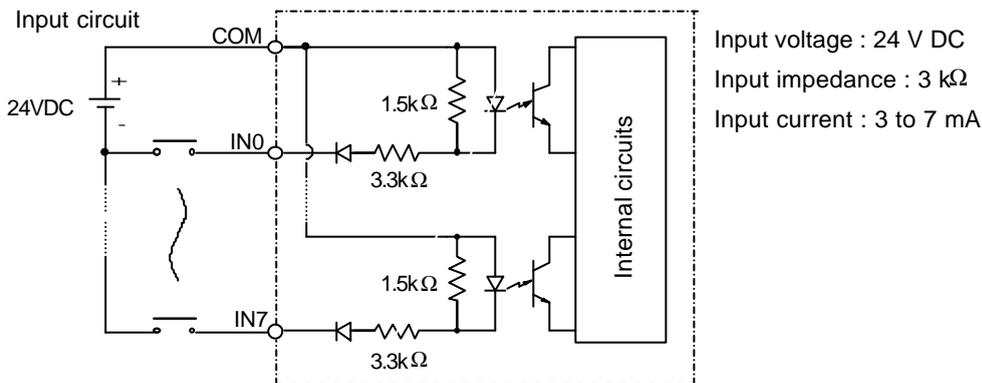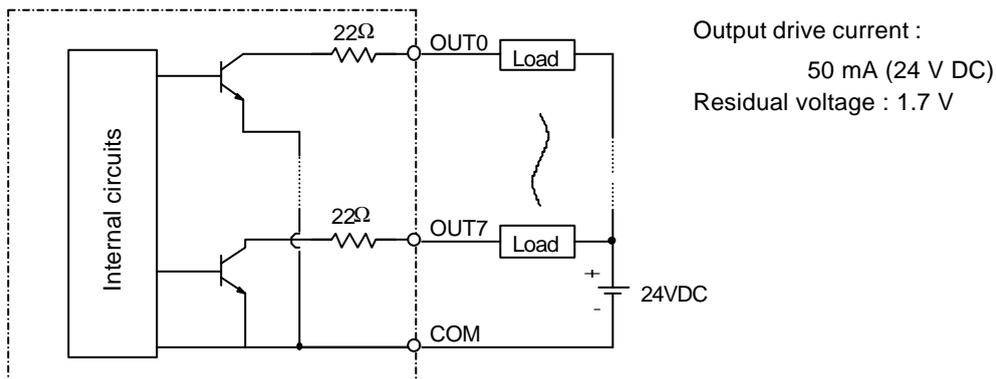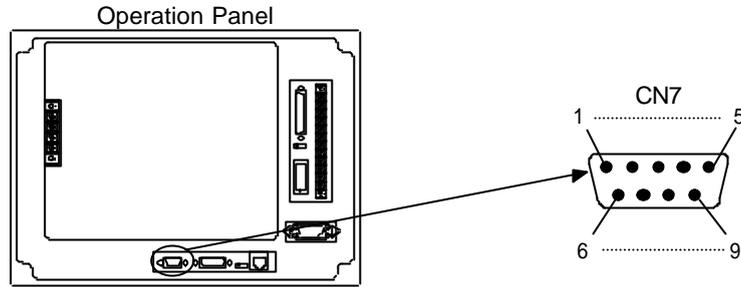
CN7 is the connector for communications with the host computer. When controlling the SR Mini HG system control units with a host computer, connect the host computer communications connector to CN7.

- For the communications interface, either RS-422A, RS-485, or RS-232C can be specified when the system is ordered.

- For the connector connected to CN7, use either a D-SUB 9-pin connector or use the 17JE13090-02 (D8A) from DDK or an equivalent connector. Also, the customer must provide a cable with the appropriate host computer side connector.

● RS-422A

1. Pin layout

Pin No.	Signal	Function
2	TA (−SD)	RS-422A send data (−)
4	RA (−RD)	RS-422A receive data (−)
5	SG	Signal ground
6	TB (+SD)	RS-422A send data (+)
8	RB (+RD)	RS-422A receive data (+)

Pin No. 1, 3, 7, and 9 are NC (not used).

2. Communications cable signal details

(Maximum connections: 32 units)

Twisted pair wire (with shield)

* $\overline{\text{TXD}}$ and $\overline{\text{RXD}}$ use negative logic.
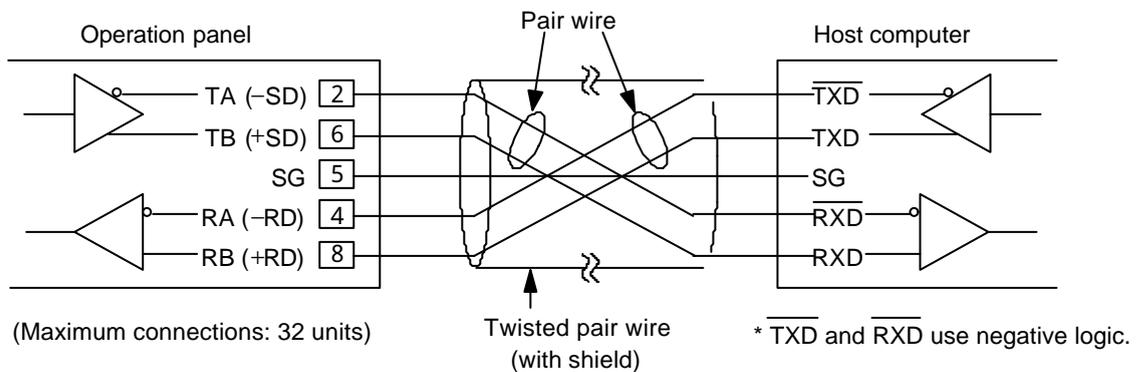
● RS-485

  1. Pin layout

Pin No.	Signal	Function
2	T/RA (−SD/RD)	RS-485 send/receive data (−)
5	SG	Signal ground
6	T/RB (+SD/RD)	RS-485 send/receive data (+)

Pin No. 1, 3, 4, 7, 8, and 9 are NC (not used).

  2. Communications cable signal details

(Maximum connections: 32 units)

* $\overline{TXD}/\overline{RXD}$ uses negative logic.
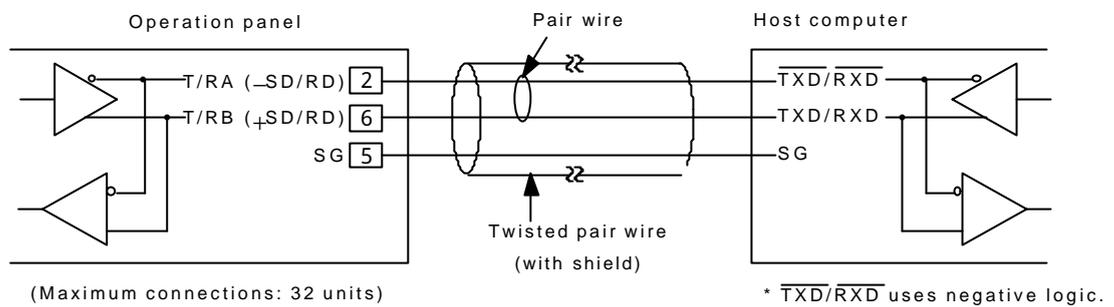
● RS-232C

  1. Pin layout

Pin No.	Signal	Function
2	RD (RXD)	RS-232C receive data
3	SD (TXD)	RS-232C send data
5	SG	Signal ground
7	RS (RTS)	RS-232C request to send
8	CS (CTS)	RS-232C clear to send

Pin No. 1, 4, 6, and 9 are NC (not used).

  ● **Please short between RS and CS within the connector.**

  2. Communications cable signal details

(Maximum connections: 1 unit)
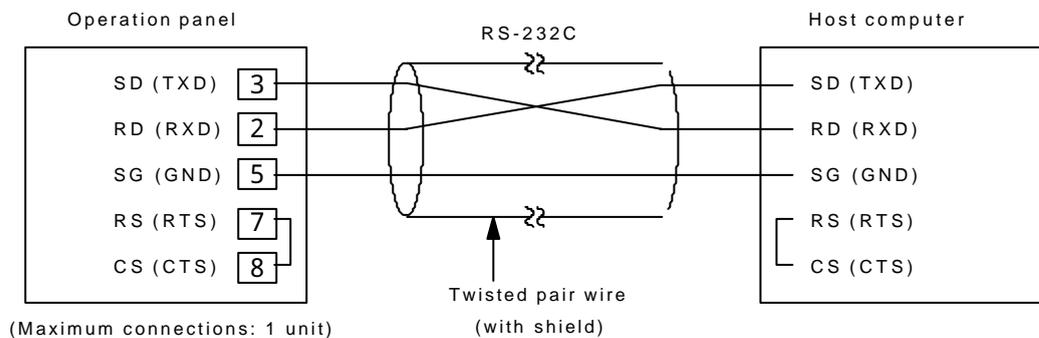
2.6 Connecting with PLCs

(1) PLC connection summary

This device can be connected to programmable controllers (PLCs) for monitoring PLC data. There are three connection methods, "1:1", "1:n", and "n:1".

NOTES

In order to monitor PLC data, it is necessary to make PLC settings and make PLC monitor screens and other screens with the **Panel Designer II screen creating tool**.

● **1:1 connection**

One operation panel is connected with one PLC as 1:1.

● **1: n connections (multi-drop connections)**

One operation panel is connected with multiple PLCs as 1: n.

(n = 1 to 32)
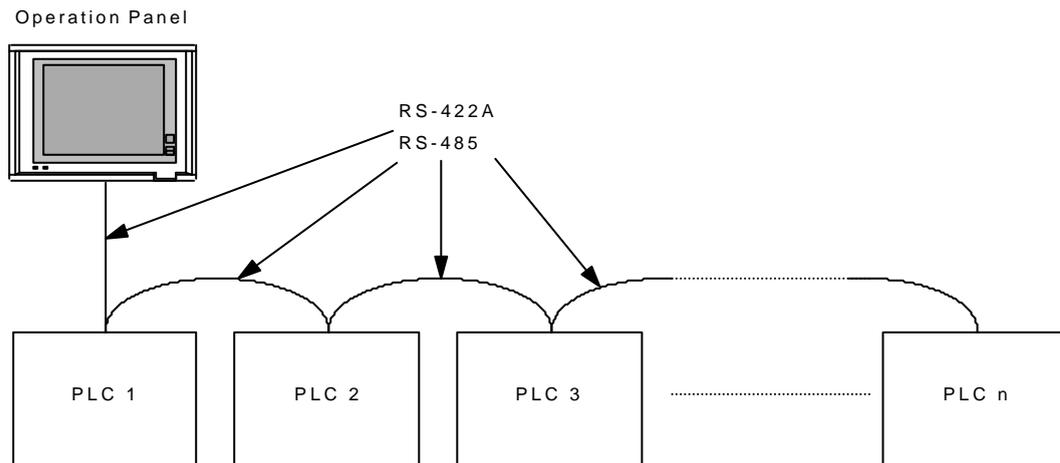
<Models for which multi-drop connection is possible>

Manufacturer	Models
MITSUBISHI	AnN, AnA, AnU
MITSUBISHI	NET10
OMRON	C series
KEYENCE	KZ series
SHARP	JW series
HITACHI	H series
TOYOPUC	TOYOPUC
FUJI	MICREX-F, FLEX-PC, NJ Computer link
Koyo	SU/SG series, SR-T
GE Fanuc	90 series, SR-T
YOKOGAWA	FA500, FA-M3
MATSUSHITA	MEWNET
YASKAWA	MEMOBUS unit
TOSHIBA	T series
SAMSUNG	SPC
LG	K500/K1000
Allen-Bradley	PLC5, SLC5
	General-purpose serial communication

Example: Multi-drop connection (RS-422A)

The figure below shows a wiring example of connecting one OPC-H with three MITSUBISHI PLCs. For detailed settings, refer to the MITSUBISHI's users manual.

Operation Panel   Link Unit   Link Unit   Link Unit

For terminal base
For connector
Terminal resistance ON
* Use twisted shield wire
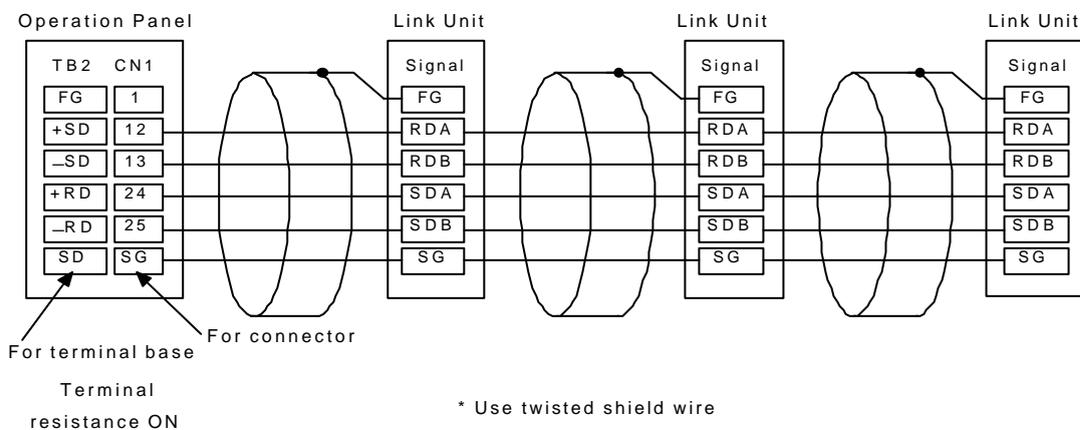
● n:1 connections (multi-link connections)

Multiple operation panels are connected to one PLC as :1.

(n = 1 to 32)
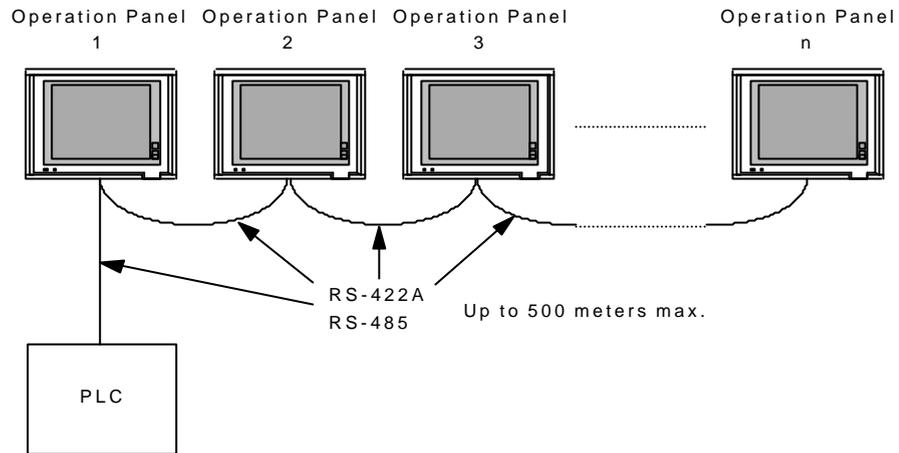
<Models for which multi-link connection is possible>

Manufacturer	Models
MITSUBISHI	AnN, AnA, AnU
MITSUBISHI	QnACPU port (with GD-MDD2)
OMRON	C series
KEYENCE	KZ series
SHARP	JW series
HITACHI	H series
TOYOPUC	TOYOPUC
FUJI	MICREX-F, NJ Computer link
YOKOGAWA	FA-M3
MATSUSHITA	MEWNET
YASKAWA	MEMOBUS unit
TOSHIBA	T series
SAMSUNG	SPC
LG	K500/K1000

Example: Connections with link units
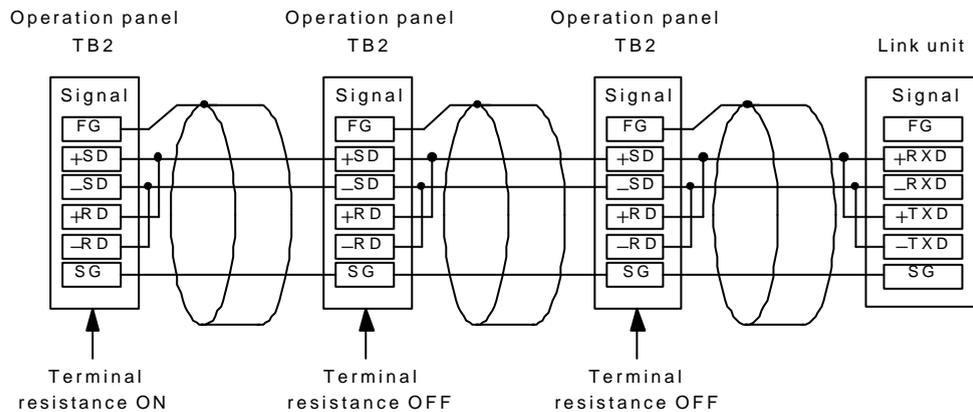
Example: When connecting directly to a Mitsubishi Q series CPU, always used the dual-port interface.
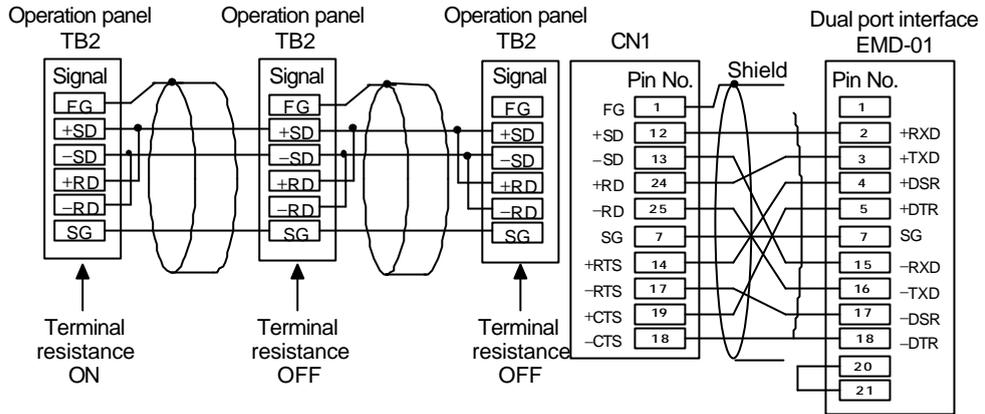
(2) MITSUBISHI PLCs 1 (A series/Q series computer unit)

■ CPUs that can be used and their connection methods

MITSUBISHI QnA

● Can be used when the CPU is from the QnA series and the link unit is the AJ71QC24, or the CPU is from the Q2ASx series and the link unit is the A1SJ71QC24.

MITSUBISHI AnA/AnN/AnU

● For the transmission mode, Format 1 and Format 4 can be selected, but normally Format 1 is used.

● Other than the QnA, all are set with AnA/AnN/AnU.

(Even when the TYPE2 is used, set with AnA/AnN/AnU.)

■ List of CPUs and link units that can be used

The PLCs and link units that can be used with this device are as follows.

Panel Designer II setting model	CPU	Computer link unit
AnA/AnN/AnU	A2A,A3A	AJ71C24-S6 AJ71C24-S8 AJ71UC24
	A2U,A3U,A4U	AJ71UC24
	A2US	A1SJ71UC24-R2 A1SJ71UC24-R4 A1SJ71UC24-PRF
	A1,A2,A3 A1N,A2N,A3N A3H,A3M,A73	AJ71C24 AJ71C24-S3 AJ71C24-S6 AJ71C24-S8 AJ71UC24
	A0J2,A0J2H	A0J2C214-S1
	A1S,A1SJ,A2S	A1SJ71C24-R2 A1SJ71C24-R4 A1SJ71C24-PRF
	A2CCPUC24	Link port with built in CPU
QnA	Q2ASX, Q2A, Q3A, Q4A	A1SJ71QC24, AJ71QC24

■ Link units

The default settings are as follows.

Item		Details [AnA/AnN/AnU link unit]	Details [QnA link unit]
Transmission control mode	RS-232C	Type 1 -> 1, Type 4 -> 4	Type 5 binary mode
	RS-422A	Type 1 -> 5, Type 4 -> 8	
Port		0 (x10, x1 both 0 setting)	0 (x10, x1 both 0 setting)
Baud rate		Set the same as OPC-H (normally 19200 bps)	Set the same as OPC-H (normally 19200 bps)
Parity		Even parity	Even parity
Transmission codes	Data bits	7(ASCII)	8(ASCII)
	Stop bit	1	1
Sumcheck		Yes	Yes
Writing during operations		Possible	Possible
Transmission side terminal resistance		Yes	—
Reception side terminal resistance		Yes	—

▲ Switch settings

<Example> Mode: RS-232C
        Baud rate: 19200 bps
        Set to Format 1

AJ71UC24

A1SJ71C24-R2
A1SJ71UC24-R2

<Example> Baud rate: Set to 19200 bps

AJ71QC24
A1SJ71QC24

● Rotary DIP switch
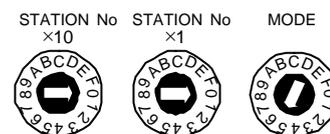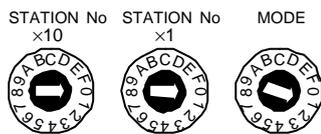
● DIP switch
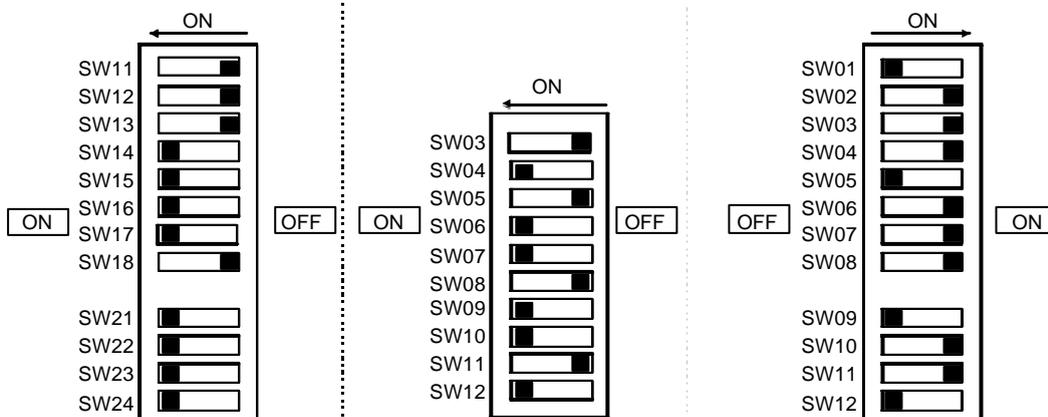
Button

With switch on

<Example>　Mode: RS-422A　Baud rate: 19200 bps　Set to Format 1

A1SJ71UC24-R4, A1SJ71C24-R4

● Rotary DIP switch

STATION No ×10　　STATION No ×1　　MODE

● DIP switch

■ Usable memory

The memory that can be used is as follows.

Usable : ×　Not usable : -

Memory	Bit writing	Type	Remarks
D (data register)	-	0	
W (link register)	-	1	
R (file register)	-	2	
TN (timer [current value])	-	3	
CN (counter [current value])	-	4	
SPU (special unit)	-	5	Slot No. *1
M (internal relay)	×	6	
L (hold relay)	×	7	
B (link relay)	×	8	
X (input relay)	×	9	
Y (output relay)	×	10	
TS (timer [contact])	×	11	
TC (timer [coil])	×	12	
CS (counter [contact])	×	13	
CC (counter [coil])	×	14	
H (link buffer)	-	15	

*1 A slot No. is necessary other than memory type/address. Also, for byte addresses, convert to words.

*When using TYPE2, use H (link buffer) memory.

The setting range for each type of memory varies with the PLC model. Set within the range that the PLC you are using can support. Also, Type is used for indirect memory specification with macros.

■ Wiring

The figures below show connections with link units.

● RS-422A
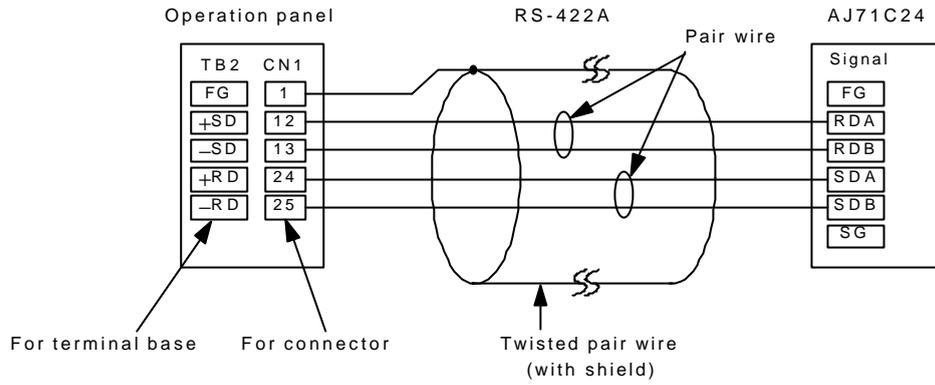
● RS-232C
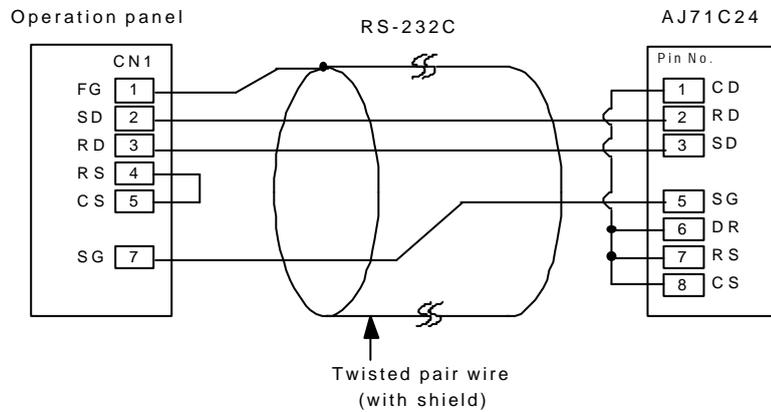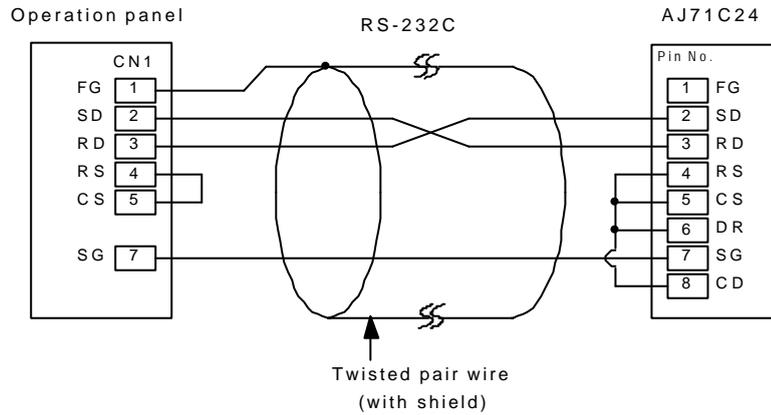
(3) MITSUBISHI PLCs 2 (A series/Q series CPU port)

- ■ Connections
  - Connected to the A series or Q series PLC CPU port. Note that the settings are made automatically.

- ■ List of models for which direct CPU port connection is possible

  The CPUs that can be used with this model are as follows.

Panel Designer II setting model	CPU
A series CPU	A2A, A3A A2U, A3U, A4U A2US A1N, A2N, A3N A3V, A73 A3H, A3M A0J2H A1S, A1SJ, A2S A2CCPUC24
Q series CPU	Q2ASx, Q2A, Q3A, Q4A

- ■ Usable memory

  The memory that can be used is as follows.

  Usable : × Not usable : -

Memory	Bit writing	Type	Remarks
D (data register)	-	0	
W (link register)	-	1	
R (file register)	-	2	
TN (timer [current value])	-	3	
CN (counter [current value])	-	4	
SPU (special unit)	-	5	Slot No. *1
M (internal relay)	×	6	
L (hold relay)	×	7	
B (link relay)	×	8	
X (input relay)	×	9	
Y (output relay)	×	10	
TS (timer [contact])	×	11	
TC (timer [coil])	×	12	
CS (counter [contact])	×	13	
CC (counter [coil])	×	14	

*1 A slot No. is necessary other than memory type/address. Also, for byte addresses, convert to words.

