Module Type Controller SRZ

Communication Extension Module

Z-CO M

Instruction Manual

(PLC/Host Communication)

www.rkc-usa.com RKC (800) 576 - 6308
Distributed By FLW Inc,

- Modbus is a registered trademark of Schneider Electric.
- The name of each programmable controller (PLC) means the products of each manufacturer.
- Company names and product names used in this manual are the trademarks or registered trademarks of the respective companies.

All Rights Reserved, Copyright © 2006, RKC INSTRUMENT INC.

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

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

Page

MEMO

1 OUTLINE

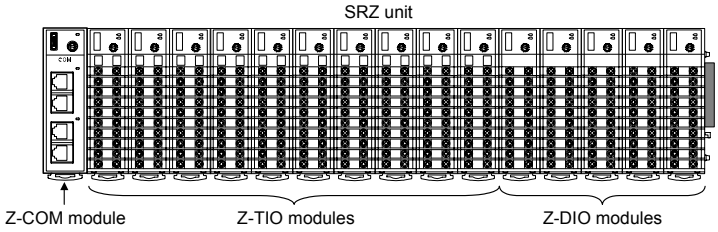
This chapter describes features, package contents, model code, and system configuration, etc.

1.1 Features

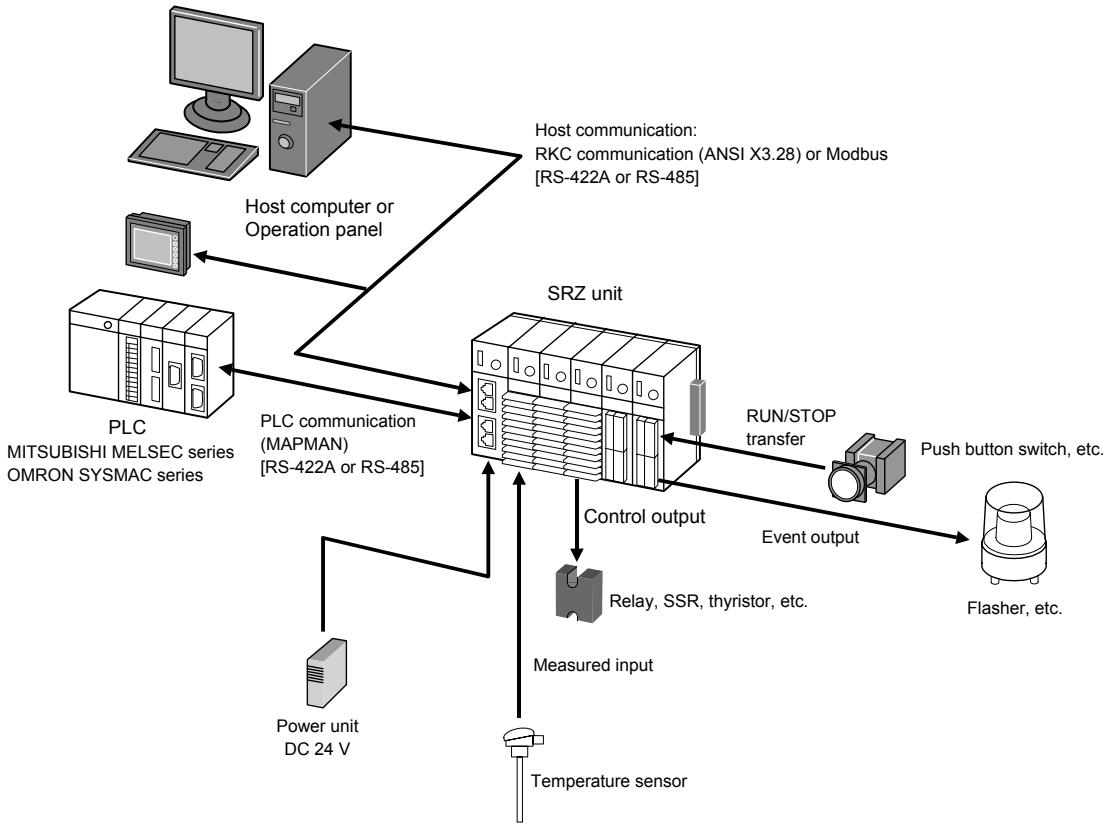
The communication extension module Z-COM module has the following features:
The SRZ unit sets all of the data items via communication. Therefore before operation, it is necessary to set value of each data item via communication.

■ The Z-COM module is connected to an SRZ functional module* (hereafter called "functional module") for the purpose of performing programmable controller communication (hereafter called "PLC communication") or host communication. The Z-COM module cannot be used alone.
The combination of Z-COM module and functional module is called an SRZ unit.

* SRZ functional module: Temperature control module Z-TIO module (hereafter called the Z-TIO module)
Digital I/O module Z-DIO module (hereafter called the Z-DIO module)



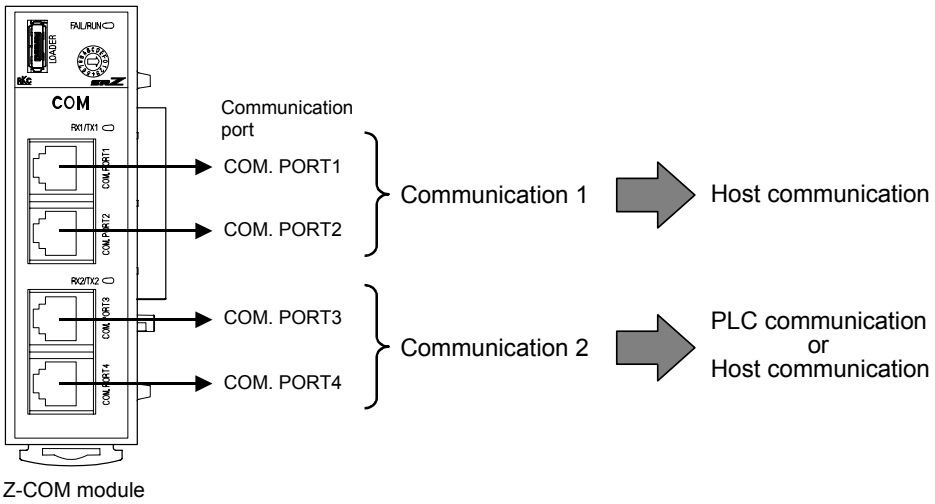
- Host communication
  SRZ unit interfaces with the host computer or the operation panel via Modbus or RKC communication protocols.
  (RS-422A and RS-485 communication interfaces are used for both protocols.)
- PLC communication
  SRZ unit can be connected to the MITSUBISHI MELSEC series or OMRON SYSMAC series programmable controller (hereafter called the PLC) without using any program.



■ The four communication ports (COM. PORT1 to COM. PORT4) of the Z-COM module can be used to perform the following types of communication. Two systems are used for communication.

	COM. PORT	Usage 1	Usage 2
Communication 1	COM. PORT1	Host communication	Host communication
	COM. PORT2 *		
Communication 2	COM. PORT3	PLC communication	Host communication
	COM. PORT4 *		

* SRZ unit extension communication port



■ Number of temperature control

- Up to 16 Z-TIO modules can be connected to one Z-COM module. For example, when up to 16 Z-TIO modules (4-channel type) are connected to one Z-COM module, the maximum number of temperature control channels per one unit becomes 64.
- For PLC communication, up to four Z-COM modules can be multi-drop connected to one PLC communication port. Therefore, temperature control of up to 256 channels per one PLC communication port can be performed.
- For host communication, up to 16 Z-COM modules can be multi-drop connected to one communication port of host computer. Therefore, temperature control of up to 1024 channels per one communication port of host computer can be performed.

1.2 Checking the Product

Before using this product, check each of the following:

- Model code
- Check that there are no scratch or breakage in external appearance (case, front panel, or terminal, etc.)
- Check that all of the items delivered are complete. (See below)

Name	Q'TY	Remarks
☐ Z-COM module	1	————
☐ Z-COM Installation Manual (IMS01T05-E☐)	1	Enclosed with instrument
☐ Z-COM PLC Communication Quick Instruction Manual (IMS01T06-E☐)	1	Enclosed with instrument
☐ Z-COM Host Communication Quick Instruction Manual (IMS01T09-E☐)	1	Enclosed with instrument
☐ Joint connector cover KSRZ-517A	2	Enclosed with instrument
☐ Power terminal cover KSRZ-518A	1	Enclosed with instrument
☐ Z-COM Instruction Manual (PLC/Host communication) (IMS01T07-E1)	1	This manual (sold separately) * * This manual can be downloaded from our website: URL: http://www.rkcinst.com/english/manual_load.htm

If any of the products are missing, damaged, or if your manual is incomplete, please contact RKC sales office or the agent.

■ Accessories (sold separately)

Name	Q'TY	Remarks
☐ End plate DEP-01	2	————
☐ Termination resistor connector for Z-COM W-BW-01	1	For RS-485
☐ Termination resistor connector for Z-COM W-BW-02	1	For RS-422A
☐ Connection cable W-BF-01-3000	1	For PLC connection (Cable length: 3 m) Terminal treatment: Modular connector and Spade lug terminal *
☐ Connection cable W-BF-02-500	1	For SRZ unit extension (Cable length: 0.5 m) Terminal treatment: Modular connectors (at both ends)
☐ Connection cable W-BF-02-1000	1	For SRZ unit extension (Cable length: 1 m) Terminal treatment: Modular connectors (at both ends)
☐ Connection cable W-BF-02-3000	1	For SRZ unit extension (Cable length: 3 m) Terminal treatment: Modular connectors (at both ends)

* Other types of cable, such as cable with 9-pin D-SUB connector, are also available. Please contact RKC sales office or the agent.

1.3 Model Code

Check whether the delivered product is as specified by referring to the following model code list. If the product is not identical to the specifications, please contact RKC sales office or the agent.

■ Z-COM module

Z - COM - A - □ □ / □ □ □

(1) (2) (3) (4) (5)

Hardware coding only Quick start code

(1) Communication 1 (COM. PORT1, COM. PORT2)
- 4: RS-422A
- 5: RS-485

(2) Communication 2 (COM. PORT3, COM. PORT4)
- 4: RS-422A
- 5: RS-485 *

* When using the OMRON SYSMAC series, RS-485 cannot be selected.

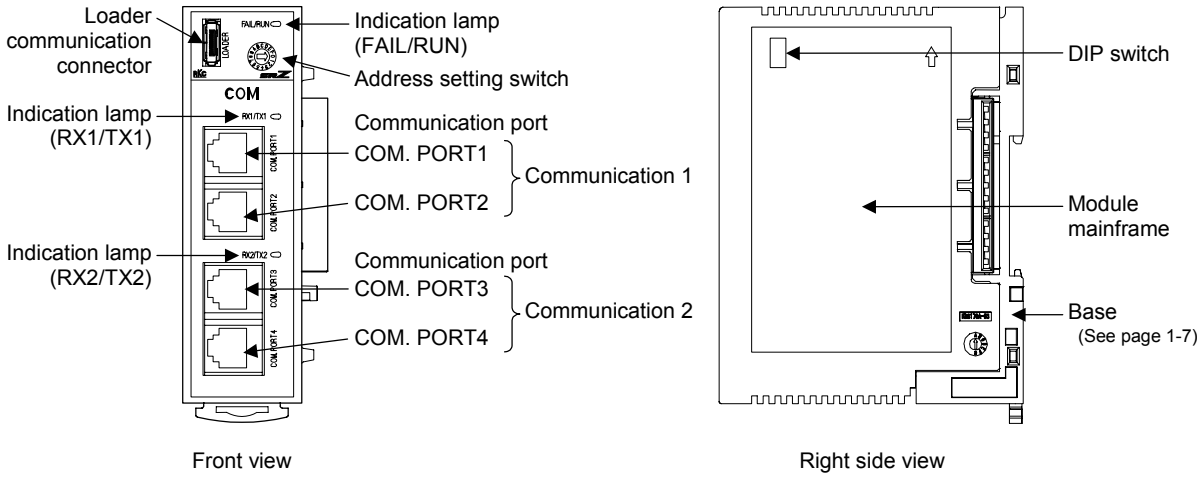
(3) Quick start code (communication protocol selection)
- N: No quick start code (Configured as factory default)
- 1: Specify quick start code 1

(4) Communication 1 protocol (COM. PORT1, COM. PORT2)
- No code: No specify quick start code
- 1: RKC communication (ANSI X3.28)
- 2: Modbus

(5) Communication 2 protocol (COM. PORT3, COM. PORT4)
- No code: No specify quick start code
- 1: RKC communication (ANSI X3.28)
- 2: Modbus
- 3: PLC communication (MITSUBISHI MELSEC series special protocol) (AnA/QnA series or Q series)
- 4: PLC communication (OMRON SYSMAC series special protocol)
- 5: PLC communication (MITSUBISHI MELSEC series special protocol) (A series, FX2N/FX2NC series or FX3U/FX3UC series)

1.4 Parts Description

■ Z-COM module mainframe



● Indication lamps

FAIL/RUN* [Green or Red]	When normal (RUN): A green lamp is on
	Self-diagnostic error (FAIL): A green lamp flashes
	Instrument abnormality (FAIL): A red lamp is on
RX1/TX1 [Green]	The green lamp is lit when data corresponding to communication 1 (COM. PORT1, COM. PORT2) is sent or received.
RX2/TX2 [Green]	The green lamp is lit when data corresponding to communication 2 (COM. PORT3, COM. PORT4) is sent or received.

* When error occurs, see **Chapter TROUBLESHOOTING (P. 9-1)**.

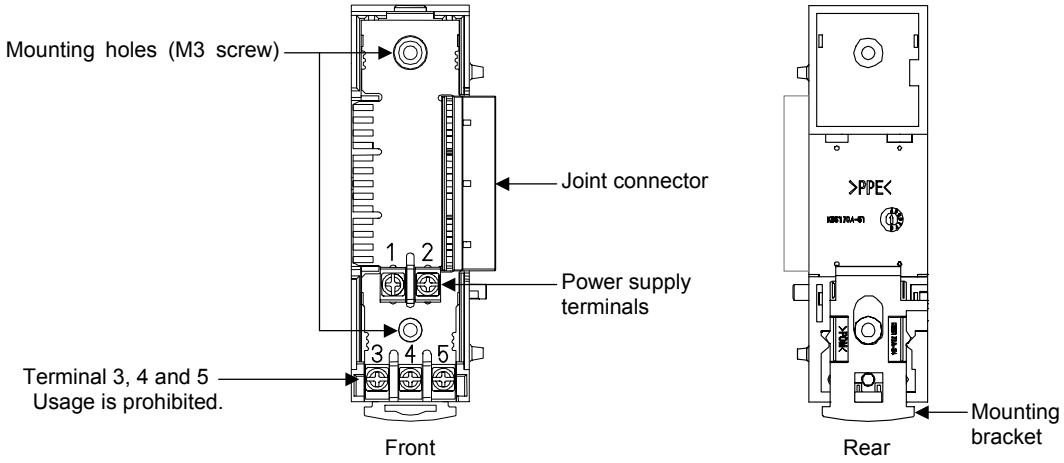
● Communication port (modular connector)

COM. PORT1 (Communication 1)	Used to connecting the Operation panel or Host computer. [RS-485 or RS-422A]
COM. PORT2 (Communication 1)	The COM. PORT2 is used for the extension of SRZ unit. [RS-485 or RS-422A]
COM. PORT3 (Communication 2)	Used to connecting the programmable controller (PLC), Operation panel or Host computer. [RS-485 or RS-422A]
COM. PORT4 (Communication 2)	The COM. PORT4 is used for the extension of SRZ unit. [RS-485 or RS-422A]

● Switches

Address setting switch	Set SRZ unit address with address setting switch.
DIP switch	• Sets communication speed, communication protocol and data bit configuration corresponding to each of communication 1 and communication 2. • Sets dip switch setting validity/invalidity.

■ Base



Mounting holes (M3 screw)	Holes for screws to fix the base to a panel, etc. Customer must provide the M3 screws.
Joint connector	Used to mechanically and electrically connect each module.
Power supply terminals	These are terminals to supply power to the Z-COM module and joined function modules.
Terminal 3, 4 and 5	These terminals cannot be used for the Z-COM module. (Usage is prohibited.) In addition, when the Z-COM module is connected to a functional module, do not use terminals 3, 4, and 5 of the functional module.
Mounting bracket	Used to fix the module on DIN rails and also to fix each module joined together.

Terminal number	Signal name
1	24 V DC (+)
2	24 V DC (–)

1.5 Example of System Configuration

The following is an example of system configuration when the SRZ unit is connected to PLC, host computer or operation panel.

One SRZ unit consists of one Z-COM module and several functional modules.

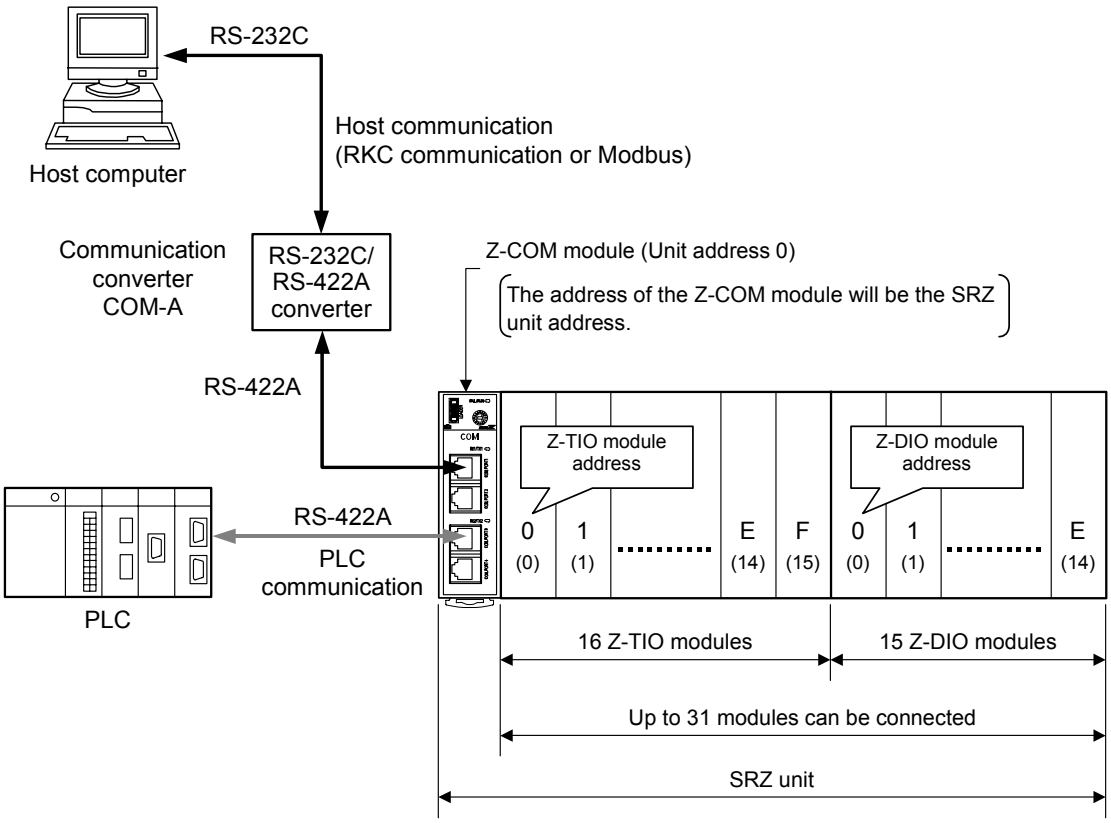
1.5.1 When one SRZ unit is connected

■ Number of connected modules for functional modules and Number of temperature controls

- **When joining functional modules of the same type to Z-COM module**
  Up to 16 functional modules (Z-TIO, Z-DIO) can be connected to one Z-COM module with SRZ unit. As the number of temperature control channels per Z-TIO module is 4, the maximum number of temperature control channels per unit becomes 64 (4-channel × 16 Z-TIO modules).
- **When joining functional modules of two or more differential types to Z-COM module**
  Up to 31 functional modules (Z-TIO, Z-DIO) can be connected to one Z-COM module with SRZ unit. (However, the maximum joinable number of functional modules of the same type is 16.)

■ Example

Communication 1 (COM. PORT1, COM. PORT2): Host communication (RS-422A)
Communication 2 (COM. PORT3, COM. PORT4): PLC communication (RS-422A)
Z-TIO module: 16 modules
Z-DIO module: 15 modules



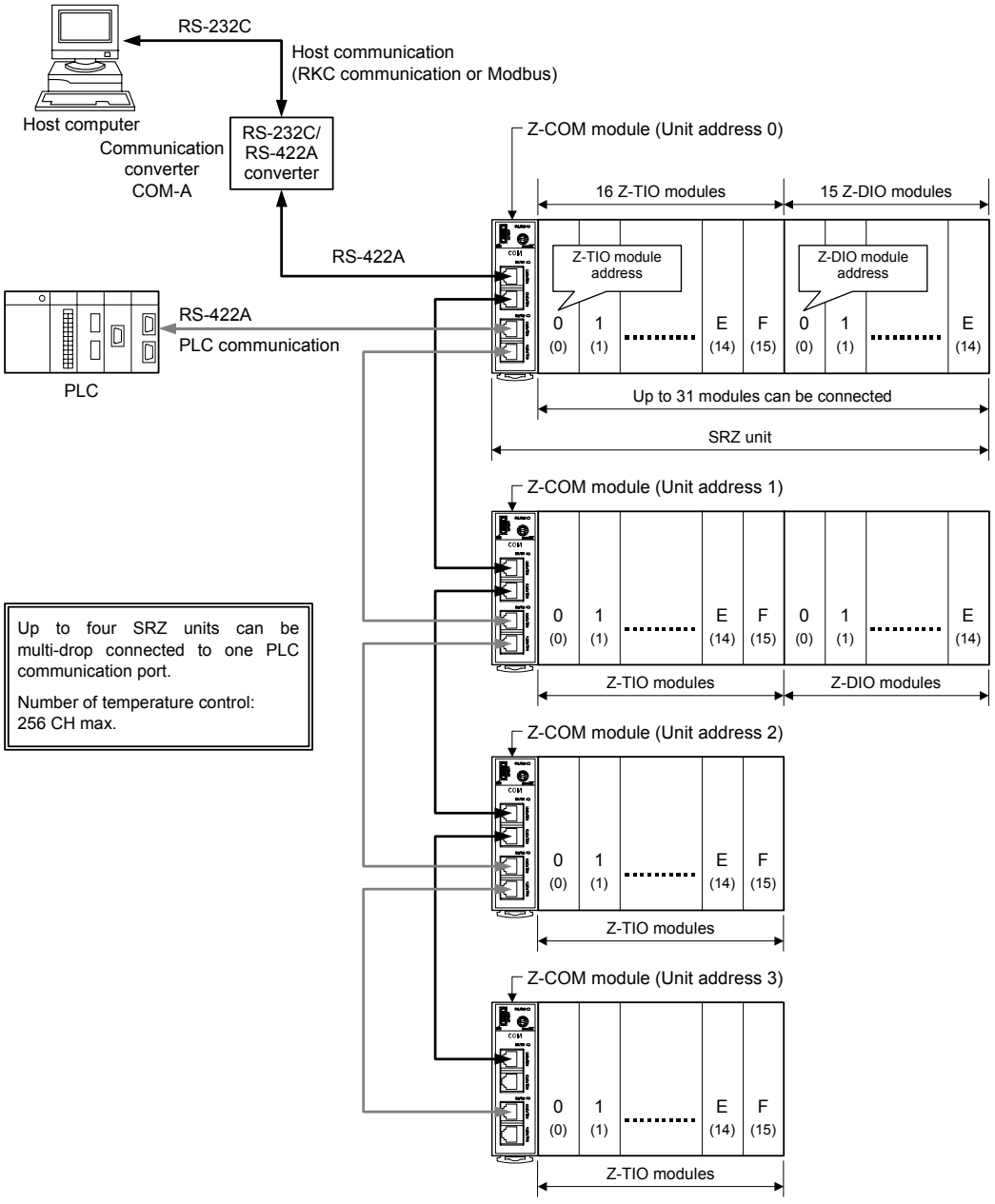
1.5.2 Multi-drop connection by PLC communication

■ Number of connected modules for SRZ units and Number of temperature controls

- For PLC communication, up to four units (i.e. four Z-COM modules) can be multi-drop connected to one PLC communication port.
- As up to 16 Z-TIO modules can be connected to one Z-COM module, temperature control of up to 256 channels can be performed. (4-channel × 16 Z-TIO modules × four SRZ units)

■ Example

Communication 1 (COM. PORT1, COM. PORT2): Host communication (RS-422A)
Communication 2 (COM. PORT3, COM. PORT4): PLC communication (RS-422A)
SRZ unit: four units



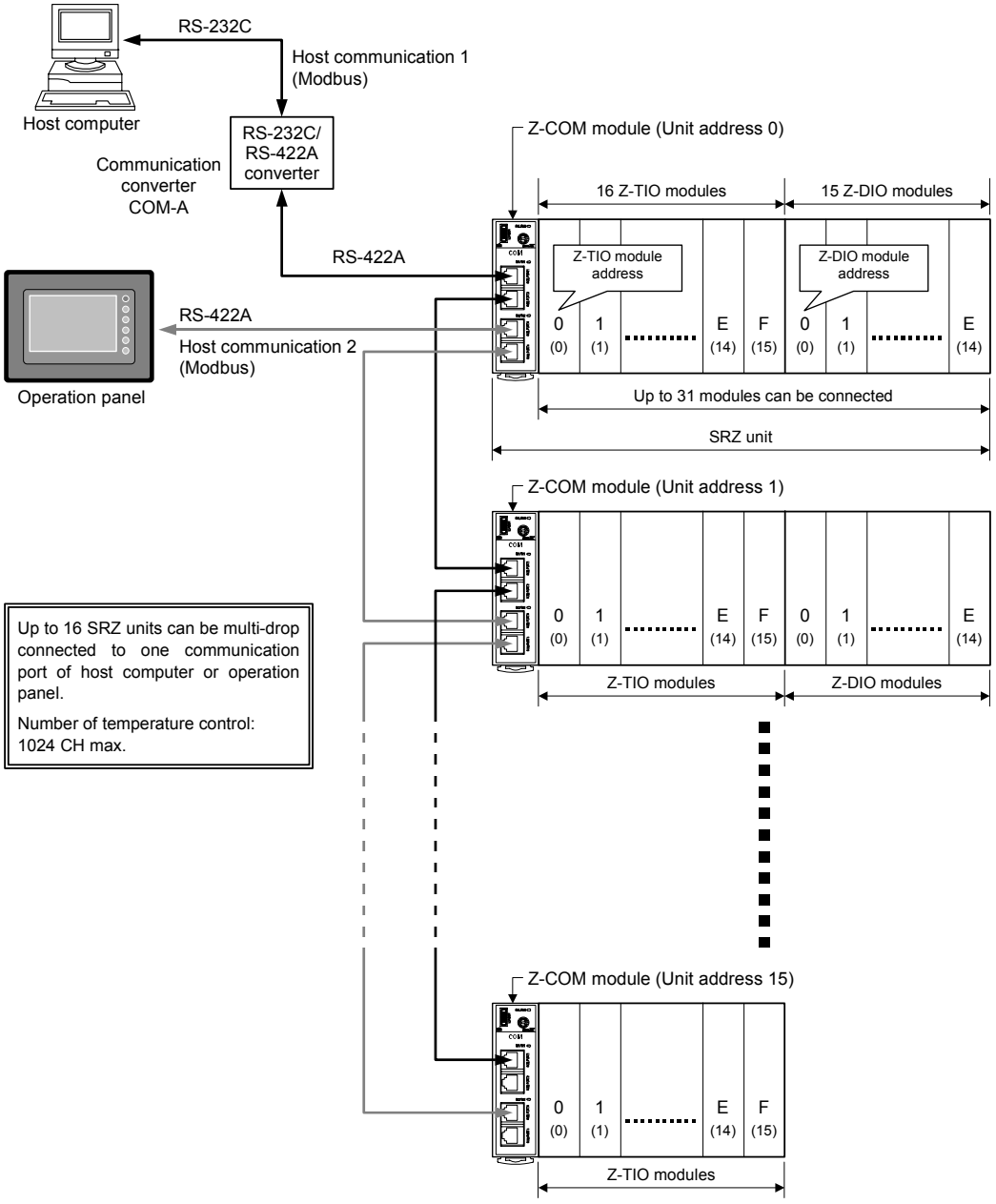
1.5.3 Multi-drop connection by host communication

■ Number of connected modules for SRZ units and Number of temperature controls

- For host communication, up to 16 units (i.e. 16 Z-COM modules) can be multi-drop connected to one host communication port.
- As up to 16 Z-TIO modules can be connected to one Z-COM module, temperature control of up to 1024 channels can be performed. (4-channel × 16 Z-TIO modules × 16 SRZ units)

■ Example

Communication 1 (COM. PORT1, COM. PORT2): Host communication 1 (RS-422A)
Communication 2 (COM. PORT3, COM. PORT4): Host communication 2 (RS-422A)
SRZ unit: four units

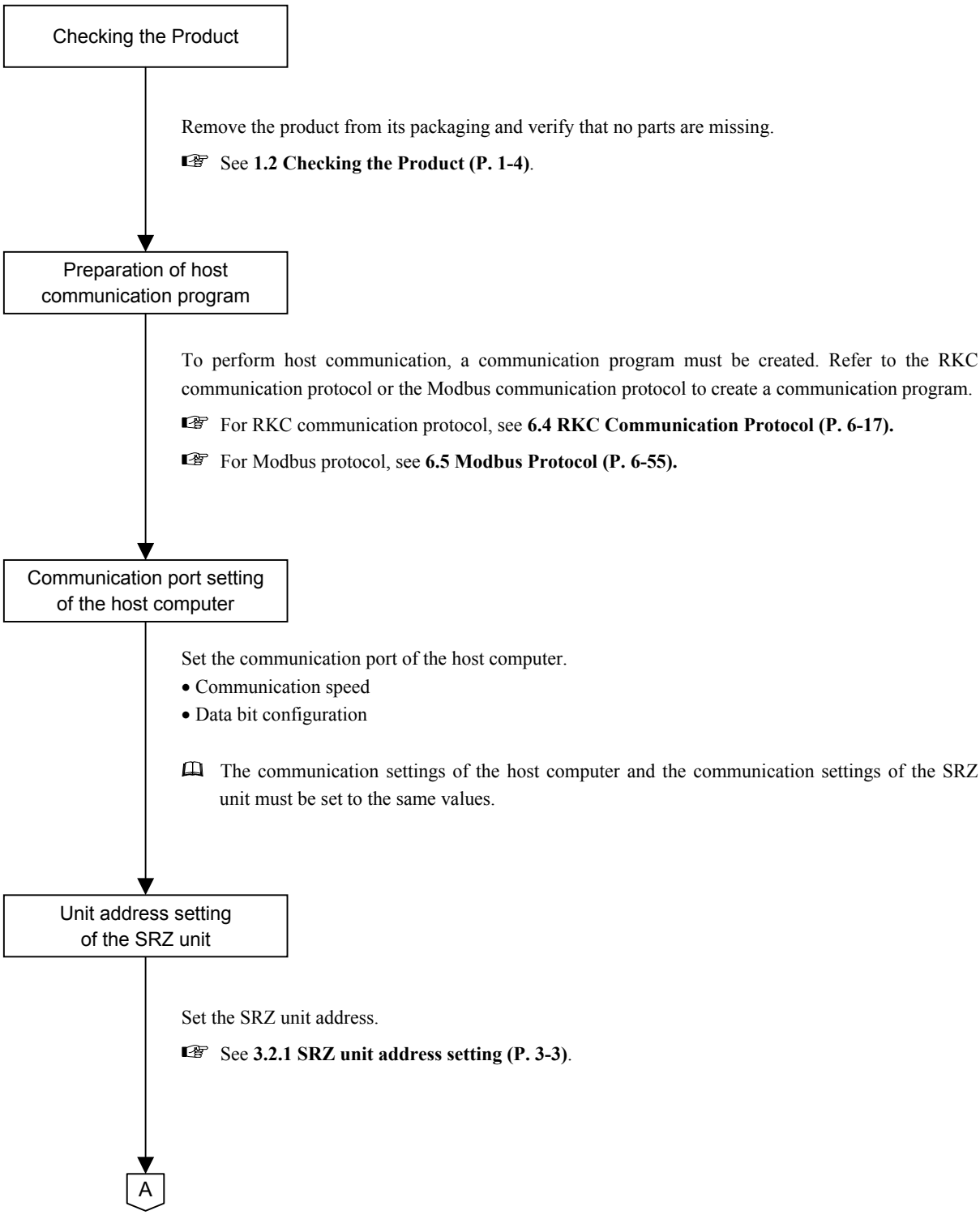


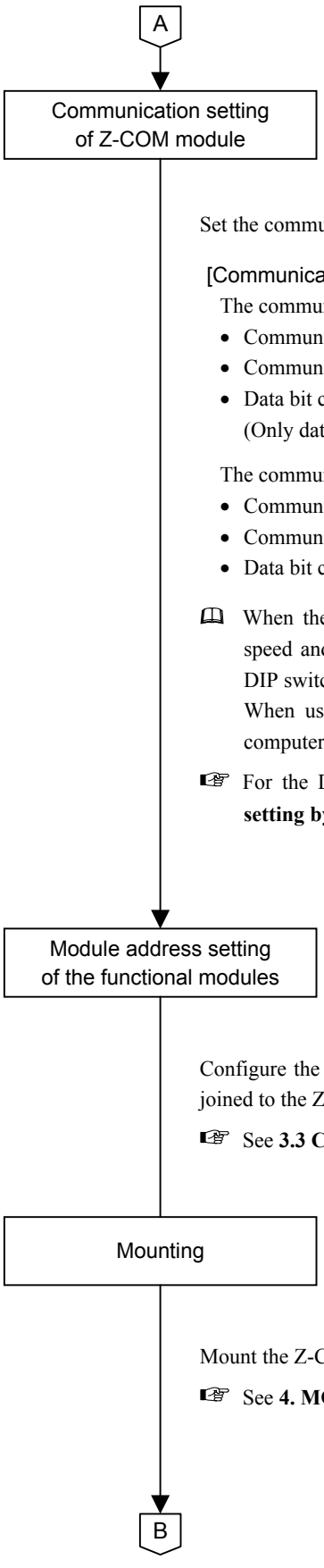
SETTING PROCEDURE TO OPERATION

2

2.1 When Use PLC Communication and Host Communication

Conduct necessary setting before operation according to the procedure described below.





Set the communication settings of Z-COM module by the DIP switch.

[Communication settings]

The communication 1 sets the details of the host communication.

- Communication speed
- Communication protocol (RKC communication or Modbus)
- Data bit configuration
  (Only data 8 bit, without parity, and stop 1 bit can be selected with the DIP switches)

The communication 2 sets the details of the PLC communication.

- Communication speed (Only 9600 or 19200 bps can be selected.)
- Communication protocol (MELSEC series or SYSMAC series special protocol)
- Data bit configuration

📖 When the DIP switches are used to configure settings, the selections for the communication speed and data bit configuration are limited. To configure settings that cannot be set with the DIP switches, use host communication (loader communication can also be used).
When using host communication to configure settings, configure the settings after the host computer and SRZ unit are able to communicate.

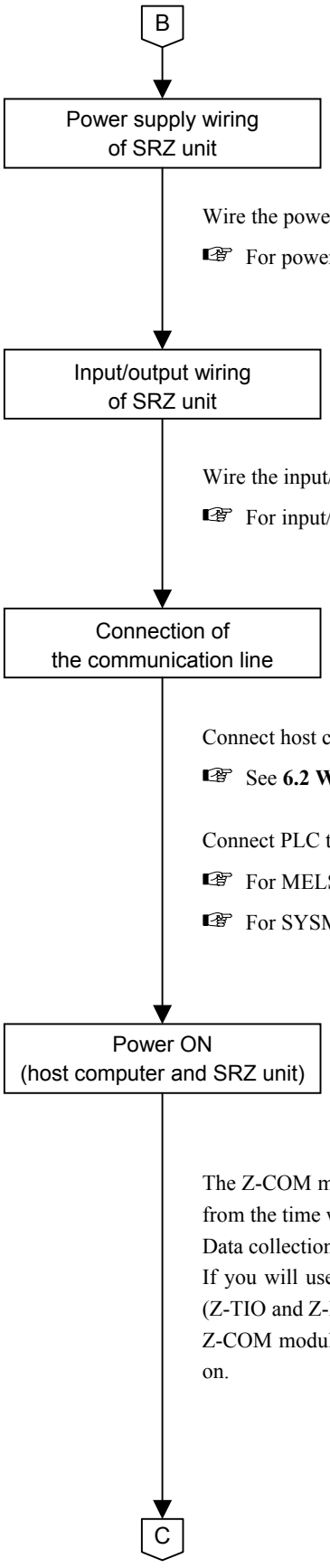
☞ For the DIP switch setting, see **3.2.2 Communication speed and communication protocol setting by DIP switch (P. 3-6).**

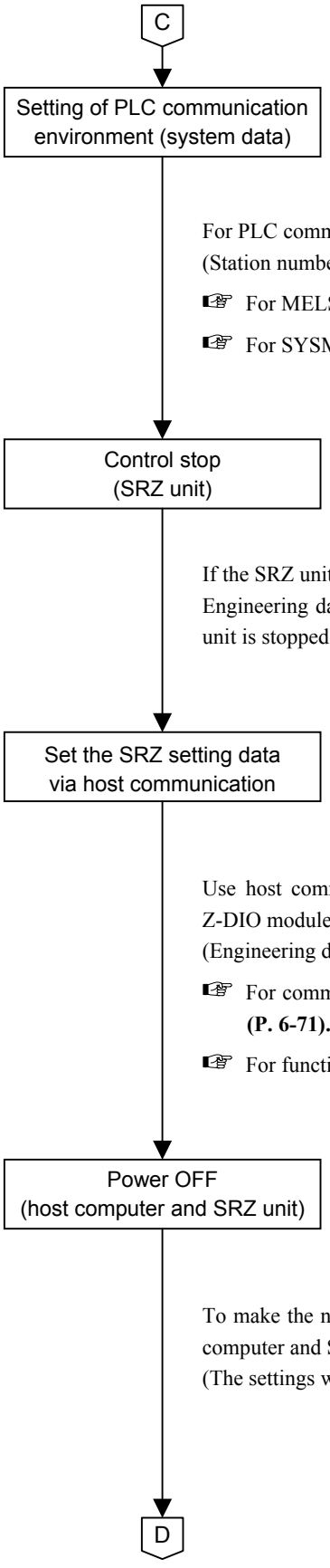
Configure the module addresses of the functional modules (Z-TIO and Z-DIO modules) that will be joined to the Z-COM module.

