PROFIBUS Communication Converter

COM-G

[For SR Mini HG SYSTEM]

Instruction Manual

RKC® RKC INSTRUMENT INC.

IMS01H02-E2

- SIMATIC® is registered trademarks of SIEMENS AG.
- Company names and product names used in this manual are the trademarks or registered trademarks of the respective companies.

Thank you for purchasing this RKC product. In order to achieve maximum performance and ensure proper operation of your new instrument, carefully read all the instructions in this manual. Please place the manual in a convenient location for easy reference.

SYMBOLS

WARNING : This mark indicates precautions that must be taken if there is danger of electric shock, fire, etc., which could result in loss of life or injury.

CAUTION : This mark indicates that if these precautions and operating procedures are not taken, damage to the instrument may result.

 : This mark indicates that all precautions should be taken for safe usage.

 : This mark indicates important information on installation, handling and operating procedures.

 : This mark indicates supplemental information on installation, handling and operating procedures.

 : This mark indicates where additional information may be located.

⚠ WARNING

- An external protection device must be installed if failure of this instrument could result in damage to the instrument, equipment or injury to personnel.
- All wiring must be completed before power is turned on to prevent electric shock, fire or damage to instrument and equipment.
- This instrument must be used in accordance with the specifications to prevent fire or damage to instrument and equipment.
- This instrument is not intended for use in locations subject to flammable or explosive gases.
- Do not touch high-voltage connections such as power supply terminals, etc. to avoid electric shock.
- RKC is not responsible if this instrument is repaired, modified or disassembled by other than factory-approved personnel. Malfunction can occur and warranty is void under these conditions.

CAUTION

- This product is intended for use with industrial machines, test and measuring equipment. (It is not designed for use with medical equipment and nuclear energy.)
- This is a Class A instrument. In a domestic environment, this instrument may cause radio interference, in which case the user may be required to take additional measures.
- This instrument is protected from electric shock by reinforced insulation. Provide reinforced insulation between the wire for the input signal and the wires for instrument power supply, source of power and loads.
- Be sure to provide an appropriate surge control circuit respectively for the following:
  - If input/output or signal lines within the building are longer than 30 meters.
  - If input/output or signal lines leave the building, regardless the length.
- This instrument is designed for installation in an enclosed instrumentation panel. All high-voltage connections such as power supply terminals must be enclosed in the instrumentation panel to avoid electric shock by operating personnel.
- All precautions described in this manual should be taken to avoid damage to the instrument or equipment.
- All wiring must be in accordance with local codes and regulations.
- All wiring must be completed before power is turned on to prevent electric shock, instrument failure, or incorrect action.
  The power must be turned off before repairing work for input break and output failure including replacement of sensor, contactor or SSR, and all wiring must be completed before power is turned on again.
- To prevent instrument damage or failure, protect the power line and the input/output lines from high currents with a protection device such as fuse, circuit breaker, etc.
- Prevent metal fragments or lead wire scraps from falling inside instrument case to avoid electric shock, fire or malfunction.
- Tighten each terminal screw to the specified torque found in the manual to avoid electric shock, fire or malfunction.
- For proper operation of this instrument, provide adequate ventilation for heat dispensation.
- Do not connect wires to unused terminals as this will interfere with proper operation of the instrument.
- Turn off the power supply before cleaning the instrument.
- Do not use a volatile solvent such as paint thinner to clean the instrument. Deformation or discoloration will occur. Use a soft, dry cloth to remove stains from the instrument.
- To avoid damage to instrument display, do not rub with an abrasive material or push front panel with a hard object.
- Do not connect modular connectors to telephone line.
- When high alarm with hold action/re-hold action is used for Alarm function, alarm does not turn on while hold action is in operation. Take measures to prevent overheating which may occur if the control device fails.

NOTICE

- This manual assumes that the reader has a fundamental knowledge of the principles of electricity, process control, computer technology and communications.
- The figures, diagrams and numeric values used in this manual are only for purpose of illustration.
- RKC is not responsible for any damage or injury that is caused as a result of using this instrument, instrument failure or indirect damage.
- RKC is not responsible for any damage and/or injury resulting from the use of instruments made by imitating this instrument.
- Periodic maintenance is required for safe and proper operation of this instrument. Some components have a limited service life, or characteristics that change over time.
- Every effort has been made to ensure accuracy of all information contained herein. RKC makes no warranty expressed or implied, with respect to the accuracy of the information. The information in this manual is subject to change without prior notice.
- No portion of this document may be reprinted, modified, copied, transmitted, digitized, stored, processed or retrieved through any mechanical, electronic, optical or other means without prior written approval from RKC.

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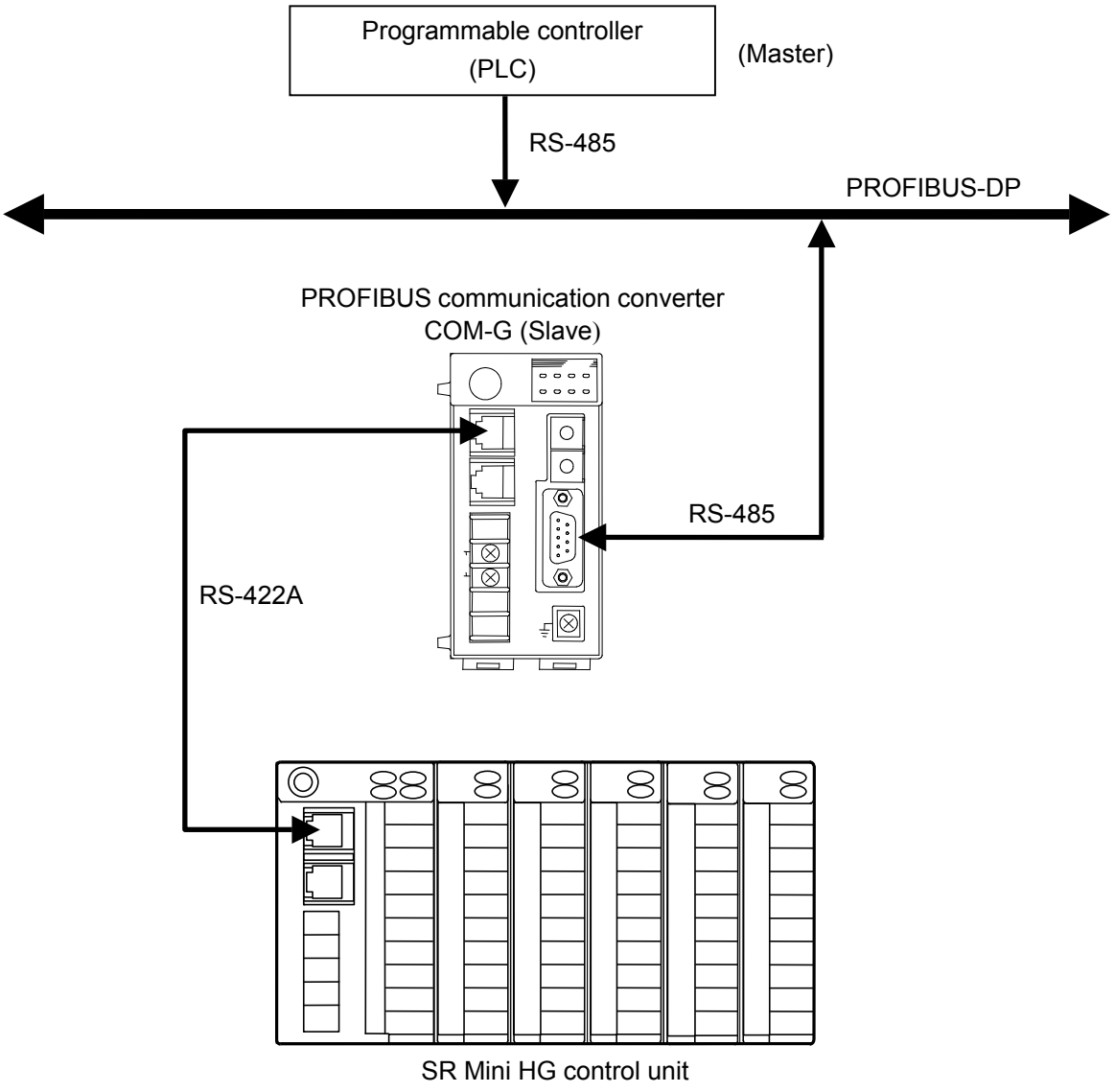
1. OUTLINE

This manual describes the specifications, mounting, wiring, setting of switch and data instructions for the **COM-G**.

1.1 Product Outline

PROFIBUS communication converter COM-G-□-10 (hereafter called COM-G) is communication converter to connect the RKC multi-point control system SR Mini HG SYSTEM (hereafter called SR Mini HG) to a programmable controller (hereafter called PLC) for PROFIBUS.
The COM-G uses the PROFIBUS-DP protocol. This protocol consists of a master and slaves, and the master side corresponds to the PLCs while the slave side corresponds to the COM-Gs.



System configuration example

■ Communication port

COM-G has the following two types of communication ports.

● PLC communication port (COM. PORT3)

This is a port to be connected to the PLC with PROFIBUS.

☞ For the specification of connecting the PLC, refer to the instruction manual for the used PLC.

☞ For PROFIBUS, refer to the home page of PROFIBUS International.
URL: http://www.profibus.com/

● SR Mini HG communication port (COM. PORT1)

This is RKC communication port used in the SR Mini HG.
One SR Mini HG control unit can be connected for one COM-G.

■ Connectable module of SR Mini HG

Modules (names/model codes) that can be configured by the SR Mini HG to be connected to the COM-G are as follows.

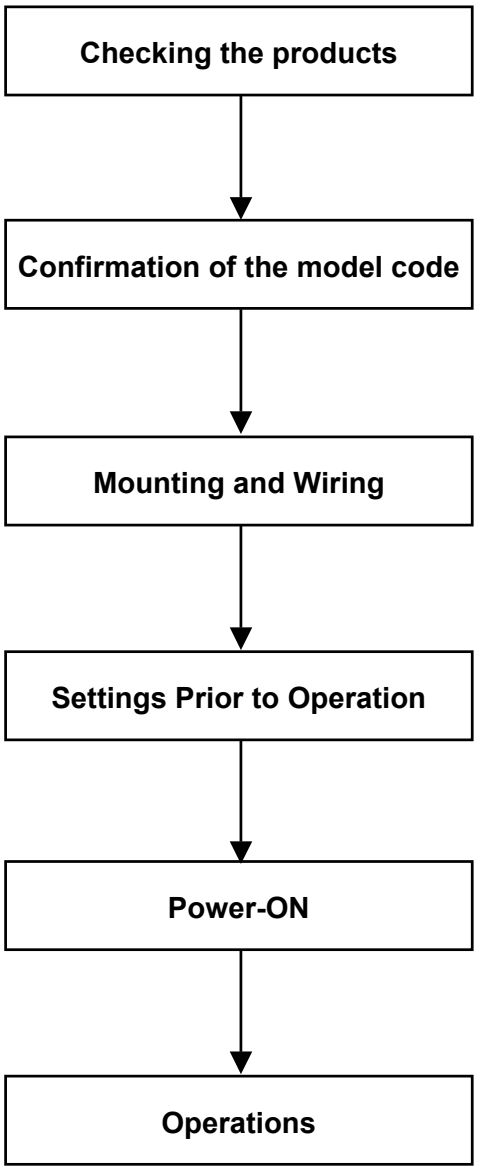
- Power supply/CPU module: H-PCP-A, H-PCP-B, H-PCP-J
  (The SR Mini HG can be connected to the COM-G only when RS-422A is a communication interface.)
- Temperature control module: H-TIO-A, H-TIO-B, H-TIO-C, H-TIO-D, H-TIO-E, H-TIO-F, H-TIO-G, H-TIO-H, H-TIO-J, H-TIO-P, H-TIO-R
- Cascade control module: H-CIO-A
- Temperature input module: H-TI-A, H-TI-B, H-TI-C
- Position proportioning control module: H-TIO-K
- Current transformer input module: H-CT-A
- Digital input module: H-DI-A, H-DI-B
- Digital output module: H-DO-A, H-DO-B, H-DO-C, H-DO-D, H-DO-G *
- Analog input module: H-AI-A, H-AI-B
- Analog output module: H-AO-A, H-AO-B
- Speed control module: H-SIO-A *

* The H-SIO-A and H-DO-G can be used only when the Power supply/CPU module is the H-PCP-J.

☞ For the SR Mini HG module configuration method, refer to **SR Mini HG SYSTEM Hardware Quick Manual (IMS01V01-E□)**, **SR Mini HG SYSTEM Hardware Instruction Manual (IMSRM15-E□)** or **Power supply/CPU module H-PCP-J Instruction Manual (IMS01J01-E□)**.

1.2 Handling Procedures

Conduct handling according to the procedure described below.



☞ Refer to **1.3 Checking the Products (P. 4)**
Refer to **1.4 GSD File (P. 4)**

☞ Refer to **1.5 Model Code (P. 5)**

☞ Refer to **3. MOUNTING (P. 10)**
Refer to **4. WIRING (P. 15)**

☞ Refer to **5.1 PROFIBUS Setting (P. 21)**
Refer to **5.2 Controller Communication Setting (P. 22)**
Refer to **6. PROFIBUS COMMUNICATION (P. 25)**
Refer to **7. LIST OF FUNCTION NUMBERS (P. 38)**

☞ Refer to **5.3 Operation Mode**
■ **Test communication mode (P. 24)**

1.3 Checking the Products

When unpacking your new instrument, please confirm that the following products are included. If any of the products are missing, damaged, or if your manual is incomplete, contact your nearest RKC sales office or the agent for replacement.

☐ PROFIBUS communication converter COM-G
(For SR Mini HG SYSTEM) …1

☐ PROFIBUS communication converter COM-G
[For SR Mini HG SYSTEM] Instruction Manual (IMS01H02-E☐) …1

1.4 GSD File

The RKC GSD File Editor (GSD file editor tool for COM-G) and GSD file sample (rkc_05aa.gsd) can be downloaded from the official RKC website:
http://www.rkcinst.com/english/download/field_network.htm.

☞ For GSD file, refer to **6. PROFIBUS COMMUNICATION (P. 25)**.

1.5 Model Code

The model code for the instrument you received is listed below. Please confirm that you have received the correct instrument by checking the nameplate. If the product you received is not the one ordered, contact your RKC sales office or the agent for replacement.

■ PROFIBUS communication converter

COM - G - □ - 10
(1) (2)

(1) Power supply types
1: 100 to 120 V AC
2: 200 to 240 V AC
3: 24 V DC

(2) Corresponding to the RKC controller
10: SR Mini HG

 A model code label is attached to the left side of the COM-G.

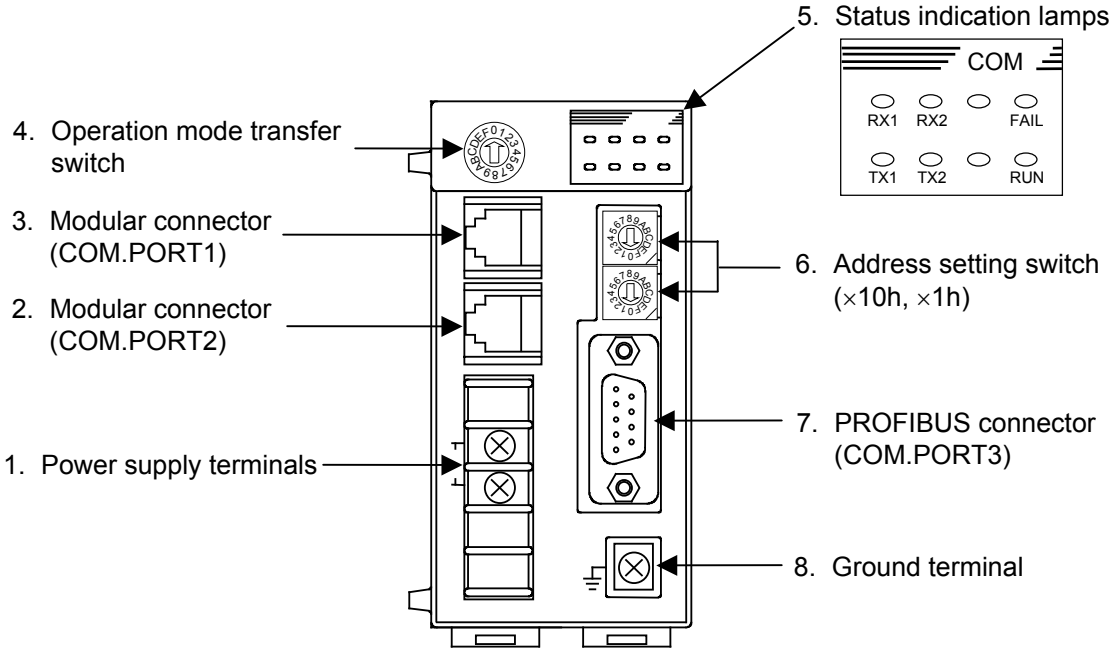
■ Modular connector cables (Sold separately)

W - BF - 02 - □□□□

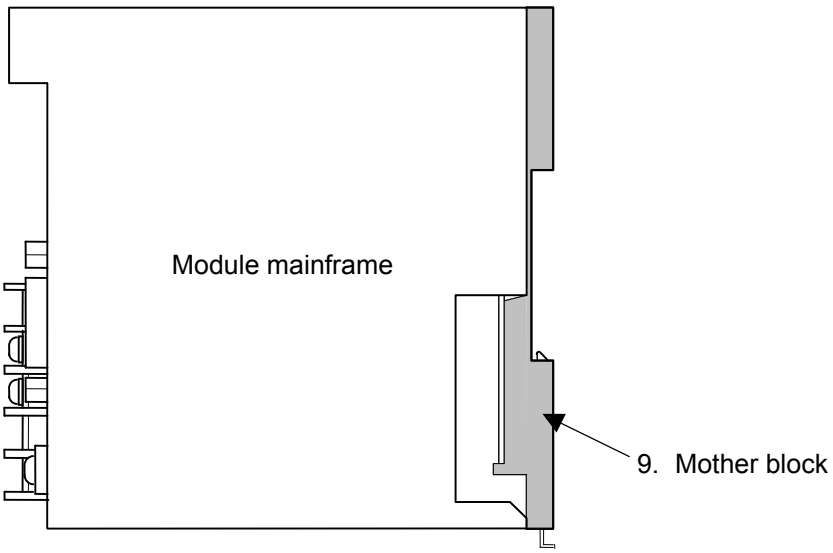
"□□□□" are filled with cable length in millimeters (mm). Please specify the length on your purchasing order. The standard length is "3000."
W-BF-02: Used to connect the SR Mini HG.

 Prepare a connection cable with a connector for the COM-G to be connected to the PLC.

1.6 Parts Description



Front view



Side view

No.	Name	Description
1	Power supply terminals	Terminal for power supply wiring
2	Modular connector (COM.PORT2)	Unused
3	Modular connector (COM.PORT1)	The SR Mini HG communication port (RS-422A)
4	Operation mode transfer switch	Operation mode transfer switch of the COM-G
5	Status indication lamps	RX1 lamp (Yellow): Flashing during the SR Mini HG data is correctly received TX1 lamp (Yellow): Flashing during the SR Mini HG data is correctly sent RX2 lamp (Yellow): Flashing during the PROFIBUS data is correctly received TX2 lamp (Yellow): Flashing during the PROFIBUS data is correctly sent FAIL lamp (Red): OFF during normal operation ON during abnormal operation RUN lamp (Green): Flashing during normal operation ON during abnormal operation
6	Address setting switch (×10h, ×1h)	Set address number of the PROFIBUS Setting range: 00h to FFh Upper-side: High-order digit setting = Set value × 10h Lower-side: Low-order digit setting = Set value × 1h
7	PROFIBUS connector (COM.PORT3)	The communication port for PROFIBUS connection (RS-485)
8	Ground terminal	Terminal for ground wiring
9	Mother block	Module DIN rail mounting connector

2. SPECIFICATIONS

■ PROFIBUS communication

Interface: Based on RS-485, EIA standard

Protocol: PROFIBUS-DP
Correspond to both static data demand and dynamic data demand
(Selected by setting of a GSD file)

Communication speed: 12 Mbps max.
Communication speed is set as follows:
- A master judges the quality situation of a line, and set it automatically.
- Set it with a sequence program of PLC.

■ The SR Mini HG communication

Interface: Based on EIA standard RS-422A

Communication method: 4-wire system, half-duplex multi-drop connection (RS-422A)

Protocol: RKC communication (Based on ANSI X 3.28 subcategories 2.5 and B1)

Synchronous method: Start/stop synchronous type

Communication speed: 9600 bps, 19200 bps (Selectable)
(factory set value: 19200 bps)

Data bit configuration: Start bit: 1
Data bit: 8
Parity bit: Without
Stop bit: 1

Communication code: ASCII 7-bit code

Maximum connections: One SR Mini HG control unit can be connected for one COM-G

Others: Test communication function
Test communication between the COM-G and SR Mini HG which can be conducted by making re-start after the operation mode is changed to the "Test communication mode" by the operation mode transfer switch.

■ Power input

Power supply voltage: 100 to 120 V AC (50/60 Hz), 200 to 240 V AC (50/60 Hz) or 24 V DC
Specify when ordering

Power supply voltage range:
100 to 120 V AC: 90 to 132 V AC
200 to 240 V AC: 180 to 264 V AC
24 V DC: 21.6 to 26.4 V DC

Power consumption:
100 to 120 V AC: 5.0 VA max.
200 to 240 V AC: 9.0 VA max.
24 V DC: 3.0 W max. 0.15 A or less

Surge current: 30 A or less

■ Self-diagnostic

Check item: Power supply monitoring

Action at self-diagnostic error: FAIL lamp ON

■ General specifications

Insulation resistance: Between power and ground terminals: 20 MΩ or more at 500 V DC

Withstand voltage: Between power and ground terminals: 1 minute at 2300 V AC

Withstand noise:
2500 V (peak to peak): AC power
1500 V (peak to peak): DC power
Pulse width: 1 μs
Rise time: 1 ns
By noise simulator

Ambient temperature range: 0 to 50 °C

Ambient humidity range: 20 to 85 %RH (Non condensing)
Absolute humidity: MAX.W.C 29 g/m^3 dry air at 101.3 kPa

Ambient operating atmosphere:
There should be neither corrosive gases nor much dust.

Storage temperature range: –25 to +55 °C

Storage humidity range: 95 % RH or less (Non condensing)

Dimensions: 48 (W) × 96 (H) × 100 (D) mm

Weight: Approx. 300 g

3. MOUNTING

⚠ WARNING

To prevent electric shock or instrument failure, always turn off the power before mounting or removing the instrument.

3.1 Mounting Environment

(1) This instrument is intended to be used under the following environmental conditions. **(IEC61010-1)** [OVERVOLTAGE CATEGORY II, POLLUTION DEGREE 2]

(2) Use this instrument within the following environment conditions:
- Allowable ambient temperature: 0 to 50 °C
- Allowable ambient humidity: 20 to 85 % RH
  (Absolute humidity: MAX.W.C 29 g/m^3 dry air at 101.3 kPa)
- Installation environment conditions: Indoor use
  Altitude up to 2000 m

(3) Avoid the following conditions when selecting the mounting location:
- Rapid changes in ambient temperature which may cause condensation.
- Corrosive or inflammable gases.
- 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.
- Exposure to direct sunlight.
- Excessive heat accumulation.

(4) Mount this instrument in the panel considering the following conditions:
- Ensure at least 50 mm space on top and bottom of the instrument for maintenance and environmental reasons.
- Do not mount this instrument 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 instrument with a forced air fan, cooler, etc. Cooled air should not blow directly on this instrument.
- In order to improve safety and the immunity to withstand noise, mount this instrument as far away as possible from high voltage equipment, power lines, and rotating machinery.

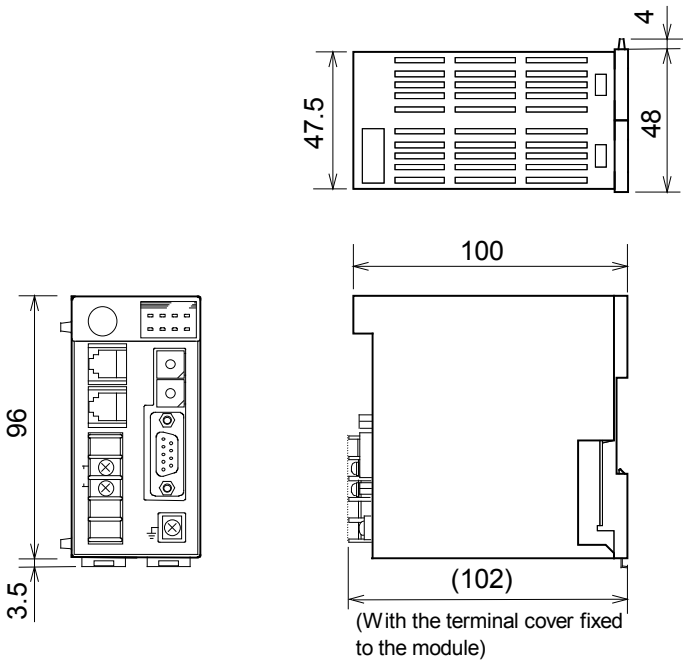
  High voltage equipment: Do not mount within the same panel.
  Power lines: Separate at least 200 mm.
  Rotating machinery: Separate as far as possible.

(5) If this instrument is permanently connected to equipment, it is important to include a switch or circuit-breaker into the installation. This should be in close proximity to the equipment and within easy reach of the operator. It should be marked as the disconnecting device for the equipment.

3.2 Dimensions

■ External dimensions

(Unit: mm)

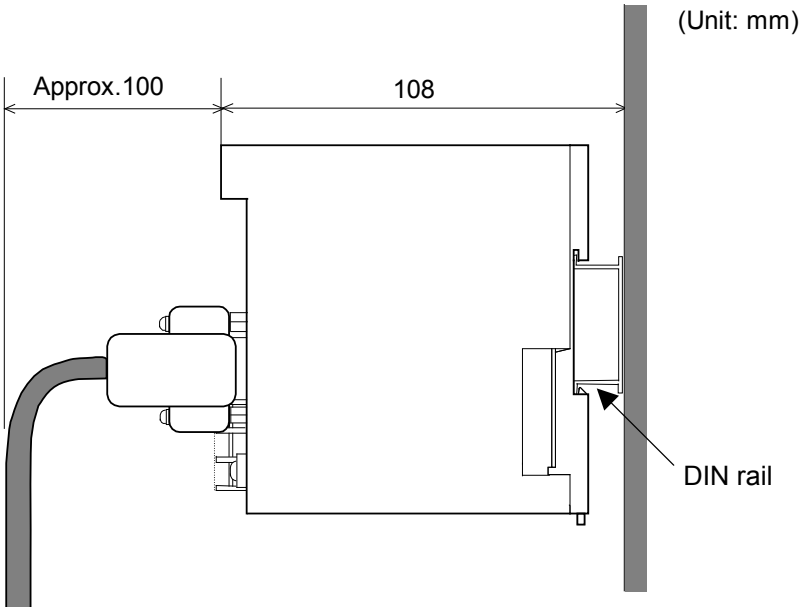


External dimensions

■ Module mounting depth

The mounting depth of each module is 108 mm from the mounting surface inside the panel to the front of the module with the module mounted on the DIN rail. However, when modular connector cables are plugged in, additional depth is required.

(Unit: mm)



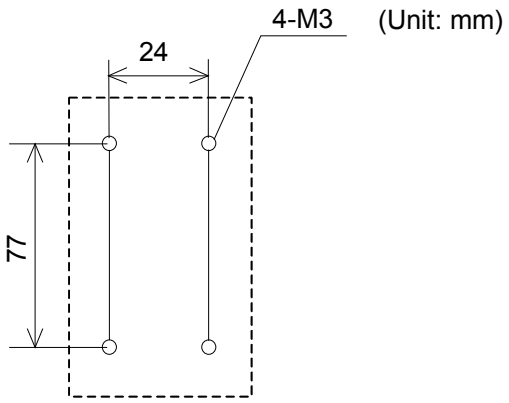
Module mounting depth

3.3 Mounting the Mother Block

The mother block can be mounted to a panel or DIN rail.

■ Panel mounting

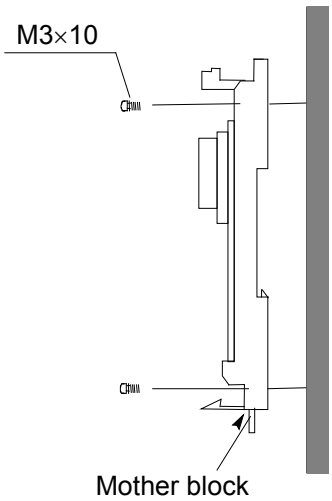
1. Refer to both the panel mounting dimensions below and the external dimensions in previous section when selecting the location.



Mounting dimensions

2. Remove the module from the mother block. For details of removing the module, refer to **3.5 Removing the Module Mainframe (P. 14)**.

3. Connect the mother blocks together before tightening the screws on the panel.
(Customer must provide the set screws)



Recommended tightening torque:
0.3 N·m (3 kgf·cm)

When the mother block is mounted on the panel, 50 mm or more space is required at the top and bottom of the mother block to attach the module mainframe.

Panel mounting

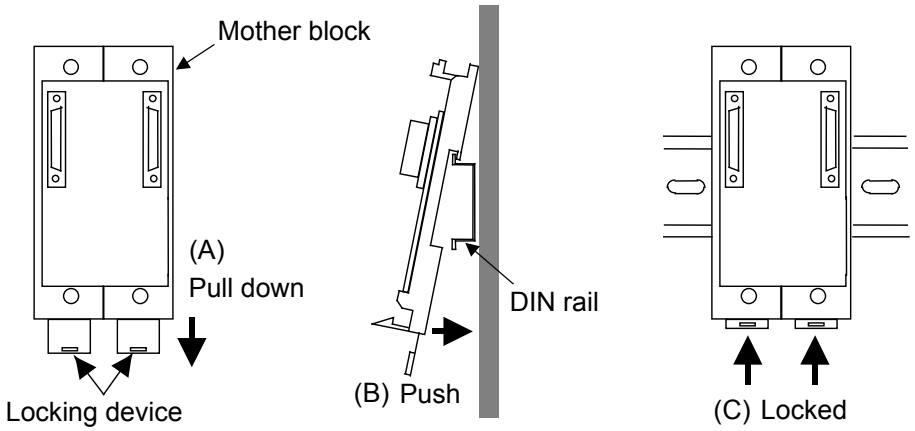
■ DIN rail mounting

1. Remove the module mainframe from the mother block. For details of removing the module mainframe, refer to **3.5 Removing the Module Mainframe (P. 14)**.