The setting range for each type of memory varies with the PLC model. Set within the range that the PLC you are using can support. Also, Type is used for indirect memory specification with macros.

■ Precautions for connecting directly to A series/Q series CPUs
(Be sure to read these precautions carefully.)

When connecting directly to a MITSUBISHI A series or Q series CPU, carefully observe the points below.

<Precautions for direct connection with CPU>

● The interference of noise on the cable for communications between this device and the ACPU or QCPU must be adequately taken into consideration.

● Also adequately consider noise in the panel and in the wiring within the machine and wire separated from motor wires.

● The longer the communications cable, the more it is affected by noise, so take this into account when wiring.

● A noise filter (ferrite core) is sold separately as an option.

CAUTION

In order to use this type of connection more safely, always mount a ferrite core. Experimental results have been reported showing that the difference in the noise voltage at which communication errors occur without and with a ferrite core is 650-900 volts.

Given the interference of noise, if the connections will be over a long distance, we recommend use of the standard type link unit.

<Precautions for settings with Panel Designer II (making screens)>

For the model setting with **the Panel Designer II screen creating tool**, for an A series CPU, select "A series CPU" and for a Q series CPU, select "Q series CPU". Beware that if you select another item (such as "AnA/AnN/AnU"), communications will be impossible.

<Precautions for using the dual-port interface (EMD-01)>

Observe the following precautions when using the dual-port interface.

● The dual-port interface power is supplied from the CPU, so make sure the CPU has adequate 5V power (maximum current consumption 350 mA).

● Make the wiring between the CPU and the dual-port interface as short as possible (1 to   1.5 m max.)

● Wire in such a way as to minimize noise.

● Switch the dual-port interface side slide switch (ON: Q series; Off: A series) before switching on the power.

■ Wiring

The figure below shows connections with a CPU port.
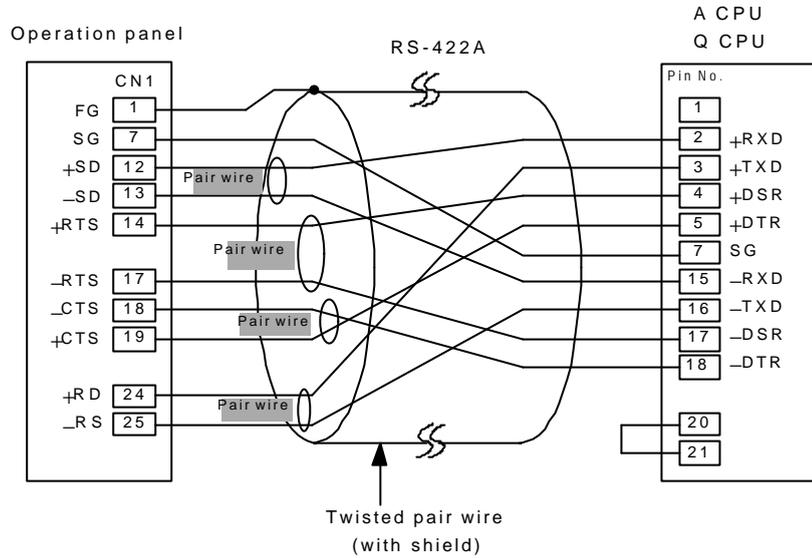
● RS-422A


```
Operation panel          RS-422A            A CPU
                                            Q CPU
     CN1                                    Pin No.
FG    1                                       1
SG    7                                        2   +RXD
+SD  12    Pair wire                            3   +TXD
_SD  13                                          4   +DSR
+RTS 14             Pair wire                      5   +DTR
                                                   7   SG
_RTS 17                                          15   _RXD
_CTS 18            Pair wire                      16   _TXD
+CTS 19                                           17   _DSR
                                                  18   _DTR
+RD  24   Pair wire
_RS  25                                          20
                                                 21
```

Twisted pair wire
(with shield)

NOTE

Install the optional ferrite core noise filter (sold separately) as in the figure below.

Connected to CPU port

Bundling band
In order to fasten the noise filter,
fasten straight down.

A series CPU
Q series CPU

Ferrite core
Install as close to the connector as possible.
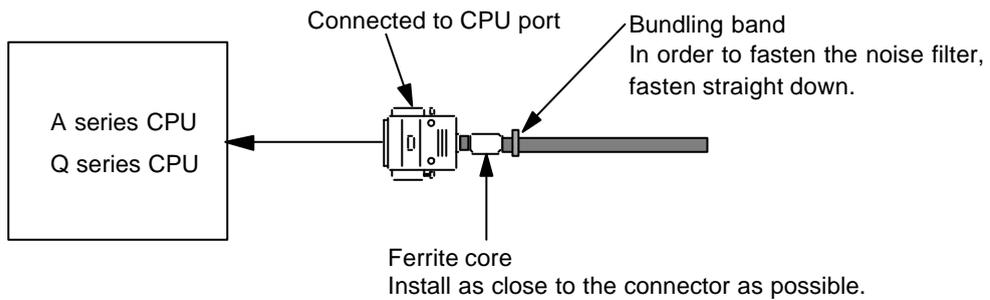
(4) MITSUBISHI PLCs 3 (FX1/2 series)

■ Connections

Connected to the FX series PLC CPU port. The settings are made automatically as follows.

Item	Details
Baud rate	9600 bps (fixed)
Parity	Even
Data bit	7

■ Usable memory

The memory that can be used is as follows.

Usable : ×   Not usable : -

Memory	Bit writing	Type	Remarks
D (data register)	-	0	
TN (timer [current value])	-	1	
CN (counter [current value])	-	2	
32CN (32-bit counter)	-	3	*1
M (internal relay)	×	4	
S (state)	×	5	
X (input relay)	×	6	Read only
Y (output relay)	×	7	
TC (timer [coil])	×	8	
CS (counter [contact])	×	9	

*1 • Items for which the number format allows double-word settings (data display numeric value display, graphs, sampling) are processed as double-word data.

• Also, bit- or word-type items are processed as lower 16-bit words.

Input : The upper 16 bits are ignored.

Output : The upper 16 bits are always written as "0".

The setting range for each type of memory varie s with the PLC model. Set within the range that the PLC you are using can support. Also, Type is used for indirect memory specification with macros.

■ Precautions for connecting directly to FX series CPUs
(Be sure to read these precautions carefully.)

When connecting directly to a Mitsubishi Electric FX series CPU, carefully observe the points below.

<Precautions for direct connection with CPU>

● The effect of noise on the cable for communications between this device and the FXCPU must be adequately taken into consideration.

● Also adequately consider noise in the panel and in the wiring within the machine and wire separated from motor wires.

● The longer the communications cable, the more it is affected by noise, so take this into account when wiring.

● A noise filter (ferrite core) is sold separately as an option.

CAUTION

In order to use this type of connection more safely, <u>always mount a ferrite core</u>. Experimental results have been reported showing that the difference in the noise voltage at which communication errors occur without and with a ferrite core is 650 to 900 volts.

<Precautions for settings with Panel Designer II (making screens)>

For the model setting with the **Panel Designer II screen creating tool**, select "FX." Beware that if you select another item (such as "A series CPU"), communications will be impossible.

■ Wiring

The figure below shows connections with a CPU port.
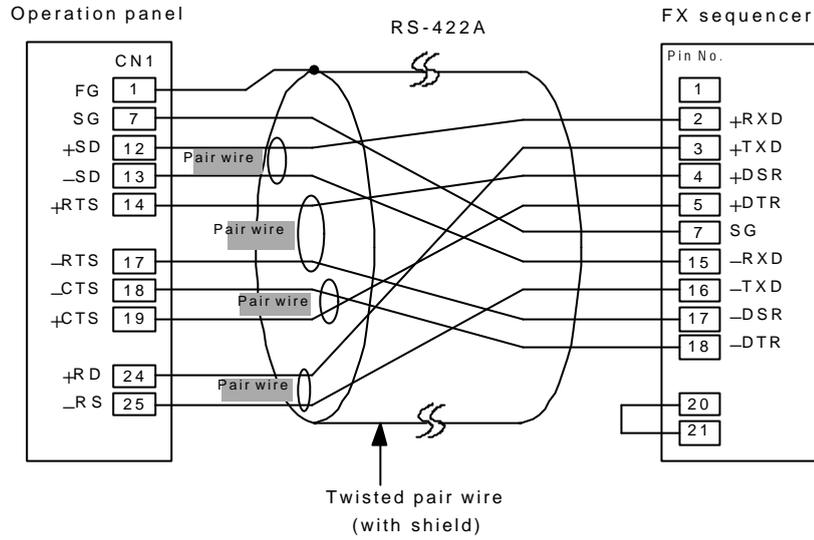
● RS-422A

Operation panel   RS-422A   FX sequencer

CN1   Pin No.

Operation panel CN1	FX sequencer Pin No.
FG 1	1
SG 7	2 +RXD
+SD 12 (Pair wire)	3 +TXD
−SD 13	4 +DSR
+RTS 14	5 +DTR
(Pair wire)	7 SG
−RTS 17	15 −RXD
−CTS 18 (Pair wire)	16 −TXD
+CTS 19	17 −DSR
	18 −DTR
+RD 24 (Pair wire)	
−RS 25	20
	21

Twisted pair wire
(with shield)

NOTE

Install the optional ferrite core noise filter (sold separately) as in the figure below.

Connected to CPU port   Bundling band
                                   In order to fix the noise filter,
                                   fasten straight down.

FX series CPU

Ferrite core
Install as close to the connector as possible.
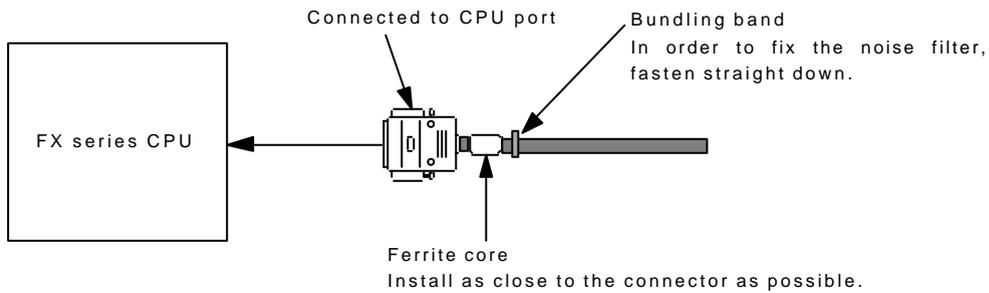
(5) MITSUBISHI PLCs 4 (Net10)

■ When connecting OPC-H to the computer link unit installed in the CPU which is connected with a data link system or network system, it is possible to access from OPC-H to other CPUs in NETII (/B) or NET/10. Select "Net10" for PLC model setting on the screen creating tool Panel Designer II.

■ Accessing other CPUs in NETII (/B) and NET/10 from OPC-H
  ● In case of NETII (/B), OPC-H can access only the CPUs under the same network (No.1 in the figure below) in which the computer link unit connected with OPC-H installed. (Assignable CPU No.: 0 to 30)
  ● In case of NET/10, OPC-H can access the CPUs linked to the same network (No.2 to No.3 in the figure below) in which the computer link unit connected with OPC-H installed. (Assignable CPU No.: 0 to 30)

■ Reading/writing on the memory of CPU (1-1, in the figure right) to which the computer link unit connected with OPC-H installed:

Set the memory setting CPU No. on the screen ereating tool Panel Designer II to "31".
The response time is the same as that of OPC-H and PLC (1:1) connection.

Reading/writing on the CPU memory with setting the CPU No. "other than 31":

Note that the response time slows down as it is the trangent transfer mode.
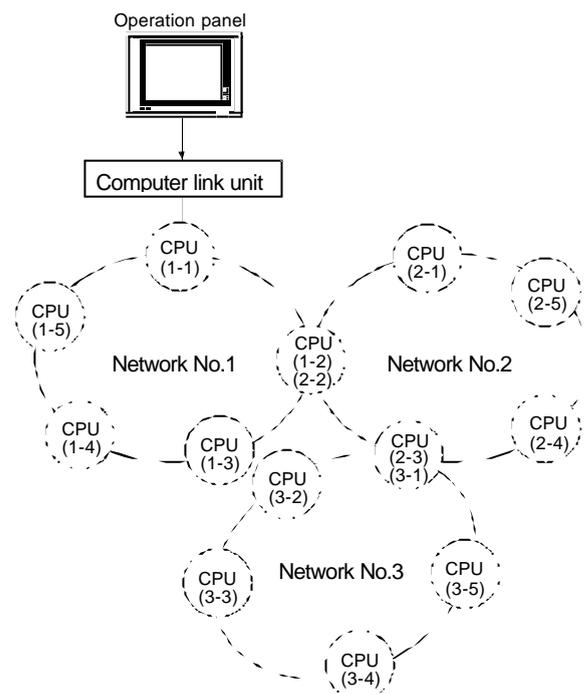
■ When accessing PLCs in other network under NET/10, assign the connecting network No. with the "Open Macro" screen on the screen creating tool Panel Designer II.
The macro command is [OUT_ENQ] in the system call [SYS], and it is impussible to access CPUs in different networks on the same screen.

■ Network Specifying Macro ---------------------------[OUT_ENQ] in the system call [SYS]

F1 Memory

n+0	Normally 0
n+1	Network specifying: 2
n+2	System code
n+3	Network No.

n+0, n+1: Fixed value "0", "2".

N+2 System code: 1 = NET/10   2 = NETII

n+3 Network No.: At the above n+2 System code, input "0" if NETII is specified, or input "Accessing Network No." if NET/10 is specified.

Do not use this macro other than the open macro on screen.

If used, a communication error will occur as the network is switched when executed.

Refer to the instruction manual for the screen creating tool Panel Designer II [IMSFT13-E□] for the macro details.

Also, see the "Network Registration" in MITSUBISHI's Computer Link/Multi-drop Link Unit.

■ For details of the NETII (/B) data link system and NET10 network system, refer to MITSUBISHI's manual.

■ Usable memory

As to the accessing usable memory of PLC, refer to the "Usable memory" in **MITSUBISHI PLCs 1 (A series/Q series computer unit)** page 2-29, and **(3) MITSUBISHI PLCs 2 (A series CPU port)** page 2-33.

CPU No. must be set on the screen creating tool Panel Designer II.

(6) OMRON PLCs

■ Link unit

The link units and CPU ports that can be connected are as follows.

CPU	Computer link unit
C20H, C28H, C40H	CPU unit with a built in RS-232C (Host link port)
C120,C120F C200H C500, C500F C1000H C2000, C2000H	C120-LK201-V1 C120-LK202-V1
C200H C200HS-CPU01, 03 C200HS-CPU21, 23 C200HS-CPU31, 33	C200H-LK201 C200H-LK201-V1 C200H-LK202 C200H-LK202-V1
C200HS-CPU21,23 C200HS-CPU31, 33 CQM1-CPU21 CQM1-CPU41, 42, 43, 44	CPU unit with a built in RS-232C (Host link port)
C500, C500F C1000H C2000, C2000H	C500-LK203
CV series CV500, CV1000 CV2000 CVM1	CPU unit with a built in RS-232C (Host link port) CV500-LK201
C200HX C200HG C200HE	CPU unit with a built in RS-232C (Host link port) Communication board (C200HW-COM02~06)

The default settings are as follows.

Item		Details
Model No.		0
Baud rate		Same as OPC-H (normally 19200 bps)
Command levels		3
Parity		Even
Transmission code	Data bits	7 (ASCII)
	Stop bits	2
1:1/1:N protocol		1:N
Synchronization select switch		Internal synchronization
CTS select switch		0V (always on)
5V supply switch		OFF
Terminal resistance on/off		On for RS-422A

■ Usable memory

The memory that can be used is as follows.

Usable : ×   Not usable : -

Memory	Bit writing	Type	Remarks
DM (data memory)	-	0	
CH (input/output relay)	-	1	
HR (hold relay)	-	2	
LR (latch relay)	-	3	
AR (alarm relay)	-	4	
T (timer [current value])	-	5	
C (counter [current value])	-	6	

The setting range for each type of memory varies with the PLC model. Set within the range that the PLC you are using can support. Also, Type is used for indirect memory specification with macros.

■ Wiring

The figures below show connections with link units.

● RS-422A

- RS-232C

Operation panel
RS-232C
A

CN1 | Pin No.
FG 1 — 1 FG
SD 2 — 2 SD
RD 3 — 3 RD
RS 4 — 4 RS
CS 5 — 5 CS
SG 7 — 7 SG

Twisted pair wire
(with shield)

A
C200H-LK201-V1
C120-LK201-V1
C500-LK203
C500-LK201-V1 PORT1

Operation panel
RS-232C
B

CN1 | Pin No.
FG 1 — Hood FG
SD 2 — 2 SD
RD 3 — 3 RD
RS 4 — 4 RS
CS 5 — 5 CS
SG 7 — 9 SG

Twisted pair wire
(with shield)

B
CV HOST LINK
CQM1
CV500-LK201-V1 PORT2
C200HS
C200HX
C200HE
C200HW (Slot)
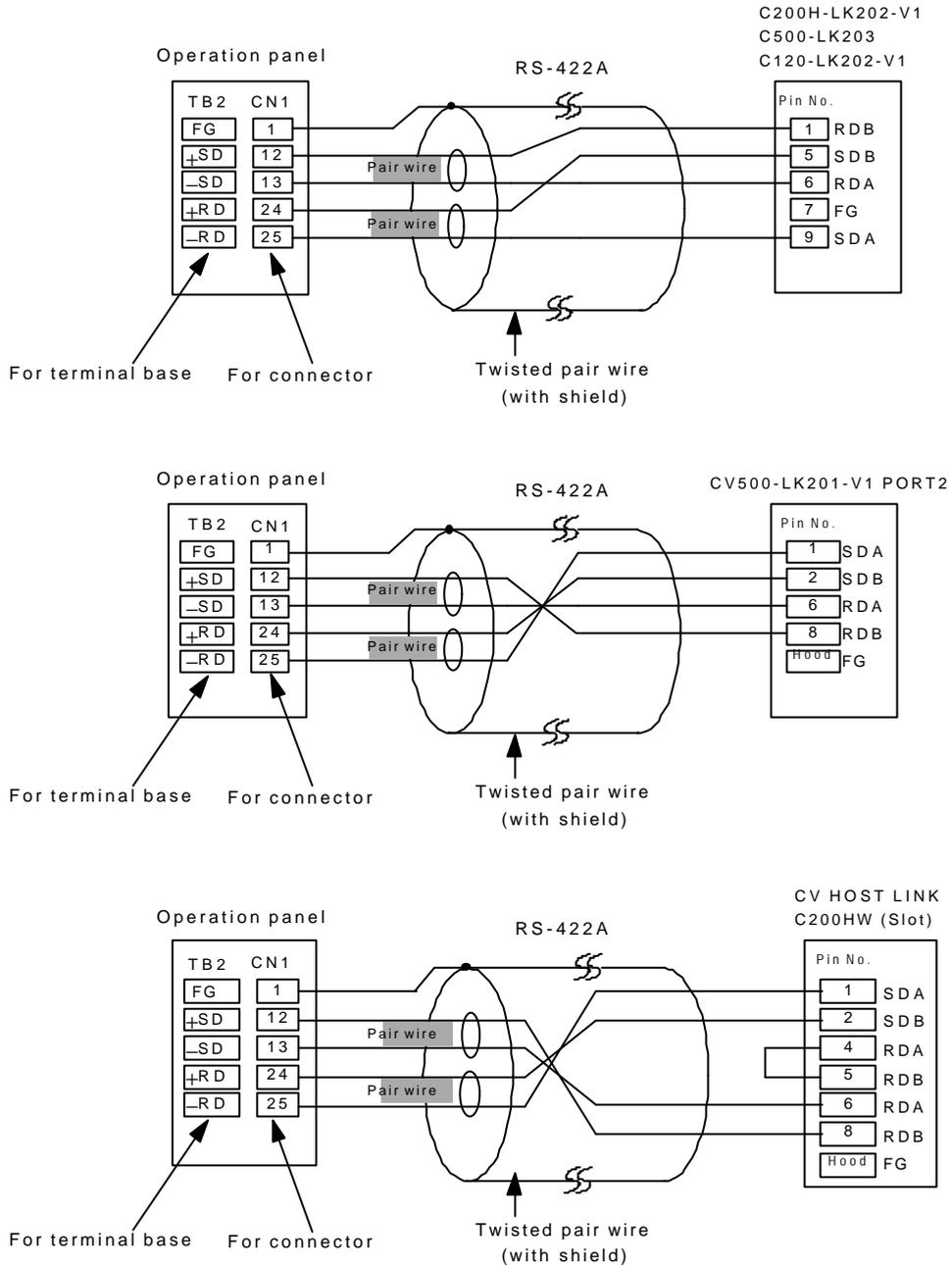
(7) SHARP PLCs 1

■ Link unit

The link units and communication ports that can be connected are as follows.

Panel Designer II setting model	CPU	Computer link unit
JW series	JW50, JW70, JW100 JW50H, JW70H JW100H	ZW-10CM JW-10CM
	JW20 JW-31CUH	JW21CM
JW70HCOM	JW70, JW100 JW70H, JW100H	CPU communication port
JW20HCOM	JW20(JW22CV) JW20H(JW22CV)	

The default settings are as follows.

Item	Details
Baud rate	Same as OPC-H (normally 19200 bps)
Parity	Even
Data bit	7
Stop bits	2
Error check	Sumcheck
RS-422A	4-wire type
Transmission control protocol	Command mode
Port	01

■ Link unit switch settings

Baud rate: 19200 bps

Switch	Setting	Details
SW0	4	Command mode
SW1	1	Station number (lower)
SW2	0	Station number (upper)
SW3-1	OFF	Not used
SW3-2	ON	4-wire type
SW3-3	OFF	Not used
SW3-4	ON	Even parity
SW4	0	Baud rate 0:19200 1:9600 2:4800 3:2400 4:1200 5:600
SW7	ON	Terminal resistance provided

■ PLC system memory setting when using communication port

Baud rate: 19200 bps

		D7	D6	D5	D4	D3	D2	D1	D0
System memory	#0236	0	0	1	1	0	0	0	0
	#0237	0	0	0	0	0	0	0	1

■ Usable memory

The memory that can be used is as follows.

Usable : × Not usable : -

Memory	Bit writing	Type	Remarks
X9XXX (register)	-	0	
XXXXX (relay)	×	1	For words, ⌐
EXXXX (self-diagnostics)	-	2	
bXXXX (timer counter)	-	3	
F1 (file register)	-	4	
F2 (file register)	-	5	
F3 (file register)	-	6	

The setting range for each type of memory varies with the PLC model. Set within the range that the PLC you are using can support. Also, Type is used for indirect memory specification with macros.

■ Wiring

The figures below show connections with link units.

● RS-422A

Operation panel | RS-422A | JW-10/21CM

TB2	CN1		Signal
FG	1		SHIELD
+SD	12	Pair wire	L1
−SD	13		L2
+RD	24	Pair wire	L3
−RD	25		L4
			GND

Ground

For terminal base   For connector   Twisted pair wire (with shield)

Operation panel | RS-422A | Communication Port

TB2	CN1		Pin No	
FG	1		1	FG
+SD	12	Pair wire	10	+TXD
−SD	13		11	−TXD
+RD	24	Pair wire	12	+RXD
−RD	25		13	−RXD

For terminal base   For connector   Twisted pair wire (with shield)

● RS-232C

Operation panel | RS-232C | communication port

CN1			Pin No.	
FG	1		1	FG
SD	2		2	SXD
RD	3		3	RXD
RS	4		4	RTS
CS	5		5	CTS
SG	7		7	SG
			12	
			14	

Twisted pair wire (with shield)

(8) SHARP PLCs 2 (JW-32CUH/33CUH)

■ Link unit

Connectable link units : JW-32CUH/JW-33CUH
Connectable CPU port : Communication port (PG/COMM1, PG/COMM2)

● JW-32CUH/JW-33CUH

The default settings are as follows.

Item	Details
Baud rate	Same as OPC-H (normally 19200 bps)
Parity	Even
Data bit	7
Stop bits	2
Error check	Sumcheck
RS-422A	4-wire type
Transmission control protocol	Command mode
Port	01

<Precautions for setting with the Panel Designer II (for screenmaking)>

When using the JW-32CUH/JW-33CUH communication port, select "JW20COM" as the PLC model setting with the **Panel Designer II screen creating tool**.

■ PLC system memory settings when using communication port

The communications parameters for communications with a PC are set in the JW-23CUH/CCCUH system memory #234/#235 (Communication Port 1) and #236/#237 (Communication Port 2).

■ Usable memory

The memory that can be used is as follows.

Usable : ×   Not usable : -

Memory	Bit writing	Type	Remarks
X9XXX (register)	-	0	
XXXXX (relay)	×	1	For words, ⌐
EXXXX (self-diagnostics)	-	2	
bXXXX (timer counter)	-	3	
F1 (file register)	-	4	
F2 (file register)	-	5	
F3 (file register)	-	6	

The setting range for each type of memory varies with the PLC model. Set within the range that the PLC you are using can support. Also, Type is used for indirect memory specification with macros.

■ Wiring

The figures below show connections with CPU ports.

●RS-422A
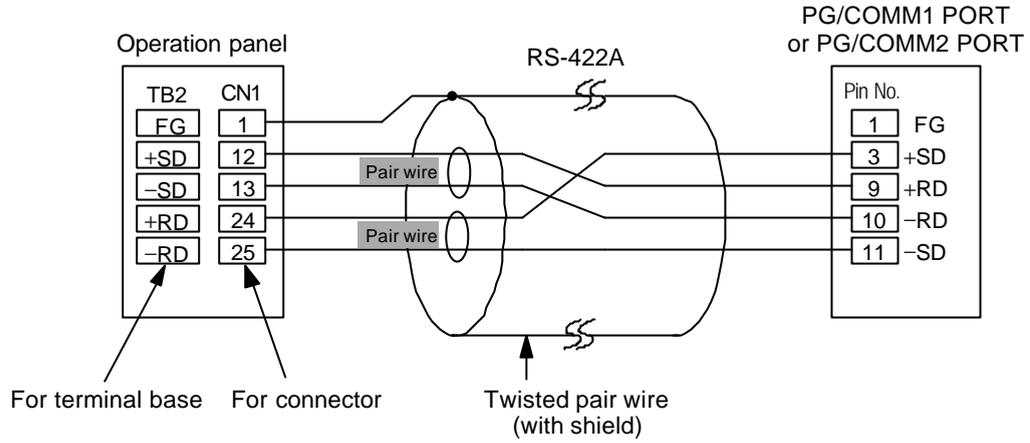
●RS-232C
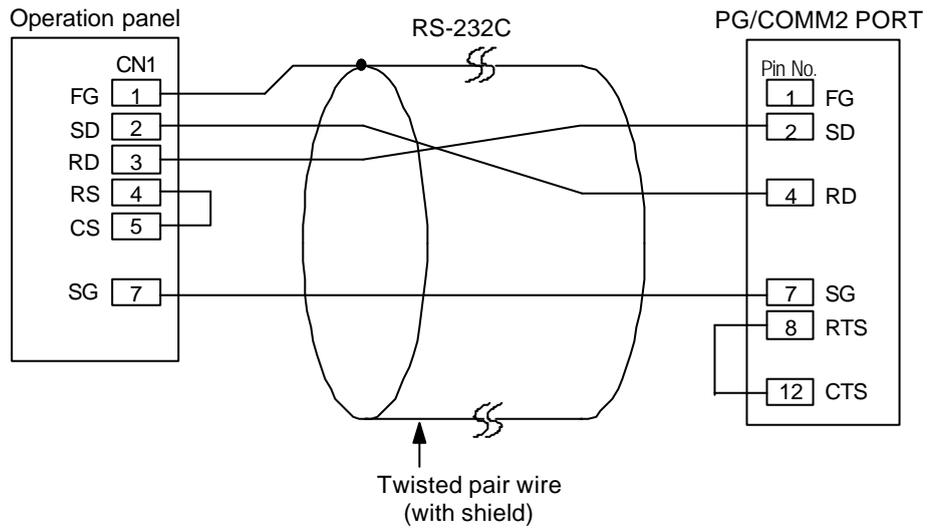
(9) HITACHI PLCs 1 (HIDIC H series)

■ Link unit

Connectable link unit : COMM-2H
Connectable CPU port : CPU link port (peripheral port)

● COMM-2H

The default settings are as follows.