☞ See **3.3 Communication Setting of the Functional Modules (P. 3-14).**

Mount the Z-COM module and functional modules on the DIN rail or panel.

☞ See **4. MOUNTING (P. 4-1).**


B
Power supply wiring of SRZ unit
Wire the power supply of SRZ unit.
☞ For power supply wiring, see 5. WIRING (P. 5-1).
Input/output wiring of SRZ unit
Wire the input/output of Z-TIO and Z-DIO modules.
☞ For input/output wiring, see SRZ Instruction Manual (IMS01T04-E□).
Connection of the communication line
Connect host computer to SRZ unit.
☞ See 6.2 Wiring (P.6-3).
Connect PLC to SRZ unit.
☞ For MELSEC series, see 7.2 MITSUBISHI PLC MELSEC Series (P. 7-3).
☞ For SYSMAC series, see 7.3 OMRON PLC SYSMAC Series (P. 7-19).
Power ON (host computer and SRZ unit)
The Z-COM module starts collecting data on functional modules (Z-TIO and Z-DIO modules) jointed from the time when the power is turned on.
Data collection takes about eight seconds.
If you will use host communication to configure the communication data of the functional modules (Z-TIO and Z-DIO modules), do so after data collection is finished.
Z-COM module system data (setting items) can be configured immediately after the power is turned on.
C



For PLC communication, set a necessary system data (setting item) via host communication.
(Station number, Register type or Register start number, etc.)

☞ For MELSEC series, see **7.2.3 PLC communication environment setting (P. 7-11).**

☞ For SYSMAC series, see **7.3.3 PLC communication environment setting (P.7-25).**

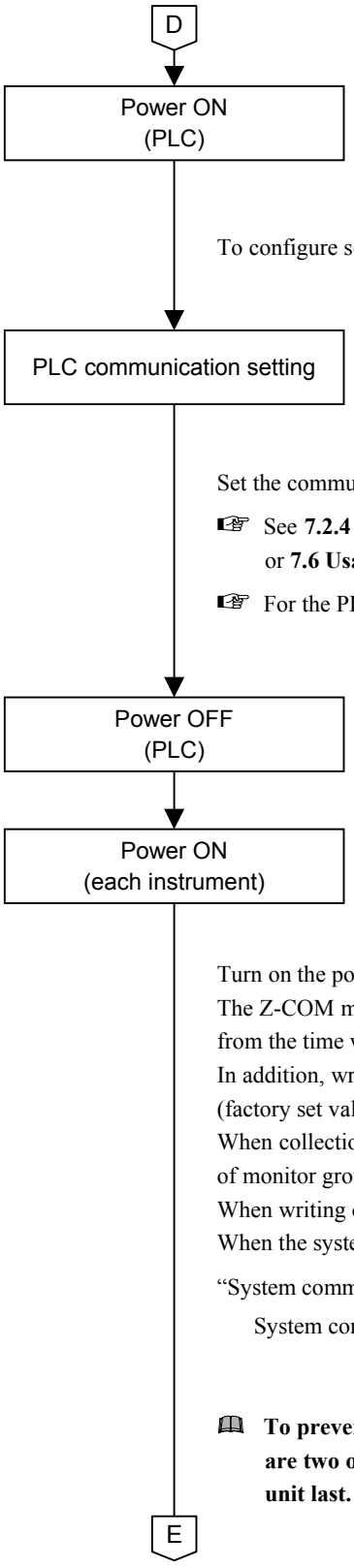
If the SRZ unit is set to control start (RUN), switch to control stop (STOP).
Engineering data can only be set in functional modules (Z-TIO and Z-DIO modules) when the SRZ unit is stopped.

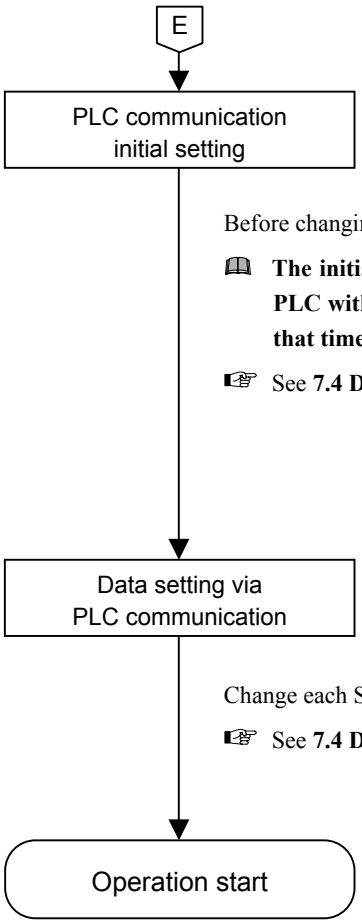
Use host communication to configure communication data in the functional modules (Z-TIO and Z-DIO modules) that cannot be configured by PLC communication.
(Engineering data and operation data, etc.)

☞ For communication data, see **6.4.5 RKC communication data (P. 6-31)** or **6.5.8 Modbus data (P. 6-71).**

☞ For function description of communication data, **SRZ Instruction Manual (IMS01T04-E☐)**.

To make the newly configured system data (setting items) take effect, turn off the power of the host computer and SRZ unit.
(The settings will take effect the next time the power is turned on.)


D
Power ON
(PLC)
To configure settings on the PLC, turn on the PLC power.
PLC communication setting
Set the communication setting of PLC side by programming tool of each manufacturer.
☞ See 7.2.4 Setting on the PLC (Computer link module) (P. 7-18), 7.3.4 PLC setting (P. 7-29) or 7.6 Usage Example (P. 7-54).
☞ For the PLC setting, see the instruction manual of each manufacturer.
Power OFF
(PLC)
Power ON
(each instrument)
Turn on the power of the SRZ unit, the PLC, and the host computer.
The Z-COM module starts collecting data on functional modules (Z-TIO and Z-DIO modules) jointed from the time when the power is turned on.
In addition, writing of the system data (monitor items) begins after the PLC communication start time (factory set value is five seconds) has passed.
When collection of the data is completed, the Z-COM module begins writing the communication data of monitor group to the PLC.
When writing of monitor group data begins, "system communication state" becomes "1."
When the system communication state becomes "1," PLC communication can be performed.
"System communication state" can be checked even via host communication.
System communication state: Identifier: QM
Modbus register address: 00CD (202)
🕮 To prevent malfunction, always turn on the power of the SRZ unit last. In addition, if there are two or more SRZ units in PLC communication, always turn on the power of the master unit last.
E



Before changing the SRZ unit data from PLC, always read it into the PLC once.

🕮 **The initial setting must always conduct. If each set value of SRZ unit 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.**

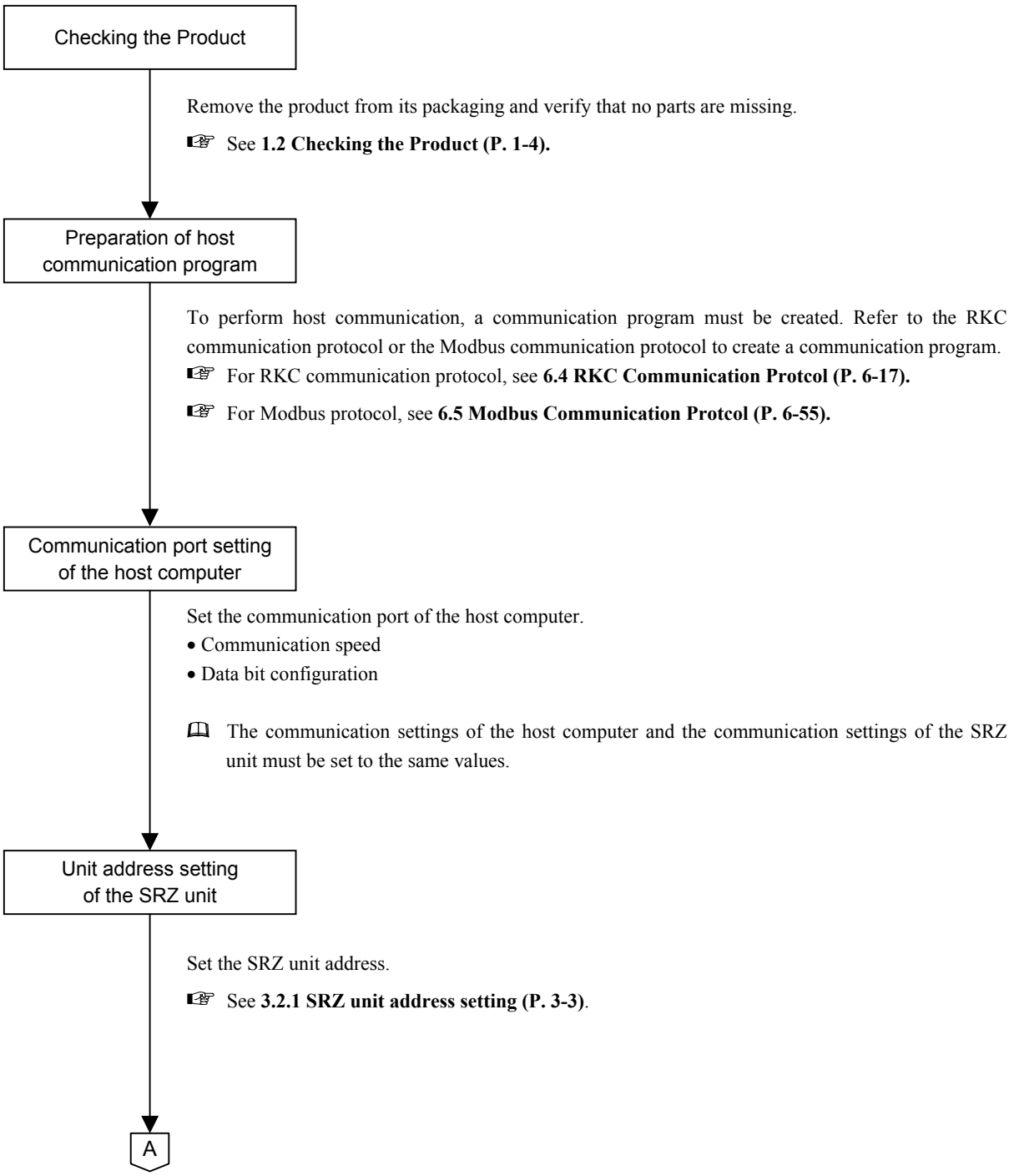
☞ See **7.4 Data Transfer (P. 7-30)** or **7.5 Usage Example (P. 7-54).**

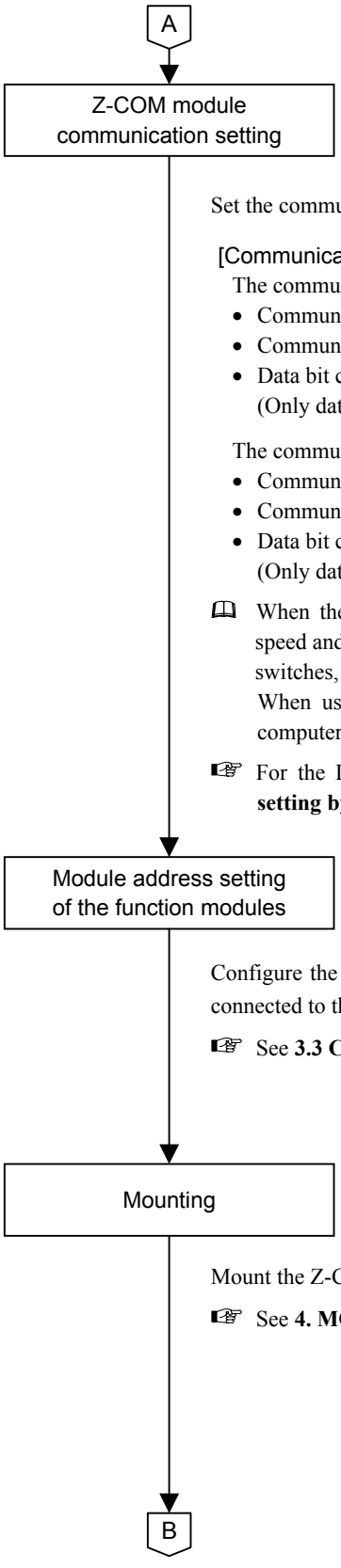
Change each SRZ unit set value data from the PLC.

☞ See **7.4 Data Transfer (P. 7-30)** or **7.5 Usage Example (P. 7-54).**

2.2 Only When Use Host Communication

Conduct necessary setting before operation according to the procedure described below.





Set the communication settings of Z-COM module by the DIP switch.

[Communication sittings]

The communication 1 sets the details of the host communication.

- Communication speed
- Communication protocol (RKC communication or Modbus)
- Data bit configuration
  (Only data 8 bit, without parity, and stop 1 bit can be selected with the DIP switches.)

The communication 2 sets the details of the PLC communication.

- Communication speed (Only 9600 or 19200 bps can be selected.)
- Communication protocol (RKC communication or Modules)
- Data bit configuration
  (Only data 8 bit, without parity, and stop 1 bit can be selected with the DIP switches.)

📖 When the DIP switches are used to configure settings, the selections for the communication speed and data bit configuration are limited. To configure settings that cannot be set with the DIP switches, use host communication.
When using host communication to configure settings, configure the settings after the host computer and SRZ unit are able to communicate.

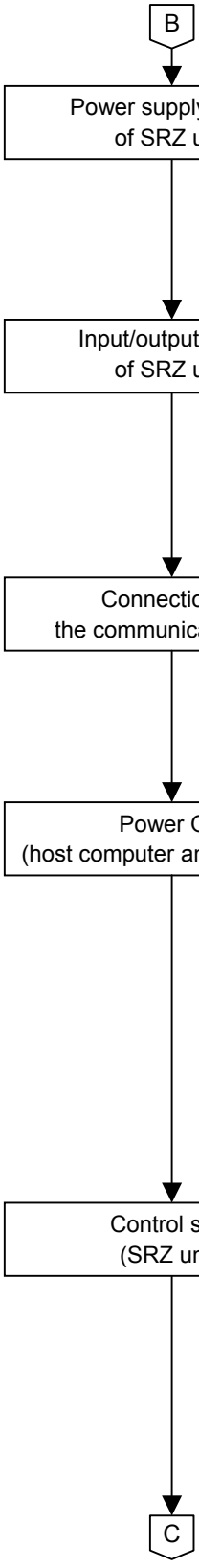
☞ For the DIP switch setting, see **3.2.2 Communication speed and communication protocol setting by DIP switch (P. 3-6).**

Configure the module addresses of the functional modules (Z-TIO and Z-DIO modules) that will be connected to the Z-COM module.

☞ See **3.3 Communication Setting of the Functional Modules (P. 3-14).**

Mount the Z-COM module and functional modules on the DIN rail or panel.

☞ See **4. MOUNTING (P. 4-1).**



Wire the power supply of SRZ unit.

☞ For power supply wiring, see **5. WIRING (P. 5-1)**.

Wire the input/output of Z-TIO and Z-DIO modules.

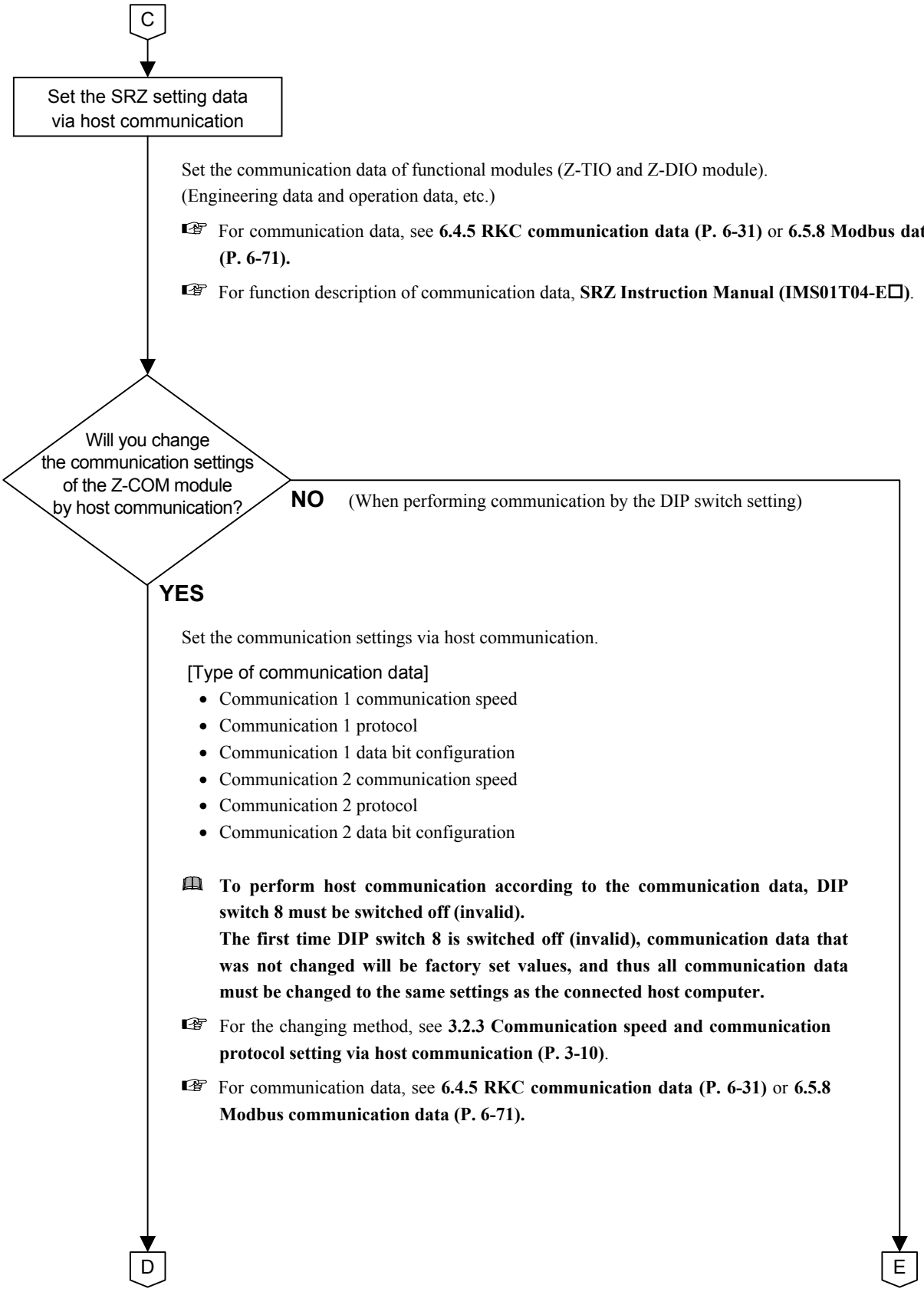
☞ For input/output wiring, see **SRZ Instruction Manual (IMS01T04-E□)**.

Connect host computer to SRZ unit.

☞ See **6.2 Wiring (P.6-3).**

The Z-COM module starts collecting data on functional modules (Z-TIO and Z-DIO modules) jointed from the time when the power is turned on.
Data collection takes about eight seconds.
If you will configure the communication data of the functional modules (Z-TIO and Z-DIO modules), do so after data collection is finished.

If the SRZ unit is set to control start (RUN), switch to control stop (STOP).
Engineering data can only be set in functional modules (Z-TIO and Z-DIO modules) when the SRZ unit is stopped.



Set the communication data of functional modules (Z-TIO and Z-DIO module).
(Engineering data and operation data, etc.)

☞ For communication data, see **6.4.5 RKC communication data (P. 6-31)** or **6.5.8 Modbus data (P. 6-71).**

☞ For function description of communication data, **SRZ Instruction Manual (IMS01T04-E□)**.

NO (When performing communication by the DIP switch setting)

YES

Set the communication settings via host communication.

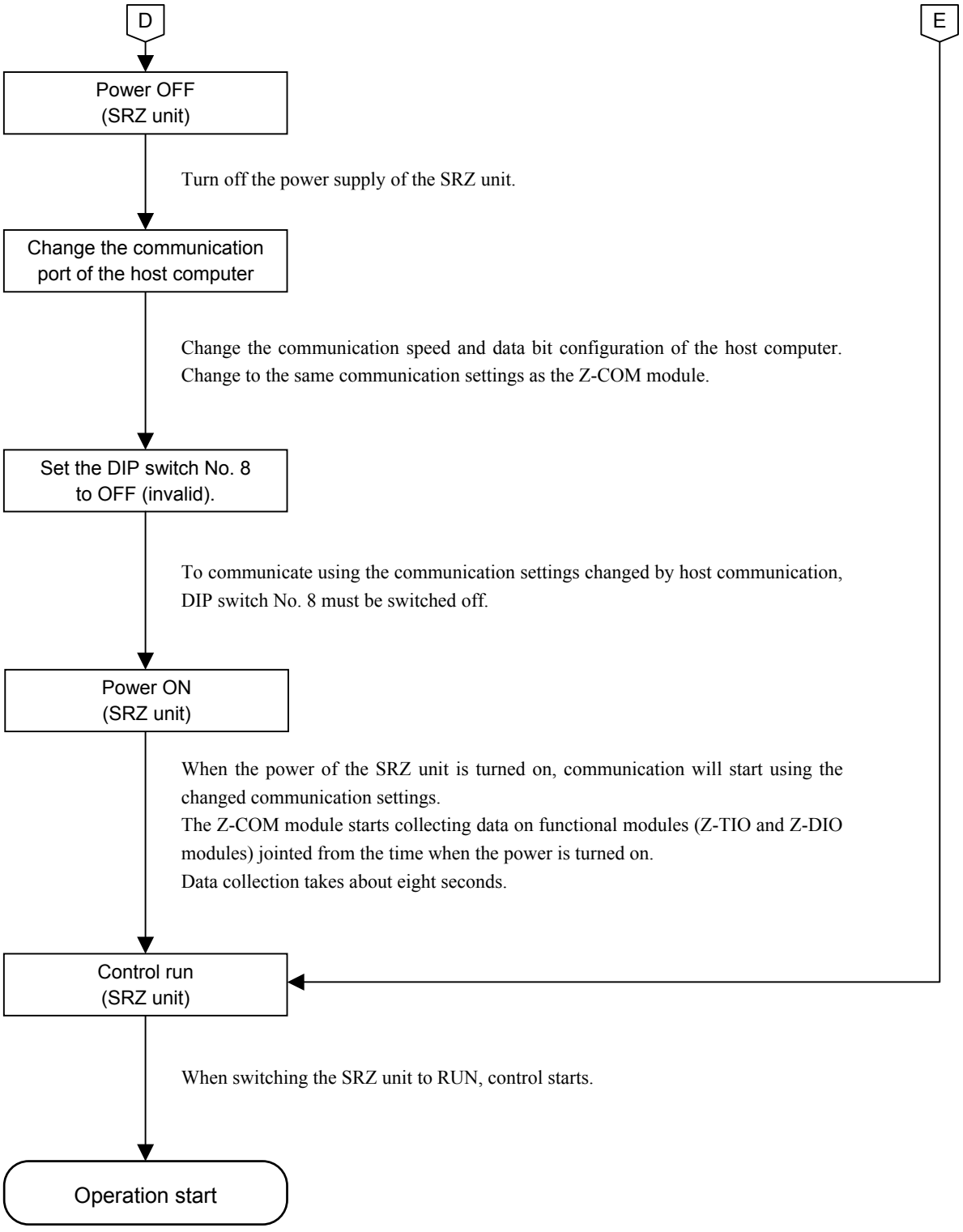
[Type of communication data]

- Communication 1 communication speed
- Communication 1 protocol
- Communication 1 data bit configuration
- Communication 2 communication speed
- Communication 2 protocol
- Communication 2 data bit configuration

🕮 **To perform host communication according to the communication data, DIP switch 8 must be switched off (invalid).**
The first time DIP switch 8 is switched off (invalid), communication data that was not changed will be factory set values, and thus all communication data must be changed to the same settings as the connected host computer.

☞ For the changing method, see **3.2.3 Communication speed and communication protocol setting via host communication (P. 3-10)**.

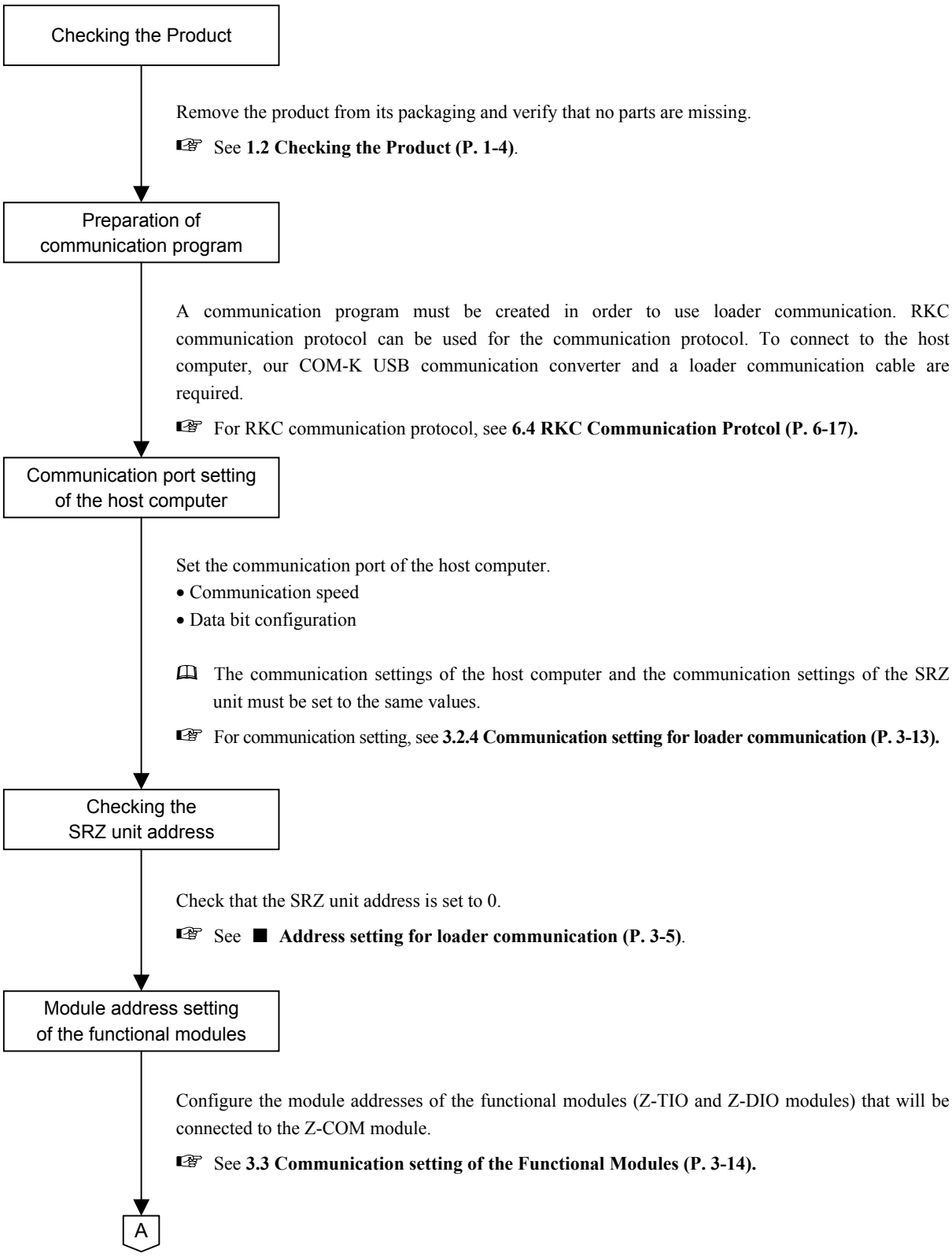
☞ For communication data, see **6.4.5 RKC communication data (P. 6-31)** or **6.5.8 Modbus communication data (P. 6-71).**

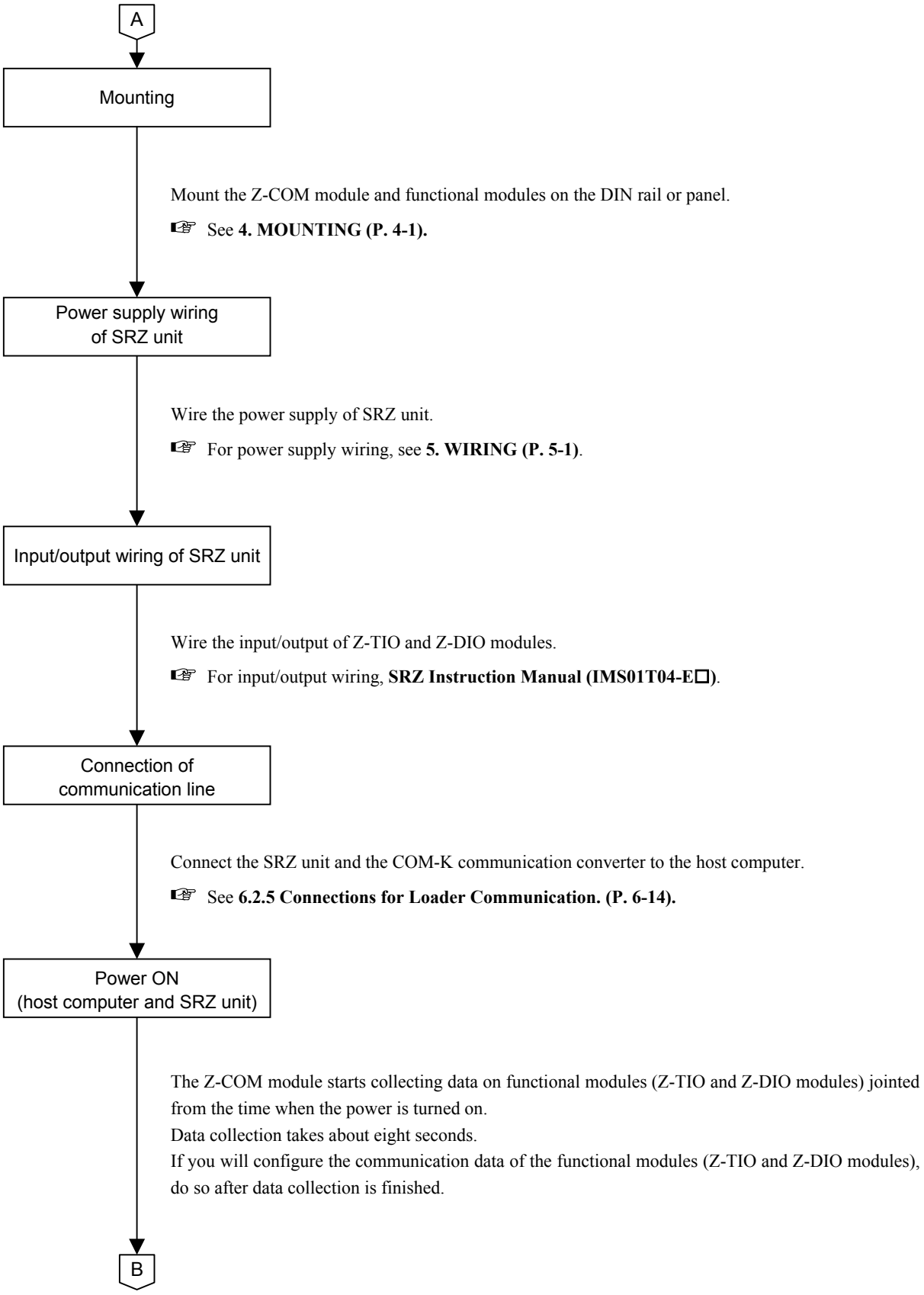

D
E
Power OFF
(SRZ unit)
Turn off the power supply of the SRZ unit.
Change the communication
port of the host computer
Change the communication speed and data bit configuration of the host computer.
Change to the same communication settings as the Z-COM module.
Set the DIP switch No. 8
to OFF (invalid).
To communicate using the communication settings changed by host communication,
DIP switch No. 8 must be switched off.
Power ON
(SRZ unit)
When the power of the SRZ unit is turned on, communication will start using the changed communication settings.
The Z-COM module starts collecting data on functional modules (Z-TIO and Z-DIO modules) jointed from the time when the power is turned on.
Data collection takes about eight seconds.
Control run
(SRZ unit)
When switching the SRZ unit to RUN, control starts.
Operation start

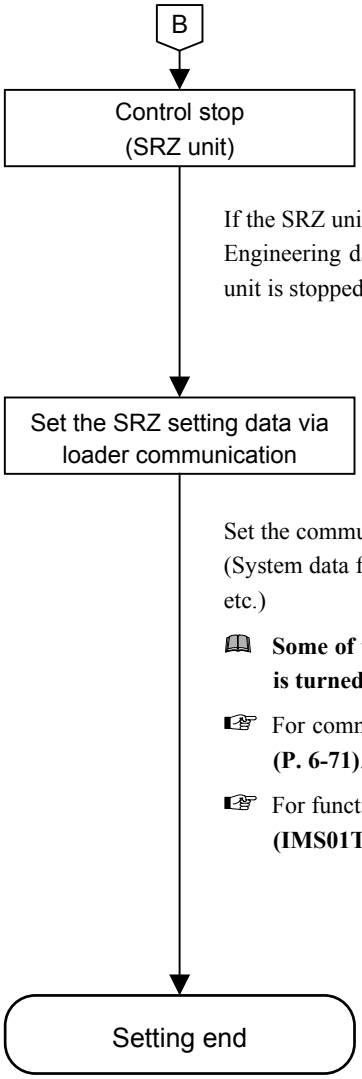
2.3 When Performing Operation Setting via Loader Communication

Conduct necessary setting before operation according to the procedure described below.

The Loader port is only for parameter setup.




A
Mounting
Mount the Z-COM module and functional modules on the DIN rail or panel.
☞ See 4. MOUNTING (P. 4-1).
Power supply wiring of SRZ unit
Wire the power supply of SRZ unit.
☞ For power supply wiring, see 5. WIRING (P. 5-1).
Input/output wiring of SRZ unit
Wire the input/output of Z-TIO and Z-DIO modules.
☞ For input/output wiring, SRZ Instruction Manual (IMS01T04-E□).
Connection of communication line
Connect the SRZ unit and the COM-K communication converter to the host computer.
☞ See 6.2.5 Connections for Loader Communication. (P. 6-14).
Power ON (host computer and SRZ unit)
The Z-COM module starts collecting data on functional modules (Z-TIO and Z-DIO modules) jointed from the time when the power is turned on.
Data collection takes about eight seconds.
If you will configure the communication data of the functional modules (Z-TIO and Z-DIO modules), do so after data collection is finished.
B



If the SRZ unit is set to control start (RUN), switch to control stop (STOP).
Engineering data can only be set in functional modules (Z-TIO and Z-DIO modules) when the SRZ unit is stopped.

Set the communication data of SRZ unit.
(System data for PLC communication, engineering data of Z-TIO and Z-DIO modules, operation data, etc.)

📖 **Some of the communication data of the Z-COM module will not take effect until the power is turned on or control is switched from STOP to RUN.**

☞ For communication data, see **6.4.5 RKC communication data (P. 6-31)** or **6.5.8 Modbus data (P. 6-71)**.

☞ For function description of communication data, see **SRZ Instruction Manual (IMS01T04-E□)**.

