**SR Mini HG SYSTEM**

*Power Supply/CPU Module*

# H-PCP-J

## PLC Communication Instruction Manual

*[For SHARP PLC]*

**SR Mini HG SYSTEM**

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.

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## ⚠ WARNING

● To prevent injury to persons, damage to instrument and equipment, a suitable external protection device shall be required.

● 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.

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# 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 as a result of failure, protect the power line and the input/output lines from high currents with a suitable overcurrent protection device with adequate breaking capacity 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.
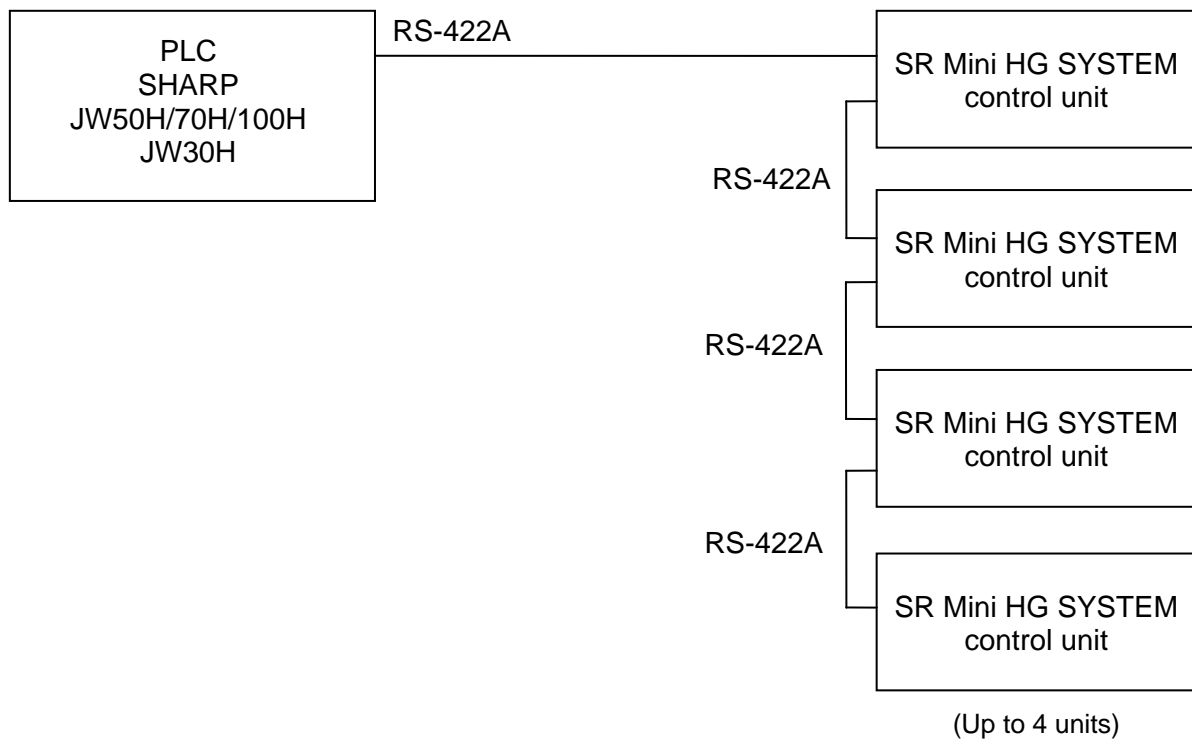
# CONTENTS

# *MEMO*

# 1.  OUTLINE

This manual describes the communication function of the SR Mini HG SYSTEM and the SHARP programmable controller (hereafter called PLC).

📖    This manual is attached when the model code of H-PCP-J module is **H-PCP-J-□□□-D∗ □□-04E**.

☞    For details of the H-PCP-J module, see the **Power Supply/CPU Module H-PCP-J Instruction Manual (IMS01J02-E□)**.

☞    This manual should be used in conjunction with **Hardware Quick Manual (IMS01V01-E□)**.

The SR Mini HG SYSTEM can be connected to the SHARP JW50H/70H/100H and JW30H link unit without using any program.
The SR Mini HG SYSTEM occupies the fixed area in the PLC data memory for each unit address.
The control unit for SR Mini HG SYSTEM consists of the H-PCP-J module and temperature control function modules.

```
┌─────────────────┐   RS-422A                        ┌─────────────────────┐
│      PLC        │─────────────────────────────────│  SR Mini HG SYSTEM  │
│     SHARP       │                                  │    control unit     │
│ JW50H/70H/100H  │                                  └─────────────────────┘
│     JW30H       │            RS-422A      ┌────────┐
└─────────────────┘                         │        │ SR Mini HG SYSTEM
                                            │        │    control unit
                             RS-422A        ┌────────┐
                                            │        │ SR Mini HG SYSTEM
                                            │        │    control unit
                             RS-422A        ┌────────┐
                                            │        │ SR Mini HG SYSTEM
                                            │        │    control unit
```

(Up to 4 units)

■ **Usable units (SHARP JW50H/70H/100H and JW30H)**

| Name | Type |
|---|---|
| Link unit | JW-10CM (JW50H/70H/100H)<br>JW-21CM (JW30H) |

■ **Usable modules (SR Mini HG SYSTEM)**

The following function module data can be used in PLC communication (see "Data map" on page 24). In addition, data on other modules connected (TI, AI, AO, etc.) can be used on one more communication port (RKC communication or Modbus).

| Function module | Type |
|---|---|
| Temperature control module | H-TIO-A   H-TIO-B   H-TIO-C   H-TIO-D   H-TIO-E<br>H-TIO-F    H-TIO-G   H-TIO-H   H-TIO-J    H-TIO-P<br>H-TIO-R |
| Position proportioning control module * | H-TIO-K |
| Speed control module * | H-SIO-A |
| Cascade control module * | H-CIO-A |
| Current transformer input module | H-CT-A (Up to 20 points/control unit are available) |

* There is restriction on usable data. Only data described in **6.3 Communication Data List (P. 17)** can be used.

☞    For the function modules, see the **Hardware Quick Manual (IMS01V01-E□)** or **Hardware Instruction Manual (IMSRM15-E□)**.

# 2. COMMUNICATION SPECIFICATIONS

| | |
|---|---|
| **Interface:** | Based on RS-422A, EIA standard |
| **Connection method:** | RS-422A: 4-wire system, multi-drop connection |
| **Synchronous method:** | Start/stop synchronous type |
| **Communication speed:** | 9600 bps, 19200 bps, 38400 bps<br>Communication speed can be selected with switch |
| **Data bit configuration:** | Start bit:　1<br>Data bit:　7<br>Parity bit:　Even<br>Stop bit:　2 |
| **Protocol:** | SHARP JW50H/70H/100H and JW30H special protocol<br>　Station address 01 |
| **Usable command:** | Computer link function (Command mode)<br>　RFLF:　File register read for each word<br>　WFLF:　File register write for each word |
| **Specification mode:** | Write mode 2 (all memory can be written)<br>H-PCP-J module changes write mode from zero to 2 when the power<br>is turned on. |
| **Maximum connections:** | 4 control units per communication port of PLC |

# 3. CONNECTIONS

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

**CAUTION**

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

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

- When disconnecting a connector, hold it by the connector itself. Disconnecting connectors by yanking on their cables can cause breakdowns.

- To prevent malfunction, never touch the contact section of a connector with bare hands or with hands soiled with oil or the like.

- To prevent malfunction, connect cable connectors securely, then firmly tighten the connector fastening screws.

- To prevent damage to cables, do not bend cables over with excessive force.

- If the instrument is easily affected by noise, use the ferrite core at the both ends of the communication cable (nearest the connector).
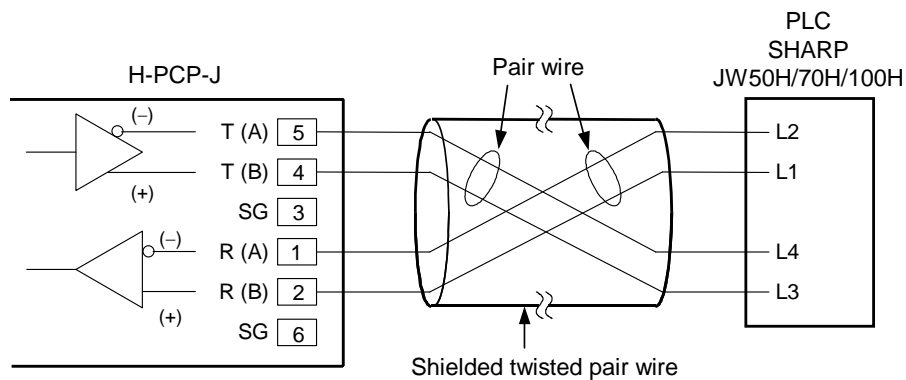
### ■ RS-422A

### ● Pin layout of modular connector (RS-422A)
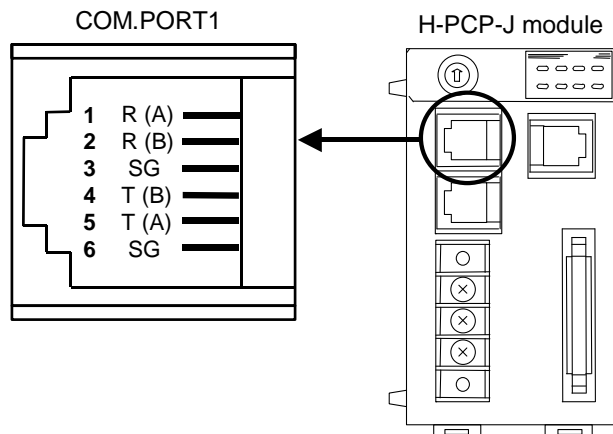
● **Connector pin number and signal details (RS-422A)**

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

● **Diagram of RS-422A wiring**



The 6-pin type modular connector should be used for the connection to the H-PCP-J module. Recommended model: TM4P-66P (Manufactured by HIROSE ELECTRIC CO., LTD.,)

Customer is requested to prepare a communication cable fit for the control unit to be connected by the PLC.