Item		Details
Transmission control procedure mode	RS-232C	Pattern 1, w/o port → 1 Pattern 1, w/o port → 2 Pattern 2, w/o port → 9 Pettern 2, with port → 7
	RS-422A	Pattern 1, with port → 2 Pattern 2, with port → 9
Station number		0 (x10, x1 both set to 0)
Baud rate		Same as OPC-H (normally 19200 bps)
Parity		Even
Transmission codes	Data bits	7 (ASCII)
	Stop bit	1
Sumcheck		Yes

● The peripheral port is fixed to Transmission Control Procedure 1 and cannot be switched to any other setting.

■ Switch settings

Baud rate: 19200 bps
MODE switch : When connecting with both RS-232C and RS-422A, set the MODE switch to 9.
RS-232C (Procedure 2, no station number) : RS-422A (Procedure 2, with station number)
ST No. switch : Set to 0 for both x10 and x1

DIP switch

Switch	Setting	Details
1	OFF	Bit length
2	OFF	Same as OPC-H baud rate (normally 19200 bps)
3	ON	
4	ON	
5	ON	Parity provided
6	ON	Even
7	OFF	stop bit 1
8	ON	Sumcheck provided

■ Usable memory

The memory that can be used is as follows.

Usable : × Not usable : -

Memory	Bit writing	Type	Remarks
WR (internal output)	-	0	
X (input relay)	×	1	For words, WX
Y (output relay)	×	2	For words, WY
L (CPU link)	×	3	For words, WL
M (data area)	×	4	For words, WM
TC (timer counter [time passed value])	-	5	
R (relay)	×	6	

The setting range for each type of memory varies with the PLC model. Set within the range that the PLC you are using can support. Also, Type is used for indirect memory specification with macros.

■ Wiring

The figures below show connections with link units.

● RS-422A

For terminal base   For connector   Twisted pair wire
(with shield)

●RS-232C

Twisted pair wire
(with shield)
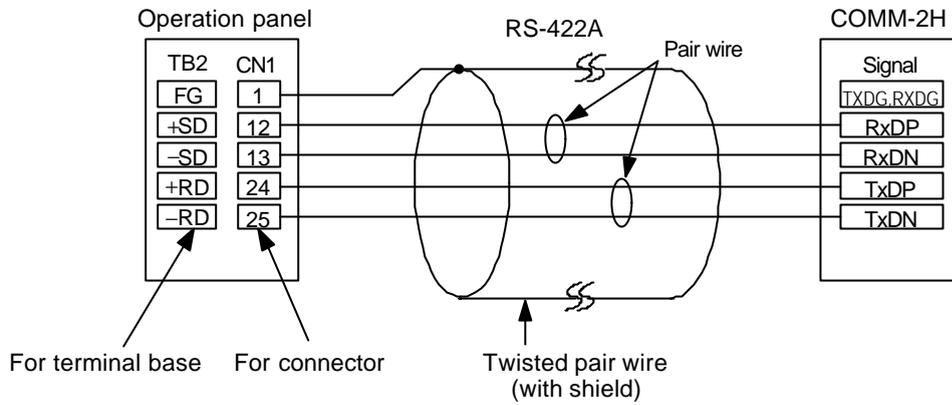
(10) HITACHI PLCs 2 (HIDIC-S10x a)

■ Link unit

Connectable link unit : Upper link H-7338 method

2α : CPU module standard equipment

4α : LWE805

ABS : Specifies the memory setting with an absolute address. For details, see the PLC
manual.

Item	Details
Baud rate	7 (only for 4α LWE805)

■ Usable memory

The memory that can be used is as follows.

● HIDIC S10 2/4 α

Usable : × Not usable : -

Memory	Bit writing	Type	Remarks
FW (work register)	-	0	
X (input relay)	-	1	For words, XW
Y (output relay)	-	2	For words, YW
R (internal relay)	-	3	For words, RW
G (global link)	-	4	For words, GW
K (keep relay)	-	5	For words, KW
T (on delay timer [contact])	-	6	For words, TW
U (one-shot timer [contact])	-	7	For words, UW
C (up/down counter [contact])	-	8	For words, CW
TS (on delay timer [set value])	-	9	
TC (on ready timer [set value])	-	10	
US (one-shot timer [set value])	-	11	
UC (one-shot timer [count])	-	12	
CS (up/down counter [set value])	-	13	
CC (up/down counter [count])	-	14	
DW (data register)	-	15	4α range

The setting range for each type of memory varies with the PLC model. Set within the range that
the PLC you are using can support. Also, Type is used for indirect memory specification with
macros.

● HIDIC ABS

Usable : ×   Not usable : -

Memory	Bit writing	Type	Remarks
0E	-	0	
06	-	1	
18	-	2	
19	-	3	
1A	-	4	
1B	-	5	
1C	-	6	
1D	-	7	

The setting range for each type of memory varies with the PLC model. Set within the range that the PLC you are using can support. Also, Type is used for indirect memory specification with macros.
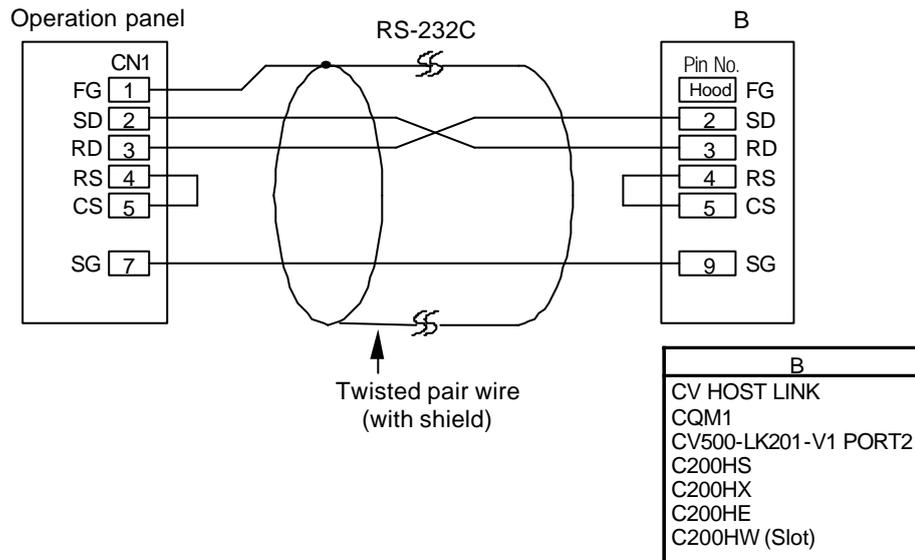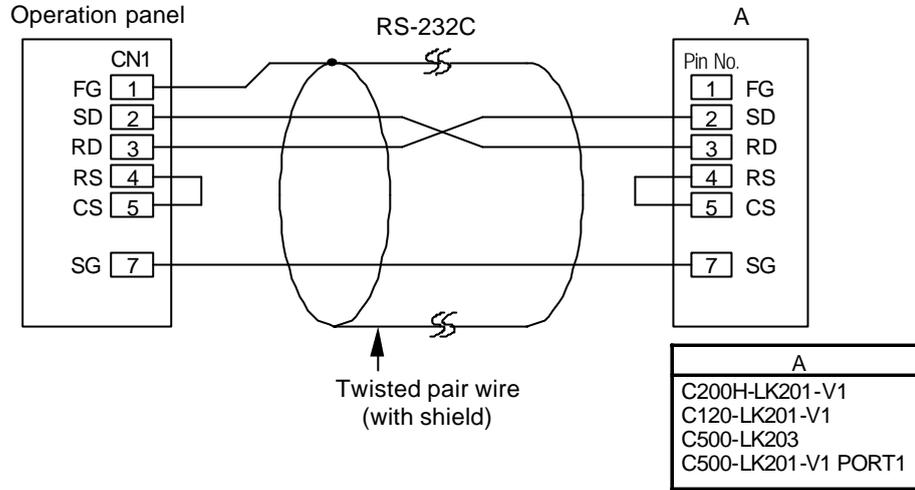
■ Wiring

The figure below shows the connections with a link unit.

● RS-422A

When connecting with a link unit from the S10x α series, insert a 50Ω (1/2W) resistor as in the figure below.
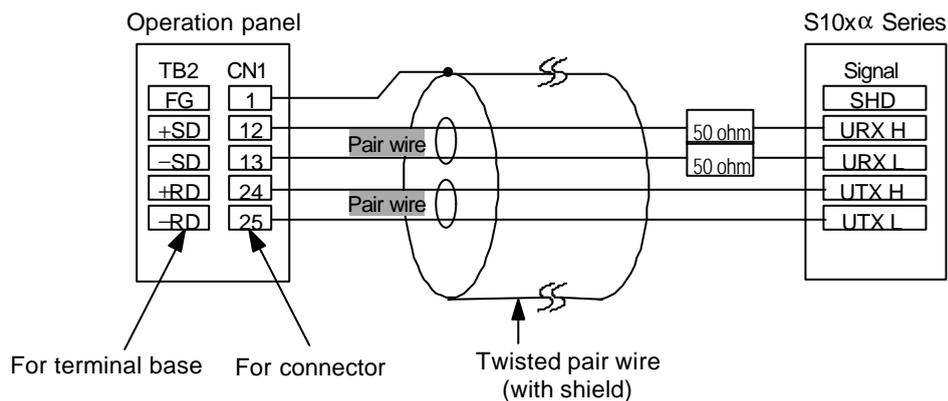
(11) MATSUSHITA PLCs

■ Link units

Link units that can be connected: Computer communication units
- FP5/FP10 : AFP5462
- FP3/FP10S : AFP3462 AFP3463
- CPU RS-232C port (FP1/FP10/FP10S)

  The default settings are as follows.

Item		Details
Transmission control		Computer link function
Baud rate		Same as OPC-H (normally 19200 bps)
Parity		Even
Transmission codes	Data bits	7
	Stop bit	1
Control signals		Invalid

■ Switch settings

The switch settings are as follows.

Switch	Setting	Details
1	ON	Same as OPC-H baud rate (normally 19200 bps)
2	OFF	
3	OFF	
4	OFF	7-bit data length
5	ON	Parity provided
6	ON	Even
7	OFF	One stop bit
8	OFF	CS, CD invalid

■ Usable memory

The memory that can be used is as follows.

Usable : × Not usable : -

Memory	Bit writing	Type	Remarks
DT (data register)	-	0	
X (external input)	-	1	For words, WX, read only
Y (external output)	×	2	For words, WY
R (internal relay)	×	3	For words, WR, including special relays
L (link relay)	×	4	For words, WL
LD (link register)	-	5	
FL (file register)	-	6	
SV (timer/counter [set value])	-	7	
EV (timer/counter [time passed value])	-	8	
T (timer [contact])	-	9	Read only
C (counter [contact])	-	10	Read only

The setting range for each type of memory varies with the PLC model. Set within the range that the PLC you are using can support. Also, Type is used for indirect memory specification with macros.
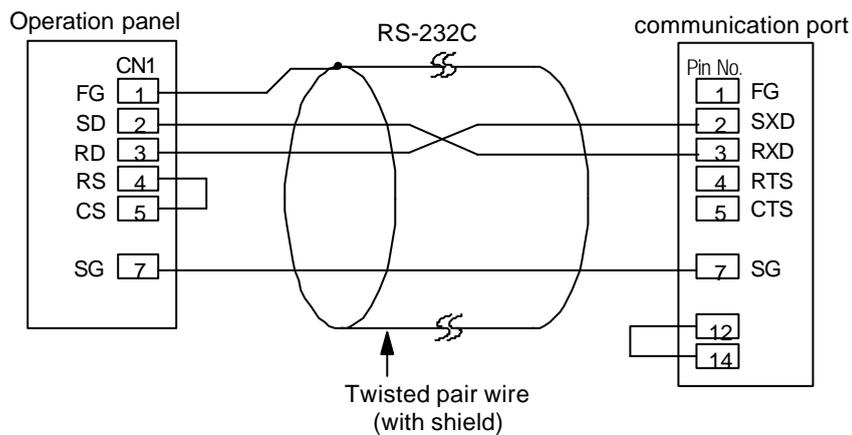
■ Wiring

The figures below show connections with link units.

● RS-422A
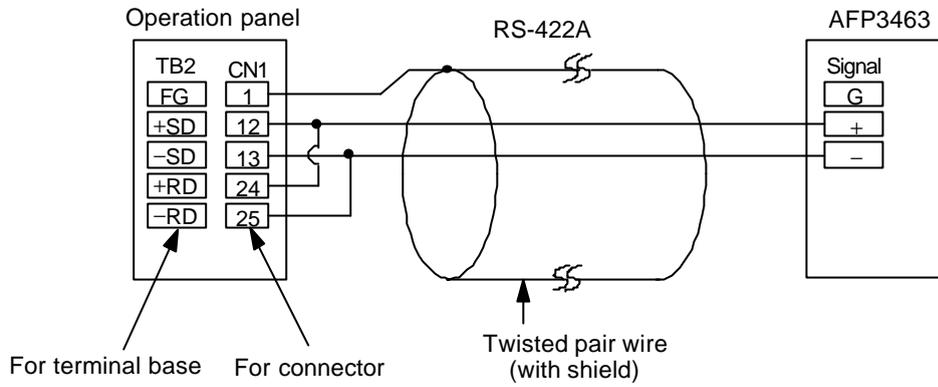
● RS-232C
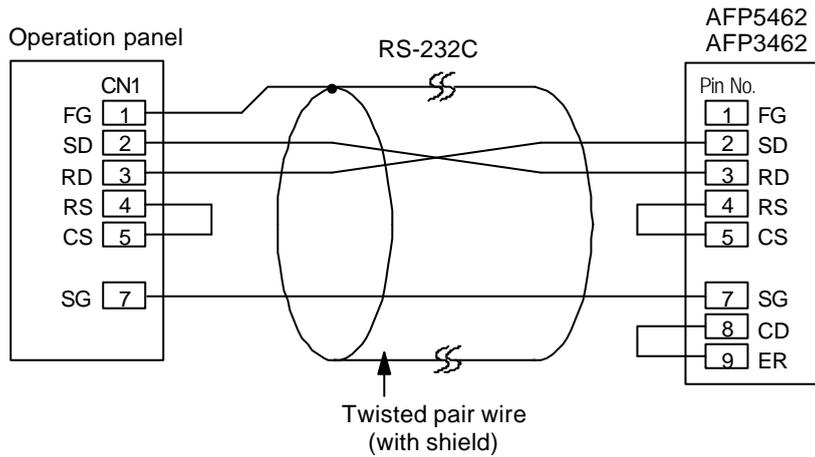
(12) YOKOGAWA PLCs 1 (FA500)

■ Link unit connectable link unit: PC link module

FA500 LC02-0N/LC01-0N

The default settings are as follows.

Item	Details
Port	01
Baud rate	Same as OPC-H (normally 19200 bps)
Data bit	7
Parity	Even
Stop bit	1
Sumcheck	Yes
Terminal character specification	No
Protection function	No

■ Usable memory

The memory that can be used is as follows.

Usable : ×   Not usable : -

Memory	Bit writing	Type	Remarks
D (data register)	-	0	
B (command register)	-	1	
TP (timer [current value])	-	2	
TS (timer [set value])	-	3	
CP (counter [current value])	-	4	
CS (counter [set value])	-	5	
X (input relay)	×	6	
Y (output relay)	×	7	
I (internal relay)	×	8	
E (common relay)	×	9	

The setting range for each type of memory varies with the PLC model. Set within the range that the PLC you are using can support. Also, Type is used for indirect memory specification with macros.

■ Wiring

The figures below show connections with link units.

● RS-422A

● RS-232C

(13) YOKOGAWA PLCs 2 (FA-M3)

■ Link unit

Connectable link units: PC link modules

FA-M3 : F3LC11-1N/F3LC01-1N/F3LC11-2N

The default settings are as follows.

Item	Details
Baud rate	Same as OPC-H (normally 19200 bps)
Data bit	7
Parity	Even
Stop bit	1
Sumcheck	Yes
Terminal character	No
Protection function	No

■ Usable memory

The memory that can be used is as follows.

Usable : ×   Not usable : -

Memory	Bit writing	Type	Remarks
D (data register)	-	0	
R (shared register)	-	1	
V (index register)	-	2	
W (link register)	-	3	
Z (special register)	-	4	
TP (timer [current value])	-	5	
TS (timer [set value])	-	6	
CP (counter [current value])	-	7	
CS (counter [set value])	-	8	
X (input relay)	×	9	
Y (output relay)	×	10	
I (internal relay)	×	11	
E (shared relay)	×	12	
L (link relay)	×	13	
M (special relay)	×	14	
B (file register)	-	15	

* The CPU No. is necessary other than for the memory type/address.
The memory notation for screen making is as on the right.

(Example   1:D00001)

CPU No. ———

Address

Memory type

The setting range for each type of memory varies with the PLC model. Set within the range that the PLC you are using can support. Also, Type is used for indirect memory specification with macros.

■ Wiring

The figures below show connections with link units.

● RS-422A

Operation panel — RS-422A — F3LC11-2N

TB2	CN1		Signal
FG	1		FG
+SD	12		RDA
−SD	13	Pair wire	RDB
+RD	24		SDA
−RD	25	Pair wire	SDB
			SG

For terminal base   For connector

Twisted pair wire
(with shield)

● RS-232C

Operation panel — RS-232C — F3LC11-1N / F3LC01-1N

CN1		Pin No.	
FG	1	1	FG
SD	2	2	RD
RD	3	3	SD
RS	4	4	ER
CS	5	5	SG
		6	DR
SG	7	7	RS
		8	CS

Twisted pair wire
(with shield)

(14) YASKAWA PLCs

■ Link unit

Connectable link units: GL60 series : JAMSC-IF60/IF61/IF611/IF612/IF613
JAMSC-120NOM 27100, PROGIC-8 PORT2
Other kinds of MEMOBUS unit can be connected.

The default settings are as follows.

Item	Details
Baud rate	Same as OPC-H (normally 19200 bps)
Data bit	8 bits RTU
Parity	Even
Stop bit	1
Error check	CRC
Port delay timer	0
Port	1

■ Usable memory

The memory that can be used is as follows.

Usable : ×   Not usable : -

Memory	Bit writing	Type	Remarks
4 (word device)	-	0	
3 (input register)	-	1	Including constant register
R (link register)	-	2	
A (expanded register)	-	3	
O (coil)	×	4	
D (link coil)	×	5	

The setting range for each type of memory varies with the PLC model. Set within the range that the PLC you are using can support. Also, Type is used for indirect memory specification with macros.
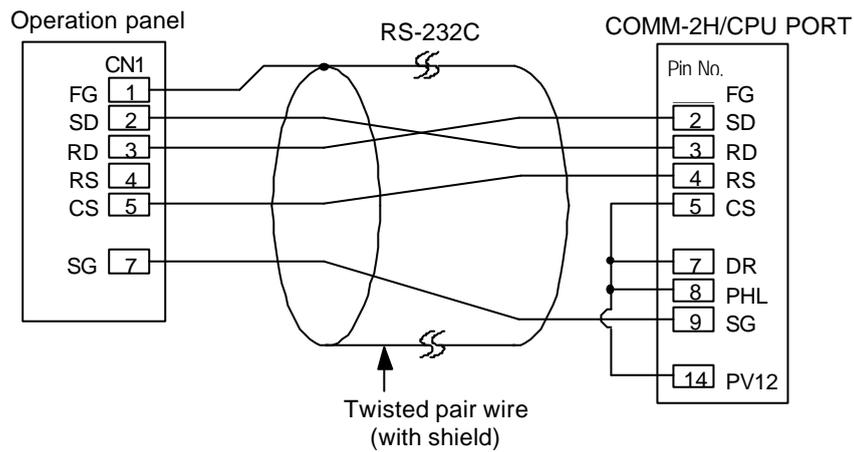
■ Wiring

The figures below show connections with link units.

● RS-422A

● RS-232C

Operation panel — RS-232C — JAMSC-IF60 / JAMSC-IF61 / JAMSC-IF611

CN1			Pin No.	
FG	1		1	PGND
SD	2		2	TXD
RD	3		3	RXD
RS	4		4	RTS
CS	5		5	CTS
			6	DSR
SG	7		7	SGND
			9	DTR

Twisted pair wire
(with shield)

Operation panel — RS-232C — PROGIC-8 PORT2

CN1			Pin No.	
FG	1		1	FG
SD	2		2	TXD
RD	3		3	RXD
RS	4		4	RTS
CS	5		5	CTS
			6	DSR
SG	7		7	GND
			9	DTR
			10	GND
			11	GND
			12	VCC(+5V)
			13	VCC(−5V)
			14	EMG1
			15	EMG2

Twisted pair wire
(with shield)
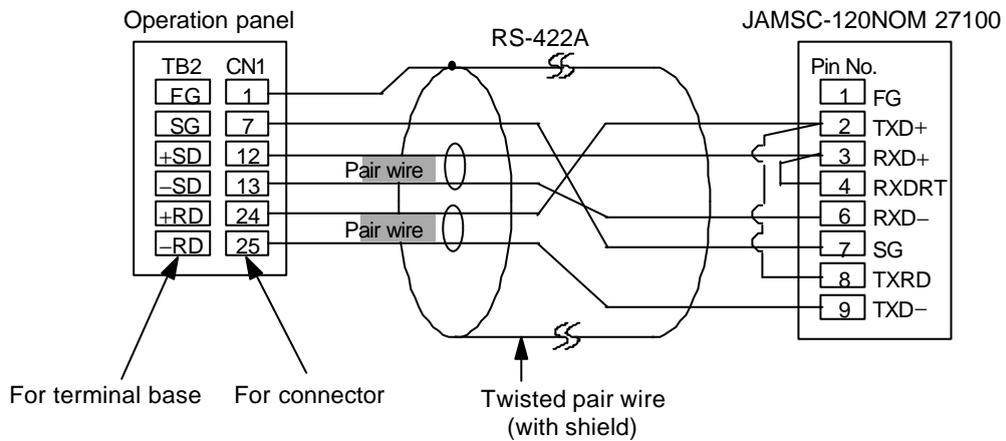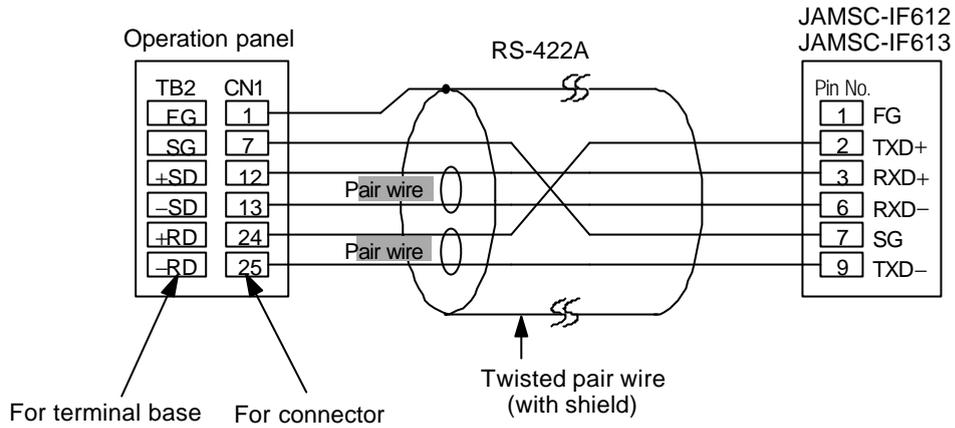
(15) TOYOPUC PLCs

■ Link unit

Connectable link units : TOYOPUC-L2/PC2 (CMP-LINK) etc.

The default settings are as follows.

Item		Details
No.		0
Baud rate		Same as OPC-H (normally 19200 bps)
Parity		Even
Transmission codes	Data bits	7 (ASCII)
	Stop bits	2

■ Switch settings

Baud rate : 19200 bps

Switch	Setting	Details
SW1	0	Station number (lower half)
SW2	0	Station number (upper half)
SW3	1	Baud rate 1:19200 2:9600 3:4800 4:2400 5:1200 6:600

Switch	Short bar	Details
STEP2	Yes	Data bit 7
STEP2	Yes	Stop bit 2

■ Usable memory

The memory that can be used is as follows.

Usable : ×　Not usable : -

| Memory	Bit writing	Type	Remarks
D (data register)	-	0	
R (link register)	-	1	
B (file register)	-	2	
N (current value register)	-	3	
X (input relay)	×	4	For words, WX
Y (output relay)	×	5	For words, WY
M (internal relay)	×	6	For words, WM
K (keep relay)	×	7	For words, WK
L (link relay)	×	8	For words, WL
T (timer)	×	9	For words, WT
C (counter)	×	10	For words, WC

The setting range for each type of memory varies with the PLC model. Set within the range that the PLC you are using can support. Also, Type is used for indirect memory specification with macros.

■ Wiring

The figure below shows the connections with a link unit.

● RS-422A
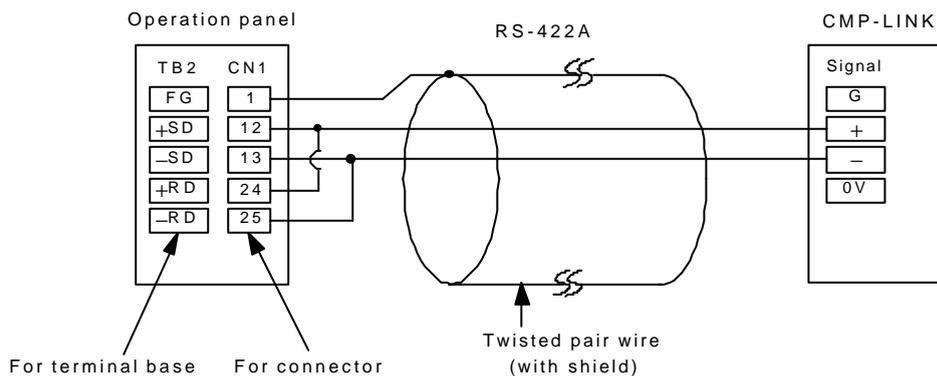
(16) FUJI PLCs 1 (MICREX-F series)

■ Link units

Connectable link units : FFU120B (PC interface module)
FFK120A

The default settings are as follows.

Item		Details
Transmission control procedure mode	RS-232C	1 (Command setting type, start-stop synchronization non-procedure)
	RS-422A	3 (Command setting type, start-stop synchronization non-procedure)
Port		0 (x10, x1 both set to 0)
Baud rate		Same as OPC-H (normally 19200 bps)
Parity		Even
Transmission code	Data bits	7 (ASCII)
	Stop bit	1
Reception side terminal resistance		Yes

■ Switch settings

● MODE switch: RS-232C : 1   RS-485 : 3

● RS-485 station number setting switch : x10, x1 both set to 0

● RS-485 terminal resistance : On

● Character configuration swiches

Switch	Setting value	Details
8	ON	Switch setting
7	ON	Parity
6	ON	Even
5	ON	7 bits
4	ON	1 bit
3	ON	Same as OPC-H baud rate (normally 19200 bps)
2	ON	
1	OFF	

<Precautions for settings with Panel Designer II (making screen)>

When using the MICREX-F series, select "H series" for PLC model setting on the screen creating tool **Panel Designer II**.

■ Usable memory

The memory that can be used is as follows.

Usable : ×   Not usable : -

Memory	Bit writing	Type	Remarks
M (auxiliary relay)	-	0	For words, WM
K (keep relay)	-	1	For words, WK
B (input/output relay)	-	2	For words, WB
W30 (file memory)	-	3	SI attribute
W31 (file memory)	-	4	SI attribute
W32 (file memory)	-	5	SI attribute
W33 (file memory)	-	6	SI attribute
W34 (file memory)	-	7	SI attribute
W35 (file memory)	-	8	SI attribute
L (link relay)	-	9	For words, WL
WF (special relay)	-	10	
TS (timer [set value 0.01])	-	11	*1
TR (timer [current value 0.01])	-	12	*1
W9 (timer [current value 0.1])	-	13	*1
CS (counter [set value])	-	14	*1
CR (counter [current value])	-	15	*1
BD (data memory)	-	16	*1
S (step relay)	-	17	*2

*1 • Items for which the number format allows double-word settings (data display numeric value display, graphs, sampling) are processed as double-word data.