2. Pull down both locking devices at the bottom of the mother block. (A)

3. Attach the top bracket of the mother block to the DIN rail and push the lower section into place on the DIN rail. (B)

4. Slide the locking devices up to secure the mother block to the DIN rail. (C)



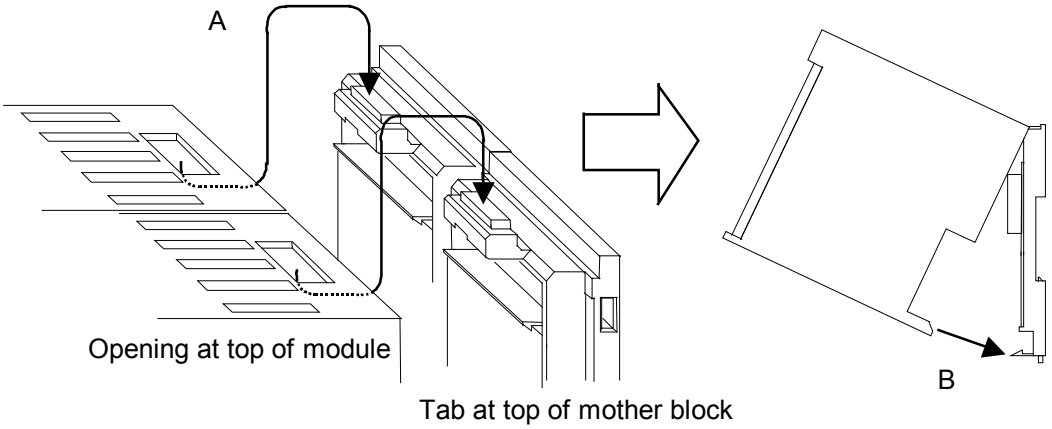
Mounting the mother block

When the mother block is mounted on panel, 50 mm or more space is required at the top and bottom of the mother block to attach the module mainframe.

3.4 Mounting the Module Mainframe

1. Place the module mainframe opening on top of the mother block tab. (A)

2. Snap the lower part of module mainframe on to the mother block. (B)

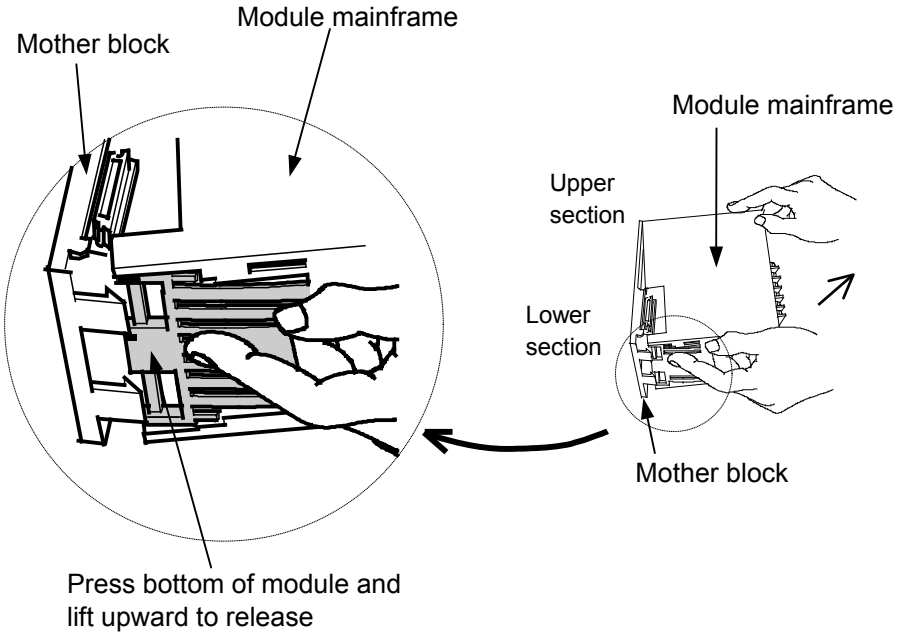


Module mounting

A snapping sound will be heard when module mainframe is securely connected to mother block.

3.5 Removing the Module Mainframe

To separate the module mainframe from the mother block, press the bottom on the module, lifting upward, to release connection.



Removing the Module

4. WIRING

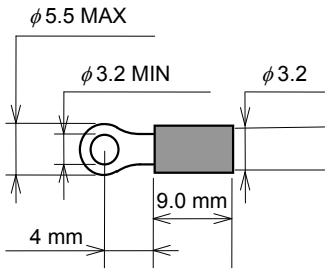
4.1 Wiring Cautions

⚠ WARNING

To prevent electric shock or instrument failure, do not turn on the power until all wiring is completed. Make sure that the wiring is correct before applying power to the instrument.

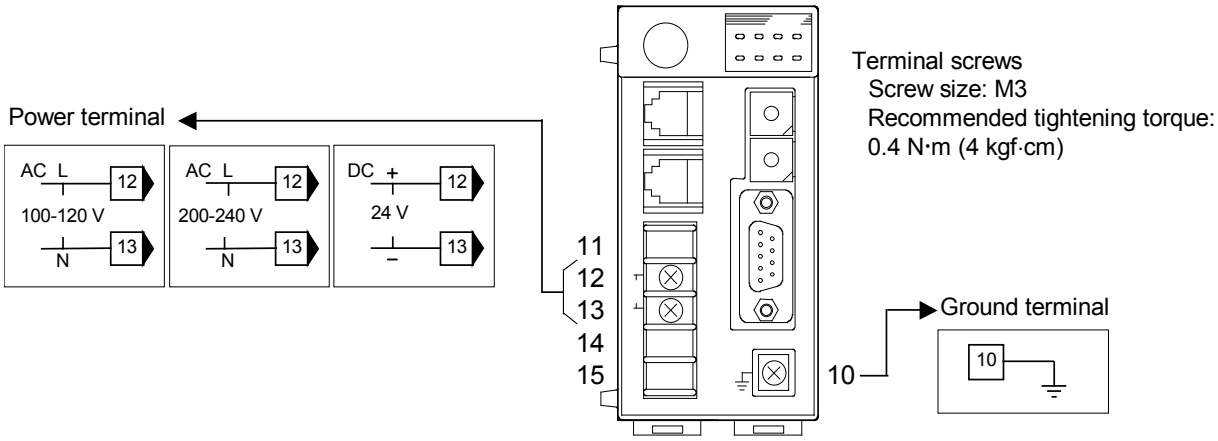
- To avoid noise induction, keep communication signal wires away from instrument power line, load lines and power lines of other electric equipment.
- If there is electrical noise in the vicinity of the instrument that could affect operation, use a noise filter.
  - Shorten the distance between the twisted power supply wire pitches to achieve the most effective noise reduction.
  - Always install the noise filter on a grounded panel. Minimize the wiring distance between the noise filter output and the instrument power supply terminals to achieve the most effective noise reduction.
  - Do not connect fuses or switches to the noise filter output wiring as this will reduce the effectiveness of the noise filter.
- Power supply wiring must be twisted and have a low voltage drop.
- For an instrument with 24 V power supply, supply power from a SELV circuit.
- A suitable power supply should be considered in end-use equipment. The power supply must be in compliance with a limited-energy circuits (maximum available current of 8 A).
- Ground the instrument separately from other equipment. The grounding resistance should be 100 Ω or less. Use grounding wires with a cross section area of 2.0 mm^2 or more.
- Use the specified solderless terminals. Only these specified solderless terminals can be used due to the insulation between the terminals.

  Screw Size: M3 × 7
  Recommended tightening torque:
  0.4 N·m (4 kgf·cm)
  Applicable wire: Solid/Twisted wire of 0.25 to 1.65 mm^2
  Specified solderless terminals:
  Manufactured by J.S.T MFG CO., LTD.
  Circular terminal with isolation V1.25–MS3
  (M3 screw, width 5.5 mm, hole diameter 3.2 mm)



- Make sure that the any wiring such as solderless terminal is not in contact with the adjoining terminals.

4.2 Terminal Configuration



Power supply/ground wiring

- **Power supply**

90 to 132 V AC Including power supply voltage variations
(Rating: 100 to 120 V AC, Single phase 50/60 Hz)
180 to 264 V AC Including power supply voltage variations
(Rating: 200 to 240 V AC, Single phase 50/60 Hz)
21.6 to 26.4 V DC Including power supply voltage variations
(Rating: 24 V DC)
Specify when ordering

- **Ground**

Ground the instrument separately from other equipment. The grounding resistance should be 100 Ω or less. Use grounding wires with a cross section area of 2.0 mm^2 or more.

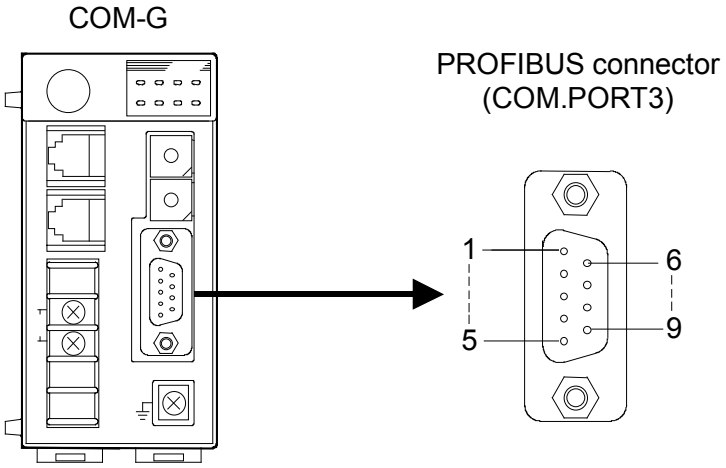
4.3 Connections

⚠ WARNING

To prevent electric shock or instrument failure, turn off the power before connecting or disconnecting the instrument and peripheral equipment.

4.3.1 Connection to PLC

■ **Pin layout of COM.PORT3**



Pin layout of COM.PORT3

☞ For the connectable connector of the PLC, refer to the instruction manual for the used PLC.

■ **Connector pin number and signal details (RS-485)**

Pin No.	Signal Name	Symbol
1	—	Unused
2	—	Unused
3	Receive data /transmission data (plus)	RxD/TxD-P
4	—	Unused
5	Signal ground	DGND
6	Termination resistor supply voltage (5 V)	VP
7	—	Unused
8	Receive data / transmission data (negative)	RxD/TxD-N
9	—	Unused

■ PROFIBUS cables

Use the PROFIBUS cable which fitted the following requirement.

- Use the shielded twisted pair wire
- Based on EN50170, European standard (Recommend cable type A)

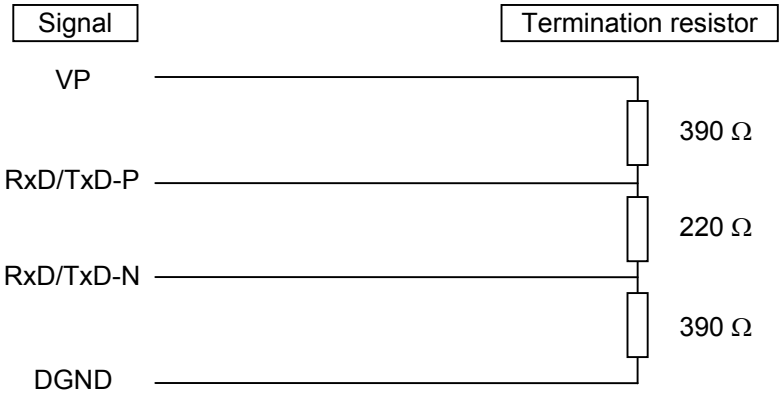
Cable type A specification

Impedance:	135 to 165 Ω
Capacitance:	< 30 pF/m
Loop resistance:	110 Ω/km
Core diameter:	0.64 mm
Core cross section:	> 0.34 mm^2

Maximum cable length by communication speed (For cable type A)

Communication speed (kbps)	9.6	19.2	93.75	187.5	500	1500	12000
Cable length (m)	1200	1200	1200	1000	400	200	100

- Connect the termination resistor to the end of a bus (Refer to below)



Termination resistor of a bus

As for the PROFIBUS cable (a connection cable of PLC and COM-G), there is a case prepared by a PLC manufacturer.

The details except the above are connected to a home page of PROFIBUS International, and obtain necessary information.
URL: http://www.profibus.com/

4.3.2 Connection to the SR Mini HG

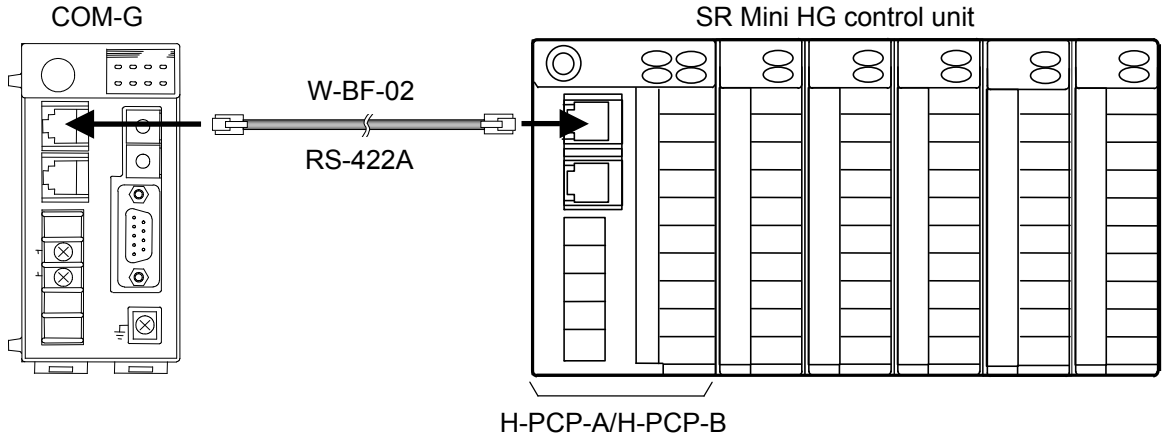
One SR Mini HG control unit can be connected for one COM-G.

When using the SR Mini HG, always set addresses of them to 0.

W-BF-02* communication cable (RKC product) can be used as communication cable (sold separately). If noise is a factor, customer should use a twisted pair cable (not included) or something to that effect.

* Shields of the cable are connected to SG (No. 6 pin) of the COM-G connector.

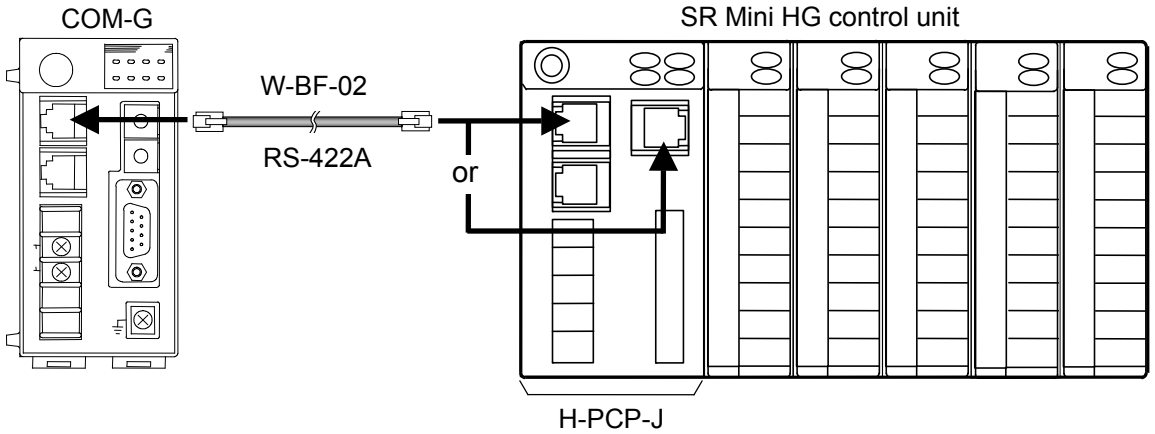
- **When used H-PCP-A or H-PCP-B module**



Cable type: W-BF-02-3000 (RKC product, Sold separately)
[Standard cable length: 3 m]

Connection example 1

- **When used H-PCP-J module**

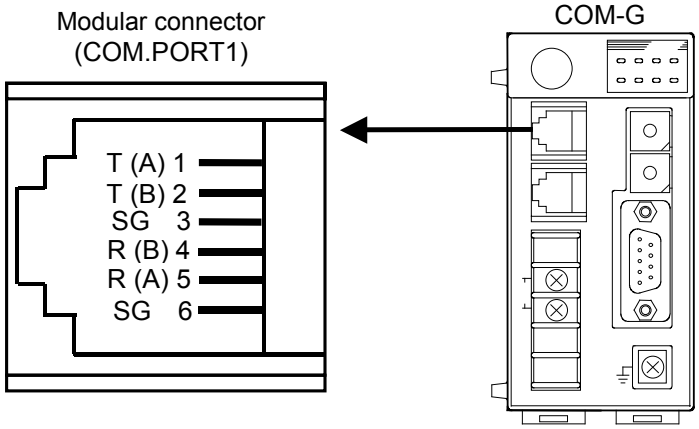


Cable type: W-BF-02-3000 (RKC product, Sold separately)
[Standard cable length: 3 m]

Connection example 2

For the communication setting with the SR Mini HG, refer to **SR Mini HG SYSTEM Communication Quick Manual (IMS01V02-E□), SR Mini HG SYSTEM Communication Instruction Manual (IMSRM09-E□)** or **Power supply/CPU module H-PCP-J Instruction Manual (IMS01J01-E□)**.

■ Pin layout of COM.PORT1



Pin layout of COM.PORT1

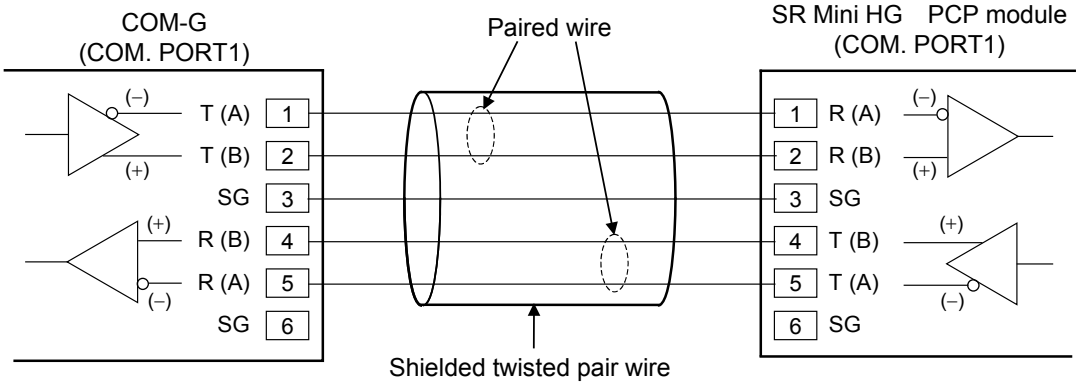
The six-pin type modular connector should be used for the connection to the COM-G. (Recommended manufacturer and model: Hirose Electric, TM4P-66P)

■ Connector pin number and signal details (RS-422A)

Pin No.	Signal name	Symbol
1	Send data	T (A)
2	Send data	T (B)
3	Signal ground	SG
4	Receive data	R (B)
5	Receive data	R (A)
6	Signal ground	SG

■ Diagram of communication cable wiring

- **RS-422A**



Communication cable wiring

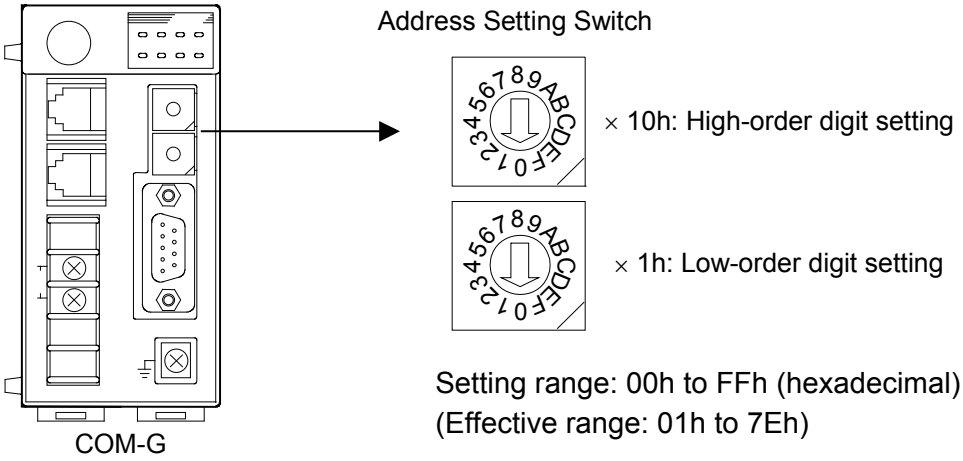
5. SETTING

5.1 PROFIBUS Setting

■ PROFIBUS address setting

The master communicates with the selected slave by specifying that slave's address number. Each slave must have a unique address number for this data transmission. Set the slave address with the address setting switch prior to operation.

With two rotary switches of the front right side of COM-G, set an address number on the PROFIBUS. For this setting, use a small slotted screwdriver.



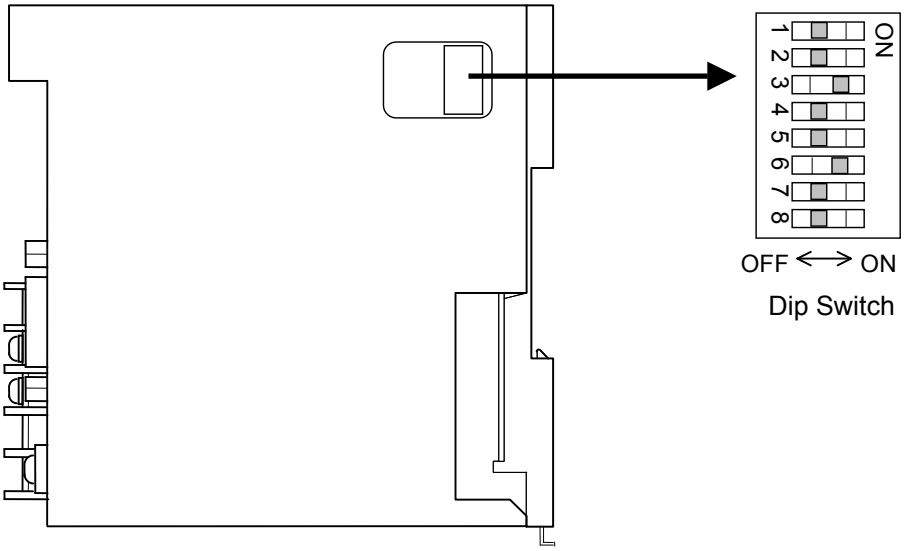
Address Setting Switch

5.2 Controller Communication Setting

5.2.1 COM-G communication setting

■ Communication speed setting

Set communication speed of communication with the SR Mini HG with a dip switch of COM-G.



Right side view

3	4	Communication speed
OFF	OFF	Interdict from setting
OFF	ON	9600 bps
ON	OFF	19200 bps
ON	ON	Interdict from setting

Factory set value: 19200 bps

Always set the following except No. 3 and 4. A different setting may cause a malfunction.

OFF: No. 1, 2, 5, 7, 8

ON: No. 6

5.2.2 SR Mini HG communication setting

■ Communication speed setting

The communication speed setting of the SR Mini HG always sets the same value as a communication speed setting of the COM-G.

■ Dada bit configuration

The data bit configuration of the SR Mini HG always sets the following value.

Start bit: 1
Data bit: 8
Parity bit: Without
Stop bit: 1

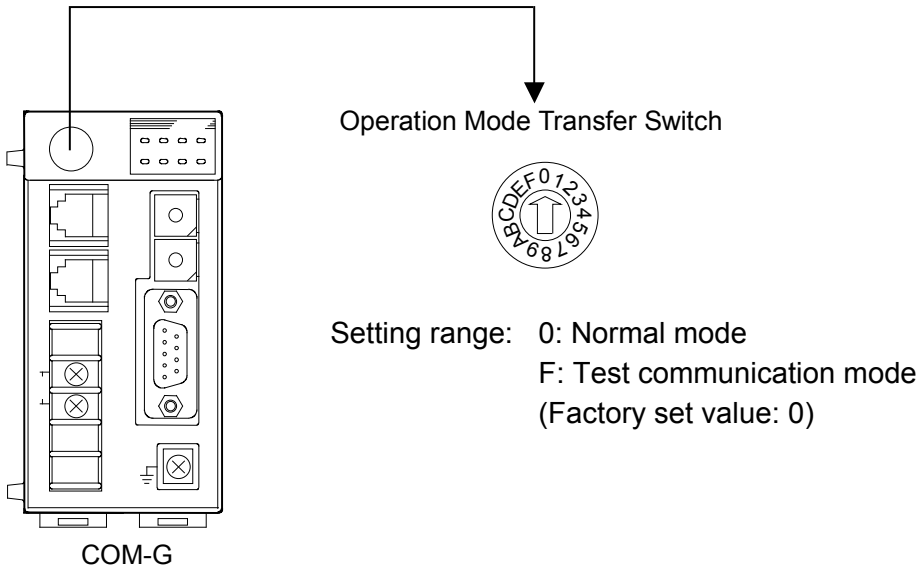
■ Address setting

When using the SR Mini HG, always set addresses of them to 0.

☞ For the communication setting with the SR Mini HG, refer to **SR Mini HG SYSTEM Communication Quick Manual (IMS01V02-E□), SR Mini HG SYSTEM Communication Instruction Manual (IMSRM09-E□)** or **Power supply/CPU module H-PCP-J Instruction Manual (IMS01J01-E□)**.

5.3 Operation Mode

The COM-G rotary switch can set the operation mode.
For this setting, use a small slotted screwdriver.



Operation Mode Transfer Switch

Do not set 1 to E. Otherwise, malfunction may result.

■ Test communication mode

The test communication mode is a mode to check that communication line of the COM-G and the SR Mini HG operates normally.

[Test communication procedures]

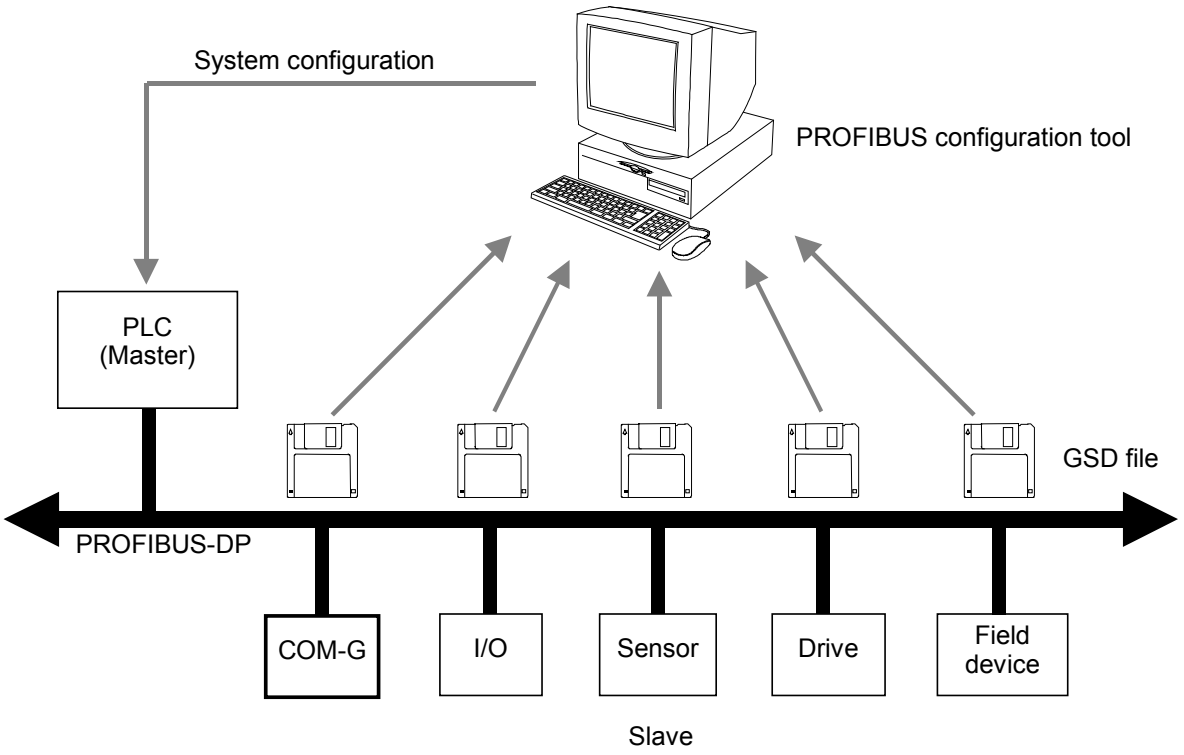
1. Connect the COM-G to the SR Mini HG by referring to **4.3.2 Connection to the SR Mini HG (P. 19)**.
2. Set the COM-G Operation Mode Transfer Switch to *F*.
3. Turn on the power of the COM-G and SR Mini HG.
   From the time when the power is turned on, the COM-G conducts polling to the SR Mini HG.
4. Check the indication state of the RX1 and TX1 lamps on the COM-G.
   The RX1 lamp flashes when the COM-G received data from the SR Mini HG.
   The TX1 lamp flashes when COM-G sends data to the SR Mini HG.
   If both of RX1 and TX1 lamps flash, this indicates that communication line between the COM-G and SR Mini HG normally operates.

6. PROFIBUS COMMUNICATION

6.1 PROFIBUS System Configuration

In order to configure a system by the PROFIBUS-DP protocol, it is necessary that communication information on each slave should be sent the master in an electronic device data sheet (GSD file) format.

Any manufacturer of the PLC which becomes a master can provide a configuration tool to configure PROFIBUS systems. The configuration tool creates master parameter records stored with data on all of the systems by combining together the GSD file of each slave connected. Thus, the desired PROFIBUS system can be configured by downloading this data to the master.

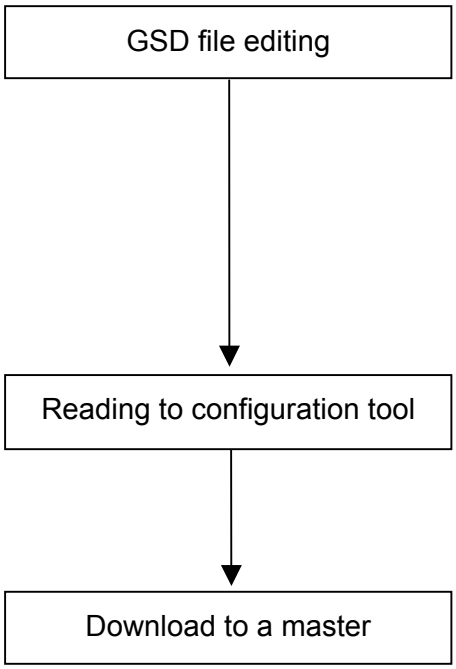


Overview of PROFIBUS system configuration

About configuration tool, please ask a manufacturer of a master product.

■ The procedure of system configuration

When a master is PLC, and a slave is COM-G, the procedure of system configuration is as follows.



Write communication data of slave onto a GSD file of COM-G.
Edit a file with the RKC GSD File Editor downloaded from RKC official website.

☞ For editing contents of a GSD file, refer to **6.2 GSD File Editing (P. 27)** and **Help of RKC GSD File Editor**.

Read the edited GSD file of COM-G on the PC by using a PLC configuration tool.
Set required parameters.

Download the data to PLC.

6.2 GSD File Editing

In GSD file editing, the PLC (master) selects data items which are read from/written to the SR Mini HG (slave). In addition, the COM-G GSD file is edited by the "RKC GSD File Editor" downloaded from RKC official website..

Here, the words of "static data" and "dynamic data" are used. Their meanings used for this product are as follows.