● **Connection using our cable**

Connection cable W-BF-01 ∗ (RKC product) can be used to connect the PLC. 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 H-PCP-J connector.



Cable type: W-BF-01-3000 (RKC product, Sold separately)
[Standard cable length: 3 m]
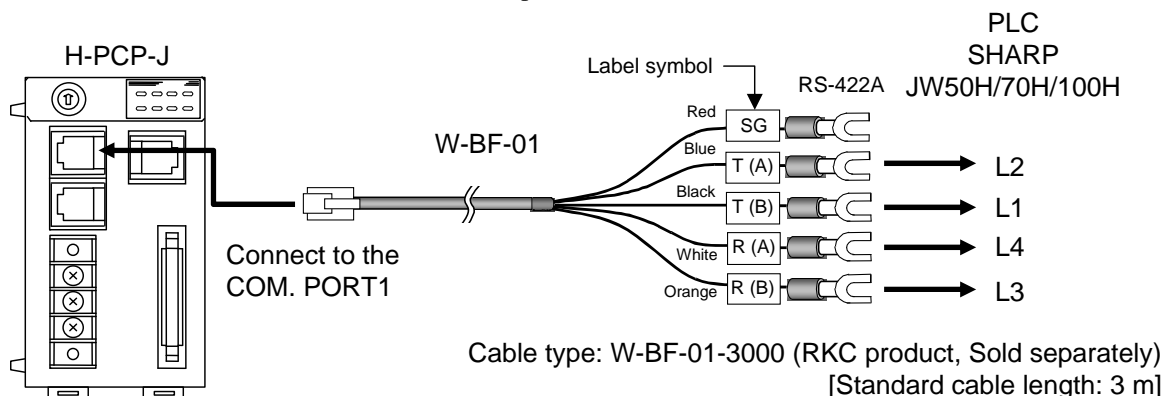
When wiring is to be made with W-BF-01 cable, connect as instructed in the above picture. (Just use the label symbol for leadwire identification and ignore the contents.)

**Be sure to insulate the wires that are not used by covering them with insulating tape.**

The details of the connectable connector for the PLC please also read the instruction manual for the used PLC.

# 4. SETTING ON THE H-PCP-J MODULE SIDE

## 4.1 PLC File Register Address Setting

Set the file register address of each control unit using the unit address setting switch at the front of the H-PCP-J module. For this setting, use a small blade screwdriver.

Unit address setting switch

Setting range:
0 to 15 (0 to F: hexadecimal)

H-PCP-J module

Up to 4 SR Mini HG SYSTEMs can be connected to a PLC communication port. Therefore the file register address uses the 4 SR Mini HG SYSTEMs as a group. The SR Mini HG SYSTEMs connected to the same PLC communication port sets the address in the same group.

> **Set unit address of each group including 0, 4, 8 and C by all means. 0, 4, 8 and C work as a master of communication transfer.**

> **Set unit address within address range of PLC (CPU unit) to use.**

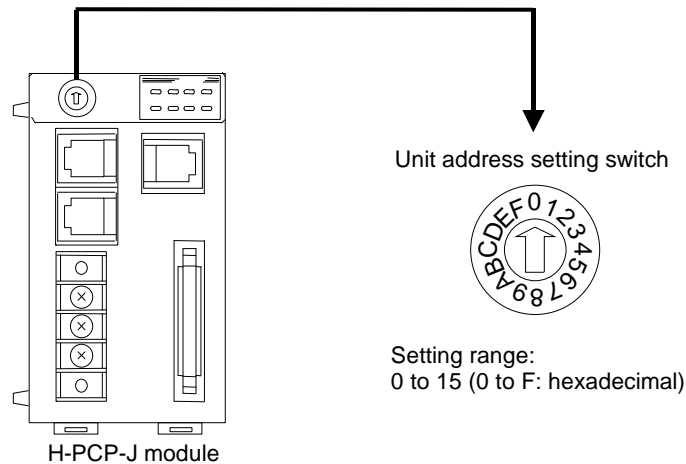| Group | Unit address setting switch | PLC file register address |
|---|---|---|
| Group 1 | **0** | F1: 000000 to F1: 001777 |
| | **1** | F1: 002000 to F1: 003777 |
| | **2** | F1: 004000 to F1: 005777 |
| | **3** | F1: 006000 to F1: 007777 |
| Group 2 | **4** | F1: 010000 to F1: 011777 |
| | **5** | F1: 012000 to F1: 013777 |
| | **6** | F1: 014000 to F1: 015777 |
| | **7** | F1: 016000 to F1: 017777 |
| Group 3 | **8** | F1: 020000 to F1: 021777 |
| | **9** | F1: 022000 to F1: 023777 |
| | **A** | F1: 024000 to F1: 025777 |
| | **B** | F1: 026000 to F1: 027777 |
| Group 4 | **C** | F1: 030000 to F1: 031777 |
| | **D** | F1: 032000 to F1: 033777 |
| | **E** | F1: 034000 to F1: 035777 |
| | **F** | F1: 036000 to F1: 037777 |

**Setting example:** When group 2 is used



| | | |
|---|---|---|
| PLC | SR Mini HG SYSTEM control unit | Unit address 4<br>File register address:<br>F1: 010000 to F1: 011777 |
| | SR Mini HG SYSTEM control unit | Unit address 5<br>File register address:<br>F1: 012000 to F1: 013777 |
| | SR Mini HG SYSTEM control unit | Unit address 6<br>File register address:<br>F1: 014000 to F1: 015777 |
| | SR Mini HG SYSTEM control unit | Unit address 7<br>File register address:<br>F1: 016000 to F1: 017777 |

Address in the same group is set

# 4.2 Protocol Selection and Communication Setting

Match the setting of data bit configuration, communication speed and communication protocol with the PLC communication specification by COM.PORT1/COM.PORT2 setting switch (SW2).
Setting example to recommend is shown in the following.
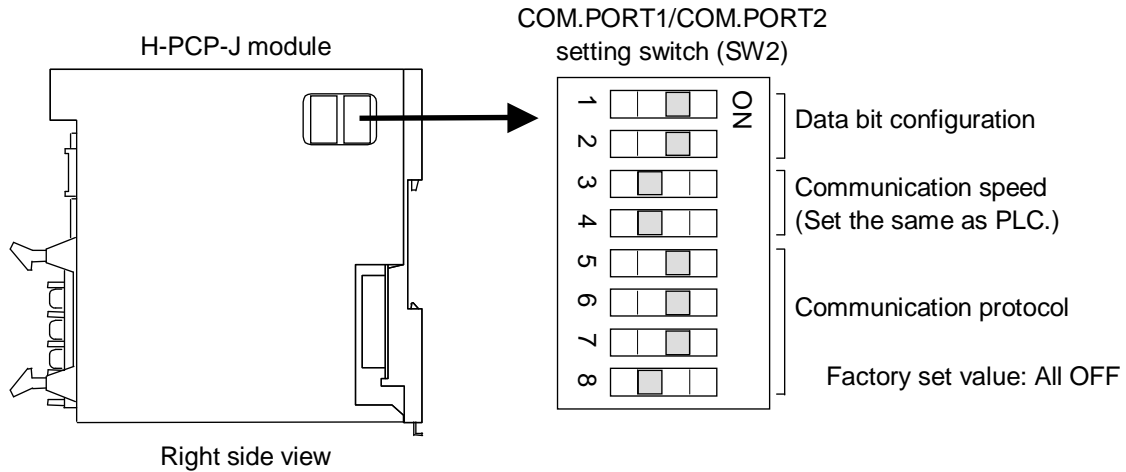


● **Data bit configuration**

| SW2 | | Data bit configuration |
|---|---|---|
| **1** | **2** | |
| ON | ON | Data 7-bit, Even parity, Stop 2-bit |

● **Communication speed**   Set the same as PLC.

| SW2 | | Communication speed |
|---|---|---|
| **3** | **4** | |
| OFF | OFF | 9600 bps |
| ON | OFF | 19200 bps |
| OFF | ON | 38400 bps |
| ON | ON | Don't set this one |

● **Protocol**

| SW2 | | | | Protocol |
|---|---|---|---|---|
| **5** | **6** | **7** | **8** | |
| ON | ON | ON | OFF | SHARP JW50H/70H/100H and JW30H special protocol Computer link (command mode) |

IMS01J05-E2

# 4.3 PLC Scanning Time Setting

Set the PLC scanning time (time of waiting for a response from the PLC) so as to adapt to the environment used. **The PLC scanning time is set via host communication (RKC communication or Modbus).**

PLC scanning time setting     Setting range: 0 to 3000 ms (Factory set value: 10 ms)

[Setting example]
Set PLC scanning time to any value more than twice as long as the maximum scanning time of PLC.