• Also, bit- or word-type items are processed as lower 16-bit words.

Input : The upper 16 bits are ignored.

Output : The upper 16 bits are always written as "0".

*2. The processing below is carried out for step relays because they are byte devices.

Input : Upper 8 bits set to 0

Output : Lower 8 bits written

The setting range for each type of memory varies with the PLC model. Set within the range that the PLC you are using can support. Also, Type is used for indirect memory specification with macros.
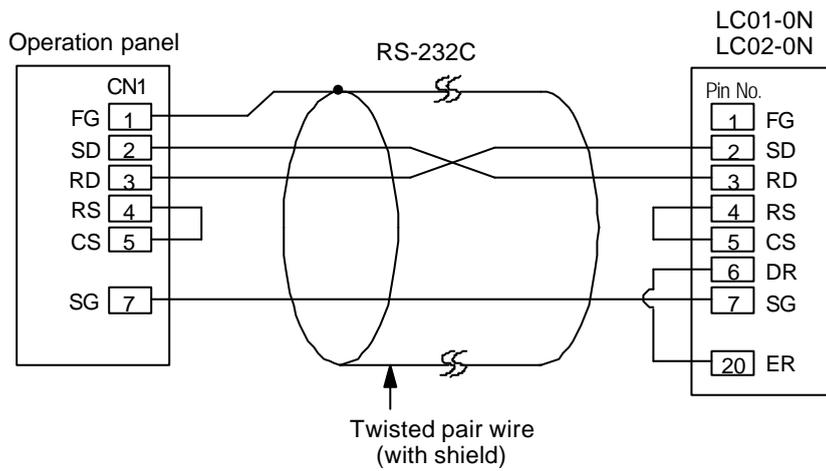
The weight of bits in memory is reversed. Watch out for this when handling switch and lamp data.

OPC-H	15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
FUJI	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F

■ Wiring

The figures below show connections with link units.

● RS-485
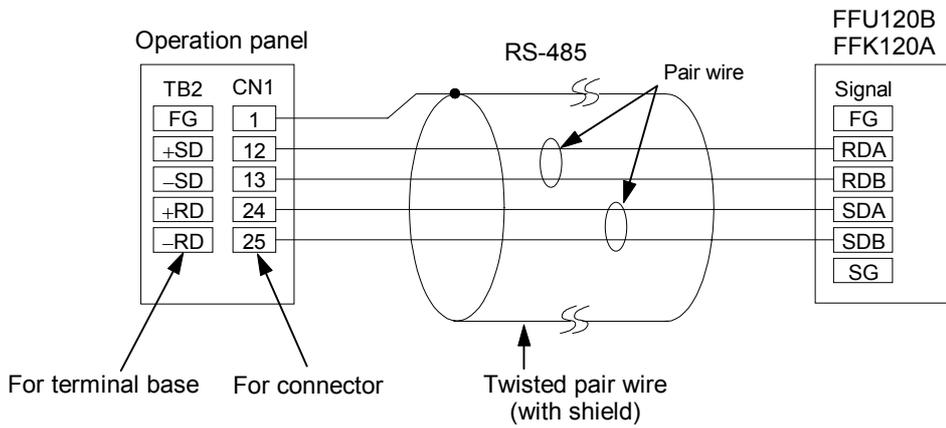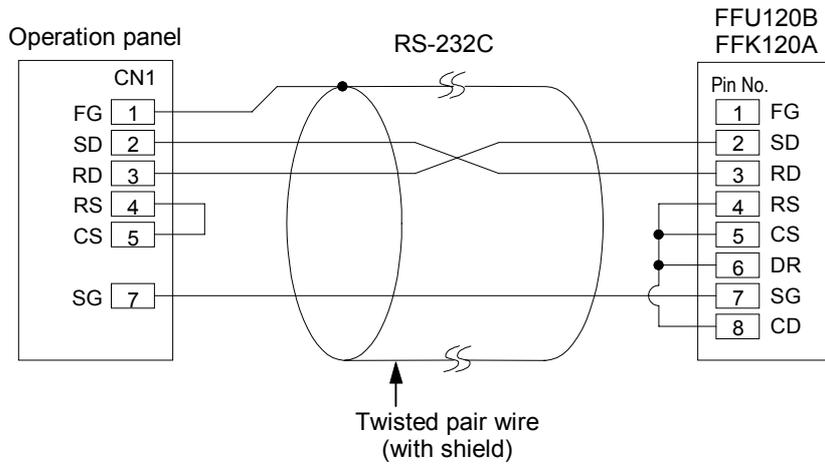
● RS-232C

(17) FUJI PLCs 2 (FLEX-PC series)

■ Link units

Connectable link units : General interface modules

NS-RS1

NJ-RS2, NJ-RS4

The default settings are as follows.

Item		Details
Transmission control procedure mode	RS-232C	1 (Command setting type, start-stop synchronization non-procedure)
	RS-422A	3 (Command setting type, start-stop synchronization non-procedure)
Port		0 (x10, x1 both set to 0)
Baud rate		Same as OPC-H (normally 19200 bps)
Parity		Even
Transmission code	Data bits	7 (ASCII)
	Stop bit	1
Reception side terminal resistance		Yes

■ Switch settings

● MODE switch : RS-232C : 1   RS-485 : 3

● RS-485 station number setting switch : ×10, ×1 both set to 0

● RS-485 terminal resistance : On

● Character configuration switches

Switch	Setting value	Details
8	ON	Switch setting
7	ON	Parity
6	ON	Even
5	ON	7 bits
4	ON	1 bit
3	ON	Same as OPC-H baud rate (normally 19200 bps)
2	ON	
1	OFF	

■ Usable memory

The memory that can be used is as follows.

Usable : ×   Not usable : -

Memory	TOYOTA spec.	Bit writing	Type	Remarks
D (data register)	D	-	0	
W (link register)	R	-	1	
M (internal relay)	M	×	2	For words, WM
L (latch relay)	K	×	3	For words, WL (WK)
X (input relay)	X	×	4	For words, WX
Y (output relay)	Y	×	5	For words, WY
R (file register)	W	-	6	
TN (timer [current value])	T N	-	7	
CN (counter [current value])	C N	-	8	
T (timer [contact])	T	×	9	
C (counter [contact])	C	×	10	
S (step relay)	unused	-	11	

The setting range for each type of memory varies with the PLC model. Set within the range that the PLC you are using can support. Also, Type is used for indirect memory specification with macros.
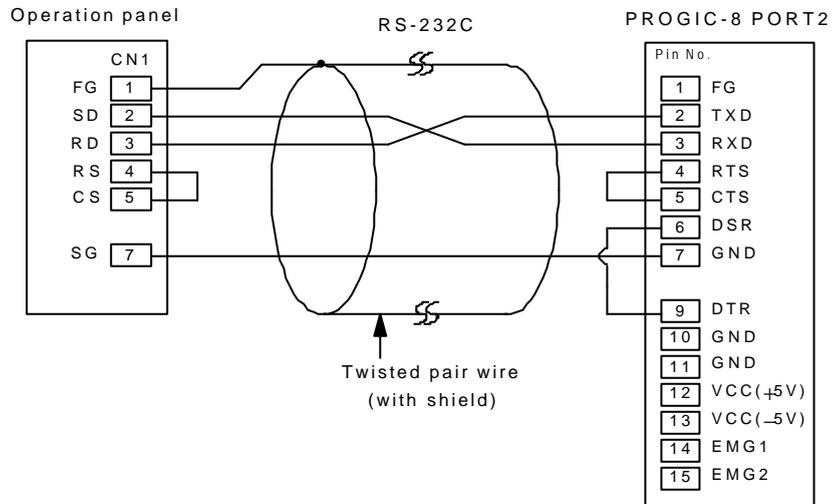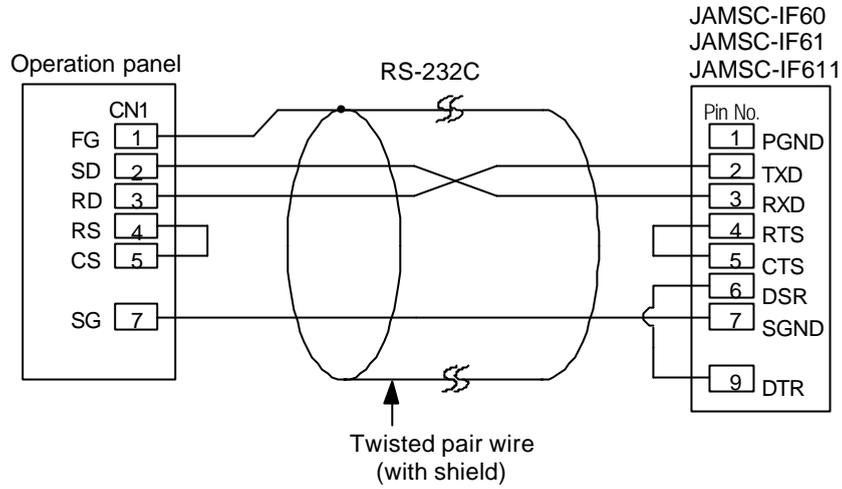
<Precautions for setting with Panel Designer II (making screens)>

When using the FLEX-PC series, select "NS series" for PLC model setting on the screen creating tool **Panel Designer II**. Also, if the FLEX series is TOYOTA spec., select" NS series (T).

■ Wiring

The figures below show connections with link units.

● RS-485
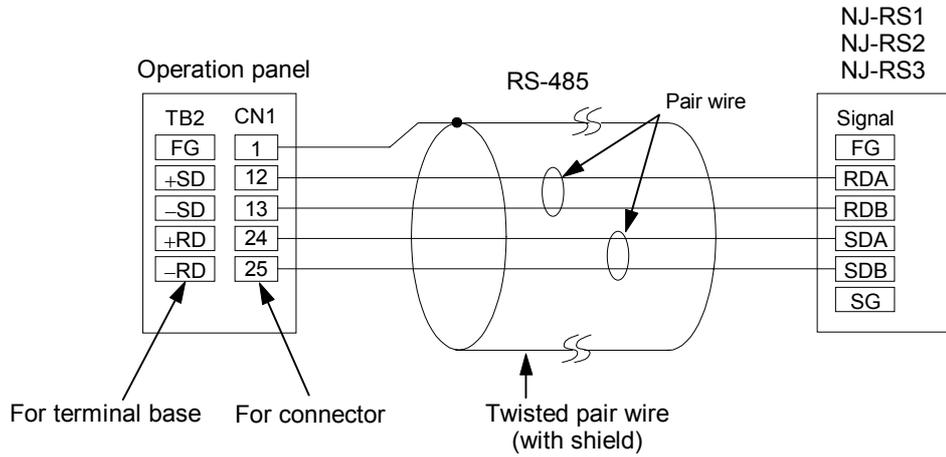
● RS-232C
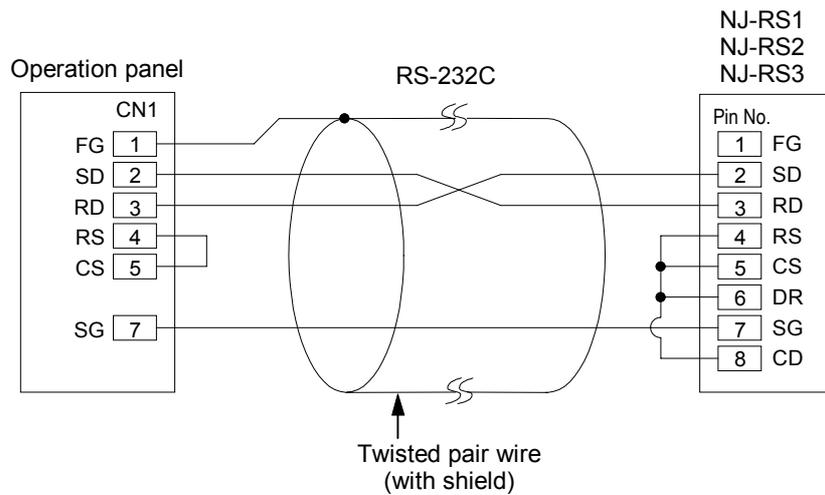
(18) FUJI PLCs 3 (FLEX-PC CPU port)

■ Connection

Connect to the CPU port of FLEX-PC.

The default settings are as follows.

Item		Details
Port		0
Baud rate		Same as OPC-H (normally 19200 bps)
Parity		Even
Transmission code	Data bits	7
	Stop bit	2

* Refer to the operation manual for FUJI PLC for details.

■ Usable Memory

The memory that can be used is as follows.

Usable : ×   Not usable : -

Memory	TOYOTA spec.	Bit writing	Type	Remarks
D (data register)	D	-	0	
W (link register)	R	-	1	
M (internal relay)	M	×	2	For words, WM
L (latch relay)	K	×	3	For words, WL (WK)
X (input relay)	X	×	4	For words, WX read only
Y (output relay)	Y	×	5	For words, WY
R (file register)	W	-	6	
TN (timer [current value])	T N	-	7	
CN (counter [current value])	C N	-	8	
T (timer)	T	×	9	
C (counter)	C	×	10	
S (step relay)	unused	-	11	

The setting range for each type of memory varies with the PLC model. Set within the range that the PLC you are using can support. Also, Type is used for indirect memory specification with macros.

<Precautions for settings with Panel Designer II (making screens)>

When using the FLEX-PC CPU TOYOTA spec., select "FLEX-PC CPU (T)" for PLC model setting on the screen creating tool **Panel Designer II**.

■ Wiring

As to the FLEX-PC CPU wiring, refer to the operation manual for FUJI PLC.

(19) FUJI PLCs 4 (TOYOTA spec. [NJ computer link])

■ Connection

Connect to the computer link terminal base of NJ-JM.

The default settings are as follows.

Item		Details
Port		0
Baud rate		Same as OPC-H (normally 19200 bps)
Parity		Even
Transmission code	Data bits	7
	Stop bit	2

* Refer to the operation manual for FUJI PLC for details.

■ Usable Memory

The memory that can be used is as follows.

Usable : ×   Not usable : -

Memory	Bit writing	Type	Remarks
D (data register)	-	0	
W (link register)	-	1	
M (internal relay)	×	2	For words, WM
L (latch relay)	×	3	For words, WL
X (input relay)	×	4	For words, WX
Y (output relay)	×	5	For words, WY
R (file register)	-	6	
TN (timer [current value])	-	7	
CN (counter [current value])	-	8	
T (timer)	×	9	
C (counter)	×	10	

The setting range for each type of memory varies with the PLC model. Set within the range that the PLC you are using can support. Also, Type is used for indirect memory specification with macros.

<Precautions for settings with Panel Designer II (making screens)>

When using the NJ computer link TOYOTA spec., select "FLEX-PC COM" for PLC model setting on the screen creating tool **Panel Designer II**.

■ Wiring

The figure below shows the connections with a PLC NJ-JM.

● RS-422A
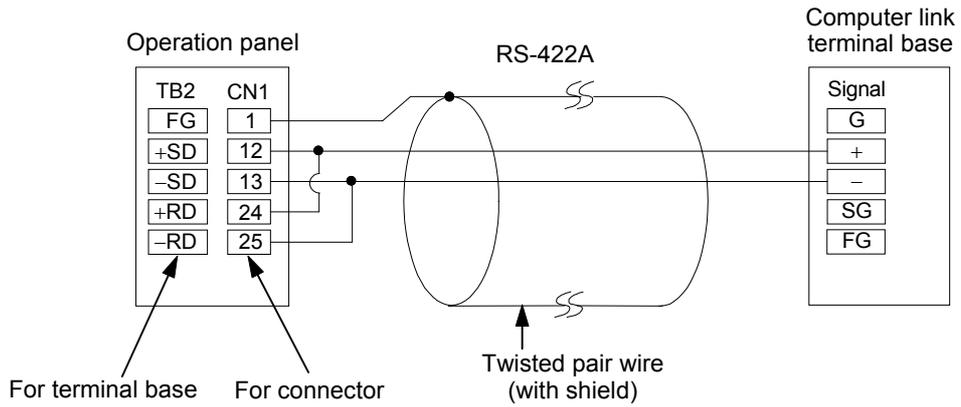
(20) KOYO PLCs

■ Link units

Connectable link units : Data communication units

    SU-5/6 U-01DM
    SG-8 G-01DM
    SR-T (TOYOTA spec.)

The default settings are as follows.

Item		Details
Function		Upper link function
Station number		"0" x10, "1" x1
Transmission speed		Same as for OPC-H (normally 19200 bps)
Parity		Odd
Transmission codes	Data bits	8
	Stop bit	1
Response delay time		0
Time outs		None
ASCII/HEX		HEX

■ Usable memory

The memory that can be used is as follows.

●SU/SG

Usable : ×　Not usable : -

Memory	Bit writing	Type	Remarks
R (word device)	-	0	
I (input relay)	-	1	
Q (output relay)	-	2	
M (internal relay)	-	3	
S (stage)	-	4	
GI (all-station transmission relay)	-	5	
GQ (specific station transmission relay)	-	6	
T (timer [contact])	-	7	
C (counter [contact])	-	8	

The setting range for each type of memory varies with the PLC model. Set within the range that the PLC you are using can support. Also, Type is used for indirect memory specification with macros.

● SR-T (TOYOTA spec.)

Usable : ×   Not usable : -

Memory	Bit writing	Type	Remarks
R (word device)	-	0	
X (input relay)	-	1	X/Y common use
Y (output relay)	-	2	X/Y common use
M (internal relay)	-	3	
S (stage)	-	4	
K (keep relay)	-	5	
L (link relay)	-	6	
T (timer [contact])	-	7	
C (counter [contact])	-	8	

The setting range for each type of memory varies with the PLC model. Set within the range that the PLC you are using can support. Also, Type is used for indirect memory specification with macros.

U-01DM settings

■ Switch settings

● Online/offline switch : Online

●UNIT ADR switch : ×10 set to 0, ×1 set to 1

●SW4 DIP switch

Switch	Setting value	Details
1	ON	Same as OPC-H baud rate (normally 19200 bps)
2	ON	
3	ON	
4	ON	Parity
5	OFF	Self-diagnostics
6	OFF	Response delay time 0 ms
7	OFF	
8	OFF	

● SW5 DIP switch

Switch	Setting value	Details
1	OFF	Master/slave control
2	OFF	Slave
3	OFF	Communications time out
4	OFF	Hex mode

■ Wiring

The figures below show connections with link units.

● RS-422A

| Operation panel | | RS-422A | | U-01DM |

Operation panel

TB2	CN1
FG	1
+SD	12
−SD	13
+RD	24
−RD	25

Pair wire
Pair wire

For terminal base   For connector

Twisted pair wire
(with shield)

U-01DM

Pin No.

1	
10	+RTS
11	−RTS
12	+CTS
13	−CTS
14	+OUT
15	−OUT
16	−IN
17	+IN
24	−IN
25	+IN

150 ohm

● RS-232C

Operation panel   RS-232C   U-01DM

Operation panel

CN1	
FG	1
SD	2
RD	3
RS	4
CS	5
SG	7

U-01DM

Pin No.

1	
2	SD
3	RD
4	RS
5	CS
7	SG

Twisted pair wire
(with shield)
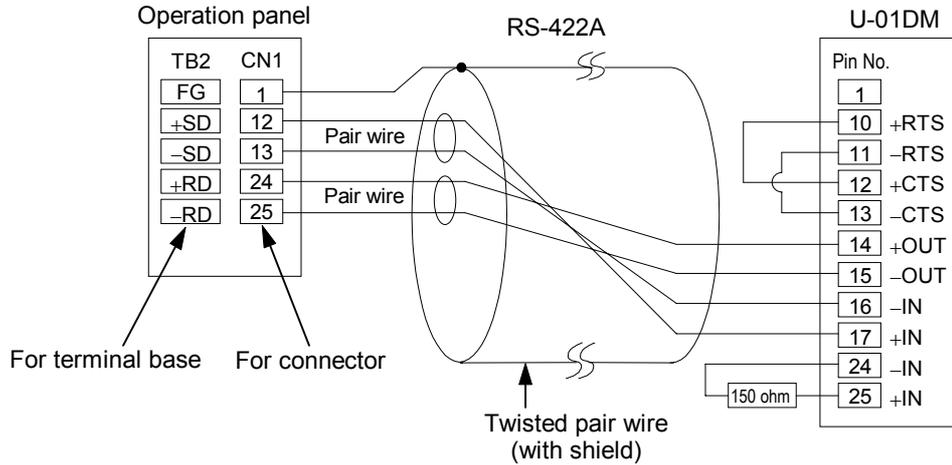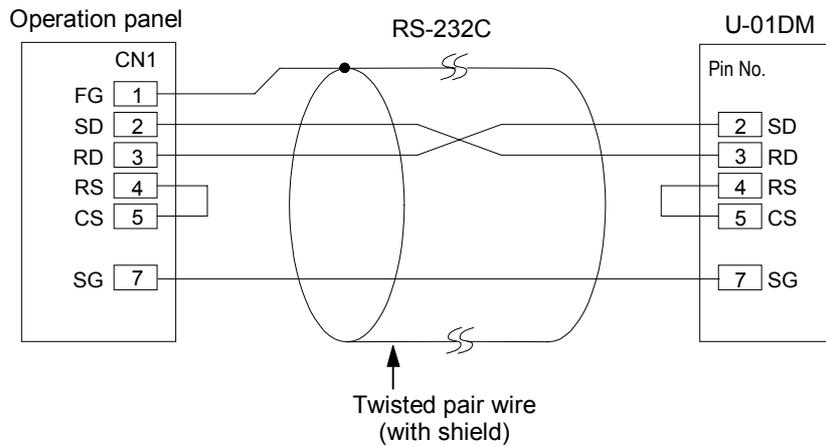
G-01DM settings

■ Switch settings

● Online/offline switch : Online

● Short plug 1 : Open

● Short plug 2

  RS-232C : Enable

  RS-422A : Disable

● SW1 DIP switch

Switch	Setting value	Details
1	ON	
2	OFF	
3	OFF	Unit No. 01
4	OFF	
5	OFF	
6	OFF	
7	OFF	1 : N
8	OFF	Slave

● SW2 DIP switch

Switch	Setting value	Details
1	ON	
2	ON	Same as OPC-H baud rate (normally 19200 bps)
3	ON	
4	ON	Parity
5	OFF	Self-diagnostics
6	OFF	Turn around delay
7	OFF	Response delay time 0 ms
8	OFF	
9	OFF	Hex mode

■ Wiring

The figures below show connections with link units.

● RS-422A

Operation panel | RS-422A | G-01DM

TB2 CN1
FG — 1
+SD — 12 — Pair wire
−SD — 13
+RD — 24 — Pair wire
−RD — 25

For terminal base   For connector   Twisted pair wire (with shield)

Pin No.
1
14 +OUT
15 −OUT
16 −IN
17 +IN

● RS-232C

Operation panel | RS-232C | G-01DM

CN1
FG — 1
SD — 2
RD — 3
RS — 4
CS — 5
SG — 7

Pin No.
2 SD
3 RD
4 RS
5 CS
7 SG

Twisted pair wire (with shield)
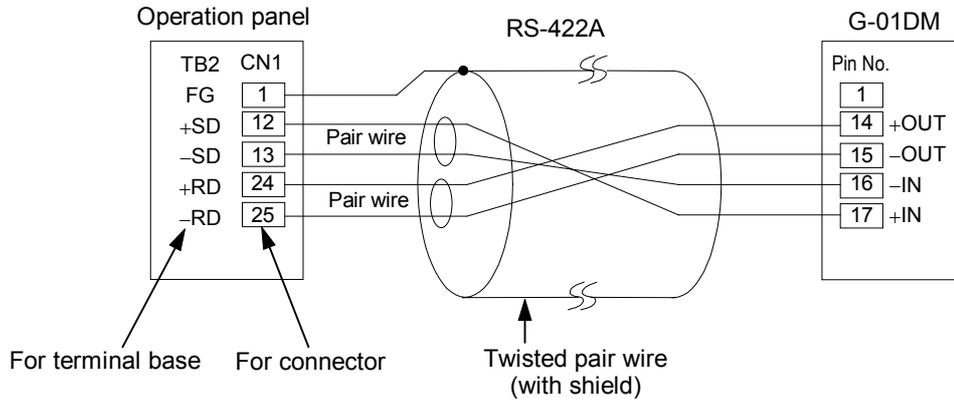
(21) Allen-Bradley PLCs 1 (PLC-5 series)

■ Link unit

Connectable communications interface modules : 1785-KE, 1770-KF2

● Communication parameters

The default settings are as follows.

Item		Details
Transmission control procedure	RS-232C	
	RS-422A	Not yet supported by 1785-KE
Port		1785-KE, 1770-KF2 station number
Baud rate		Normally 19200 bps (Maximum 9600 bps for 1770-KF2)
Protocol		Full duplex
Error check		BCC
Parity		Even
Response		No
Transmission code	Data bits	8
	Stop bit	1

● **Precaution**

For Allen-Bradley, the station number is added to the communications parameter. This station number specifies the station number of the PLC-5 CPU communicating with the operation panel (and therefore differs from the 1785-KE or 1770-KF2 station number). Make this setting with **the Panel Designer II screen creating tool**.

■ Usable memory

The memory that can be used is as follows.

Usable : ×   Not usable : -

Memory	Bit writing	Type	Remarks
N (integer)	-	0	
B (bit)	-	1	
TP (timer [current value])	-	2	
TA (timer [set value])	-	3	
CP (counter [current value])	-	4	
CA (counter [set value])	-	5	
I (input)	-	6	
O (output)	-	7	
S (status)	-	8	

The setting range for each type of memory varies with the PLC model. Set within the range that the PLC you are using can support. Also, Type is used for indirect memory specification with macros.

1785-KE settings

■ Switch settings

● SW1 (selection protocol)

Switch	Setting value	Details
1	ON	
2	OFF	BCC, even, no
3	OFF	
4	ON	Duplicate messages not accepted
5	OFF	Handshaking signals ignored
6	ON	Diagnostic commands executed

● SW2 (station number) sets the 1785-KE station number. (Station numbers must not be duplicated on the network.)

Switch	Setting value	Details
1	ON	First digit (octal number)
2	ON	
3	ON/OFF	Second digit (octal number)
4	ON/OFF	
5	ON/OFF	
6	ON/OFF	Third digit (octal number)
7	ON/OFF	
8	ON/OFF	

● SW3 (network link communications speed)

Matched to the network this link is used in

Switch	Setting value	Details
1	ON	Data highway (57.6 kbps)
2	ON	
3	ON	Link transmission speed (57.6 kbps)
4	ON	
5	ON	
6	ON	Local/remote selection

● SW4 (spare)

Switch	Setting value	Details
1	OFF	For expansion; Normally OFF
2	OFF	
3	OFF	
4	OFF	

■ Wiring

The figure below shows the connections with the link unit.

● RS-232C

Operation panel	RS-232C	1785-KE

Twisted pair wire
(with shield)
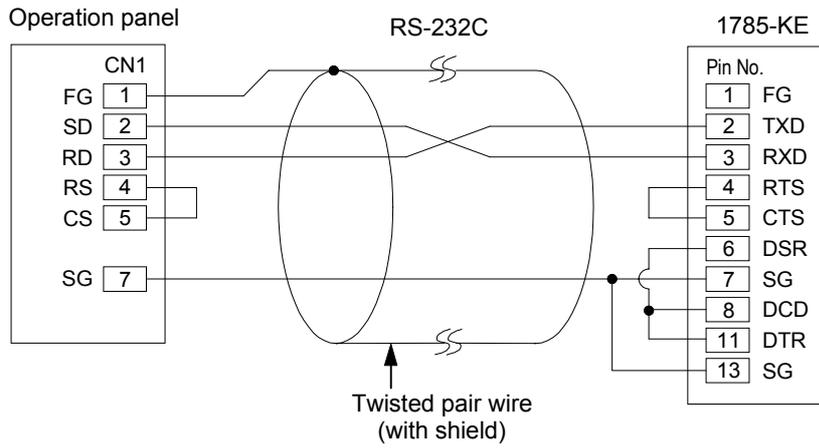
Settings for 1770-KF2

■ Switch settings

● SW1 (selection protocol)

Switch	Setting value	Details
1	ON	Protocol
2	OFF	Protocol
3	ON	Duplicate messages not accepted
4	OFF	Handshaking signals ignored
5	OFF	Protocol

● SW2, SW3, SW4 (station number)

Sets the station number for the 1770-KF2. (Station numbers must not be duplicated on the network.)