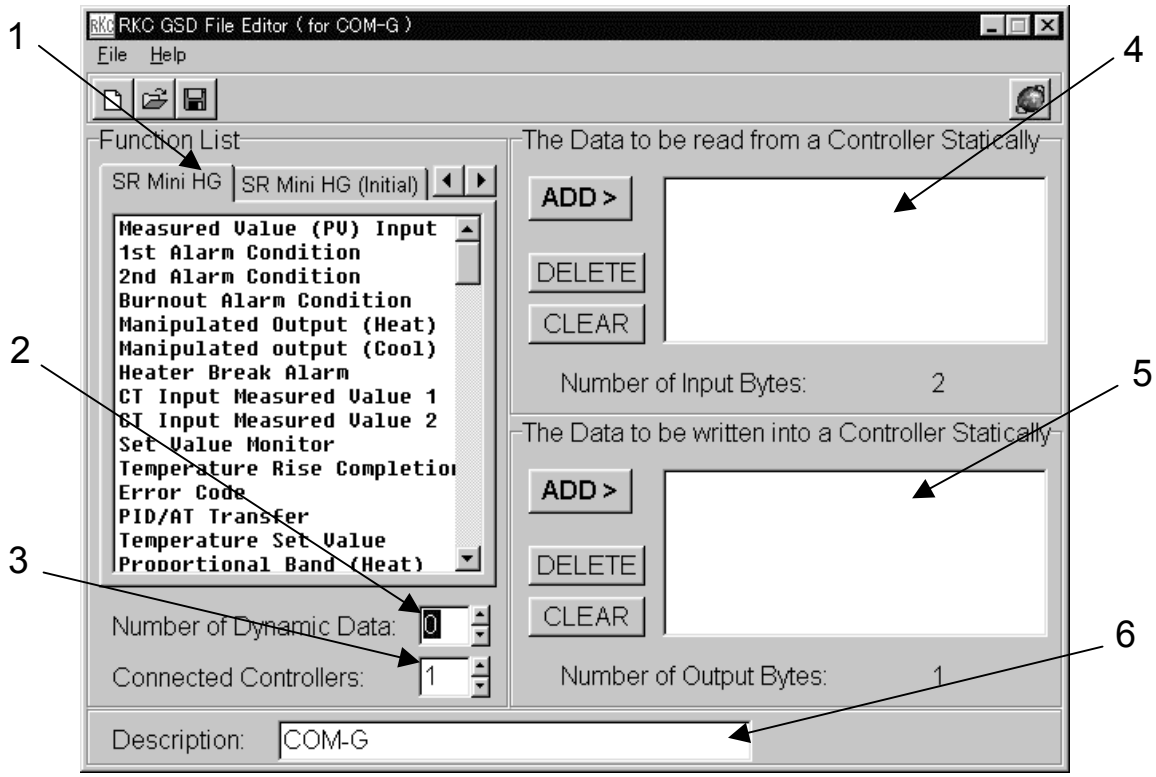
Static data: Data which can always be read/written by the PLC (master).
The number of data points and data items are specified in the GSD file.

Dynamic data: Data requested to be read/written by the event from PLC (master) as instructed by the sequence program.
Only the number of data points is specified in the GSD file. Data items are specified by the sequence program of the PLC (master).

☞ For installation method of the RKC GSD File Editor, refer to **Readme file**.
In addition, for details of editing method, refer to **Help of RKC GSD File Editor**.

■ RKC GSD File Editor

The content selected and entered by the "RKC GSD File Editor" is as follows.



Editing screen of RKC GSD file editor

1. Function List

Click the tab written with “SR Mini HG” or “SR Mini HG (Initial)” to display the Function List (communication items).

📖 For the SR Mini HG, the Function List is divided into two sections: “SR Mini HG” and “SR Mini HG (Initial).” In order to read/write data in “SR Mini HG (Initial),” first set “Control RUN/STOP transfer” (Function No.: 5352, Identifier: SR) in the Function List of “SR Mini HG” to “0” (Control STOP) and then set “Initial setting mode” (Function No.: 494E, Identifier: IN) to “1.”

☞ For initial setting, refer to **7.2.2 Initial setting data (extended communication) (P. 52)**.

2. Number of Dynamic Data

Set the number of data item to set with PLC (master).
Maximum values: 10 items

📖 When dynamic data requested, 6 bytes per data item is used.

3. Connected Controllers

For the SR Mini HG, the setting is made by replacing “Connected Controllers” with “Connected Channels.” The SR Mini HG sets the maximum number of channels in temperature control, digital input, digital output, analog input and analog output.
Maximum values: 20 channels

4. The Data to be read from a Controller Statically

Static data items to be read from the SR Mini HG are selected from among items described in the Function List.
Maximum items: 50 items

📖 When static data requested, 2 bytes per data item is used.

📖 In addition to data item designation, the following 2 bytes are already assigned.

- COM-G status information (1 byte)
- Write permit flag check register (1 byte)

5. The Data to be written into a Controller Statically

Static data items to be written to the SR Mini HG is selected from among items described in the Function List. Select writable data by referring to **7. LIST OF FUNCTION NUMBERS (P. 38)**.
Maximum items: 50 items

📖 When static data requested, 2 bytes per data item is used.

📖 In addition to data item designation, 1 byte corresponding to the “COM-G write permit flag” is already assigned.

6. Description

It is designed so that the GSD file can be identified on the PLC configuration tool by entering the Description (comment).

The maximum value of all of the setting items cannot be set due to limits set to the COM-G. The maximum data length is 160 bytes for both read and write.
For this reason, the maximum number of setting items is within the range of the following equation.

Nsr × Nc × 2 + Nd × 6 + 2 ≤ 160: Display in "Number of Input Bytes"

Nsw × Nc × 2 + Nd × 6 + 1 ≤ 160: Display in "Number of Output Bytes"

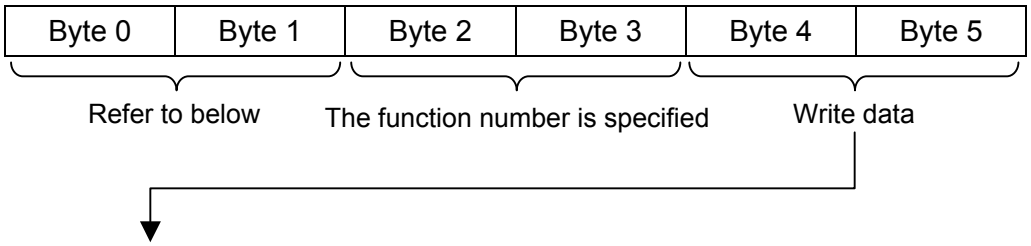
Nsr: Number of static data items read from SR Mini HG
Nsw: Number of static data items written to SR Mini HG
Nc: Number of connection channel of SR Mini HG
Nd: Number of dynamic data request

In addition, it is designed so that the setting exceeding 160 bytes cannot be made by using the RKC GSD File Editor.

6.3 Data Send/Receive by Dynamic Data Request

The dynamic data request uses 3-word (6-byte) data for both send and receive.
The specifications for each byte are as follows.

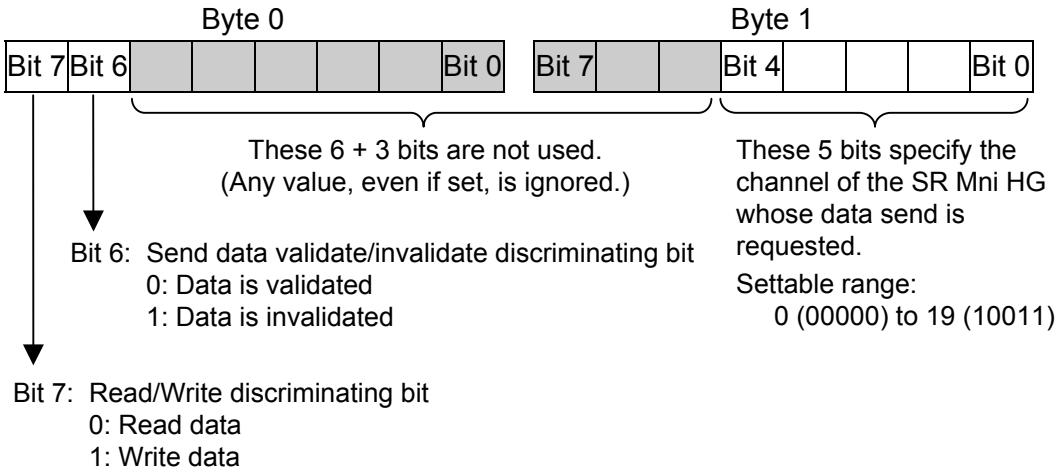
- **When send data from PLC to COM-G**



- If MSB (bit 7) in Byte 0 is set to 1, data relevant to function number is written.
- If MSB (bit 7) in Byte 0 is set to 0, data in Byte 4 and 5 will be ignored.

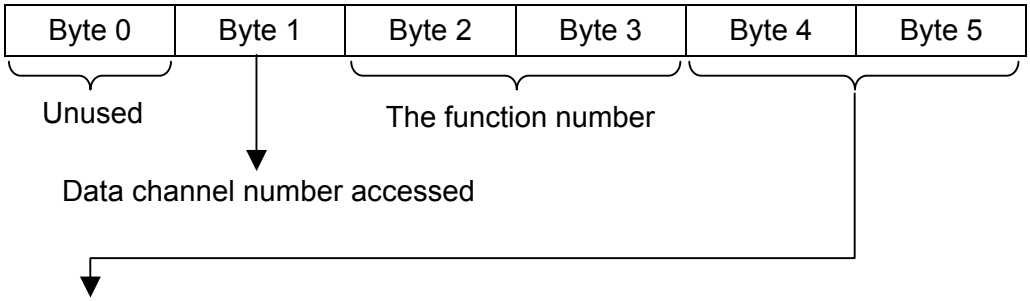
Byte 0: Only Bit 7 and Bit 6 are used.
- Bit 7: Read/Write discriminating bit
  When at 1, this indicates that the data is for write.
  When at 0, this indicates that the data is for read.
- Bit 6: Send data validate/invalidate discriminating bit
  When at 1, the COM-G ignores the data even if sent.
  When at 0, the COM-G accepts the data.

Byte 1: Specify a channel number of accessing SR Mini HG.



The value obtained by subtructing "1" from the actual channel number becomes the channel number specified by Byte 1. Therefore, "0" is specified when at channel 1.

- **When PLC received data from COM-G**



- For data read, the value read out from COM-G.
- For data write, the value written to COM-G when ACK is returned, or the infinite value when NAK is returned.

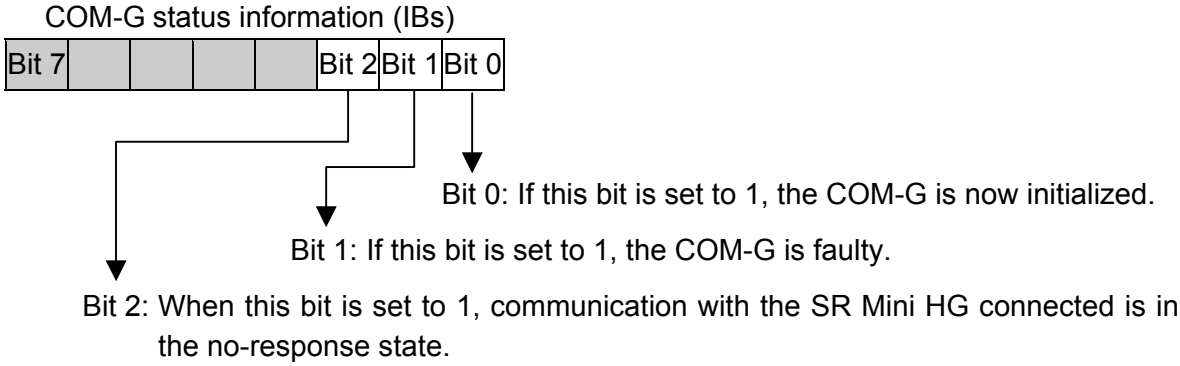
The value obtained by adding "1" to Byte 1 data becomes the actual channel number. Therefore, when at Byte 1 data = "0," this means that data access is made to channel 1.

6.4 Registers Assigned to PLC

The GSD file is read to the configuration tool for the PLC, the register area is automatically reserved. In addition, 3 register areas in the registers for dynamic data request, for read by static data request and for write by static data request are independently reserved.
Also, the first 2 bytes for data read and the first 1 byte for data write in the register assigned to the PLC are used for furnishing information on the COM-G status and for the write permit flag.

■ COM-G status information (IBs)

The first read only 1-byte register (IBs) consists of bits which furnish information on the COM-G status.
The respective bit configuration is as follows. (Bit 0 corresponding to LSB and Bit 7, MSB.)



■ Write permit flags (QBw, IBw)

Data may be written by static data request depending on the PLC even if the PLC is not in the RUN state.
In order to prevent this, the COM-G is provided with the following 1-byte register.

- Write permit flag register (QBw)
- Read register to check that the write permit flag is set (IBw)

The COM-G conducts data write to the SR Mini HG connected only when this 1-byte flag value is in the hexadecimal number “F.” If “F” is stored in the write permit flag register, “F” is also set to the read side.

The operation of writing a hexadecimal value of “F” to the write permit flag register (QBw) is necessary for both static and dynamic data requests.

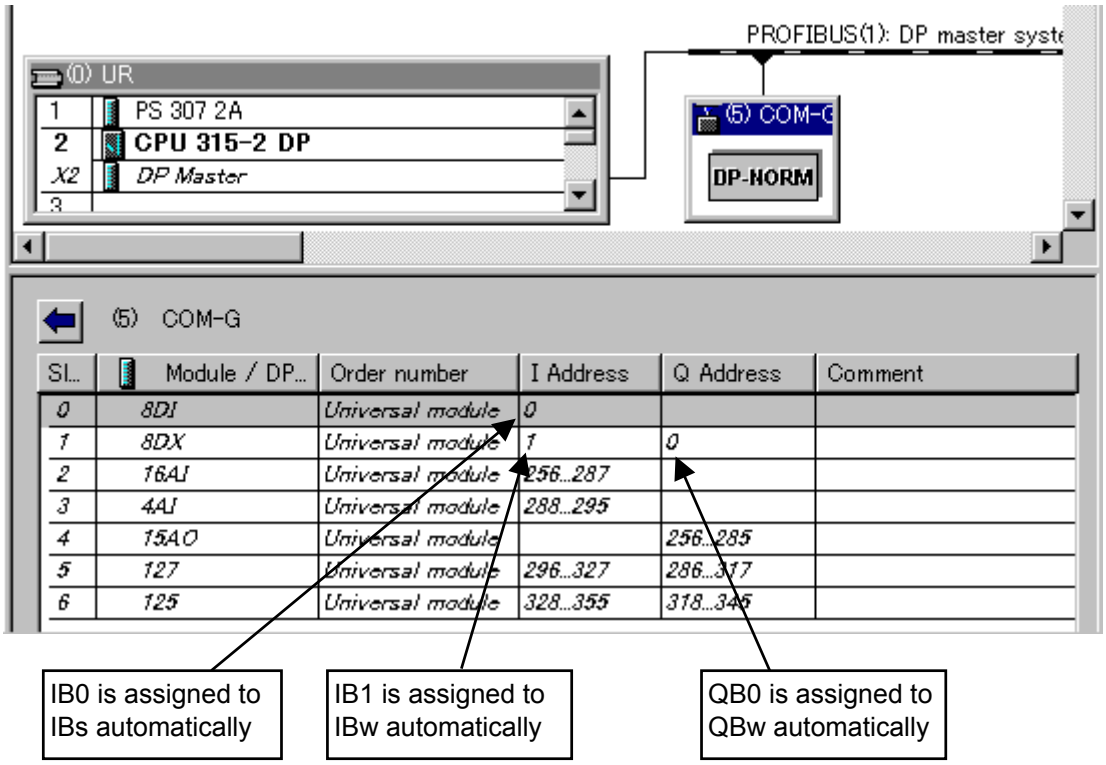
If any value other than “F” is stored in the write permit flag register, “0” is set to the read side.

■ Setting example of “COM-G status information (IBs)” and “Write permit flags (QBw, IBw)”

This section shows a setting example using STEP7 (programming software) from SIEMENS.

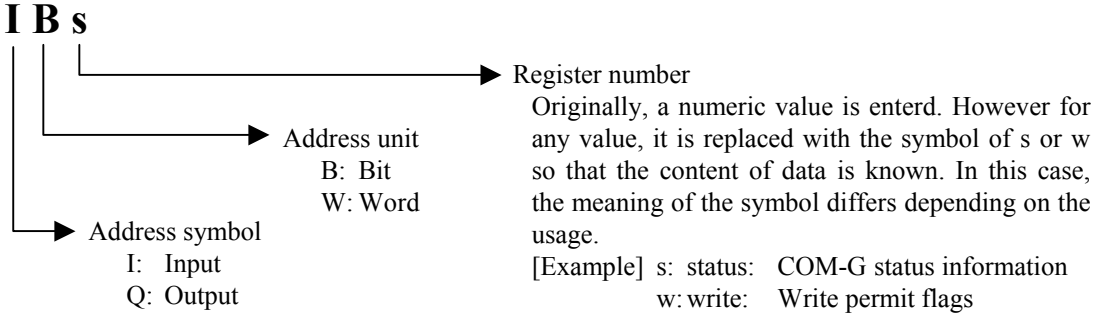
● Setting example of PLC configuration

If the COM-G hardware configuration is conducted in STEP 7, any values are automatically assigned to the “COM-G status information (IBs)” and “Write permit flags (QBw and IBw).”
In the following example, IB0 is assigned to “COM-G status information (IBs),” and QB0 and IB1 are assigned to “Write permit flags (QBw and IBw).”



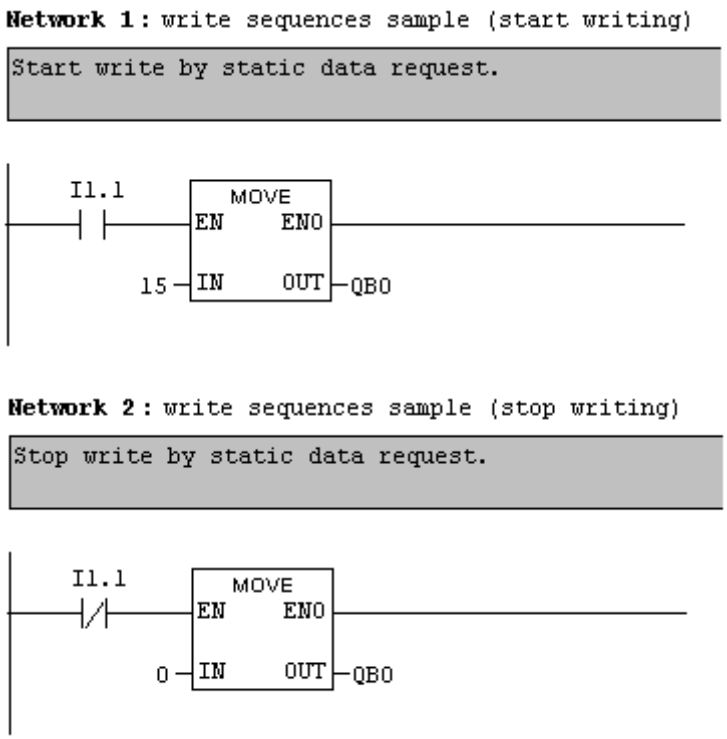
Display example of STEP 7

The symbols of IBs, QBw and IBw are used for a description of the register. The meaning of these symbols are as follows.



- **Example of sequence program (data written by static data request)**

COM-G performs data writing for a temperature controller connected to it by writing a hexadecimal number "F" (decimal number: 15) to the "write permit flag register (QBw)" of "Write permit flags."
In the following example, the above operation is performed with a MOVE instruction.
The example on this page is related to the "Setting example of PLC configuration" on a previous page. Therefore, QB0 is assigned to the "write permit flag register (QBw)" in the sequence programming of a PLC.



When I1.1 is ON, a hexadecimal number: F (decimal number: 15) is written to QB0 and a write of static data request is done.

When I1.1 is OFF, a hexadecimal number: 0 (decimal number: 0) is written to QB0 and a write of static data request is stopped.

Example of sequence program

■ Example of data assignment

The registers for static and dynamic data requests are assigned as follows it the following conditions are satisfied.

- Number of channel of SR Mini HG connected with COM-G: 5 channels
- Number of registers used by dynamic data request: 10
- Number of data items read by static data request: 4 items
  [Measured value (PV), Set value (SV), Alarm 1 status, Alarm 2 status]
- Number of data items written by static data request: 3 items
  [Set value (SV), Heat-side proportional band, Integral time]

● Assignment of registers read by static data request (5 sets × 4 items = 20 words)

Base address: IWr

Register address	IWr	IWr + 1	IWr + 2	IWr + 3	IWr + 4	IWr + 5	IWr + 6	IWr + 7	IWr + 8	IWr + 9
SR Mini HG channel	1	2	3	4	5	1	2	3	4	5
Read item	Measured value (PV)	Measured value (PV)	Measured value (PV)	Measured value (PV)	Measured value (PV)	Set value (SV)	Set value (SV)	Set value (SV)	Set value (SV)	Set value (SV)

IWr + 10	IWr + 11	IWr + 12	IWr + 13	IWr + 14	IWr + 15	IWr + 16	IWr + 17	IWr + 18	IWr + 19
1	2	3	4	5	1	2	3	4	5
Alarm 1 status	Alarm 1 status	Alarm 1 status	Alarm 1 status	Alarm 1 status	Alarm 2 status	Alarm 2 status	Alarm 2 status	Alarm 2 status	Alarm 2 status

● Assignment of registers written by static data request (5 sets × 3 items = 15 words)

Base address: QWw

Register address	QWw	QWw + 1	QWw + 2	QWw + 3	QWw + 4	QWw +5	QWw + 6	QWw + 7	QWw + 8	QWw + 9
SR Mini HG channel	1	2	3	4	5	1	2	3	4	5
Read item	Set value (SV)	Set value (SV)	Set value (SV)	Set value (SV)	Set value (SV)	Heat-side proportional band	Heat-side proportional band	Heat-side proportional band	Heat-side proportional band	Heat-side proportional band

QWw + 10	QWw + 11	QWw + 12	QWw + 13	QWw + 14
1	2	3	4	5
Integral time	Integral time	Integral time	Integral time	Integral time

- **Assignment of registers input by dynamic data request (6-byte × 10/2 = 30 words)**

  Base address: IWdr

Register address	IWdr	Iwdr + 1	IWdr + 2	IWdr + 3	IWdr + 4	IWdr + 5	IWdr + 6	IWdr + 7	IWdr + 8	IWdr + 9
Data request number	1	1	1	2	2	2	3	3	3	4
Input item	Channel	Function number	Send value	Channel	Function number	Send value	Channel	Function number	Send value	Channel

IWdr + 10	IWdr + 11	IWdr + 12	IWdr + 13	IWdr + 14	IWdr + 15	IWdr + 16	IWdr + 17	IWdr + 18	IWdr + 19
4	4	5	5	5	6	6	6	7	7
Function number	Send value	Channel	Function number	Send value	Channel	Function number	Send value	Channel	Function number

IWdr + 20	IWdr + 21	IWdr + 22	IWdr + 23	IWdr + 24	IWdr + 25	IWdr + 26	IWdr + 27	IWdr + 28	IWdr + 29
7	8	8	8	9	9	9	10	10	10
Send value	Channel	Function number	Send value	Channel	Function number	Send value	Channel	Function number	Send value

- **Assignment of registers input by dynamic data request (6-byte × 10/2 = 30 words)**

  Base address: QWdw

Register address	QWdw	Qwdw + 1	QWdw + 2	QWdw + 3	QWdw + 4	QWdw + 5	QWdw + 6	QWdw + 7	QWdw + 8	QWdw + 9
Data request number	1	1	1	2	2	2	3	3	3	4
Output item	Channel	Function number	Send value	Channel	Function number	Send value	Channel	Function number	Send value	Channel

QWdw + 10	QWdw + 11	QWdw + 12	QWdw + 13	QWdw + 14	QWdw + 15	QWdw + 16	QWdw + 17	QWdw + 18	QWdw + 19
4	4	5	5	5	6	6	6	7	7
Function number	Send value	Channel	Function number	Send value	Channel	Function number	Send value	Channel	Function number

QWdw + 20	QWdw + 21	QWdw + 22	QWdw + 23	QWdw + 24	QWdw + 25	QWdw + 26	QWdw + 27	QWdw + 28	QWdw + 29
7	8	8	8	9	9	9	10	10	10
Send value	Channel	Function number	Send value	Channel	Function number	Send value	Channel	Function number	Send value

The “Channel” also includes information on “Read/Write discriminating bit” and “Send data validate/invalidate discriminating bit.” (Refer to P. 30)

6.5 Processing of Numeric Data Values

Numeric data values obtained via communication with the COM-G and processed by SR Mini HG include those with and without decimal points and also those with minus signs.

● For numeric data value without decimal point

If there is no decimal point, the value is processed as it is.
In parameters which only have ON or OFF status, 1 = ON, 0 = OFF.

[Example]

A signal wire for temperature input is disconnected and the burnout state occurs.
→ Read value corresponding to function No. 4231 (burnout): 1 (Hexadecimal number: 0001H)

● For numeric data value with decimal point

The decimal point is omitted.

[Example 1]

The PV display unit on the SR Mini HG displays a temperature measured value of 120.5 °C.
→ Read value corresponding to function No. 4D31 (temperature measured value):
1205 (Hexadecimal number: 04B5H)

[Example 2]

The PV display unit on the SR Mini HG displays a temperature measured value of 130 °C.
→ Read value corresponding to function No. 4D31 (temperature measured value):
130 (Hexadecimal number: 0082H)

● For numeric data value with minus sign

The value is expressed as a 2's complement value which is obtained by subtracting the minus value from the hexadecimal number 10000H.

[Example 1]

The PV display unit on the SR Mini HG displays a temperature measured value of –1 °C.
→ Read value corresponding to function No. 4D31 (temperature measured value):
Hexadecimal number: FFFFH (10000H – 1 = FFFFH)

[Example 2]

The PV display unit on the SR Mini HG displays a temperature measured value of –2.5 °C.
→ Read value corresponding to function No. 4D31 (temperature measured value):
Hexadecimal number: FFE7H (10000H – 25 = 10000H – 19H = FFE7H)

The original minus value can be found by revising the word value to the INT value on the sequence program side.

7. LIST OF FUNCTION NUMBERS

7.1 Reference to List of Function Numbers

A list of function numbers shows data on SR Mini HG which can make communication via PROFIBUS.

(1) (2) (3) (4) (5) (6) (7)

Function No.	Iden-tifier	Name	Attri-bite	Struc-ture	Data range	Factry set value
4D31	**M1**	Temperature measured value (PV)	RO	C	TC/RTD input: Within input range Current/voltage input: Within display scale range	—
		Motor speed measured value (H-SIO-A module)	RO	C	Within display scale range	—
4141	**AA**	Alarm 1 status	RO	C	0: OFF 1: ON	—
4142	**AB**	Alarm 2 status	RO	C	0: OFF 1: ON	—
4231	**B1**	Burnout status	RO	C	0: OFF 1: ON	—

(1) Function number: The function number is the communication item number to specify with GSD file when carry out read/write of data. The function number is the value that converted the identifier into the hexadecimal numeral with ASCII code.

(2) Identifier: Communication identifier of RKC communication

(3) Communication item: Communication item is written.

(4) Attribute:
RO: Read only
Slave (COM-G) → Master (PLC)
WO: Write only
Slave (COM-G) ← Master (PLC)
R/W: Read and Write
Slave (COM-G) ↔ Master (PLC)

(5) Structure:
C: Data for each channel
L: Data for each event input logic circuit
M: Data for each module
U: Data for each unit address

(6) Data range: The display or setting range of data is written.

(7) Factory set value: The factory set value of data is written.

Data of function No. 4D31 (identifier M1) and function No. 5331 (identifier S1) with H-TIO-□/H-CIO-A module is different from H-SIO-A module. Data is discriminated by channel number.

Function No. 4D31: For H-TIO-□/H-CIO-A module . Temperature measured value (PV)
For H-SIO-A module ..... Motor speed measured value
Function No. 5331: For H-TIO-□/H-CIO-A module . Temperature set value (SV)
For H-SIO-A module ..... Motor speed set value

7.2 SR Mini HG Function Number List

7.2.1 Normal setting data

Function No.	Iden-tifier	Name	Attri-bite	Struc-ture	Data range	Factory set value
4D31	**M1**	Temperature measured value (PV)	RO	C	TC/RTD input: Within input range Current/Voltage input: Within display scale range	—
		Motor speed measured value (H-SIO-A module)	RO	C	Within display scale range	—
4141	**AA**	Alarm 1 state	RO	C	0: OFF 1: ON	—
4142	**AB**	Alarm 2 state	RO	C	0: OFF 1: ON	—
4231	**B1**	Burnout state	RO	C	0: OFF 1: ON	—
4F31	**O1**	Heat-side manipulated output value	RO	C	−5.0 to +105.0 %	—
4F32	**O2**	Cool-side manipulated output value	RO	C	−5.0 to +105.0 %	—
4143	**AC**	Heater break alarm state	RO	C	0: OFF 1: ON	—
4D33	**M3**	Current transformer input measured value 1 (H-TIO-A/C/D module)	RO	C	0.0 to 100.0 A or 0.0 to 30.0 A Current transformer (CT) input measured value of the H-TIO-A/C/D module.	—
4D34	**M4**	Current transformer input measured value 2 (H-CT-A module)	RO	C	0.0 to 100.0 A or 0.0 to 30.0 A Current transformer (CT) input measured value of the H-CT-A module.	—
4D53	**MS**	Set value monitor	RO	C	TC/RTD input: Within input range Current/Voltage input, H-SIO-A: Within display scale range	—
4845	**HE**	Temperature rise completion state	RO	U	0: Rise not complete 1: Rise completed	—

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Function No.	Iden-tifier	Name	Attri-bite	Struc-ture	Data range	Factory set value
4552	**ER**	Error code	RO	U	0: Operations normal 1: Backup data check error 2: RAM read/write error 3: System structure error 4: Internal communications error 5: A/D converter error 6: Adjustment data error	—
4731	**G1**	PID/AT transfer	R/W	C	0: PID control operation 1: AT (Autotuning) operation	0
5331	**S1**	Temperature set value (SV) *	R/W	C	TC/RTD input: Within input range (Within setting limiter) Current/Voltage input: Within display scale range (Within setting limiter)	0 [a]
		Motor speed set value (H-SIO-A module) *	R/W	C	Within display scale range (Within setting limiter)	0 [a]
5031	**P1**	Heat-side proportional band *	R/W	C	0.1 to 1000.0 % of span	3.0 [b]
5032	**P2**	Cool-side proportional band *	R/W	C	0.1 to 1000.0 % of span	3.0
4931	**I1**	Integral time *	R/W	C	1 to 3600 seconds	240 [b]
4431	**D1**	Derivative time *	R/W	C	0 to 3600 seconds (0: PI action)	60 [b]
5631	**V1**	Overlap/Deadband *	R/W	C	−10.0 to +10.0 % of span	0.0

* Item stored in the memory area.

[a] The position of the decimal point differs depending on the input range.

[b] Factory set value of H-SIO-A module become as follows.