MEMO

COMMUNICATION SETTING

3

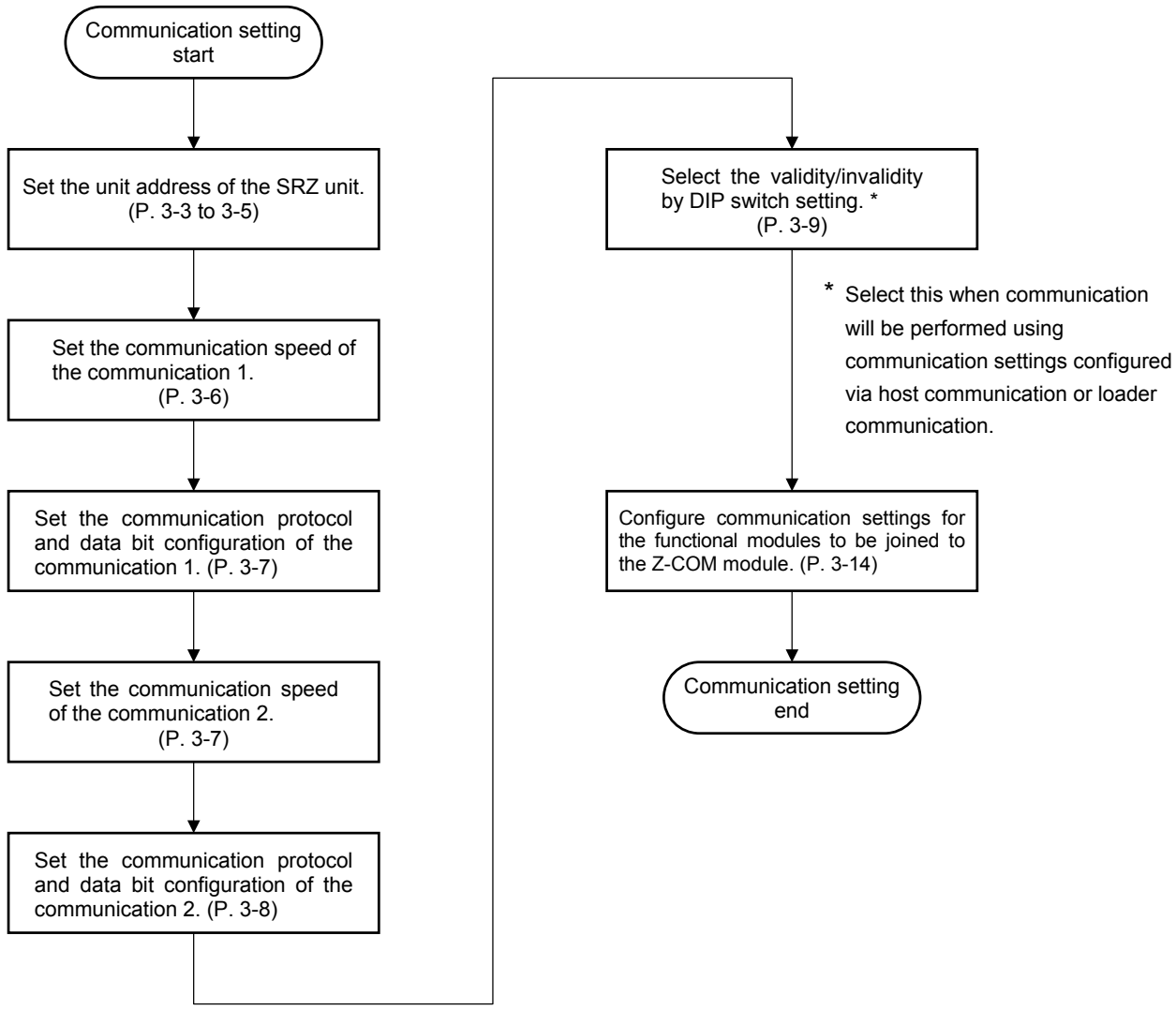
This chapter describes communication setting of the SRZ unit. Set communication setting before mounting and wiring.

3.1 Communication Setting Procedures

⚠ WARNING

- To prevent electric shock or instrument failure, always turn off the power before setting the switch.
- To prevent electric shock or instrument failure, never touch any section other than those instructed in this manual.

Set the addresses and the communication speed, data bit configuration, and communication protocol for communication 1 and communication 2.
Set the communication contents which are used by the customer in the following procedures.



3.2 Communication Setting of Z-COM Module

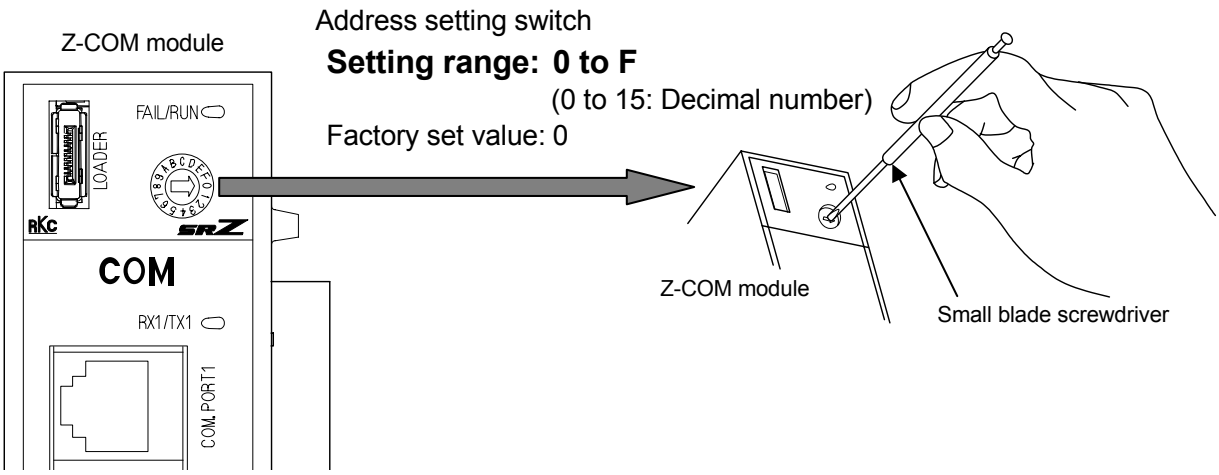
CAUTION

Do not separate the module mainframe from the base with the power turned on. If so, instrument failure may result.

3.2.1 SRZ unit address setting

When SRZ units are multi-drop connected, set an address to each Z-COM module.
This becomes the unit address of the SRZ unit. (The unit address is common to the PLC and host communications.)
Set an address for the SRZ unit (address for Z-COM module) using a small blade screwdriver.

To avoid problems or malfunction, do not duplicate an address on the same communication line.



For the address setting for PLC communication, see page 3-4.

For the address setting for host communication, see page 3-5.

■ Address setting for PLC communication

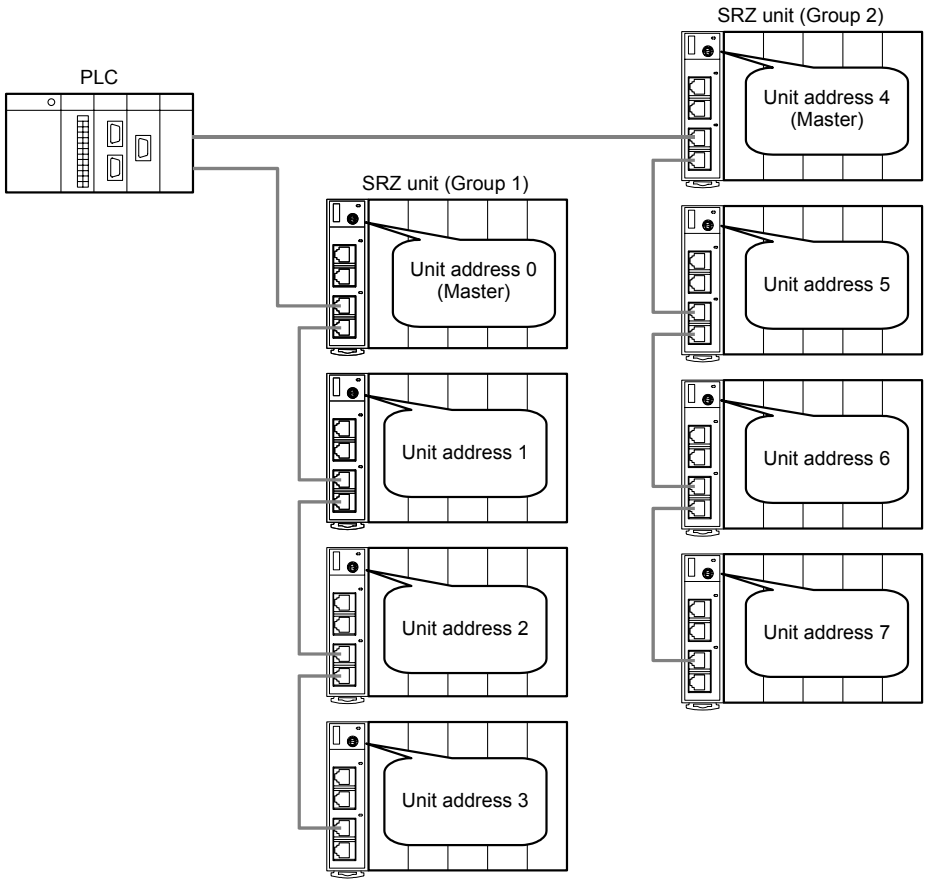
Up to four Z-COM modules can be connected to a PLC communication port. Therefore the unit address uses the four Z-COM modules as a group. For Z-COM modules which are multi-drop connected to the same PLC communication port, use successive numbers assigned to any one of four groups shown in the following table as their addresses.

Always set the unit address of each group including 0, 4, 8 or C. 0, 4, 8 or C becomes the master for communication transfer.

Group	Address setting switch
Group 1	0 (Master)
	1
	2
	3
Group 2	4 (Master)
	5
	6
	7

Group	Address setting switch
Group 3	8 (Master)
	9
	A
	B
Group 4	C (Master)
	D
	E
	F

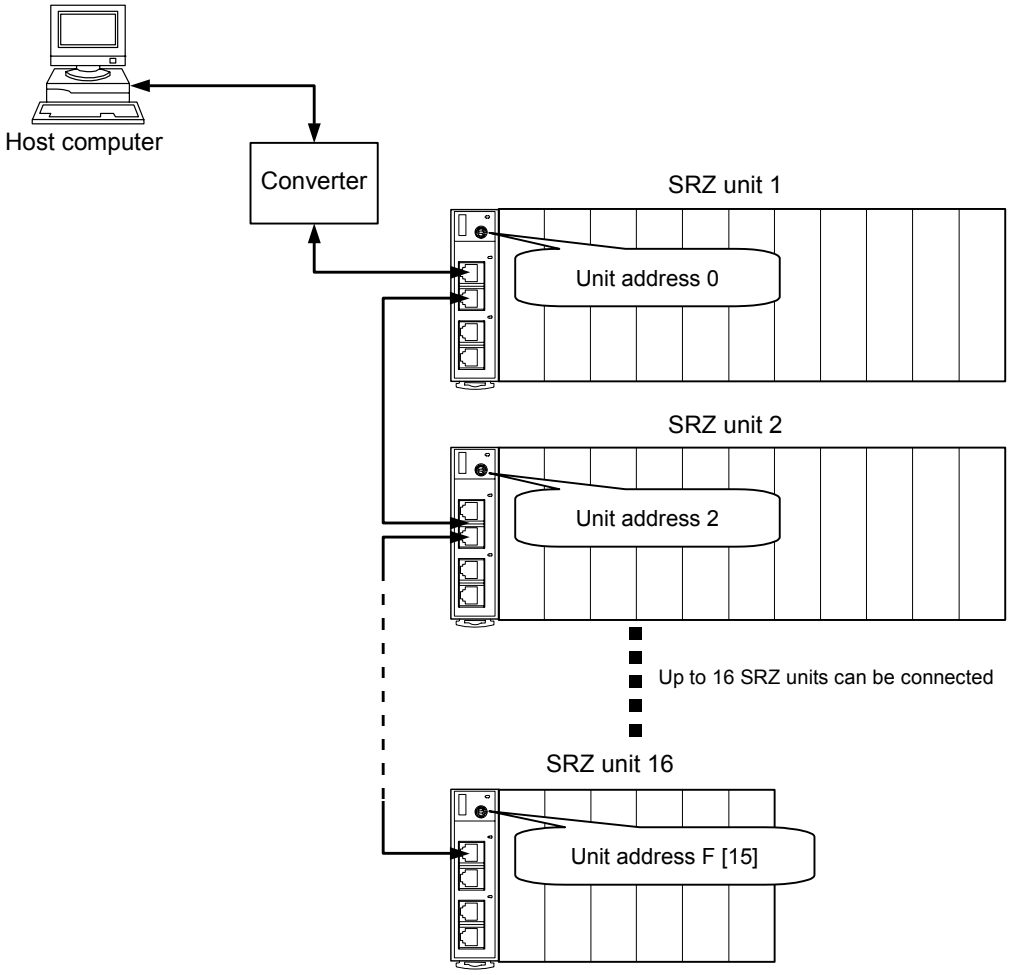
Example of unit address setting (When eight SRZ units are connected):



■ Address setting for host communication (RKC communication or Modbus)

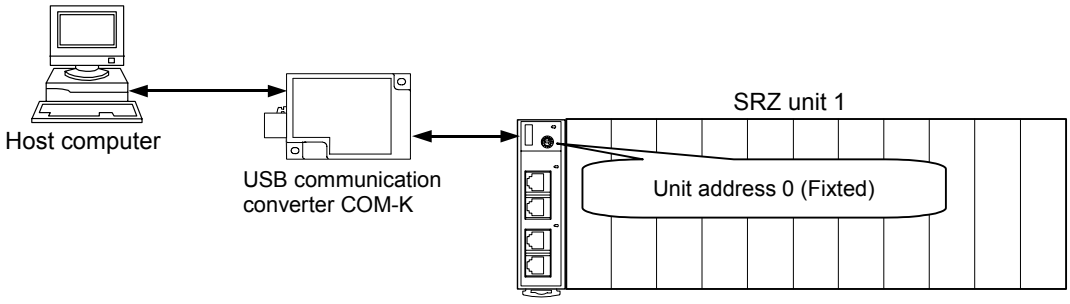
Differently from PLC communication, there are no group restrictions. Free settings can be made in the range of 0 to F.

For Modbus, the value obtained by adding "1" to the set address corresponds to the address used for the actual program.



■ Address setting for loader communication

When loader communication is performed, the host computer and SRZ unit communicate on a one-to-one basis, and thus the unit address is fixed at "0."

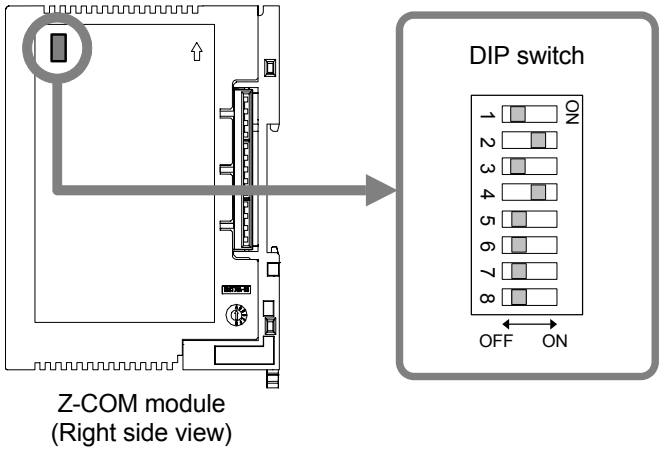


The Loader port is only for parameter setup.

3.2.2 Communication speed and communication protocol setting by DIP switch

Use the DIP switch on the right side of Z-COM module to select communication speed, data bit, configuration and protocol. The data change become valid the power of the Z-COM module is turned on again or when control is switched from STOP to RUN.

When the SRZ units are multi-drop connected, set the DIP switches in all of the Z-COM modules to the same positions.

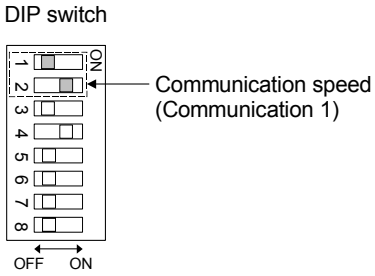


DIP switch position

(1) Communication 1 (COM. PORT1 and COM. PORT2) setting

■ Communication speed (switch No. 1, No. 2)

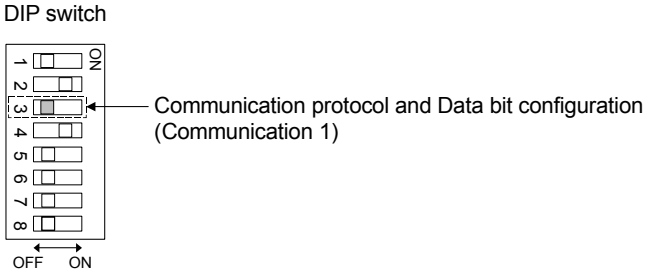
Use switches No. 1 and 2 to set the communication speed for Communication 1.



1	2	Communication speed (Communication 1)
OFF	OFF	4800 bps
ON	OFF	9600 bps
OFF	ON	19200 bps (Factory set value)
ON	ON	38400 bps

■ Communication protocol and Data bit configuration (switch No. 3)

Use switch No. 3 to set the communication protocol and data bit configuration for Communication 1.



3	Communication protocol and Data bit configuration (Communication 1)
OFF	Host communication (RKC communication) Data 8-bit, without parity, Stop 1-bit (Factory set value *)
ON	Host communication (Modbus) Data 8-bit, without parity, Stop 1-bit

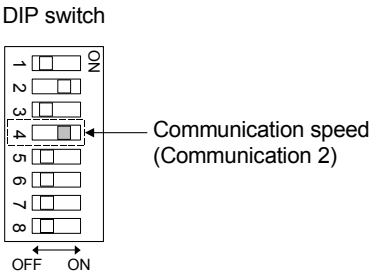
* Factory set values when the communication protocol is not specified at the factory.

The data bit configuration other than the above can be changed by the host communication **(P. 3-10)** or loader communication **(P. 3-13)**.

(2) Communication 2 (COM. PORT3 and COM. PORT4) setting

■ Communication speed (switch No. 4)

Use switch No. 4 to set the communication speed for Communication 2.

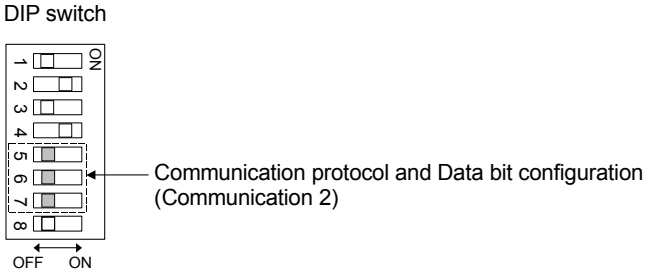


4	Communication speed (Communication 2)
OFF	9600 bps
ON	19200 bps (Factory set value)

When the communication speed of communication 2 is changed to “4800 bps” or “38400 bps,” it can be changed by the host communication **(P. 3-10)** or loader communication **(P. 3-13)**.

■ Communication protocol and Data bit configuration (switch No. 5, 6 and 7)

Use switch No. 5, 6 and 7 to set the communication protocol and data bit configuration for Communication 2.



5	6	7	Communication protocol and Data bit configuration (Communication 2)
OFF	OFF	OFF	Host communication (RKC communication) Data 8-bit, without parity, Stop 1-bit (Factory set value *)
ON	OFF	OFF	Host communication (Modbus) Data 8-bit, without parity, Stop 1-bit
OFF	ON	OFF	PLC communication MITSUBISHI MELSEC series special protocol A compatible, 1C frame, type 4 AnA/AnUCPU common command (QR/QW) QnA compatible, 3C frame, type 4 command (0401/1401) ZR register only Data 7-bit, without parity, Stop 1-bit (AnA/QnA and Q series)
ON	ON	OFF	PLC communication OMRON SYSMAC series special protocol C mode command (RD/WD) Data 7-bit, Even parity, Stop 2-bit
OFF	OFF	ON	PLC communication MITSUBISHI MELSEC series special protocol A compatible, 1C frame, type 4 ACPU common command (WR/WW) Data 7-bit, without parity, Stop 1-bit (A series, FX2N/FX2NC series and FX3U/FX3UC series)

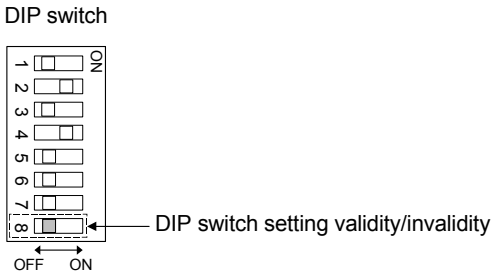
* Factory set values when the communication protocol is not specified at the factory.

The data bit configuration other than the above can be changed by the host communication **(P. 3-10)** or loader communication **(P. 3-13)**.

(3) DIP switch setting validity/invalidity

■ Validity/invalidity of DIP switch setting (switch No. 8)

Set switch No.8 to "ON" when performing communication by the communication settings set via host communication or loader communication. When set to "ON," the DIP switch settings are disabled.



8	DIP switch setting validity/invalidity
OFF	Valid (Factory set value)
ON	Invalid (According to the settings in Host communication or Loader communication)

3.2.3 Communication speed and communication protocol setting via host communication

In order to use host communication to change the communication speed, communication protocol, or data bit configuration of the SRZ unit, host computer and SRZ unit communication must first be enabled in the DIP switch communication settings.
Set the following communication data via host communication. (See "■ **Setting example" on page 3-11**.)

The communication data below will not take effect until the power is restarted or control is switched from STOP to RUN.

For the procedure of connection, wiring and power ON, see **2. SETTING PROCEDURE TO OPERATION (P. 2-1)**.

Name	RKC Identifier	Digits	Modbus register address		Attribute	Structure*	Data range	Factory set value
			HEX	DEC				
Communication 1 protocol	VK	1	8000	32768	R/W	U	0: RKC communication 1: Modbus	0
Communication 1 communication speed	VL	1	8001	32769	R/W	U	0: 4800 bps 2: 19200 bps 1: 9600 bps 3: 38400 bps	2
Communication 1 data bit configuration	VM	7	8002	32770	R/W	U	0 to 5 See Table 1 (P. 3-10).	0
Communication 2 protocol	VP	1	8004	32772	R/W	U	0: RKC communication 1: Modbus 2: MITSUBISHI MELSEC series special protocol A compatible, 1C frame, type 4 AnA/AnUCPU common command (QR/QW) AnA/QnA series, Q series QnA compatible, 3C frame, type 4 command (0401/1401) ZR register only 3: OMRON SYSMAC series special protocol 4: MITSUBISHI MELSEC series special protocol A compatible, 1C frame, type 4 ACPU common command (WR/WW) (A series, FX2N/FX2NC series, FX3U/FX3UC series)	0
Communication 2 communication speed	VU	1	8005	32773	R/W	U	0: 4800 bps 2: 19200 bps 1: 9600 bps 3: 38400 bps	2
Communication 2 data bit configuration	VW	7	8006	32774	R/W	U	0 to 11 See Table 1 (P. 3-10).	0

* U: Data for each SRZ unit

Table 1: Data bit configuration

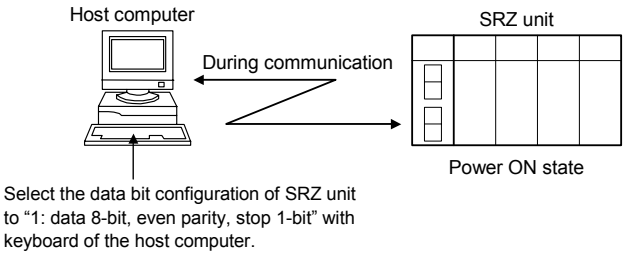
Set value	Data bit	Parity bit	Stop bit
0	8	Without	1
1	8	Even	1
2	8	Odd	1
3	7	Without	1
4	7	Even	1
5	7	Odd	1

Set value	Data bit	Parity bit	Stop bit
6	8	Without	2
7	8	Even	2
8	8	Odd	2
9	7	Without	2
10	7	Even	2
11	7	Odd	2

■ Setting example

When changing the data bit configuration of communication 1 for SRZ unit:
(Change the data bit configuration from “data 8-bit, no parity, stop 1-bit” to “data 8-bit, even parity, stop 1-bit.”)

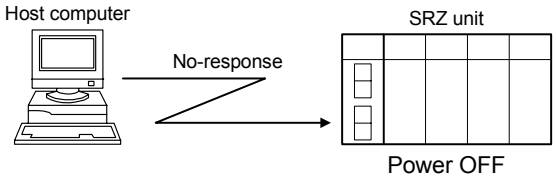
1. Change the data bit configuration of SRZ unit on the host computer.
Change to “1: data 8-bit, even parity, Stop 1-bit.”



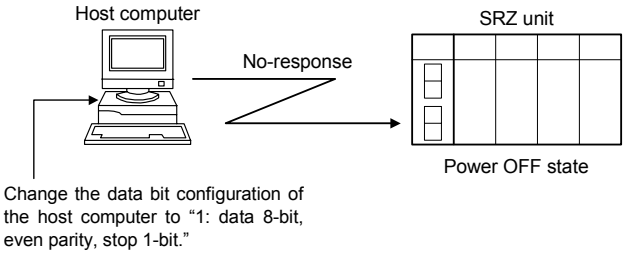
The first time that DIP switch No.8 is switched off (invalid), the following communication data will be factory set values. In addition to the communication data that is to be changed, there may be other settings that must be configured.

- Communication 1 communication speed
- Communication 1 protocol
- Communication 1 data bit configuration
- Communication 2 communication speed
- Communication 2 protocol
- Communication 2 data bit configuration

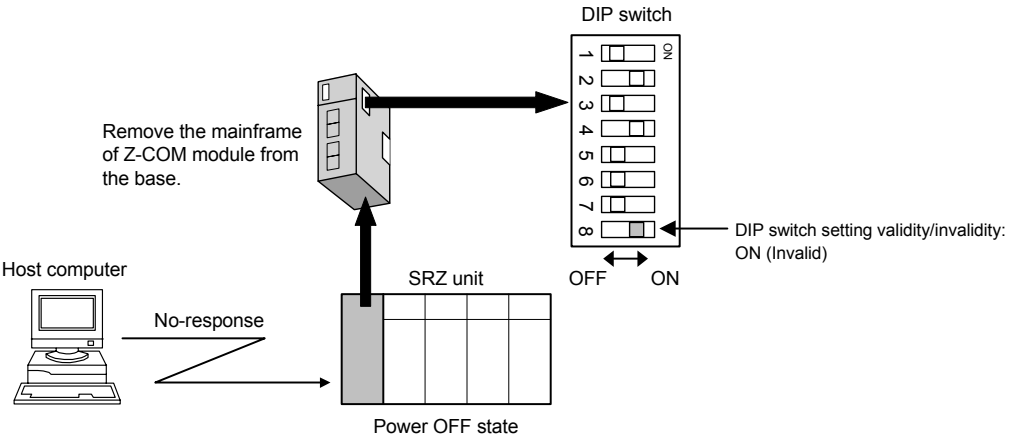
2. Turn off the power supply of SRZ unit. Communication will be “no-response.”



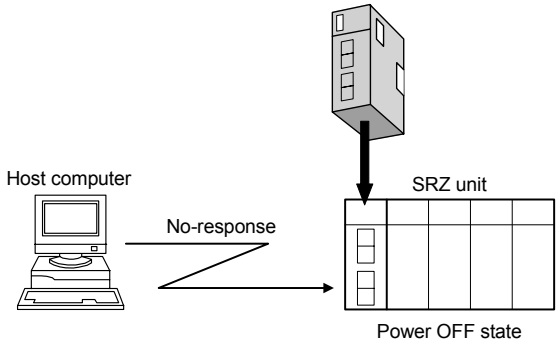
3. Change the data bit configuration of the host computer. Change to “1: data 8-bit, even parity, stop 1-bit.”



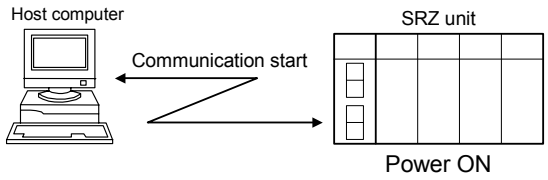
4. Remove the mainframe of Z-COM module from the base. Then, set the DIP switch No.8 to "ON (Invalid)."



5. Mount the mainframe of Z-COM module on the base.



6. Turn on the power supply of SRZ unit. If the power is turned on, communication starts at the changed value.



3.2.4 Communication setting for loader communication

When loader communication is used, the communication speed, communication protocol, and data bit configuration of the Z-COM module are fixed. (There is no need to configure the communication settings of the Z-COM module.)
Set the communication settings of the host computer to the same settings as the Z-COM module.

Communication speed, communication protocol, and data bit configuration for loader communication

Name	Data (fixed value)
Communication speed	38400 bps
Communication protocol	RKC communication Based on ANSI X3.28-1976 subcategory 2.5, B1
Data bit configuration	Data bit: 8 Parity bit: Without Stop bit: 1

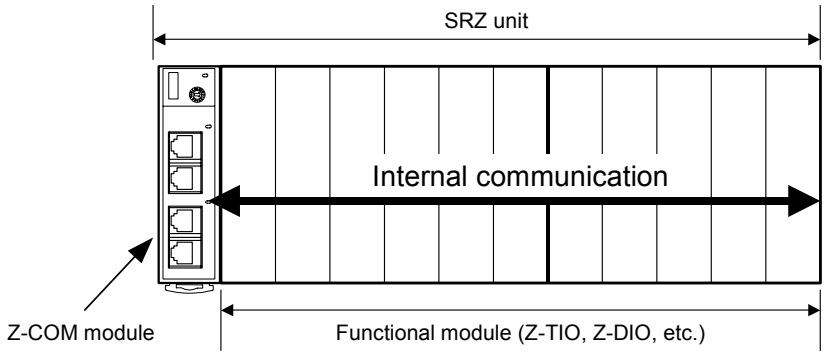
SRZ unit address is fixed to "0."

The communication settings are the same as for host communication.

☞ For setting details, see **3.2.3 Communication speed and communication protocol setting via host communication (P. 3-10)**.

3.3 Communication Setting of the Functional Modules

Only make the module address setting to make the functional module (Z-TIO, Z-DIO, etc.) communication settings. The SRZ unit performs internal communication between the Z-COM module and the functional module, so the communication protocol, communication speed, and data bit configuration do not need to be set.



Setting the Z-TIO module address determines the temperature control channel No. used for communication.

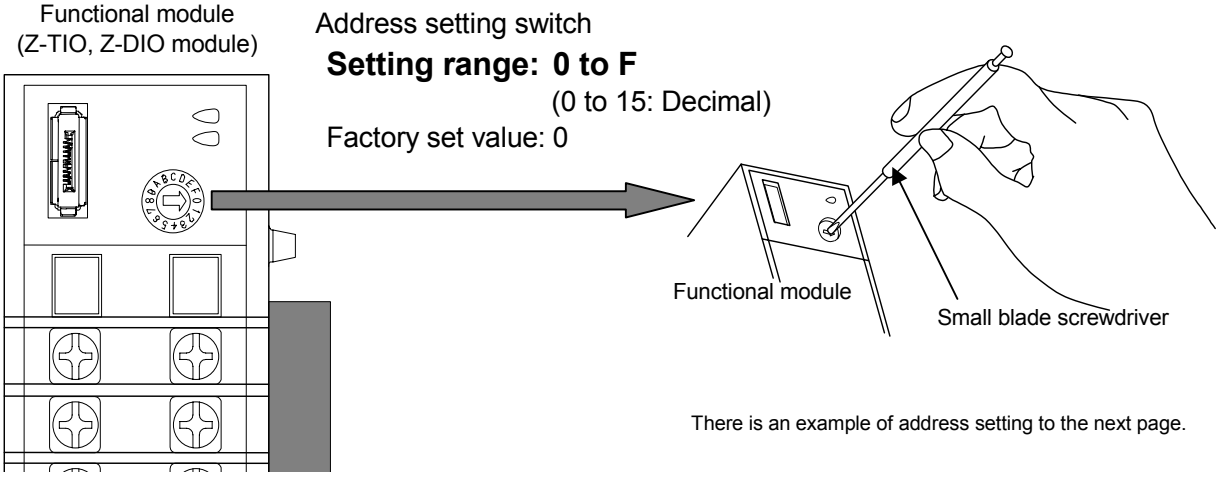
☞ For temperature control channel number, see **3.3.2 Temperature control channel of the SRZ unit (P. 3-15).**

☞ For the data for each module and data for each channel, see **6.4.5 Temperature control channel number of communication (P 6-29).**

3.3.1 Address setting of the functional modules

Set the address of the functional modules. When using two or more functional modules, set the desired module address to each module. For this setting, use a small blade screwdriver.

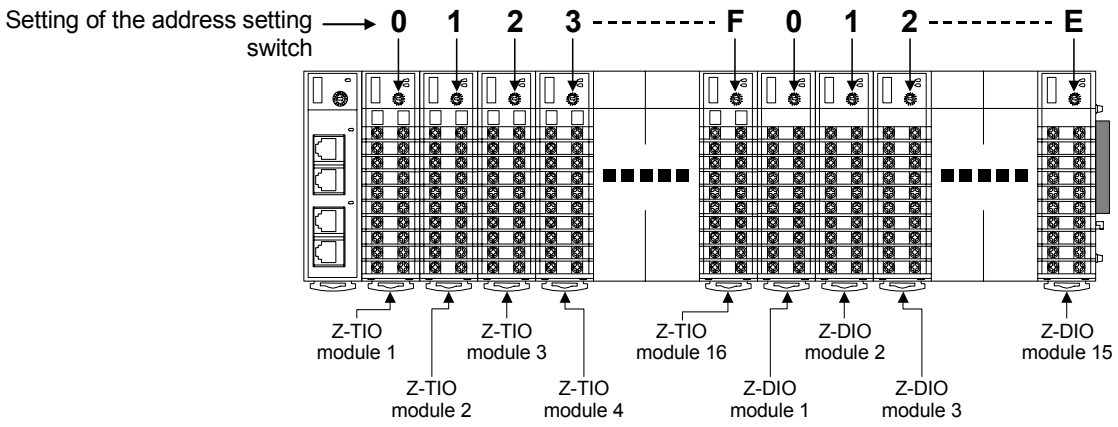
📖 **To avoid problems or malfunction, do not duplicate an module address on the same communication line.**



There is an example of address setting to the next page.

☞ For the maximum number of connected modules, see **4.3 Joinable Number of Modules (P. 4-6).**

Address setting example of functional module (16 Z-TIO module, 15 Z-DIO module):



3.3.2 Temperature control channel of the SRZ unit

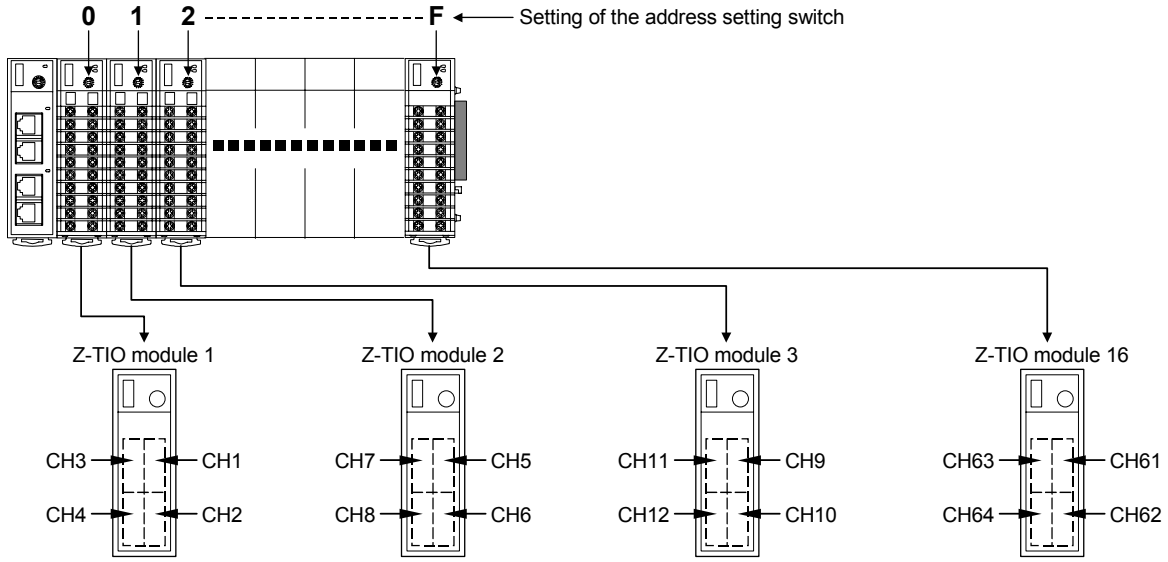
Setting the Z-TIO module address determines the temperature control channel number used for communication. To each Z-TIO module address, the relevant temperature control channel is assigned. Each temperature control channel number can be calculated from the following equation.

Temperature control channel number of communication =
Setting of the address setting switch [a] × Maximum channel number of the functional module [b] + 1

[a] When the setting is A to F, it is a decimal number.

[b] For the Z-TIO module, it is calculated by "4."