● SW5 (network link communications speed)

Matched to the network the link is used in

Switch setting value		Details
1	2	
ON	ON	57.6kbps

● SW6 (asynchronous link communications speed)

Set the same as for the operation panel

Switch	Setting value	Details
1	OFF	
2	ON	9600bps
3	ON	
4	ON	Diagnostic commands executed

● SW7 (network link selection)

Switch setting value		Details
1	2	
ON	OFF	Pier transmission link

● SW8 (RS-232C/RS-422A selection)

Switch setting value		Details
1	2	
OFF	ON	RS-232C
ON	OFF	RS-422A

■ Wiring

The figures below show connections with link units.

● RS-422A
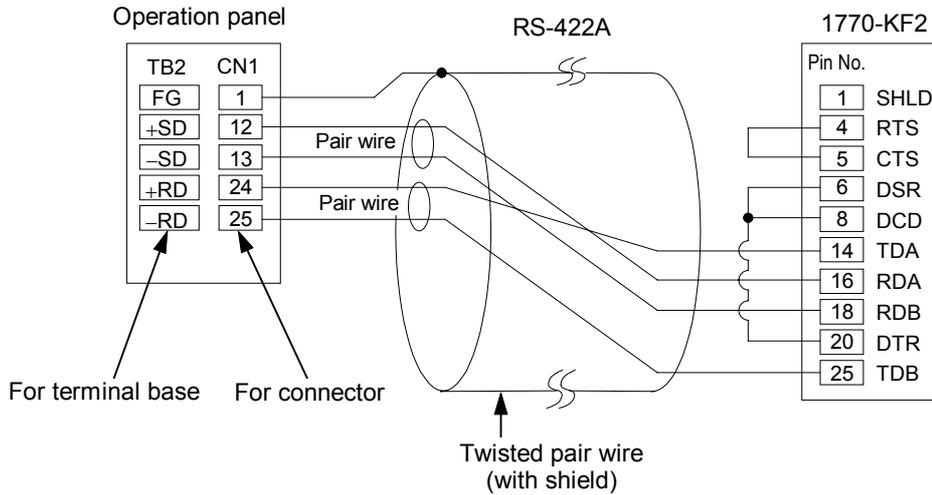
● RS-232C
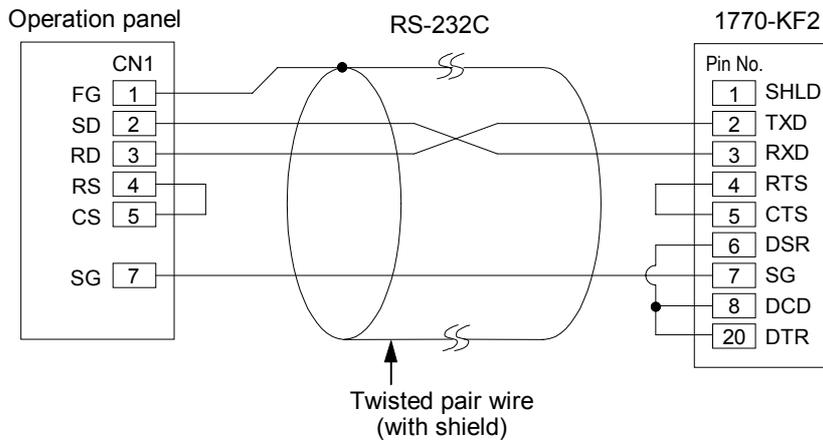
(22) Allen-Bradley PLCs 2 (SLC500 series)

■ Link unit

Connectable CPU ports : CPU Channel 0 from SLC5/03 on
Connectable communications interface module : 1747-KE

● Communications parameters

The default settings are as follows.

Item		Details
Transmission control procedure	RS-232C	
	RS-422A	Not yet supported by channel 0
Port		At 1747-KE
Baud rate		Normally 19200 bps (Maximum 9600 bps for 1770-KF2)
Protocol		Full duplex
Error check		BCC
Parity		Even
Response		No
Transmission code	Data bits	8
	Stop bit	1

● **Precaution**

For Allen-Bradley, the station number is added to the communications parameter. This station number specifies the CPU station number for the SLC-500 communicating with the operation panel. Make this setting with **the Panel Designer II screen creating tool**.
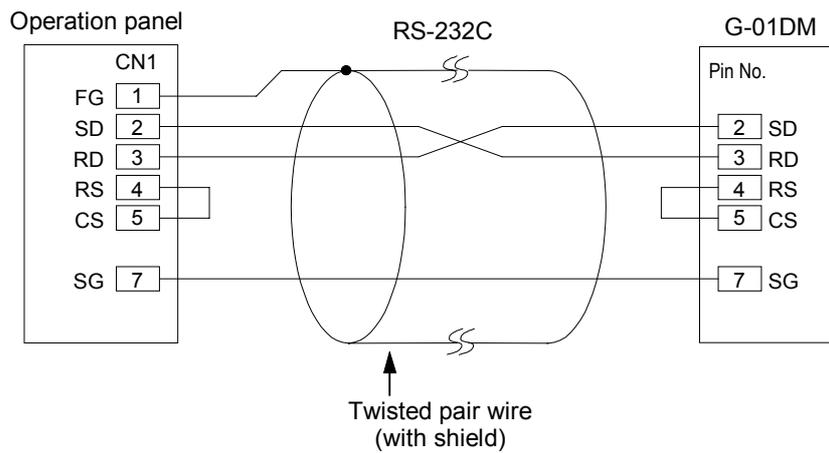
■ Usable memory

The memory that can be used is as follows.

Usable : ×   Not usable : -

Memory	Bit writing	Type	Remarks
N (integer)	-	0	
B (bit)	-	1	
TP (timer [current value])	-	2	
TA (timer [set value])	-	3	
CP (counter [current value])	-	4	
CA (counter [set value])	-	5	
I (input)	-	6	
O (output)	-	7	
S (status)	-	8	

The setting range for each type of memory varies with the PLC model. Set within the range that the PLC you are using can support. Also, Type is used for indirect memory specification with macros.

CPU port Channel 0 settings

■ Channel 0 transmission parameter settings

When setting the parameters for CPU port Channel 0, use the special software and set as follows.

Baud Rate : 19200
Duplicate Detect : ON
ACK Timeout(×20ms) : 20
Control Line : NO HANDSHAKING
Parity: EVEN
Error Detect : BCC
NAK Retries : 3
ENQ Retries : 3
Embedded Responses : AUTO-DETECT

■ Wiring

The figure below shows the connections with the CPU port channel 0.

● RS-232C
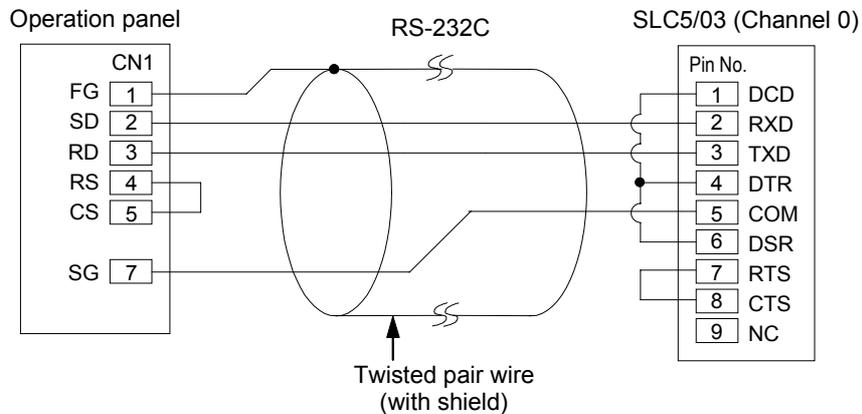
Settings for 1747-KE

■ 1747-KE transmission parameter settings

When setting the parameters for the 1747-KE, use the special software and set as follows.

DF1 Port Setup Menu

Baud Rate: 19200
Bit Per Character : 8
Parity: EVEN
Stop Bit : 1

DF1 Full-Duplex Setup Detection

Duplicate Packet Detection : Enabled
Checksum : BCC
Constant Carrier Detect : Disabled
Message Timeout : 400
Hardware Handshaking : Disabled
Embedded Response Detect : AUTO-DETECT
ACK Timeout (×5ms): 90
ENQuiry Retries : 3
NAK Recived Retries : 3

■ Wiring

The figures below show connections with link units.

● RS-422A
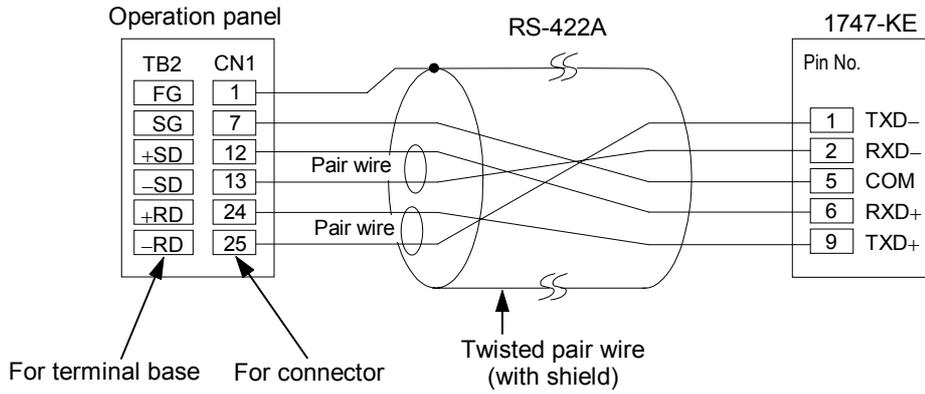
● RS-232C
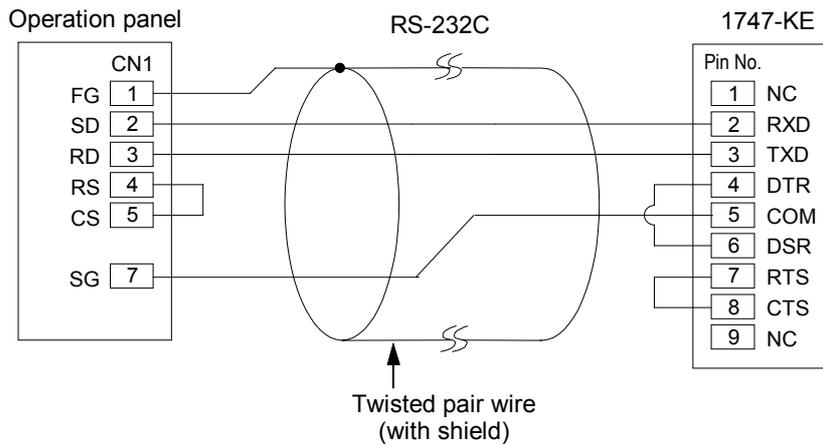
(23) GE Fanuc PLCs

■ Link unit

Connectable link unit : Programmable co-processor (PCM)
The default settings are as follows.

Item		Details
Function		Upper link function
Port		01 (x10 set to 0, x1 set to 1)
Baud rate		Same as OPC-H (normally 19200 bps)
Parity		Odd
Transmission code	Data bits	8
	Stop bit	1
Response delay time		0
Time out		None
ASCII/HEX		HEX

■ Usable memory

The memory that can be used is as follows.

Usable : ×   Not usable : -

Memory	Bit writing	Type	Remarks
R (data register)	-	0	
I (input relay)	-	1	
Q (output relay)	-	2	

The setting range for each type of memory varies with the PLC model. Set within the range
that the PLC you are using can support. Also, Type is used for indirect memory specification
with macros.

■ Wiring

The figures below show connections with link units.

● RS-422A

Twisted pair wire
(with shield)

● RS-232C

Twisted pair wire
(with shield)
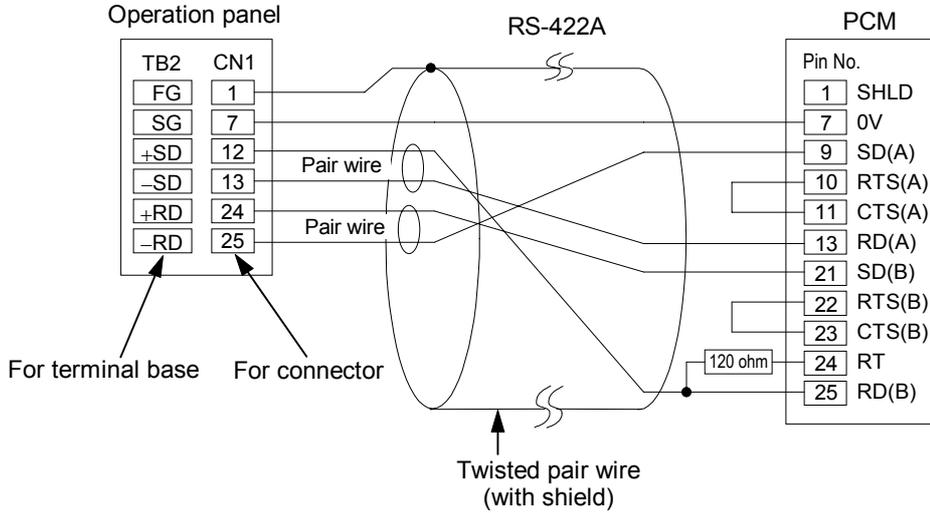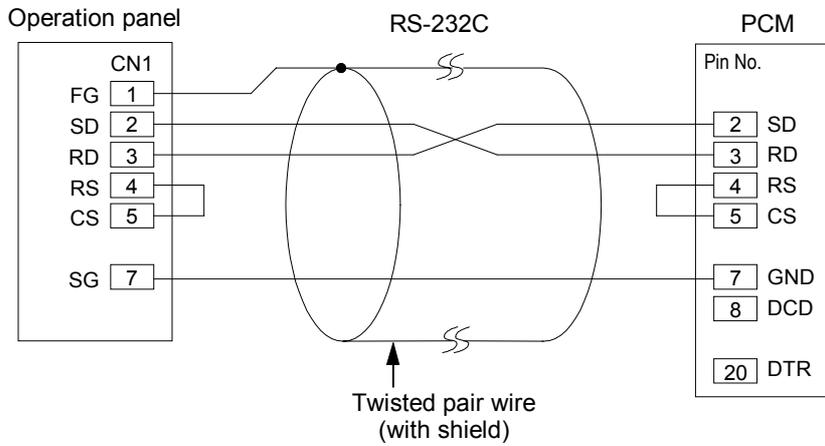
(24) TOSHIBA PLCs (T series)

■ Link unit

Connected to the PLC CPU port.
The default settings are as follows.

Item		Details
Port		01
Baud rate		19200 bps
Parity		Odd
Transmission code	Data bits	8
	Stop bit	1

* Refer to the operation manual for TOSHIBA PLC for details.

■ Setting the PLC transmission parameters

When setting the parameters for the PLC main unit, use the T series programmer and set as follows in the system information "7. Computer Link."

Station No.:	1
Baud rate:	19200 bps
Parity:	Odd
Data bit:	8 bit
Stop bit:	1 bit

■ Usable memory

The memory that can be used is as follows.

Usable : ×   Not usable : -

Memory	Bit writing	Type	Remarks
D (data register)	-	0	
X (input register)	-	1	For words, XW
Y (output register)	-	2	For words, YW
R (auxiliary register)	-	5	For words, RW
L (link relay register)	-	6	For words, LW
W (link register)	-	7	
F (file register)	-	8	
TN (timer [current value])	-	9	Read Only
CN (counter [current value])	-	10	Read Only
TS (timer [contact])	-	11	Read Only
CS (counter [contact])	-	12	Read Only

The setting range for each type of memory varies with the PLC model. Set within the range that the PLC you are using can support. Also, Type is used for indirect memory specification with macros.

■ Wiring

The figure below shows the connections with the link unit.

● RS-422A
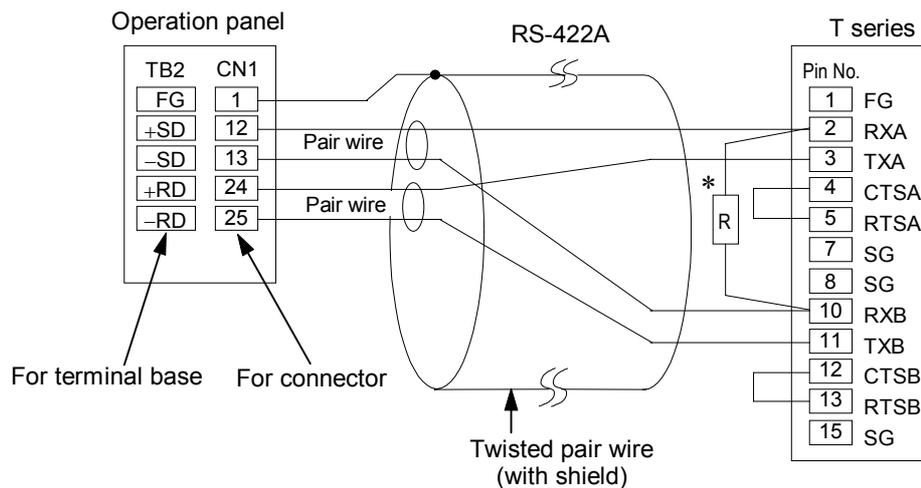
* R is a 120 ohm, 1/2 W resistor.

(25) SIEMENS PLCs 1 (S5-90U, S5-95U, S5-100U)

■ Connectable units

The units that can be connected are as follows.

CP-521SI (3964R Transmission Protocol)

S5-95U second serial interface (3964R Transmission Protocol)

‖ **CAUTION** ‖
The same type of program is necessary on the PLC side as for the RK512.

■ Setting the PLC transmission parameters.

Set the parameters for the PLC main unit as follows.
9600 · 4800 ·2400 · 1200 bps (Same as OPC-H.)
Even parity
No Busy
RS-232C (V.24) interface
8data bits
Hand shake OFF

■ Usable memory

The memory that can be used is as follows.

Usable : ×   Not usable : -

Memory	Bit writing	Type	Remarks
DB (data register)	-	0	
I (input relay)	-	1	For words, IW Read only
Q (output relay)	-	2	For words, QW Read only
F (internal relay)	-	3	For words, FW Read only
T (timer [current value])	-	4	Read only
C (counter [current value])	-	5	Read only
AS (absolute address)	-	6	

The setting range for each type of memory varies with the PLC model. Set within the range that the PLC you are using can support. Also, Type is used for indirect memory specification with macros.

CP521SI

■ Wiring

The figure below shows the connections with the CP521SI.

● RS-232C
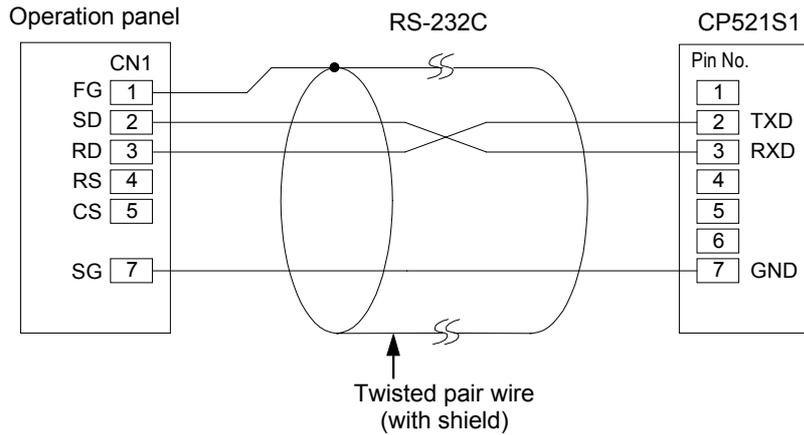
S5-95U second serial interface

■ Wiring

When using the S5-95U second interface, use the special Siemens Converter 6ES5 734-1BD20 cable. However, since the connector on the special cable cannot be connected directly to the operation panel, it is necessary to prepare a cable to connect between this cable and the operation panel.

● RS-232C
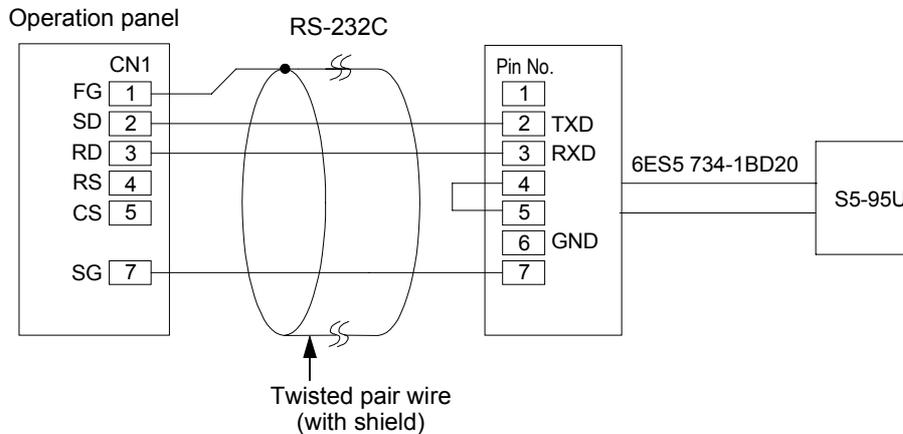
(26) SIEMENS PLCs 2 (S5-115U, S5-135U, S5-155U)

■ Connectable units

The units that can be connected are as follows.

CP-524 (3664R Transmission Protocol)

PC-525 (3964R Transmission Protocol)

CAUTION

The RK512 is necessary.

■ Connections

The default settings are as follows.

Item	Details
Baud rate	19200bps

■ Usable memory

The memory that can be used is as follows.

Usable : ×   Not usable : -

Memory	Bit writing	Type	Remarks
DB (data register)	-	0	
I (input relay)	-	1	For words, IW
Q (output relay)	-	2	For words, QW
F (internal relay)	-	3	For words, FW
T (timer [current value])	-	4	
C (counter [current value])	-	5	
AS (absolute address)	-	6	

The setting range for each type of memory varies with the PLC model. Set within the range that the PLC you are using can support. Also, Type is used for indirect memory specification with macros.

■ Wiring

The figure below shows the connections with the CP524/525.

● RS-422A
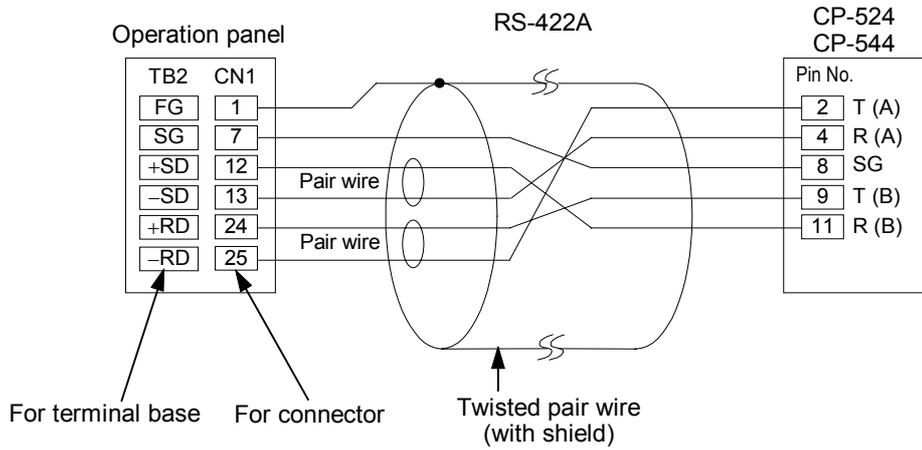
● RS-232C
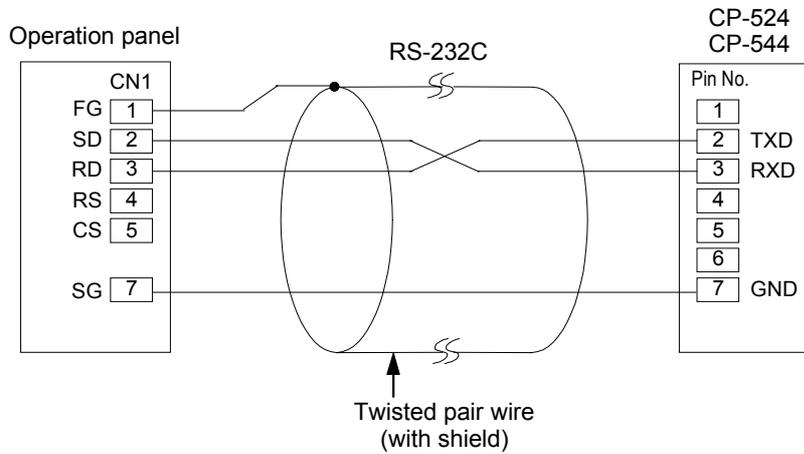
(27) SIEMENS PLCs 3 (TI545, TI555)

■ Connections

Connect to the TI545/555 CPU port (built in RS-232C port). The default settings are as follows.

Item	Details
Baud rate	19200bps

■ Usable memory

The memory that can be used is as follows.

Usable : ×   Not usable : -

Memory	Bit writing	Type	Remarks
V	-	0	
WX	-	1	
WY	-	2	

The setting range for each type of memory varies with the PLC model. Set within the range that the PLC you are using can support. Also, Type is used for indirect memory specification with macros.

■ Wiring

The figure below shows the connections with the TI545/555.

● RS-232C

Twisted pair wire
(with shield)
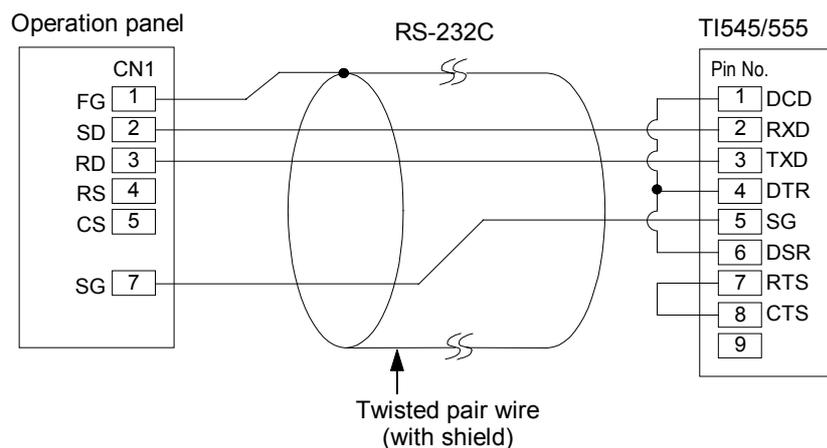
(28) SHINKO PLCs (SELMART-100 or later series)

■ PLCs that can be connected and their connection methods

● SELMART

These PLCs can be used when the CPU is from the SELMART-100 or later series and the link unit version is O1M2-UCI-6_.

■ Link units

Link unit to be connected: O1M2-UCI-6X (touch panel communication card)

The default settings are as follows.

Item		Details
Transmission control mode RS-232C		Type 1 → 1 (fixed)
Baud rate		Same as OPC-H (normally 19200 bps)
Parity		Even
Transmission code	Data bits	7 (ASCII)
	Stop bit	1
Sum check		Yes

Set all the communications parameters using the internal constants. For details, refer to the Shinko Electric Link Unit Operations Manual.

■ Usable memory

The memory that can be used is as follows.

Usable : ×   Not usable : -

Memory	Bit writing	Type	Remarks
D (data register)	-	0	

The setting range for each type of memory varies with the PLC model. Set within the range that the PLC you are using can support. Also, Type is used for indirect memory specification with macros.

* The only memory that SELMART supports is the D register. Other memory cannot be used.   Be aware that it can be set with the **Panel Designer II screen creating tool**, but still cannot be used.

■ Wiring

The figure below shows the connections for the link unit.