Heat-side proportional band: 300.0 %
Integral time: 2 seconds
Derivative time: 0 second

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Function No.	Iden-tifier	Name	Attri-bite	Struc-ture	Data range	Factory set value
4341	**CA**	Control response parameters *	R/W	C	0: Slow 1: Medium 2: Fast In order to perform PID control by using the fuzzy function, specify "Fast." The fuzzy function is effective to restrict overshoot or undershoot occurring at operation start, or resulting from set value changes. (Fuzzy function correspond to H-TIO-P/R module only.)	0 [a]
4131	**A1**	Alarm 1 set value *	R/W	C	TC/RTD input: Within input range or span range Current/Voltage input, H-SIO-A: Within display scale range or span range	Note 1
4132	**A2**	Alarm 2 set value *	R/W	C		
4848	**HH**	Setting change rate limiter *	R/W	C	0.0 to 100.0 % of span/minute	0.0

* Item stored in the memory area.

[a] Heat control (H-TIO-☐/H-CIO-A): 0
Heat/Cool control (H-TIO-☐/H-CIO-A): 2
Position proportioning control (H-TIO-K): 0
Speed control (H-SIO-A): 0

Note 1 TC/RTD input:

Process high alarm:	Input range high
Process low alarm:	Input range low
Deviation high alarm:	50 °C [°F]
Deviation low alarm:	–50 °C [°F]
Deviation high/low alarm:	50 °C [°F] (alarm 1), 0 °C [°F] (alarm 2)
Band alarm:	50 °C [°F] (alarm 1), 0 °C [°F] (alarm 2)
No alarm function:	Input range high, Input range low

The position of the decimal point differs depending on the input range.

Current/voltage input, H-SIO-A:

Process high alarm:	100.0 %
Process low alarm:	0.0 %
Deviation high alarm:	50.0 %
Deviation low alarm:	–50.0 %
Deviation high/low alarm:	50.0 % (alarm 1), 0.0 % (alarm 2)
Band alarm:	50.0 % (alarm 1), 0.0 % (alarm 2)
No alarm function:	100.0 %(alarm 1), 0.0 % (alarm 2)

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Function No.	Iden-tifier	Name	Attri-bite	Struc-ture	Data range	Factory set value
4133	**A3**	Heater break alarm set value 1 (H-TIO-A/C/D module)	R/W	C	0.0 to 100.0 A or 0.0 to 30.0 A For the Current transformer (CT) input of the H-TIO-A/C/D module.	0.0
4134	**A4**	Heater break alarm set value 2 (H-CT-A module)	R/W	C	0.0 to 100.0 A or 0.0 to 30.0 A For the Current transformer (CT) input of the H-CT-A module.	0.0
4549	**EI**	Operation mode transfer	R/W	C	0: Unused If set to "Unused," no control, monitor or alarm monitor is performed. 1: Monitor If set to "Monitor," only the monitor is performed. No control or alarm monitor is performed. 2: Alarm If set to "Alarm," monitor or alarm monitor is performed. No control is performed. 3: Normal Selected to normal mode to perform control, monitor or alarm monitor.	3
5430	**T0**	Heat-side proportioning cycle time	R/W	C	1 to 100 seconds Setting will be invalidated in Current/Voltage output.	20 *
5431	**T1**	Cool-side proportioning cycle time	R/W	C	1 to 100 seconds Setting will be invalidated in Current/Voltage output and heat control.	20 *

* Relay contact output: 20 seconds
Voltage pulse output, Open collector output, Triac output: 2 seconds

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Function No.	Iden-tifier	Name	Attri-bite	Struc-ture	Data range	Factory set value
5042	**PB**	PV bias	R/W	C	–5.00 to +5.00 % of span ZK-1103 specification: –Input span to +Input span [a]	0.00 ZK-1103: 0 [b]
5352	**SR**	Control RUN/STOP transfer	R/W	U	0: Control STOP 1: Control RUN Only when the initial set mode is "0: Normal communication," control can be start.	0
494E	**IN**	Initial setting mode	R/W	U	0: Normal communication Normal communication is possible. 1: Extended communication [c] Normal and initial setting communication are possible.	0
5A41	**ZA**	Memory area number	R/W	U	1 to 8	1
4152	**AR**	Alarm interlock release	WO	U	1: Release (1 only)	—
4A31	**J1**	Auto/Manual transfer	R/W	C	0: Auto 1: Manual Setting will be invalidated in ON/OFF control and Heat/Cool control.	0
4F4E	**ON**	Manual output value	R/W	C	–5.0 to +105.0 % Setting will be invalidated in ON/OFF control and Heat/Cool control. H-TIO-C/D [Z-1017 spec.]: –105.0 to 0.0 % (cool-side) 0.0 to +105.0 % (heat-side)	0.0

[a] For –Input span < –999.9.....Low limit value: –999.9
For –Input span < –99.99.....Low limit value: –99.99
For –Input span < –9.999.....Low limit value: –9.999

[b] Unit (°C, °F, etc.) and decimal point position (No digit below decimal point, 1 digit below decimal point, 2 digits below decimal point or 3 digits below decimal point) depends on input range type.

[c] If extended communication is selected, the content of each identifier described in the **7.2.2 Initial setting data (extended communications) (P. 52)** can be changed or selected.

When the control is started, it is impossible to change the settings to the extended communications. For the change to the extended communications, the control must be first stopped by the "Control RUN/STOP transfer (Function No. 5352, Identifier SR)."

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Function No.	Iden-tifier	Name	Attri-bite	Struc-ture	Data range	Factory set value
4844	**HD**	Temperature rise completion range	R/W	C	1 to 10 °C or 1 to 20 °F	Note 1
4853	**HS**	Temperature rise completion trigger	R/W	C	0: Unsed 1: Used Do not set "1: Used" in H-TIO-H/J module and H-SIO-A module, because temperature rise completion is not judged. *	0
5433	**T3**	Temperature rise completion soak time	R/W	U	0 to 360 minutes	0
4D35	**M5**	AI measured value	RO	C	Within display scale range	—
4144	**AD**	AI alarm 1 state	RO	C	0: OFF 1: ON	—
4145	**AE**	AI alarm 2 state	RO	C	0: OFF 1: ON	—
4135	**A5**	AI alarm 1 set value	R/W	C	Within display scale range	Note 2
4136	**A6**	AI alarm 2 set value	R/W	C	Within display scale range	Note 2
4A49	**JI**	AI zero point correction	R/W	C	0: Cancel 1: Execution	0
4A4A	**JJ**	AI full scale correction	R/W	C	0: Cancel 1: Execution	0
4E4A	**NJ**	AI operation mode transfer	R/W	C	0: Unused mode Neither monitor nor alarm monitor is done in this mode. 1: Normal mode Normal mode in which monitor and alarm are done.	1
4150	**AP**	Control loop break alarm (LBA) state	RO	C	0: OFF 1: ON	—

* If the channel of each of the H-TIO-H/J and H-SIO-A modules is set "1: Used," it does no reach the completion of temperature rise. As a result, the state of this completion (Function No. 4845, Identifier HE) which is judged by performing the *OR* operation of all the channels cannot be attained, thereby continuing the incompletion of temperature rise.

Note 1 TC/RTD input: 10 °C or 20 °F
Current/Voltage input: 10 % of display scale

Note 2 Process high alarm: 100.0
Process low alarm: 0.0
No alarm function: 100.0 (AI alarm 1 set value) or 0.0 (AI alarm 2 set value)
The position of the decimal point differs depending on AI decimal point position (Function No. 4A55, Identifier JU) setting.

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Function No.	Identifier	Name	Attribite	Structure	Data range	Factory set value
4850	**HP**	LBA use selection	R/W	C	0: Unused 1: Used	0
4336	**C6**	LBA time	R/W	C	1 to 7200 seconds	480
5632	**V2**	LBA deadband	R/W	C	Input span	0 [a]
4D36	**M6**	AO output value monitor	RO	C	Display scale range Data will be validated in manual mode.	—
5336	**S6**	AO output set value	R/W	C	Display scale range Setting will be validated in manual mode.	0.0 [b]
584F	**XO**	AO function selection	R/W	C	0: Unused 1: Manual mode (outputs data given by the AO output set value) 2: Temperature measured value (PV) 3: Set value monitor 4: Temperature deviation value (deviation between the temperature measured value and set value monitor) 5: Heat-side manipulated output value 6: Cool-side manipulated output value 7: AI measured value 8: TI measured value 9: Opening monitor (2 to 9: Recorder output mode)	1
4F59	**OY**	AO corresponding channel setting	R/W	C	1 to 20 (TIO and Positioning input channel) 1 to 40 (AI and TI channel) Setting will be validated in recorder output mode.	1

[a] The position of the decimal point differs depending on the input range.

[b] The position of the decimal point differs depending on AO decimal point position (Function No. 4A52, Identifier JR) setting.

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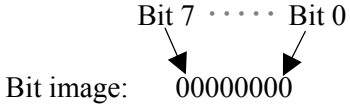
Function No.	Iden-tifier	Name	Attri-bite	Struc-ture	Data range	Factory set value
4356	**CV**	AO zooming high limit	R/W	C	AO zooming low limit to 100.0 % Setting will be validated in recorder output mode.	100.0
4357	**CW**	AO zooming low limit	R/W	C	0.0 % to AO zooming high limit Setting will be validated in recorder output mode.	0.0
4A4B	**JK**	AO zero point adjustment setting	R/W	C	−5.00 to +5.00 %	0.00
4A4C	**JL**	AO full scale adjustment setting	R/W	C	−5.00 to +5.00 %	0.00
4C31	**L1**	H-DI-A module input state	RO	M	0 to 255 [a] Contact input state is expressed as a bit image in decimal number.	—
5133	**Q3**	Event DO state (H-DO-C module)	RO	M	0 to 255 [b] Contact output state is expressed as a bit image in decimal number.	—
5134	**Q4**	Event DO manual output value (H-DO-C module)	R/W	M	0 to 255 [b] Contact output state is expressed as a bit image in decimal number.	0

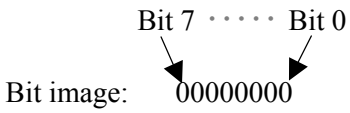
[a] Each contact input state is assigned as a bit image in binary numbers. However, send data from the SR Mini HG be changed to decimal ASCII code from the bit image in binary numbers.



Bit data 0: OFF 1: ON

Bit 0: CH1 (DI1) Bit 4: CH5 (DI5)
Bit 1: CH2 (DI2) Bit 5: CH6 (DI6)
Bit 2: CH3 (DI3) Bit 6: CH7 (DI7)
Bit 3: CH4 (DI4) Bit 7: CH8 (DI8)

[b] Each contact output state is assigned as a bit image in binary numbers. However, send data from the SR Mini HG be changed to decimal ASCII code from the bit image in binary numbers.



Bit data 0: OFF 1: ON

Bit 0: CH1 (DO1) Bit 4: CH5 (DO5)
Bit 1: CH2 (DO2) Bit 5: CH6 (DO6)
Bit 2: CH3 (DO3) Bit 6: CH7 (DO7)
Bit 3: CH4 (DO4) Bit 7: CH8 (DO8)

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Function No.	Iden-tifier	Name	Attri-bite	Struc-ture	Data range	Factory set value
4137	**A7**	Event DO extension alarm set value (H-DO-C module)	R/W	C	TC/RTD input: Within input range or span range Current/Voltage input, H-SIO-A: Within display scale range or span range	0 *
4B48	**KH**	Cascade monitor	RO	C	± Input span Data will be validated in slave channel	—
4B46	**KF**	Cascade ON/OFF	R/W	C	0: OFF 1: ON Setting will be validated in master channel.	0
4B47	**KG**	Cascade gain	R/W	C	–9.999 to +10.000 As the cascade gain is validated only in the slave channel, the polling or selecting of the same value is made also in the master channel.	1.000
4B49	**KI**	Cascade bias	R/W	C	–99.99 to +100.00 % As the cascade bias is validated only in the slave channel, the polling or selecting of the same value is made also in the master channel.	–50.00
4D37	**M7**	TI measured value	RO	C	Within input range	—
4146	**AF**	TI alarm 1 state	RO	C	0: OFF 1: ON	—
4147	**AG**	TI alarm 2 state	RO	C	0: OFF 1: ON	—
4232	**B2**	TI burnout state	RO	C	0: OFF 1: ON	—
4138	**A8**	TI alarm 1 set value	R/W	C	Within input range	Note 1
4139	**A9**	TI alarm 2 set value	R/W	C	Within input range	Note 1
5043	**PC**	TI PV bias	R/W	C	–5.00 to +5.00 % of span	0.00

* The position of the decimal point differs depending on the input range.

Note 1 Process high alarm: Input range high
Process low alarm: Input range low
No alarm function: Input range high for TI alarm 1 set value or
Input range low for TI alarm 2 set value
The position of the decimal point differs depending on the input range.

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Function No.	Iden-tifier	Name	Attri-bite	Struc-ture	Data range	Factory set value
454A	**EJ**	TI operation mode transfer	R/W	C	0: Unused mode Neither monitor nor alarm monitor is done in this mode. 1: Normal mode Normal mode in which monitor and alarm are done.	1
4C33	**L3**	PCP module DI state (H-PCP-B module)	RO	M	0 to 7 [a] PCP module DI state is expressed as a bit image in decimal number.	—
4C34	**L4**	Event DI contact input monitor (H-DI-B module)	RO	M	0 to 255 [b] Contact input state is expressed as a bit image in decimal number.	—
4C35	**L5**	Event DI logic input monitor (H-DI-B module)	RO	L	0 to 15 [c] Logic input status is expressed as a bit image in decimal number.	—

[a] PCP module DI state is assigned as a bit image in binary numbers. However, send data from the SR Mini HG be changed to decimal ASCII code from the bit image in binary numbers.

Bit 7 ····· Bit 0

Bit image: 00000000

Bit data 0: OFF 1: ON

Bit 0: CH1 (DI1)
Bit 1: CH2 (DI2)
Bit 2: CH3 (DI3)
Bit 3 to Bit7 are unused.

[b] Each contact input state is assigned as a bit image in binary numbers. However, send data from the SR Mini HG be changed to decimal ASCII code from the bit image in binary numbers.

Bit 7 ····· Bit 0

Bit image: 00000000

Bit data 0: OFF 1: ON

Bit 0: CH1 (DI1)
Bit 1: CH2 (DI2)
Bit 2: CH3 (DI3)
Bit 3: CH4 (DI4)
Bit 4: CH5 (DI5)
Bit 5: CH6 (DI6)
Bit 6: CH7 (DI7)
Bit 7: CH8 (DI8)

[c] Each logic input state is assigned as a bit image in binary numbers. However, send data from the SR Mini HG be changed to decimal ASCII code from the bit image in binary numbers.

Bit 7 ····· Bit 0

Bit image: 00000000

Bit data 0: OFF 1: ON

Bit 0: Logic input 1
Bit 1: Logic input 2
Bit 2: Logic input 3
Bit 3: Logic input 4
Bit 4 to Bit 7 are unused.

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Function No.	Iden-tifier	Name	Attri-bite	Struc-ture	Data range	Factory set value
5135	**Q5**	Event DI logic output monitor (H-DI-B module)	RO	M	0 to 255 [a] Logic output state is expressed as a bit image in decimal number.	—
4148	**AH**	H-CT-A module heater break alarm state	RO	C	0: Normal 1: Break 2: Welding	—
414A	**AJ**	Overall alarm state	RO	U	0 to 2047 [b] Alarm status is expressed as a bit image in decimal number.	—
4D38	**M8**	Positioning monitor	RO	C	–5.0 to +105.0 %	—
5633	**V3**	Positioning output neutral zone	R/W	C	0.1 to 10.0 % of motor time	2.0
544A	**TJ**	Motor time	R/W	C	5 to 1000 seconds	10
4F53	**OS**	Integrated output limiter	R/W	C	100.0 to 200.0 % of motor time	150.0

[a] Each logic output state is assigned as a bit image in binary numbers. However, send data from the SR Mini HG be changed to decimal ASCII code from the bit image in binary numbers.

Bit 7 ····· Bit 0

Bit image: 00000000

Bit data 0: OFF 1: ON

Bit 0: Logic output 1
Bit 1: Logic output 2
Bit 2: Logic output 3
Bit 3: Logic output 4
Bit 4: Logic output 5
Bit 5: Logic output 6
Bit 6: Logic output 7
Bit 7: Logic output 8

[b] Each alarm state is assigned as a bit image in binary numbers. However, send data from the SR Mini HG be changed to decimal ASCII code from the bit image in binary numbers.

Bit 15 ····· Bit 0

Bit image: 0000000000000000

Bit data 0: OFF 1: ON

Bit 0: Logical *OR* of alarm 1 status in all channels
Bit 1: Logical *OR* of alarm 2 status in all channels
Bit 2: Logical *OR* of burnout alarm status in all channels
Bit 3: Logical *OR* of heater break alarm status in all channels
Bit 4: Temperature rise completion status
Bit 5: Logical *OR* of AI alarm 1 status in all channels
Bit 6: Logical *OR* of AI alarm 2 status in all channels
Bit 7: Logical *OR* of control loop break alarm status in all channels
Bit 8: Logical *OR* of TI alarm 1 status in all channels
Bit 9: Logical *OR* of TI alarm 2 status in all channels
Bit 10: Logical *OR* of TI burnout alarm status in all channels
Bit 11 to Bit 15 are unused.

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Function No.	Iden-tifier	Name	Attri-bite	Struc-ture	Data range	Factory set value
4F4F	**OO**	Manual positioning output value	R/W	C	−5.0 to +105.0 %	0.0
4430	**D0**	H-DO-G manipulated output value	RO	C	−5.0 to +105.0 %	—
4432	**D2**	H-DO-G DO output state	RO	C	0 to 65535 * Output state is expressed as a bit image in decimal number.	—
4433	**D3**	H-DO-G output limiter (high)	R/W	C	Output limiter low to 105.0 %	100.0
4434	**D4**	H-DO-G output limiter (low)	R/W	C	−5.0 % to Output limiter high	0.0
4435	**D5**	H-DO-G output cycle time	R/W	C	1 to 100 seconds	2
4436	**D6**	H-DO-G Auto/Manual transfer	R/W	C	0: Auto 1: Manual Setting will be invalidated in ON/OFF control and Heat/Cool control.	0
4437	**D7**	H-DO-G manual output value	R/W	C	−5.0 to +105.0 % Setting will be invalidated in ON/OFF control and Heat/Cool control.	0.0
4438	**D8**	H-DO-G master channel setting	R/W	C	0 to The number of H-TIO-□ module use channel (0: Unused)	0
4439	**D9**	H-DO-G output ratio set value	R/W	C	0.001 to 9.999	1.00

* Each output state is assigned as a bit image in binary numbers. However, send data from the SR Mini HG SYSTEM be changed to decimal ASCII code from the bit image in binary numbers.

Bit 15 · · · · · · · · · · · · · · Bit 0

Bit image: 0000000000000000

Bit data 0: OFF 1: ON

Bit 0: CH1 (DO1)
Bit 1: CH2 (DO2)
Bit 2: CH3 (DO3)
Bit 3: CH4 (DO4)
Bit 4: CH5 (DO5)
Bit 5: CH6 (DO6)
Bit 6: CH7 (DO7)
Bit 7: CH8 (DO8)
Bit 8: CH9 (DO9)
Bit 9: CH10 (DO10)
Bit 10: CH11 (DO11)
Bit 11: CH12 (DO12)
Bit 12: CH13 (DO13)
Bit 13: CH14 (DO14)
Bit 14: CH15 (DO15)
Bit 15: CH16 (DO16)

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Function No.	Iden-tifier	Name	Attri-bite	Struc-ture	Data range	Factory set value
5354	**ST**	PLC scanning time setting *	R/W	U	0 to 255 ms	10
4759	**GY**	Integral time limiter at AT end	R/W	U	1 to 3600 seconds Setting will be validated in Heat/Cool control.	3600

* Set the PLC scanning time (time of waiting for a response from the PLC) so as to adapt to the environment used.
In order to shorten the data updating period on the SR Mini HG side, the PLC scanning time (time of waiting for a response from the PLC) prior to factory shipment is set as short as 10 ms. If the PLC processing speed becomes slower according to the CPU processing speed, IO unit configuration and user program capacity of the PLC used, the communication response speed on the PLC side also becomes slower. As a result, the SR Mini HG will detect time-out and thus no communication processing may be normally made. If it does not normally operate, set the PLC scanning time to more than 50 ms.

7.2.2 Initial setting data (extended communication)

CAUTION

The Initial setting data should be set according to the application before setting any parameter related to operation. Once the Initial setting data is set correctly, those data is not necessary to be changed for the same application under normal conditions. If they are changed unnecessarily, it may result in malfunction or failure of the instrument. RKC will not bear any responsibility for malfunction or failure as a result of improper changes in the Initial setting.

Data of function No. 4883 (identifier H3) with H-TIO-□/H-CIO-A module is different from H-SIO-A module. Data is discriminated by channel number (module number).

Function No. 4883: .. For H-CIO-A module .....Cascade DI function selection
For H-SIO-A module.....DI process selection

■ Setting procedure of initial setting data

The initial setting data items can be set by changing to the initial setting mode (extended communication). Transfer to initial setting mode sets in "1" with function No. 494E (identifier IN).

The instrument cannot be changed to the initial setting mode state at control start (during control). If it needs to be changed to the above state, first stop the control by "Control RUN/STOP transfer" (function No.: 5352, identifier: SR).

No control can be started during initial setting mode. If the control needs to be re-started, first change the instrument the normal communication state set identifier IN (function No. 494E) by 0.

Function No.	Identifier	Name	Attribute	Structure	Data range	Factory set value
5849	**XI**	Input range number	R/W	C	H-TIO-A/B/C/D/K/P: 0 to 63 H-TIO-E/F/G/R, H-CIO-A: 0 to 120 H-TIO-H/J, H-CIO-A: 0 to 12 H-SIO-A: 0 (fixed) If the input range number is changed, all of the settings corresponding to the channels in the relevant module return to the default values. Refer to **Input range table (P. 79)**	Note 1

Note 1 The factory set value varies depending on the specifications when ordering.

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Function No.	Iden-tifier	Name	Attri-bite	Struc-ture	Data range	Factory set value
5348	**SH**	Setting limiter high	R/W	C	TC/RTD input: Setting limiter low to Input range high	Input range high
					Current/Voltage input, H-SIO-A: Setting limiter low to Display scale high	Display scale high
534C	**SL**	Setting limiter low	R/W	C	TC/RTD input: Input range low to Setting limiter high	Input range low
					Current/Voltage input, H-SIO-A: Display scale low to Setting limiter high	Display scale low
4631	**F1**	Digital filter	R/W	C	H-TIO-A/B/C/D/K/P 0 to 100 seconds (0: OFF) H-TIO-E/F/G/H/J/R, H-CIO-A, H-SIO-A 0.0 to 100.0 seconds (0.0: OFF)	0 or 0.0
4156	**AV**	Input error determination point (high)	R/W	C	TC/RTD input: Within input range	Input range high
					Current/Voltage input, H-SIO-A: Within display scale range	Display scale high
4157	**AW**	Input error determination point (low)	R/W	C	TC/RTD input: Within input range	Input range low
					Current/Voltage input, H-SIO-A: Within display scale range	Display scale low
5748	**WH**	Action at input error (high)	R/W	C	0: Normal control 1: Manipulated output value at input error	0 *
574C	**WL**	Action at input error (low)	R/W	C	0: Normal control 1: Manipulated output value at input error	0

* Heat control (H-TIO-□/H-CIO-A): 0 Heat/Cool control (H-TIO-□/H-CIO-A): 1
Position proportioning control (H-TIO-K): 0 Speed control (H-SIO-A): 0

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Function No.	Iden-tifier	Name	Attri-bite	Struc-ture	Data range	Factory set value
4742	**GB**	AT bias	R/W	C	Within ± input span range	0 [a]
4848	**HH**	Setting change rate limiter (H-PCP-A/B module)	R/W	C	0.0 to 100.0 %/minute of span	0.0
4F48	**OH**	Output limiter high	R/W	C	Output limiter low to 105.0 %	100.0 [b]
4F4C	**OL**	Output limiter low	R/W	C	−5.0 % to Output limiter high	0.0 [c]
4956	**IV**	ON/OFF control differential gap (upper)	R/W	C	0.00 to 10.00 % of span	0.02
4957	**IW**	ON/OFF control differential gap (lower)	R/W	C	0.00 to 10.00 % of span	0.02
4F45	**OE**	Manipulated output value at input error	R/W	C	−5.0 to +105.0 % (Heat control, Position proportioning control, Speed control) −105.0 to +105.0 % (Heat/Cool control)	0.0
5048	**PH**	Output change rate limiter (up)	R/W	C	0.0 to 100.0 %/second (0.0: OFF) Setting will be invalidated in ON/OFF control.	0.0
504C	**PL**	Output change rate limiter (down)	R/W	C	0.0 to 100.0 %/second (0.0: OFF) Setting will be invalidated in ON/OFF control.	0.0

[a] The position of the decimal point differs depending on the input range.

[b] Heat control (H-TIO-□/H-CIO-A): 100.0 Heat/Cool control (H-TIO-□/H-CIO-A): 100.0
Position proportioning control (H-TIO-K): 100.0 Speed control (H-SIO-A): 100

[c] Heat control (H-TIO-□/H-CIO-A): 0.0 Heat/Cool control (H-TIO-□/H-CIO-A): 100.0
Position proportioning control (H-TIO-K): 0.0 Speed control (H-SIO-A): 0

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Function No.	Iden-tifier	Name	Attri-bite	Struc-ture	Data range	Factory set value
5845	**XE**	Direct/Reverse action selection	R/W	C	0: Direct action 1: Reverse action If the Direct/Reverse action selection is changed, all of the settings corresponding to the channels in the relevant module return to the default values. Setting will be invalidated in Heat/Cool control.	Note 1
584E	**XN**	Hot/Cold start selection	R/W	C	0: Hot start At restarting Operation mode → Same as mode before the power failure Output value → Same as value before the power failure 1: Cold start At restarting Operation mode → Same as mode before the power failure Output value → Output limiter low	1

Note 1 The factory set value varies depending on the specifications when ordering.

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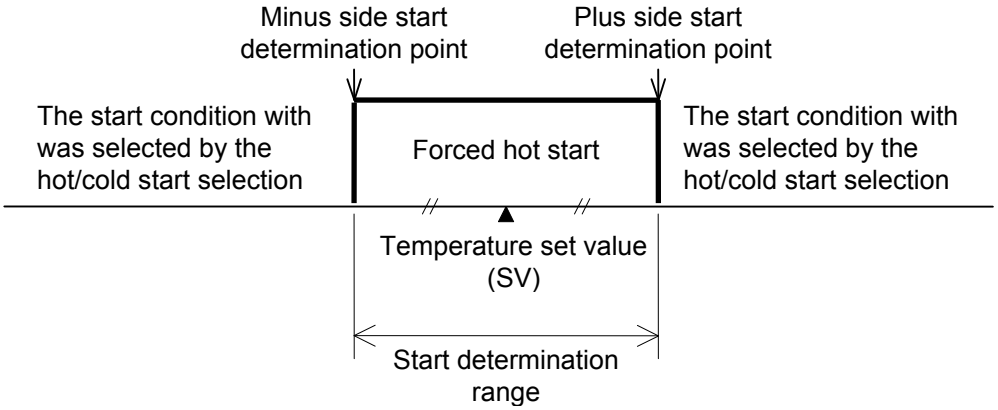
Function No.	Iden-tifier	Name	Attri-bite	Struc-ture	Data range	Factory set value
5358	**SX**	Start determination point *	R/W	C	0.0 to 100.0 % of span (Deviation setting from the temperature set value) Setting will be invalidated in H-SIO-A module.	3.0

* On restarting after power failure, if the temperature measured value (PV) is within the setting range by the start determination points, the hot start will definitely be carried out. If the temperature measured value (PV) is outside this range, the operation will begin with the start condition with was selected by the hot/cold start selection (function No. 584E, Identifier XN).



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Function No.	Iden-tifier	Name	Attri-bite	Struc-ture	Data range	Factory set value
5831	**X1**	Control RUN/STOP holding *	R/W	U	0: Not hold Start-up from control stop status 1: Hold Start-up from before the stop status 2: Start-up from control run status	1
454B	**EK**	Temperature rise completion hold function	R/W	U	0: Not hold 1: Hold	1

* Action after power-ON differs depending on control RUN/STOP holding (function No. 5831, Identifier X1) setting.

Control RUN/STOP holding (Function No. 5831, Identifier X1)	Status after power-ON	
	Operation mode transfer (Function No. 4549, Identifier EI)	Control RUN/STOP transfer (Function No. 5352, Identifier SR)
0: Not hold	Same as mode before the power failure	"0: Control STOP" Stopped until "1: Control RUN" is instructed from the PLC or host computer.
1: Hold	Same as mode before the power failure	Same as status before the power failure Control before power failure is maintained even if no PLC or host computer is connected.
2: Start-up from control run status	"1: Monitor" mode However if the operation mode is set to "0: Unused," "0: Unused" remains unchanged.	"1: Control RUN" However, no control is performed until the operation mode is set to "3: Normal (perform control)."

☞ For the Operation mode transfer (Function No. 4549, Identifier EI) and Control RUN/STOP transfer (Function No. 5352, Identifier SR), refer to the **7.2.1 Nomal setting data (P. 39)**.

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Function No.	Iden-tifier	Name	Attri-bite	Struc-ture	Data range	Factory set value
5A58	**ZX**	Interval time setting (Transmission transfer time setting) (For H-PCP-J module COM. PORT1/ COM. PORT2)	R/W	U	H-PCP-A/B module: 0 to 255 ms H-PCP-J module: 0 to 100 ms	H-PCP-A/B: 0 H-PCP-J: 1
5A59	**ZY**	H-PCP-J module COM. PORT3 Interval time setting (Transmission transfer time setting)	R/W	U	0 to 100 ms	1
4841	**HA**	Alarm 1 differential gap	R/W	U	0.00 to 10.00 % of span	0.10
4842	**HB**	Alarm 2 differential gap	R/W	U	0.00 to 10.00 % of span	0.10
5841	**XA**	Alarm 1 type selection	R/W	U	0: Process high alarm 1: Process low alarm 2: Deviation high alarm 3: Deviation low alarm 4: Deviation high/low alarm 5: Band alarm 6: No alarm function	Note 1
5842	**XB**	Alarm 2 type selection	R/W	U	0: Process high alarm 1: Process low alarm 2: Deviation high alarm 3: Deviation low alarm 4: Deviation high/low alarm 5: Band alarm 6: No alarm function	Note 1
5741	**WA**	Alarm 1 hold action	R/W	U	0: Not provided 1: Provided 2: Re-hold action Re-hold action will be validated in deviation alarm.	Note 1
5742	**WB**	Alarm 2 hold action	R/W	U	0: Not provided 1: Provided 2: Re-hold action Re-hold action will be validated in deviation alarm.	Note 1

Note 1 The factory set value varies depending on the specifications when ordering.