Example: When 16 Z-TIO modules (4-channel type) are joined



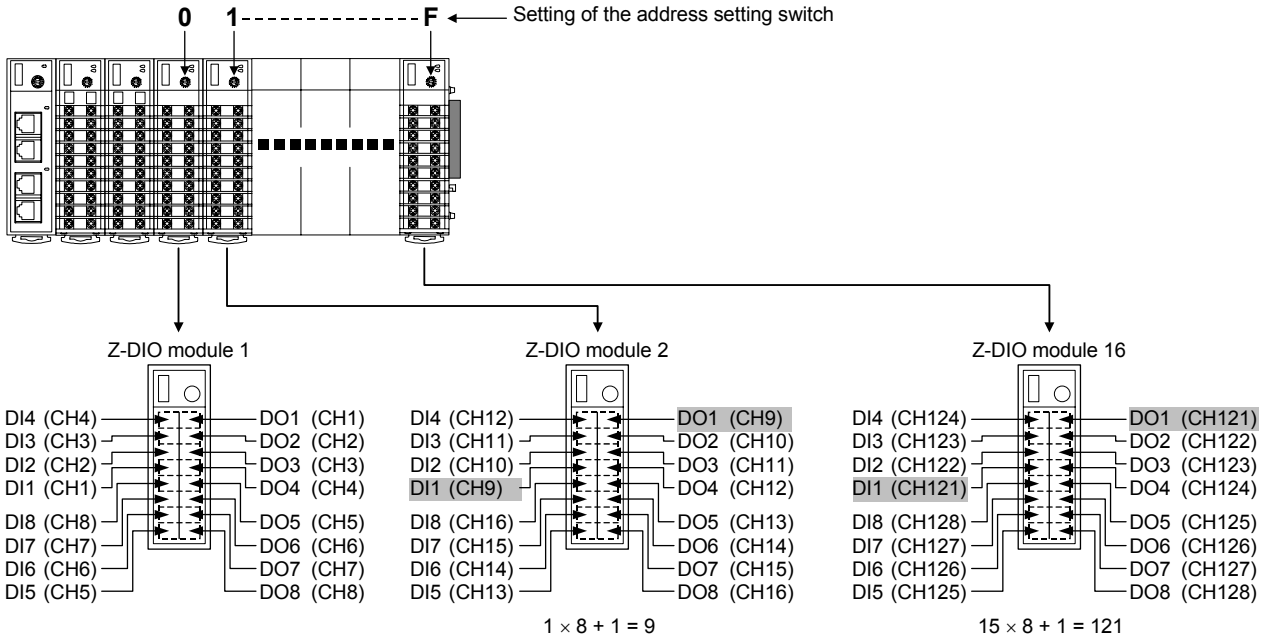
3.3.3 Digital input/output channel of Z-DIO module

Setting the Z-DIO module address determines the digital input/output channel number of SRZ unit. To each Z-DIO module address, the relevant digital input/output channel is assigned. Each digital input/output channel can be calculated from the following equation.

Digital input/output channel number = Setting of the address setting switch* × 8 + 1

* When the setting is A to F, it is a decimal number.

Example: When 16 Z-DIO modules are joined



4 MOUNTING

This chapter describes method of module joining and the SRZ unit mounting.

4.1 Mounting Cautions

⚠ WARNING

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

(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: −10 to +50 °C
- Allowable ambient humidity: 5 to 95 % RH
  (Absolute humidity: MAX.W.C 29.3 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.

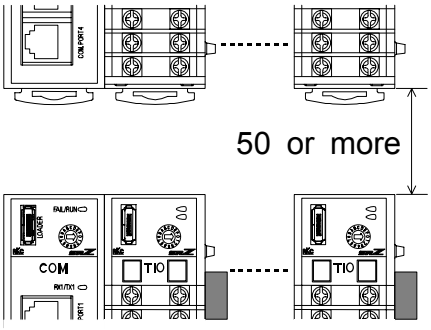
(4) Take the following points into consideration when mounting this instrument in the panel.

- Provide adequate ventilation space so that heat does not build up.
- 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, or the like. However, do not allow cooled air to blow this instrument directly.
- 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

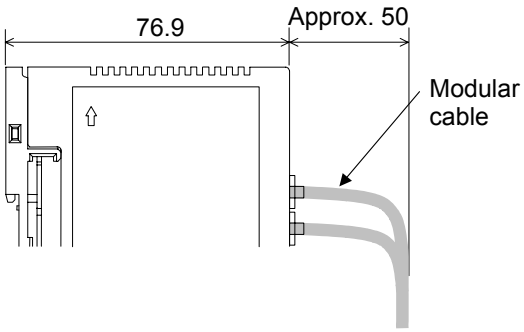
- Space required between each module vertically
  When the module is mounted on the panel, allow a minimum of 50 mm at the top and bottom of the module to attach the module to the mainframe.

(Unit: mm)

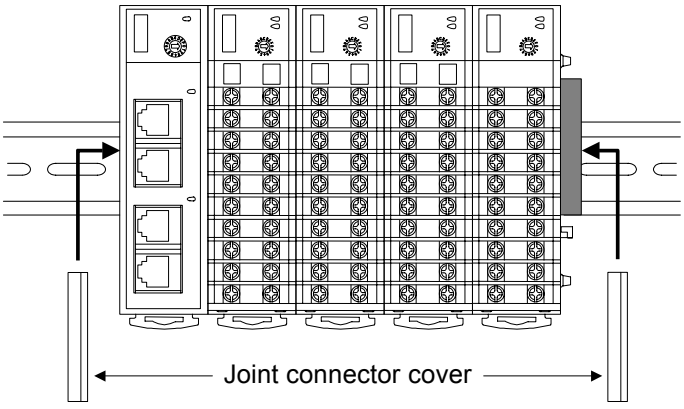


- Depth for modular cables mount type module
  Space for modular cables must be considered when installing.

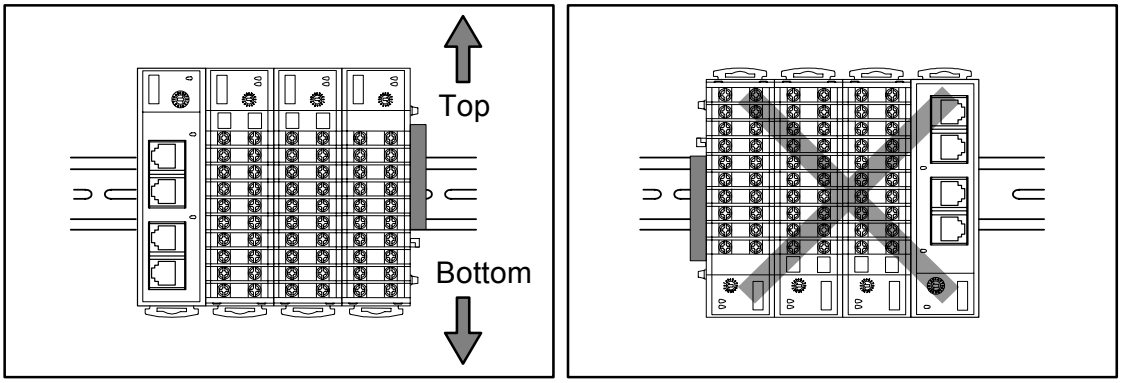
(Unit: mm)



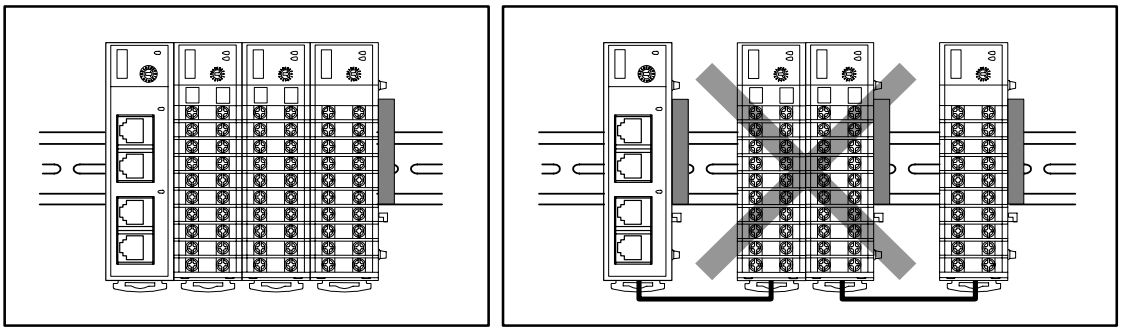
- It is recommended to use a plastic cover on the connector on both sides of the mounted modules for protection of connectors.



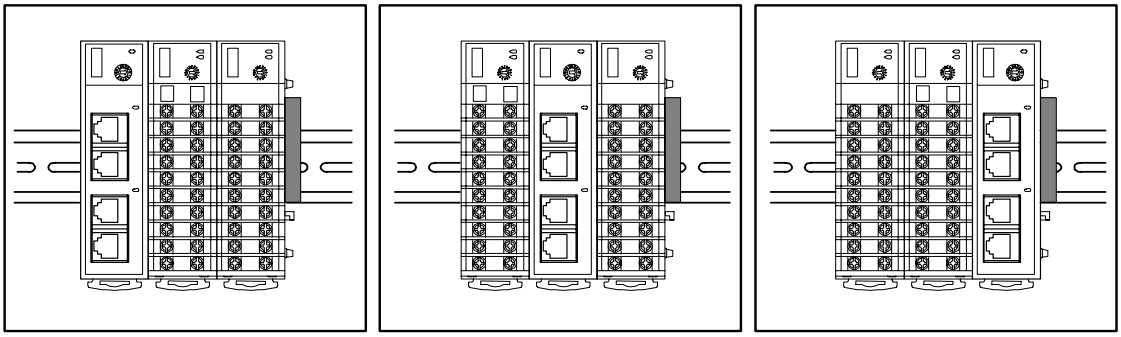
- Installing direction of SRZ unit
  Mount the SRZ unit in the direction specified as shown below.



- Be sure the Z-COM module and functional modules (Z-TIO, Z-DIO) are joined when using them.



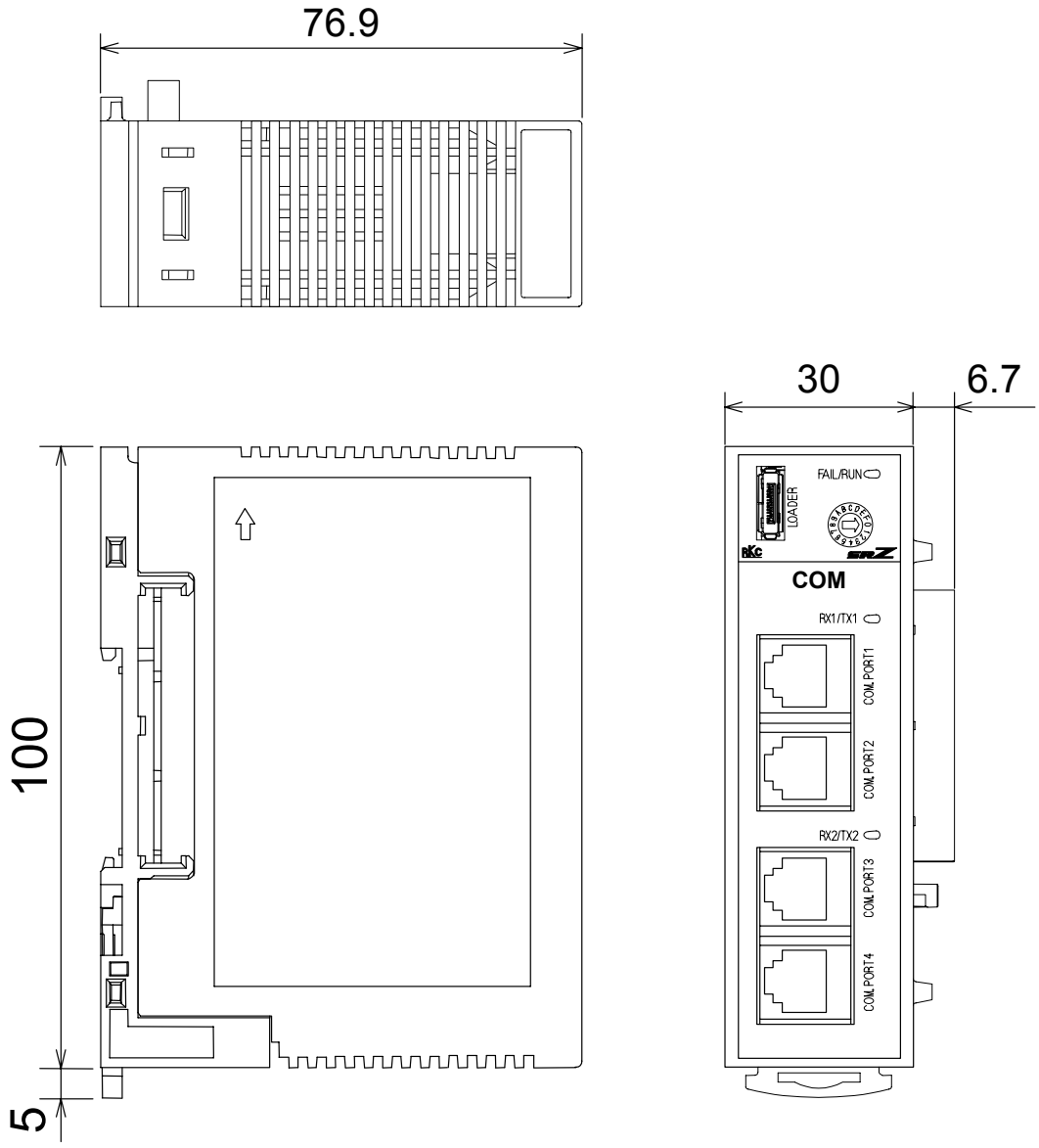
- Joining position of Z-COM module
  Z-COM module connected inside the same unit can be placed in any position.



4.2 Dimensions

■ **Dimensions (Z-COM module)**

(Unit: mm)



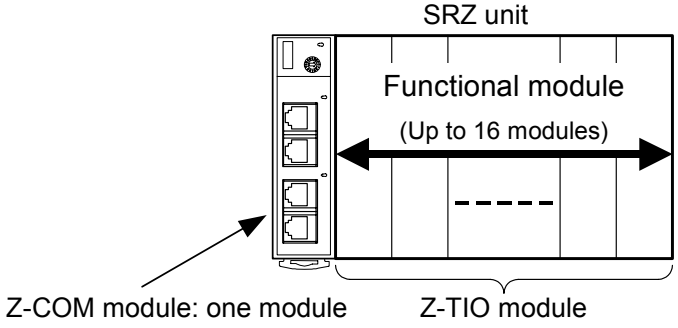
☞ For dimension of the functional module, see Instruction Manual of each functional module.

4.3 Joinable Number of Modules

The maximum number of functional modules (Z-TIO, Z-DIO) described in the following can be joined per Z-COM module.

■ When joining functional modules of the same type: Up to 16 modules

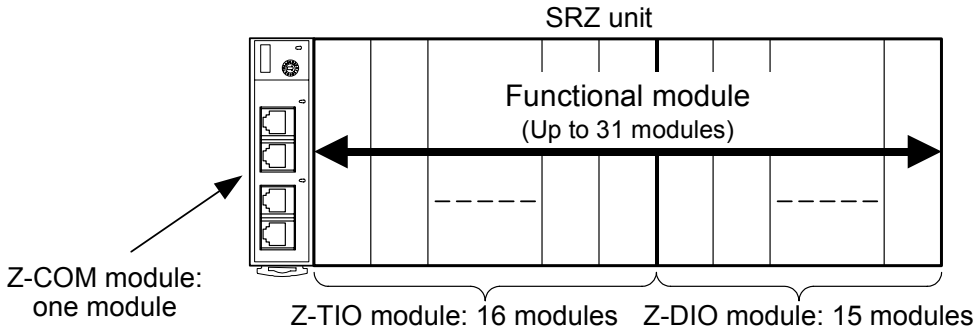
[Example] When only the Z-TIO module is jointed



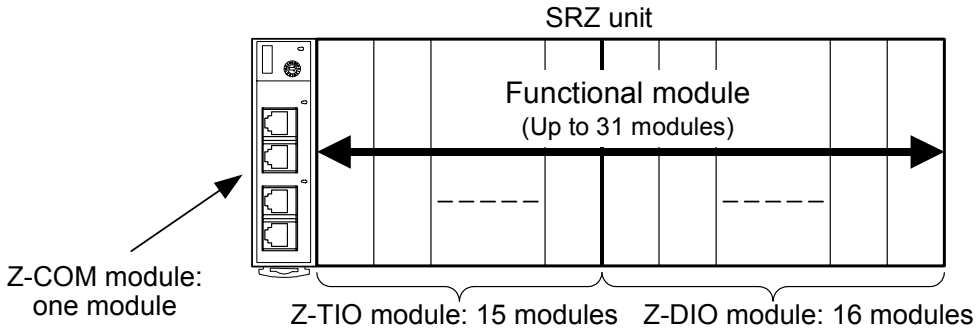
■ When joining functional modules of two or more different types: Up to 31 modules

(However, the maximum joinable number of functional modules of the same type is 16.)

[Example 1] When 16 Z-TIO modules and 15 Z-DIO modules are jointed



[Example 2] When 15 Z-TIO modules and 16 Z-DIO modules are jointed

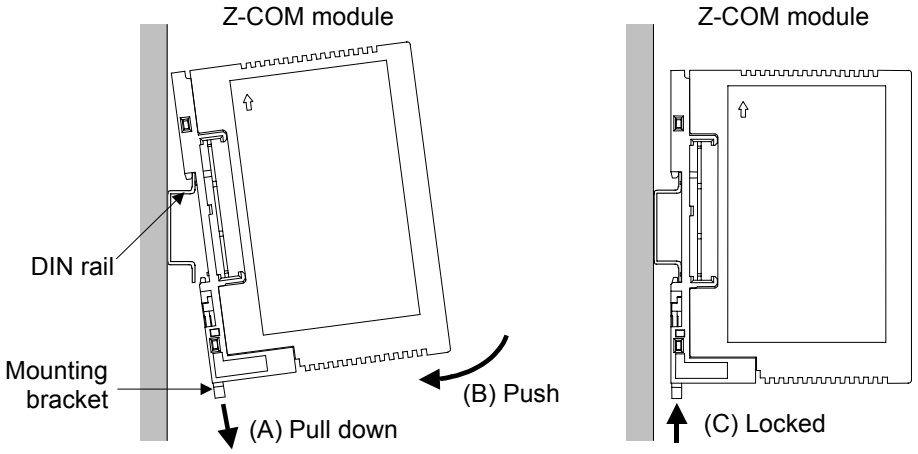


4.4 DIN Rail Mounting

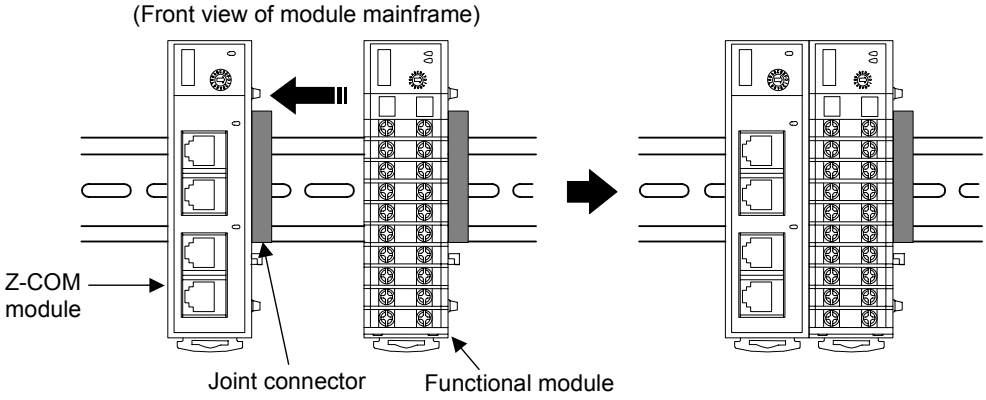
■ Mounting procedures

1. Pull down the mounting bracket at the bottom of the module (A). Attach the hooks on the top of the module to the DIN rail and push the lower section into place on the DIN rail (B).

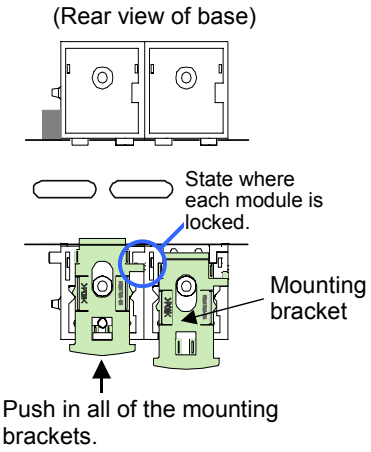
2. Slide the mounting bracket up to secure the module to the DIN rail (C).



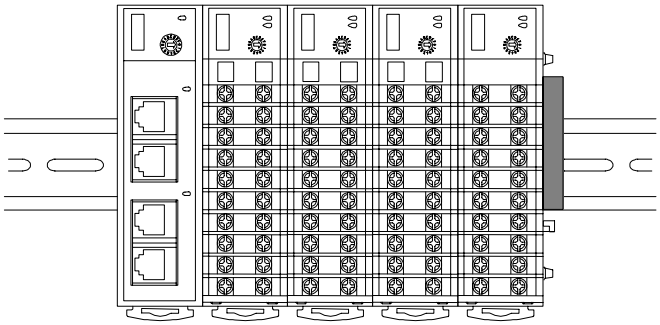
3. Mount the modules on the DIN rail. Slide the modules until the modules are closely joined together and the joint connectors are securely connected.



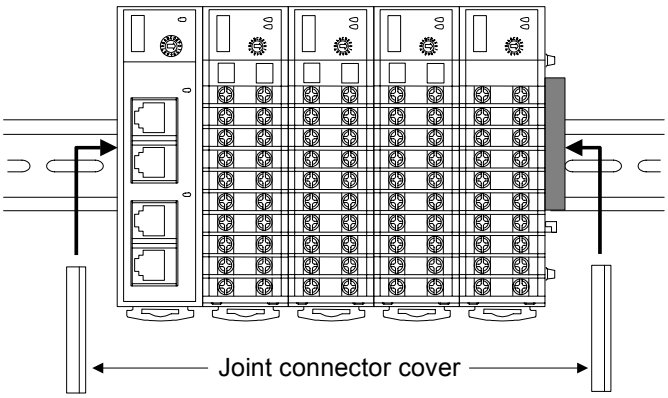
4. Push in the mounting brackets to lock the modules together and fix to the DIN rail.



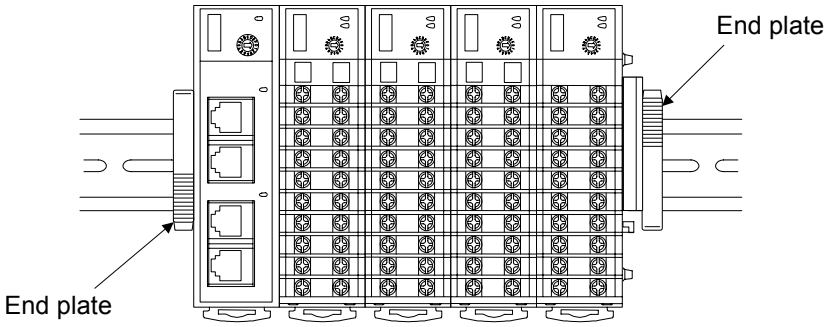
5. Connect the required number of functional modules.



6. Install a plastic cover on the connector on both sides of the mounted modules for protection of connectors.



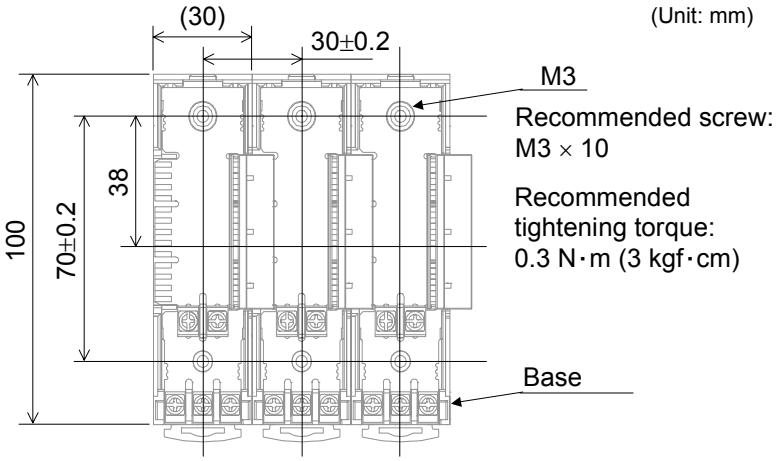
7. Secure both ends of the modules jointed together with the end plates.



4.5 Panel Mounting

■ Mounting procedures

1. Refer to the mounting dimensions below when selecting the location.



Mounting dimensions

2. Remove the base from the module (B) while the lock is pressed (A). (Fig.1)

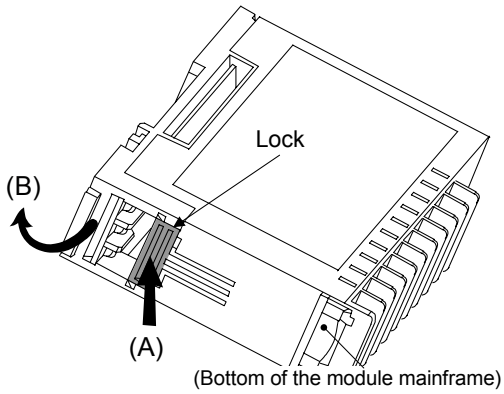


Fig 1: Removing the base

3. Join bases. Then, lock them by pushing in the mounting brackets.

☞ See step *4* on **page 4-7**.

4. Fix the base to its mounting position using M3 screws. Customer must provide the screws.

5. Mount the module on the base. (Fig.2)

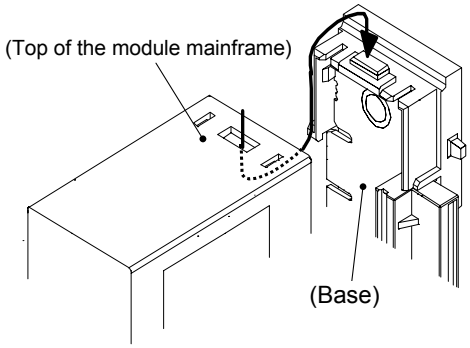
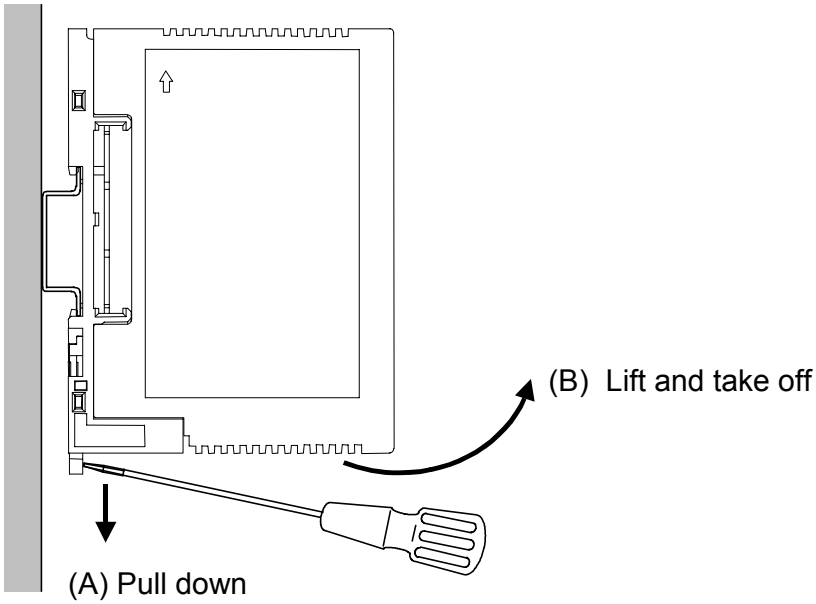


Fig2: Mounting the module mainframe

4.6 Removing from the DIN Rail

■ Removing procedures

1. Pull down a mounting bracket with a blade screwdriver (A).
2. Lift the module from bottom, and take it off (B).



5 WIRING

This chapter explains the procedures for connecting the power supply wiring to the SRZ unit. For information on connecting input/output wiring to functional modules, see the manual for each functional module.

5.1 Wiring Cautions

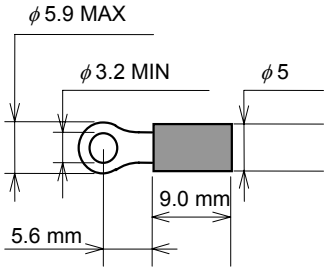
⚠ WARNING

To prevent electric shock or instrument failure, do not turn on the power until all the wiring is completed.

- To avoid noise induction, keep communication signal wire 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 the end-use equipment. The power supply must be in compliance with a limited-energy circuits (maximum available current of 8 A).
- Supply the power to only one of the joined modules. When power is supplied to any one of the joined modules, all of the joined modules will receive power.
- Select the power capacity which is appropriate for the total power consumption of all joined modules and the initial current surge when the power is turned on.

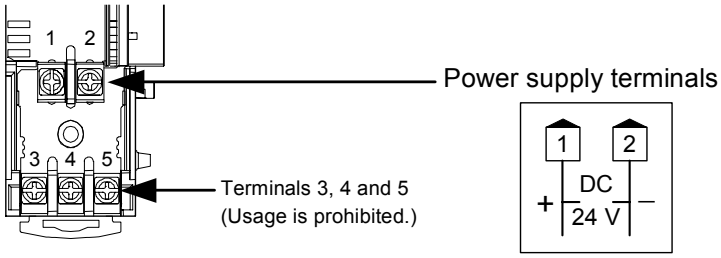
  Power consumption (at maximum load): 30 mA max. (at 24 V DC) [Z-COM module]
  Rush current: 10 A or less
- When connecting the wiring to the power supply terminals on the base, use the specified solderless terminals. Only these specified solderless terminals can be used due to the insulation between the terminals.

Screw Size:	M3 × 7 (with 5.8 × 5.8 square washer)
Recommended tightening torque:	0.4 N·m (4 kgf·cm)
Applicable wire:	Solid/twisted wire of 2 mm^2
Specified solderless terminal:	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)



5.2 Wiring of Power Supply

5.2.1 Terminal configuration (base)

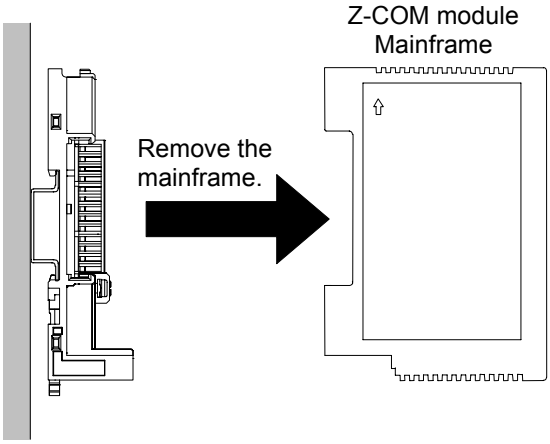


When using the Z-COM module connected to functional modules, terminals 3, 4, and 5 are not used. Do not connect anything to terminals 3, 4, and 5.
In addition, do not use terminals 3, 4, and 5 of functional modules.

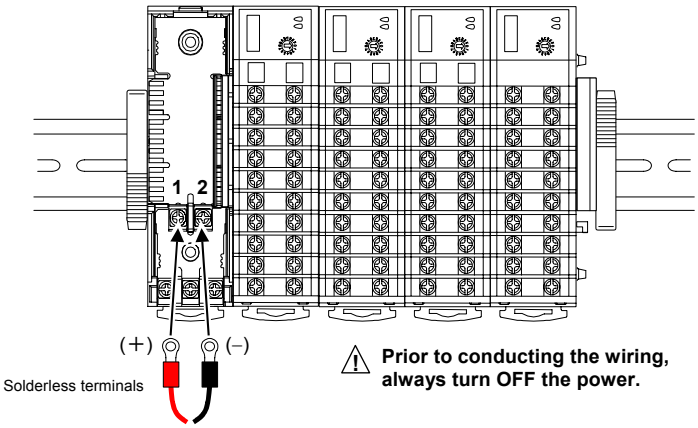
5.2.2 Wiring method

When using the Z-COM module connected to functional modules, the power supply wiring is connected to any one of the modules. Power is supplied from the module with the power wiring to the other modules.

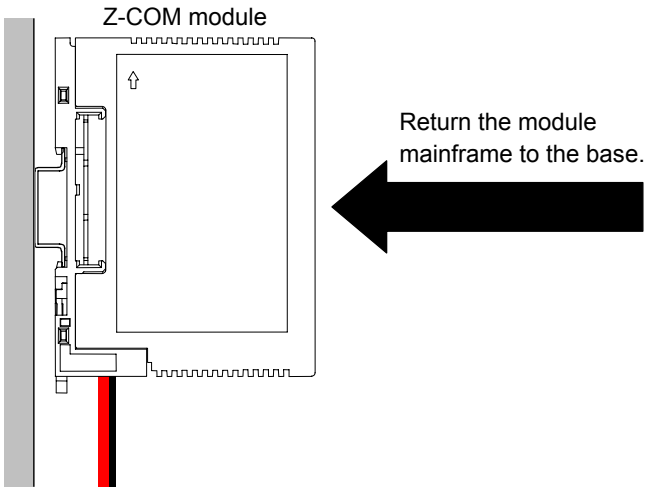
1. Remove the module mainframe to which the power wiring will be connected.



2. Attach the solderless terminals to the power terminals with a Phillips head screwdriver. When attaching the terminals, make sure that the polarity (+ and –) is correct.



3. Return the module mainframe to the base. This completes the wiring work.



6 HOST COMMUNICATION

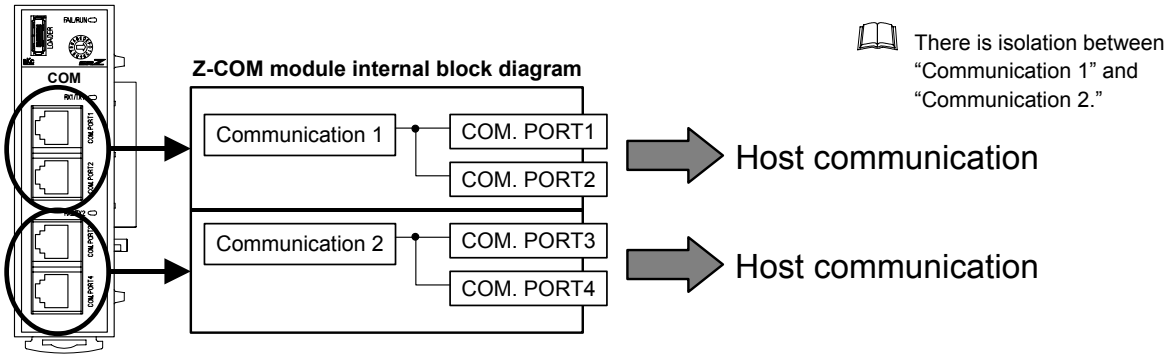
This chapter describes connection method for host communication, communication protocol, and communication data.

6.1 Outline

The following two communication systems of Z-COM module are available.

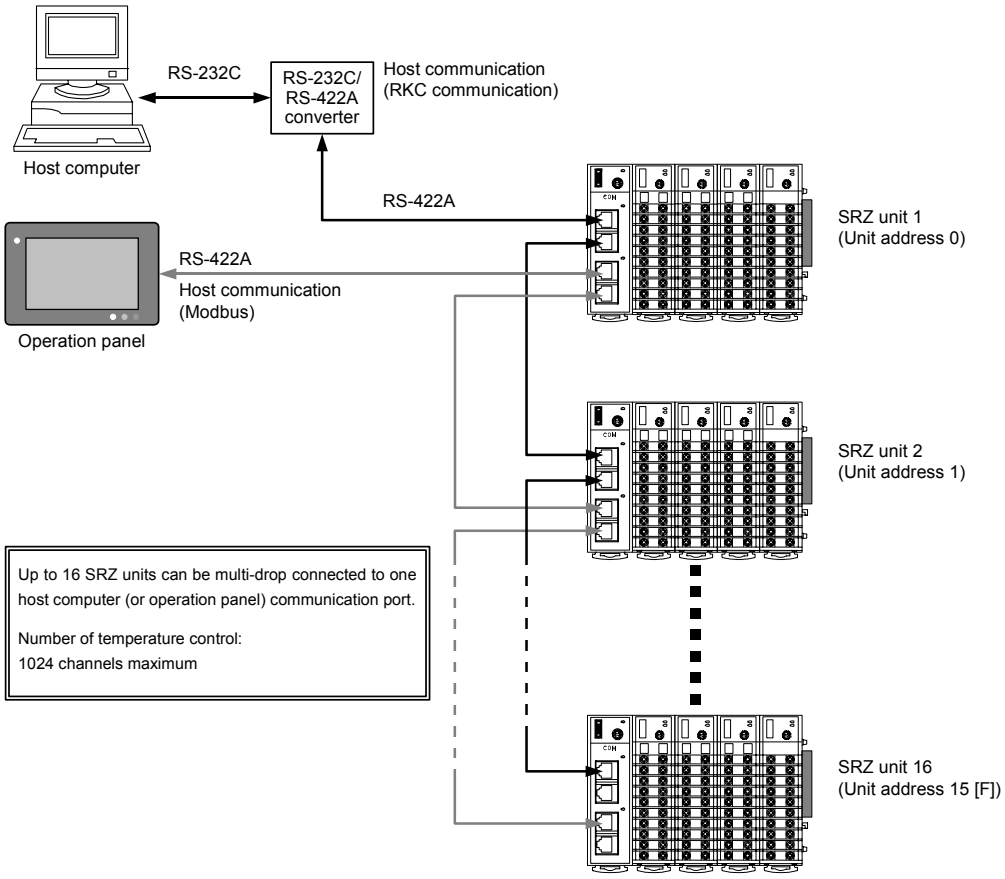
- Communication 1 (COM. PORT1, COM. PORT2)
- Communication 2 (COM. PORT3, COM.PORT4)

Both communication 1 and communication 2 are available as host communication. It is also possible to use only Communication 1 or only Communication 2.