> **If PLC scanning time is extremely short (When at a factory set value of 10 ms as an example), the SR Mini HG SYSTEM may detect the time-out not conducting normal communication processing.**

> The maximum scanning time of PLC differs depending on the CPU processing speed, I/O unit configuration and the user program capacity of the PLC.

> For the PLC scanning time setting (Identifier ST), see the **Power Supply/CPU Module H-PCP-J Instruction Manual (IMS01J02-E□)**.

# 5. SETTING ON THE PLC SIDE

Set the PLC as follows. (Recommend setting example)

| Item | Description |
|------|-------------|
| Function setting | Command mode |
| Station address | 01 |
| Operation mode | 4-wire system Even parity |
| Transmission speed | Set the same as SR Mini HG SYSTEM |
| Termination resistor | Termination resistor is inserted |

☞   The setting item varies depending on the PLC. The details of the setting procedure for the PLC please also read the instruction manual for the used PLC.

# 6.  COMMUNICATION DATA

## 6.1 Request Command and Data Transfer

Data transfer between PLC and SR Mini HG SYSTEM are executed by request command.

● **Request command "0: Monitor (PLC ← SR Mini HG SYSTEM)"**
Command which requests the SR Mini HG SYSTEM to write data such as temperature measured values, etc. (attribute: RO) to the PLC side.
The SR Mini HG SYSTEM always repeats data writing until "1: Setting" or "2: Set value monitor" is set to the request command.
The PCP communication status is set to "1: Writing on monitor data" during data transfer.

● **Request command "1: Setting (PLC → SR Mini HG SYSTEM)"**
Command which requests the SR Mini HG SYSTEM to read data such as temperature set values, etc. (attribute: R/W or WO) from the PLC side. Just when "1: Setting" is set to the request command, the SR Mini HG SYSTEM starts reading the data from the PLC side.
The PCP communication status is set to "2: Reading out setting data" during data transfer. After the data is transferred, the request command and PCP communication status returns to "0: Monitor" and "1: Writing on monitor data," respectively.

● **Request command "2: Set value monitor (PLC ← SR Mini HG SYSTEM)"**
Command which requests the SR Mini HG SYSTEM to write data such as temperature set values, etc. (attribute: R/W) to the PLC side. Just when "2: Set value monitor" is set to the request command, the SR Mini HG SYSTEM starts writing the data to the PLC side.
The PCP communication status is set to "3: Writing on setting data" during data transfer. After the data is transferred, the request command and PCP communication status returns to "0: Monitor" and "1: Writing on monitor data," respectively.
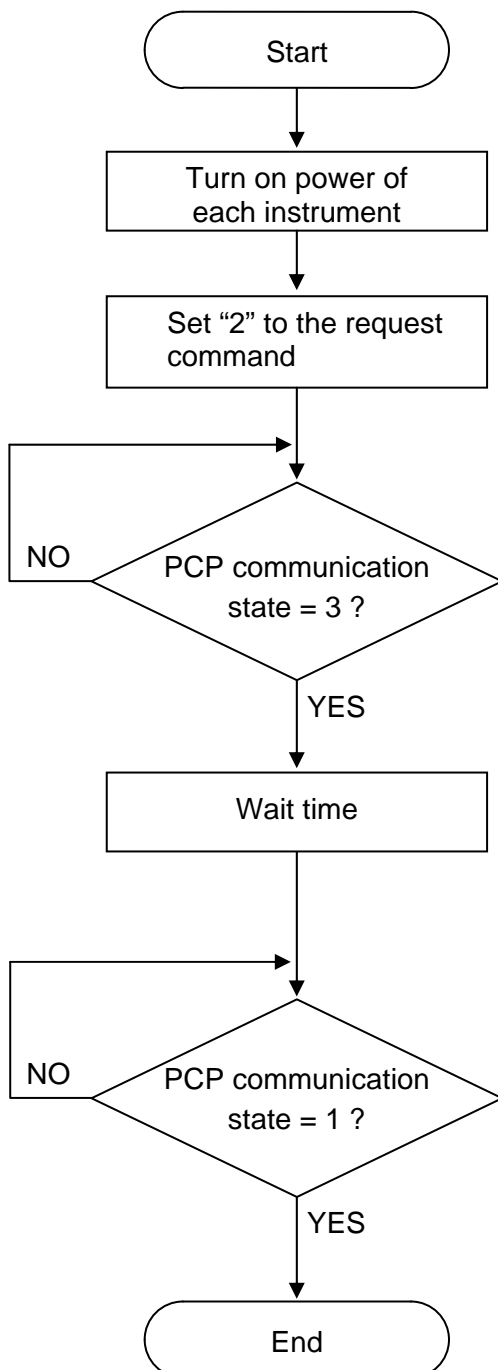
## ■ Data transfer procedures

📖 **Change each set value of SR Mini HG SYSTEM from the PLC after the initial settings are made.**
**If each set value of SR Mini HG SYSTEM is changed from the PLC without setting the initial values, it is re-written to 0 with each set value of the PLC at that time set to 0.**

● **Initial Setting (When transmit data of temperature setting values from SR Mini HG SYSTEM to PLC)**

```
        ┌─────────────────┐
        │      Start      │
        └────────┬────────┘
                 ↓
        ┌─────────────────┐
        │ Turn on power of│
        │ each instrument │
        └────────┬────────┘
                 ↓
        ┌─────────────────┐
        │ Set "2" to the  │
        │ request command │
        └────────┬────────┘
                 ↓
         ◇ PCP communication
    NO ◁──  state = 3 ?
                 │ YES
                 ↓
        ┌─────────────────┐
        │    Wait time    │
        └────────┬────────┘
                 ↓
         ◇ PCP communication
    NO ◁──  state = 1 ?
                 │ YES
                 ↓
        ┌─────────────────┐
        │      End        │
        └─────────────────┘
```

When 2 (Set value monitor) is set to request command, the SR Mini HG SYSTEM starts writing the data items such as temperature set value, etc. (attribute: R/W) to the PLC side.

If 3 (Writing on setting data) is set to PCP communication state in the PLC, this indicates that SR Mini HG SYSTEM data items such as temperature set value, etc. (attribute: R/W) are being written into the PLC.

Reserve data write time as wait time. In addition, process data in each item as indefinite during this period.
  Waiting time (for 38400 bps):
                Approx. 1 second/control unit

If 1 (Writing on monitor data) is set to PCP communication state in the PLC, this indicates that SRV data items such as temperature set value, etc. (attribute: R/W) have been written to start writing SR Mini HG SYSTEM data items such as temperature measured values (PV), etc. (attribute: RO) into the PLC.

● **Data setting (When transmit data of temperature setting values from PLC to SR Mini HG SYSTEM)**

```
        ┌──────────────┐
        (    Start     )
        └──────┬───────┘
               │
        ┌──────▼───────────┐
        │ Set temperature  │
        │ set value (SV)   │
        │ and other setting│
        │ data to each     │
        │ register (memory)│
        │ in the PLC.      │
        └──────┬───────────┘
               │
        ┌──────▼───────────┐
        │ Set "1" to the   │
        │ request command  │
        └──────┬───────────┘
               │
        ┌──────▼───────────┐
   NO   ◇ PCP communication ◇
  ◄─────  state = 2 ?
        └──────┬───────────┘
             YES│
        ┌──────▼───────────┐
        │   Wait time      │
        └──────┬───────────┘
               │
   NO   ◇ PCP communication ◇
  ◄─────  state = 1 ?
             YES│
            ┌───▼──┐
            │  A   │
            └──────┘
```

[Data setting]

When 1 (Setting) is set to request command, the SR Mini HG SYSTEM starts reading the temperature set value data set to the register (memory) on the PLC side.

If 2 (Reading out setting data) is set to PCP communication state in the PLC, this indicates that temperature set values data are being read from the PLC.