● RS-232C

Operation panel   RS-232C   O1M2-UCI-6□

CN1			Pin No.	
FG	1		1	FG
SD	2		2	SD
RD	3		3	RD
RS	4		4	RS
CS	5		5	CS
SG	7		7	SG

(D-SUB 25-pin full size)

Twisted pair wire
(with shield)

(29) SAMSUNG PLCs (SPC series)

■ Connection method

The default settings are as follows.

Item	Details
Baud rate	Same as OPC-H (9600, 4800, 2400, 1200 bps)
Parity	None
Stop bit	1
Terminal resistance	Inserted for RS-485

For details, refer to the SAMSUNG PLC Operations Manual.

■ Usable memory

The memory that can be used is as follows.

Usable : ×   Not usable : -

Memory	Bit writing	Type	Remarks
R	-	0	
L	-	1	
M	-	2	
K	-	3	
F	-	4	
W	-	5	

The setting range for each type of memory varies with the PLC model. Set within the range that the PLC you are using can support. Also, Type is used for indirect memory specification with macros.

■ Wiring

The figures below show connections with the SPC series.

● RS-422A/485

For terminal base   For connector

Twisted pair wire
(with shield)

● RS-232C

Twisted pair wire
(with shield)
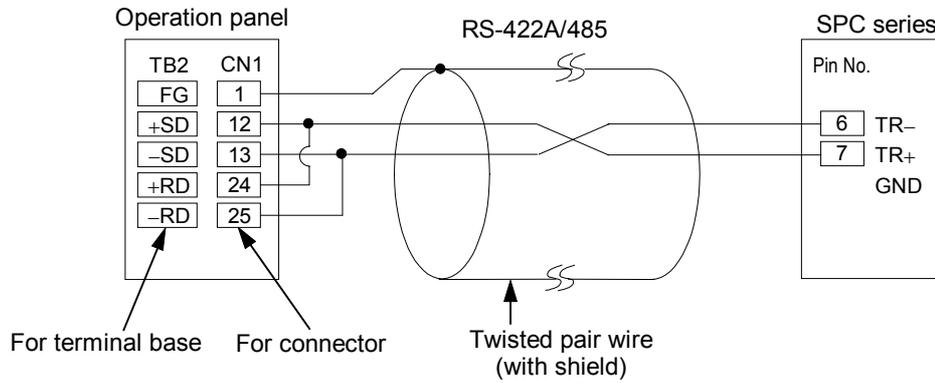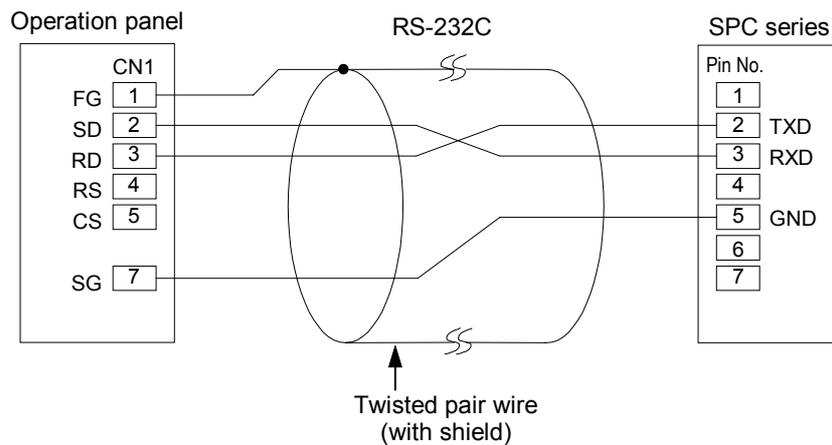
(30) KEYENCE PLCs (KZ series)

■ PC link unit

Connectable PC link unit : KZ-L2
The default settings are as follows.

Item		Details
Port		0
Baud rate		Same as OPC-H (9600, 4800, 2400, 1200 bps)
Parity		Even
Transmission code	Data bits	7 (ASCII)
	Stop bit	2
Terminal resistance on/off		On for RS-422A

The station number is set with the station number setting switch, the terminal resistance is set with the terminator, and the transmission speed, data bits, parity, and stop bit are set with the SET B DIP switch.

For details, refer to the KEYENCE PC Link Unit Communications Specifications.

■ Usable memory

The memory that can be used is as follows.

Usable : ×   Not usable : -

| Memory	Bit writing	Type	Remarks
DM (data memory)	-	0	
CH (input/output relay)	-	1	

The setting range for each type of memory varies with the PLC model. Set within the range that the PLC you are using can support. Also, Type is used for indirect memory specification with macros.

■ Wiring

The figures below show connections with link units.

● RS-422A
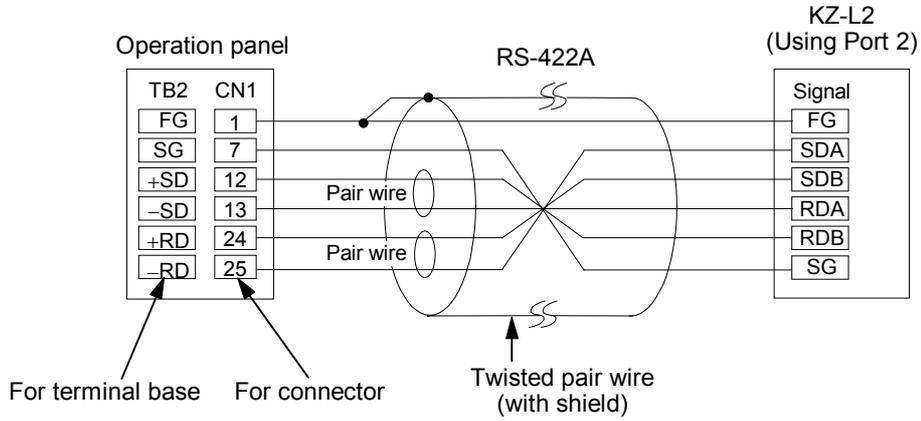
● RS-232C
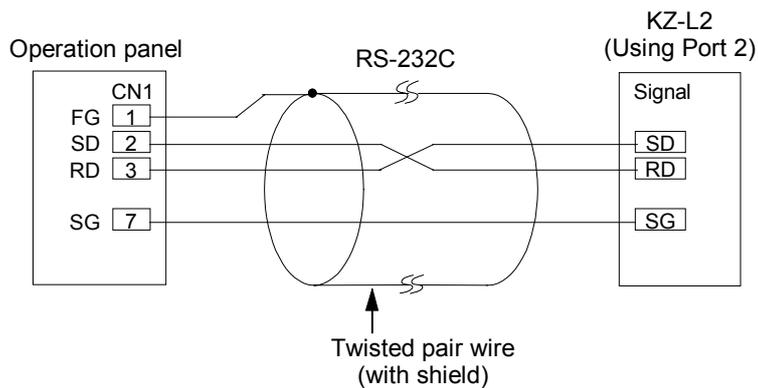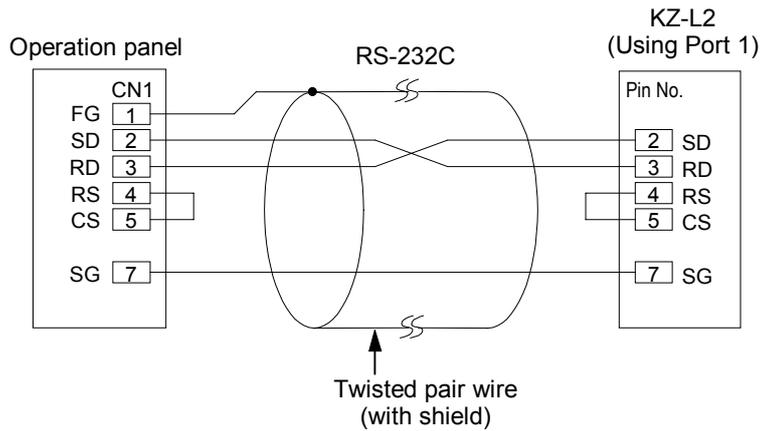
(31) LG PLCs

■ PLCs that can be connected and their connection methods

Link units connected : K10/60/200

K500/K1000

The default settings are as follows.

Item	Details [K10/60/200]	Details (K500/K1000)
Baud rate	9600 bps (fixed)	19200 bps
Parity	None (fixed)	None
Data bit	8 (fixed)	8
Stop bit	1 (fixed)	1

For details, refer to the LG PLC Operations Manual.

■ Usable memory

The memory that can be used is as follows.

● K10/K60/K200

Usable : ×   Not usable : -

Memory	Bit writing	Type	Remarks
D (data register)	-	0	
M	-	1	
P (input/output)	-	2	Input: Read only
K (keep relay)	-	3	
TC (timer [current value])	-	4	Read only
CC (counter [current value])	-	5	Read only
TS (timer [set value])	-	6	Read only
CS (counter [set value])	-	7	Read only

● K500/K1000

Usable : ×   Not usable : -

Memory	Bit writing	Type	Remarks
P (input/output)	-	0	Input: Read only
M (relay)	-	1	
L (link)	-	2	
K (keep relay)	-	3	
F	-	4	Read only
T (timer [current value])	-	5	
C (counter [current value])	-	6	
D (data register)	-	7	

The setting range for each type of memory varies with the PLC model. Set within the range that the PLC you are using can support. Also, Type is used for indirect memory specification with macros.

■ Wiring

The figures below show the connections for the <u>K10/60/200</u>

● RS-232C
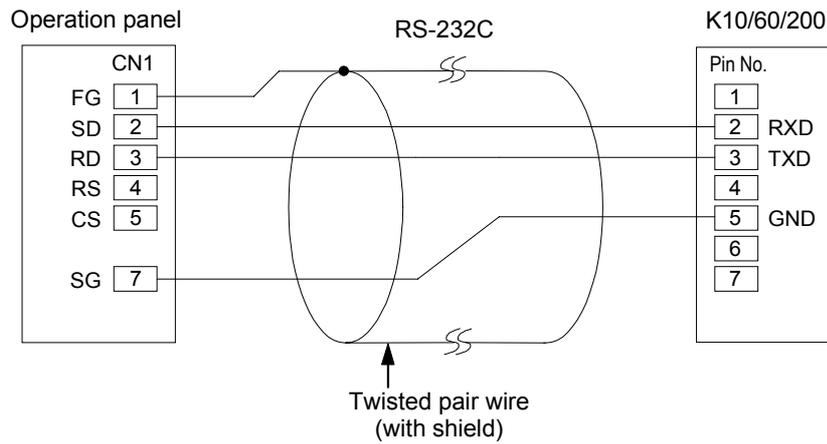
The figure below shows the connections for the <u>K500/K1000</u>.

● RS-232C
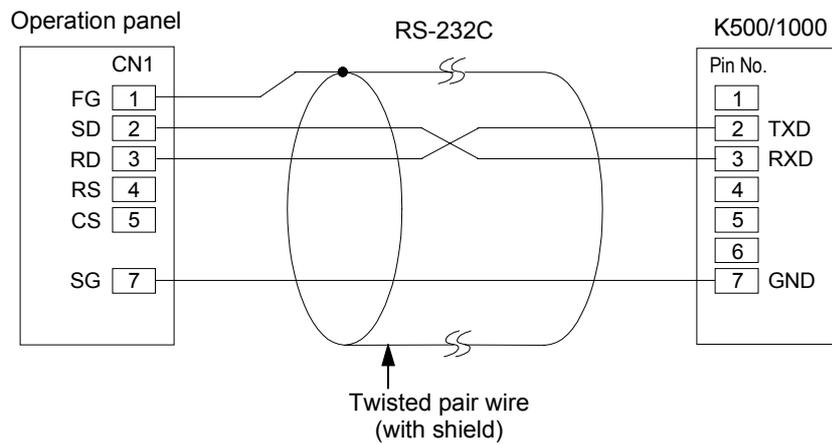
(32) FANUC PLCs

■ Connection

Connect to the CPU unit port (JD14) of Power Mate-Model H/D.

● Communication Parameter

The default settings are as follows.

Item	Details
Baud rate	19200 bps (fixed)
Data bit	8 (fixed)
Stop bit	Even (fixed)
Parity	1 (fixed)
Interface	RS-422A (fixed)
Station No.	0 (fixed)

■ Usable memory

The memory that can be used is as follows.

Usable : ×   Not usable : -

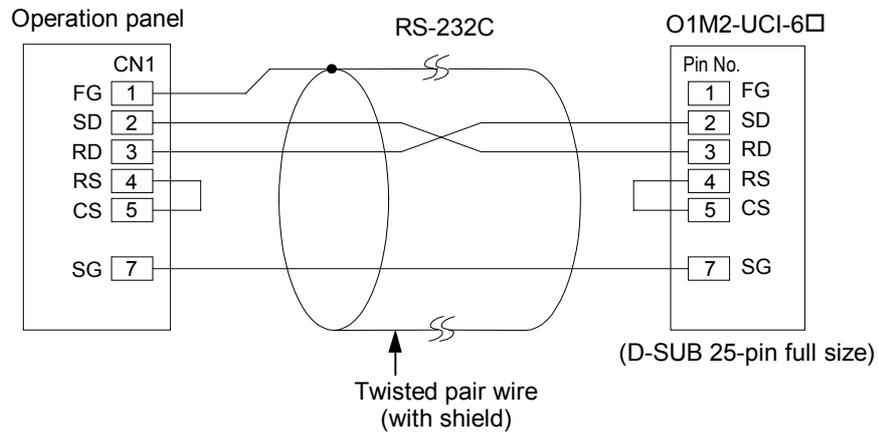| Memory	Bit writing	Type	Remarks
D (data register)	×	0	
X (input relay)	×	1	For words, WX
Y (output relay)	×	2	For words, WY
R (internal relay)	×	3	For words, WR
K (keep relay)	×	4	For words, WK
T (timer)	-	5	
C (counter)	-	6	

The setting range for each type of memory varies with the PLC model. Set within the range that the PLC you are using can support. Also, Type is used for indirect memory specification with macros.

■ Wiring

The figure below shows the connections with the JD14 port.

● RS-422A
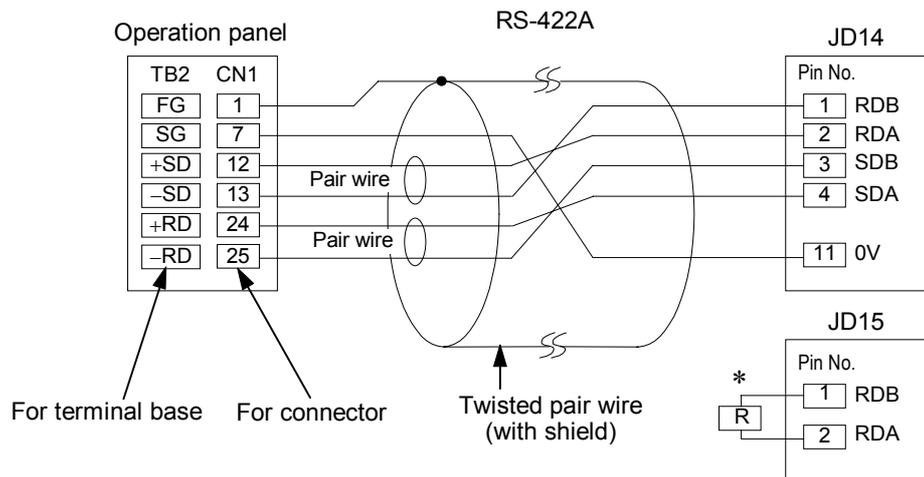
* R is a 100 ohm, 1/2W resistor

MEMO

OPERATION **3**

3.1 Preparations Before Operation

Before beginning actual operations, follow the procedure below to double check each item carried out up till now to ensure safe operation.

(1) Check that the equipment is not subject to any of the adverse environmental conditions in Chapter 2 2.1.

See Chapter 2 "**2.1 Mounting Precautions**" (Page 2-2).

(2) Check that the power supply voltage meets the specifications.

Use power within the range **100 to 240 VAC**.

(3) Check that there are no abnormalities in the wiring.

See **Chapter 2 Mounting and Wiring** (Page 2-1).

(4) Check that the control unit initial settings have been made correctly.

Refer to the separate **"Installation Manual"** or Chapter 3 **"3.2 Initial Settings Before Operations"** (Page 3-3).

(5) Switching on the power and starting operation.

See Chapter 3 **"3.3 Switching On the Power For the First Time"** (Page 3-5) and **Operation Panel Screen Operation Manual [IMSRM38-E□]**.

* If there is anything that you feel is abnormal, see **Chapter 6 "In Case of Trouble"** (Page 6-1) in this document.

3.2 Initial Settings Before Operations

Make the control unit and operation panel communication settings match. If you bought the control unit and operation panel as a set, the control unit and operation panel were given the same settings.

(1) Settings for communication with control unit

<u>Setting procedure</u>

1. If you pull up with the main unit top linkage section as the fulcrum while pressing the [ ] section (removal lever), the main unit and the mother block are separated.
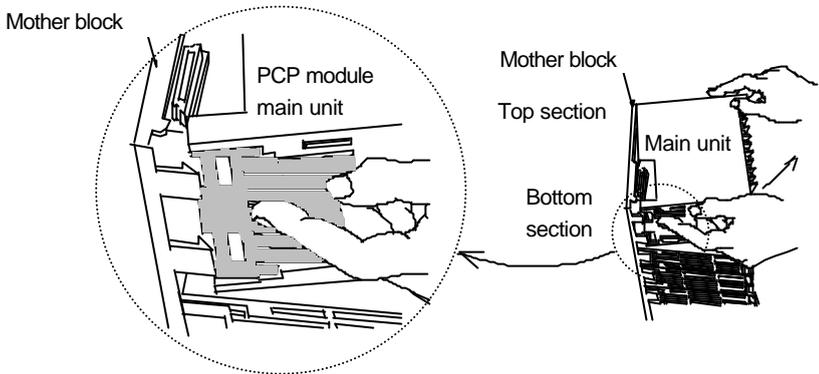
2. Use the DIP switch on the PCP module main unit to switch to the data composition and communication speed to be used.
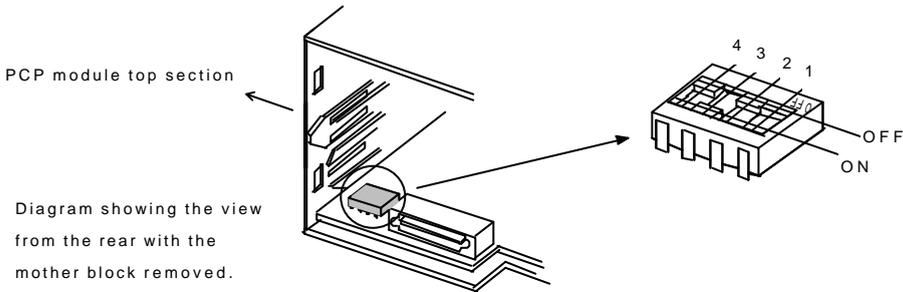
1	2	Data composition
OFF	OFF	8 bits, no parity
OFF	ON	7 bits, even parity
ON	OFF	7 bits, odd parity
ON	ON	(Do not set this.)

3	4	Communication speed
OFF	OFF	2400 bps
OFF	ON	4800 bps
ON	OFF	9600 bps
ON	ON	19200 bps

* When connecting with the operation panel, check that the DIP switches are set to the positions marked by the arrows.

3. When the settings are completed, assemble the main unit and mother block top part linkage section. Reverse the procedure you used when separating them, with the top section linkage part as the fulcrum, fit in the main unit bottom section. Install firmly until you hear the units click into place.

(2) Setting the unit address

CAUTION

Set so that no unit addresses are duplicated in the same line. Duplicate addresses can cause breakdown and malfunction.
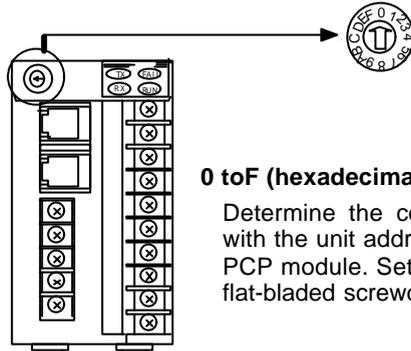
0 toF (hexadecimal) : Address No. 0 to15

Determine the control unit address No. with the unit address setting switch in the PCP module. Set this switch with a small flat-bladed screwdriver.

PCP module

(3) Settings for communications with host computer (optional)

These settings are made with a screen registered in the operation panel. Always make the host computer and operational panel (OPC-H) communications settings the same. For details on the setting method, refer to **Operation Panel Screen Operation Manual [IMSRM38-E□]**.

(4) Settings for communications with a programmable controller (PLC)

These settings are made with a screen registered for the operation panel. Always make the PLC and operational panel (OPC-H) communications settings the same. For details on the setting method, refer to **Operation Panel Screen Operation Manual [IMSRM38-E□]**.

3.3 Switching On the Power For the First Time

Checks before switching on the power

Check the following items before switching on the power.

- Check that the operating environment conforms to the precautions in **"Chapter 2 MOUNTING AND WIRING"**.

- Check that there are no abnormalities in the wiring or wiring connections.

- When switching on the power for the first time after changing the control unit module composition, check that the control unit system settings have been made.

    (Refer to Operation Panel Screen Operation Manual [IMSRM38-E☐].)

MEMO

FUNCTION EXPLANATIONS

4

4.1 Display Functions and Touch Panel

(1) Display functions

■ Number of characters that can be displayed (one screen)
- 1-byte characters (8 x 16 dots) : 80 characters x 24 lines
- 2-byte characters (16 x 16 dots) : 40 characters x 24 lines

■ Size of characters that can be displayed

Half size (1 byte; 8 x 16 dots) and full size (2 bytes; 16 x 16 dots) can both be displayed expanded from x1 to x8 vertically and horizontally. Also, characters can be set to 1/4 size (8 x 8 dots).

```
2-bytes                    4x size
  □      ──────────►         □         ──────────►   Up to vertical and horizontal 8x
         Vertical and horizontal 2x                  (128 x 128 dots)

                           (32 x 32 dots)

1/4 size         1-byte                4x size
  □   ◄──────      □     ──────────►     □     ──────────►   Up to vertical and horizontal 8x
(8 x 8 dots)  1/4 setting  Vertical and horizontal 2x        (64 x 128 dots)
                           (16 x 32 dots)
```
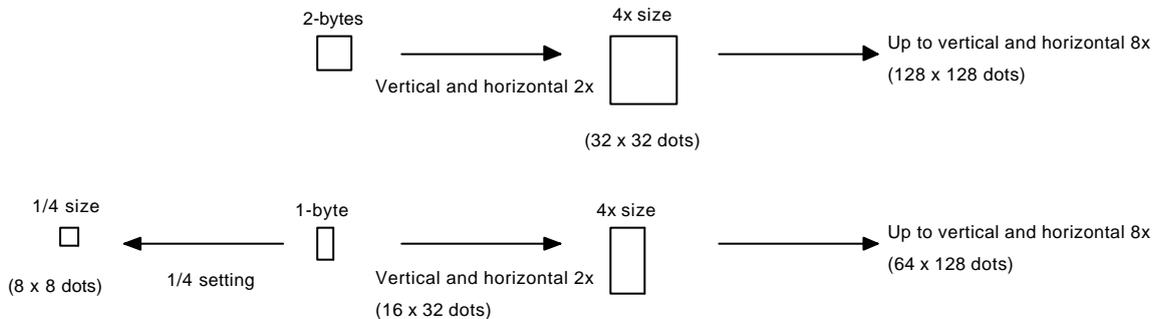
■ Types of characters that can be displayed
- JIS/ASCII 8-bit code characters

(2) Touch panel

With this operation panel, such operations as changing settings and changing display are carried out by touching the transparent touch panel on the display. This makes it easy to operate by interacting with the display. Also, when you press a switch, the operation panel beeps, so you can be sure that the switch was pressed.

CAUTIONS

- **Do not strike or drag along the surface of the touch panel (display unit) with a sharply pointed object. This can cause scratches and damage.**
- **Do not allow the touch panel (display unit) to become indelibly stained. Doing so can make the display hard to read or damage the touch panel.**
- **In order to prevent scratches and damage, do not press the touch switches with anything other than your fingers.**
- **Do not press the touch switches with unnecessary force. This can damage them.**

4.2 Printer Print Functions

By connecting a printer to the operation panel (OPC-H), you can print data sheets, make hard copies of screens, etc.

(1) Data sheets printing function

The data sheets printing function prints monitor values, setting values, alarm histories, and other pre-registered ledgers. The types of data sheets printing are as follows.

■ Fixed interval printing

The selected pre-registered ledgers are printed at the fixed time interval. This printing interval can be set from 1 to 240 minutes.

When the ledgers are selected, time measurement for fixed interval printing starts and the first printing is made.

■ Fixed time printing

The selected pre-registered ledgers are printed at the fixed time. Up to 8 times can be set.

■ Alarm item printing

When an alarm occurs, the selected pre-registered ledgers are printed.

■ Alarm history printing

When the alarm history reaches 20 items, the alarm history ledger is printed automatically.

■ Manual printing

On the "Data Sheets Print" "Manual Print Item Select" screen, when you touch the switch to the right of the name of the ledger you want to print, it is printed immediately with the data of that moment.

NOTES

● For details on the data sheet printing function screen and setting method, refer to **Operation Panel Screen Operation Manual [IMSRM38-E□]**.
● Connect the printer as explained in **"2.5 Connections"** (Page 2-14).

(2) Data sheets printing format

Twelve data sheets printing formats are pre-registered for the data sheets printing function. The data sheets printing formats are as follows.