	COM. PORT	Usage 1	Usage 2	Usage 3
Communication 1	COM. PORT1	Host communication	Unused	Host communication
	COM. PORT2			
Communication 2	COM. PORT3	Unused	Host communication	Host communication
	COM. PORT4			

- Usage example



6.2 Wiring

⚠ WARNING

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

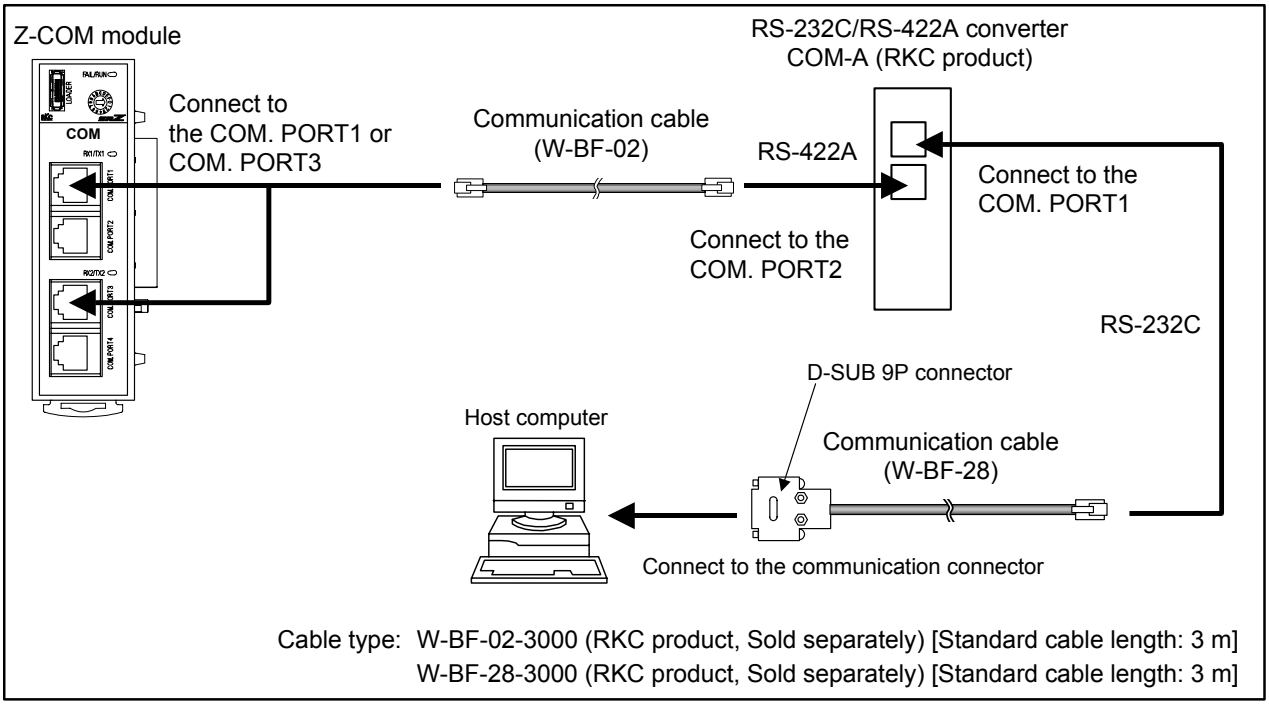
CAUTION

- To avoid noise induction, keep communication signal wire away from instrument power line, load lines and power lines of other electric equipment.
- 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 in the both ends of the communication cable (nearest the connector).

6.2.1 When SRZ unit is connected to a host computer with RS-422A

Customer is requested to prepare a communication cable fit for the SRZ unit to be connected by the host computer.

■ When the interface of host computer is RS-232C (1-to-1 connection)



Cable type: W-BF-02-3000 (RKC product, Sold separately) [Standard cable length: 3 m]
W-BF-28-3000 (RKC product, Sold separately) [Standard cable length: 3 m]

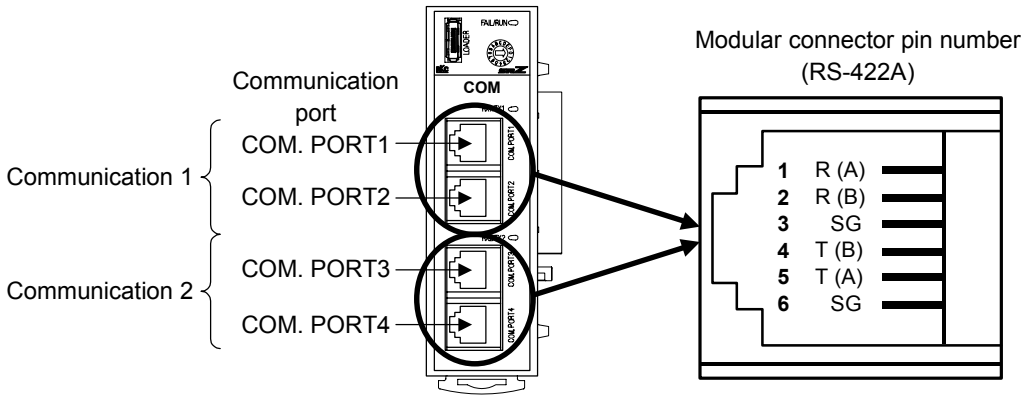
Connection cable W-BF-02 * and W-BF-28 (RKC product) can use to connect the host computer.
* Shield of the cable are connected to SG (No. 6 pin) of the Z-COM modular connector.

Recommended RS-232C/RS-422A converter: **COM-A** (RKC product)
For the COM-A, see **COM-A/COM-B Instruction Manual (IMSRM33-E□).**

For the termination resistor of Z-COM module, see **6.2.4 Termination resistor of Z-COM module (P. 6-13).**

● Pin layout of modular connector

The contents of the modular connector signal are all the same from COM. PORT1 to COM. PORT4.

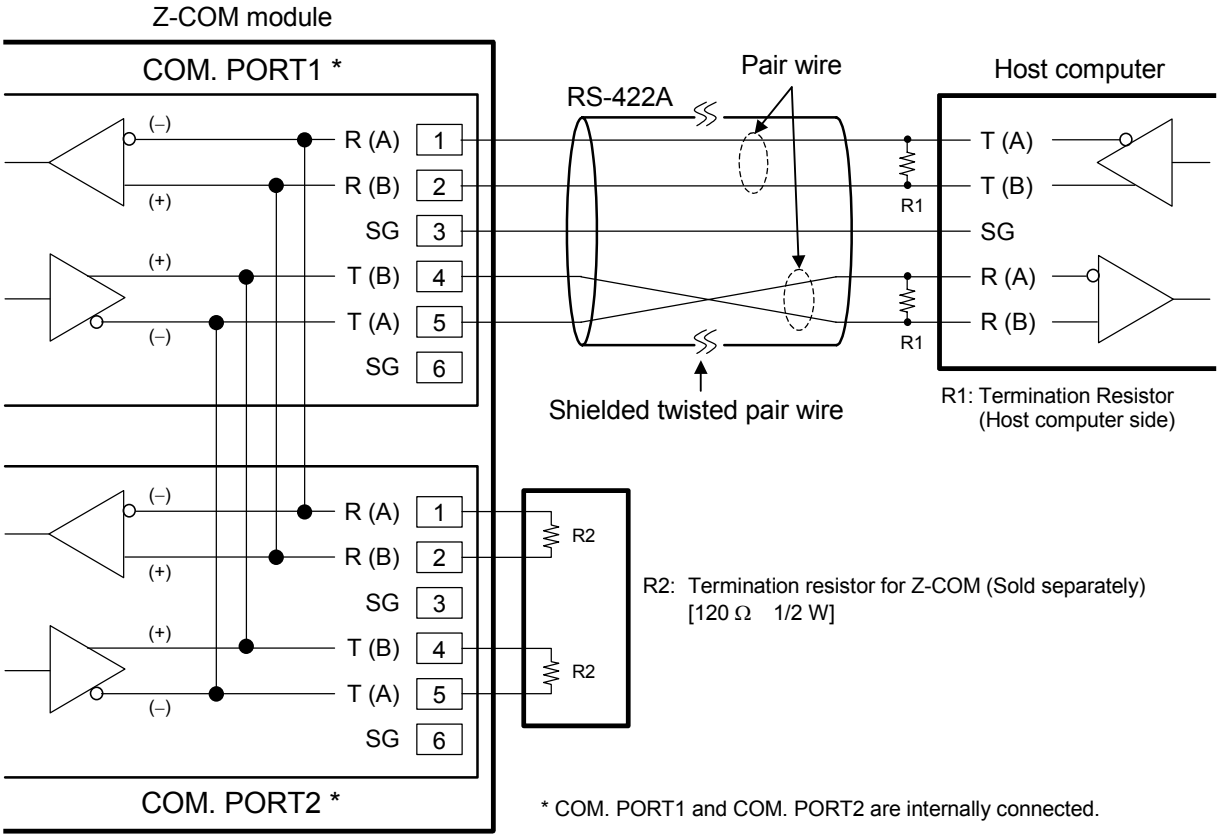


● **Connector pin number and signal details**

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

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

■ When the interface of host computer is RS-422A (1-to-1 connection)

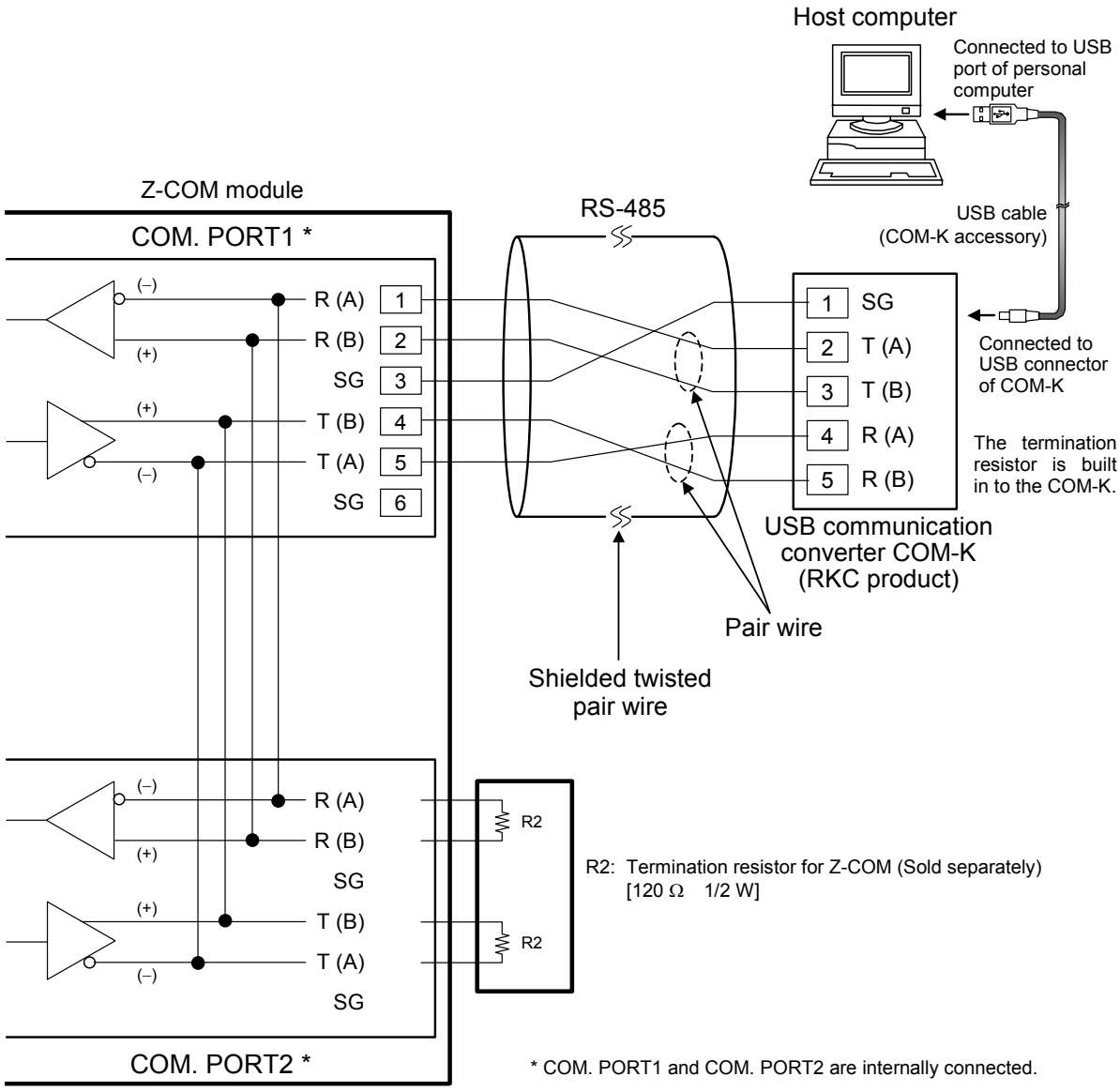


The method wiring of COM. PORT3 and COM. PORT4 is the same as a figure above.

For the termination resistor of Z-COM module, see **6.2.4 Termination resistor of Z-COM module (P. 6-13).**

■ When the host computer has a USB connector (1-to-1 connection)

When the host computer has a USB connector, connect the USB communication converter between the host computer and the Z-COM module.



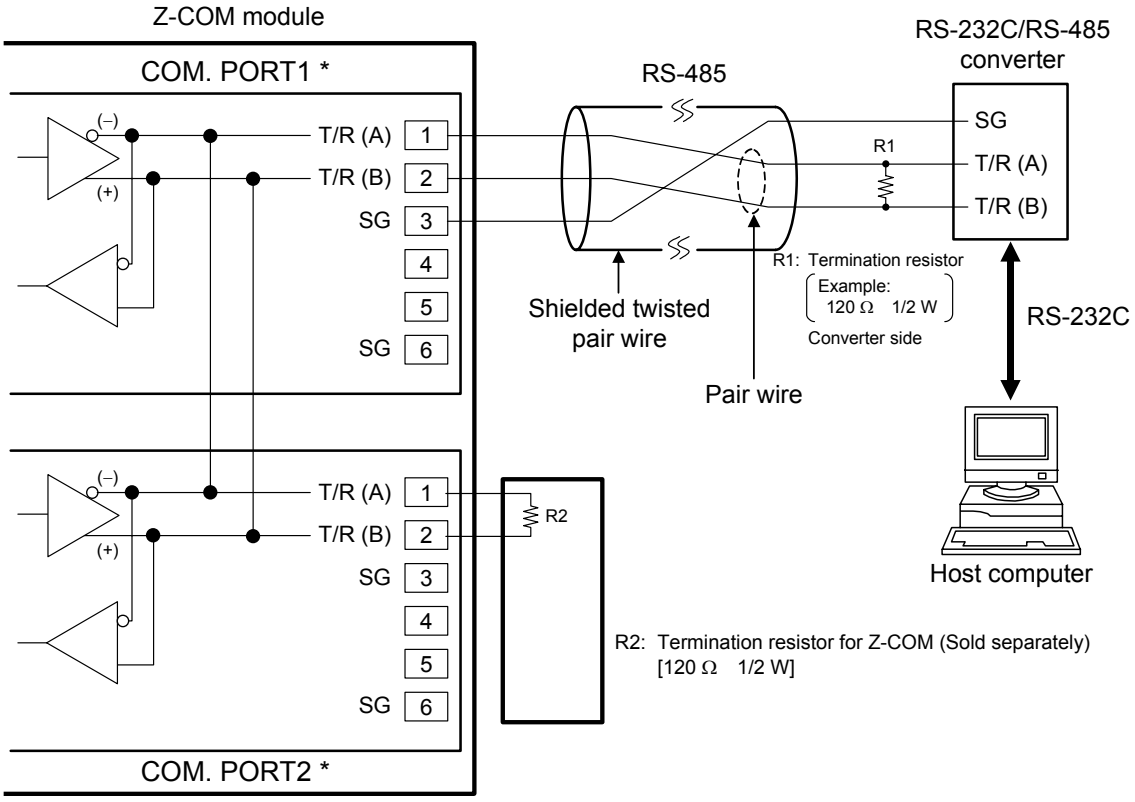
The method wiring of COM. PORT3 and COM. PORT4 is the same as a figure above.

For the termination resistor of Z-COM module, see **6.2.4 Termination resistor of Z-COM module (P. 6-13).**

6.2.2 When SRZ unit is connected to a host computer with RS-485

Customer is requested to prepare a communication cable fit for the SRZ unit to be connected by the host computer.

■ When the interface of host computer is RS-232C (1-to-1 connection)



* COM. PORT1 and COM. PORT2 are internally connected.

The method wiring of COM.PORT3 and COM.PORT4 is the same as a figure above.

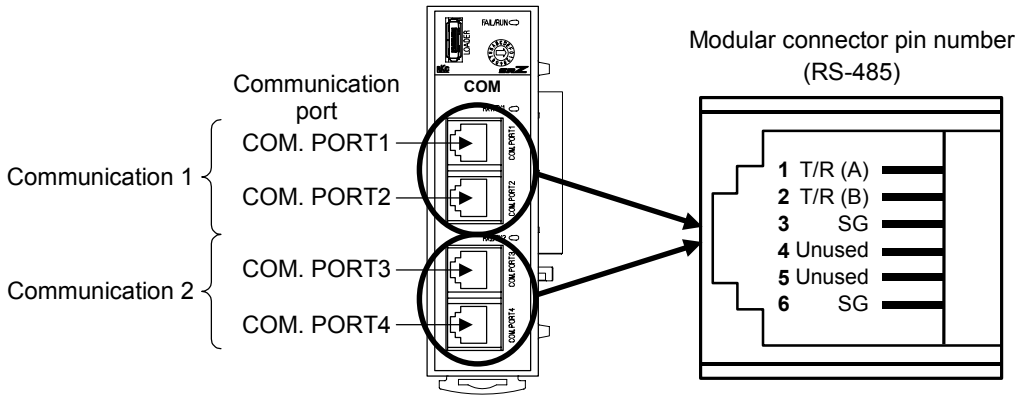
For the termination resistor of Z-COM module, see **6.2.4 Termination resistor of Z-COM module (P. 6-13).**

When the host computer (master) uses Windows95/98/Me/NT/2000/XP, use a RS-232C/RS-485 converter with an automatic send/receive transfer function.

Recommended RS-232C/RS-485 converter:
CD485, CD485/Vmanufactured by Data Link, Inc. or equivalent

- **Pin layout of modular connector**

The contents of the modular connector signal are all the same from COM. PORT1 to COM. PORT4.

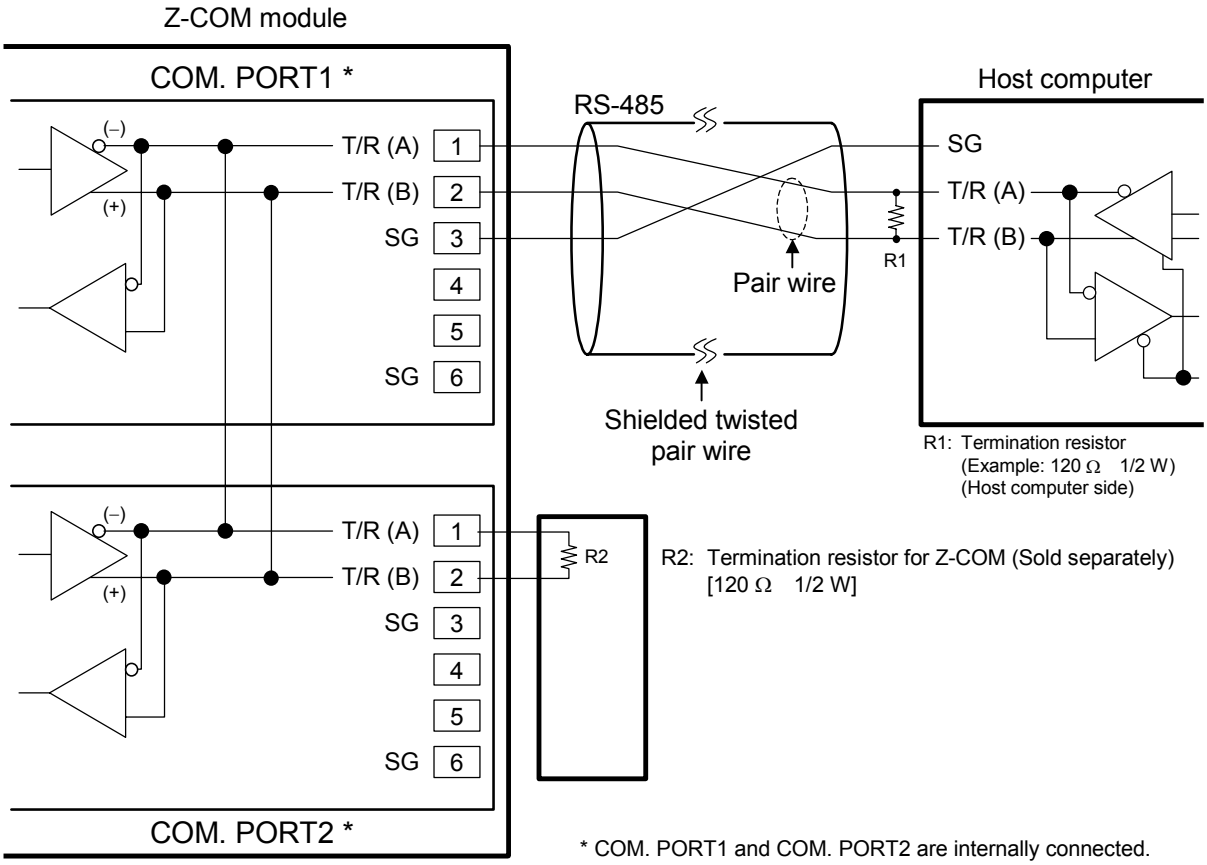


- **Connector pin number and signal details**

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

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

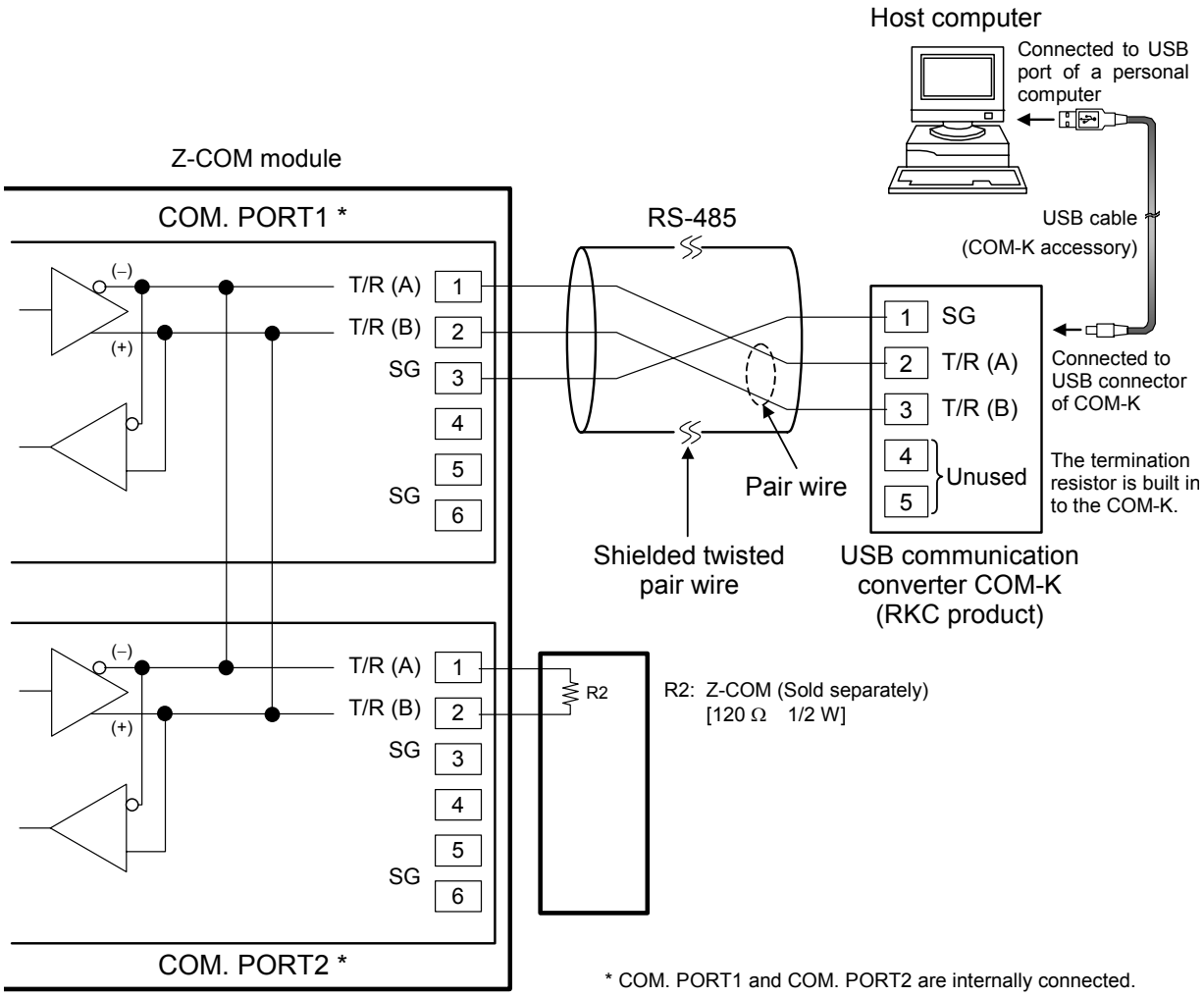
■ When the interface of host computer is RS-485 (1-to-1 connection)



The method wiring of COM. PORT3 and COM. PORT4 is the same as a figure above.

For the termination resistor of Z-COM module, see **6.2.4 Termination resistor of Z-COM module (P. 6-13).**

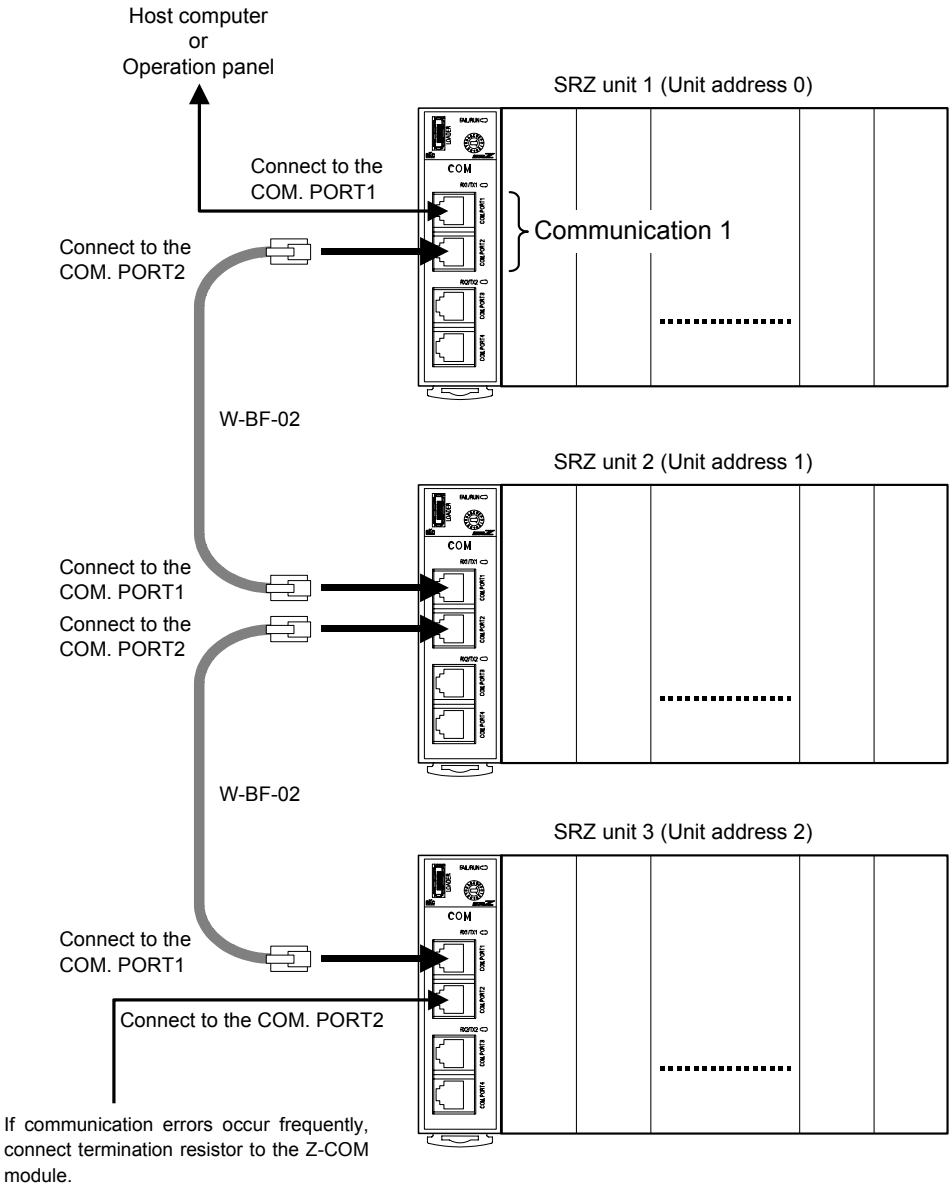
■ When the host computer has a USB connector (1-to-1 connection)



☞ For the termination resistor of Z-COM module, see **6.2.4 Termination resistor of Z-COM module (P. 6-13).**

6.2.3 Multiple SRZ unit connections

■ When two or more SRZ units are connected to the communication 1 (COM. PORT1, COM. PORT2)

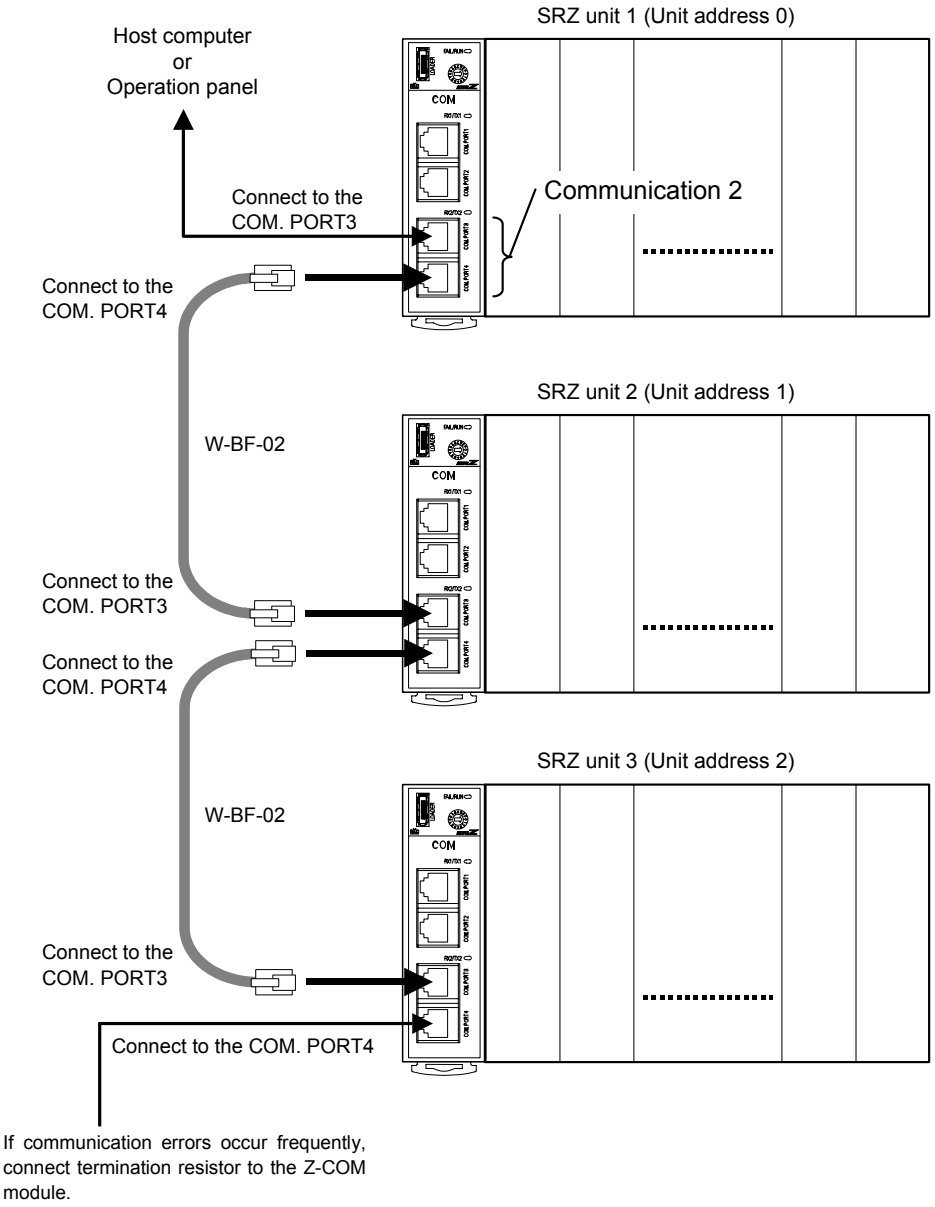


When the interface is RS-422, can be connected by our cable (sold separately: W-BF-02).
Cable type: W-BF-02-3000 (Sold separately) [Standard cable length: 3 m]

COM. PORT1 and COM. PORT2 are internally connected.

For the termination resistor of Z-COM module, see **6.2.4 Termination resistor of Z-COM module (P. 6-13).**

■ When two or more SRZ units are connected to the communication 2 (COM. PORT3, COM. PORT4)



When the interface is RS-422, can be connected by our cable (sold separately: W-BF-02).
Cable type: W-BF-02-3000 (Sold separately) [Standard cable length: 3 m]

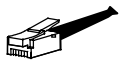
COM. PORT3 and COM. PORT4 are internally connected.

For the termination resistor of Z-COM module, see **6.2.4 Termination resistor of Z-COM module (P. 6-13).**

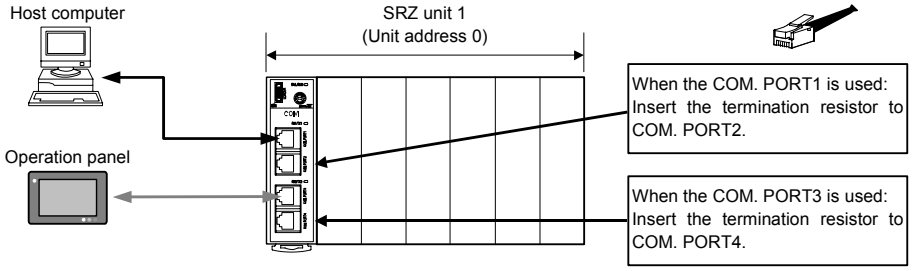
6.2.4 Termination resistor of Z-COM module

If communication errors occur frequently due to the operation environment or the communication distance, connect termination resistors to the Z-COM module and the other party unit.

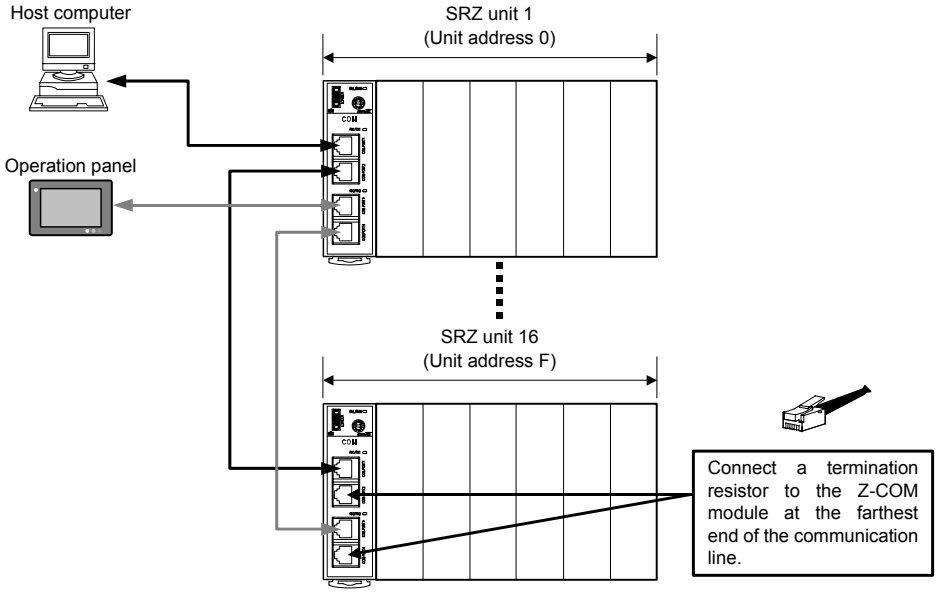
For the termination resistor of the Z-COM module, connect a Z-COM termination resistor connector (sold separately).