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Function No.	Iden-tifier	Name	Attri-bite	Struc-ture	Data range	Factory set value
4C41	**LA**	Alarm 1 interlock	R/W	U	0: Not provided 1: Provided	0
4C42	**LB**	Alarm 2 interlock	R/W	U	0: Not provided 1: Provided	0
4F41	**OA**	Alarm 1 action at input error	R/W	U	0: Normal alarm action 1: Forced alarm ON when temperature measured value exceeds abnormal input trigger input.	0
4F42	**OB**	Alarm 2 action at input error	R/W	U	0: Normal alarm action 1: Forced alarm ON when temperature measured value exceeds abnormal input trigger input.	0
4446	**DF**	Number of alarm delay times	R/W	U	0 to 255 times	0
434C	**CL**	Module initialization *	R/W	U	0: Normal state (Initialization is not executed) 1: Initialize only the new module (Only modules which are not recognized by the H-PCP-J module are initialized) 2: Initialize all module Only 1 or 2 can be used in the selecting and the value will automatically return to 0 after the selection of 1 or 2.	0

* Initialize method for changing the module composition

To change module configuration, use the following procedures:

- When a module is added to the control unit: Initialize only the new module
- When a module is deleted from the control unit: Initialize only the new module
- When a module is inserted (added) between the modules in the control unit: Initialize all modules
- To change the arrangement of the modules in the control unit: Initialize all modules

Note that when all modules are initialized all internal data of all modules are set to the default values.

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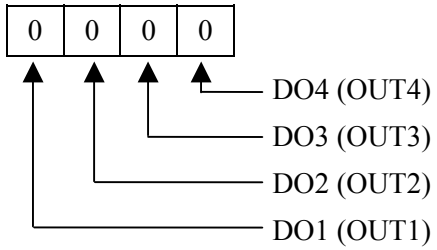
Function No.	Iden-tifier	Name	Attri-bite	Struc-ture	Data range	Factory set value
5650	**VP**	H-PCP-A/B module DO type selection	R/W	U	0000 to 9999 [a]	CH1: 9 CH2: 1 CH3: 2 CH4: 3
5A46	**ZF**	CT channel setting	R/W	C	0 to 20 (0: Unused) Allocates the channels for H-TIO-□ module to the input channels of H-CT-A module.	Note 1
4C54	**LT**	DO function selection (H-DO-A/B/D module)	R/W	M	00 to 88 [b]	Note 1

[a] H-PCP-A/B module DO type selection

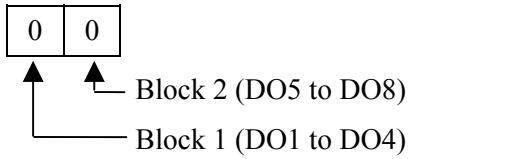


Setting will be validated for only DO1 and DO2 in case of H-PCP-B module.

Data range
- 0: No alarm function
- 1: Alarm 1/TI alarm 1
- 2: Alarm 2/TI alarm 2
- 3: Burnout
- 4: Heater break alarm (HBA)
- 5: Temperature rise completion output
- 6: AI alarm 1
- 7: AI alarm 2
- 8: Control loop break alarm (LBA)
- 9: FAIL output

[b] DO function selection (H-DO-A/B/D module)

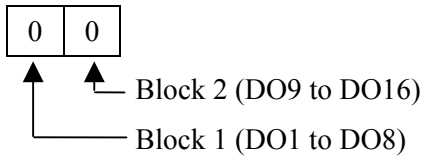
H-DO-A/B module



Setting will be validated for only block 1 (DO1 to DO4) in case of H-DO-B module.

Data range
- 0: No alarm function
- 1: Alarm 1
- 2: Alarm 2
- 3: Burnout
- 4: Heater break alarm (HBA)
- 5: AI alarm 1
- 6: AI alarm 2
- 7: Control loop break alarm (LBA)
- 8: (Not settable)

H-DO-D module



Note 1 The factory set value varies depending on the specifications when ordering.

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Function No.	Iden-tifier	Name	Attri-bite	Struc-ture	Data range	Factory set value
584B	**XK**	DI function selection (H-DI-A module)	R/W	M	0: Unused 1: Function mode 1 – Memory area transfer (ENABLE terminal is used) After area selection setting, the actual area is changed by detecting the ENABLE edge. – Control RUN/STOP transfer – Alarm interlock release 2: Function mode 2 – Memory area transfer The actual area is changed approximately 2 seconds after area selection setting. – Control RUN/STOP transfer – Alarm interlock release	1
4832	**H2**	DI using selection (H-DI-A module)	R/W	M	0 to 255 *	255

* DI using selection (H-DI-A module) ×: Used –: Unused

Setting data	Memory area transfer	Control RUN/STOP transfer	Alarm interlock release
63	×	×	×
127			
191			
255			
48	–	×	×
47	×	–	×
32	–	–	×
31	×	×	–
16	–	×	–
15	×	–	–
0	–	–	–

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Function No.	Identifier	Name	Attribute	Structure	Data range	Factory set value
564B	**VK**	AI input range number	R/W	C	0: 0 to 10 mV DC 1: −10 to +10 mV DC 2: 0 to 100 mV DC 3: −100 to +100 mV DC 4: 0 to 1 V DC 5: −1 to +1 V DC 6: 0 to 5 V DC 7: 1 to 5 V DC 8: −5 to +5 V DC 9: 0 to 10 V DC 10: −10 to +10 V DC 11: 0 to 20 mA DC 12: 4 to 20 mA DC If the input range number is changed, all of the settings corresponding to the channels in the relevant module return to the default values.	Note 1
4A53	**JS**	AI display scale high	R/W	C	Span 10000 or less (Within −9999 to +10000)	100.0 *
4A56	**JV**	AI display scale low	R/W	C	Span 10000 or less (Within −9999 to +10000)	0.0 *
4843	**HC**	AI alarm 1 differential gap	R/W	U	0.00 to 10.00 % of span	0.10
4846	**HF**	AI alarm 2 differential gap	R/W	U	0.00 to 10.00 % of span	0.10
5843	**XC**	AI alarm 1 type selection	R/W	U	0: Process high alarm 1: Process low alarm 2 to 6: No alarm function	Note 1
5844	**XD**	AI alarm 2 type selection	R/W	U	0: Process high alarm 1: Process low alarm 2 to 6: No alarm function	Note 1
5743	**WC**	AI alarm 1 hold action	R/W	U	0: Not provided 1: Provided	Note 1
5744	**WD**	AI alarm 2 hold action	R/W	U	0: Not provided 1: Provided	Note 1

* The position of the decimal point differs depending on AI decimal point position (Function No. 4A55, Identifier JU) setting.

Note 1 The factory set value varies depending on the specifications when ordering.

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Function No.	Iden-tifier	Name	Attri-bite	Struc-ture	Data range	Factory set value
4C43	**LC**	AI alarm 1 interlock	R/W	U	0: Not provided 1: Provided	0
4C44	**LD**	AI alarm 2 interlock	R/W	U	0: Not provided 1: Provided	0
544B	**TK**	Number of AI alarm delay times	R/W	U	0 to 255 times	0
4A55	**JU**	AI decimal point position	R/W	C	0: No digit below decimal point 1: 1 digit below decimal point 2: 2 digits below decimal point 3: 3 digits below decimal point	1
4A54	**JT**	Power supply frequency selection	R/W	U	0: 50 Hz 1: 60 Hz	0
4632	**F2**	AI digital filter	R/W	C	0.0 to 100.0 seconds (0.0: OFF)	0.0
5641	**VA**	AI moving average	R/W	C	0: Not provided 1: Provided	0
5856	**XV**	Display scale high (H-TIO-H/J, H-CIO-A, H-SIO-A module)	R/W	C	Span 10000 or less (Within –9999 to +10000)	H-TIO-H/J: 100.0 * H-CIO-A: 100.0 * H-SIO-A: 300 *
5857	**XW**	Display scale low (H-TIO-H/J, H-CIO-A, H-SIO-A module)	R/W	C	Span 10000 or less (Within –9999 to +10000)	H-TIO-H/J: 0.0 * H-CIO-A: 0.0 * H-SIO-A: 0 *
5855	**XU**	Decimal point position (H-TIO-H/J, H-CIO-A, H-SIO-A module)	R/W	C	0: No digit below decimal point 1: 1 digit below decimal point 2: 2 digits below decimal point 3: 3 digits below decimal point	H-TIO-H/J: 1 H-CIO-A: 1 H-SIO-A: 0

* The position of the decimal point differs depending on Decimal point position (Function No. 5855, Identifier XU) setting.

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Function No.	Iden-tifier	Name	Attri-bite	Struc-ture	Data range	Factory set value
4856	**HV**	AO display scale high	R/W	C	Span 10000 or less (Within –9999 to +10000)	100.0 [a]
4857	**HW**	AO display scale low	R/W	C	Span 10000 or less (Within –9999 to +10000)	0.0 [a]
4A52	**JR**	AO decimal point position	R/W	C	0: No digit below decimal point 1: 1 digit below decimal point 2: 2 digits below decimal point 3: 3 digits below decimal point	1
5057	**PW**	AO output change rate limiter	R/W	C	0.0 to 100.0 %/second (0.0: OFF)	0.0
5846	**XF**	Event DO function selection	R/W	C	0 to 30 [b]	0
5847	**XG**	Event DO corresponding channel setting	R/W	C	1 to 40 [b]	1
5848	**XH**	Event DO mode select setting	R/W	C	0 to 40 [b]	0
4847	**HG**	Event DO extension alarm differential gap	R/W	U	0.00 to 10.00 %	0.10
4C45	**LE**	Event DO extension alarm interlock	R/W	U	0: Not provided 1: Provided	0
5449	**TI**	Number of Event DO extension alarm delay times	R/W	U	0 to 255 times	0
584C	**XL**	Cascade tracking (H-CIO-A module)	R/W	M	0: Not provided Cascade monitored value becomes zero. 1: Provided Cascade monitored value just before is hold.	0

[a] The position of the decimal point differs depending on AO decimal point position (Function No. 4A52, Identifier JR) setting

[b] Set the function, corresponding channel and mode select of Event DO. Event DO uses it with event output function.

☞ For the data, refer to the ■ **Event output function (P. 73)**.

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Function No.	Iden-tifier	Name	Attri-bite	Struc-ture	Data range	Factory set value
4B44	**KD**	Cascade data selection (H-CIO-A module)	R/W	M	0: Manipulated outpur value 1: Temperature measured value (PV) 2: Temperature set value (SV) 3: Set value monitor 4: Temperature deviation	0
4833	**H3**	Cascade DI function selection (H-CIO-A module)	R/W	M	0: Unused 1: Cascade control ON/OFF only 2: Auto/Manual transfer only 3: DI1 validate (Cascade control ON/OFF), DI2 validate (Auto/Manual transfer)	3
		DI process selection (H-SIO-A module) *	R/W	M	0: Unused 1: H-SIO-A open/closed loop control transfer only 2: Control RUN/STOP transfer only 3: H-SIO-A open/closed loop control transfer and Control RUN/STOP transfer	3

* DI process selection setting or communication setting ×: Validate –: Invalidate

Transfer by external contact input	Transfer via communication	
DI process selection (Function No. 4833, Identifier H3)	**H-SIO-A open/closed loop control transfer (Function No. 534D, Identifier SM)**	**Control RUN/STOP transfer (Function No. 5352, Identifier SR)**
0: Unused	×	×
1: H-SIO-A open/closed loop control transfer only	–	×
2: Control RUN/STOP transfer only	×	–
3: H-SIO-A open/closed loop control transfer and Control RUN/STOP transfer	–	–

☞ For Control RUN/STOP transfer (Function No. 5352, Identifier SR), refer to **7.2.1 Normal setting data (P. 39)**.

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Function No.	Iden-tifier	Name	Attri-bite	Struc-ture	Data range	Factory set value
584A	**XJ**	TI input range number	R/W	C	0 to 120 If the input range number is changed, all of the settings corresponding to the channels in the relevant module return to the default values. Refer to **Input range table (P. 79)**	Note 1
4633	**F3**	TI digital filter	R/W	C	0.0 to 100.0 seconds (0.0: OFF)	0.0
4849	**HI**	TI alarm 1 differential gap	R/W	U	0.00 to 10.00 % of span	0.10
484A	**HJ**	TI alarm 2 differential gap	R/W	U	0.00 to 10.00 % of span	0.10
5850	**XP**	TI alarm 1 type selection	R/W	U	0: Process high alarm 1: Process low alarm 2 to 6: No alarm function	Note 1
5851	**XQ**	TI alarm 2 type selection	R/W	U	0: Process high alarm 1: Process low alarm 2 to 6: No alarm function	Note 1
5745	**WE**	TI alarm 1 hold action	R/W	U	0: Not provided 1: Provided	Note 1
5746	**WF**	TI alarm 2 hold action	R/W	U	0: Not provided 1: Provided	Note 1
4C46	**LF**	TI alarm 1 interlock	R/W	U	0: Not provided 1: Provided	0
4C47	**LG**	TI alarm 2 interlock	R/W	U	0: Not provided 1: Provided	0
4F43	**OC**	TI alarm 1 action at input error	R/W	U	0: Normal alarm action 1: Forced alarm ON when temperature measured value exceeds abnormal input trigger input.	0
4F44	**OD**	TI alarm 2 action at input error	R/W	U	0: Normal alarm action 1: Forced alarm ON when temperature measured value exceeds abnormal input trigger input.	0

Note 1 The factory set value varies depending on the specifications when ordering.

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Function No.	Iden-tifier	Name	Attri-bite	Struc-ture	Data range	Factory set value
4447	**DG**	Number of TI alarm delay times	R/W	U	0 to 255 times	0
5231	**R1**	Event DI type selection 1	R/W	L	0 to 30 * (17 to 30: Not settable)	0
5232	**R2**	Event DI type selection 2	R/W	L	0 to 30 * (17 to 30: Not settable)	0
5233	**R3**	Event DI type selection 3	R/W	L	0 to 30 * (17 to 30: Not settable)	0
5234	**R4**	Event DI type selection 4	R/W	L	0 to 30 * (17 to 30: Not settable)	0
4531	**E1**	Event DI corresponding channel selection 1	R/W	L	1 to 80 *	1
4532	**E2**	Event DI corresponding channel selection 2	R/W	L	1 to 80 *	1
4533	**E3**	Event DI corresponding channel selection 3	R/W	L	1 to 80 *	1
4534	**E4**	Event DI corresponding channel selection 4	R/W	L	1 to 80 *	1
5731	**W1**	Event DI reversal selection 1	R/W	L	0: Normal 1: Reversal	0
5732	**W2**	Event DI reversal selection 2	R/W	L	0: Normal 1: Reversal	0
5733	**W3**	Event DI reversal selection 3	R/W	L	0: Normal 1: Reversal	0
5734	**W4**	Event DI reversal selection 4	R/W	L	0: Normal 1: Reversal	0
4C55	**LU**	Event DI logic circuit selection	R/W	L	0: *AND* (1 active) 1: *NAND* (0 active) 2: *OR* (1 active) 3: *NOR* (0 active)	0
4C57	**LW**	Event DI delay timer setting	R/W	L	0 to 255 times	1

* Set the type and corresponding channel of Event DI. Event DI uses it with logic input function.

☞ For the data, refer to the ■ **Logic input function (P. 76)**.

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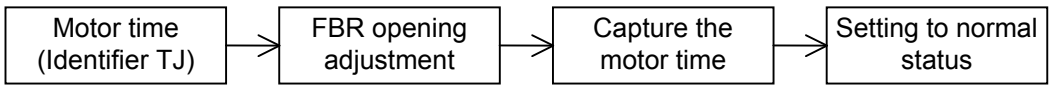
Function No.	Iden-tifier	Name	Attri-bite	Struc-ture	Data range	Factory set value
4448	**DH**	Number of HBA trigger points (H-CT-A module)	R/W	U	0 to 255 times	5
4656	**FV**	Positioning adjustment counter (H-TIO-K module)	R/W	C	0 to 100 *	0

* Positioning adjustment counter

The opening adjustment and the motor time are taken in. When the specified setting counter value is input, the operations begin. (This is only validated when control is stopped.)

📖 **Always adjust the opening first and capture the motor time after the adjustment is complete.**



☞ For details, refer to the ■ **Positioning adjustment counter (P. 78)**.

☞ For the motor time (Function No. 544A, Identifier TJ), refer to **7.2.1 Normal setting data (P. 39)**.

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Function No.	Iden-tifier	Name	Attri-bite	Struc-ture	Data range	Factory set value
5651	**VQ**	H-PCP-B module DI type selection	R/W	U	0 to 3 * 0: No function 1: Function mode 1 2: Function mode 2 3: Function mode 3	0

* There are four patterns of the following in DI type selection.

0: No function

1: Function mode 1

Memory area selection by using DI1 to DI3 (8-area selection)

	Control area							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
DI1	×	–	×	–	×	–	×	–
DI2	×	×	–	–	×	×	–	–
DI3	×	×	×	×	–	–	–	–

×: Contact open
–: Contact closed

2: Function mode 2

Memory area selection by using DI1 and DI2 (4-area selection)

	Control area			
	1	**2**	**3**	**4**
DI1	×	–	×	–
DI2	×	×	–	–

×: Contact open
–: Contact closed

Control RUN/STOP transfer by using DI3

Contact open: Control STOP
Contact closed: Control STOP

3: Function mode 3

Memory area selection by using DI1 (2-area selection)

Contact open: Area 1
Contact closed: Area 2

Alarm interlock release by using DI2

Contact closed: Alarm interlock release

Control RUN/STOP transfer by using DI3

Contact open: Control STOP
Contact closed: Control STOP

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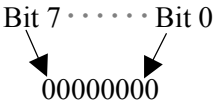
Function No.	Iden-tifier	Name	Attri-bite	Struc-ture	Data range	Factory set value
4834	**H4**	H-PCP-B module DI using selection	R/W	U	0 to 7 [a] Selection status is expressed as a bit image in decimal number.	7
5653	**VS**	H-PCP-A module, H-PCP-J module DO de-energized selection	R/W	U	0 to 255 [b] Selection status is expressed as a bit image in decimal number.	0
4A46	**JF**	H-SIO-A input frequency at full scale	R/W	C	10 to 50000 Hz	130
5343	**SC**	H-SIO-A control range	R/W	C	0.00 to 50.00 %	10.00
5355	**SU**	H-SIO-A output scale high	R/W	C	H-SIO-A output scale low to 10000	400 [c]
5344	**SD**	H-SIO-A output scale low	R/W	C	–9999 to H-SIO-A output scale high	0 [c]
5350	**SP**	H-SIO-A measuring method	R/W	C	0: Periodic computation method 1: Pulse count method	0

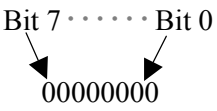
[a] DI using selection is assigned as a bit image in binary numbers. However, send data from the SR Mini HG be changed to decimal ASCII code from the bit image in binary numbers.



Bit 0: CH1 (DI1)
Bit 1: CH2 (DI2)
Bit 2: CH3 (DI3)
Bit 3 to Bit 7 are unused.

Bit data 0: Unused 1: Used

[b] Each DO selection state is assigned as a bit image in binary numbers. However, send data from the SR Mini HG be changed to decimal ASCII code from the bit image in binary numbers.



Bit data 0: Energized 1: De-energized

Bit 0: DO1
Bit 1: DO2
Bit 2: DO3
Bit 3: DO4
Bit 4: DO5
Bit 5: DO6
Bit 6: DO7
Bit 7: DO8
For H-PCP-A module, Bit 4 to Bit 7 are unused.

[c] The position of the decimal point differs depending on Decimal point position (Function No. 5855, Identifier XU) setting.

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Function No.	Iden-tifier	Name	Attri-bite	Struc-ture	Data range	Factory set value
5351	**SQ**	H-SIO-A divide ratio	R/W	C	1 to 1000 Validates only for periodic computation method.	10
5254	**RT**	H-SIO-A gate time	R/W	C	0.1 to 4.0 seconds Validates only for pulse count method.	1.0
5341	**SA**	H-SIO-A auto zero time	R/W	C	1 to 100 seconds	5
5357	**SW**	H-SIO-A alarm hold cancel time	R/W	U	1 to 255 seconds Setting will be invalidated in no alarm hold action.	60
534D	**SM**	H-SIO-A open/closed loop control transfer	R/W	C	0: Closed loop control (PID control) 1: Open loop control	0
5345	**SE**	H-SIO-A correction trigger	R/W	C	0: Normal 1: Correction executed 2: Correction canceled Processing time of correction execution or cancel is about 1 second. Do not turn OFF the power during the processing time. In addition, maintain the setting more than 0.5 second in order to let it recognize modification in setting modification.	0
4A32	**J2**	H-SIO-A correction actual measured value	R/W	C	Within display scale range	0 [a]
4A57	**JW**	PV bias unit selection	R/W	U	0: % (of span) 1: Unit of input range	0 [b]

[a] The position of the decimal point differs depending on Decimal point position (Function No. 5855, Identifier XU) setting.

[b] For the ZK-1103 specification, the factory set value is 1 (Unit of input range).

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Function No.	Iden-tifier	Name	Attri-bite	Struc-ture	Data range	Factory set value
5655	**VU**	H-PCP-J module DO type selection	R/W	C	0: No alarm function 1: Alarm 1/TI alarm 1 2: Alarm 2/TI alarm 2 3: Burnout 4: Heater break alarm (HBA) 5: Temperature rise completion output 6: AI alarm 1 7: AI alarm 2 8: Control loop break alarm (LBA) 9: FAIL output 10: PLC communication state [Action] 1 to 4, 6 to 8 : Closed at alarm occurrence 5: Closed at temperature rise completion 9: Open at fail occurrence 10: Closed at communication with PLC Be action of energized case. Action reverses in case of de-energized. (For the energize/de-energized, refer to H-PCP-J module DO de-energized selection.)	CH1: 9 CH2: 1 CH3: 2 CH4: 3 CH5: 4 CH6: 5 CH7: 8 CH8: 10

■ Event output function

The event output function enables up to eight points to be output per module of unique alarms different from ordinary temperature and AI alarms (Extension alarm output function), control unit operations (Status output function) and comparison results which are output only under certain conditions (Data comparison output function). The function can be set for each channel of the H-DO-C module.

● Extension alarm output function

An extension alarm is output independently of H-TIO-□ module alarms. As it is independently set, it can be provided as a dedicated alarm output.

Event DO function selection (Function No. 5846, Identifier XF)		Event DO corresponding channel setting (Function No. 5847, Identifier XG)	Event DO mode select setting (Function No. 5848, Identifier XH)
Setting data	Function name		
10	Temperature deviation alarm	1 to 20 CH (H-TIO-□ module)	0: High alarm 1: Low alarm 2: High/low alarm 3: Band alarm 4: High alarm with hold action 5: Low alarm with hold action 6: High/low alarm with hold action 7: Band alarm with hold action 8: High alarm with re-hold action 9: Low alarm with re-hold action 10: High/low alarm with re-hold action
	Motor speed deviation alarm	1 to 20 CH (H-SIO-A module)	
11	Temperature process alarm	1 to 20 CH (H-TIO-□ module)	0: High alarm 1: Low alarm 2: High alarm with hold action 3: Low alarm with hold action
	Motor speed process alarm	1 to 20 CH (H-SIO-A module)	
12	Temperature set value alarm	1 to 20 CH (H-TIO-□ module)	0: High alarm 1: Low alarm
	Motor speed set value alarm	1 to 20 CH (H-SIO-A module)	
13	AI process alarm	1 to 40 CH (H-AI-□ module)	0: High alarm 1: Low alarm 2: High alarm with hold action 3: Low alarm with hold action
20	TI process alarm	1 to 40 CH (H-TI-□ module)	0: High alarm 1: Low alarm 2: High alarm with hold action 3: Low alarm with hold action

📖 This output is different from the ordinary alarm output from the H-DO-A/B type module. Similarly, the ordinary alarm cannot be output from the H-DO-C type module (for event output).

📖 The alarm differential gap and alarm delay timer are commonly set.

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- **Status output function**

  This function is used to output the control unit action status other than the extension alarm output in addition to the ordinary alarm output status (Alarm 1 status, etc.).

Event DO function selection (Function No. 5846, Identifier XF)		Event DO corresponding channel setting (Function No. 5847, Identifier XG)	Event DO mode select setting (Function No. 5848, Identifier XH)
Setting data	Function name		
0	Unused (Manual mode)	—	—
1	Alarm 1	1 to 20 CH (H-TIO-☐/H-SIO-A module)	—
2	Alarm 2	1 to 20 CH (H-TIO-☐/H-SIO-A module)	—
3	Burnout	1 to 20 CH (H-TIO-☐ module)	—
4	Heater break alarm (HBA)	1 to 20 CH (H-TIO-☐ module)	—
5	AI alarm 1	1 to 40 CH (H-AI-☐ module)	—
6	AI alarm 2	1 to 40 CH (H-AI-☐ module)	—
7	Control loop break alarm (LBA)	1 to 20 CH (H-TIO-☐ module)	—
8	PID/AT	1 CH	—
17	TI alarm 1	1 to 40 CH (H-TI-☐ module)	—
18	TI alarm 2	1 to 40 CH (H-TI-☐ module)	—
19	TI burnout	1 to 40 CH (H-TI-☐ module)	—
22	Event DI logic output status	1 to 40 CH (H-DI-B module)	—
9	Not settable	—	—
23 to 30	Not settable	—	—

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- **Data comparison output function**

  This function is used to output the result of comparison between the measured value and measured value (or set value and set value) within the same group.

Event DO function selection (Function No. 5846, Identifier XF)		Event DO corresponding channel setting (Function No. 5847, Identifier XG)	Event DO mode select setting (Function No. 5848, Identifier XH)
Setting data	**Function name**	**Data 1**	**Data 2**
14	**Temperature measured value comparison** Comparison between the temperature measured value and temperature measured value	1 to 20 CH (H-TIO-☐ module)	1 to 20 CH (H-TIO-☐ module)
	Motor speed measured value comparison Comparison between the motor speed measured value and motor speed measured value	1 to 20 CH (H-SIO-A module)	1 to 20 CH (H-SIO-A module)
15	**Temperature set value comparison** Comparison between the temperature set value and temperature set value	1 to 20 CH (H-TIO-☐ module)	1 to 20 CH (H-TIO-☐ module)
	Motor speed set value comparison Comparison between the motor speed set value and motor speed set value	1 to 20 CH (H-SIO-A module)	1 to 20 CH (H-SIO-A module)
16	**AI measured value comparison** Comparison between the AI measured value and AI measured value	1 to 40 CH (H-AI-☐ module)	1 to 40 CH (H-AI-☐ module)
21	**TI measured value comparison** Comparison between the TI measured value and TI measured value	1 to 40 CH (H-TI-☐ module)	1 to 40 CH (H-TI-☐ module)

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[Relationship between output and comparison]

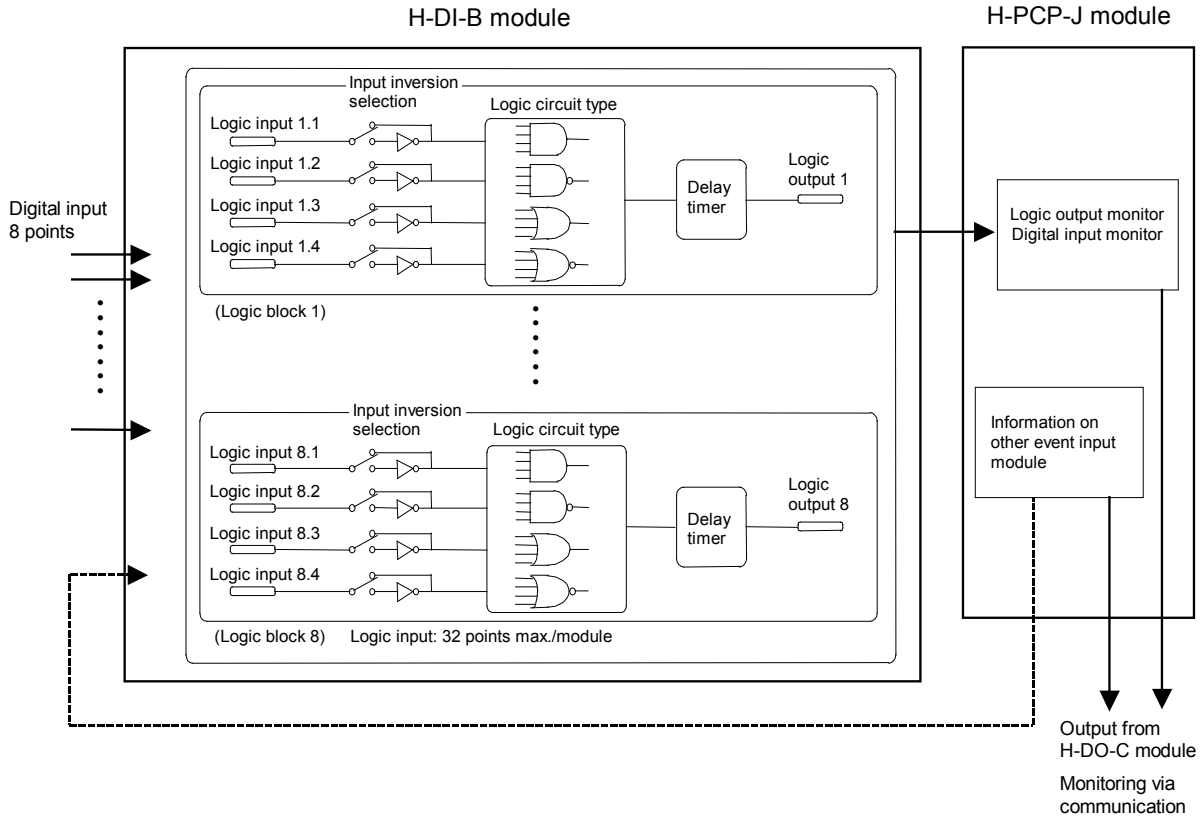
Computing equation:
The output turns ON at (Data 2) − (Data 1) ≤ 0

This means :
The output turns ON if (Data 2) is smaller than or equal to (Data 1). {Data 2 ≤ Data 1}
The output turns OFF if (Data 2) is larger than (Data 1). {Data 2 > Data 1}

■ Logic input function

Each logic is built by four event inputs. Up to eight logic results (logic outputs) per H-DI-B module can be monitored through communication or can be output from H-DO-C module. In addition, this function can assign the input of the H-DI-B module to any channel number of the H-DO-C module to output the result.

The logic section of event DI module consists of 4 logic input points, input reversal selection, logic circuit type selection, input delay timer and logic output.



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Event DI type selection		Event DI corresponding channel selection	Note
Setting data	Description		
0	Input always OFF	—	Always ON at "Reversal" selection
1	Event DI input	1 to 80	0: OFF 1: ON
2	Event DI logic output	1 to 80	0: OFF 1: ON
3	Event DO output	1 to 72	0: OFF 1: ON
4	PCP error code	—	0: Not provided 1: Provided
5	Temperature rise completion	—	0: Rise not complete 1: Rise completed
6	PID/AT logical *OR*	—	0: All PID 1: Any one is in AT
7	Alarm 1	1 to18	0: OFF 1: ON
8	Alarm 2	1 to18	0: OFF 1: ON
9	Burnout	1 to18	0: OFF 1: ON
10	Heater break alarm (HBA)	1 to18	0: OFF 1: ON
11	Control loop break alarm (LBA)	1 to18	0: OFF 1: ON
12	AI alarm 1	1 to 36	0: OFF 1: ON
13	AI alarm 2	1 to 36	0: OFF 1: ON
14	TI alarm 1	1 to 36	0: OFF 1: ON
15	TI alarm 2	1 to 36	0: OFF 1: ON
16	TI burnout	1 to 36	0: OFF 1: ON
17 to 30	Not settable	—	—

Each contact status can be monitored by the following identifier.