■ Temperature control monitor

Temperature control channel name

Item title

Print unit number and name

Execution memory area number and name

```
<<<SR Mini HG System>>>                              95/ 3/25 (THU) 19:16
   ***  TIO Monitor  ***
 Unit 1                Area
 CH      PV( )     SV( )    AT  AL   MVh (%)   MVc (%)   CT1 (A)    HBA1 (A)
 Temp 1     38        0                -5        -5        0.0        0.0
 Temp 2     36        0                -5        -5        0.0        0.0
 Temp 3     40        0                -5        -5        0.0        0.0
 Temp 4     37        0                -5        -5        0.0        0.0
 Temp 5     38        0                -5        -5        0.0        0.0
 Temp 6   ------    ------    --  --  ------    ------    -----      -----
```

Time of printing

HBA1 set value

CT1 measurements

Cooling side control output value

Heating side control output value

Temperature alarm status
When there is an alarm, ● mark printed and when no alarm, blank printed

Temperature measured value
According to the temperature units (°C or °F)

Auto tuning status
When executing, ● printed; when stopped, blank

Temperature set value
According to the temperature units (°C or °F)

■ TI monitor

Item title

Print unit number and name

Time of printing

```
<<<SR Mini PC System>>>                          95/3/25 (THU) 19:16
***        Monitor  ***
Unit
 CH     PV( )   AL1 AL2 B.O         CH     PV( )   AL1 AL2 B.O
TI  1   ------   --  --  --        TI 21   ------   --  --  --
TI  2   ------   --  --  --        TI 22   ------   --  --  --
TI  3   ------   --  --  --        TI 23   ------   --  --  --
TI  4   ------   --  --  --        TI 24   ------   --  --  --
TI  5   ------   --  --  --        TI 25   ------   --  --  --
TI  6   ------   --  --  --        TI 26   ------   --  --  --
```

TI burnout status

When there is a burnout, ● mark printed; when there is none, blank printed

TI No. 2 alarm status

When there is an alarm, ● mark printed; when there is no alarm, blank printed

TI No. 1 alarm status

When there is an alarm, ● mark printed; when there is no alarm, blank printed

TI measured value

TI CH name

■ AI monitor

Item title

Number and name of unit being printed

Time of printing

```
<<<SR Mk i HG System>>>                    95/ 3/25 (THU) 19:16
 *** AI Monitor ***
 Unit1 :
  CH          AI          AL1 AL2    CH          AI         AL1 AL2
 AI  1    ------ ( % ) -- --     AI  21   ------ ( % ) -- --
 AI  2    ------ ( % ) -- --     AI  22   ------ ( % ) -- --
 AI  3    ------ ( % ) -- --     AI  23   ------ ( % ) -- --
 AI  4    ------ ( % ) -- --     AI  24   ------ ( % ) -- --
 AI  5    ------ ( % ) -- --     AI  25   ------ ( % ) -- --
 AI  6    ------ ( % ) -- --     AI  26   ------ ( % ) -- --
```

AI No. 2 alarm status
When there is an alarm, ● mark printed;
when there is no alarm blank

AI No. 1 alarm status
When there is an alarm, ● mark printed;
when there is no alarm blank

AI units

AI measured value

AI CH name

■ Temperature control settings

Item title

Number and name of unit being printed

Execution memory area number and name

Time of printing

Dead band/overlap set value

```
<<<SR Mini CG System>>>                    95/ 3/25 (THU) 19:16
  ***  TIO Setting Value  ***
 Unit                    Area
   CH    SV(  )  AL1(  ) AL2(  )  Ph(%)    Pc(%)   I(Sec)  D(Sec)  DB/OL(%)
 Temp 1    0      50     -50      3.0      3.0     240     60      0.0
 Temp 2    0      50     -50      3.0      3.0     240     60      0.0
 Temp 3    0      50     -50      3.0      3.0     240     60      0.0
 Temp 4    0      50     -50      3.0      3.0     240     60      0.0
 Temp 5    0      50     -50      3.0      3.0     240     60      0.0
 Temp 6   ------  ------  ------  ------   ------  ------  ------  ------
```

Derivative time set value

Integral time set value

Cooling side proportional band set value

Heating side proportional band set value

No. 2 temperature alarm set value
According to temperature units (°C or °F)

No. 1 temperature alarm set value
According to temperature units (°C or °F)

Temperature set value
According to temperature units
(°C or °F)

Temperature control channel name

■ TI settings

Item title   Number and name of unit being printed   Time of printing

```
<<<SR Mini HG System>>>                          95/ 3/25 (THU) 19:16
   *** TI Setting ***
   Unit

   CH      AL1(  ) AL2(  )              CH      AL1(  ) AL2(  )
TI  1    ------ ------              TI  21    ------ ------
TI  2    ------ ------              TI  22    ------ ------
TI  3    ------ ------              TI  23    ------ ------
TI  4    ------ ------              TI  24    ------ ------
TI  5    ------ ------              TI  25    ------ ------
TI  6    ------ ------              TI  26    ------ ------
```

TI CH name   TI No. 1 alarm set value   TI No. 2 alarm set value

■ AI settings

Item title   Number and name of unit being printed

```
<<<SR Mini HG System>>>                          95/ 3/25 (THU) 19:16
   *** AI Setting ***
   Unit

   CH      AL1      AL2                 CH      AL1      AL2
AI  1    ------ ------ ( % )        AI  21    ------ ------ ( % )
AI  2    ------ ------ ( % )        AI  22    ------ ------ ( % )
AI  3    ------ ------ ( % )        AI  23    ------ ------ ( % )
AI  4    ------ ------ ( % )        AI  24    ------ ------ ( % )
AI  5    ------ ------ ( % )        AI  25    ------ ------ ( % )
AI  6    ------ ------ ( % )        AI  26    ------ ------ ( % )
```

Time of printing

AI No. 1 alarm set value   AI No. 2 alarm set value   AI units

AI CH name

■ Process files (Temperature Control 1)

Number and name of process file being printed

Item title

Number and name of unit being printed

Time of printing

```
<<<SRMini HG System>>>                          95/ 3/25 (THU) 19:16
   ***  File Trans (TIO 1)   ***
   File1  OPC 1        Unit
     CH    SV( )    Ph(%)    Pc(%)    I(Sec)    D(Sec)    DB/OL(%)
   Temp 1    0      3.0      3.0      240       60        0
   Temp 2    0      3.0      3.0      240       60        0
   Temp 3    0      3.0      3.0      240       60        0
   Temp 4    0      3.0      3.0      240       60        0
   Temp 5    0      3.0      3.0      240       60        0
   Temp 6   - - - - - -  - - - - - -  - - - - - -  - - - - - -  - - - - - -  - - - - - -
```

Dead band/overlap set value

Derivative time set value

Integral time set value

Temperature set value
According to temperature units
(°C or °F)

Cooling side proportional band set value

Temperature control channel name

Heating side proportional band set value

■ Process file (Temperature Control 2)

Item title

Number and name of process file being printed

Number and name of unit being printed

Time of printing

```
<<<SR Mni HG System>>>                      95/ 3/25 (THU) 19:16
  ***  File Trans. (TIO2) ***

  File 1:OPC 1      Unit 1:

   CH     Resp.   AL1( )   AL2( )   Mode      PVB(%)
  Temp 1  Slow    50.0    -50.0    Regular    0.00
  Temp 2  Slow    50.0    -50.0    Regular    0.00
  Temp 3  Slow    50.0    -50.0    Regular    0.00
  Temp 4  Fast    50.0    -50.0    Monitor    0.00
  Temp 5  Fast    50.0    -50.0    Un Used    0.00
  Temp 6  ------  ------   -----   ------     ------
```

PV bias set value

Control response
Slow, Medium or Fast printed

Mode state
Not Used, Monitor, Alarm,
or Normal printed

Temperature control channel name

No. 2 temperature alarm set value

No. 1 temperature alarm set value

■ Process file (TI)

Item title

Number and name of process file being printed

Number and name of unit being printed

Time of printing

```
<<<SRMini HG System>>>                     95/ 3/25 (THU) 19:16
  *** File Trance (T1) ***
  File1: OPC 1          Unit :

    CH   AL1( ) AL2( ) Mode  PVB(%)    CH   AL1( ) AL2( ) Mode  PVB(%)
  TI  1   50.0  -50.0  Regular  0.00   TI  21  ------  ------  ------  --
  TI  2   50.0  -50.0  Regular  0.00   TI  22  ------  ------  ------  --
  TI  3   50.0  -50.0  Regular  0.00   TI  23  ------  ------  ------  --
  TI  4   50.0  -50.0  Monitor  0.00   TI  24  ------  ------  ------  --
  TI  5   50.0  -50.0  Un Used  0.00   TI  25  ------  ------  ------  --
  TI  6  ------  ------  ------  --    TI  26  ------  ------  ------  --
```

TI No. 2 alarm set value

TI No. 1 alarm set value

PV bias set value

Mode state

Temperature control channel name

Not Used, Monitor, Alarm, or Normal printed

■ Process file (AI)

Item title

Number and name of process file being printed

Number and name of unit being printed

Time of printing

```
<<<SRMini HG System>>>                     95/ 3/25 (THU) 19:16
  *** File Trans (AI) ***
  File      OPC1        Unit

    CH      AL1     AL2               CH      AL1     AL2
  AI  1  ------  ------  ( % )     AI  21  ------  ------  ( % )
  AI  2  ------  ------  ( % )     AI  22  ------  ------  ( % )
  AI  3  ------  ------  ( % )     AI  23  ------  ------  ( % )
  AI  4  ------  ------  ( % )     AI  24  ------  ------  ( % )
  AI  5  ------  ------  ( % )     AI  25  ------  ------  ( % )
  AI  6  ------  ------  ( % )     AI  26  ------  ------  ( % )
```

AI CH name

AI No. 1 alarm set value

AI No. 2 alarm set value

AI units

■ Process file (PC)

Item title   Number and name of unit being printed

```
<<<SRMin HG System>>>                    95/ 3/25 (THU) 19:16
  *** File Trans (PC) ***
   File 1     O P C 1
     CH           CH           CH           CH           CH
  PC 001    O   PC 027   O   PC 053   O   PC 079   O   PC 105   O
  PC 002    O   PC 028   O   PC 054   O   PC 080   O   PC 106   O
  PC 003    O   PC 029   O   PC 055   O   PC 081   O   PC 107   O
  PC 004    O   PC 030   O   PC 056   O   PC 082   O   PC 108   O
  PC 005    O   PC 031   O   PC 057   O   PC 083   O   PC 109   O
  PC 006    O   PC 032   O   PC 058   O   PC 084   O   PC 110   O
```

Time of printing

PC data name   General set value

■ Alarm history

Item title

Time of printing

```
<<<SR Mini HG System>>>                    95/ 3/25 (THU) 19:16
   *** AlarmHist. ***

   No.     Item    Unit  CH    Name      Date        Count
   1       AI AL2   1     1     Temp 1    3/23 13: 7    20
   2       AI AL2   1     2     Temp 2    3/23 13: 7    25
   3       AI AL2   1     3     Temp 3    3/23 13: 7    24
   4       AI AL2   1     4     Temp 4    3/23 13: 7    24
   5       AI AL2   1     1     Temp 1    3/23 13: 8    21
   6       AI AL2   1     2     Temp 2    3/23 13: 8    26
```

Alarm generation count

Alarm generation time

Alarm generating channel name

Alarm generating channel

Alarm type

Alarm generating unit

Alarm history number

(3) Print screen (screen hard-copy)

The print screen function prints out a copy of the display screen just as it is when the print screen function is executed. Graphs and computer graphics are also printed out as is.

■ Executing print screen

Pressing the Print Screen switch on the front of the operation panel makes a hard copy of the contents of the screen.

[Operation panel]

PRINT SCREEN switch
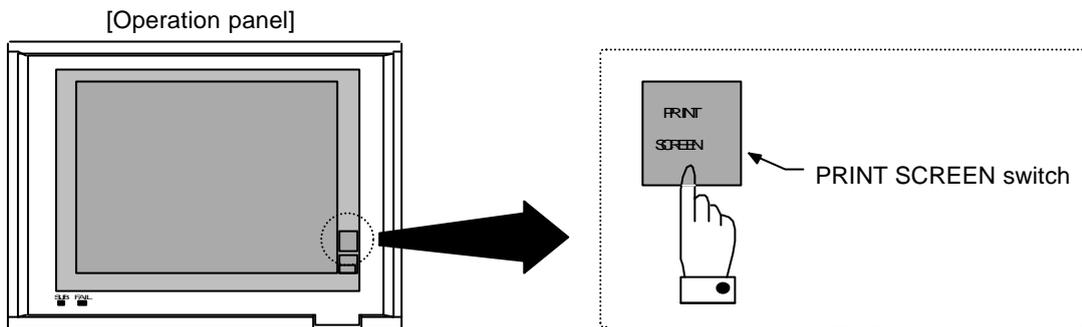
■ Print screen inversion selection

On the display screen, if the background is black and the characters and lines are white, when you print out this screen with the print screen function, white characters and lines are printed on a completely black background, which is extremely difficult to read. Therefore, if you set the bit inversion selection to "1 : Inverted Printing", then print, the characters and lines are printed black on a white background (the color of the paper), which is much easier to read.

NOTE

For details on the print screen inversion selection, refer to **Operation Panel Screen Operation Manual [IMSRM38-E□]**.

4.3 External Storage Function (Memory Card)

The external storage function uses an optional memory card to store process files, all setting data, etc. into the memory card. All operations for the memory card, such as initialization, settings, registration, etc. can be carried out with the operation panel screens for memory cards.

■ Types of memory cards that can be used

The memory cards that can be used with the operation panel are SRAM cards (with lithium battery backup) conforming to JEIDA (Japan Electronics Industry Development Association) Version 4.1 Standards.
Capacity (Bytes) : 256K, 512K, 1M

NOTES

- Select the appropriate capacity for the amount of data you need to store.
- Only SRAM cards with "card attribute information (device information table, device size)" can be used.

■ Data that can be registered in memory cards

CAUTION

Process files and all the settings (for maintenance) cannot be registered in the same memory card. Have a memory card dedicated to each of these uses.

- Process files

  Process files are stored files for operations settings (settings, alarm settings, PID constants, etc.)

  A maximum of 80 process files can be registered. However, since there are limits to the capacity of the memory card, the number of files that can be registered may be limited if individual files are large.

- All settings (for maintenance)

  The complete set of settings is for maintenance, so is not normally used by the user.

■ Memory card handling precautions

CAUTIONS

In order to prevent breakdown or deformation of memory cards or destruction of the data they contain, observe the precautions below and handle memory card carefully.

● **Use only memory cards that meet the specifications.**

● **Do not bend memory cards, drop them, or subject them to strong mechanical shock.**

● **Keep memory cards away from direct sunlight, high temperature, and high humidity.**

Item	Specification
Usage ambient temperature	0 to 50 °C
Usage ambient humidity	45 to 85% relative humidity (no condensation allowed)

● **After use, store memory cards in their cases to protect them from static electricity and dust.**

● **Do not touch the connector section of the memory card with your hands and keep out pins and other foreign objects. Also, keep dust and dirt out of the connector section.**

● **Be careful about the service life of the memory card (SRAM) battery. Environmental conditions can reduce the battery service life, so it is best to replace the battery a little early. When the battery in a memory card (SRAM) is running low, the memory card unit LED lamp lights up red.**

4.4 User Screens

With the OPC-H, in addition to the screens pre-registered at the factory, screens produced by the user can be added. In particular, the PLC related screens are not pre-registered at the factory, so they are produced by the user.

Producing screens requires the separate **Panel Designer II screen creating tool**.

| NOTE |

For details on screen making methods, the screen data transfer method, etc. refer to the
Panel Designer II Screen creating Tool Instruction Manual [IMSFT13-E□].

■ Screen processing procedure

1. Start up the **Panel Designer II screen creating tool** and open the standard file on the sample disk.

2. Add the screen made by the user to the standard screen data.

| CAUTION |

All user screens added must have a key switch assigned for returning to the standard screen.

3. Connect the PC and the operation panel. For details on the connection method, see "2.5 Connections" (Page 2-14).

4. Switch the operation panel screen to the system screen.

● Displaying the system screen

After starting up the operation panel as normal, press the [DISPLAY ON/OFF] key while pressing the hidden [SYSTEM] key.

* Displaying the menu bar by touching the screen title as shown in the figure below makes it easier to check the hidden key "SYSTEM" position.

[Operation panel]

Hidden key [SYSTEM]

Menu bar

DISPLAY ON/OFF KEY

Press the DISPLAY ON/OFF key while pressing the hidden key [SYSTEM]
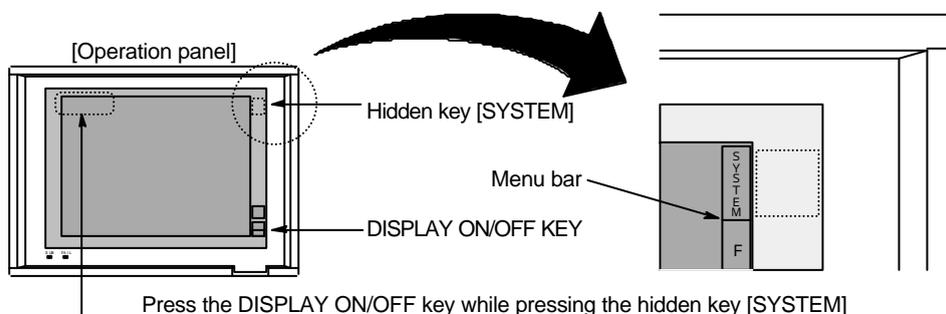
When touching to this part (screen title), the menu bar appears.
It disappears if touched once more.

5. Transfer the screen data containing the screen data transferred from the OPC-H and the screens made by the user from the PC to the OPC-H. The OPC-H screen at this time is the system screen.

6. When the data transfer is complete, return the OPC-H screen from the system screen to the regular display.

   ● How to return to the regular screen

   With the system screen being displayed, if you press just the hidden [SYSTEM] key, frames labeled SYSTEM and MODE are displayed at the right edge of the screen, so press the hidden [F1] key to the right of MODE (beneath the hidden [SYSTEM] key) to return to the normal display.

About 12 mm

Hidden [SYSTEM] key
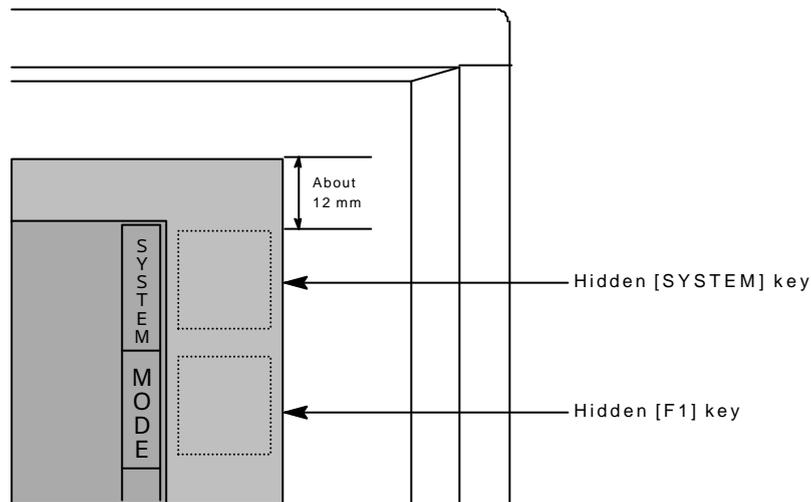
Hidden [F1] key

Press the hidden [SYSTEM] key, then press the hidden [F1] key.

4.5 Other Functions

For details on the setting method for the functions below, refer to **the Operation Panel Screen Operations Manual [IMSRM38-E□]**.

1. Calendar function

   Displays the Western (Gregorian) calendar year, month, day of the week, hour, and minute on the top right of the display screen.

2. Screen scan function

   If the screen scan function is selected as On and the scan time set with the screen scan function setting screen, the operation monitor screen is scanned automatically. Also, when multiple control units are connected, the operation monitor screen is scanned for each control unit.

3. Host communications function (option)

   The operation panel (OPC-H) can be connected to a host computer. Either RS-232C, RS-422A, or RS-485 can be selected as the communications interface.

   | NOTES |

   - For details on the methods for connecting with host computers, see "**Chapter 2 Mounting and Wiring**" (Page 2-1).
   - For further details on communications with host computers, refer to the separate **Communications Operations Manual [IMSRM09-E□]**.

4. Timer function

   This function starts the control (temperature rise) for each temperature control channel at the specified time.

5. Screen saver function

   This function switches off the display screen if there is not even a single screen operation for the specified duration. A screen that has been switched OFF by the screen saver function is switched on by pressing the [DISPLAY ON/OFF] key.

MEMO

MAINTENANCE 5

5.1 Maintenance Precautions

This product uses transparent touch panel keys to improve operability. Observe the following rules when cleaning the screen.

- In order to prevent scratches and other damage, do not strike or pull along the surface of the touch panel (display unit) with a fingernail or pointed object.

- In order to prevent deformation and discoloration, do not wipe this product with any volatile organic solvent (paint thinner, benzene, etc.), chemicals, or washcloth impeded with a chemical cleaner. If you clean this product with a volatile organic solvent, this can cause switch breakdown and clouding of the screen.
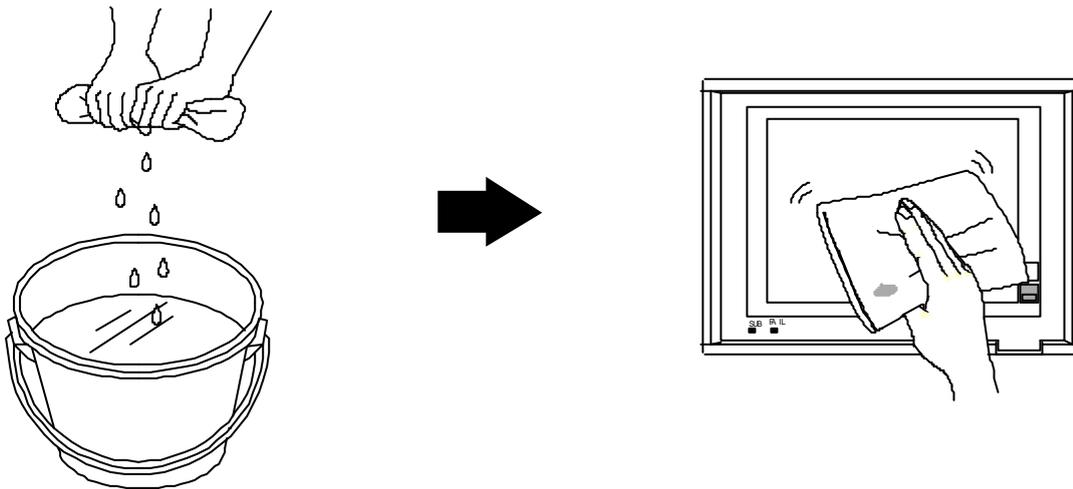

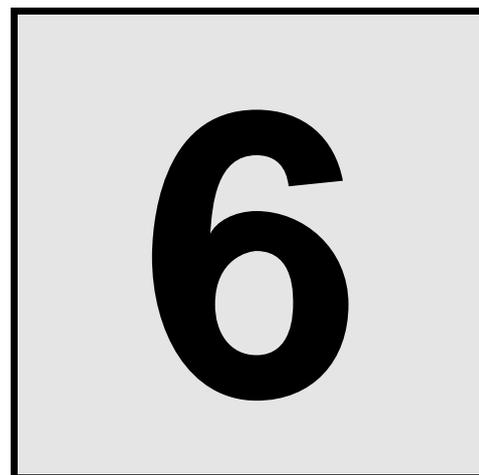Volatile organic solvents   Chemicals   Chemically impregnated washcloth

5.2 Screen Cleaning Method

Wipe the screen with a soft cloth that has been dipped in neutral detergent diluted with water and well wrung out.

IN CASE OF TROUBLE

6

6.1 Alarm Display Screen

If an alarm occurs when the power is switched on or while the system is operating, you can check the alarm state on the "Alarm Display" screen. '■" is displayed flashing in the column to the right side of any alarm that has occurred. For details on the "Alarm Display" screen, refer to **the Operation Panel Screen Operation Manual [IMSRM38-E□]**.

■ Alarm Display Screen

| Alarm Display | | | | | | | 97/ 4/ 1(TUE)12:00 |

SRM Alarm	
AL1	
AL2	
BO	
HBA	
LBA	
T.R.C	
TI AL1	
TI AL2	
TI BO	
AI AL1	
AI AL2	

System Error	
ROM Error	
RAM Backup Error	
Mem. Card Data ERR	
Calender ERR	

SRM SCI	
Parity Error	
Framing Error	
Over-RUN Error	
Time-out Error	

Mem. Card SCI	
Parity Error	
Framing Error	
Over-RUN Error	
Time-out Error	

Unit No.	1	2	3	4	5	6	7	8
Error	O							

| Ope. Menu | | | Alarm Hist. | | ALM Cancel |

(1) SRM alarms

1. AL1

   "■" is displayed flashing in the column on the right if a No. 1 temperature control alarm (AL1) occurs on even one of the temperature control channels for any of the units in use.

2. AL2

   ■is displayed flashing in the column on the right if a No. 2 temperature control alarm (AL2) occurs on even one of the temperature control channels for any of the units in use.

3. BO

   "■" is displayed flashing in the column on the right if a burnout alarm (BO) occurs on even one of the temperature control channels for any of the units in use.

   | NOTE |

   The BO alarm occurs if a temperature control chanel meets with all the conditions below when the timer function executed.

   - Operation mode "0: Not used"
   - No connection
   - Timer mode setting "Timer No.: Other than 0"

   Intended not to use, but channel condition is that the timer function can be used.

   This is because the operation mode is changed forcibly to "1: Monitor" at the moment of the timer execution, and unconnected channels are recognized as burnout. Therefore, be sure for all the unused temperature control channels to set the "Timer No.: 0 (not used)".

4. HBA

   "■" is displayed flashing in the column on the right if a heater break alarm (HBA) occurs on even one of the temperature control channels for any of the units in use.

5. LBA

   "■" is displayed flashing in the column on the right if a control loop break alarm (LBA) occurs on even one of the temperature control channels for any of the units in use.

6. T.R.C (Temperature rise complete)

   "■" is displayed flashing in the column on the right if the temperature rise is complete for any of the units in use.

7. TI AL1

   "■" is displayed flashing in the column on the right if even one TI No. 1 alarm (TI AL1) occurs among the TI channels for any of the units in use.

8. TI AL2

   "■" is displayed flashing in the column on the right if even one TI No. 2 alarm (TI AL2) occurs among the TI channels for any of the units in use.

9. TI BO

   "■" is displayed flashing in the column on the right if a burnout alarm occurs on even one of the TI channels among all the units in use.

10. AI AL1

"■" is displayed flashing in the column on the right if even one AI No. 1 alarm (AL1) occurs among the analog input channels for any of the units in use.

11. AI AL2

"■" is displayed flashing in the column on the right if even one AI No. 2 alarm (AL2) occurs among the analog input channels for any of the units in use.

(2) System alarms

1. ROM error

"■" is displayed flashing in the column on the right if an operation panel (OPC-H) ROM reading error occurs.

2. RAM Backup error

"■" is displayed flashing in the column on the right if an operation panel (OPC-H) RAM reading/writing error occurs.

3. Mem. card data error

"■" is displayed flashing in the column on the right if the power goes off during process file transfer.

4. Calendar timer error

"■" is displayed flashing in the column on the right if a calendar timer power or hardware error occurs.

(3) SRM communications (control unit communications)

1. Parity error

"■" is displayed flashing in the column on the right if a parity error occurs during communications with a control unit.

2. Framing error

"■" is displayed flashing in the column on the right if a framing error occurs during communications with a control unit.

3. Over-run error

"■" is displayed flashing in the column on the right if an overrun error occurs during communications with a control unit.

4. Time-out error

"n" is displayed flashing in the column on the right if there was no response and communications with a control unit timed out.

(4) Memory card communications

1. Parity error

   "■" is displayed flashing in the column on the right if a parity error occurs during communications with the memory card unit.

2. Framing error

   "■" is displayed flashing in the column on the right if a framing error occurs during communications with the memory card unit.

3. Over-run error

   "■" is displayed flashing in the column on the right if an overrun error occurs during communications with the memory card unit.

4. Time-out error

   "■" is displayed flashing in the column on the right if there was no response and communications with the memory card unit timed out.

(5) Error codes

If any of the errors below occurs in a control unit, the corresponding error code is displayed for that unit.

   1 : Backup data error
   2 : RAM read/write error
   3 : System configuration error
   4 : Internal communications error
   5 : A/D converter error
   6 : Adjustment data error

   NOTE

   For SRM communications errors and memory card communications errors, after the error is ended and the system returns to normal, the alarm display goes out automatically.

## (6) Precaution when switching power back on

One of the functions of the operation panel (OPC-H) is the "Data Management Selection" function. When the "Data Management Selection" function is being used, observe the following precautions.

When switching the power off then on again in order to end an OPC-H alarm or error, if the Data Management Selection setting is "1 : OPC → Controller", when the power is switched back on, the OPC-H data is transferred to the control units. If the OPC-H data has been destroyed, that destroyed data is transferred to the control units, so beware when switching the power back on.

■ Switching the power back on when the data has been destroyed

If Data Management Selection is set ahead of time to "OPC → Controller", when the power is switched on;

The destroyed OPC-H data is transferred to the control unit and the data before the destruction is erased.
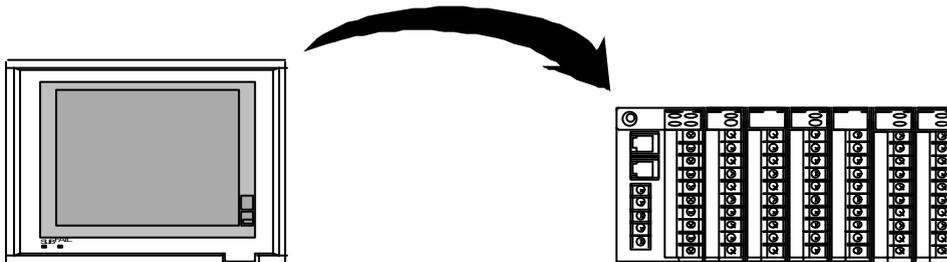
If Data Management Selection is set ahead of time to "Controller → OPC", when the power is switched on;

The data before the destruction is transferred to the OPC-H.
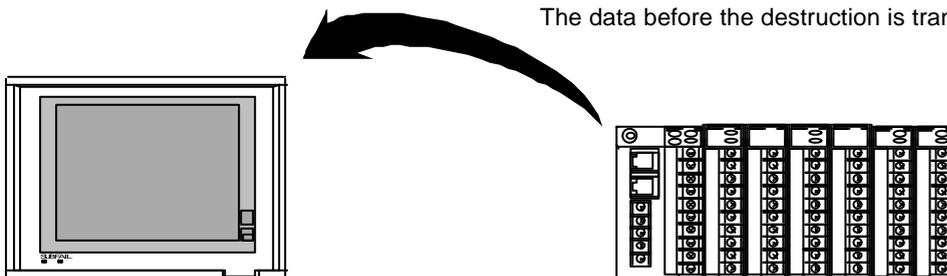
NOTES

● The factory setting is "0 : Controller → OPC".