Termination resistor for Z-COM (Sold separately):	W-BW-01 (for RS-485)	[120 Ω 1/2 W]	
	W-BW-02 (for RS-422A)	[120 Ω 1/2 W]	

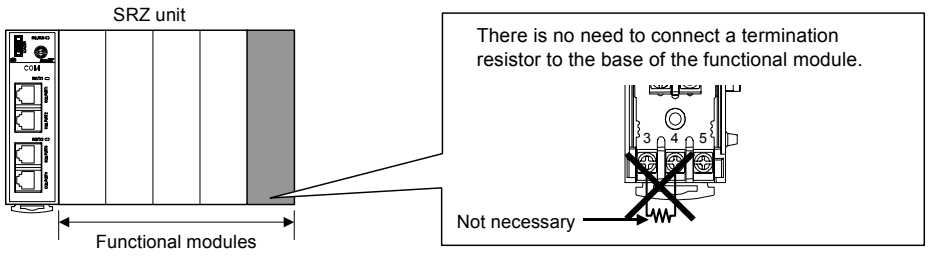
For the termination resistor of the other party unit, see the other party unit Instruction Manual.



When two or more SRZ units are connected, connect a termination resistor to the Z-COM module at the farthest end of the communication line.



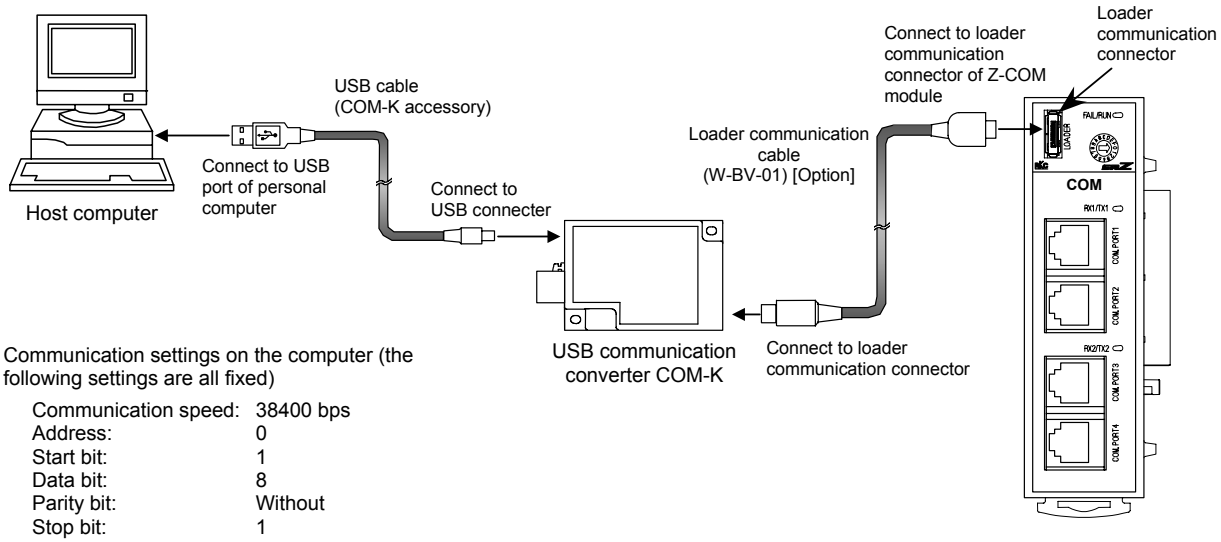
Termination resistor of the functional modules (Z-TIO, Z-DIO):
When using a Z-COM module joined together with functional modules, there is no need to connect a termination resistor to the functional modules.



6.2.5 Connections for loader communication

Z-COM module is equipped standard with a loader communication connector.
The module loader communication connector, our COM-K USB communication converter (sold separately)*, and a personal computer can be connected with the appropriate cables.

* A loader communication cable (option) is required for the connection to the loader communication connector on the Z-COM module.
  USB communication converter COM-K-1 (with Loader communication cable [cable length: 1 m])



Communication settings on the computer (the following settings are all fixed)

Communication speed:	38400 bps
Address:	0
Start bit:	1
Data bit:	8
Parity bit:	Without
Stop bit:	1

The Loader port is only for parameter setup.

For the COM-K, see the **COM-K Instruction Manual (IMR01Z01-E□).**

6.3 Communication Requirements

■ Processing times during data send/receive

When the host computer is using either the polling or selecting procedure for communication, the following processing times are required for SRZ unit to send data:
- Response wait time after SRZ unit sends BCC in polling procedure
- Response wait time after SRZ unit sends ACK or NAK in selecting procedure

RKC communication (Polling procedure)

Procedure details	Time
Response send time after controller receives ENQ	60 ms max.
Response send time after controller receives ACK	60 ms max.
Response send time after controller receives NAK	60 ms max.
Response send time after controller sends BCC	2 ms max.

RKC communication (Selecting procedure)

Procedure details	Time
Response send time after controller receives BCC	60 ms max.
Response wait time after controller sends ACK	2 ms max.
Response wait time after controller sends NAK	2 ms max.

Modbus

Procedure details	Time
Read holding registers [03H] Response send time after the slave receives the query message	60 ms max.
Preset single register [06H] Response send time after the slave receives the query message	100 ms max.
Diagnostics (loopback test) [08H] Response send time after the slave receives the query message	30 ms max.
Preset multiple registers [10H] Response send time after the slave receives the query message	100 ms max.

■ Caution for selecting

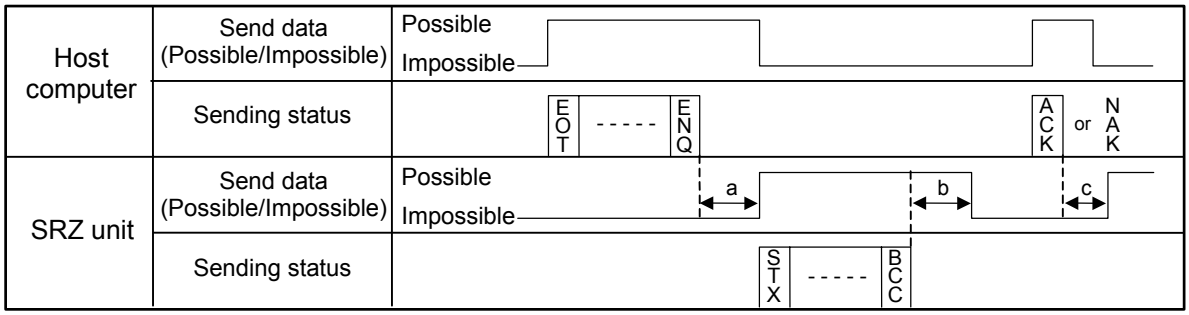
When selecting of the following communication data of a Z-TIO module is performed, the next selecting procedure for the changed Z-TIO module will not be possible for 4 to 6 seconds.
For this reason, when there are many channels to be changed, do not perform selecting for each channel individually; perform selecting for all channels at once. Note that if the communication data exceeds 128 bytes, the data will be separated into blocks by ETB.

- Input type
- Decimal point position
- Integral/derivative time decimal point position

■ RS-485 (2-wire system) send/receive timing

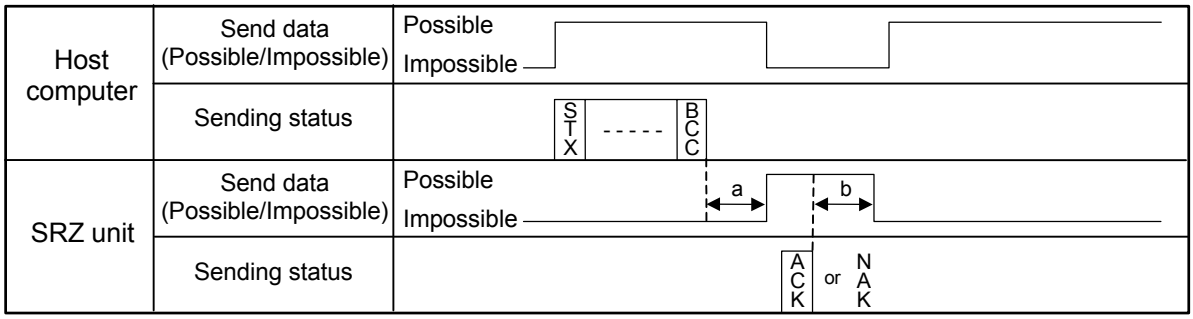
RS-485 communication is conducted through two wires, therefore the transmission and reception of data requires precise timing.

● Polling procedure



a: Response send time after the controller receives [ENQ] + Interval time
b: Response send time after the controller sends BCC
c: Response send time after the controller receives [ACK] + Interval time or
Response send time after the controller receives [NAK] + Interval time

● Selecting procedure



a: Response send time after the controller receives BCC + Interval time
b: Response wait time after the controller sends ACK or Response wait time after the controller sends NAK

To switch the host computer from transmission to reception, send data must be on line.

The following processing times are requires for the SRZ unit to process data.
- In Polling procedure, Response wait time after the SRZ unit sends BCC
- In Selecting procedure, Response wait time after the SRZ unit sends ACK or NAK

■ Fail-safe

A transmission error may occur with the transmission line disconnected, shorted or set to the high-impedance state. In order to prevent the above error, it is recommended that the fail-safe function be provided on the receiver side of the host computer. The fail-safe function can prevent a framing error from its occurrence by making the receiver output stable to the MARK (1) when the transmission line is in the high-impedance state.

6.4 RKC Communication Protocol

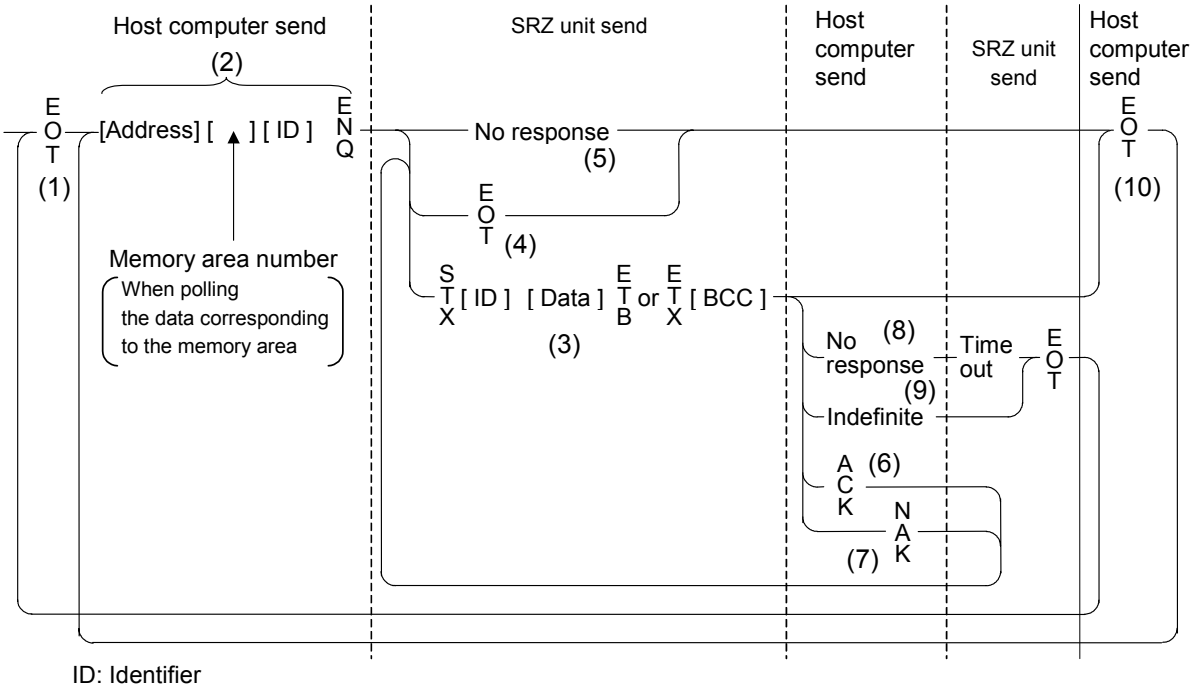
RKC communication uses the polling/selecting method to establish a data link. The basic procedure is followed ANSI X3.28 subcategory 2.5, B1 basic mode data transmission control procedure (Fast selecting is the selecting method used in SRZ unit).

- The polling/selecting procedures are a centralized control method where the host computer controls the entire process. The host computer initiates all communication so the SRZ unit responds according to queries and commands from the host.

- The code use in communication is 7-bit ASCII code including transmission control characters.
  Transmission control characters used in SRZ unit:
  EOT (04H), ENQ (05H), ACK (06H), NAK (15H), STX (02H), ETB (17H), ETX (03H)
  ( ): Hexadecimal

6.4.1 Polling procedures

Polling is the action where the host computer requests one of the connected SRZ units to transmit data.
An example of the polling procedure is shown below:



(1) Data link initialization

Host computer sends EOT to the controllers to initiate data link before polling sequence.

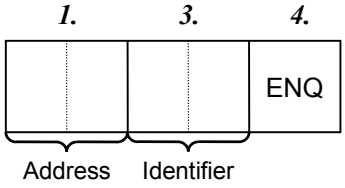
(2) Data sent from host computer - Polling sequence

The host computer sends the polling sequence in the following two types of formats:

- Format in which no memory area number is specified, and
- Format in which the memory area number is specified.

- When no memory area number is specified

  To be sent in this format for any identifier not corresponding to the memory area.

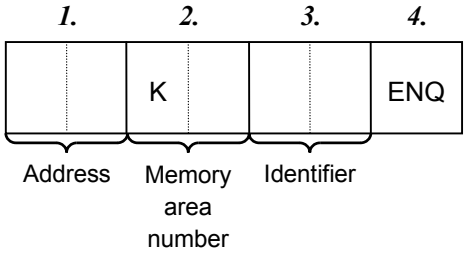


Example:

0	1	M	1	ENQ

- When the memory area number is specified

  To be sent in this format for any identifier corresponding to the memory area.



Example:

0	1	K	1	S	1	ENQ

1. Address (2 digits)
This data is a unit address of the SRZ for polled and must be the same as the unit address set value in item **3.2.1 SRZ unit address setting (P. 3-3).**

The polling address which transmitted a message once becomes effective so long as data link is not initialized by transmit and receive of EOT.

2. Memory area number (2 digits)
This is the identifier to specify the memory area number. It is expressed by "K1" to "K8" to each memory area number (from 1 to 8). If the memory area number is assigned with "K0," this represents that control area is specified.

The memory area now used for control is called "Control area."

If the memory area number is not specified when polling the identifier corresponding to the memory area, this represents that the control area is specified.

If any identifier not corresponding to the memory area is assigned with a memory area number, this memory area number is ignored.

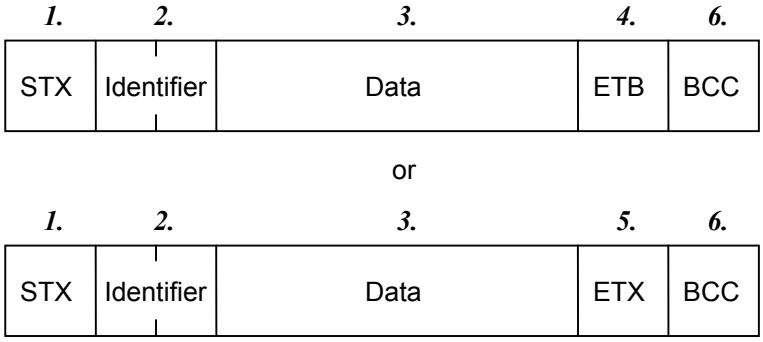
3. Identifier (2 digits)
The identifier specifies the type of data that is requested from the SRZ unit. Always attach the ENQ code to the end of the identifier.

☞ See **6.4.5 Communication data list (P. 6-31)**.

4. ENQ
The ENQ is the transmission control character that indicates the end of the polling sequence. The host computer then must wait for a response from the SRZ unit.

(3) Data sent from the SRZ unit

If the polling sequence is received correctly, the SRZ unit sends data in the following format:



🕮 If the length of send data (from STX to BCC) exceeds 128 bytes, it is divided into blocks by ETB. In this case, the succeeding divided data is sent after STX.

1. STX
STX is the transmission control character which indicates the start of the text transmission (identifier and data).

2. Identifier (2 digits)
The identifier indicates the type of data (measured value, status and set value) sent to the host computer.

☞ For the communication data, see **6.4.5 RKC communication data list (P. 6-31)**.

3. Data
Data which is indicated by an identifier of SRZ unit, consisting of channel numbers, data, etc. Each channel number and data are delimited by a space (20H). The data and the next channel number are delimited by a comma (2CH).

- Channel number: 3-digit ASCII code, not zero-suppressed. Channels without channel numbers may exist depending on the type of identifier.
- Data: ASCII code, zero-suppressed with spaces (20H). The number of digits varies depending on the type of identifier.

Memory area soak time monitor and area soak time become the following data:

- When data range is 0 hour 00 minute to 99 hours 59 minutes:
  Data range is 0:00 to 99:59, punctuation of time unit is expressed in colon ": (3AH)."
- When data range is 0 minute 00 second to 199 minutes 59 seconds:
  Data range is 0:00 to 199:59, punctuation of time unit is expressed in colon ": (3AH)."

"0" (without a decimal point) is sent for unused channels and for data that is invalid due to the function selection.

4. ETB
Transmission control character indicating the end of the block.

5. ETX
Transmission control character indicating the end of the text.

6. BCC
BCC (Block Check Character) detects error using horizontal parity and is calculated by horizontal parity (even number).

Calculation method of BCC: *Exclusive OR* all data and characters from STX through ETB or ETX, not including STX.

Example:

STX	M	1	0	1			1	5	0	.	0	ETX	BCC
	4DH	31H	30H	31H	20H	20H	31H	35H	30H	2EH	30H	03H	

Hexadecimal numbers

BCC = 4DH ⊕ 31H ⊕ 30H ⊕ 31H ⊕ 20H ⊕ 20H ⊕ 31H ⊕ 35H ⊕ 30H ⊕ 2EH ⊕ 30H ⊕ 03H = 54H
(⊕: *Exclusive OR*)
Value of BCC becomes 54H

(4) EOT send (Ending data transmission from the SRZ unit)

In the following cases, the SRZ unit sends EOT to terminate the data link:

- When the specified identifier is invalid
- When there is an error in the data format
- When all the data has been sent
- When the module that relates to the identifier is not connected

(5) No response from the SRZ unit

The SRZ unit will not respond if the polling address is not received correctly. It may be necessary for the host computer to take corrective action such as a time-out.

(6) ACK (Acknowledgment)

An acknowledgment ACK is sent by the host computer when data received is correct. When the SRZ unit receives ACK from the host computer, the SRZ unit will send any remaining data of the next identifier without additional action from the host computer. When host computer determines to terminate the data link, EOT is sent from the host computer.

- When ACK is received after ETX and BCC are sent, the next identifier data is sent according to the order of the communication data list.
- When ACK is received after ETB and BCC are sent, the data after ETB is sent.

(7) NAK (Negative acknowledge)

If the host computer does not receive correct data from the SRZ unit, it sends a negative acknowledgment NAK to the SRZ unit. The SRZ unit will re-send the same data when NAK is received. This cycle will go on continuously until either recovery is achieved or the data link is corrected at the host computer.
If the host computer sends NAK after the SRZ unit performs ETB block transmission, the SRZ unit will resend from the identifier.

(8) No response from host computer

When the host computer does not respond within approximately three seconds after the SRZ unit sends data, the SRZ unit sends EOT to terminate the data link (time-out time: about 3 seconds).

(9) Indefinite response from host computer

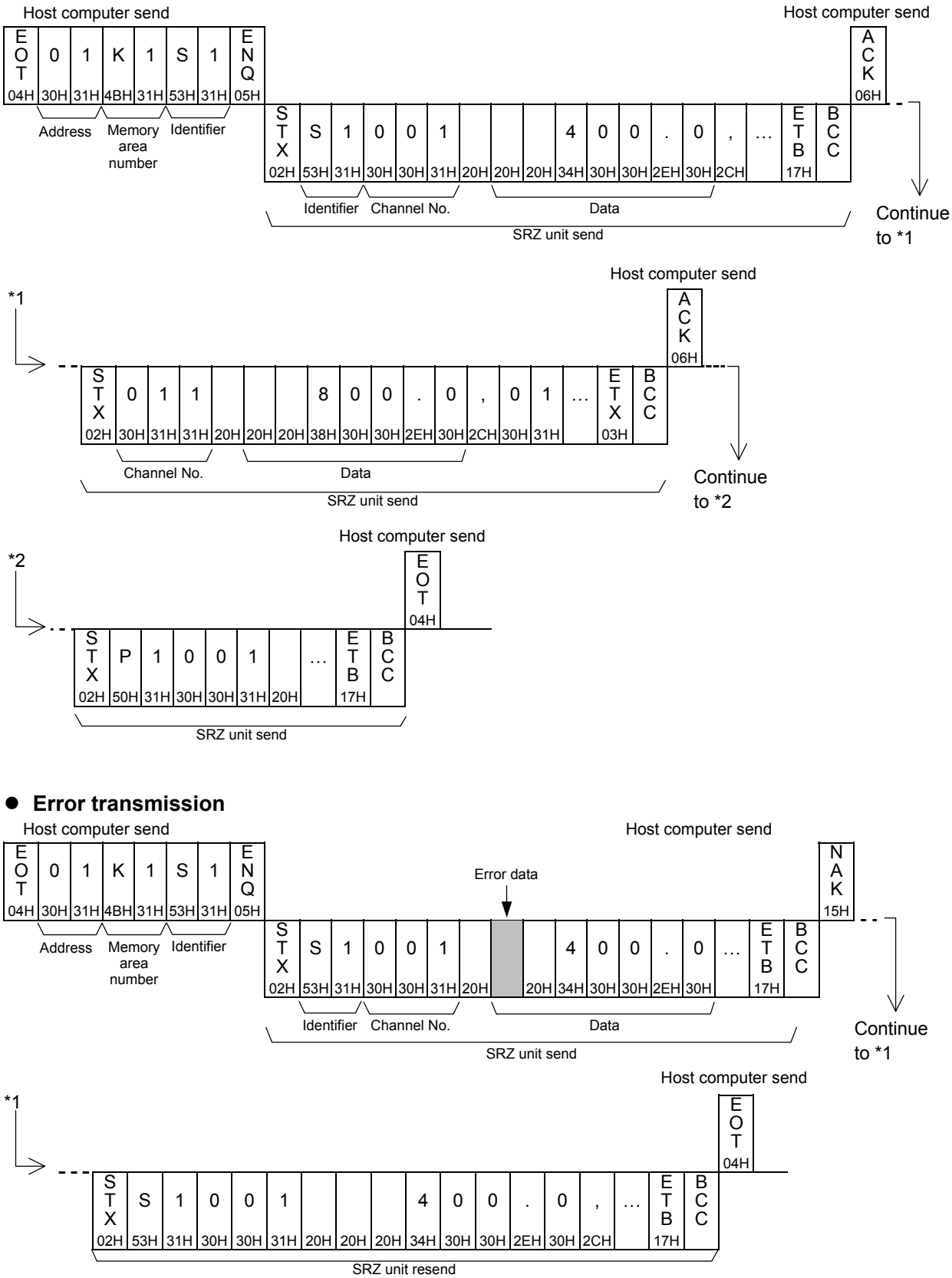
The SRZ unit sends EOT to terminate the data link when the host computer response is indefinite.

(10) EOT (Data link termination)

The host computer sends EOT message when it is necessary to suspend communication with the SRZ unit or to terminate the data link due lack of response from the SRZ unit.

■ Polling procedure example (When the host computer requests data)

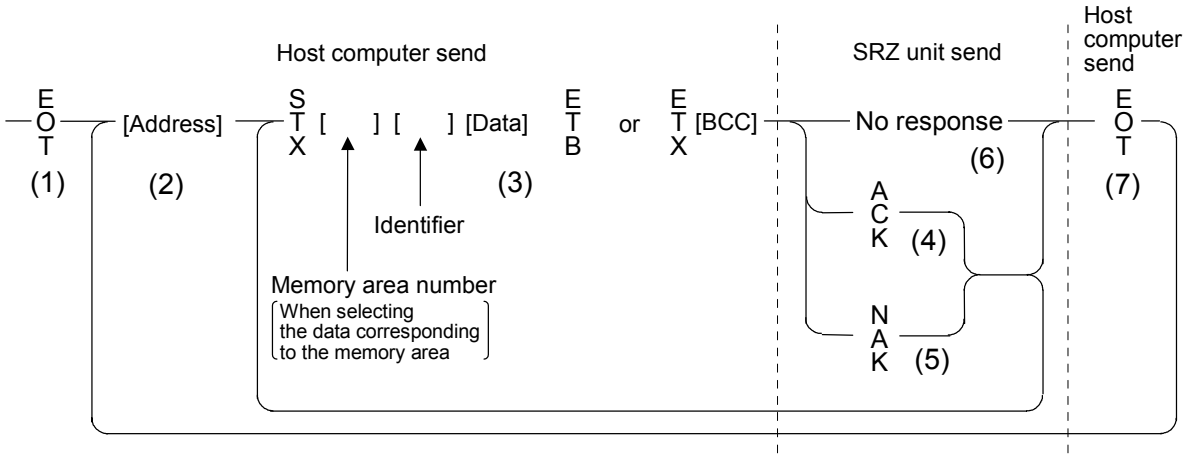
● Normal transmission



● Error transmission

6.4.2 Selecting procedures

Selecting is the action where the host computer requests one of the connected SRZ units to receive data. An example of the selecting procedure is shown below:



(1) Data link initialization

Host computer sends EOT to the SRZ unit to initiate data link before selecting sequence.

(2) Sending selecting address from the host computer

Host computer sends selecting address for the selecting sequence.

Address (2 digits):
This data is a unit address of the SRZ to be selected and must be the same as the unit address set value in item **3.2.1 SRZ unit address setting (P. 3-3).**

As long as the data link is not initialized by sending or receiving EOT, the selecting address once sent becomes valid.

(3) Data sent from the host computer

The host computer sends data for the selecting sequence with the following format:

- When no memory area number is specified

STX	Identifier	Data	ETB	BCC

or

STX	Identifier	Data	ETX	BCC

- When the memory area number is specified

STX	Memory area number	Identifier	Data	ETB	BCC

or

STX	Memory area number	Identifier	Data	ETX	BCC

☞ For the STX, Memory area number Identifier, Data, ETB, ETX and BCC, see **6.4.1 Polling procedures (P. 6-17).**.

🕮 If the length of send data (from STX to BCC) exceeds 128 bytes, it is divided into blocks by ETB. In this case, the succeeding divided data is sent after STX.

🕮 Area soak time set data as the following:

- When data range is 0 hour 00 minute to 99 hours 59 minutes:
  Data range is 0:00 to 99:59, punctuation of time unit is expressed in colon ": (3AH)."
- When data range is 0 minute 00 second to 199 minutes 59 seconds:
  Data range is 0:00 to 199.59, punctuation of time unit is expressed in colon ": (3AH)."

In addition to above, when minute and second data are set in more than 60, become as the following:

Example: 1:65 (1 hour 65 minutes) → 2:05 (2 hours 05 minutes)
0:65 (0 minute 65 seconds) → 1:05 (1 minute 05 seconds)

🕮 About numerical data:

The data that receipt of letter is possible

- Data with numbers below the decimal point omitted or zero-suppressed data can be received.
  (Number of digits: Within 7 digits)
  <Example> When data send with −001.5, −01.5, −1.5, −1.50, −1.500 at the time of −1.5, SRZ unit can receive a data.

- When the host computer sends data with decimal point to item of without decimal point, the SRZ unit receives a message with the value that cut off below the decimal point.
  <Example> When setting range is 0 to 200, the SRZ unit receives as a following.

Send data	0.5	100.5
Receive data	0	100

- The SRZ unit receives value in accordance with decided place after the decimal point. The value below the decided place after the decimal point is cut off.
  <Example> When setting range is −10.00 to +10.00, the controller receives as a following.

Send data	−.5	−.058	.05	−0
Receive data	−0.50	−0.05	0.05	0.00

The data that receipt of letter is impossible

The SRZ unit sends NAK when received a following data.

+	Plus sign and the data that gained plus sing
−	Only minus sign (there is no figure)
−.	Only minus sign and decimal point (period)

(4) ACK (Acknowledgment)

An acknowledgment ACK is sent by the SRZ unit when data received is correct. When the host computer receives ACK from the SRZ unit, the host computer will send any remaining data. If there is no more data to be sent to the SRZ unit, the host computer sends EOT to terminate the data link.

(5) NAK (Negative acknowledge)

If the SRZ unit does not receive correct data from the host computer, it sends a negative acknowledgment NAK to the host computer. Corrections, such as re-send, must be made at the host computer.

The send conditions of NAK (after reception of ETX or BCC)

- When an error occurs on communication the line (parity, framing error, etc.)
- When a BCC check error occurs
- When the specified identifier is invalid
- When receive data exceeds the setting range
- When receive data is the identifier of RO (read only)
- When the module related to the identifier received by the SRZ is not connected

The send conditions of NAK (after reception of ETB or BCC)

- When a BCC check error occurs

(6) No response from SRZ unit

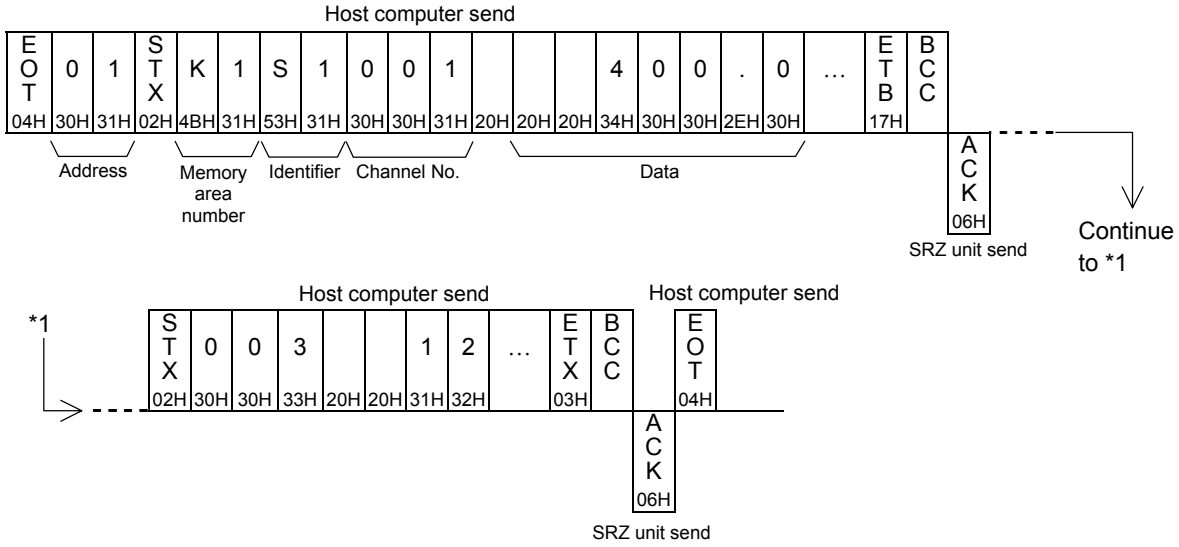
The SRZ unit does not respond when it can not receive the selecting address, STX, ETB, ETX or BCC.

(7) EOT (Data link termination)

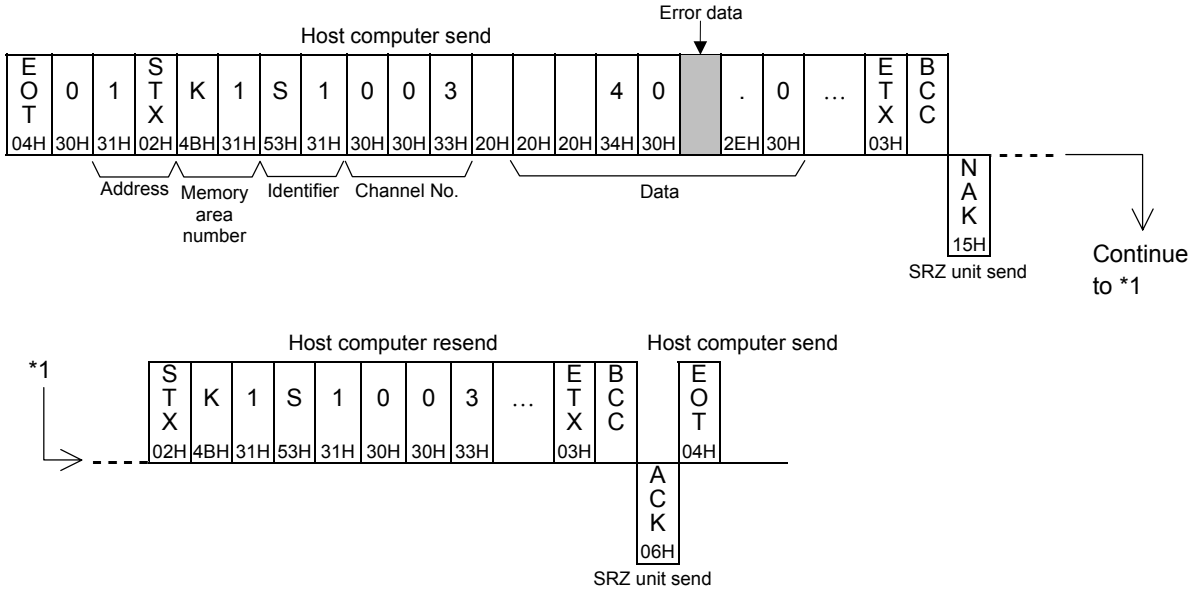
The host computer sends EOT when there is no more data to be sent from the host computer or there is no response from the SRZ unit.

■ Selecting procedure example (when the host computer sends data)

● Normal transmission



● Error transmission



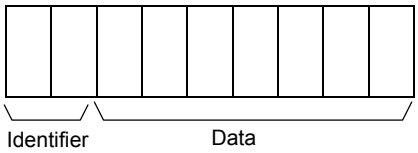
6.4.3 Communication data structure

■ Data description

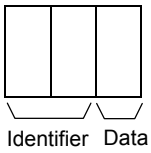
Part of the data above is shown below.