Digital input (1 to 8) → Event DI contact input monitor (Function No. 4C34, Identifier L4)

Logic input (1 to 4)/Logic section → Event DI logic input monitor (Function No. 4C35, Identifier L5)

Logic input (1 to 8) → Event DI logic output monitor (Function No. 5135, Identifier Q5)

For function No. 4C34, 43C5 and 5135 (identifier L4, L5 and Q5), refer to **7.2.1 Normal setting data (P. 39)**.

■ Positioning adjustment counter

Item	Setting data (Setting counter value)	Description	Status
Opening adjustment	0	Normal status	
	1	Opening adjustment star, open-side output start (Motor time: 110 %)	Automatic
	2	Capture the open-side opening value after 3 seconds stop	
	3	Close-side output start (Motor time: 110 %)	
	4	Capture the close-side opening value after 3 seconds stop	
	5	Above data stored in H-TIO-K module	
	6	Hold status	
Capture the motor time	7	Outputs the close-side until the positioning becomes 0 %. Open-side output start if the positioning is less than 0 %. Stops at an positioning of more than 100 %, and capture the motor time by H-TIO-K module	Automatic
	8	After the motor time has been captured, close-side output comes ON (Motor time : 110 %)	
	9	Hold status	
–	10 to 100	Not settable	

When you input setting counter 1, the opening adjustment starts, operations are carried out automatically up to setting counter 6, then the system goes on hold status. When you input setting counter 7, the motor time capture starts, operations are carried out automatically up to setting counter 9, then the system goes on hold status. After the settings are complete, always set to “0: Normal status.”

■ Input Range Table

Thermocouple input (H-TIO-A/B/C/D/E/G/K/P/R, H-TI-B/C, H-CIO-A)

Input type		Range No.
K	0 to 400 °C	0
	0 to 800 °C	1
	0 to 1300 °C	2
	0.0 to 400.0 °C	46
	0.0 to 800.0 °C	47
	0.0 to 1300.0 °C [1]	80
	0 to 800 °F	3
	0.0 to 800.0 °F	48
	0 to 2400 °F	4
	0.0 to 2400.0 °F [1]	81
	−200.0 to +300.0 °C [1]	64
	−100.0 to +400.0 °C [2]	67
J	0 to 400 °C	5
	0 to 800 °C	6
	0 to 1200 °C	7
	0.0 to 400.0 °C	49
	0.0 to 800.0 °C	50
	0.0 to 1200.0 °C [1]	82
	0 to 1600 °F	8
	0.0 to 700.0 °F	51
	0 to 2100 °F	9
	0.0 to 1600.0 °F [1]	83
	−200.0 to +300.0 °C [1]	65
R	0 to 1700 °C	10
	0.0 to 1700.0 °C [1]	84
	0 to 3000 °F	11
S	0 to 1700 °C	12
	0.0 to 1700.0 °C [1]	85
	0 to 3000 °F	13
B [3]	0 to 1800 °C	14
	0.0 to 1800.0 °C [1]	86
	0 to 3000 °F	15
E	0 to 1000 °C	17
	0.0 to 700.0 °C	52
	0 to 400 °C	16
	0.0 to 400.0 °C [1]	87
	0.0 to 1000.0 °C [1]	88
	0 to 1800 °F	18
	0.0 to 1800.0 °F [1]	89

Input type		Range No.
T	0.0 to 400.0 °C	53
	0 to 400 °C	20
	0 to 200 °C	19
	−200 to +200 °C	21
	0.0 to 200.0 °C [1]	90
	−200.0 to +200.0 °C [1]	91
	0.0 to 700.0 °F	54
	0 to 700 °F	22
	−300 to +400 °F	23
	−300.0 to +400.0 °F [1]	92
N	0 to 1300 °C	24
	0.0 to 1300.0 °C [1]	93
	0 to 2300 °F	25
	0.0 to 2300.0 °F [1]	94
PL II	0 to 1200 °C	26
	0.0 to 1200.0 °C [1]	95
	0 to 2300 °F	27
	0.0 to 2300.0 °F [1]	96
W5Re/ W26Re	0 to 2300 °C	28
	0.0 to 2300.0 °C [1]	97
	0 to 3000 °F	29
U	0.0 to 600.0 °C	55
	0 to 400 °C	30
	−200 to +200 °C	31
	0.0 to 400.0 °C [1]	98
	−200.0 to +200.0 °C [1]	99
	0 to 700 °F	32
	−300 to +400 °F	33
	0.0 to 700.0 °F [1]	100
	−300.0 to +400.0 °F [1]	101
L	0 to 400 °C	34
	0.0 to 400.0 °C	56
	0.0 to 900.0 °C	57
	0 to 900 °C	35
	0 to 800 °F	36
	0 to 1600 °F	37
	0.0 to 800.0 °F [1]	102
	0.0 to 1600.0 °F [1]	103

[1] The range can be specified only by H-TIO-E/G/R, H-TI-B or H-CIO-A module (high accuracy type).

[2] The range can be specified only by H-TIO-A/B/C/D [Z-1013 specification] or H-TI-C module [Z-1013 specification].

[3] Accuracy is not guaranteed between 0 and 400 °C (0 and 800 °F) for type B thermocouple input.

RTD input (H-TIO-A/B/C/D/E/F/G/K/P/R, H-TI-A/B, H-CIO-A)

Input type		Range No.
JPt100	0.0 to 400.0 °C	59
	0 to 400 °C	38
	−200 to +200 °C	39
	−200.0 to +200.0 °C	58
	−50.00 to +150.00 °C [1]	106
	−300 to +900 °F	41
	0 to 800 °F	40
	0.0 to 800.0 °F	60
	−300.0 to +900.0 °F [2]	104
Pt100	0.0 to 400.0 °C	62
	0 to 400 °C	42
	−200 to +200 °C	43
	−200.0 to +200.0 °C	61
	−50.00 to +150.00 °C [1]	107
	−300 to +1200 °F	45
	0 to 800 °F	44
	0.0 to 800.0 °F	63
	−300.0 to +1200.0 °F [2]	105

[1] The range with the resolution of 1/100 can be specified only by H-TIO-E module.
[2] The range can be specified only by H-TIO-F module (high accuracy type).

Current input and Voltage input (H-TIO-H/J, H-CIO-A)

Input type			Range No.
Voltage input *	0 to 10 mV DC	0.0 to 100.0 %	0
	−10 to +10 mV DC	0.0 to 100.0 %	1
	0 to 100 mV DC	0.0 to 100.0 %	2
	−100 to +100 mV DC	0.0 to 100.0 %	3
	0 to 1 V DC	0.0 to 100.0 %	4
	−1 to +1 V DC	0.0 to 100.0 %	5
	0 to 5 V DC	0.0 to 100.0 %	6
	1 to 5 V DC	0.0 to 100.0 %	7
	−5 to +5 V DC	0.0 to 100.0 %	8
	0 to 10 V DC	0.0 to 100.0 %	9
	−10 to +10 V DC	0.0 to 100.0 %	10
Current input *	0 to 20 mA DC	0.0 to 100.0 %	11
	4 to 20 mA DC	0.0 to 100.0 %	12

* Display scale of the current and voltage input can be changed.

Pulse input (H-SIO-A)

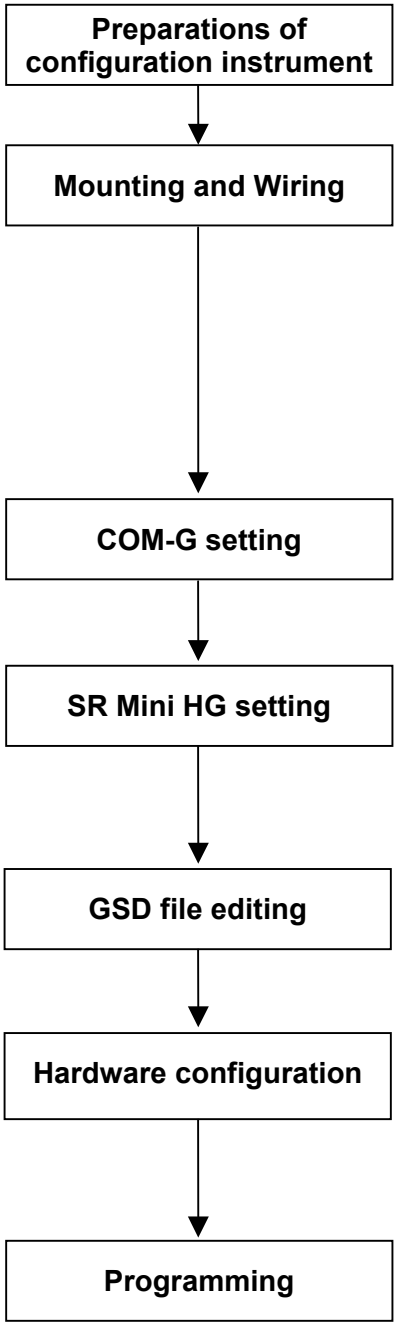
Input type		Range No.
Pulse input	• Dry contact input (Power supply for sensor, 12 V DC) • Voltage input (Power supply for sensor, 12 V DC) Specify when ordering with model code.	0

Do not set any number other than 0, as this may cause malfunction.

8. USAGE EXAMPLE

In this Chapter, an example of using PROFIBUS communication when the COM-G and SR Mini HG are connected to a PLC as a master.

8.1 Handling Procedures



☞ Refer to **8.2 System Configuration (P. 82)**.

☞
- For mounting and wiring of the COM-G, refer to **3. MOUNTING (P. 10)** and **4. WIRING (P. 15)**.
- For mounting and wiring of the PLC, refer to **PLC Instruction Manual**.
- For mounting and wiring of the SR Mini HG, refer to **SR Mini HG SYSTEM Hardware Instruction Manual (IMSRM15-E□)** or **Power Supply/CPU Module H-PCP-J Instruction Manual (IMS01J01-E□)**.

☞ Refer to **5. SETTING (P. 21)** and **8.3 Hardware Setting (P. 83)**.

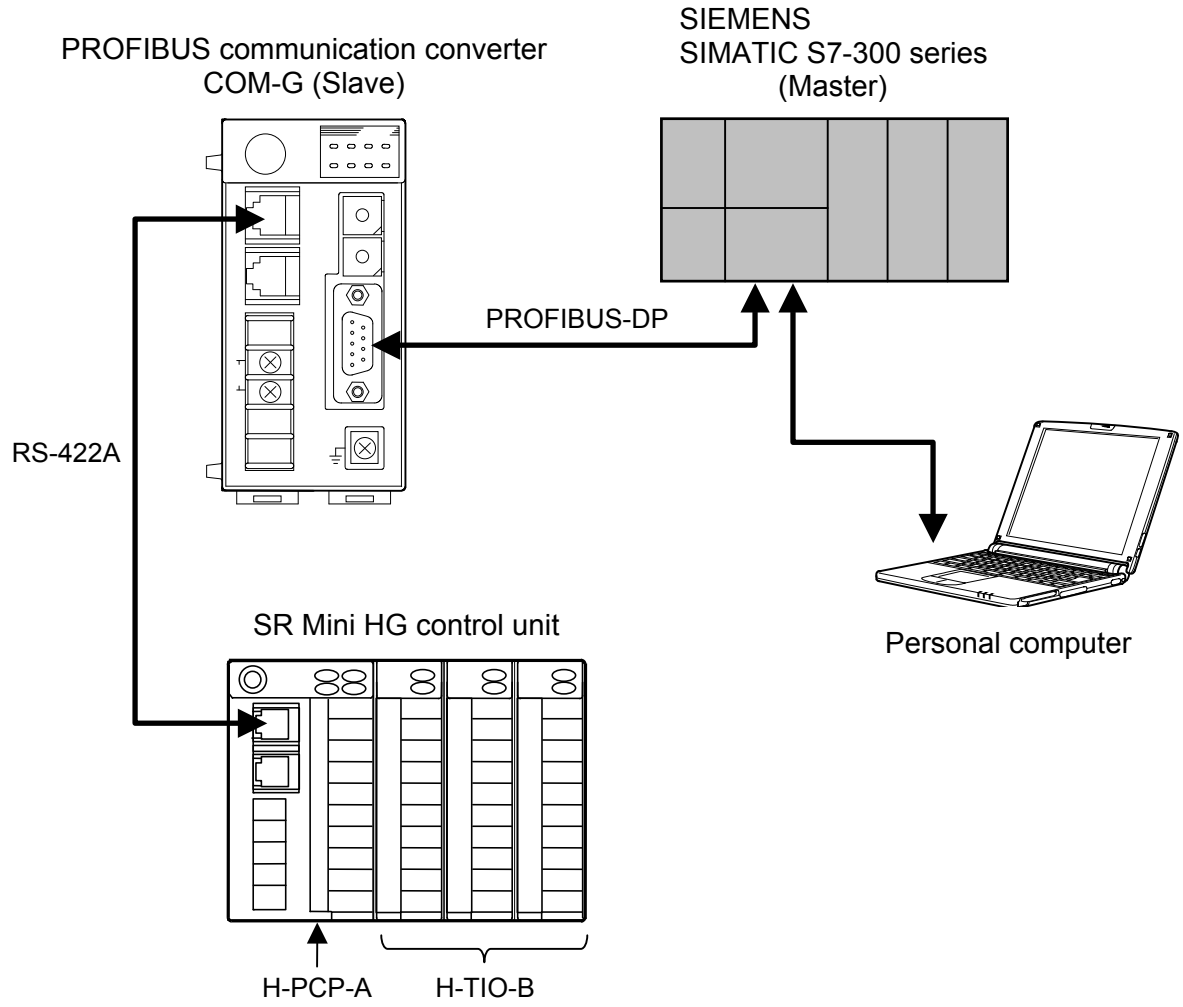
☞ Refer to **8.3 Hardware Setting (P. 83)** and **SR Mini HG SYSTEM Hardware Instruction Manual (IMSRM15-E□)** or **Power Supply/CPU Module H-PCP-J Instruction Manual (IMS01J01-E□)**.

☞ Refer to **6.2 GSD File Editing (P. 27)**, **7. LIST OF FUNCTION NUMBER (P. 38)** and **8.4 Example of the GSD File Editing (P. 84)**.

☞ Refer to **6. PROFIBUS COMMUNICATION (P. 25)**, **8.5 Setting Example of the Programming Software STEP7 (P. 86)** and **Instruction Manual of the Programming Software STEP7**.

☞ Refer to **8.5 Setting Example of the Programming Software STEP7 (P. 86)** and **Instruction Manual of the Programming Software STEP7**.

8.2 System Configuration



■ Use instruments

- PROFIBUS communication converter
  COM-G-1-10
- SR Mini HG SYSTEM
  Power/CPU module H-PCP-A, Temperature control module H-TIO-B
- PLC
  SIMATIC S7-300 series (SIEMENS AG)
  CPU: CPU315-2DP Power module: PS307 2A
- Personal computer
  Software of the following must be installed in a personal computer.
  - RKC GSD file editor (Download from the official RKC website)
  - Programming Software STEP7 V5.0 orV5.1 (SIEMENS AG)

☞ For the personal computer to be connected to the PLC, refer to Instruction Manual of PLC and STEP7.

8.3 Hardware Setting

Set each hardware's as the following.

There is not the hardware setting of PLC: SIMATIC S7-300 series (SIEMENS AG).

■ COM-G setting

Set the COM-G in requirement of the following.

[PROFIBUS communication requirement]
- PROFUBUS address: 3

[SR Mini HG communication requirement]
- SR Mini HG communication speed: 19200 bps

For setting method, refer to **5. SETTING (P. 21)**.

■ SR Mini HG setting

Set the SR Mini HG in requirement of the following.

[SR Mini HG communication requirement]
- SR Mini HG address: 0
- SR Mini HG communication speed: 19200 bps
- SR Mini HG data bit configuration: Data 8 bits, Without parity, Stop 1 bit

An address of SR Mini HG connecting with COM-G always sets "0."
In addition, data bit configuration of SR Mini HG always sets "Data bit: 8, Parity bit: Without, and Stop bit: 1."

For setting method, refer to **SR Mini HG SYSTEM Communication Quick Manual (IMS01V02-E□), SR Mini HG Communication Instruction Manual (IMSRM09-E□)** or **Power Supply/CPU Module H-PCP-J Instruction Manual (IMS01J01-E□)**.

8.4 Example of the GSD File Editing

Set requirement of the following with a RKC GSD File Editor, and create a GSD file.

[Setting requirement]

- Number of SR Mini HG channel connected to COM-G: 5 channels
- Number of register to use by dynamic data request: 10
- Read item of static data request: 4 items [Temperature input measured value (PV), Temperature set value (SV), Alarm 1 state, Alarm 2 state]
- Write item of static data request: 3 items [Temperature set value (SV), Heat-side proportional band, Integral time]

[Handling Procedures]

1. Start the RKC GSD File Editor and then display a list of SR Mini HG function numbers by clicking the tab described as "SR Mini HG" in the Function List.

2. Static data items to be read from the SR Mini HG are selected from among items in the Function List. If the ADD button in the "The Data to be read from a Controller Statically" column is clicked after item selection, item names and communication identifiers are displayed in the list on the right side.
[Selecting items: Measured Value (PV) Input, Temperature Set Value, 1st Alarm Condition, 2nd Alarm Condition]

3. Static data items to be written from the SR Mini HG are selected from among items in the Function List. If the ADD button in the "The Data to be written into a Controller Statically" column is clicked after item selection, item names and communication identifiers are displayed in the list on the right side.
[Selecting items: Temperature Set Value, Proportional Band (Heat), Integral Time]

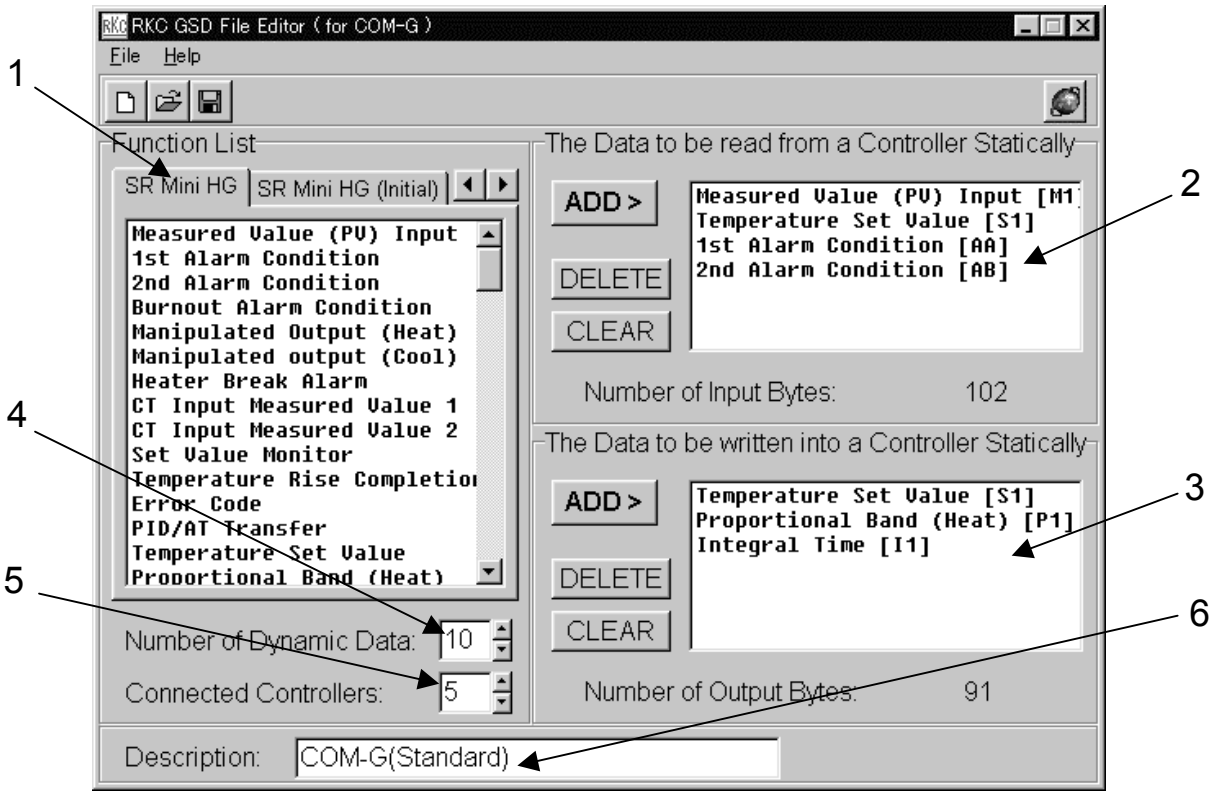
4. The number of registers at "10" used for a dynamic data request is set to "Number of Dynamic Data."

5. For "Connected Controllers," set the SR Mini HG channel number "5" connected to the COM-G. (For the SR Mini HG, replacing "Connected Controllers" with "Connected Channels.")

6. "COM-G (Standard)" is entered in "Description" to enable the GSD file to be identified on Programming Software STEP7.

7. If setting of the above was finished, save it as a GSD file.
The file name is "RKC_05AA.gsd."

☞ For an operation method of the RKC GSD File Editor, refer to **Help of RKC GSD File Editor**.

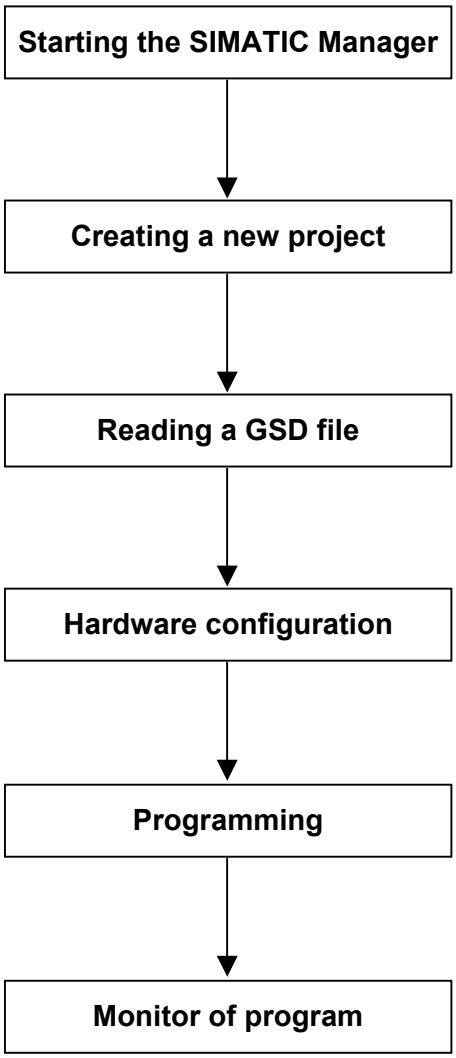


RKC GSD File Editor screen displayed when work procedures from 1 to 6 are finished

8.5 Setting Example of the Programming Software STEP7

8.5.1 Outline

The procedure of using the Programming Software STEP7 V5.0 is as follows.



☞ Refer to **8.5.2 Starting the SIMATIC Manager and creating a new project (P. 87)**.

☞ Refer to **8.5.2 Starting the SIMATIC Manager and creating a new project (P. 87)**.

☞ Refer to **8.5.3 Reading a GSD file (P. 88)**.

☞ Refer to **8.5.4 Hardware configuration (P. 91)**.

☞ Refer to **8.5.5 Programming (P. 96)**.

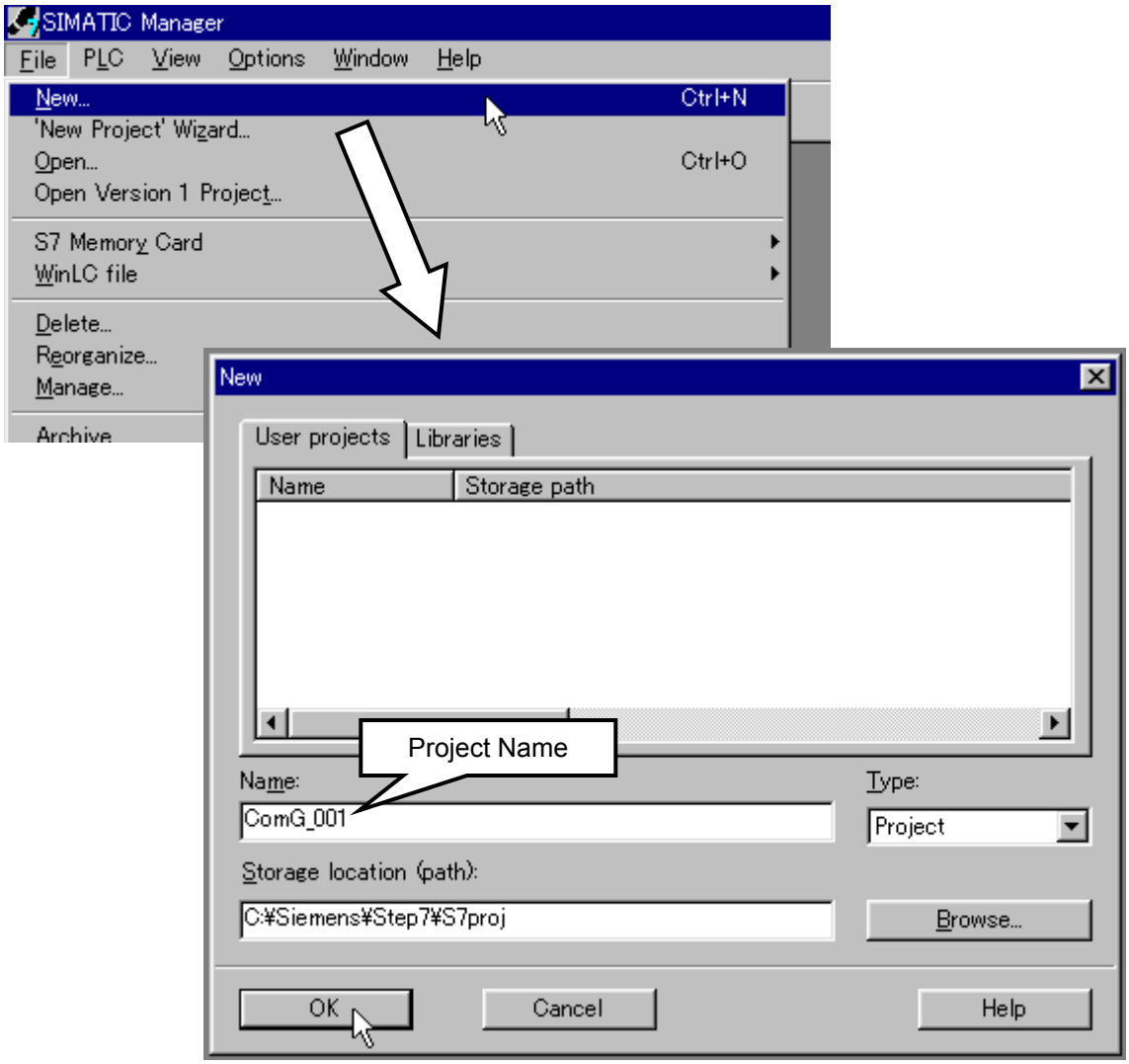
☞ Refer to **8.5.5 Programming (P. 96)**.

☞ For details, refer to Instruction Manual of the Programming Software STEP7.

8.5.2 Starting the SIMATIC Manager and creating a new project

1. Start SIMATIC Manager from an icon or start button.

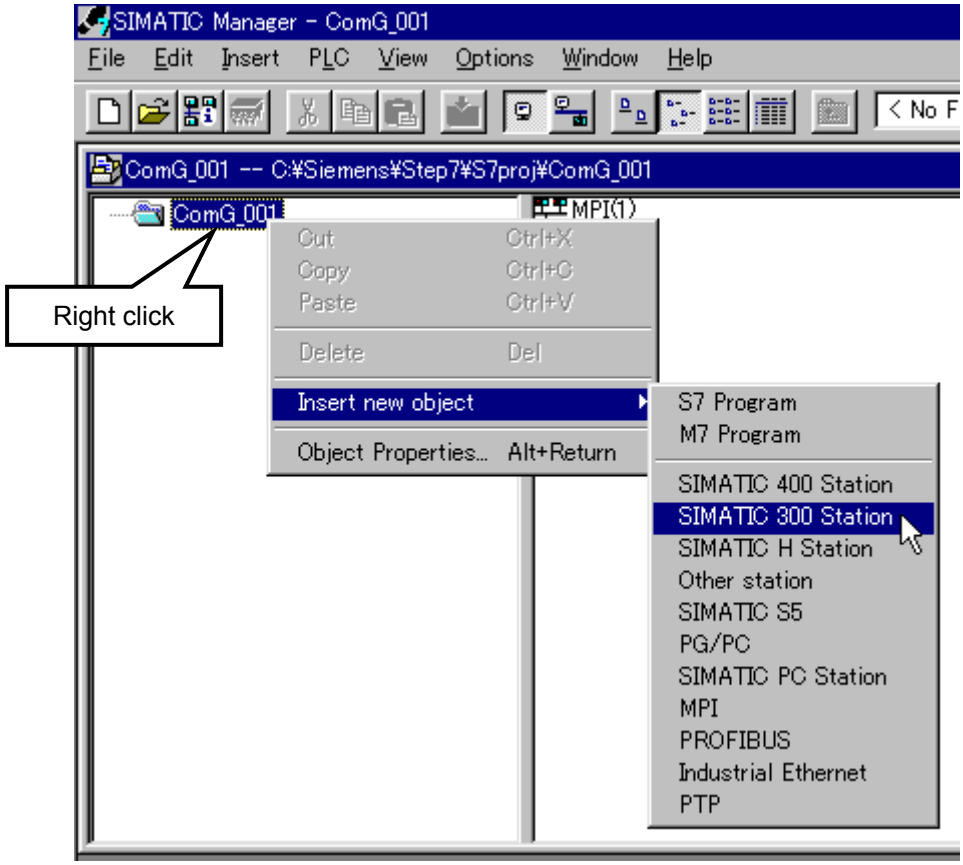
2. Select the menu command **File > New…**, and creating a new project.
The project name is “ComG_001” (an example).



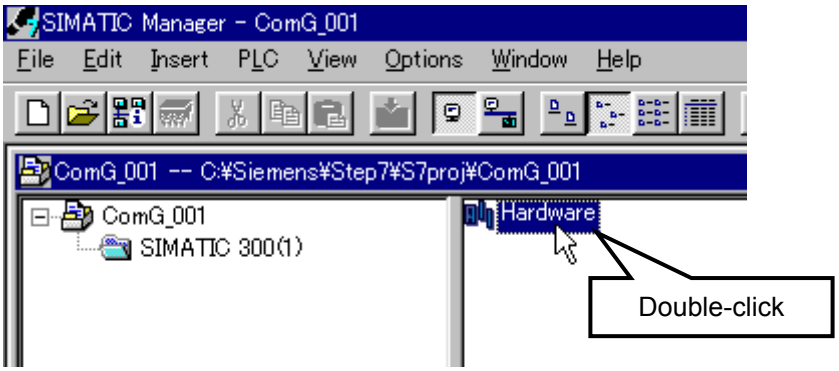
3. Clicking “OK” displays the project.