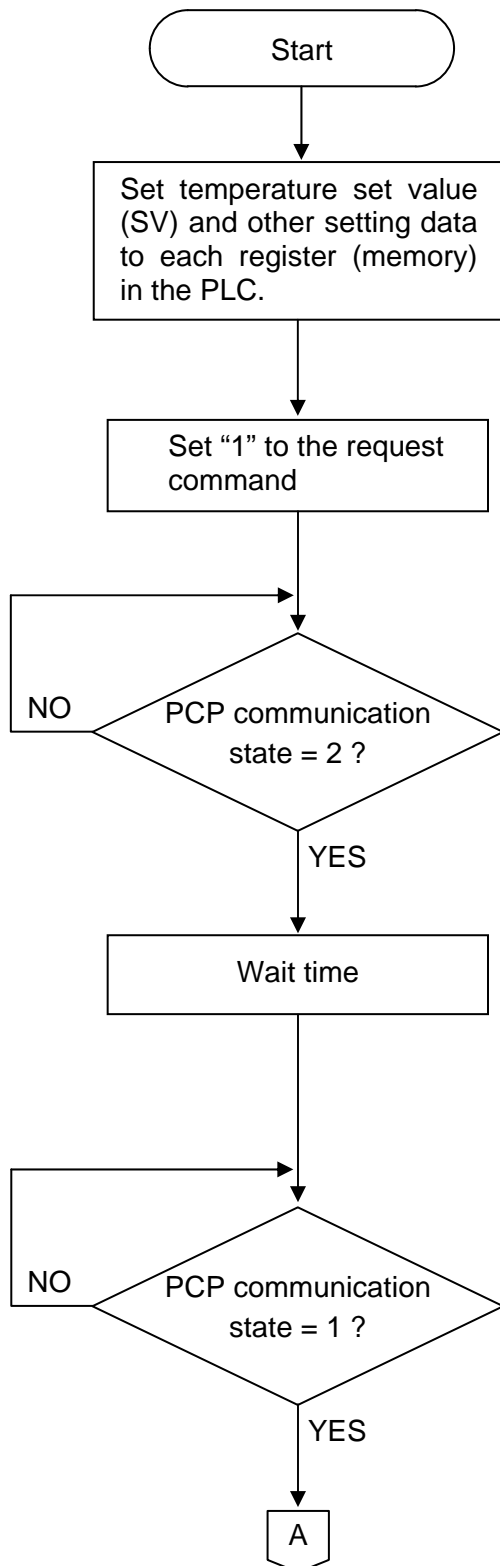Reserve data read time as wait time. In addition, process data in each item as indefinite during this period.
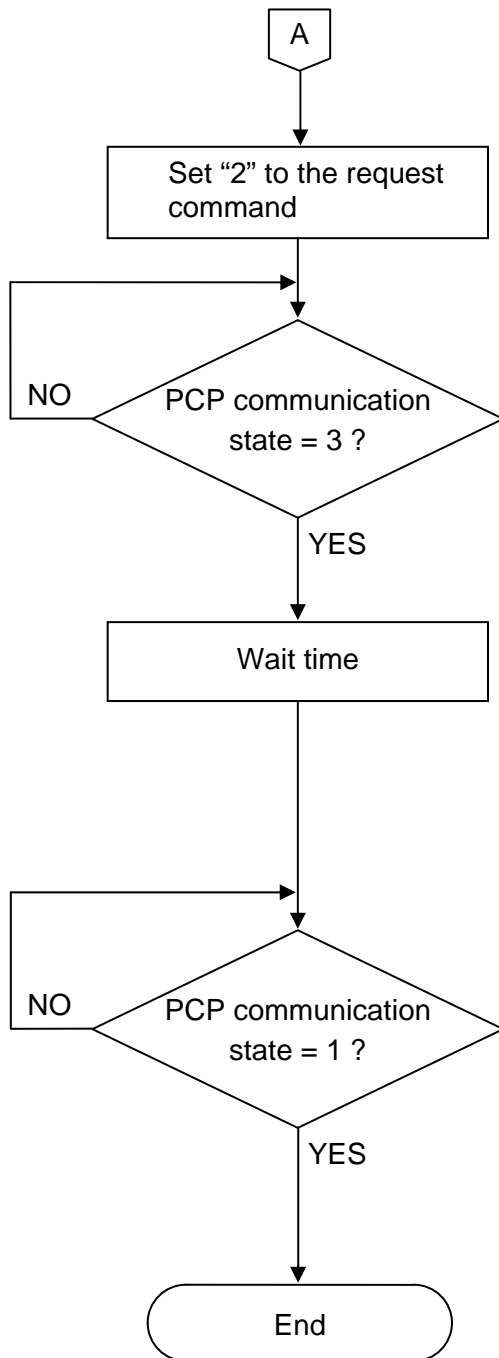
Waiting time (for 38400 bps):
Approx. 2 seconds/control unit

If 1 (Writing on monitor data) is set to PCP communication state in the PLC, this indicates that temperature set value data have been read to start writing SR Mini HG SYSTEM data items such as temperature measured values (PV) etc. (attribute: RO) into the PLC.

Continued from the previous page.

A

Set "2" to the request command

[Confirmation of setting data]

When 2 (Set value monitor) is set to request command, the SR Mini HG SYSTEM starts writing the temperature set value data set to the PLC side.

PCP communication state = 3 ? — NO / YES

If 3 (Writing on setting data) is set to PCP communication state in the PLC, this indicates that SR Mini HG SYSTEM temperature set value data are being written into the PLC.

Wait time

Reserve data write time as wait time. In addition, process data in each item as indefinite during this period.

Waiting time (for 38400 bps):

Approx. 1 second/control unit

PCP communication state = 1 ? — NO / YES

If 1 (Writing on monitor data) is set to PCP communication state in the PLC, this indicates that temperature set values have been written to start writing SR Mini HG SYSTEM data items such as temperature measured values (PV), etc. (attribute: RO) into the PLC.

End

# 6.2 Data Processing Precautions

● With PLC communication, the maximum number of channels per unit address is 20.

● Read data of unused channel and undefined address is *0*.

● The data type is treated as binary data with a sign and without a decimal point. For this reason, carefully express and set the data. (excluding the TIO status)
  [Example]   Heat-side proportional band

    Initial value of internal data:   3.0
    Communication data:          30

● If the data range error occurs during data setting, "Setting error" (bit 8 in the TIO status) is set to ON in the channel where the error occurs. The SR Mini HG SYSTEM continues operation at the present set value without updating the data.

  📖    Any attempt to write to an unused channel is not processed as an error.

● The autotuning (AT) function starts its execution with PID/AT transfer and the request command set to "1: AT operation" and "1: Setting," respectively. After the autotuning function finishes its execution, PID/AT transfer returns to "0: PID control operation" and thus the PID constants are updated.

● When the PLC communication status is selected by selecting the H-PCP-J module DO type (Identifier VU), the digital output (DO) is turned on or off according to the status of communication between the H-PCP-J module and PLC.

| Communication error | PLC communication status (H-PCP-J module DO) | Operation mode |
|---|---|---|
| When the communication is error after the power ON immediately | OFF | "1: Monitor" |
| When the communication is error during operation | OFF | Same as mode before the communication error |

If communication between the H-PCP-J module and PLC is ready, the PLC communication status (H-PCP-J module DO) is turned on to enable operation to continue.

  ☞    The H-PCP-J module DO type selection (Identifier VU) is set by host communication. For the host communication, see the **Power Supply/CPU Module H-PCP-J Instruction Manual (IMS01J02-E□)**.

● Some communication data may become invalid depending on the module selection or the configuration of the SR Mini HG System control unit.
  If any one of the conditions listed below occurs and data items written are within the setting range, read data becomes *0*. Under these conditions, no error response message will occur.
  − When heat/cool control, manual output value and auto/manual transfer are invalid.
  − When heat control, cool-side manipulated output, cool-side proportional band and overlap/deadband are invalid.
  − When ON/OFF control, cool-side manipulated output, heat-side and cool-side proportional band, integral time, derivative time and overlap/deadband are invalid.
  − When the H-CT-A module is not provided, current transformer input measured value and heater break alarm set value are invalid.

# 6.3 Communication Data List

📖 • Name
  ◆: Item stored in the memory area.
  [  ]: The functional module name that data becomes valid is written.

• Attributes
  RO: At the time of request command "0: Monitor," SR Mini HG SYSTEM writes in data.
       (SR Mini HG SYSTEM → PLC)
  R/W: At the time of request command "1: Setting," SR Mini HG SYSTEM read out data.
       At the time of request command "2: Set value monitor," SR Mini HG SYSTEM
       writes in data. (SR Mini HG SYSTEM ↔ PLC)
  WO: At the time of request command "1: Setting," SR Mini HG SYSTEM read out data.
       (SR Mini HG SYSTEM ← PLC)

• Structure
  C: Data for each channel                    U: Data for each unit address

| Name | Attri-bute | Struc-ture | Data range | Factory set value |
|---|---|---|---|---|
| Temperature set value (SV)        ◆ [H-TIO-□, H-CIO-A] | R/W | C | TC/RTD input:   Within input range (Within setting limiter) Current/voltage input:   Within display scale range   (Within setting limiter) | 0 The position of the decimal point differs depending on the input range. |
| Motor speed set value ◆ [H-SIO-A] | | | Within display scale range (Within setting limiter) | |
| Alarm 1 set value        ◆ [H-TIO-□, H-CIO-A, H-SIO-A] | 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 | See Factory set value table of Alarm 1/ Alarm 2 set value * |
| Alarm 2 set value        ◆ [H-TIO-□, H-CIO-A, H-SIO-A] | R/W | C | | |