● "Data Management Selection" set the OPC-H initial setting screen. For detail of the OPC-H initial settings, see **the Operation Panel Screen Operation Manual [IMSRM38-E□]**.

(7) Handling system alarms

1. ROM error, RAM Backup error

   Touch the ┃ **ALM Cancel** ┃ key at the bottom right of the "Alarm Display" screen, then switch off the power. When you switch the power back on, if the '■' has not gone out, it is necessary to replace the ROM, some other part, or the operation panel. Please contact the marketing person you dealt with at RKC, your nearest RKC office, or the agent from which you purchased this product.

2. Calendar timer error

   Touch the ┃ **ALM Cancel** ┃ key at the bottom right of the "Alarm Display" screen, then switch off the power.

   When you switch the power back on, if the '■' has not gone out it is necessary to replace the backup batteries or the operation panel. Please contact the marketing person you dealt with at RKC, your nearest RKC office, or the agent from which you purchased this product.

(8) Handling SRM communications errors

Touch the ┃ **ALM Cancel** ┃ key at the bottom right of the "Alarm Display" screen to put out the '■'. If the '■' is displayed flashing again, take the measures below.

● Check that the communications settings are correct.

● Check that the communications cable connectors are correctly connected.

If this does not solve the problem, please contact the marketing person you dealt with at RKC, your nearest RKC office, or the agent from which you purchased this product.

(9) Handling a memory card communications error

Touch the ┃ **ALM Cancel** ┃ key at the bottom right of the "Alarm Display" screen to put out the '■'. If the '■' is displayed flashing again, take the measures below.

● Check that the communications settings are correct.

● Check that the communications cable connectors are correctly connected.

If this does not solve the problem, please contact the marketing person you dealt with at RKC, your nearest RKC office, or the agent from which you purchased this product.

6.2 Troubleshooting

This section explains how to infer the cause and solve the problem in the unlikely event that an error occurs in this device. For inquiries concerning causes not covered in this section, please note the model name of this device and its specifications, then contact the marketing person you dealt with at RKC, your nearest RKC office, or the agent from which you purchased this product.

If it is necessary to replace a device, always strictly observe the warnings below.

⚠ **WARNING**

- In order to prevent electric shock or instrument failure, always turn off the system power before replacing the instrument.

- In order to prevent electric shock or instrument failure, always turn off the power before mounting or removing the operation panel.

- In order to prevent electric shock or instrument failure, do not turn on the power until all the wiring is finished.

- In order to prevent electric shock or instrument failure, do not touch the insides of operation panel or connector pins.

- Have all wiring performed by personnel who have been educated in the necessary basics of electricity and who are experienced in such field work.

CAUTION

When replacing a module, always replace with the same model module. Also, if you replace a module with one of a different type, it is necessary to carry out such operations as module initialization, so please contact the marketing person you dealt with at RKC, your nearest RKC office, or the agent from which you purchased this product.

NOTE

For details on operation panel and module replacement methods, see **"6.3 Replacement Methods"** (Page 6-16) or the separate **SR Mini HG Hardware Instruction Manual**.

(1) Operation panel related

Symptom	Probable cause	Solution
Power lamp does not light up (SUB output display lamp does not light up green)	Power not being supplied	Check external breaker etc.
	Appropriate power supply voltage not being supplied	Check the power supply.
	Power supply terminal contact defect	Retighten the terminals.
	Power supply section defect	Replace the operation panel.
Screen display abnormality	Noise generating source nearby	Separate the operation panel and the noise generating source.
	Appropriate power supply voltage not being supplied	Check the power supply specifications.
Screen not displayed	The DISPLAY ON/OFF switch is OFF.	Press the switch ON.
	LCD backlight defect	Replace the operation panel.
None of the control units operate.	Modules not initialized	Execute "Module Initialization"
Specific channel does not work Specific control output does not work Specific alarm does not work Specific measurement not displayed	The operations mode switching specification is not set correctly.	Switch the operations mode.
	Module defect	Replace the module.
	Modules not initialized	Execute "Module Initialization"
Touch switches on screen do not work	Computer mode	Switch to Local mode.
	Touch switch defect	Replace the operation panel.
Error message displayed	See 6.1 Alarm Didplay Screen.	

(2) Control unit related

1. PCP module related

Symptom	Probable cause	Solution
RUN lamp does not light up	Power not being supplied	Check external breaker etc.
	Appropriate power supply voltage not being supplied	Check the power supply.
	Power supply terminal contact defect	Retighten the terminals.
	Power supply section defect	Replace PCP module.
RUN lamp stays lit	Module out of place	Install back in place
	The module was not initialized after the module configuration was changed	Execute "Module Initialization" or return the configuration to its original specifications.
Data transmission/reception (TX, RX) lamp not lit up	Operation panel or host computer power not on	Check the power.
	OPC-H connection cable disconnected	Inspect cable and replace as necessary
	CPU section defect	Replace PCP module.
DO not output	Output allocation defect	Check the allocation settings.
	Output circuit defect	Replace the PCP module.
FAIL output	PCP module CPU section, power section defect	Replace the PCP module.
FAIL output (but FAIL lamp not lit up) RUN lamp stays on	The module was not initialized after the module configuration was changed	Execute "Module Initialization" or return the configuration to its original specifications.
	Module out of place	Install back in place.

* OPC-H : Operation panel

2. DI, AI, and TI module related

Symptom	Probable cause	Solution
RUN lamp does not flash	Power line defect	Replace mother block.
	Power supply section defect	Replace PCP module.
	CPU section breakdown	Replace module.
RUN lamp stays on.	Module different from system specifications inserted	Replace with module matching specifications.
	Maximum number of linkable units exceeded	Eliminate a module.
FAIL lamp lit up	CPU section breakdown	Replace module.
No inputs change	System set to Not Used mode	Switch to Used mode.
	Main CPU section breakdown	Replace PCP module.
	Bus line defect	Replace mother block.
Specific input value does not change	Sensor cut line	Replace sensor.
	Terminal improperly tightened	Retighten.
	System set to Not Used mode	Switch to Used mode.
	Input circuit, CPU breakdown	Replace module.
Error from certain module on	Head mother block defect in error module	Replace mother block.
	Module connections disconnected	Check connections.

3. TIO, CIO module related

Symptom	Probable cause	Solution
RUN lamp does not flash	Power line defect	Replace mother block.
	Power supply section defect	Replace PCP module.
	CPU section breakdown	Replace module.
RUN lamp stays on.	Module different from system specifications inserted	Replace with module matching specifications.
	Maximum number of linkable units exceeded	Eliminate a module.
FAIL lamp lit up	CPU section breakdown	Replace module.
Specific output not output	Input cut line	Replace sensor.
	External operating device defect	Inspect external operating devices.
	Output section mis-wiring, cut line	Inspect wiring; replace as necessary.
	Terminal screw loose	Retighten.
	Output circuit, CPU breakdown	Replace module.
	Bus line defect	Replace mother block.
No outputs operate	System set to Stop mode	Switch to Start mode.
	System set to Not Used mode	Switch to Used mode.
	Load power not supplied	Supply power.
	Load power supply voltage outside rating	Change to voltage within rating.
	Main CPU section breakdown	Replace PCP module.
	Bus line defect	Replace mother block
Specific output relay does not go off	Output relay contacts stuck	Replace module.
	External operation device recovery defect due to leakage current at surge killer etc.	Reevaluate surge killer; reevaluate external operating device.
	Output circuit, CPU breakdown	Replace TIO module.
No output relays go off	Main CPU section breakdown	Replace PCP module.
ON/OFF with extremely short period	Terminal tightening defect	Tighten more.
	Control period too short	Change period setting.
	Malfunction due to excess noise	Investigate noise filter installation
No input values change	System set to Not Used mode	Switch to Used mode.
	Main CPU section breakdown	Replace PCP module.
	Bus line defect	Replace mother block.
Specific input value does not change	Sensor cut line	Replace sensor.
	Terminal improperly tightened	Retighten.
	System set to Not Used mode	Switch to Used mode.
	Input circuit, CPU breakdown	Replace module.
Error from certain module on	Head mother block defect in error module	Replace mother block.
	Module connections disconnected	Check connections.

Continued on next page.

Symptom	Probable cause	Solution
Control unstable	PID constant values inappropriate	Execute auto-tuning and change the PID constant settings.
	Terminal tightening defect	Tighten more.
	External operating device operation defects	Inspect the external operating device.
	Output circuit, CPU breakdown	Replace the TIO module.
Error from certain module on	Head mother block defect in error module	Replace mother block.
	Module connections disconnected	Check connections.

4. DO, AO module related

Symptom	Probable cause	Solution
RUN lamp does not flash	Power line defect	Replace mother block.
	Power supply section defect	Replace module.
	CPU section breakdown	Replace module.
FAIL lamp lit up	Maximum number of linkable units exceeded	Eliminate a module.
	CPU section breakdown	Replace module.
Specific output not operating (RUN lamp flashing)	External operating device defect	Inspect external operating device
	Output section mis-wiring, cut line	Inspect wiring; replace as necessary.
	Terminal screw loose	Tighten more.
	Output circuit, CPU breakdown	Replace module.
	Bus line defect	Replace mother block.
No outputs operate	Load power not supplied	Supply power.
	Load power supply voltage outside rating	Change to voltage within rating.
	Main CPU section breakdown	Replace PCP module.
	Bus line defect	Replace mother block.
Specific output relay does not go off	Output relay contacts stuck	Replace module.
	External operation device recovery defect due to leakage current at surge killer etc.	Reevaluate surge killer; reevaluate external operating device.
	Output circuit, CPU breakdown	Replace module.
No output relays go off	Main CPU section breakdown	Replace PCP module.
Output chattering ON/OFF with extremely short period	Terminal tightening defect	Tighten more.
ON/OFF with extremely short period	Control period too short	Change period setting
	Malfunction due to excess noise	Investigate noise filter installation
Error from certain module on	Head mother block defect in error module	Replace mother block.
	Module connections disconnected	Check connections.

5. CT module related

| Symptom	Probable cause	Solution
RUN lamp does not flash	Power line defect	Replace mother block.
	Power supply section defect	Replace module.
	CPU section breakdown	Replace module.
FAIL lamp lit up	Module different from system specifications inserted	Replace with module matching specifications.
	Maximum number of linkable units exceeded	Eliminate a module.
	CPU section breakdown	Replace module.
Electrical current read-in value abnormal	CT sensor different from module specifications used	Replace CT sensor.
	Heater cut line	Inspect heater.
	Terminal loose, mis-wiring between channels	Tighten terminals, check wiring.
	Input circuit, CPU breakdown	Replace module.
Error from certain module on	Head mother block defect in error module	Replace mother block.
	Module connections disconnected	Check connections.

6.3 Replacement Method

⚠ **WARNING**

In order to prevent electric shock or instrument failure, always turn off the power before mounting or removing the operation panel.
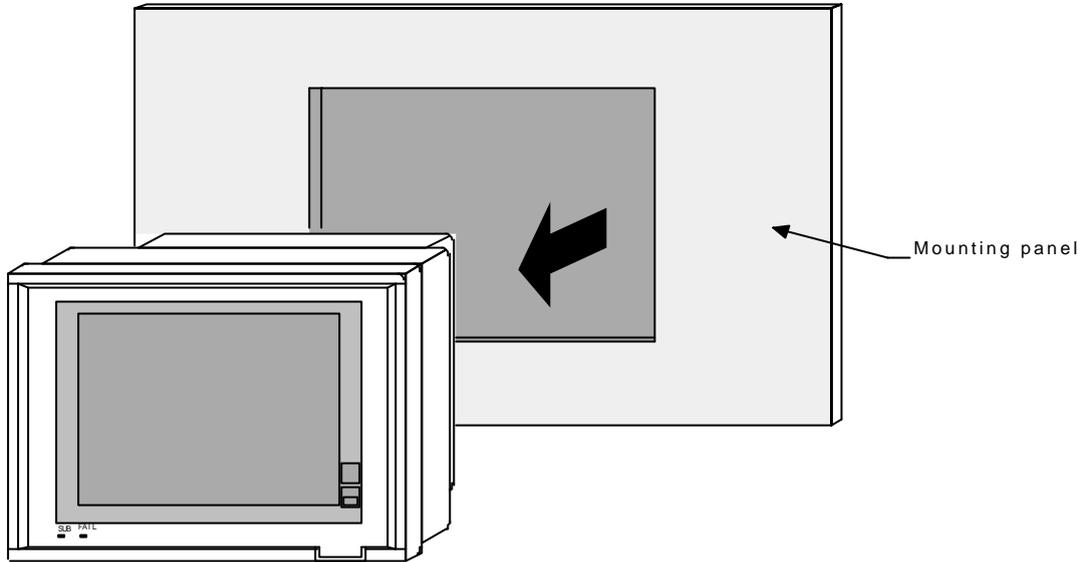
(1) Removal

1. Remove the terminals, modular cable, connectors, etc. from the rear.

   *When removing a connector, observe the cautions in "**2.5 Connections**" (Page 2-14).

2. Remove the mounting brackets.
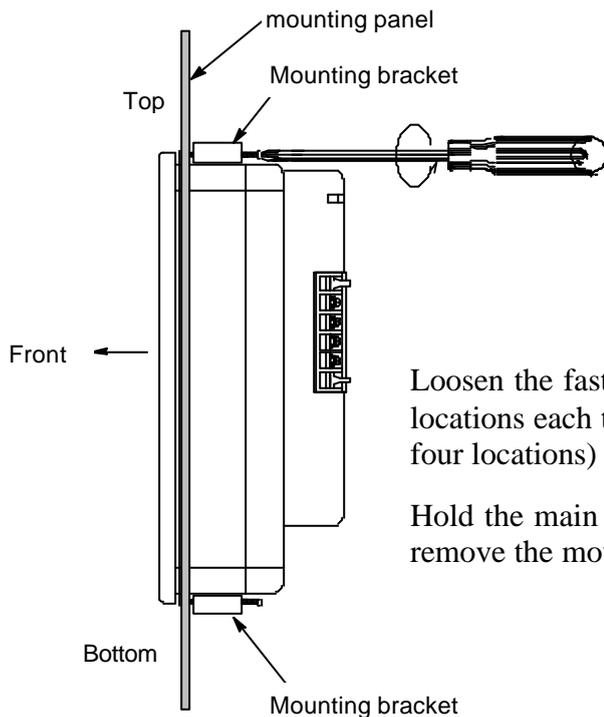
Loosen the fastening screws for the mounting brackets at the two locations each top and bottom on the rear of the main unit (total of four locations) and remove those mounting brackets.

Hold the main unit so that it does not fall out the front when you remove the mounting brackets.

3. Remove the operation panel main unit from the mounting panel.

Mounting panel

(2) Mounting method

Mount the operation panel by reversing the removal procedure.

| CAUTION |

When fastening the operation panel with the mounting brackets, be careful not to tighten excessively. Also, tighten the tightening screws so that the gasket sealing of the main unit front surface panel section and the mounting surface becomes uniform.

● Mount the corrected operation panel.

Mounting panel

Mounting bracket

Top

Front

Dustproof gasket

Bottom

4 mm max.
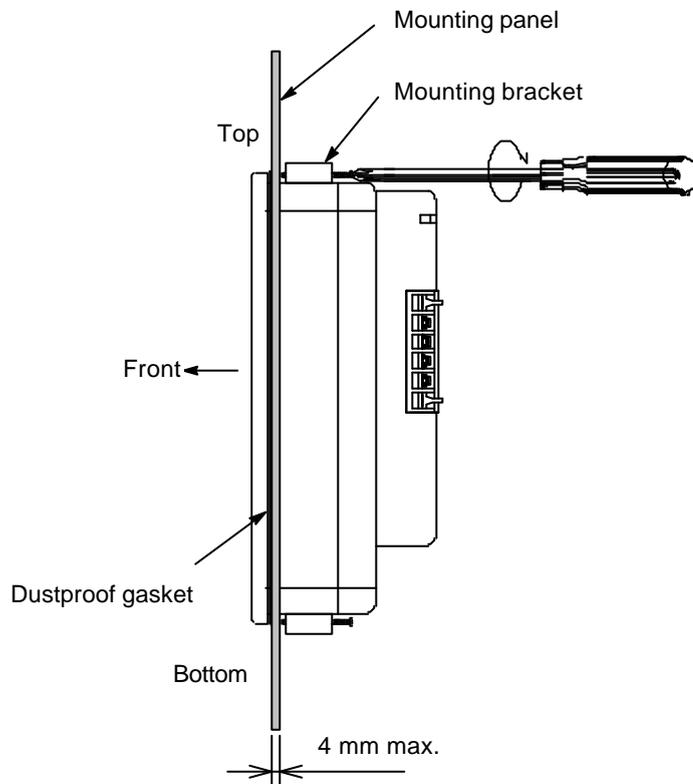
Tightening torque (recommended value) : 0.3 to 0.5 N·m (3 to 5 kgf·cm)

SPECIFICATIONS

7

7.1 Display Specifications

(1) Display method

TFT color LCD

(2) Number of dots

640 (W) × 480 (H) dots

(3) Effective display surface area

211 (W) ×158 (H) mm

(4) Display colors

16 colors: Black, blue, red, purple, green, cyan, yellow, white, gray, indigo, light brown, light purple, forest green, light blue, light green, silver gray

(5) Display characters

- Half-size (1-byte) characters: 80 characters × 24 lines
- Full-size (2-byte) characters: 40 characters ×24 lines

(6) Character sizes

- Half-size (1-byte) characters: 8 × 16 dots
- Full-size (2-byte) characters: 16 ×16 dots
- Double-size characters: 32 × 32 dots
- Character characters: 8 ×8 dots

(7) Figure drawing

Straight lines, circles, arcs, fan shape, rectangles, painting, etc.

(8) Character types

ANK codes

(9) Display contents

- Control unit measurement values, setting values, switches, etc.
- PLC data

(10) LED display

- SUB output display lamp (SUB): Green/red LED (lit up green when power switched on, lit up red only when alarm occurs or temperature rise completed)
- FAIL output display lamp (FAIL): Red LED (lit up for error)

7.2 Settings Specifications

(1) Setting method

Interactive settings using front touch panel keys

(2) Settings contents
- Control unit settings
- Mode switching settings
- Initial settings
- Settings for other functions

(3) Number of keys
- In display area (transparent section): 500 maximum
- Outside display area (direct keys): 7 (including protection removal switch)

(4) Key types
- In display area (transparent section): Screen switching, data setting, mode switching keys etc.
- Outside display area (direct keys): PRINT SCREEN, DISPLAY ON/OFF

7.3 Output Specifications

(1) SUB outputs
- Outputs: 2
- Output type: Open collector output
- Output rating: 24 V DC, 50 mA max. (resistance load)

(2) FAIL output
- Output: 1
- Output type: Open collector output
- Output rating: 24 V DC, 50 mA max. (resistance load)

7.4 Control Unit Communications Specifications

(1) Communications interface

EIA standard RS-422A

(2) Communications protocol

ANSI X3.28 subcategory 2.5 B1

(3) Connection method

4-line multidrop connections (RS-422A)

(4) Synchronization method

Start/stop synchronization

(5) Communications speed

2400 bps, 4800 bps, 9600 bps, 19200 bps

(6) Data format

- Start bit: 1
- Data bits: 7 or 8
- Parity: No or yes (when yes, odd or even)
- Stop bits: 1 or 2

(7) Connected modules

- H-PCP-A, B: 1/unit
- H-TIO-A, B, C, D, E, F, G, H, J, K, P, R: 10/unit
- H-TI-A, B, C: 5/unit
- H-CIO-A: 5/unit
- H-DO-A, B, C, D: 5/unit
- H-CT-A: 5/unit
- H-AI-A, B: 10/unit
- H-AO-A, B: 5/unit
- H-DI-A: 1/unit

(8) Maximum number of modules per unit

10/unit

(9) Maximum number connected

8 units

(10) Communications codes

JIS (ASCII) 7 bit codes

7.5 Function Specifications

(1) Self-diagnostics functions

- Check items:
  1. Sub-board errors
  2. CPU section power supply monitoring (reset)
  3. Watchdog timer
- Display for errors:
  FAIL LED lamp lights up
  Other displays go out
- FAIL output:
  1. Outputs : 1
  2. Output type : Open collector output
  3. Output ratings : 24 V DC, 50 mA max.

(2) Name setting functions

- Alarm message setting:
  Number of characters = 32 half-size (1-byte) characters
  With the SR Mini HG System, "Alarm Message" is displayed when an alarm occurs and the contents of the message can be set.
- Unit names:
  Characters = 8 half-size (1-byte) characters
  Unit names can be set
- Channel names:
  Characters = 8 half-size (1-byte) characters
  Channel names can be set.
- Memory area names:
  Characters = 12 half-size (1-byte) characters
  Memory area names can be set

(3) Setting value management functions

- Selection item:
  Management method selected for when power switched on
- Setting method:
  Set with screen

(4) Screen scan functions

- Applicable screens:
  Operations monitor screen scanned automatically
- Setting method:
  Set with screen
- Setting items:
  Screen scanning function on/off selection
  Screen scanning time: 10 to 9999 seconds

(5) Screen saver functions (screen automatic off)

- Applicable screens:
  All screens
- Setting method:
  Set with screen
- Setting items:
  Screen saver function on/off selection
  Screen saver time: 1 to 99 minutes

(6) Calendar functions
- Display: Western (Gregorian) calendar year, month, day, day of the week, hour, minute display
- Setting method: Time set with screen
- Precision: Within ± 4 seconds per day

(7) Control unit error monitor function
- Monitor items: Monitors for communication stoppage
- Display for errors: Error message displayed on screen

(8) Timer functions
- Operations: Control start/stop and memory area No. setting for the SR Mini HG System is carried out according to the timer.
- Setting method: Set with screen
- Setting items:
  1. Timer functions: Not used, specified day, weekly, or daily selected
  2. Month and day: Sets the month and day (valid when timer function set for specific day)
  3. Day of week: Sets the day of the week (valid when timer function set for weekly)
  4. Block: Selects from three types of setting times
  5. Start/stop time: Sets the hour and minute and ON/OFF
  6. Timer block: Selects the block No. and memory area No. for each unit

(9) Alarm functions
- Alarm types:
  1. Temperature control alarm
  2. AI alarm
  3. System alarm: Self-diagnostics results, communications errors, printer errors, etc.

(10) Alarm recording functions
- Contents of function: Records the alarm item, month, day, hour, minute, and number of times generated
- Items that can be recorded:
  1. Alarm type
  2. Unit number
  3. Channel number
  4. Channel name
  5. Alarm item
  6. Date and time of occurrence
  7. Number of times occurred
- Item recording count: Up to 20 items
- Number of times recording count: 1 to 255 times
- Processing when more than 20 alarm items occur: Oldest data replaced with newest
  Recording stopped
  *Select one or the other.

(11) PLC communications

- Communications standards: 1. EIA RS-232C

  2. EIA RS-422A

  3. EIA RS-485

- Communications protocol: Special protocol supported by the PLC manufacturer

- Communications type: 1. RS-232C: Point-to-point connections

  2. RS-422A: 4-wire type multi-drop connections

  3. RS-485: 2-wire type multi-drop connections

- Synchronization method: Start-stop synchronization

- Communication speed: 2400 bps, 4800 bps, 9600 bps, 19200 bps

- Data format: 1. Start bit: 1

  2. Data bits: 7 or 8

  3. Parity bit: No or yes (odd or even)

  4. Stop bit: 1 or 2

- Communication codes: JIS (ASCII) codes

- PLC types: 1. MITSUBISHI (AnA/AnN/AnU, QnA, CPU ports, FX, Net10)

  2. OMRON

  3. SHARP
     (JW series, JW70HCOM, JW20COM, JW-32CUH/33CUH)

  4. HITACHI (HIDIC H series, HIDIC-S10Xa)

  5. MATSUSHITA

  6. YOKOGAWA (FA500, FA-M3)

  7. YASKAWA

  8. TOYOPUC

  9. FUJI (MICREX-F series, FLEX-PC series,
         FLEX-PC CPU port, NJ computer link)

  10. KOYO (SU-5/6, SG-8, SR-T)

  11. Allen-Bradley (PLC5, SLC500)

  12. GE Fanuc

  13. TOSHIBA (T series)

  14. SIEMENS (S5, TI545/555)

  15. SHINKO (SELMART-100 or later series)

  16. SAMSUNG (SPC series)

  17. KEYENCE (KZ series)

  18. LG (K10/60/200, K500/1000)

  19. FANUC

(12) Printer

- Interface: Centronics interface

                                   1. PC-PR201 series

                                   2. EPSON ESC/P series   * Either one can be selected.

- Ledger types: Fixed formats: 12
- Page count: Maximum 256 pages/ledger
- Contents of printing: Monitor values, setting values, alarm records, etc.
- Printing method: Key input, specified time interval printing, specified time printing, printing when alarm occurs
- Specified time interval printing:

                                   1.Time settings: 1

                                   2.Time setting range: 1 to 240 minutes (in units of 1 minute)

- Specified time printing: 1. Time settings: 8 maximum

                                   2. Time setting range: 00:00 to 23:59

- Print screen: Prints screen being displayed

7.6 Option Functions Specifications

(1) Host computer communications

- Communications standards: 1. EIA RS-232C

    2. EIA RS-422A

    3. EIA RS-485 * One must be specified when the order is placed.

- Communications protocol: PLC data

    Special protocol supported by the PLC manufacturer

    Other data : ANSI X3.28 subcategory 2.5 B1

- Connection method: 1. RS232C: Point-to-point connections

    2. RS-422A: 4-wire multi-drop connections

    3. RS-485: 2-wire multi-drop connections

- Synchronization method: Start/stop synchronization
- Communication speed: 2400 bps, 4800 bps, 9600 bps, 19200 bps
- Data format: 1. Start bit: 1

    2. Data bits: 7 or 8

    3. Parity bit: No or yes (odd or even)

    4. Stop bit: 1 or 2

- Communications codes: JIS (ASCII) codes

(2) External storage (memory card) function

- Target memory: 1. Process file data   *Including PLC data

    2. All settings data

- File count: Process file data: 80 files maximum

    All settings data: 1 file

    *Storing process file data and all settings data requires separate memory cards.

- Memory card types: JEIDA 4.1

    SRAM cards: 256K, 512K, 1M bytes

    *Backed up with lithium battery

    *Only SRAM cards with "card attribute information (device information table, device size)" can be used.

- File operations: 1. Batch operation   6. File name setting

    2. Batch setting   7. Attribute changing

    3. File copy

    4. File deletion

    5. Data browsing

7.7 General Specifications

(1) Power supply voltage

85 to 265 V AC (for both 50 and 60 Hz)

*Note that these figures include the power supply voltage fluctuation.
(Rating : 100 to 240 V AC)

(2) Power consumption

50 VA max.

(3) Insulation resistance

Between power terminal and ground terminal: 20 MΩ min. at 500 V DC

(4) Withstand voltage

Between power terminal and ground terminal: 1500 V AC for 1 minute

(5) Data storage function

● Data protection: Backup with lithium battery
● Battery service life: About 10 years (cumulative time with main power off)

   *However, this service life depends on the product storage duration, storage environment, and usage environment.

(6) Withstand noise

1500 Vp-p   *With noise simulator with pulse width of 1 μ and 50 ns and startup of 1 ns

(7) Mounting method

Panel mounting

(8) Dust proofing, splashproofing

IP65   *However this only applies to front surface with operation panel mounted on the mounting panel.

(9) Weight

Approx. 3.0 kg

(10) External dimensions

240 (H) ×328 (W) ×97 (D) mm

7.8 Usage Environment Conditions

(1) Permitted ambient temperature

0 to 50 °C

(2) Permitted ambient humidity

45 to 85 % relative humidity (no condensation allowed)

(3) Usage atmosphere

There must be no corrosive gas and dust must not be excessive.

(4) Ground

Grounding resistance of 100 Ω or less

MEMO

RKC®

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