8.5.3 Reading a GSD file

1. Right clicks a project “ComG_001” folder, and select the command **Insert new object > SIMATIC 300 Station**. This operation can create the “SIMATIC 300” folder under the “ComG_001” folder.



2. Clicking the “SIMATIC 300” folder displays “Hardware” on the right side of the window. Therefore, double click it.
Thus, hardware configuration tool “HW Config” starts.



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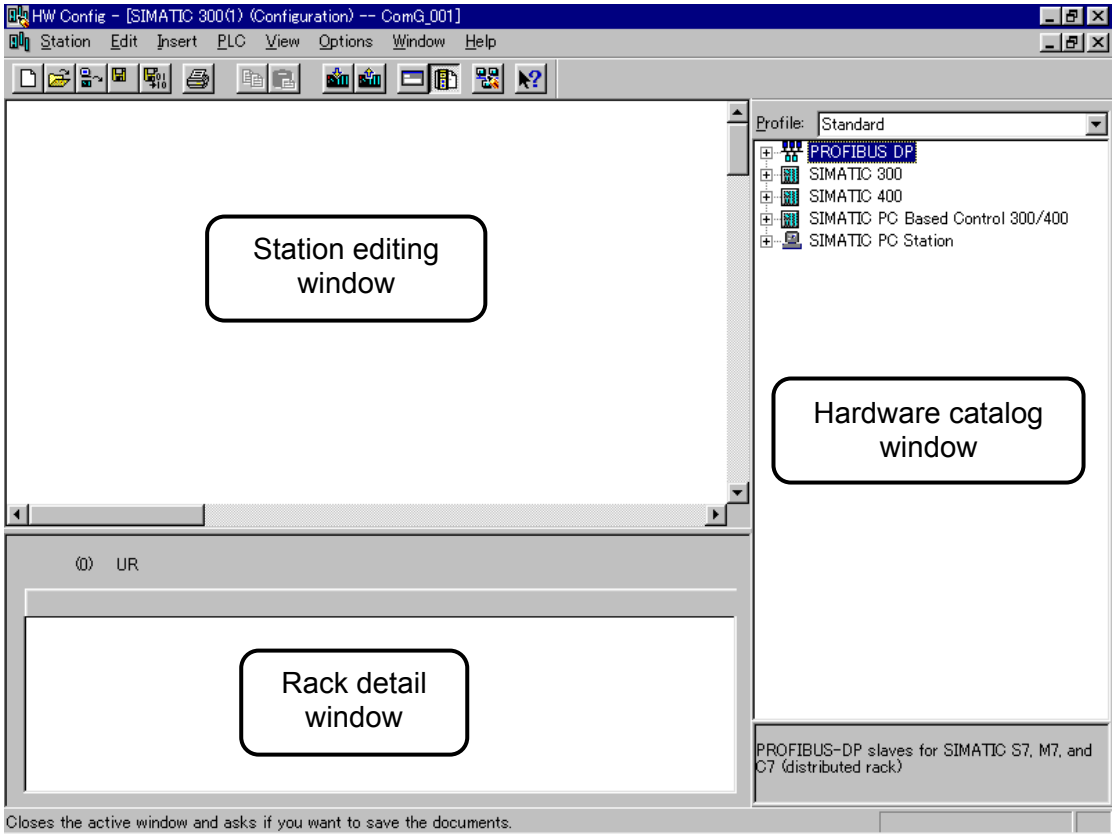
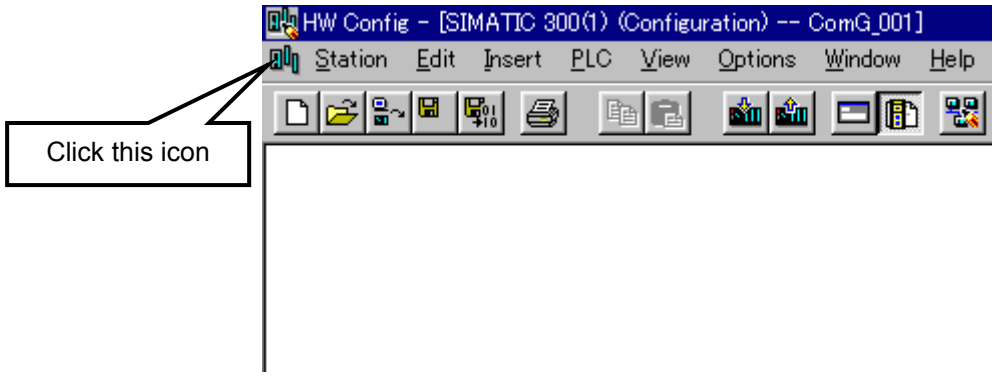
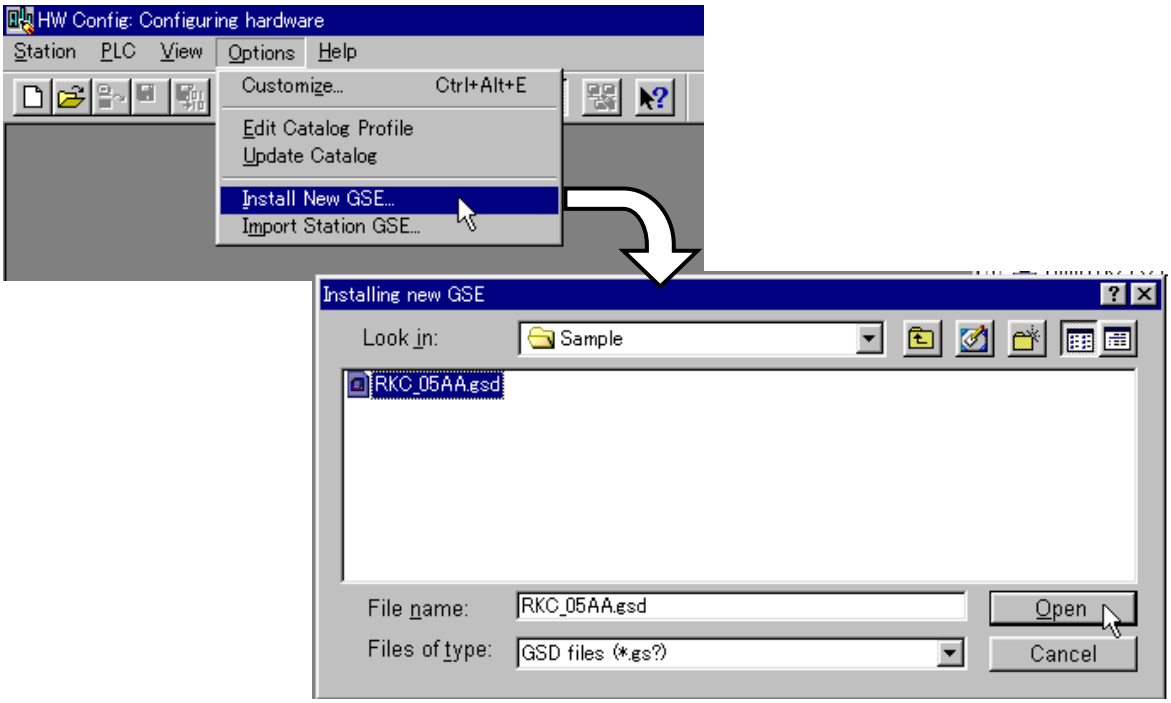
Hardware configuration tool “HW Config” layout



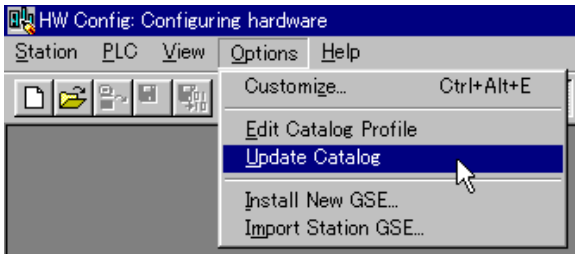
3. In order to read the GSD file, it is necessary to close the “HW Config” station editing and rack detail windows once.
Click the icon on the left side of the menu and then “Close (C).”



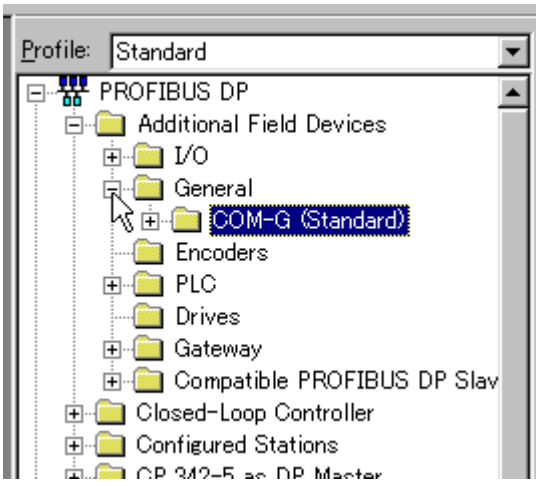
4. Next, select the menu command **Options > Install New GSE…**, and specified a GSD file of COM-G. Here, the "RKC_05AA.gsd" GSD file created in item **8.4 Example of The GSD File Editing (P. 84)** is specified.



5. The hardware catalogue is updated when select the menu command **Options > Update Catalog**.



6. Check that the COM-G GSD file has been read.
If the selection of **PROFIBUS DP > Additional Field Devices > General** is made in succession on the hardware catalog, "COM-G (Standard)" set by RKC GSD File Editor can be checked.



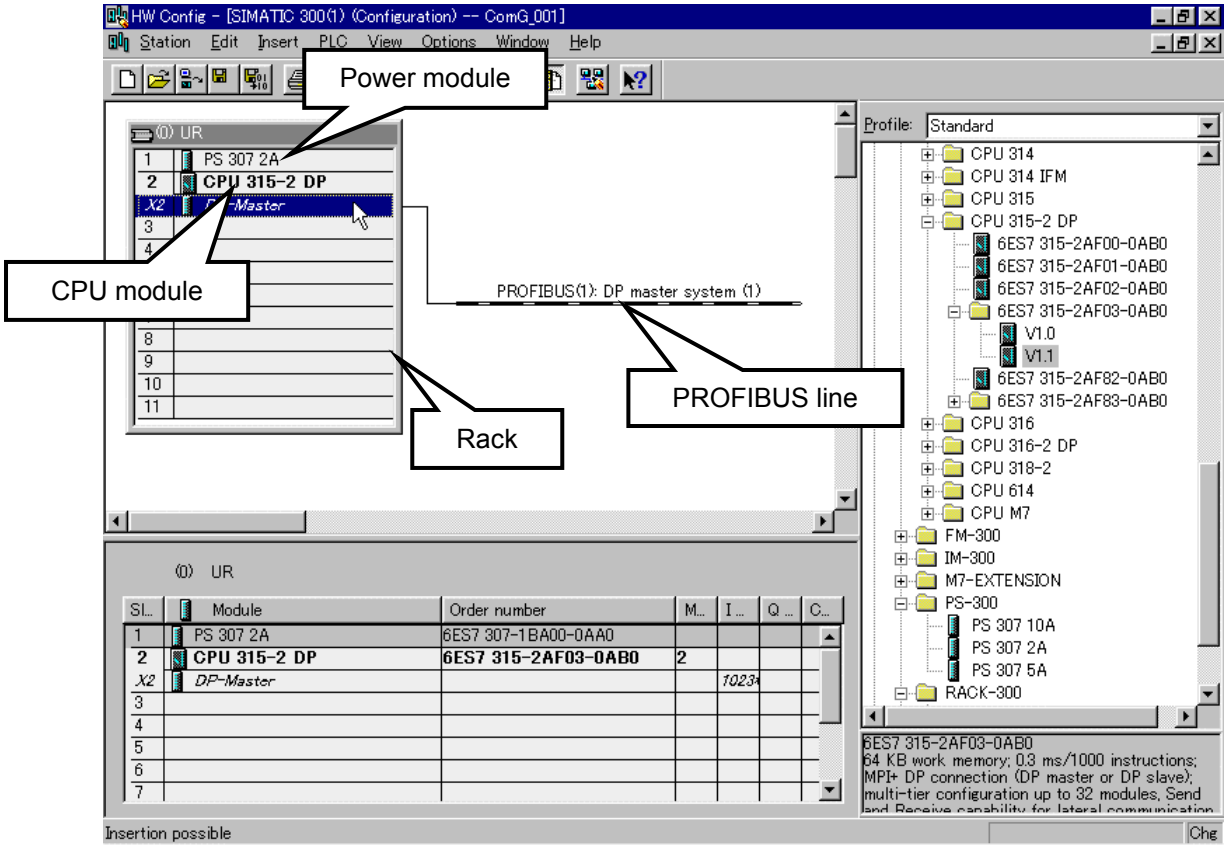
8.5.4 Hardware configuration

1. After checking that the COM-G GSD file was read, minimize “HW Config.”
As the screen returns to the main window of the “ComG_001” project, double click “Hardware” on the right side of the window again to display a screen on which configuration is made in hardware configuration including the COM-G. (Same as No.2 in **8.5.3 Reading a GSD file**)

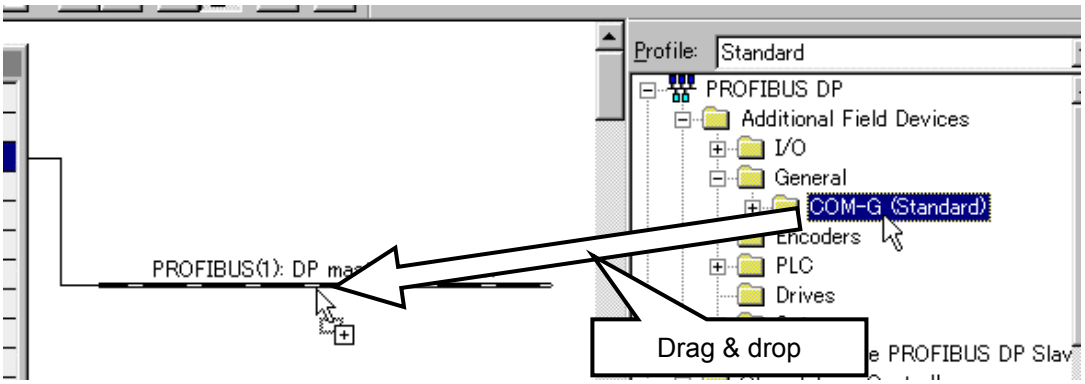
2. A rack is added on the station editing window and the Power and CUP modules are added on it. In addition, the CPU module has already been defined as the PROFIBUS master.
Here, the following Power and CPU modules are specified as an example.

- Power module: PS 307A (2A)
- CPU module: 315-2 DP (SIMATIC S7-300A series)

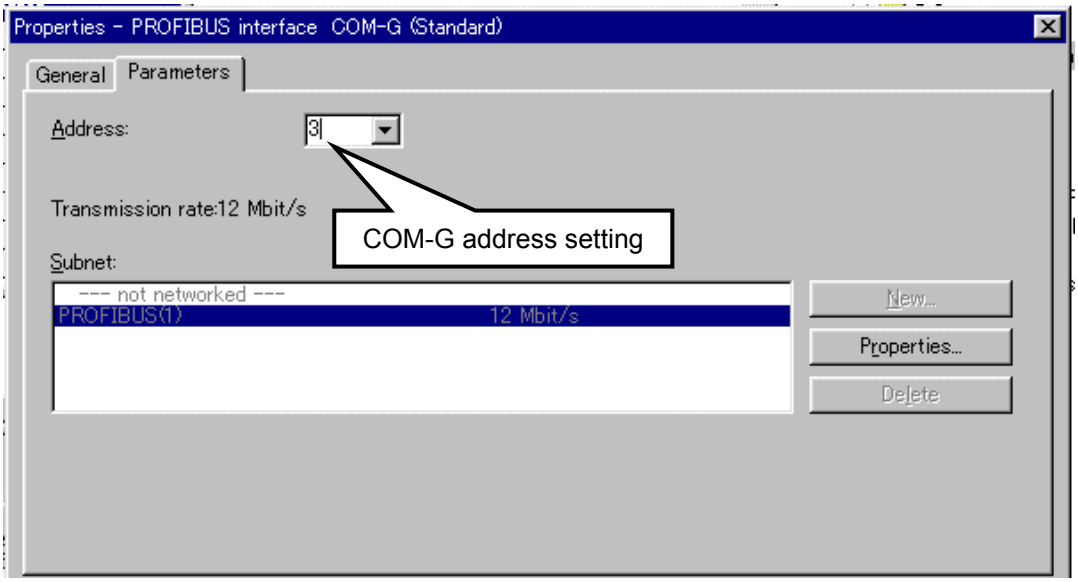
☞ For details of the procedure for adding the rack, and Power and CPU modules and for defining the PROFIBUS master, refer to the instruction manual for Programming Software STEP7.



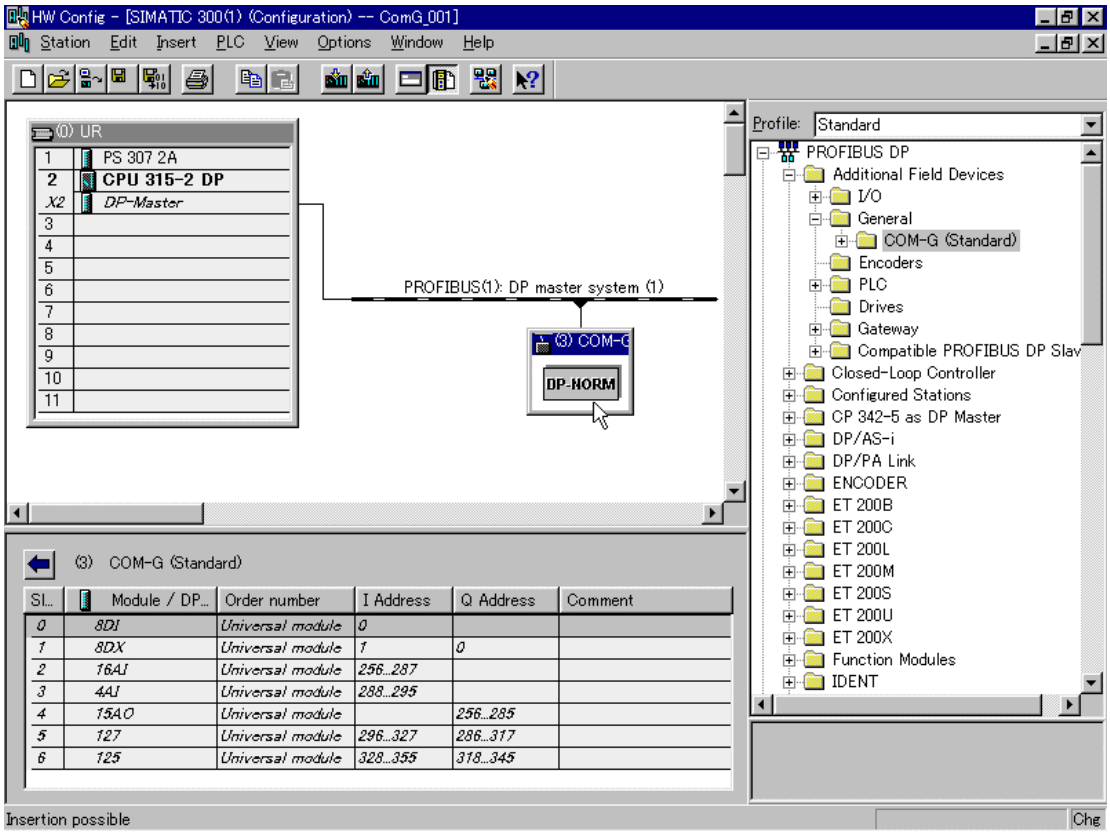
3. Select “COM-G (Standard)” read in the previous item from the hardware catalog and then drag and drop it on the PROFIBUS line.



4. As a dialog to set any COM-G address is displayed, enter the same value as that in the address specified by the COM-G address setting switch.
PROFIBUS address of COM-G: 3



5. COM-G is displayed on the PROFIBUS line.
In addition, register of the same size as data written at a GSD file of COM-G is assigned to rack details window.



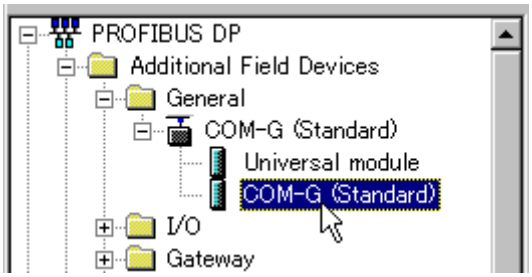
[COM-G register assignment details]

(3) COM-G (Standard)

Sl...	Module / DP...	Order number	I Address	Q Address	Comment
0	8DI	Universal module	0		
1	8DX	Universal module	1	0	
2	16AI	Universal module	256...287		
3	4AI	Universal module	288...295		
4	15AO	Universal module		256...285	
5	127	Universal module	296...327	286...317	
6	125	Universal module	328...355	318...345	

0: 8DI: Register of COM-G status information (1 byte)
1: 8DX: COM-G write permit flag check register and write permit flag register (Read: 1 byte, Write: 1 byte)
2: 16AI:
3: 4AI: } Read register by static data request (40 bytes)
4: 15AO: Write register by static data request (30 bytes)
5: 127:
6: 125: } Register of dynamic data request (Read: 60 bytes, Write: 60 bytes)

In STEP7 V5.1, only “COM-G” is displayed on the PROFIBUS line even after the operation of Nos. 3and 4 but nothing is displayed on the rack detail window. When using V5.1, as there is the light blue “COM-G (Standard)” icon at the adjoining lower part of “COM-G (Standard)” in the hardware catalog, drag and drop it on the rack detail window. Thus, the register configuration is displayed on the rack detail window.



6. Double click each register assignment list on rack detail window to change the register assignment depending on the environment used.
Here, each register is assigned as follows.

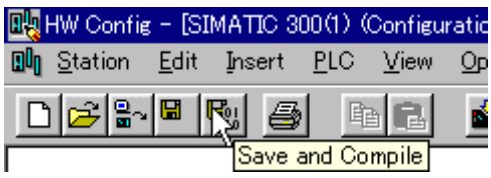
- Register of COM-G status information: IB0
- Write permit flag check register: IB1
- Write permit flag register: QB0
- Data of read register: After IW10
- Data of write register: After QW10

(3) COM-G (Standard)

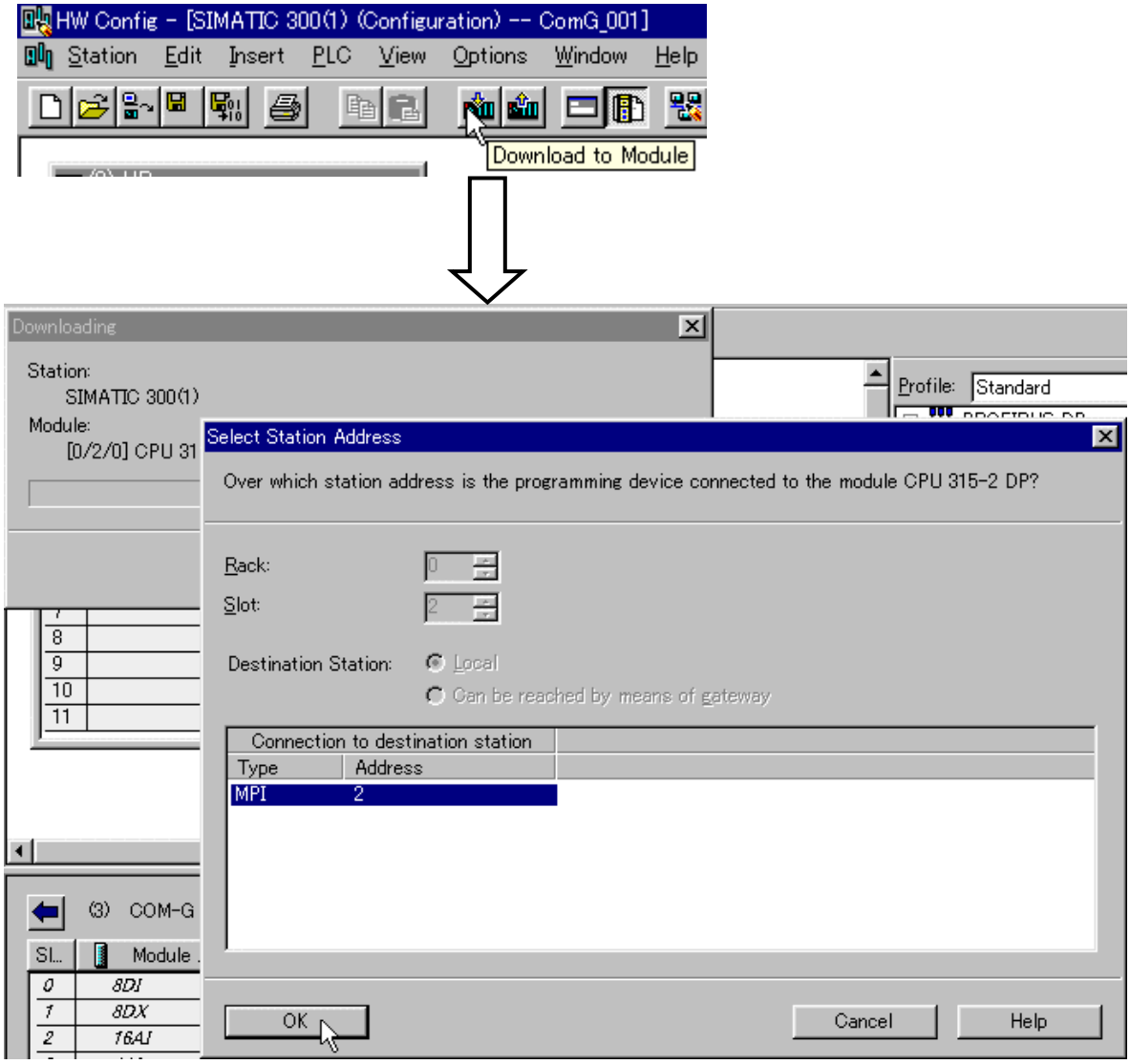
Sl...	Module / DP...	Order number	I Address	Q Address	Comment
0	8DI	Universal module	0		
1	8DX	Universal module	1	0	
2	16AI	Universal module	10...41		
3	4AI	Universal module	42...49		
4	15AO	Universal module		10...39	
5	127	Universal module	50...81	40...71	
6	125	Universal module	82...109	72...99	

The register assignable area may be limited depending on the memory capacity of the CPU module. For details, refer to the instruction manual for each CPU module.

7. Click the “Save and Compile” button on the toolbar to store and compile the configuration.



8. Click the “Download to Module” button of toolbar, and download the data which did hardware configuration to the CPU module.
As a specified window of the module to be downloaded appears halfway, select the module.
Leave the address as it is.



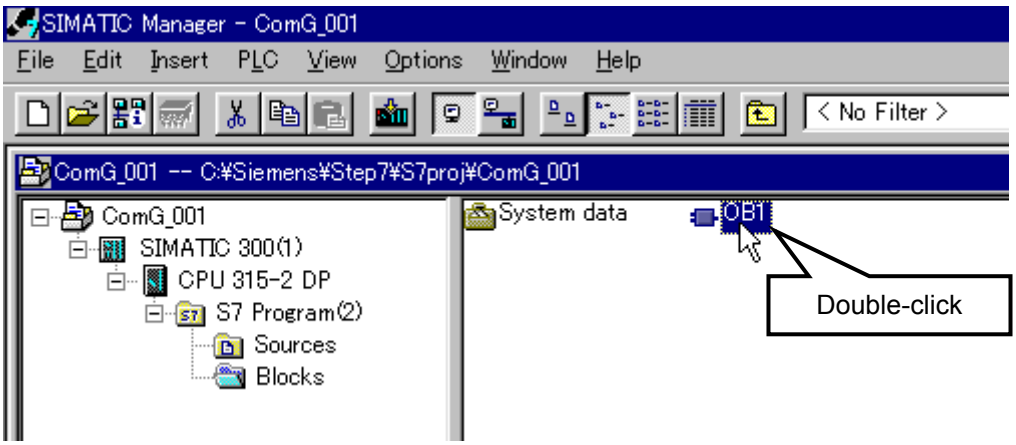
8.5.5 Programming

This section is explained on the assumption that use language of STEP7 is “English” mode.

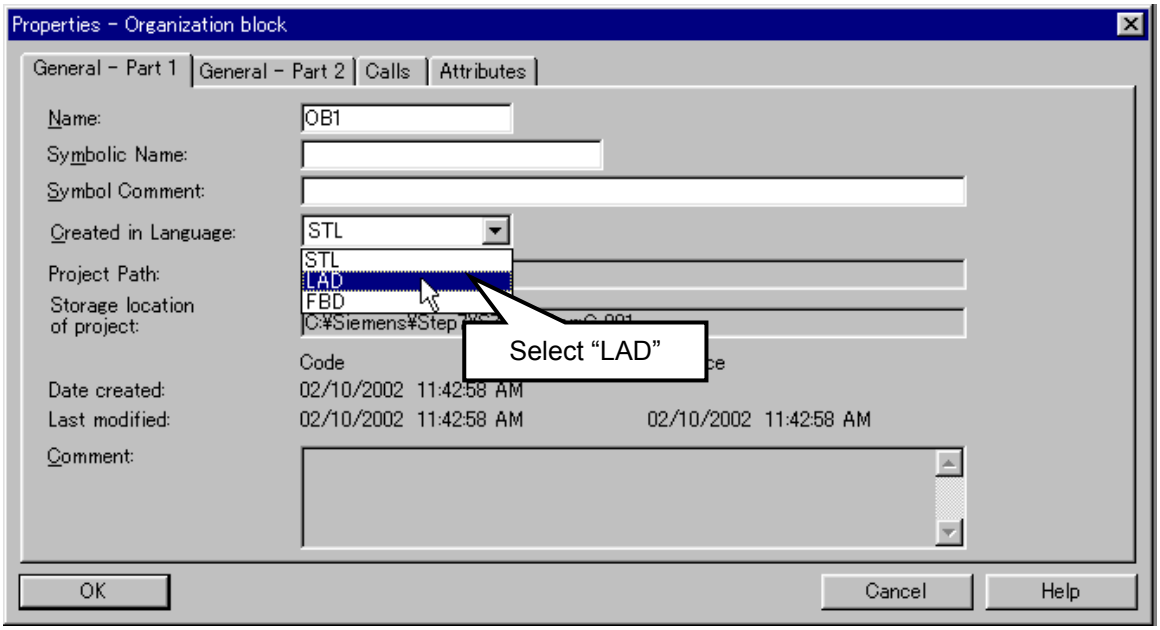
☞ For change method of use language, refer to Instruction Manual of the Programming Software STEP7.

■ Preparations

1. Open the project “ComG_001” folder in the order of **CPU 315-2 DP > S7 Program > Blocks**, and then double click “OB1” displayed on the right side of the window.



2. A window of “Properties - Organization block” is displayed.
Hereafter, as a sequence program is created by the ladder, change the “Created in Language:” column to “LAD.”