● Data for each unit (Without channel)

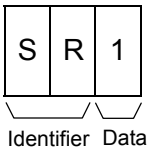
Data length 7 digits



Data length 1 digit

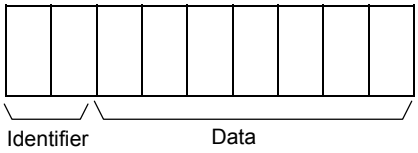


Example) Data structure for control RUN/STOP switching in each SRZ unit

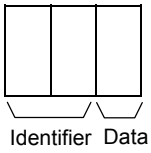


● Data for each module

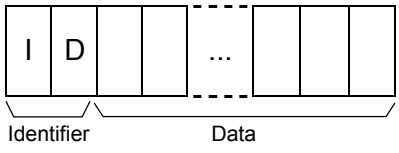
Data length 7 digits



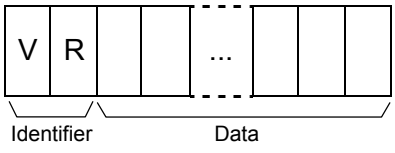
Data length 1 digit



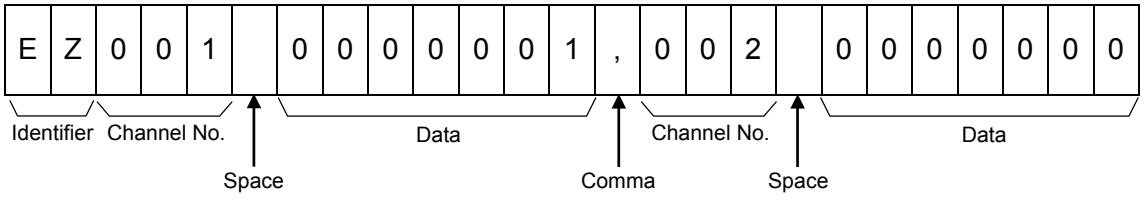
Data length 32 digits (Model code)



Data length 8 digits (ROM version)



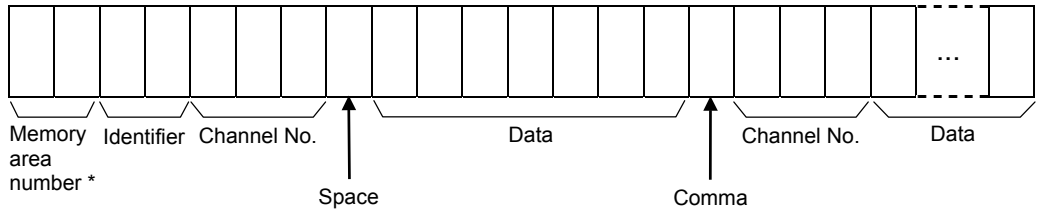
Example) Data structure of error codes of TIO and DIO modules



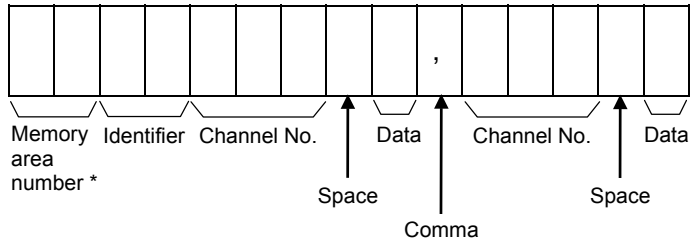
☞ For the calculation method of the channel number, see **6.4.4 Channel number of communication (P. 6-29).**

- **Data for each channel**

Data length 7 digits

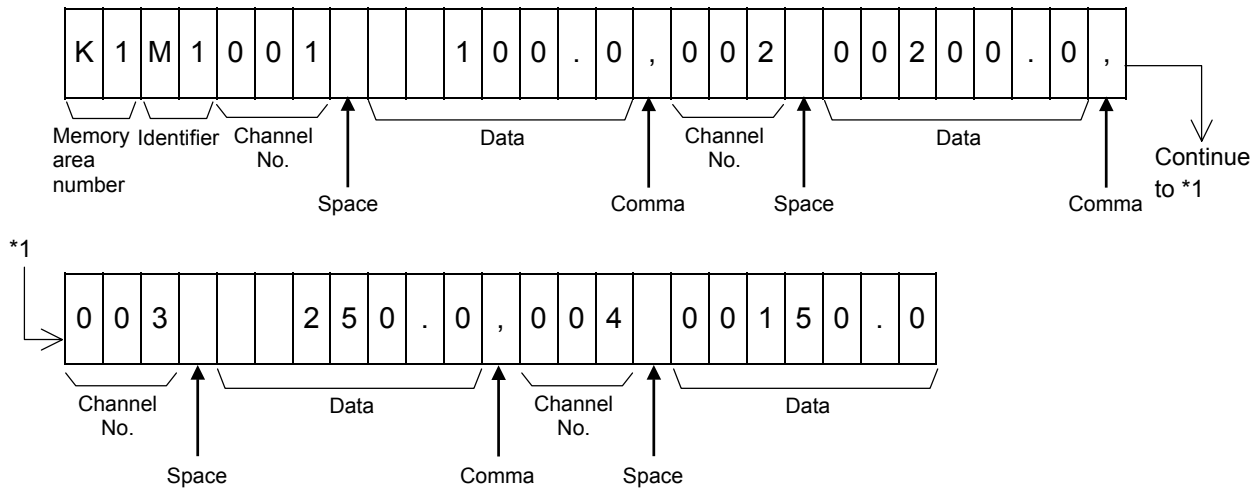


Data length 1 digit



* To select data corresponding to a memory area, specify the number of the appropriate memory area.
If a memory area number is specified for data that does not correspond to a memory area, the specification will be invalid.

Example) Data configuration of measured value (PV) of Z-TIO module



☞ For the calculation method of the channel number, see **6.4.4 Channel number of communication (P. 6-29).**

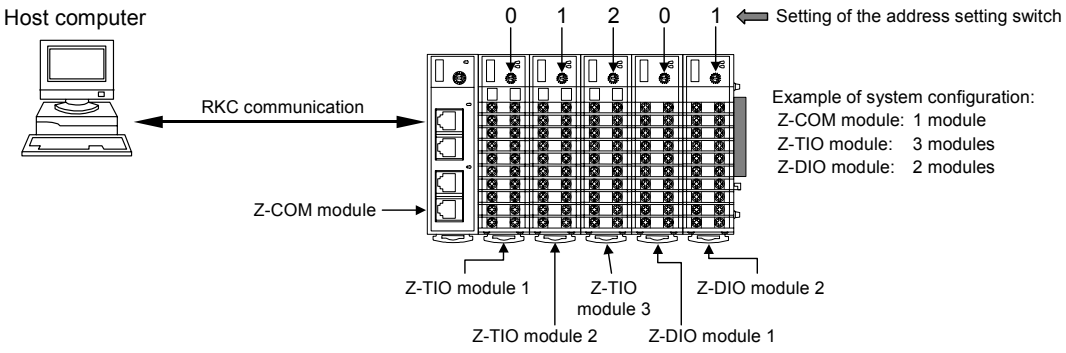
6.4.4 Channel number of communication

The channel numbers for handling communication data consist of the following three types.

- Data for each module (Communication data common to all modules)
  This includes error codes (identifier: EZ) for each Z-TIO and Z-DIO module and integrated operating time monitors (identifier: UV).
- Data for each module (Communication data particular to one module)
  This includes digital input (DI) state 1 (identifier: L1) and DO manual output 1 (identifier: Q4) of a Z-DIO module.
- Data for each channel
  Measured values (PV) (identifier: M1) of a Z-TIO module, event 1 set values (identifier: A1), and other data.

■ Calculation method of the channel number

The method of calculating the channel number is explained below using the example of an SRZ unit configuration.



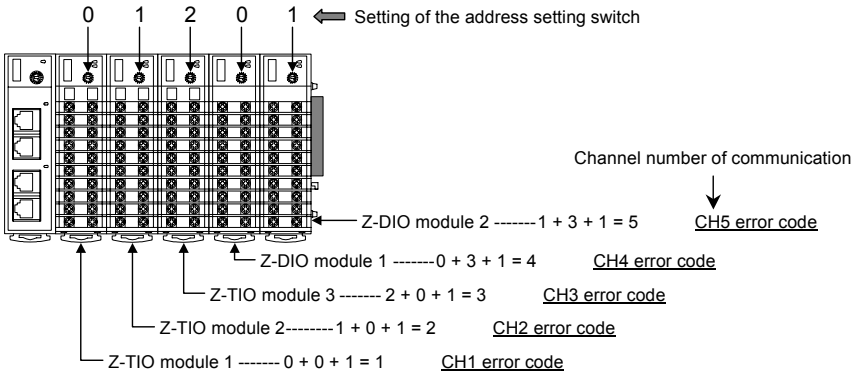
(1) Data for each module (Communication data common to all modules)

Computing equation:
Channel number of communication = Setting of the address setting switch + Offset value + 1

Offset value:
- Offset value of Z-TIO module: 0
- Offset value of Z-DIO module: Value of number of connected modules (Z-TIO module) [Identifier: QY]*

  * If the number of connected modules (Z-TIO modules) (identifier: QY) is not updated to the most recent number, it will not be possible to calculate the correct channel number.

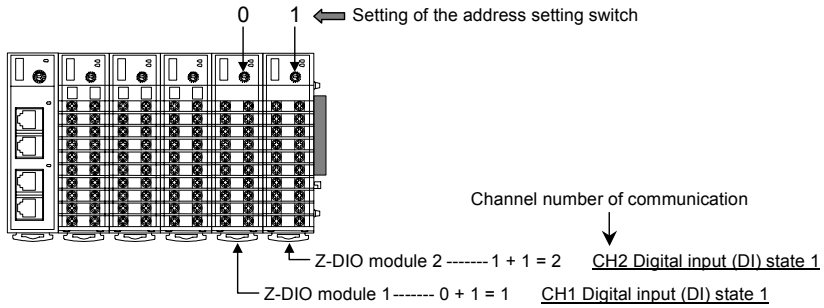
Example) Channel number of error code (Identifier: EZ) of Z-TIO/Z-DIO module



(2) Data for each module (Communication data particular to one module)

Computing equation:
Channel number of communication = Setting of the address setting switch + 1

Example) Channel number of digital input (DI) state 1 (Identifier: L1) of Z-DIO module



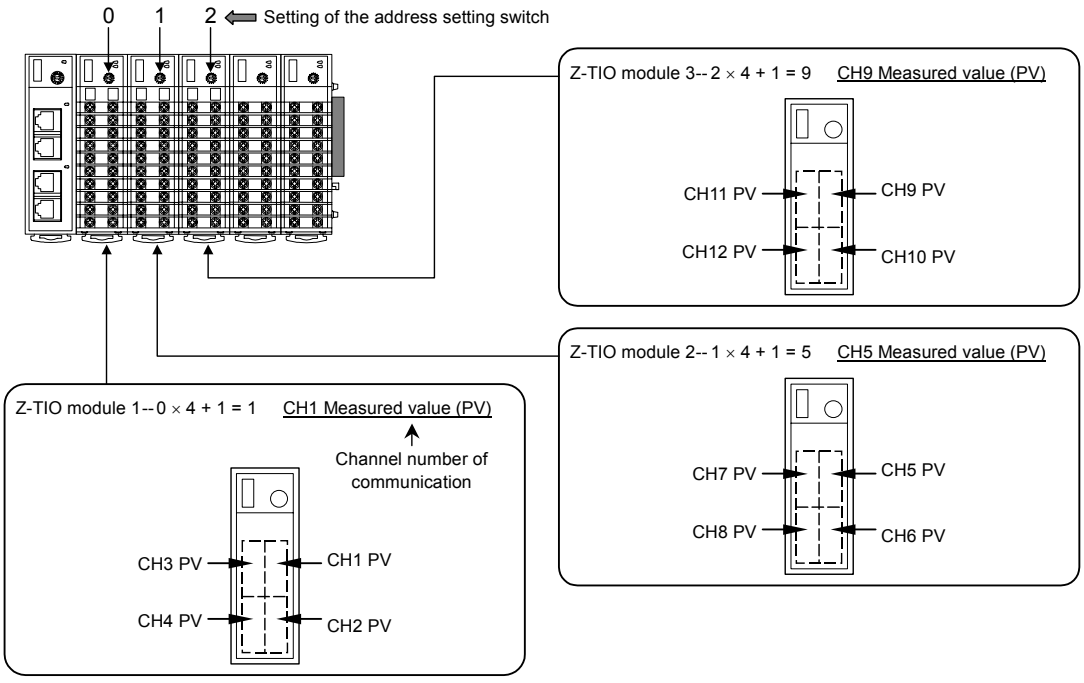
(3) Data for each channel

Computing equation:
Channel number of communication =
Setting of the address setting switch × Maximum channel number of the functional module + 1

Maximum channel number of the functional module:

- Maximum channel number of Z-TIO module: 4
- Maximum channel number of Z-DIO module: 8

Example) Channel number of measured value (PV) (Identifier: M1) of Z-TIO module



6.4.5 RKC communication data list

■ Reference to communication data list

(1) No.	(1) Name	(2) Identifier	(3) Digits	(4) Attribute	(5) Structure	(6) Data range	(7) Factory set value
1	Model code (Z-COM module)	ID	32	RO	M	Model code (character)	—

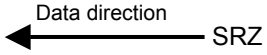
(1) Name: Communication data name

(2) Identifier: Communication identifier of RKC communication

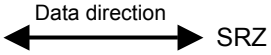
(3) Digits: The number of communication data digits in RKC communication

(4) Attribute: A method of how communication data items are read or written when viewed from the host computer is described

RO: Read only data



R/W: Read and Write data



(5) Structure: C: Data for each channel [1, 2] M: Data for each module
U: Data for each SRZ unit

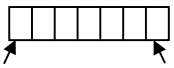
[1] On a two-channel type (Z-TIO module), there is no communication data for the 3rd and 4th channels.

[2] When heat/cool control or position proportioning control is performed, there will be communication data (indicated by ♣ in the name column) for which the 2nd channel and 4th channel of the Z-TIO module will be invalid. [Read is possible (0 is shown), but the result of Write is disregarded.]

☞ For the data structure, see **6.4.3 Communication data structure (P. 6-27).**

(6) Data range: Read or Write range of communication data

ASCII code data (Example: 7 digits)



Most significant digit ····· Least significant digit

(7) Factory set value: Factory set value of communication data

Some of the communication data of the Z-COM module will not be enabled until the power is turned on again, or control is switched from STOP to RUN.

Communication data No. 19 to 39

Communication data of the Z-TIO/Z-DIO module includes both "Normal setting data" and "Engineering setting data." During RUN (control), the attribute of engineering setting data is RO. To configure engineering setting data, the RUN/STOP switch must be set to STOP (control stopped).

Z-TIO module: Normal setting data No. 1 to 79
Engineering setting data No. 80 to 201

Z-DIO module: Normal setting data No. 1 to 11
Engineering setting data No. 12 to 25

The Engineering setting data should be set according to the application before setting any parameter related to operation. Once the Engineering setting data are set correctly, those datas are 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 Engineering setting.

■ Communication data of Z-COM module

The communication data below is for PLC communication.

- No. 11 to 15: System data (monitoring item) for PLC communication
- No. 27 to 35, No. 37: System data (setting item) for PLC communication

☞ For the communication data of Z-COM module, see **Chapter 8 COMMUNICATION DATA DESCRIPTION (P. 8-1)**.

No.	Name	Identifier	Digits	Attribute	Structure	Data range	Factory set value
1	Model code (Z-COM module)	ID	32	RO	M	Model code (character)	—
2	Model code (Functional module)	IE	32	RO	M	Model code (character)	—
3	ROM version (Z-COM module)	VR	8	RO	M	ROM version	—
4	ROM version (Functional module)	VQ	8	RO	M	ROM version	—
5	Integrated operating time monitor (Z-COM module)	UT	7	RO	M	0 to 19999 hours	—
6	Integrated operating time monitor (Functional module)	UV	7	RO	M	0 to 19999 hours	—
7	Error code (Z-COM module)	ER	7	RO	U	1: Adjustment data error 2: Data back-up error 4: A/D conversion error 32: Logic output data error 64: Program error (stack) * 128: Watchdog timer error * Error condition is shown by the *OR* of each module. When multiple errors occur, the error No. is the sum value. * Error code of the Z-COM module	—
8	Error code (Functional module)	EZ	7	RO	M	1: Adjustment data error 2: Data back-up error 4: A/D conversion error 32: Logic output data error Error condition is shown by each module. When multiple errors occur, the error No. is the sum value.	—
9	Backup memory state monitor (Z-COM module)	EM	1	RO	M	0: The content of the backup memory does not coincide with that of the RAM. 1: The content of the backup memory coincides with that of the RAM.	—
10	Backup memory state monitor (Functional module)	CZ	1	RO	M	0: The content of the backup memory does not coincide with that of the RAM. 1: The content of the backup memory coincides with that of the RAM.	—
11	System communication state	QM	1	RO	U	Bit data b0: Data collection condition b1 to b15: Unused Data 0: Before data collection is completed 1: Data collection is completed [Decimal number: 0, 1]	—
12	SRZ normal communication flag	QL	1	RO	U	0/1 transfer (For communication checking) "0" and "1" are repeated for each communication period.	—

Continued on the next page.

Continued from the previous page.

No.	Name	Identifier	DIgits	Attribute	Structure	Data range	Factory set value
13	PLC communication error code	ES	7	RO	U	Bit data b0: PLC register read/write error b1: Slave communication timeout b2: Unused b3: Internal communication error b4: Master communication timeout b5 to b15: Unused Data 0: OFF 1: ON [Decimal number: 0 to 31]	—
14	Unit recognition flag	QN	7	RO	U	Bit data b0: SRZ unit 1 b1: SRZ unit 2 b2: SRZ unit 3 b3: SRZ unit 4 b4 to b15: Unused Data 0: No unit exists 1: Unit exists [Decimal number: 0 to 15]	—
15	Monitor for the number of connected modules	QK	7	RO	U	0 to 31	—
16	RUN/STOP transfer (Each unit)	SR	1	R/W	U	0: STOP (Control stop) 1: RUN (Control start)	0
17	RUN/STOP transfer (Each module)	SW	1	R/W	M	0: STOP (Control stop) 1: RUN (Control start)	0
18	Control RUN/STOP holding setting	X1	1	R/W	M	0: Not holding (STOP start) 1: Holding (RUN/STOP hold)	1
The following items are enabled when the power is turned on again or when control is changed from STOP to RUN.							
19	Communication 1 protocol	VK	1	R/W	U	0: RKC communication 1: Modbus	0
20	Communication 1 communication speed	VL	1	R/W	U	0: 4800 bps 2: 19200 bps 1: 9600 bps 3: 38400 bps	2
21	Communication 1 data bit configuration	VM	7	R/W	U	0 to 5 See **Table 1 (Data bit configuration)**	0
22	Communication 1 interval time	VN	7	R/W	U	0 to 250 ms	10
23	Communication 2 protocol	VP	1	R/W	U	0: RKC communication 1: Modbus 2: MITSUBISHI MELSEC series special protocol A compatible, 1C frame (type 4), AnA/AnUCPU common command (QR/QW), AnA/QnA series, Q series QnA compatible, 3C frame (type 4), command (0401/1401) Only ZR register 3: OMRON SYSMAC series special protocol 4: MITSUBISHI MELSEC series special protocol A compatible, 1C frame (type 4), ACPU common command (WR/WW) (A series, FX2N/FX2NC series, FX3U/FX3UC series)	0
24	Communication 2 communication speed	VU	1	R/W	U	0: 4800 bps 2: 19200 bps 1: 9600 bps 3: 38400 bps	2
25	Communication 2 data bit configuration	VW	7	R/W	U	0 to 11 See **Table 1 (Data bit configuration)**	0

Table1: Data bit configuration

Set value	Data bit	Parity bit	Stop bit
0	8	Without	1
1	8	Even	1
2	8	Odd	1
3	7	Without	1
4	7	Even	1
5	7	Odd	1

Set value	Data bit	Parity bit	Stop bit
6	8	Without	2
7	8	Even	2
8	8	Odd	2
9	7	Without	2
10	7	Even	2
11	7	Odd	2

Continued on the next page.

Continued from the previous page.

No.	Name	Identifier	Digits	Attribute	Structure	Data range	Factory set value
26	Communication 2 interval time	VX	7	R/W	U	0 to 250 ms	10
27	Station number	QV	7	R/W	U	0 to 31	0
28	PC number (CPU No.)	QW	7	R/W	U	0 to 255 Only set when connected to Mitsubishi's MELSEC Series.	255
29	Register type	QZ	7	R/W	U	MITSUBISHI MELSEC series 0: D register (Data register) 1: R register (File register) 2: W register (Link register) 3: ZR register (Method of specifying consecutive numbers when 32767 of R register is exceeded.) Only enabled when the "QnA compatible 3C frame" is used. 4 to 29: Unused OMRON SYSMAC series 0: DM register (Data memory) 1 to 9: Unused 10 to 22: EM register (Extended data memory) [Specify the bank No.] [Specify the bank No.+10] 23 to 28: Unused 29: EM register (Extended data memory) [Specify the current bank]	0
30	Register start number (High-order 4 bit)	QS	7	R/W	U	0 to 15: QnA compatible 3C frame	0
31	Register start number (Low-order 16 bit)	QX	7	R/W	U	0 to 9999: A compatible, 1C frame, ACPU common command (WR/WW), OMRON SYSMAC series 0 to 65535: A compatible, 1C frame, AnA/AnUCPU common command (QR/QW), QnA compatible 3C frame, command (0401/1401)	1000
32	System data address bias	QQ	7	R/W	U	0 to 65535	2100
33	COM module link recognition time	QT	7	R/W	U	0 to 255 seconds	10
34	PLC scanning time	VT	7	R/W	U	0 to 3000 ms	255
35	PLC communication start time	R5	7	R/W	U	1 to 255 seconds	5
36	Method for setting the number of connected modules	RY	7	R/W	U	0: Does nothing 1: The maximum number of connected modules for functional modules is automatically set only when the power is turned ON. 2: The maximum number of connected modules for functional modules is automatically set when the number of connected modules is changed.	1
37	Slave mapping method	RK	7	R/W	U	0: Bias from the address setting switch [Register address + (Address setting switch%4) × System data address bias] 1: Bias disabled	0
38	Number of connected modules (Z-TIO module)	QY	7	R/W	U	0 to 16 This is the maximum address of the Z-TIO module that is connected to the Z-COM module.	—
39	Number of connected modules (Z-DIO module)	QU	7	R/W	U	0 to 16 This is the maximum address of the Z-DIO module that is connected to the Z-COM module.	—

■ Communication data of Z-TIO module

☞ For details of Z-TIO module communication data, see **SRZ Instruction Manual (IMS01T04-E□)**.

No.	Name	Identifier	Digits	Attribute	Structure	Data range	Factory set value
1	Measured value (PV)	M1	7	RO	C	Input scale low to Input scale high	—
2	Comprehensive event state	AJ	7	RO	C	Least significant digit: Event 1 state 2nd digit: Event 2 state 3rd digit: Event 3 state 4th digit: Event 4 state 5th digit: Heater break alarm state 6th digit: Temperature rise completion 7th digit: Burnout Data 0: OFF 1: ON	—
3	Operation mode state monitor	L0	7	RO	C	Least significant digit: Control STOP 2nd digit: Control RUN 3rd digit: Manual mode * 4th digit: Remote mode * 5th digit to Most significant digit: Unused Data 0: OFF 1: ON * During operation in manual mode, the manual mode of the operation mode state monitor is set to the "1: ON" state and the remote mode of the same monitor is se to the "0: OFF" state even if the parameter, "Remote/Local transfer" is set to "1: Remote mode."	—
4	Manipulated output value (MV) monitor [heat-side] ♣	O1	7	RO	C	PID control or heat/cool PID control: −5.0 to +105.0 % Position proportioning control with feedback resistance (FBR) input: 0.0 to 100.0 %	—
5	Manipulated output value (MV) monitor [cool-side] ♣	O2	7	RO	C	−5.0 to +105.0 %	—
6	Current transformer (CT) input value monitor	M3	7	RO	C	CTL-6-P-N: 0.0 to 30.0A CTL-12-S56-10L-N: 0.0 to 100.0 A	—
7	Set value (SV) monitor	MS	7	RO	C	Setting limiter (low) to Setting limiter (high)	—
8	Remote setting (RS) input value monitor	S2	7	RO	C	Setting limiter (low) to Setting limiter (high)	—
9	Burnout state monitor	B1	1	RO	C	0: OFF 1: ON	—
10	Event 1 state monitor	AA	1	RO	C	0: OFF 1: ON	—
11	Event 2 state monitor	AB	1	RO	C		—
12	Event 3 state monitor	AC	1	RO	C		—
13	Event 4 state monitor	AD	1	RO	C		—
14	Heater break alarm (HBA) state monitor	AE	1	RO	C	0: OFF 1: ON	—
15	Output state monitor	Q1	7	RO	M	Least significant digit: OUT1 2nd digit: OUT2 3rd digit: OUT3 4th digit: OUT4 5th digit to Most significant digit: Unused Data 0: OFF 1: ON When control output is specified, this function is available only for a proportioning control.	—

Continued on the next page.

Continued from the previous page.

No.	Name	Identifier	DIgits	Attribute	Structure	Data range	Factory set value
16	Memory area soak time monitor	TR	7	RO	C	0 minutes 00 seconds to 199 minutes 59 seconds: 0:00 to 199:59 (min:sec) 0 hours 00 minutes to 99 hours 59 minutes: 0:00 to 99:59 (hrs:min) Data range of Area soak time can be selected on the Soak time unit	—
17	Holding peak value ambient temperature monitor	Hp	7	RO	C	−10.0 to +100.0 °C (14.0 to 212.0 °F)	—
18	Logic output monitor 1	ED	7	RO	M	Least significant digit: Logic output 1 2nd digit: Logic output 2 3rd digit: Logic output 3 4th digit: Logic output 4 5th digit to Most significant digit: Unused Data 0: OFF 1: ON	—
19	Logic output monitor 2	EE	7	RO	M	Least significant digit: Logic output 5 2nd digit: Logic output 6 3rd digit: Logic output 7 4th digit: Logic output 8 5th digit to Most significant digit: Unused Data 0: OFF 1: ON	—
20	PID/AT transfer	G1	1	R/W	C	0: PID control 1: Autotuning (AT)	0
21	Auto/Manual transfer	J1	1	R/W	C	0: Auto mode 1: Manual mode	0
22	Remote/Local transfer	C1	1	R/W	C	0: Local mode 1: Remote mode When performing remote control by remote setting input andalso performing cascade control and ratio setting, transfer to the Remote mode.	0
23	Memory area transfer	ZA	7	R/W	C	1 to 8	1
24	Interlock release	AR	1	R/W	C	0: Normal state 1: Interlock release execution	0
25	Event 1 set value ★	A1	7	R/W	C	Deviation action, Deviation action between channels, Temperature rise completion range: −Input span to +Input span Process action, SV action: Input scale low to Input scale high MV action: −5.0 to +105.0 % If the Event type corresponds to "0: None," set to RO (Only reading data is possible). When temperature rise completion is selected at Event 3 action type. If Event 4 corresponds to "9: Control loop break alarm (LBA)," the Event 4 set value becomes RO (Only reading data is possible).	50
26	Event 2 set value ★	A2	7	R/W	C		50
27	Event 3 set value ★	A3	7	R/W	C		50
28	Event 4 set value ★	A4	7	R/W	C		50
29	Control loop break alarm (LBA) time ★	A5	7	R/W	C	0 to 7200 seconds (0: Unused) If Event 4 is other than "9: Control loop break alarm (LBA)," set to RO (Only reading data is possible).	480
30	LBA deadband ★	N1	7	R/W	C	0 (0.0) to Input span If Event 4 is other than "9: Control loop break alarm (LBA)," set to RO (Only reading data is possible).	0 (0.0)
31	Set value (SV) ★	S1	7	R/W	C	Setting limiter (low) to Setting limiter (high)	TC/RTD input: 0 °C [°F] V/I input: 0.0 %

★: Parameters which can be used in multi-memory area function

Continued on the next page.

Continued from the previous page.

No.	Name	Identifier	DIgits	Attribute	Structure	Data range	Factory set value
32	Proportional band [heat-side] ★ ♣	P1	7	R/W	C	TC/RTD inputs: 0 (0.0) to Input span (Unit: °C [°F]) Varies with the setting of the decimal point position selection. Voltage (V)/current (I) inputs: 0.0 to 1000.0 % of Input span 0 (0.0): ON/OFF action (ON/OFF action for both heat and cool actions in case of a heat/cool control type.)	TC/RTD: 30 V/I: 30.0
33	Integral time [heat-side] ★ ♣	I1	7	R/W	C	PID control or heat/cool PID control: 0 to 3600 seconds or 0.0 to 1999.9 seconds (0, 0.0: PD action) Position proportioning control: 1 to 3600 seconds or 0.1 to 1999.9 seconds Varies with the setting of the integral/derivative time decimal point position selection.	240
34	Derivative time [heat-side] ★ ♣	D1	7	R/W	C	0 to 3600 seconds or 0.0 to 1999.9 seconds (0, 0.0: PI action) Varies with the setting of the integral/derivative time decimal point position selection.	60
35	Control response parameter ★ ♣	CA	1	R/W	C	0: Slow 1: Medium 2: Fast P or PD action: 2 (Fast) fixed	PID control, Position proportioning control: 0 Heat/cool PID control: 2
36	Proportional band [cool-side] ★ ♣	P2	7	R/W	C	TC/RTD inputs: 1 to Input span or 0.1 to Input span (Unit: °C [°F]) Varies with the setting of the decimal point position selection. Voltage (V)/current (I) inputs: 0.1 to 1000.0 % of Input span If control is other than heat/cool PID control, set to RO (Only reading data is possible).	TC/RTD: 30 V/I: 30.0
37	Integral time [cool-side] ★ ♣	I2	7	R/W	C	0 to 3600 seconds or 0.0 to 1999.9 seconds (0, 0.0: PD action) Varies with the setting of the integral/derivative time decimal point position selection. If control is other than heat/cool PID control, set to RO (Only reading data is possible).	240
38	Derivative time [cool-side] ★ ♣	D2	7	R/W	C	0 to 3600 seconds or 0.0 to 1999.9 seconds (0, 0.0: PI action) Varies with the setting of the integral/derivative time decimal point position selection. If control is other than heat/cool PID control, set to RO (Only reading data is possible).	60
39	Overlap/Deadband ★ ♣	V1	7	R/W	C	TC/RTD inputs: −Input span to +Input span (Unit: °C [°F]) Voltage (V)/current (I) inputs: −100.0 to +100.0 % of Input span Minus (−) setting results in overlap. However, the overlapping range is within the proportional range. If control is other than heat/cool PID control, set to RO (Only reading data is possible).	0

★: Parameters which can be used in multi-memory area function

Continued on the next page.

Continued from the previous page.

No.	Name	Identifier	DIgits	Attribute	Structure	Data range	Factory set value
40	Manual reset ★	MR	7	R/W	C	–100.0 to +100.0 % If the integral function is valid, set to RO (Only reading data is possible). When integral action (heating or cooling side) is zero, manual reset value is added to the control output.	0.0
41	Setting change rate limiter (up) ★	HH	7	R/W	C	0 (0.0) to Input span/unit time * 0 (0.0): Unused	0 (0.0)
42	Setting change rate limiter (down) ★	HL	7	R/W	C	* Unit time: 60 seconds (factory set value)	0 (0.0)
43	Area soak time ★	TM	7	R/W	C	0 minutes 00 seconds to 199 minutes 59 seconds: 0:00 to 199:59 (min:sec) 0 hours 00 seconds to 99 hours 59 minutes: 0:00 to 99:59 (hrs:min) Data range of Area soak time can be selected on the Soak time unit.	0:00
44	Link area number ★	LP	7	R/W	C	0 to 8 (0: No link)	0
45	Heater break alarm (HBA) set value	A7	7	R/W	C	When CT is CTL-6-P-N: 0.0 to 30.0 A (0.0: Not used) When CT is CTL-12-S56-10L-N: 0.0 to 100.0 A (0.0: Not used) If there is no current transformer (CT) or CT is assigned to "0: None," set to RO (Only reading data is possible).	0.0
46	Heater break determination point	NE	7	R/W	C	0.0 to 100.0 % of HBA set value (0.0: Heater break determination is invalid) If there is no current transformer (CT) or CT is assigned to "0: None," set to RO (Only reading data is possible). If Heater break alarm (HBA) corresponds to "0: Type A," set to RO (Only reading data is possible).	30.0
47	Heater melting determination point	NF	7	R/W	C	0.0 to 100.0 % of HBA set value (0.0: Heater melting determination is invalid)) If there is no current transformer (CT) or CT is assigned to "0: None," set to RO (Only reading data is possible). If Heater break alarm (HBA) corresponds to "0: Type A," set to RO (Only reading data is possible).	30.0
48	PV bias	PB	7	R/W	C	–Input span to +Input span	0
49	PV digital filter	F1	7	R/W	C	0.0 to 100.0 seconds (0.0: Unused)	0.0
50	PV ratio	PR	7	R/W	C	0.500 to 1.500	1.000
51	PV low input cut-off	DP	7	R/W	C	0.00 to 25.00 % of input span If the Square root extraction corresponds to "0: Unused," set to RO (Only reading data is possible).	0.00
52	RS bias *	RB	7	R/W	C	–Input span to +Input span	0
53	RS digital filter *	F2	7	R/W	C	0.0 to 100.0 seconds (0.0: Unused)	0.0
54	RS ratio *	RR	7	R/W	C	0.001 to 9.999	1.000
55	Output distribution selection	DV	1	R/W	C	0: Control output 1: Distribution output	0
56	Output distribution bias	DW	7	R/W	C	–100.0 to +100.0 %	0.0
57	Output distribution ratio	DQ	7	R/W	C	–9.999 to +9.999	1.000

* Data on RS bias, RS ratio and RS digital filter is that in cascade control or ratio setting.

★: Parameters which can be used in multi-memory area function

Continued on the next page.

Continued from the previous page.

No.	Name	Identifier	DIgits	Attribute	Structure	Data range	Factory set value
58	Proportional cycle time	T0	7	R/W	C	0.1 to 100.0 seconds This item becomes RO (Only reading data is possible) for the voltage/current output specification. This parameter is valid when "0: control output" has been selected at No.89 "Output assignment."	Relay contact output: 20.0 seconds Voltage pulse output, triac output and open collector output: 2.0 seconds
59	Minimum ON/OFF time of proportioning cycle	VI	7	R/W	C	0 to 1000 ms This item becomes RO (Only reading data is possible) for the voltage/current output specification.	0
60	Manual manipulated output value ♣	ON	7	R/W	C	PID control: Output limiter (low) to Output limiter (high) Heat/cool PID control: − Cool-side output limiter (high) to + Heat-side output limiter (high) Position proportioning control: When there is feedback resistance (FBR) input and no feedback resistance (FBR) input is disconnected: Output limiter (low) to Output limiter (high) When there is no feedback resistance (FBR) input or the feedback resistance (FBR) input is disconnected: 0: Close-side output OFF, Open-side output OFF 1: Close-side output ON, Open-side output OFF 2: Close-side output OFF, Open-side output ON	0.0
61	Area soak time stop function	RV	1	R/W	C	0: No function 1: Event 1 2: Event 2 3: Event 3 4: Event 4	0
62	EDS mode (for disturbance 1)	NG	1	R/W	C	0: No function 1: EDS function mode 2: Learning mode 3: Tuning mode EDS function: External disturbance suppression function	0
63	EDS mode (for disturbance 2)	NX	1	R/W	C		0
64	EDS value 1 (for disturbance 1)	NI	7	R/W	C	−100.0 to +100.0 %	0.0
65	EDS value 1 (for disturbance 2)	NJ	7	R/W	C		0.0
66	EDS value 2 (for disturbance 1)	NK	7	R/W	C	−100.0 to +100.0 %	0.0
67	EDS value 2 (for disturbance 2)	NM	7	R/W	C		0.0
68	EDS transfer time (for disturbance 1)	NN	7	R/W	C	0 to 3600 seconds or 0.0 to 1999.9 seconds	0
69	EDS transfer time (for disturbance 2)	NO	7	R/W	C		0
70	EDS action time (for disturbance 1)	NQ	7	R/W	C	1 to 3600 seconds	600
71	EDS action time (for disturbance 2)	NL	7	R/W	C		600
72	EDS action wait time (for disturbance 1)	NR	7	R/W	C	0.0 to 600.0 seconds	0.0
73	EDS action wait time (for disturbance 2)	NY	7	R/W	C		0.0

Continued on the next page.

Continued from the previous page.

No.	Name	Identifier	Digits	Attribute	Structure	Data range	Factory set value
74	EDS value learning times	NT	7	R/W	C	0 to 10 times (0: No learning mode)	1
75	EDS start signal	NU	1	R/W	C	0: EDS start signal OFF 1: EDS start signal ON (for disturbance 1) 2: EDS start signal ON (for disturbance 2)	0
76	Operation mode	EI	1	R/W	C	0: Unused 1: Monitor 2: Monitor + Event function 3: Control	3
77	Startup tuning (ST)	ST	1	R/W	C	0: ST unused 1: Execute once 2: Execute always The startup tuning (ST) function is activated according to the ST start condition selected. If control is position proportioning control, set to RO (Only reading data is possible).	0
78	Automatic temperature rise learning	Y8	1	R/W	C	0: Unused 1: Learning	0
79	Communication switch for logic	EF	7	R/W	M	Least significant digit: Communication switch 1 2nd digit: Communication switch 2 3rd digit: Communication switch 3 4th digit: Communication switch 4 5th digit to Most significant digit: Unused Data 0: OFF 1: ON	0
Set data No. 80 or later are for engineering setting [Writable in the STOP mode]							
80	Input type	XI	7	R/W	C	0: TC input K 1: TC input J 2: TC input R 3: TC input S 4: TC input B 5: TC input E 6: TC input N 7: TC input T 8: TC input W5Re/W26Re 9: TC input PLII 12: RTD input Pt100 13: RTD input JPt100 14: Current input 0 to 20 mA DC 15: Current input 4 to 20 mA DC 16: Voltage (high) input 0 to 10 V DC 17: Voltage (high) input 0 to 5 V DC 18: Voltage (high) input 1 to 5 V DC 19: Voltage (low) input 0 to 1 V DC 20: Voltage (low) input 0 to 100 mV DC 21: Voltage (low) input 0 to 10 mV DC 22: Feedback resistance input 100 to 150 Ω 23: Feedback resistance input 151 Ω to 6 kΩ If changed to voltage (high) input from TC/RTD/current/voltage (low)/feedback resistance input, select the hardware by the input selector switch at the side of the module. (See **SRZ Instruction Manual [IMS01T04-E□]**).	Depends on model code When not specifying: 0
81	Display unit	PU	7	R/W	C	0: °C 1: °F The engineering unit for voltage/current input is expressed as %.	0

Continued on the next page.

Continued from the previous page.