\* Factory set value table of Alarm 1/Alarm 2 set value

| Input type | Alarm type | Alarm 1 set value | Alarm 2 set value |
|---|---|---|---|
| **TC/RTD input** | Process high alarm | Input range (high limit) | Input range (high limit) |
| | Process low alarm | Input range (low limit) | Input range (low limit) |
| | Deviation high alarm, Deviation high/low alarm, Band alarm | 50 °C [1] | 50 °C [1] |
| | Deviation low alarm | −50 °C [1] | −50 °C [1] |
| | No alarm function | Input range (high limit) | Input range (low limit) |
| **Current/voltage input H-SIO-A** | Process high alarm | 100 (100.0) % | 100 (100.0) % |
| | Process low alarm | 0 (0.0) % | 0 (0.0) % |
| | Deviation high alarm, Deviation high/low alarm, Band alarm | 50 (50.0) % | 50 (50.0) % |
| | Deviation low alarm | −50 (−50.0) % | −50 (−50.0) % |
| | No alarm function | 100 (100.0) % | 100 (100.0) % |

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

Continued from the previous page.

| Name | Attri-bute | Struc-ture | Data range | Factory set value |
|------|------------|------------|------------|-------------------|
| Heater break alarm set value [H-CT-A] | R/W | C | 0.0 to 100.0 A or 0.0 to 30.0 A<br><br>For the current transformer (CT) input of the H-CT-A module.<br><br>Allocates the channels for H-TIO-□ module to the input channels of H-CT-A module by CT channel setting.<br>For the CT channel setting, see the **Power Supply/CPU Module H-PCP-J Instruction Manual (IMS01J02-E□)**. | 0.0 |
| Operation mode transfer [H-TIO-□, H-CIO-A, H-SIO-A] | R/W | C | 0: Unused<br>  If set to "Unused," no control, monitor or alarm monitor is performed.<br>1: Monitor<br>  If set to "Monitor," only the monitor is performed. No control or alarm monitor is performed.<br>2: Alarm<br>  If set to "Alarm," monitor or alarm monitor is performed. No control is performed.<br>3: Normal<br>  Selected to normal mode to perform control, monitor or alarm monitor. | 3 |
| Auto/Manual transfer [H-TIO-□, H-CIO-A] | R/W | C | 0: Auto<br>1: Manual<br><br>Setting will be invalid in ON/OFF control and heat/cool control. | 0 |
| Manual output value [H-TIO-□, H-CIO-A] | R/W | C | −5.0 to +105.0 %<br><br>Setting will be invalid in ON/OFF control and heat/cool control. | 0.0 |
| Overlap/deadband ◆ [H-TIO-□, H-CIO-A] | R/W | C | −10.0 to +10.0 % of span | 0.0 |
| Heat-side proportional band ◆ [H-TIO-□, H-CIO-A, H-SIO-A] | R/W | C | 0.1 to 1000.0 % of span | H-TIO-□, H-CIO-A: 3.0<br>H-SIO-A: 300.0 |
| Cool-side proportional band ◆ [H-TIO-□, H-CIO-A] | R/W | C | 0.1 to 1000.0 % of span | 3.0 |

Continued from the previous page.

| Name | Attri-bute | Struc-ture | Data range | Factory set value |
|------|-----------|-----------|-----------|------------------|
| Integral time ◆ [H-TIO-□, H-CIO-A, H-SIO-A] | R/W | C | 1 to 3600 seconds | H-TIO-□, H-CIO-A: 240 H-SIO-A: 2 |
| Derivative time ◆ [H-TIO-□, H-CIO-A, H-SIO-A] | R/W | C | 0 to 3600 seconds (0: PI action) | H-TIO-□, H-CIO-A: 60 H-SIO-A: 0 |
| PID/AT transfer * [H-TIO-□, H-CIO-A, H-SIO-A] | R/W | C | 0: PID control operation 1: AT (Autotuning) operation  The autotuning (AT) function starts its execution with PID/AT transfer and the request command set to "1: AT operation" and "1: Setting," respectively. After the autotuning function finishes its execution, PID/AT transfer returns to "0: PID control operation." | 0 |

* Autotuning (AT) is the function which automatically measures, calculates and sets the optimum PID constants according to the set temperature.

📖 **Caution for using the Autotuning (AT)**
**When a temperature change (UP and/or Down) is 1C or less per minute during Autotuning, Autotuning may be cancelled before calculating PID values. In that case, adjust the PID values manually. It is possible to happen when the set value is around the ambient temperature or is close to the maximum temperature achieved by the load.**

The following is the conditions necessary to carry out autotuning and the conditions which will cause the autotuning to stop.

**Conditions necessary for autotuning:**

The autotuning should be executed after satisfying all of the following conditions:
- Operation mode conditions:
  − Auto/Manual transfer → Auto mode
  − PID/AT transfer → PID control mode
  − Control RUN/STOP transfer → Control RUN mode
- The measured value (PV) is without input error range [Input error determination point (high) > Measured value (PV) > Input error determination point (low)].
- The output limiter high limit should be more than 0.1 % and the output limiter low limit should be less than 99.9 %.
- When operation mode is set to "Normal (Can be controlled )."

When the autotuning is finished, the display of each channel automatically returns to "0: PID control operation."

Continued from the previous page.

**Conditions which will cause the autotuning to stop:**
- When the temperature set value (SV) is changed.
- When the memory area is changed.
- When the PV bias value is changed.
- When the AT bias value is changed.
- When transfer to Manual mode using the Auto/Manual transfer.
- When the measured value (PV) goes to input error range [Measured value (PV) $\geq$ Input error determination point (high) or Input error determination point (low) $\geq$ Measured value (PV)].
- When the power is cut off.
- When FAIL occurs in the module whose channel is under the autotuning. Otherwise, when FAIL occurs in the H-PCP-J module.
- When transfer to the PID control mode by the PID/AT transfer.
- When operation mode is set to "Unused," "Monitor" or "Alarm."
- When the Control RUN/STOP function is changed to the "Control STOP" function.

> **When the above-mentioned conditions to stop the autotuning occurs, the autotuning is immediately stopped and switch over to the PID control mode. The PID constants return to the values at the start of the autotuning.**

Continued from the previous page.

| Name | Attri-bute | Struc-ture | Data range | Factory set value |
|------|-----------|-----------|------------|-------------------|
| Temperature measured value (PV) [H-TIO-□, H-CIO-A] | RO | C | TC/RTD input:<br>  Within input range<br>Current/voltage input:<br>  Within display scale range | — |
| Motor speed measured value [H-SIO-A] | | | Within display scale range | — |
| Heat-side manipulated output value [H-TIO-□, H-CIO-A] | RO | C | −0.5 to +105.0 % | — |
| Cool-side manipulated output value [H-TIO-□, H-CIO-A] | RO | C | −0.5 to +105.0 % | — |
| Current transformer input measured value [H-CT-A] | RO | C | 0.0 to 100.0 A or 0.0 to 30.0 A<br><br>Current transformer (CT) input measured value of the H-CT-A module.<br>Allocates the channels for H-TIO-□ module to the input channels of H-CT-A module by CT channel setting.<br>For the CT channel setting, see the **Power Supply/CPU Module H-PCP-J Instruction Manual (IMS01J02-E□)**. | — |
| TIO status [H-TIO-□, H-CIO-A, H-SIO-A] | RO | C | Each operation status is assigned as a bit image in binary numbers.<br>Bit data<br>  bit 0: Heat-side manipulated output status<br>  bit 1: Unused<br>  bit 2: Alarm 1 status<br>  bit 3: Alarm 2 status<br>  bit 4: Burnout status<br>  bit 5: Heater break alarm status<br>  bit 6: Control loop break alarm (LBA) status<br>  bit 7: Temperature rise completion status<br>  bit 8: Setting error<br>  bit 9 to 15: Unused<br>Data    0: OFF    1: ON<br><br>    bit 15 ·······················bit 0<br><br>Bit image: 0000000000000000<br>[Decimal number: 0 to 509] | — |
| Set value monitor [H-TIO-□, H-CIO-A, H-SIO-A] | RO | C | TC/RTD input:<br>  Within input range<br>Current/voltage input, H-SIO-A:<br>  Within display scale range | — |

Continued from the previous page.

| Name | Attri-bute | Struc-ture | Data range | Factory set value |
|------|------------|------------|------------|-------------------|
| Request command [H-PCP-J] | R/W | U | 0: Monitor<br>Command which requests the SR Mini HG SYSTEM to write data such as temperature measured values, etc. (attribute: RO) to the PLC side.<br>The SR Mini HG SYSTEM always repeats data writing until "1: Setting" or "2: Set value monitor" is set to the request command. The PCP communication status is set to "1: Writing on monitor data" during data transfer.<br>1: Setting<br>Command which requests the SR Mini HG SYSTEM to read data such as temperature set values, etc. (attribute: R/W or WO) from the PLC side. Just when "1: Setting" is set to the request command, the SR Mini HG SYSTEM starts reading the data from the PLC side.<br>The PCP communication status is set to "2: Reading out setting data" during data transfer. After the data is transferred, the request command and PCP communication status returns to "0: Monitor" and "1: Writing on monitor data," respectively.<br>2: Set value monitor<br>Command which requests the SR Mini HG SYSTEM to write data such as temperature set values, etc. (attribute: R/W) to the PLC side. Just when "2: Set value monitor" is set to the request command, the SR Mini HG SYSTEM starts writing the data to the PLC side.<br>The PCP communication status is set to "3: Writing on setting data" during data transfer. After the data is transferred, the request command and PCP communication status returns to "0: Monitor" and "1: Writing on monitor data," respectively. | 0 |
| PCP communication status [H-PCP-J] | RO | U | 1: Writing on monitor data<br>During monitor data of attribute RO is written to PLC<br>2: Reading out setting data<br>During setting data of attribute R/W or WO is read from PLC<br>3: Writing on setting data<br>During setting data of attribute R/W is written to PLC | — |