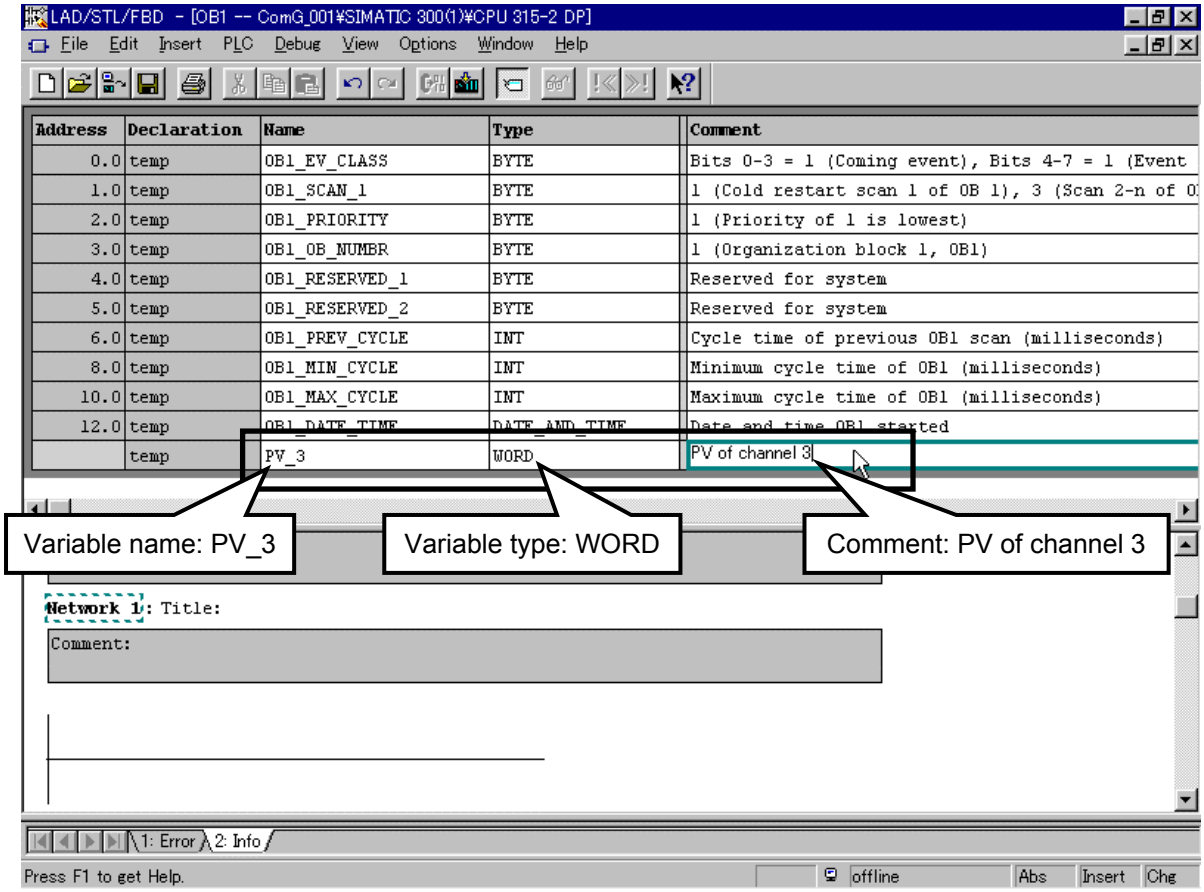


■ Example of static data read

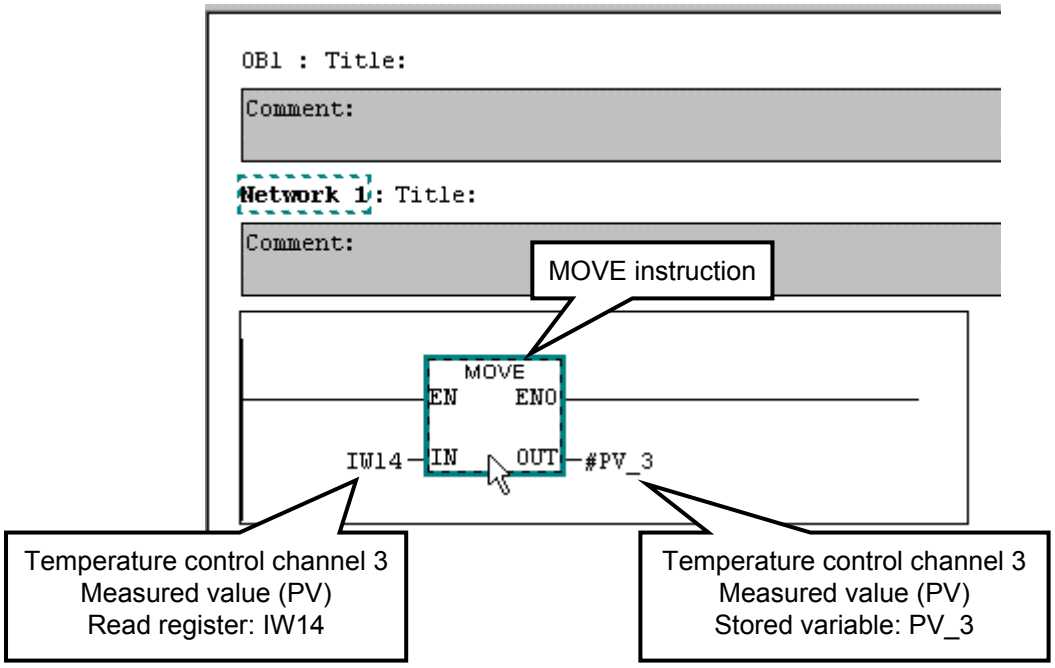
The following is a program example in which a Measured value (PV) of SR Mini HG temperature control channel 3 is read and then stored into the variable.

☞ For details of programming, refer to Instruction Manual of the Programming Software STEP7.

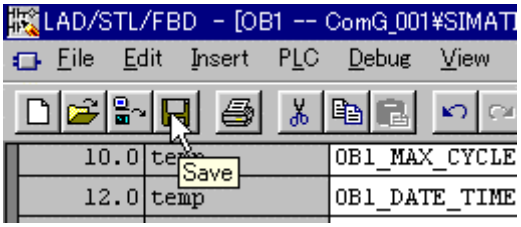
1. Before describing the sequence program, define the variable to write the Measured value (PV). Describe a comment (Example: PV of channel 3) if necessary with the variable name and type assumed to be “PV_3” and “WORD,” respectively.



2. Next, store the Measured value (PV) of temperature control channel 3 into the “PV_3” variable by using the MOVE instruction.
As the data read register has been defined so that it can be used from “IW10” by the hardware configuration, the Measured value (PV) of temperature control channel 3 ought to be stored in IW14.
Therefore, set “IW14” to the input (IN) of the MOVE instruction and the “PV_3” variable to the output (OUT) of the same instruction.



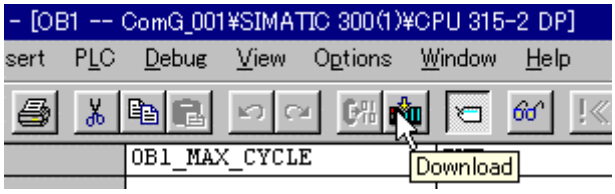
3. Click the “Save” button of toolbar, and save a sequence program.



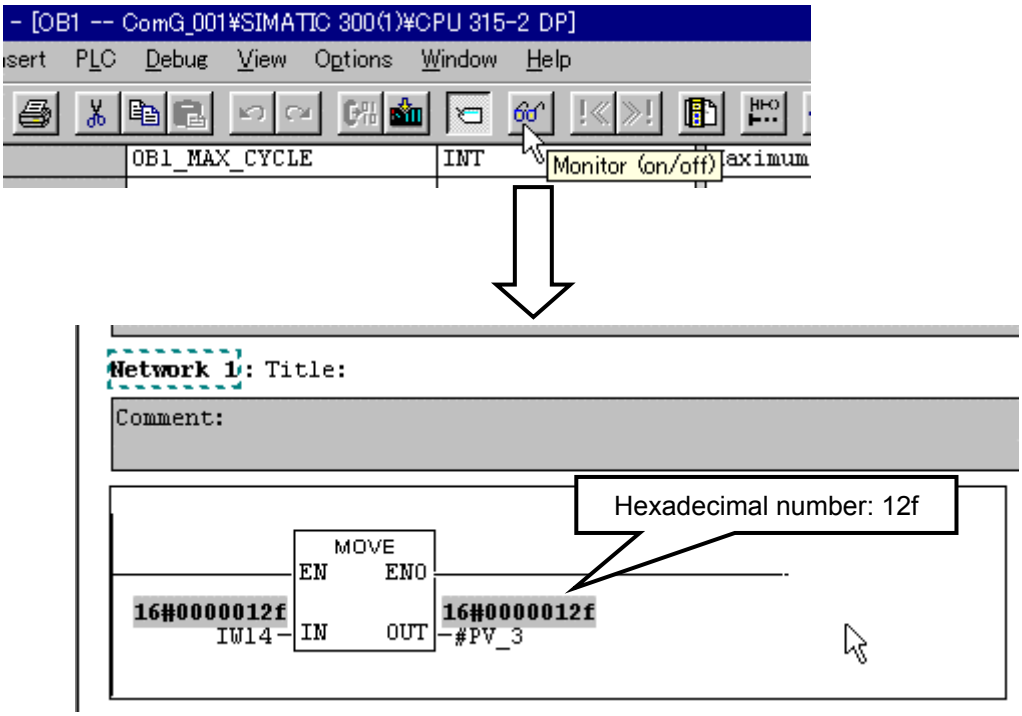
■ Program monitor (static data read)

Confirm that a program works normally by a monitor function.

1. Click the “Download” button of toolbar, and download a program in PLC.



2. Click the “Monitor (on/off)” button of toolbar.
By this operation, a value of a variable can be seen on a sequence program.
A value of “12f” appears in this program. This hexadecimal value is converted to a decimal value “303.” In addition, as the decimal point of the Measured value (PV) of temperature control channel 3 is in the first decimal place, the actual Measured value (PV) corresponds to “30.3 °C.”



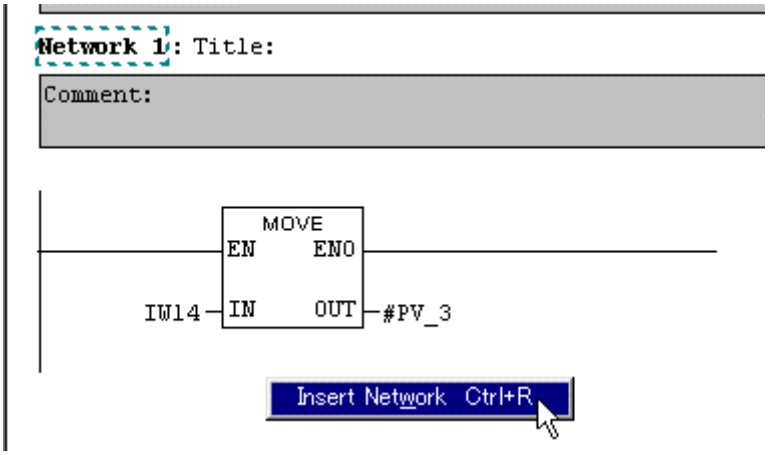
3. Click the “Monitor (on/off)” of toolbar again, and finish monitor.

■ Example of static data write

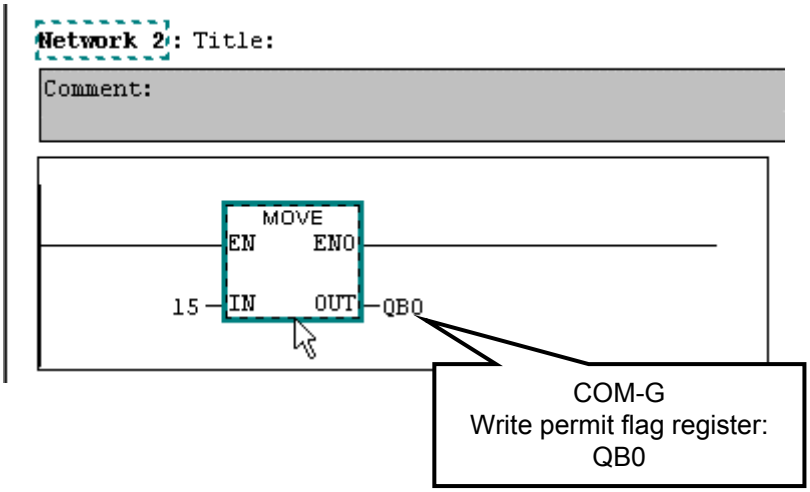
A program example to write 200.0 °C at Set value (SV) of the temperature control channel 3 of SR Mini HG is as follows.

☞ For details of programming, refer to Instruction Manual of the Programming Software STEP7.

1. Click the right on a program area, and select "Insert Network" of a displayed menu.
New network (Network 2) is added.



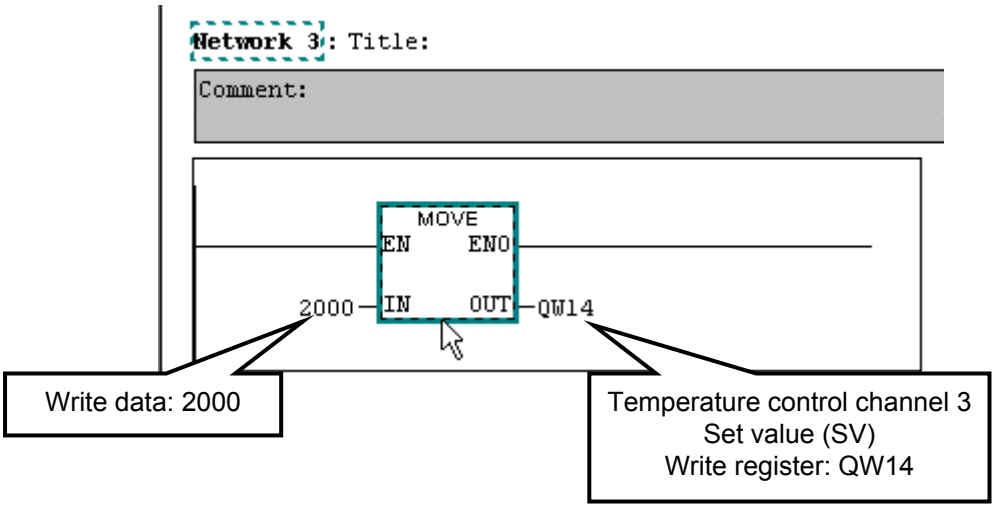
2. Set the COM-G write permit flag on the added network to enable data write to the SR Mini HG side.
As the write permit flag is specified to the "QB0" register by the hardware configuration, enter a hexadecimal value of "F" (a decimal value of "15") into this register by the MOVE instruction.



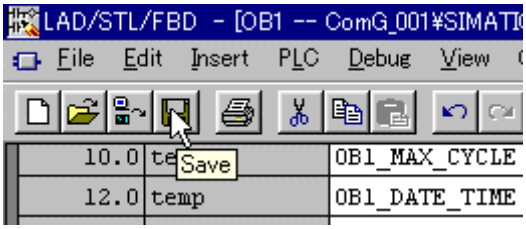
📖 Only when a hexadecimal value of "F" (a decimal value of "15") is written to the write permit flag register, data write to the SR Mini HG is enabled.

☞ For write permit flags, refer to **6.4 Registers Assigned to PLC (P. 32)**.

3. Add the new network (Network 3) again.
Write 200.0 °C to the Set value (SV) of temperature control channel 3 by using the MOVE instruction.
As the data write register was defined so as to be used from "QW10" by the hardware configuration, the Set value (SV) of temperature control channel 3 becomes QW14.
Therefore, set "QW14" to the output (OUT) of the MOVE instruction. In addition, as the decimal point of a write data value of "200.0" is omitted, set "2000" to the input (IN).



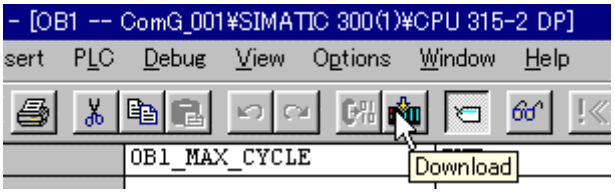
4. Click the "Save" button of toolbar, and save a sequence program.



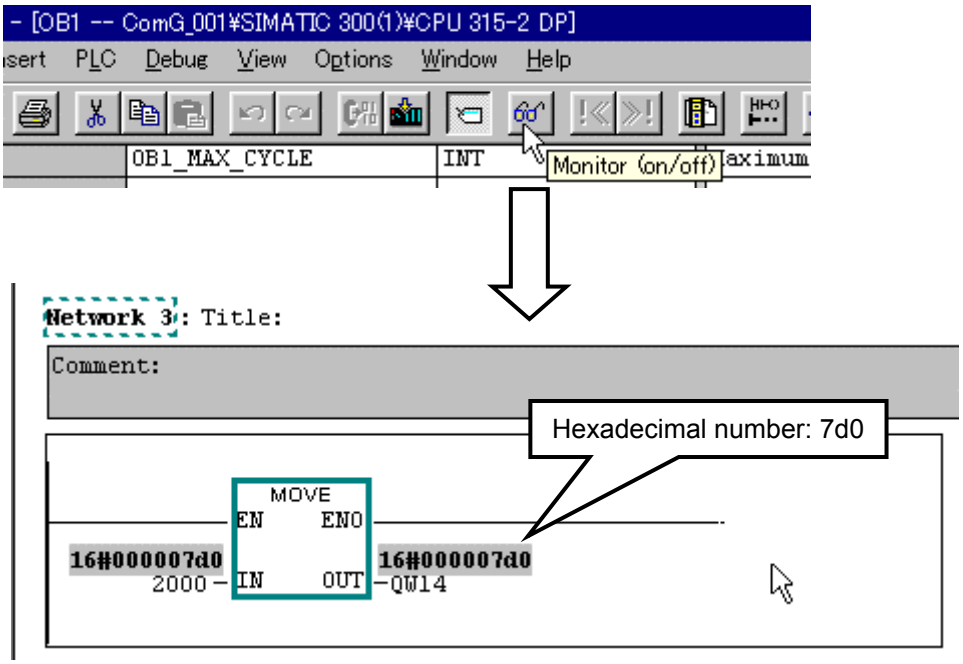
■ Program monitor (static data write)

Confirm that a program works normally by a monitor function.

1. Click the “Download” button of toolbar, and download a program in PLC.



2. Click the “Monitor (on/off)” button of toolbar.
Confirm that “2000” is written at “QW14.”
A value of “7d0” appears in this program. This hexadecimal value is converted to a decimal value “2000.”
Therefore, Set value (SV) of temperature control channel 3 is “200.0 °C.”



3. Click the “Monitor (on/off)” of toolbar again, and finish monitor.

9. TROUBLESHOOTING

This section explains probable causes and treatment procedures if any abnormality occurs in the instrument. For any inquiries, please contact RKC sales office or the agent, to confirm the specifications of the product.

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

⚠ WARNING

- To prevent electric shock or instrument failure, always turn off the system power before replacing the instrument.
- To prevent electric shock or instrument failure, always turn off the power before mounting or removing the instrument.
- To prevent electric shock or instrument failure, do not turn on the power until all wiring is completed. Make sure that the wiring is correct before applying power to the instrument.
- To prevent electric shock or instrument failure, do not touch the inside of the instrument.
- All wiring must be performed by authorized personnel with electrical experience in this type of work.

CAUTION

All wiring must be completed before power is turned on to prevent electric shock, instrument failure, or incorrect action.

Problem	Possible cause	Solution
No response	Wrong connection, no connection or disconnection of the communication cable	Confirm the connection method or condition and connect correctly
	Breakage, wrong wiring, or imperfect contact of the communication cable	Confirm the wiring or connector and repair or replace the wrong one
	Communication speed setting of COM-G and SR Mini HG is mismatch	Confirm the communication speed setting and set that correctly
	Wrong PROFIBUS address setting	Confirm the address setting and set that correctly
	Wrong SR Mini HG address setting	

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Problem	Possible cause	Solution
No response	Wrong the GSD file entering • Wrong the function number specifying • Wrong the connectable number of channels specifying • Wrong data items by static data request specifying etc.	Confirm the contents of the GSD file and set that correctly
	COM-G is not corresponding to SR Mini HG	Contact RKC sales office or the agent
Not recognized by a PROFIBUS master	Wrong the GSD file entering • The number of function number specified in User_Prm_Data has exceeded 50 items • A value of Max_Input_Len or Max_Output_Len has exceeded 160	Confirm the contents of the GSD file and set that correctly * or Edit a GSD file with a RKC GSD editor
	Operation mode transfer switch has become F	Turn a switch into 0, and turn on the power of COM-G once again
	Wrong initialization of PROFIBUS	Turn on the power of COM-G once again
All the values that have been read in PLC from COM-G are 0	Controller connection is not established	Confirm the bit of controller status (Any bit is not set to 1: no response)
	A specified function number is invalidated	Confirm the function number
Cannot write the value at the SR Mini HG	A write permission flag is not F	Make the sequence that a write permission flag becomes F when a sequence starts
	Initial setting data was tried to be written during “Normal communication”	Conduct data write after changing the initial set mode to “Extended communication” following control stop
Cannot write the value at dynamic data request	MSB of byte 0 of dynamic data request is not 1	Change the sequence so that MSB of byte 0 becomes 1

* For contents of a GSD file, refer to **APPENDIX (P. 106)**.

Continued on the next page.

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Problem	Possible cause	Solution
Cannot write the value at dynamic data request	A write permission flag is not F	Make the sequence that a write permission flag becomes F when a sequence starts
All the bits of controller status of one address are 0	The number of connection controller specified with User_Prm_Data of the GSD file is wrong	Confirm the contents of the GSD file and set that correctly *
	Wrong the SR Mini HG address setting	Confirm that an address is 0
	Communication speed setting of COM-G and SR Mini HG has not corresponded	Set the same communication speed in COM-G and SR Mini HG
	Wrong the data bit configuration	Set a right value
	SR Mini HG is not corresponding to COM-G	Confirm the communication specification of SR Mini HG are RS-485 or RS-422A

* For contents of a GSD file, refer to **APPENDIX (P. 106)**.

APPENDIX

A.1 Contents of GSD File

Contents of GSD file are as follows.
In addition, the following GSD file is automatically created if the RKC GSD File Editor is used. However, if an error occurs on the system configuration side, edit the GSD file using the text editor, etc. by referring to **A.2 User Description Contents (P. 108)**.

```
; General Information:
#Profibus_DP
Vendor_Name = “RKC INSTRUMENT INC.”
Model_Name = “COM-G”
Revision = “1.0”
Ident_Number = 0x05AA
Protocol_Ident = 0
Station_Type = 0
FMS_supp = 0
Hardware_Release = “1.0”
Software_Release = “1.0”
Redundancy = 0
Repeater_Ctrl_Sig =0
24V_Pins = 0
Implementation_Type = “ASIC_solution”
Slave_Family = 0      ; General

Max_Diag_Data_Len = 8
Auto_Baud_supp = 1
9.6_supp = 1
19.2_supp = 1
93.75_supp = 1
187.5_supp = 1
500_supp = 1
1.5M_supp = 1
3M_supp = 1
6M_supp = 1
12M_supp = 1
MaxTsdr_9.6 = 60
MaxTsdr_19.2 = 60
MaxTsdr_93.75 = 60
MaxTsdr_187.5 = 60
MaxTsdr_500 = 100
MaxTsdr_1.5M = 150
MaxTsdr_3M = 250
MaxTsdr_6M = 450
MaxTsdr_12M = 800
```

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```
Freeze_Mode_supp = 1
Sync_Mode_supp = 1
Set_Slave_Add_supp = 0
Min_Slave_Intervall = 1
Modular_Station = 1
Max_Module = 1

User_Prm_Data_Len = *A
User_Prm_Data = *B
Max_Input_Len = *C
Max_Output_Len = *D
Max_Data_Len = *E
Module = *F
Endmodule
```

User description point: *A, *B, *C, *D, *E, *F

A change of file contents except a user description point prohibits it.

A.2 Change Method of a User Description Point

Explain to the contents which a user in a GSD file enters.

- **User_Prm_Data_Len = *A**

  Enter the total byte number of "User_Prm_Data" (data to enter with *B) with decimal numbers.

- **User_Prm_Data = *B**

  Enter the number of channels of the SR Mini HG connected to the COM-G following 0x00,0x01 (fixed value) in a word value.
  Next, enumerate function numbers corresponding to data items to be read by request for static data in word values.
  Lastly, enumerate function numbers corresponding to data items to be written by request for static data in word values.
  However, if the number of columns (characters) per line exceeds an 80 due to an increase in number of data points, first enter "¥" into the end of the line and then move to the subsequent line to enter the remaining data into that line in succession.

  ☞ For function number, refer to **7.2 SR Mini HG Function Number List (P. 39)**.

- **Max_Input_Len = *C**

  Enter the following result of computation.
  (Number of data items read by static data request) × (Number of connected channels) × 2
  + (Number of registers used by dynamic data request) × 6 + 2

- **Max_Output_Len = *D**

  Enter the following result of computation.
  (Number of data items written by static data request) × (Number of connected channels) × 2
  + (Number of registers used by dynamic data request) × 6 + 1

- **Max_Data_Len = *E**

  Enter a total of *C and *D.

- **Module = *F**

  Enter the number of data read by static data request, the number of data written by static data request and the number of data used by dynamic data request.
  An entry method is as follows.

  [The fixed parts]

  Module = "COM-G" 0x10,0x30

  At first, specify the above. This part is fixed.

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[Data read by static data request]

Enter the data in the format of "0x5$."

- When the computation result of (Number of data points read by request for static data) × (Number of connectable channels) × 2 / 2 is 16 or less:
  Convert the value obtained by subtracting 1 from the computation result to the corresponding hexadecimal value to enter it into "$."
  [Example] For a computation result of 15:
  $ = 15 – 1 = 14 = EH
  Module = "COM-G" 0x10,0x30,0x5E
- When the computation result of (Number of data points read by request for static data) × (Number of connectable channels) × 2 / 2 exceeds 16:
  As only one hexadecimal digit can be entered in "$," "0x5$" is required for each digit.
  Therefore, first divide the computation result into groups consisting of 16, each and convert the value obtained by subtracting 1 from the respective result to the corresponding hexadecimal value to enter it into "$." However, if a number in the last group becomes less than 16, conduct the same processing as described above and enter that value into the end of the line.
  [Example] For a computation result of 36:
  Divide the above result into groups of 16, 16 and 4.
  $ = 16 – 1 = 15 = FH
  $ = 16 – 1 = 15 = FH
  $ = 4 – 1 = 3 = 3H
  Module = "COM-G" 0x10,0x30,0x5F,0x5F,0x53

[Data written by static data request]

Enter the data in the format of "0x6*."

- When the computation result of (Number of data points write by request for static data) × (Number of connectable channels) × 2 / 2 is 16 or less:
  Convert the value obtained by subtracting 1 from the computation result to the corresponding hexadecimal value to enter it into "*."
  [Example] For a computation result of 15:
  * = 15 – 1 = 14 = EH
  Module = "COM-G" 0x10,0x30,0x6E

- When the computation result of (Number of data points write by request for static data) × (Number of connectable channels) × 2 / 2 exceeds 16:
  As only one hexadecimal digit can be entered in "*," "0x6*" is required for each digit.
  Therefore, first divide the computation result into groups consisting of 16, each and convert the value obtained by subtracting 1 from the respective result to the corresponding hexadecimal value to enter it into "*." However, if a number in the last group becomes less than 16, conduct the same processing as described above and enter that value into the end of the line.

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[Example] For a computation result of 36:
Divide the above result into groups of 16, 16 and 4.
* = 16 – 1 = 15 = FH
* = 16 – 1 = 15 = FH
* = 4 – 1 = 3 = 3H
Module = “COM-G” 0x10,0x30,0x6F,0x6F,0x63

[Dynamic data request]
Enter the data in the format of “0x7?.”
In the following example, a dynamic data request (0x7?) together with a static data read request (0x5$) is specified.
Module = “COM-G” 0x10,0x30,0x5$,0x7?

- When the computation result of (Number of registers used by request for dynamic data) × 6/ 2 is 16 or less:
  Convert the value obtained by subtracting 1 from the computation result to the corresponding hexadecimal value to enter it into “?.”
  [Example] For a computation result of 15:
  * = 15 – 1 = 14 = EH
  Module = “COM-G” 0x10,0x30,0x5$,0x7E
- When the computation result of (Number of registers used by request for dynamic data) × 6 / 2 exceeds 16:
  As only one hexadecimal digit can be entered in “?,” “0x7?” is required for each digit.
  Therefore, first divide the computation result into groups consisting of 16, each and convert the value obtained by subtracting 1 from the respective result to the corresponding hexadecimal value to enter it into “?.” However, if a number in the last group becomes less than 16, conduct the same processing as described above and enter that value into the end of the line.
  [Example] For a computation result of 36:
  Divide the above result into groups of 16, 16 and 4.
  ? = 16 – 1 = 15 = FH
  ? = 16 – 1 = 15 = FH
  ? = 4 – 1 = 3 = 3H
  Module = “COM-G” 0x10,0x30,0x5$,0x7F,0x7F,0x73

[Data read/written of static data request and dynamic data request]
Enter it in order of data read by static data request, data written by static data request and dynamic data request
Module = “COM-G” 0x10,0x30,0x5$,0x6*,0x7?

User_Prm_Data can specify the number of data items of static data request to 50.

The maximum length of data which can be exchanged during data exchange is 160 bytes for both input and output due to limits set to the COM-G.
Thus, the maximum number of numeric values specified by "Module =..." becomes as follows.

$$Nsr \times Nc \times 2 + Nd \times 6 + 2 \leq 160$$
$$Nsw \times Nc \times 2 + Nd \times 6 + 1 \leq 160$$

Nsr: Number of static data items read from SR Mini HG
Nsw: Number of static data items written to SR Mini HG
Nc: Number of connection channel of SR Mini HG
Nd: Number of dynamic data request

The maximum values of Max_Input_Len, Max_Output_Len and Max_Data_Len are 160. And, the maximum number of dynamic data request is limited to ten by specification of COM-G.

$$Nd \leq 10$$

Static and dynamic data requests to be specified after Module = "COM-G" 0x10,0x30, must be in the order of "data read by static data request," "data write by static data request" and "dynamic data request."

If the function number 0x00,0x01 (the hexadecimal number 01) is specified as a function number for User_Prm_Data and that for Byte2 and Byte3 by dynamic data request, it is possible to obtain the status of SR Mini HG connected to the COM-G.
The controller status obtained by this function number expresses the status of each bit.

Bit 0: Setting this bit to 1 indicates that any response was made in reply to communication (polling/selecting) from the COM-G.
(This bit is set to 1 in response to ACK as well as even to NAK and BCC error.)
Bit 1: Setting this bit to 1 makes a response to polling/selecting to indicate that there was a BCC error.
Bit 2: Setting this bit to 1 makes a response to selecting to indicate that NAK was returned.
Any bit is not set to 1: Indicates the status of no response.

If either of the following conditions is not satisfied, bit 1 and bit 2 cannot be set to 0.

- No response
- To write 0 to the value with this function number identifier (0x00,0x01)

In this controller status, "NAK with respect to selecting" can be checked but not "if there was an error in polling (usually set to EOT)."

The first 0x00,0x01corresponding to User_Prm_Data is different from controller status function number 0x00,0x01. Specify the controller status corresponding to User_Prm_Data as follows.

User_Prm_Data = 0x00,0x01,0x00,0x01

Fixed

Function number of controller status

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