Continued from the previous page.

| Name | Attri-bute | Struc-ture | Data range | Factory set value |
|------|------------|------------|------------|-------------------|
| PCP normal communication flag [H-PCP-J] | RO | U | The numbers 0 and then 1 are repeated in every communication period.<br><br>The SR Mini HG SYSTEM rewrites 0 and 1 in this area alternately like $0 \to 1 \to 0$ in every communication period. It is possible to determine whether or not the SR Mini HG SYSTEM makes communication by monitoring this area periodically using the PLC program. | — |
| Memory area number [H-TIO-□, H-CIO-A, H-SIO-A] | WO | U | 1 to 8<br>Data reading is always made from the PLC regardless of the request command. Any numeric value other than 1 to 8 becomes invalid.<br>Changing the memory area automatically writes each set value to the PLC. | — |
| Control RUN/STOP transfer * [H-PCP-J] | WO | U | 0: Control STOP<br>1: Control RUN | — |
| PV bias [H-TIO-□, H-CIO-A, H-SIO-A] | R/W | C | −5.00 to +5.00 % of span<br>ZK-1103 specification:<br>    −Input span to +Input span | 0.00<br>ZK-1103: 0 [a] |
| Setting change rate limiter ◆ [H-TIO-□, H-CIO-A, H-SIO-A] | R/W | C | 0.0 to 100.0 % of span/minute | 0.0 |

* **When the control RUN/STOP holding setting is set to "Not hold" or "Hold":**
The control RUN/STOP transfer setting is always read from the PLC regardless of the request command. Any numeric value other than *0* and *1* becomes invalid.

**When the control RUN/STOP holding setting is set to "Start-up from control RUN status":**
As the control RUN/STOP transfer setting is always set to "1: Control RUN," any value set to the control RUN/STOP transfer becomes invalid.

☞ The Control RUN/STOP holding (Identifier X1) is set by host communication. For the host communication, see the **Power Supply/CPU Module H-PCP-J Instruction Manual (IMS01J02-E□)**.

[a] Unit (°C, °F, etc.) and decimal point position (No decimal place, One decimal place, Two decimal places or Three decimal places) depends on input range type.

# 7.  DATA MAP

## 7.1 Reference to Data Map

This data map summarizes the data (file register) addresses, channels and names that can be used with PLC. For details on each data range, see the **6.3 Communication Data List (P. 17)**.

(b)

| Unit address 0 | Unit address 1 | Unit address 2 | Unit address 3 | Name |
|---|---|---|---|---|
| F1: 000000 to F1: 000047 | F1: 002000 to F1: 002047 | F1: 004000 to F1: 004047 | F1: 006000 to F1: 006047 | Temperature set value (SV) CH1 to CH20 |
| F1: 000050 to F1: 000117 | F1: 002050 to F1: 002117 | F1: 004050 to F1: 004117 | F1: 006050 to F1: 006117 | Alarm 1 set value CH1 to CH20 |

(a) →  (c) →

(a) Unit address:  Unit address of SR Mini HG SYSTEM

(b) Name:  Data names

(c) Address:  Data (file register) addresses
File register address is expressed in octadecimal

# 7.2 Data Map List

## ■ Unit address 0 to 3 (Group 1)

| Unit address 0 | Unit address 1 | Unit address 2 | Unit address 3 | Name |
|---|---|---|---|---|
| F1: 000000 to<br>F1: 000047 | F1: 002000 to<br>F1: 002047 | F1: 004000 to<br>F1: 004047 | F1: 006000 to<br>F1: 006047 | Temperature set value (SV)<br>CH1 to CH20 |
| F1: 000050 to<br>F1: 000117 | F1: 002050 to<br>F1: 002117 | F1: 004050 to<br>F1: 004117 | F1: 006050 to<br>F1: 006117 | Alarm 1 set value          CH1 to CH20 |
| F1: 000120 to<br>F1: 000167 | F1: 002120 to<br>F1: 002167 | F1: 004120 to<br>F1: 004167 | F1: 006120 to<br>F1: 006167 | Alarm 2 set value          CH1 to CH20 |
| F1: 000170 to<br>F1: 000237 | F1: 002170 to<br>F1: 002237 | F1: 004170 to<br>F1: 004237 | F1: 006170 to<br>F1: 006237 | Heater break alarm set value<br>(H-CT-A module)          CH1 to CH20 |
| F1: 000240 to<br>F1: 000307 | F1: 002240 to<br>F1: 002307 | F1: 004240 to<br>F1: 004307 | F1: 006240 to<br>F1: 006307 | Operation mode transfer    CH1 to CH20 |
| F1: 000310 to<br>F1: 000357 | F1: 002310 to<br>F1: 002357 | F1: 004310 to<br>F1: 004357 | F1: 006310 to<br>F1: 006357 | Auto/Manual transfer       CH1 to CH20 |
| F1: 000360 to<br>F1: 000427 | F1: 002360 to<br>F1: 002427 | F1: 004360 to<br>F1: 004427 | F1: 006360 to<br>F1: 006427 | Manual output value        CH1 to CH20 |
| F1: 000430 to<br>F1: 000477 | F1: 002430 to<br>F1: 002477 | F1: 004430 to<br>F1: 004477 | F1: 006430 to<br>F1: 006477 | Overlap/deadband           CH1 to CH20 |
| F1: 000500 to<br>F1: 000547 | F1: 002500 to<br>F1: 002547 | F1: 004500 to<br>F1: 004547 | F1: 006500 to<br>F1: 006547 | Heat-side proportional band<br>CH1 to CH20 |
| F1: 000550 to<br>F1: 000617 | F1: 002550 to<br>F1: 002617 | F1: 004550 to<br>F1: 004617 | F1: 006550 to<br>F1: 006617 | Cool-side proportional band<br>CH1 to CH20 |
| F1: 000620 to<br>F1: 000667 | F1: 002620 to<br>F1: 002667 | F1: 004620 to<br>F1: 004667 | F1: 006620 to<br>F1: 006667 | Integral time              CH1 to CH20 |
| F1: 000670 to<br>F1: 000737 | F1: 002670 to<br>F1: 002737 | F1: 004670 to<br>F1: 004737 | F1: 006670 to<br>F1: 006737 | Derivative time            CH1 to CH20 |
| F1: 000740 to<br>F1: 001007 | F1: 002740 to<br>F1: 003007 | F1: 004740 to<br>F1: 005007 | F1: 006740 to<br>F1: 007007 | PID/AT transfer            CH1 to CH20 |
| F1: 001010 to<br>F1: 001057 | F1: 003010 to<br>F1: 003057 | F1: 005010 to<br>F1: 005057 | F1: 007010 to<br>F1: 007057 | Temperature measured value (PV)<br>CH1 to CH20 |
| F1: 001060 to<br>F1: 001127 | F1: 003060 to<br>F1: 003127 | F1: 005060 to<br>F1: 005127 | F1: 007060 to<br>F1: 007127 | Heat-side manipulated output value<br>CH1 to CH20 |
| F1: 001130 to<br>F1: 001177 | F1: 003130 to<br>F1: 003177 | F1: 005130 to<br>F1: 005177 | F1: 007130 to<br>F1: 007177 | Cool-side manipulated output value<br>CH1 to CH20 |
| F1: 001200 to<br>F1: 001247 | F1: 003200 to<br>F1: 003247 | F1: 005200 to<br>F1: 005247 | F1: 007200 to<br>F1: 007247 | Current transformer input measured value<br>(H-CT-A module)          CH1 to CH20 |
| F1: 001250 to<br>F1: 001317 | F1: 003250 to<br>F1: 003317 | F1: 005250 to<br>F1: 005317 | F1: 007250 to<br>F1: 007317 | TIO status                 CH1 to CH20 |
| F1: 001320 to<br>F1: 001367 | F1: 003320 to<br>F1: 003367 | F1: 005320 to<br>F1: 005367 | F1: 007320 to<br>F1: 007367 | Set value monitor          CH1 to CH20 |
| F1: 001370 | F1: 003370 | F1: 005370 | F1: 007370 | Request command |
| F1: 001372 | F1: 003372 | F1: 005372 | F1: 007372 | PCP communication status |
| F1: 001374 | F1: 003374 | F1: 005374 | F1: 007374 | PCP normal communication flag |

Continued from the previous page.

| Unit address 0 | Unit address 1 | Unit address 2 | Unit address 3 | Name |
|---|---|---|---|---|
| F1: 001376 to F1: 001413 | F1: 003376 to F1: 003413 | F1: 005376 to F1: 005413 | F1: 007376 to F1: 007413 | Do not use this address range |
| F1: 001414 | F1: 003414 | F1: 005414 | F1: 007414 | Memory area number |
| F1: 001416 | F1: 003416 | F1: 005416 | F1: 007416 | Control RUN/STOP transfer |
| F1: 001420 to F1: 001437 | F1: 003420 to F1: 003437 | F1: 005420 to F1: 005437 | F1: 007420 to F1: 007437 | Do not use this address range |
| F1: 001440 to F1: 001507 | F1: 003440 to F1: 003507 | F1: 005440 to F1: 005507 | F1: 007440 to F1: 007507 | PV bias                 CH1 to CH20 |
| F1: 001510 to F1: 001557 | F1: 003510 to F1: 003557 | F1: 005510 to F1: 005557 | F1: 007510 to F1: 007557 | Setting change rate limiter                 CH1 to CH20 |
| F1: 001560 to F1: 001777 | F1: 003560 to F1: 003777 | F1: 005560 to F1: 005777 | F1: 007560 to F1: 007777 | Do not use this address range |

## ■ Unit address 4 to 7 (Group 2)

| Unit address 4 | Unit address 5 | Unit address 6 | Unit address 7 | Name |
|---|---|---|---|---|
| F1: 010000 to F1: 010047 | F1: 012000 to F1: 012047 | F1: 014000 to F1: 014047 | F1: 016000 to F1: 016047 | Temperature set value (SV)                 CH1 to CH20 |
| F1: 010050 to F1: 010117 | F1: 012050 to F1: 012117 | F1: 014050 to F1: 014117 | F1: 016050 to F1: 016117 | Alarm 1 set value       CH1 to CH20 |
| F1: 010120 to F1: 010167 | F1: 012120 to F1: 012167 | F1: 014120 to F1: 014167 | F1: 016120 to F1: 016167 | Alarm 2 set value       CH1 to CH20 |
| F1: 010170 to F1: 010237 | F1: 012170 to F1: 012237 | F1: 014170 to F1: 014237 | F1: 016170 to F1: 016237 | Heater break alarm set value (H-CT-A module)        CH1 to CH20 |
| F1: 010240 to F1: 010307 | F1: 012240 to F1: 012307 | F1: 014240 to F1: 014307 | F1: 016240 to F1: 016307 | Operation mode transfer   CH1 to CH20 |
| F1: 010310 to F1: 010357 | F1: 012310 to F1: 012357 | F1: 014310 to F1: 014357 | F1: 016310 to F1: 016357 | Auto/Manual transfer     CH1 to CH20 |
| F1: 010360 to F1: 010427 | F1: 012360 to F1: 012427 | F1: 014360 to F1: 014427 | F1: 016360 to F1: 016427 | Manual output value      CH1 to CH20 |
| F1: 010430 to F1: 010477 | F1: 012430 to F1: 012477 | F1: 014430 to F1: 014477 | F1: 016430 to F1: 016477 | Overlap/deadband         CH1 to CH20 |
| F1: 010500 to F1: 010547 | F1: 012500 to F1: 012547 | F1: 014500 to F1: 014547 | F1: 016500 to F1: 016547 | Heat-side proportional band                 CH1 to CH20 |
| F1: 010550 to F1: 010617 | F1: 012550 to F1: 012617 | F1: 014550 to F1: 014617 | F1: 016550 to F1: 016617 | Cool-side proportional band                 CH1 to CH20 |
| F1: 010620 to F1: 010667 | F1: 012620 to F1: 012667 | F1: 014620 to F1: 014667 | F1: 016620 to F1: 016667 | Integral time           CH1 to CH20 |
| F1: 010670 to F1: 010737 | F1: 012670 to F1: 012737 | F1: 014670 to F1: 014737 | F1: 016670 to F1: 016737 | Derivative time         CH1 to CH20 |

Continued from the previous page.

| Unit address 4 | Unit address 5 | Unit address 6 | Unit address 7 | Name |
|---|---|---|---|---|
| F1: 010740 to F1: 011007 | F1: 012740 to F1: 013007 | F1: 014740 to F1: 015007 | F1: 016740 to F1: 017007 | PID/AT transfer           CH1 to CH20 |
| F1: 011010 to F1: 011057 | F1: 013010 to F1: 013057 | F1: 015010 to F1: 015057 | F1: 017010 to F1: 017057 | Temperature measured value (PV)           CH1 to CH20 |
| F1: 011060 to F1: 011127 | F1: 013060 to F1: 013127 | F1: 015060 to F1: 015127 | F1: 017060 to F1: 017127 | Heat-side manipulated output value           CH1 to CH20 |
| F1: 011130 to F1: 011177 | F1: 013130 to F1: 013177 | F1: 015130 to F1: 015177 | F1: 017130 to F1: 017177 | Cool-side manipulated output value           CH1 to CH20 |
| F1: 011200 to F1: 011247 | F1: 013200 to F1: 013247 | F1: 015200 to F1: 015247 | F1: 017200 to F1: 017247 | Current transformer input measured value (H-CT-A module)           CH1 to CH20 |
| F1: 011250 to F1: 011317 | F1: 013250 to F1: 013317 | F1: 015250 to F1: 015317 | F1: 017250 to F1: 017317 | TIO status           CH1 to CH20 |
| F1: 011320 to F1: 011367 | F1: 013320 to F1: 013367 | F1: 015320 to F1: 015367 | F1: 017320 to F1: 017367 | Set value monitor           CH1 to CH20 |
| F1: 011370 | F1: 013370 | F1: 015370 | F1: 017370 | Request command |
| F1: 011372 | F1: 013372 | F1: 015372 | F1: 017372 | PCP communication status |
| F1: 011374 | F1: 013374 | F1: 015374 | F1: 017374 | PCP normal communication flag |
| F1: 011376 to F1: 011413 | F1: 013376 to F1: 013413 | F1: 015376 to F1: 015413 | F1: 017376 to F1: 017413 | Do not use this address range |
| F1: 011414 | F1: 013414 | F1: 015414 | F1: 017414 | Memory area number |
| F1: 011416 | F1: 013416 | F1: 015416 | F1: 017416 | Control RUN/STOP transfer |
| F1: 011420 to F1: 011437 | F1: 013420 to F1: 013437 | F1: 015420 to F1: 015437 | F1: 017420 to F1: 017437 | Do not use this address range |
| F1: 011440 to F1: 011507 | F1: 013440 to F1: 013507 | F1: 015440 to F1: 015507 | F1: 017440 to F1: 017507 | PV bias           CH1 to CH20 |
| F1: 011510 to F1: 011557 | F1: 013510 to F1: 013557 | F1: 015510 to F1: 015557 | F1: 017510 to F1: 017557 | Setting change rate limiter           CH1 to CH20 |
| F1: 011560 to F1: 011777 | F1: 013560 to F1: 013777 | F1: 015560 to F1: 015777 | F1: 017560 to F1: 017777 | Do not use this address range |

## ■ Unit address 8 to B (Group 3)

| Unit address 8 | Unit address 9 | Unit address A | Unit address B | Name |
|---|---|---|---|---|
| F1: 020000 to F1: 020047 | F1: 022000 to F1: 022047 | F1: 024000 to F1: 024047 | F1: 026000 to F1: 026047 | Temperature set value (SV)           CH1 to CH20 |
| F1: 020050 to F1: 020117 | F1: 022050 to F1: 022117 | F1: 024050 to F1: 024117 | F1: 026050 to F1: 026117 | Alarm 1 set value           CH1 to CH20 |
| F1: 020120 to F1: 020167 | F1: 022120 to F1: 022167 | F1: 024120 to F1: 024167 | F1: 026120 to F1: 026167 | Alarm 2 set value           CH1 to CH20 |
| F1: 020170 to F1: 020237 | F1: 022170 to F1: 022237 | F1: 024170 to F1: 024237 | F1: 026170 to F1: 026237 | Heater break alarm set value (H-CT-A module)           CH1 to CH20 |

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| Unit address 8 | Unit address 9 | Unit address A | Unit address B | Name |
|---|---|---|---|---|
| F1: 020240 to F1: 020307 | F1: 022240 to F1: 022307 | F1: 024240 to F1: 024307 | F1: 026240 to F1: 026307 | Operation mode transfer      CH1 to CH20 |
| F1: 020310 to F1: 020357 | F1: 022310 to F1: 022357 | F1: 024310 to F1: 024357 | F1: 026310 to F1: 026357 | Auto/Manual transfer        CH1 to CH20 |
| F1: 020360 to F1: 020427 | F1: 022360 to F1: 022427 | F1: 024360 to F1: 024427 | F1: 026360 to F1: 026427 | Manual output value         CH1 to CH20 |
| F1: 020430 to F1: 020477 | F1: 022430 to F1: 022477 | F1: 024430 to F1: 024477 | F1: 026430 to F1: 026477 | Overlap/deadband            CH1 to CH20 |
| F1: 020500 to F1: 020547 | F1: 022500 to F1: 022547 | F1: 024500 to F1: 024547 | F1: 026500 to F1: 026547 | Heat-side proportional band                   CH1 to CH20 |
| F1: 020550 to F1: 020617 | F1: 022550 to F1: 022617 | F1: 024550 to F1: 024617 | F1: 026550 to F1: 026617 | Cool-side proportional band                   CH1 to CH20 |
| F1: 020620 to F1: 020667 | F1: 022620 to F1: 022667 | F1: 024620 to F1: 024667 | F1: 026620 to F1: 026667 | Integral time               CH1 to CH20 |
| F1: 020670 to F1: 020737 | F1: 022670 to F1: 022737 | F1: 024670 to F1: 024737 | F1: 026670 to F1: 026737 | Derivative time             CH1 to CH20 |
| F1: 020740 to F1: 021007 | F1: 022740 to F1: 023007 | F1: 024740 to F1: 025007 | F1: 026740 to F1: 027007 | PID/AT transfer             CH1 to CH20 |
| F1: 021010 to F1: 021057 | F1: 023010 to F1: 023057 | F1: 025010 to F1: 025057 | F1: 027010 to F1: 027057 | Temperature measured value (PV)                   CH1 to CH20 |
| F1: 021060 to F1: 021127 | F1: 023060 to F1: 023127 | F1: 025060 to F1: 025127 | F1: 027060 to F1: 027127 | Heat-side manipulated output value                   CH1 to CH20 |
| F1: 021130 to F1: 021177 | F1: 023130 to F1: 023177 | F1: 025130 to F1: 025177 | F1: 027130 to F1: 027177 | Cool-side manipulated output value                   CH1 to CH20 |
| F1: 021200 to F1: 021247 | F1: 023200 to F1: 023247 | F1: 025200 to F1: 025247 | F1: 027200 to F1: 027247 | Current transformer input measured value (H-CT-A module)         CH1 to CH20 |
| F1: 021250 to F1: 021317 | F1: 023250 to F1: 023317 | F1: 025250 to F1: 025317 | F1: 027250 to F1: 027317 | TIO status                  CH1 to CH20 |
| F1: 021320 to F1: 021367 | F1: 023320 to F1: 023367 | F1: 025320 to F1: 025367 | F1: 027320 to F1: 027367 | Set value monitor           CH1 to CH20 |
| F1: 021370 | F1: 023370 | F1: 025370 | F1: 027370 | Request command |
| F1: 021372 | F1: 023372 | F1: 025372 | F1: 027372 | PCP communication status |
| F1: 021374 | F1: 023374 | F1: 025374 | F1: 027374 | PCP normal communication flag |
| F1: 021376 to F1: 021413 | F1: 023376 to F1: 023413 | F1: 025376 to F1: 025413 | F1: 027376 to F1: 027413 | Do not use this address range |
| F1: 021414 | F1: 023414 | F1: 025414 | F1: 027414 | Memory area number |
| F1: 021416 | F1: 023416 | F1: 025416 | F1: 027416 | Control RUN/STOP transfer |
| F1: 021420 to F1: 021437 | F1: 023420 to F1: 023437 | F1: 025420 to F1: 025437 | F1: 027420 to F1: 027437 | Do not use this address range |
| F1: 021440 to F1: 021507 | F1: 023440 to F1: 023507 | F1: 025440 to F1: 025507 | F1: 027440 to F1: 027507 | PV bias                     CH1 to CH20 |
| F1: 021510 to F1: 021557 | F1: 023510 to F1: 023557 | F1: 025510 to F1: 025557 | F1: 027510 to F1: 027557 | Setting change rate limiter                   CH1 to CH20 |
| F1: 021560 to F1: 021777 | F1: 023560 to F1: 023777 | F1: 025560 to F1: 025777 | F1: 027560 to F1: 027777 | Do not use this address range |

## ■ Unit address C to F (Group 4)

| Unit address C | Unit address D | Unit address E | Unit address F | Name |
|---|---|---|---|---|
| F1: 030000 to F1: 030047 | F1: 032000 to F1: 032047 | F1: 034000 to F1: 034047 | F1: 036000 to F1: 036047 | Temperature set value (SV) CH1 to CH20 |
| F1: 030050 to F1: 030117 | F1: 032050 to F1: 032117 | F1: 034050 to F1: 034117 | F1: 036050 to F1: 036117 | Alarm 1 set value CH1 to CH20 |
| F1: 030120 to F1: 030167 | F1: 032120 to F1: 032167 | F1: 034120 to F1: 034167 | F1: 036120 to F1: 036167 | Alarm 2 set value CH1 to CH20 |
| F1: 030170 to F1: 030237 | F1: 032170 to F1: 032237 | F1: 034170 to F1: 034237 | F1: 036170 to F1: 036237 | Heater break alarm set value (H-CT-A module) CH1 to CH20 |
| F1: 030240 to F1: 030307 | F1: 032240 to F1: 032307 | F1: 034240 to F1: 034307 | F1: 036240 to F1: 036307 | Operation mode transfer CH1 to CH20 |
| F1: 030310 to F1: 030357 | F1: 032310 to F1: 032357 | F1: 034310 to F1: 034357 | F1: 036310 to F1: 036357 | Auto/Manual transfer CH1 to CH20 |
| F1: 030360 to F1: 030427 | F1: 032360 to F1: 032427 | F1: 034360 to F1: 034427 | F1: 036360 to F1: 036427 | Manual output value CH1 to CH20 |
| F1: 030430 to F1: 030477 | F1: 032430 to F1: 032477 | F1: 034430 to F1: 034477 | F1: 036430 to F1: 036477 | Overlap/deadband CH1 to CH20 |
| F1: 030500 to F1: 030547 | F1: 032500 to F1: 032547 | F1: 034500 to F1: 034547 | F1: 036500 to F1: 036547 | Heat-side proportional band CH1 to CH20 |
| F1: 030550 to F1: 030617 | F1: 032550 to F1: 032617 | F1: 034550 to F1: 034617 | F1: 036550 to F1: 036617 | Cool-side proportional band CH1 to CH20 |
| F1: 030620 to F1: 030667 | F1: 032620 to F1: 032667 | F1: 034620 to F1: 034667 | F1: 036620 to F1: 036667 | Integral time CH1 to CH20 |
| F1: 030670 to F1: 030737 | F1: 032670 to F1: 032737 | F1: 034670 to F1: 034737 | F1: 036670 to F1: 036737 | Derivative time CH1 to CH20 |
| F1: 030740 to F1: 031007 | F1: 032740 to F1: 033007 | F1: 034740 to F1: 035007 | F1: 036740 to F1: 037007 | PID/AT transfer CH1 to CH20 |
| F1: 031010 to F1: 031057 | F1: 033010 to F1: 033057 | F1: 035010 to F1: 035057 | F1: 037010 to F1: 037057 | Temperature measured value (PV) CH1 to CH20 |
| F1: 031060 to F1: 031127 | F1: 033060 to F1: 033127 | F1: 035060 to F1: 035127 | F1: 037060 to F1: 037127 | Heat-side manipulated output value CH1 to CH20 |
| F1: 031130 to F1: 031177 | F1: 033130 to F1: 033177 | F1: 035130 to F1: 035177 | F1: 037130 to F1: 037177 | Cool-side manipulated output value CH1 to CH20 |
| F1: 031200 to F1: 031247 | F1: 033200 to F1: 033247 | F1: 035200 to F1: 035247 | F1: 037200 to F1: 037247 | Current transformer input measured value (H-CT-A module) CH1 to CH20 |
| F1: 031250 to F1: 031317 | F1: 033250 to F1: 033317 | F1: 035250 to F1: 035317 | F1: 037250 to F1: 037317 | TIO status CH1 to CH20 |
| F1: 031320 to F1: 031367 | F1: 033320 to F1: 033367 | F1: 035320 to F1: 035367 | F1: 037320 to F1: 037367 | Set value monitor CH1 to CH20 |
| F1: 031370 | F1: 033370 | F1: 035370 | F1: 037370 | Request command |
| F1: 031372 | F1: 033372 | F1: 035372 | F1: 037372 | PCP communication status |
| F1: 031374 | F1: 033374 | F1: 035374 | F1: 037374 | PCP normal communication flag |
| F1: 031376 to F1: 031413 | F1: 033376 to F1: 033413 | F1: 035376 to F1: 035413 | F1: 037376 to F1: 037413 | Do not use this address range |

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| Unit address C | Unit address D | Unit address E | Unit address F | Name |
|---|---|---|---|---|
| F1: 031414 | F1: 033414 | F1: 035414 | F1: 037414 | Memory area number |
| F1: 031416 | F1: 033416 | F1: 035416 | F1: 037416 | Control RUN/STOP transfer |
| F1: 031420 to F1: 031437 | F1: 033420 to F1: 033437 | F1: 035420 to F1: 035437 | F1: 037420 to F1: 037437 | Do not use this address range |
| F1: 031440 to F1: 031507 | F1: 033440 to F1: 033507 | F1: 035440 to F1: 035507 | F1: 037440 to F1: 037507 | PV bias                               CH1 to CH20 |
| F1: 031510 to F1: 031557 | F1: 033510 to F1: 033557 | F1: 035510 to F1: 035557 | F1: 037510 to F1: 037557 | Setting change rate limiter                               CH1 to CH20 |
| F1: 031560 to F1: 031777 | F1: 033560 to F1: 033777 | F1: 035560 to F1: 035777 | F1: 037560 to F1: 037777 | Do not use this address range |

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