No.	Name	Identifier	Digits	Attribute	Structure	Data range	Factory set value
82	Decimal point position	XU	7	R/W	C	0: No decimal place 3: Three decimal places 1: One decimal place 4: Four decimal places 2: Two decimal places TC input: • K, J, T, E: Only 0 or 1 can be set. • R, S, B, N, PLII, W5Re/W26Re: Only 0 can be set. RTD input: Only 0 or 1 can be set. V/I inputs: From 0 to 4 can be set.	Depends on model code When not specifying: TC/RTD: 1 V/I: 1
83	Input scale high	XV	7	R/W	C	TC/RTD inputs: Input scale low to Maximum value of the selected input range Voltage (V)/current (I) inputs: –19999 to +99999 Varies with the setting of the decimal point position.	TC/RTD: Maximum value of the selected input range V/I: 100.0
84	Input scale low	XW	7	R/W	C	TC/RTD inputs: Minimum value of the selected input range to Input scale high Voltage (V)/current (I) inputs: –19999 to +99999 Varies with the setting of the decimal point position.	TC/RTD: Minimum value of the selected input range V/I: 0.0
85	Input error determination point (high)	AV	7	R/W	C	Input error determination point (low limit) to (Input range high + 5 % of Input span)	Input range high + (5 % of Input span)
86	Input error determination point (low)	AW	7	R/W	C	(Input range low – 5 % of Input span) to Input error determination point (high limit)	Input range low – (5 % of Input span)
87	Burnout direction	BS	1	R/W	C	0: Upscale 1: Downscale Valid only when the TC input and voltage (low) input are selected.	0
88	Square root extraction	XH	1	R/W	C	0: Unused 1: Used	0
89	Output assignment (Logic output selection function)	E0	1	R/W	C	0: Control output 1: Logic output result 2: FAIL output	0
90	Energized/De-energized (Logic output selection function)	NA	1	R/W	C	0: Energized 1: De-energized	0
91	Even 1 type	XA	7	R/W	C	0: None 1: Deviation high (Using SV monitor value) [1] 2: Deviation low (Using SV monitor value) [1] 3: Deviation high/low (Using SV monitor value) [1] 4: Band (Using SV monitor value) [1] 5: Process high [1] 6: Process low [1] 7: SV high 8: SV low 9: Unused 10: MV high [heat-side] [1, 2] 11: MV low [heat-side] [1, 2] 12: MV high [cool-side] [1] 13: MV low [cool-side] [1] 14: Deviation high (Using local SV) [1] 15: Deviation low (Using local SV) [1] 16: Deviation high/low (Using local SV) [1] 17: Deviation (Using local SV) [1] 18: Deviation between channels high [1] 19: Deviation between channels low [1] 20: Deviation between channels high/low [1] 21: Deviation between channels band [1] [1] Event hold action is available. [2] If there is feedback resistance (FBR) input in position proportioning control, set to the feedback resistance (FBR) input value.	Depends on model code When not specifying: 0

Continued on the next page.

Continued from the previous page.

No.	Name	Identifier	Digits	Attribute	Structure	Data range	Factory set value
92	Event 1 channel setting	FA	1	R/W	C	1: Channel 1 2: Channel 2 3: Channel 3 4: Channel 4 This function is valid when "deviation between channels" is selected.	1
93	Event 1 hold action	WA	1	R/W	C	0: OFF 1: Hold action ON (When power turned on) 2: Re-hold action ON (When power turned on and SV changed) This function is valid when input value, deviation or manipulated value action has been selected. In case of a deviation action, this function is not available while in remote mode and while setting changing rate limiter is working.	Depends on model code When not specifying: 0
94	Event 1 interlock	LF	1	R/W	C	0: Unused 1: Used	0
95	Event 1 differential gap	HA	7	R/W	C	① Deviation, process or set value, Deviation action between channels: 0 to Input span (Unit: °C [°F]) ② MV: 0.0 to 110.0 %	①: TC/RTD: 1 °C [°F] V/I: 0.1 % ②: 0.1 %
96	Event 1 delay timer	TD	7	R/W	C	0 to 18000 seconds	0
97	Force ON of Event 1 action	OA	7	R/W	C	Least significant digit: Event output turned on at input error occurrence 2nd digit: Event output turned on in manual mode 3rd digit: Event output turned on during the autotuning (AT) function is being executed 4th digit: Event output turned on during the setting change rate limiter is being operated 5th digit to Most significant digit: Unused Data 0: Invalid 1: Valid	0
98	Event 2 type	XB	7	R/W	C	0: None 1: Deviation high (SV monitor value used) [1] 2: Deviation low (SV monitor value used) [1] 3: Deviation high/low (SV monitor value used) [1] 4: Band (SV monitor value used) [1] 5: Process high [1] 6: Process low [1] 7: SV high 8: SV low 9: Unused 10: MV high [heat-side] [1, 2] 11: MV low [heat-side] [1, 2] 12: MV high [cool-side] [1] 13: MV low [cool-side] [1] 14: Deviation high (Local SV value used) [1] 15: Deviation low (Local SV value used) [1] 16: Deviation high/low (Local SV value used) [1] 17: Deviation (Local SV value used) [1] 18: Deviation between channels high [1] 19: Deviation between channels low [1] 20: Deviation between channels high/low [1] 21: Deviation between channels band [1] [1] Event hold action is available. [2] If there is feedback resistance (FBR) input in position proportioning control, set to the feedback resistance (FBR) input value.	Depends on model code When not specifying: 0

Continued on the next page.

Continued from the previous page.

No.	Name	Identifier	Digits	Attribute	Structure	Data range	Factory set value
99	Event 2 channel setting	FB	1	R/W	C	1: Channel 1 2: Channel 2 3: Channel 3 4: Channel 4 This function is valid when "deviation between channels" is selected.	1
100	Event 2 hold action	WB	1	R/W	C	0: OFF 1: Hold action ON (When power turned on) 2: Re-hold action ON (When power turned on and SV changed) This function is valid when input value, deviation or manipulated value action has been selected. In case of a deviation action, this function is not available while in remote mode and while setting changing rate limiter is working.	Depends on model code When not specifying: 0
101	Event 2 interlock	LG	1	R/W	C	0: Unused 1: Used	0
102	Event 2 differential gap	HB	7	R/W	C	① Deviation, process or set value, Deviation action between channels: 0 to Input span (Unit: °C [°F]) ② MV: 0.0 to 110.0 %	①: TC/RTD: 1 °C [°F] V/I: 0.1 % ②: 0.1 %
103	Event 2 delay timer	TG	7	R/W	C	0 to 18000 seconds	0
104	Force ON of Event 2 action	OB	7	R/W	C	Least significant digit: Event output turned on at input error occurrence 2nd digit: Event output turned on in manual mode 3rd digit: Event output turned on during the autotuning (AT) function is being executed 4th digit: Event output turned on during the setting change rate limiter is being operated 5th digit to Most significant digit: Unused Data 0: Invalid 1: Valid	0
105	Event 3 type	XC	7	R/W	C	0: None 1: Deviation high (SV monitor value used) [1] 2: Deviation low (SV monitor value used) [1] 3: Deviation high/low (SV monitor value used) [1] 4: Band (SV monitor value used) [1] 5: Process high [1] 6: Process low [1] 7: SV high 8: SV low 9: Temperature rise completion 10: MV high [heat-side] [1, 2] 11: MV low [heat-side] [1, 2] 12: MV high [cool-side] [1] 13: MV low [cool-side] [1] 14: Deviation high (Local SV value used) [1] 15: Deviation low (Local SV value used) [1] 16: Deviation high/low (Local SV value used) [1] 17: Deviation (Local SV value used) [1] 18: Deviation between channels high [1] 19: Deviation between channels low [1] 20: Deviation between channels high/low [1] 21: Deviation between channels band [1] [1] Event hold action is available. [2] If there is feedback resistance (FBR) input in position proportioning control, set to the feedback resistance (FBR) input value.	Depends on model code When not specifying: 0

Continued on the next page.

Continued from the previous page.

No.	Name	Identifier	Digits	Attribute	Structure	Data range	Factory set value
106	Event 3 channel setting	FC	1	R/W	C	1: Channel 1 2: Channel 2 3: Channel 3 4: Channel 4 This function is valid when "deviation between channels" is selected.	1
107	Event 3 hold action	WC	1	R/W	C	0: OFF 1: Hold action ON (When power turned on) 2: Re-hold action ON (When power turned on and SV changed) This function is valid when input value, deviation or manipulated value action has been selected. In case of a deviation action, this function is not available while in remote mode and while setting changing rate limiter is working.	Depends on model code When not specifying: 0
108	Event 3 interlock	LH	1	R/W	C	0: Unused 1: Used	0
109	Event 3 differential gap	HC	7	R/W	C	① Deviation, process, set value, Deviation action between channels or Temperature rise completion: 0 to Input span (Unit: °C [°F]) ② MV: 0.0 to 110.0 %	①: TC/RTD: 1 °C [°F] V/I: 0.1 % ②: 0.1 %
110	Event 3 delay timer	TE	7	R/W	C	0 to 18000 seconds If Event 3 corresponds to "9: Temperature rise completion," the Event 3 delay timer becomes the temperature rise completion soak time.	0
111	Force ON of Event 3 action	OC	7	R/W	C	Least significant digit: Event output turned on at input error occurrence 2nd digit: Event output turned on in manual mode 3rd digit: Event output turned on during the autotuning (AT) function is being executed 4th digit: Event output turned on during the setting change rate limiter is being operated 5th digit to Most significant digit: Unused Data 0: Invalid 1: Valid	0
112	Event 4 type	XD	7	R/W	C	0: None 1: Deviation high (SV monitor value used) [1] 2: Deviation low (SV monitor value used) [1] 3: Deviation high/low (SV monitor value used) [1] 4: Band (SV monitor value used) [1] 5: Process high [1] 6: Process low [1] 7: SV high 8: SV low 9: Control loop break alarm (LBA) 10: MV high [heat-side] [1, 2] 11: MV low [heat-side] [1, 2] 12: MV high [cool-side] [1] 13: MV low [cool-side] [1] 14: Deviation high (Local SV value used) [1] 15: Deviation low (Local SV value used) [1] 16: Deviation high/low (Local SV value used) [1] 17: Deviation (Local SV value used) [1] 18: Deviation between channels high [1] 19: Deviation between channels low [1] 20: Deviation between channels high/low [1] 21: Deviation between channels band [1] [1] Event hold action is available. [2] If there is feedback resistance (FBR) input in position proportioning control, set to the feedback resistance (FBR) input value.	Depends on model code When not specifying: 0

Continued on the next page.

Continued from the previous page.

No.	Name	Identifier	Digits	Attribute	Structure	Data range	Factory set value
113	Event 4 channel setting	FD	1	R/W	C	1: Channel 1 2: Channel 2 3: Channel 3 4: Channel 4 This function is valid when "deviation between channels" is selected.	1
114	Event 4 hold action	WD	1	R/W	C	0: OFF 1: Hold action ON (When power turned on) 2: Re-hold action ON (When power turned on and SV changed) This function is valid when input value, deviation or manipulated value action has been selected. In case of a deviation action, this function is not available while in remote mode and while setting changing rate limiter is working.	Depends on model code When not specifying: 0
115	Event 4 interlock	LI	1	R/W	C	0: Unused 1: Used	0
116	Event 4 differential gap	HD	7	R/W	C	① Deviation, process or set value, Deviation action between channels: 0 to Input span (Unit: °C [°F]) ② MV: 0.0 to 110.0 % Becomes invalid when the Event 4 type corresponds to "9: Control loop break alarm (LBA)."	①: TC/RTD: 1 °C [°F] V/I: 0.1 % ②: 0.1 %
117	Event 4 delay timer	TF	7	R/W	C	0 to 18000 seconds	0
118	Force ON of Event 4 action	OD	7	R/W	C	Least significant digit: Event output turned on at input error occurrence 2nd digit: Event output turned on in manual mode 3rd digit: Event output turned on during the autotuning (AT) function is being executed 4th digit: Event output turned on during the setting change rate limiter is being operated 5th digit to Most significant digit: Unused Data 0: Invalid 1: Valid	0
119	CT ratio	XS	7	R/W	C	0 to 9999	CTL-6-P-N: 800 CTL-12-S56-10L-N: 1000
120	CT assignment	ZF	1	R/W	C	0: None 1: OUT1 2: OUT2 3: OUT3 4: OUT4	1
121	Heater break alarm (HBA) type	ND	1	R/W	C	0: Heater break alarm (HBA) type A (Time-proportional control output) 1: Heater break alarm (HBA) type B (Continuous control output and time-proportional control output)	1
122	Number of heater break alarm (HBA) delay times	DH	7	R/W	C	0 to 255 times	5
123	Hot/Cold start	XN	1	R/W	C	0: Hot start 1 1: Hot start 2 2: Cold start	0
124	Start determination point	SX	7	R/W	C	0 to Input span (The unit is the same as input value.) (0: Action depending on the Hot/Cold start selection)	Depends on specification
125	SV tracking	XL	1	R/W	C	0: Unused 1: Used	1

Continued on the next page.

Continued from the previous page.

No.	Name	Identifier	Digits	Attribute	Structure	Data range	Factory set value
126	MV transfer function [Action taken when changed to Manual mode from Auto mode]	OT	1	R/W	C	0: MV in Auto mode is used. [Balanceless-bumpless function] 1: MV in previous Manual mode is used.	0
127	Control action	XE	1	R/W	C	0: Brilliant II PID control (Direct action) 1: Brilliant II PID control (Reverse action) 2: Brilliant II Heat/Cool PID control [Water cooling type] 3: Brilliant II Heat/Cool PID control [Air cooling type] 4: Brilliant II Heat/Cool PID control [Cooling gain linear type] 5: Position proportioning control	Depends on model code When not specifying: 1
128	Integral/derivative time decimal point position ♣	PK	1	R/W	C	0: 1 second setting (No decimal place) 1: 0.1 seconds setting (One decimal place)	0
129	Derivative action ♣	KA	1	R/W	C	0: Measured value derivative 1: Deviation derivative	0
130	Undershoot suppression factor ♣	KB	7	R/W	C	0.000 to 1.000	Water cooling: 0.100 Air cooling: 0.250 Cooling gain linear type: 1.000
131	Derivative gain ♣	DG	7	R/W	C	0.1 to 10.0	6.0
132	ON/OFF action differential gap (upper) ♣	IV	7	R/W	C	TC/RTD inputs: 0 to Input span (Unit: °C [°F]) Voltage (V)/current (I) inputs: 0.0 to 100.0 % of input span	TC/RTD: 1 °C [°F] V/I: 0.1 %
133	ON/OFF action differential gap (lower) ♣	IW	7	R/W	C		TC/RTD: 1 °C [°F] V/I: 0.1 %
134	Action (high) at input error ♣	WH	1	R/W	C	0: Normal control 1: Manipulated output value at input error	0
135	Action (low) at input error ♣	WL	1	R/W	C		0
136	Manipulated output value at input error ♣	OE	7	R/W	C	−105.0 to +105.0 % Actual output values become those restricted by the output limiter. Position proportioning control: If there is no feedback resistance (FBR) input or the feedback resistance (FBR) input is disconnected, an action taken when abnormal is in accordance with the value action setting during STOP.	0.0
137	Manipulated output value at STOP mode [heat-side] ♣	OF	7	R/W	C	−5.0 to +105.0 % Position proportioning control: Only when there is feedback resistance (FBR) input and it does not break, the manipulated output value [heat-side] at STOP is output.	−5.0
138	Manipulated output value at STOP mode [cool-side] ♣	OG	7	R/W	C		−5.0
139	Output change rate limiter (up) [heat-side] ♣	PH	7	R/W	C	0.0 to 100.0 %/seconds (0.0: OFF)	0.0
140	Output change rate limiter (down) [heat-side] ♣	PL	7	R/W	C	Becomes invalid when in position proportioning control.	0.0
141	Output limiter (high) [heat-side] ♣	OH	7	R/W	C	Output limiter (low) to 105.0 % Position proportioning control: Becomes valid only when there is feedback resistance (FBR) input and it does not break.	105.0

Continued on the next page.

Continued from the previous page.

No.	Name	Identifier	Digits	Attribute	Structure	Data range	Factory set value
142	Output limiter (low) [heat-side] ♣	OL	7	R/W	C	−5.0 % to Output limiter (high) Position proportioning control: Becomes valid only when there is feedback resistance (FBR) input and it does not break.	−5.0
143	Output change rate limiter (up) [cool-side] ♣	PX	7	R/W	C	0.0 to 100.0 %/seconds (0.0: OFF)	0.0
144	Output change rate limiter (down) [cool-side] ♣	PY	7	R/W	C	Becomes invalid when in position proportioning control.	0.0
145	Output limiter (high) [cool-side] ♣	OX	7	R/W	C	Output limiter (low) [cool-side] to 105.0 %	105.0
146	Output limiter (low) [cool-side] ♣	OY	7	R/W	C	−5.0 % to Output limiter (high) [cool-side]	−5.0
147	AT bias ♣	GB	7	R/W	C	−Input span to +Input span	0
148	AT cycles ♣	G3	1	R/W	C	0: 1.5 cycles 1: 2.0 cycles 2: 2.5 cycles 3: 3.0 cycles	1
149	Output value with AT turned on ♣	OP	7	R/W	C	Output value with AT turned off to 105.0 % Actual output values become those restricted by the output limiter. Position proportioning control: Becomes valid only when there is feedback resistance (FBR) input and it does not break (high limit of feedback resistance input at AT).	105.0
150	Output value with AT turned off ♣	OQ	7	R/W	C	−105.0 % to Output value with AT turned on Actual output values become those restricted by the output limiter. Position proportioning control: Becomes valid only when there is feedback resistance (FBR) input and it does not break (low limit of feedback resistance input at AT).	−105.0
151	AT differential gap time ♣	GH	7	R/W	C	0.0 to 50.0 seconds	10.0
152	Proportional band adjusting factor [heat-side] ♣	KC	7	R/W	C	0.01 to 10.00 times	1.00
153	Integral time adjusting factor [heat-side] ♣	KD	7	R/W	C	0.01 to 10.00 times	1.00
154	Derivative time adjusting factor [heat-side] ♣	KE	7	R/W	C	0.01 to 10.00 times	1.00
155	Proportional band adjusting factor [cool-side] ♣	KF	7	R/W	C	0.01 to 10.00 times	1.00
156	Integral time adjusting factor [cool-side] ♣	KG	7	R/W	C	0.01 to 10.00 times	1.00
157	Derivative time adjusting factor [cool-side] ♣	KH	7	R/W	C	0.01 to 10.00 times	1.00
158	Proportional band limiter (high) [heat-side] ♣	P6	7	R/W	C	TC/RTD inputs: 0 (0.0) to Input span (Unit: °C [°F]) Varies with the setting of the decimal point position selection. Voltage (V)/current (I) inputs: 0.0 to 1000.0 % of input span	TC/RTD: Input span V/I: 1000.0 %
159	Proportional band limiter (low) [heat-side] ♣	P7	7	R/W	C	0 (0.0): ON/OFF action (ON/OFF action for both heat and cool actions in case of a heat/cool control type.)	TC/RTD: 0 V/I: 0.0 %

Continued on the next page.

Continued from the previous page.

No.	Name	Identifier	Digits	Attribute	Structure	Data range	Factory set value
160	Integral time limiter (high) [heat-side] ♣	I6	7	R/W	C	PID control or heat/cool PID control: 0 to 3600 seconds or 0.0 to 1999.9 seconds Position proportioning control: 1 to 3600 seconds or 0.1 to 1999.9 seconds Varies with the setting of the integral/derivative time decimal point position selection.	3600
161	Integral time limiter (low) [heat-side] ♣	I7	7	R/W	C		PID control, Heat/cool PID control: 0 Position proportioning control: 1
162	Derivative time limiter (high) [heat-side] ♣	D6	7	R/W	C	0 to 3600 seconds or 0.0 to 1999.9 seconds Varies with the setting of the integral/derivative time decimal point position selection.	3600
163	Derivative time limiter (low) [heat-side] ♣	D7	7	R/W	C		0
164	Proportional band limiter (high) [cool-side] ♣	P8	7	R/W	C	TC/RTD inputs: 1 to input span or 0.1 to input span (Unit: °C [°F]) Varies with the setting of the decimal point position selection. Voltage (V)/current (I) inputs: 0.1 to 1000.0 % of input span	TC/RTD: Input span V/I: 1000.0 %
165	Proportional band limiter (low) [cool-side] ♣	P9	7	R/W	C		TC/RTD: 1 (0.1) V/I: 0.1 %
166	Integral time limiter (high) [cool-side] ♣	I8	7	R/W	C	0 to 3600 seconds or 0.0 to 1999.9 seconds Varies with the setting of the integral/derivative time decimal point position selection. If control is other than heat/cool PID control, set to RO (Only reading data is possible).	3600
167	Integral time limiter (low) [cool-side] ♣	I9	7	R/W	C		0
168	Derivative time limiter (high) [cool-side] ♣	D8	7	R/W	C	0 to 3600 seconds or 0.0 to 1999.9 seconds Varies with the setting of the integral/derivative time decimal point position selection. If control is other than heat/cool PID control, set to RO (Only reading data is possible).	3600
169	Derivative time limiter (low) [cool-side] ♣	D9	7	R/W	C		0
170	Open/Close output neutral zone ♣	V2	7	R/W	C	0.1 to 10.0 %	2.0
171	Action at feedback resistance (FBR) input error ♣	SY	1	R/W	C	0: Action depending on the valve action at STOP 1: Control action continued	0
172	Feedback adjustment ♣	FV	1	R/W	C	0: Adjustment end 1: Open-side adjustment start 2: Close-side adjustment start	—
173	Control motor time ♣	TN	7	R/W	C	5 to 1000 seconds	10
174	Integrated output limiter ♣	OI	7	R/W	C	0.0 to 200.0 % of control motor time (0.0: OFF) Becomes invalid when there is feedback resistance (FBR) input.	150.0
175	Valve action at STOP ♣	VS	1	R/W	C	0: Close-side output OFF, Open-side output OFF 1: Close-side output ON, Open-side output OFF 2: Close-side output OFF, Open-side output ON Becomes valid when there is no feedback resistance (FBR) input or the feedback resistance (FBR) input is disconnected.	0
176	ST proportional band adjusting factor ♣	KI	7	R/W	C	0.01 to 10.00 times	1.00
177	ST integral time adjusting factor ♣	KJ	7	R/W	C	0.01 to 10.00 times	1.00

Continued on the next page.

Continued from the previous page.

No.	Name	Identifier	Digits	Attribute	Structure	Data range	Factory set value
178	ST derivative time adjusting factor ♣	KK	7	R/W	C	0.01 to 10.00 times	1.00
179	ST start condition ♣	SU	1	R/W	C	0: Activate the startup tuning (ST) function when the power is turned on; when transferred from STOP to RUN; or when the set value (SV) is changed. 1: Activate the startup tuning (ST) function when the power is turned on; or when transferred from STOP to RUN. 2: Activate the startup tuning (ST) function when the set value (SV) is changed.	0
180	Automatic temperature rise group ♣	Y7	7	R/W	C	0 to 16 (0: Automatic temperature rise function OFF)	0
181	Automatic temperature rise dead time ♣	RT	7	R/W	C	0.1 to 1999.9 seconds	10.0
182	Automatic temperature rise gradient data ♣	R2	7	R/W	C	0.1 to Input span/minutes	1.0
183	EDS transfer time decimal point position ♣	NS	1	R/W	C	0: 1 second setting (No decimal place) 1: 0.1 seconds setting (One decimal place)	0
184	Output average processing time for EDS ♣	NV	7	R/W	C	0.1 to 200.0 seconds	1.0
185	Responsive action trigger point for EDS ♣	NW	7	R/W	C	0 to Input span (Unit: °C [°F], %)	1
186	Setting change rate limiter unit time	HU	7	R/W	C	1 to 3600 seconds	60
187	Soak time unit	RU	1	R/W	C	0: 0:00 to 99:59 (hrs:min) [0 hours 00 minutes to 99 hours 59 minutes] 1: 0:00 to 199:59 (min:sec) [0 minutes 00 seconds to 199 minutes 59 seconds] Set the data range of Memory area soak time monitor and Area soak time.	1
188	Setting limiter (high)	SH	7	R/W	C	Setting limiter (low) to Input scale high	Input scale high
189	Setting limiter (low)	SL	7	R/W	C	Input scale low to Setting limiter (high)	Input scale low
190	PV transfer function ♣	TS	1	R/W	C	0: Unused 1: Used	0
191	Operation mode assignment 1 (Logic output selection function) Logic output 1 to 4	EA	7	R/W	C	0: No assignment 1: Operation mode (monitor, control) 2: Operation mode (monitor, event function, control) 3: Auto/Manual 4: Remote/Local 5: Interlock release	0
192	Operation mode assignment 2 (Logic output selection function) Logic output 5 to 8	EB	7	R/W	C	0: No assignment 1: Operation mode (monitor, control) 2: Operation mode (monitor, event function, control) 3: Auto/Manual 4: Remote/Local 5: Interlock release	0
193	SV select function	KM	1	R/W	C	0: Remote SV function 1: Cascade control function 2: Ratio setting function 3: Cascade control 2 function	0

Continued on the next page.

Continued from the previous page.

No.	Name	Identifier	DIgits	Attribute	Structure	Data range	Factory set value
194	Remote SV function master channel module address	MC	7	R/W	C	−1 (Master channel is selected from itself) 0 to 99 (Master channel is selected from other modules)	−1
195	Remote SV function master channel selection	MN	7	R/W	C	1 to 99	1
196	Output distribution master channel module address	DY	7	R/W	C	−1 (Master channel is selected from itself) 0 to 99 (Master channel is selected from other modules)	−1
197	Output distribution master channel selection	DZ	7	R/W	C	1 to 99	1
198	Address of interacting modules	RL	7	R/W	C	−1 (Interact with its own module address) 0 to 99 (Interact with the addresses of other modules)	−1
199	Channel selection of interacting modules	RM	7	R/W	C	1 to 99 Becomes valid when the selected module is "Z-TIO module."	1
200	Selection switch of interacting modules	RN	7	R/W	C	Least significant digit: Memory area number 2nd digit: Operation mode 3rd digit: Auto/Manual 4th digit: Remote/Local 5th digit EDS start signal 6th digit Interlock release Most significant digit: Suspension of area soak time Data 0: No interaction 1: Interact with other channels	0
201	TIO interval time	VG	7	R/W	M	0 to 250 ms	10

■ Communication data of Z-DIO module

No.	Name	Identifier	DIgits	Attribute	Structure	Data range	Factory set value
1	Digital input (DI) state 1	L1	7	RO	M	Least significant digit: DI1 state 2nd digit: DI2 state 3rd digit: DI3 state 4th digit: DI4 state 5th digit to Most significant digit: Unused Data 0: Contact open 1: Contact closed	—
2	Digital input (DI) state 2	L6	7	RO	M	Least significant digit: DI5 state 2nd digit: DI6 state 3rd digit: DI7 state 4th digit: DI8 state 5th digit to Most significant digit: Unused Data 0: Contact open 1: Contact closed	—
3	Digital output (DO) state 1	Q2	7	RO	M	Least significant digit: DO1 state 2nd digit: DO2 state 3rd digit: DO3 state 4th digit: DO4 state 5th digit to Most significant digit: Unused Data 0: OFF 1: ON	—
4	Digital output (DO) state 2	Q3	7	RO	M	Least significant digit: DO5 state 2nd digit: DO6 state 3rd digit: DO7 state 4th digit: DO8 state 5th digit to Most significant digit: Unused Data 0: OFF 1: ON	—
5	DO manual output 1	Q4	7	R/W	M	Least significant digit: DO1 manual output 2nd digit: DO2 manual output 3rd digit: DO3 manual output 4th digit: DO4 manual output 5th digit to Most significant digit: Unused Data 0: OFF 1: ON	0
6	DO manual output 2	Q5	7	R/W	M	Least significant digit: DO5 manual output 2nd digit: DO6 manual output 3rd digit: DO7 manual output 4th digit: DO8 manual output 5th digit to Most significant digit: Unused Data 0: OFF 1: ON	0
7	DO output distribution selection	DO	1	R/W	C	0: DO output 1: Distribution output	0
8	DO output distribution bias	O8	7	R/W	C	–100.0 to +100.0 %	0.0
9	DO output distribution ratio	O9	7	R/W	C	–9.999 to +9.999	1.000
10	DO proportional cycle time	V0	7	R/W	C	0.1 to 100.0 seconds	Depends on specification
11	DO minimum ON/OFF time of proportioning cycle	VJ	7	R/W	C	0 to 1000 ms	0
Set data No. 12 or later are for engineering setting [Writable in the STOP mode]							
12	DI function assignment	H2	7	R/W	M	0 to 29 (See page 6-53)	1
13	Memory area setting signal	E1	1	R/W	M	0: Valid 1: Invalid	1
14	DO signal assignment module address 1 [DO1 to DO4]	LQ	7	R/W	M	–1, 0 to 99 When "-1" is selected, all of the signals of the same type (except temperature rise completion and DO manual output value) are *OR*-operated and produced as outputs from DO.	–1

Continued on the next page.

Continued from the previous page.

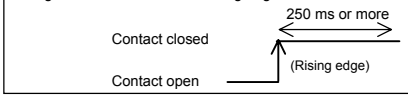
No.	Name	Identifier	DIgits	Attribute	Structure	Data range	Factory set value
15	DO signal assignment module address 2 [DO5 to DO8]	LR	7	R/W	M	−1, 0 to 99 When "-1" is selected, all of the signals of the same type (except temperature rise completion and DO manual output value) are *OR*-operated and produced as outputs from DO.	−1
16	DO output assignment 1 [DO1 to DO4]	LT	7	R/W	M	0 to 13 (See page 6-54)	1
17	DO output assignment 2 [DO5 to DO8]	LX	7	R/W	M	0 to 13 (See page 6-54)	1
18	DO energized/de-energized	NB	7	R/W	C	0: Energized 1: De-energized	0
19	DO output distribution master channel module address	DD	7	R/W	C	−1 (Master channel is selected from itself) 0 to 99 (Master channel is selected from other modules)	−1
20	DO output distribution master channel selection	DJ	7	R/W	C	1 to 99	1
21	DO manipulated output value (MV) at STOP mode	OJ	7	R/W	C	−5.0 to +105.0 %	−5.0
22	DO output limiter (high)	D3	7	R/W	C	DO output limiter (low) to 105.0 %	105.0
23	DO output limiter (low)	D4	7	R/W	C	−5.0 % to DO output limiter (high)	−5.0
24	DIO interval time	VF	1	R/W	M	0 to 250 ms	10

Table 1: DI assignment table

Set value	DI1	DI2	DI3	DI4	DI5	DI6	DI7	DI8
0	No assignment							
1	Memory area transfer (1 to 8) [1]			Area set [2]	Operation mode [3]		Interlock release	AUTO/MAN [4]
2								REM/LOC [4]
3								EDS start signal 1
4								Soak stop
5								RUN/STOP [4]
6							AUTO/MAN [4]	REM/LOC
7								EDS start signal 1
8								Soak stop
9								RUN/STOP [4]
10							REM/LOC [4]	EDS start signal 1
11								Soak stop
12								RUN/STOP [4]
13							EDS start signal 1	Soak stop
14								RUN/STOP [4]
15							Soak stop	
16					Interlock release	AUTO/MAN [4]	REM/LOC [4]	EDS start signal 1
17								Soak stop
18								RUN/STOP [4]
19							EDS start signal 1	Soak stop
20								RUN/STOP [4]
21							Soak stop	
22					AUTO/MAN [4]	REM/LOC [4]	EDS start signal 1	Soak stop
23								RUN/STOP [4]
24							Soak stop	
25					REM/LOC [4]	EDS start signal 1		
26	Memory area transfer (1, 2) [1]	Area set [2]	Interlock release	RUN/STOP [4]	AUTO/MAN [4]	REM/LOC [4]	Operation mode [3]	
27	Memory area transfer (1 to 8) [1]			Area set [2]	Operation mode [3]		EDS start signal 1	EDS start signal 2
28	Memory area transfer (1, 2) [1]	Area set [2]	Interlock release	RUN/STOP [4]	AUTO/MAN [4]	REM/LOC [4]		
29	EDS start signal 1	EDS start signal 2					Operation mode [3]	

RUN/STOP: RUN/STOP transfer (Contact closed: RUN)
AUTO/MAN: Auto/Manual transfer (Contact closed: Manual mode)
REM/LOC: Remote/Local transfer (Contact closed: Remote mode)
Interlock release (Contact closed: Interlock release)
EDS start signal 1 (Contact closed: EDS start signal ON [for disturbance 1])
EDS start signal 2 (Contact closed: EDS start signal ON [for disturbance 2])
Soak stop (Contact closed: Soak stop)

DI signal will become valid at rising edge after the closed contact is held for 250ms.



[1] Memory area transfer

(×:Contact open –: Contact closed)

	Memory area number							
	1	2	3	4	5	6	7	8
DI1	×	–	×	–	×	–	×	–
DI2	×	×	–	–	×	×	–	–
DI3	×	×	×	×	–	–	–	–

[2] Area set becomes invalid prior to factory shipment.

[3] Operation mode transfer

(×:Contact open –: Contact closed)

	Operation mode			
	Unused	Monitor	Monitor + Event function	Control
DI5 (DI7)	×	–	×	–
DI6 (DI8)	×	×	–	–

[4] Actual device states (AUTO/MAN, REM/LOC, RUN/STOP)

	DI-switched state	Communication-switched state	Actual device state
Auto/Manual transfer [a] (AUTO/MAN)	Manual (Contact closed)	Manual → Auto	Manual mode
		Auto → Manual	
	Auto (Contact open)	Manual → Auto	Auto mode
		Auto → Manual	
Remote/Local transfer [a] (REM/LOC)	Remote (Contact closed)	Remote → Local	Remote mode
		Local → Remote	
	Local (Contact open)	Remote → Local	Local mode
		Local → Remote	
RUN/STOP [b]	RUN (Contact closed)	STOP → RUN	RUN
		RUN → STOP	STOP
	STOP (Contact open)	STOP → RUN	STOP

[a] Device state when AUTO/MAN or REM/LOC assigned to DI is set so that the Z-TIO module and Z-DIO module are linked using the Master-slave mode of the Z-TIO module.

[b] STOP of RUN/STOP switching is given priority regardless of communication or DI switching.

Table 2: DO assignment table

[DO1 to DO4]

Set value	DO1	DO2	DO3	DO4
0	No assignment			
1	DO1 manual output	DO2 manual output	DO3 manual output	DO4 manual output
2	Event 1 comprehensive output [1]	Event 2 comprehensive output [2]	Event 3 comprehensive output [3]	Event 4 comprehensive output [4]
3	Event 1 (CH1)	Event 2 (CH1)	Event 3 (CH1)	Event 4 (CH1)
4	Event 1 (CH2)	Event 2 (CH2)	Event 3 (CH2)	Event 4 (CH2)
5	Event 1 (CH3)	Event 2 (CH3)	Event 3 (CH3)	Event 4 (CH3)
6	Event 1 (CH4)	Event 2 (CH4)	Event 3 (CH4)	Event 4 (CH4)
7	Event 1 (CH1)	Event 1 (CH2)	Event 1 (CH3)	Event 1 (CH4)
8	Event 2 (CH1)	Event 2 (CH2)	Event 2 (CH3)	Event 2 (CH4)
9	Event 3 (CH1)	Event 3 (CH2)	Event 3 (CH3)	Event 3 (CH4)
10	Event 4 (CH1)	Event 4 (CH2)	Event 4 (CH3)	Event 4 (CH4)
11	HBA (CH1)	HBA (CH2)	HBA (CH3)	HBA (CH4)
12	Burnout status (CH1)	Burnout status (CH2)	Burnout status (CH3)	Burnout status (CH4)
13	Temperature rise completion [5]	HBA comprehensive output [6]	Burnout state comprehensive output [7]	DO4 manual output

[DO5 to DO8]

Set value	DO5	DO6	DO7	DO8
0	No assignment			
1	DO5 manual output	DO6 manual output	DO7 manual output	DO8 manual output
2	Event 1 comprehensive output [1]	Event 2 comprehensive output [2]	Event 3 comprehensive output [3]	Event 4 comprehensive output [4]
3	Event 1 (CH1)	Event 2 (CH1)	Event 3 (CH1)	Event 4 (CH1)
4	Event 1 (CH2)	Event 2 (CH2)	Event 3 (CH2)	Event 4 (CH2)
5	Event 1 (CH3)	Event 2 (CH3)	Event 3 (CH3)	Event 4 (CH3)
6	Event 1 (CH4)	Event 2 (CH4)	Event 3 (CH4)	Event 4 (CH4)
7	Event 1 (CH1)	Event 1 (CH2)	Event 1 (CH3)	Event 1 (CH4)
8	Event 2 (CH1)	Event 2 (CH2)	Event 2 (CH3)	Event 2 (CH4)
9	Event 3 (CH1)	Event 3 (CH2)	Event 3 (CH3)	Event 3 (CH4)
10	Event 4 (CH1)	Event 4 (CH2)	Event 4 (CH3)	Event 4 (CH4)
11	HBA (CH1)	HBA (CH2)	HBA (CH3)	HBA (CH4)
12	Burnout status (CH1)	Burnout status (CH2)	Burnout status (CH3)	Burnout status (CH4)
13	Temperature rise completion [5]	HBA comprehensive output [6]	Burnout state comprehensive output [7]	DO8 manual output

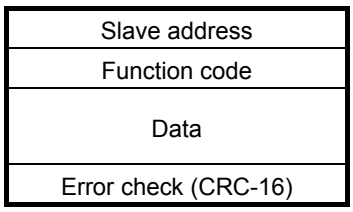
[1] Logical *OR* of Event 1 (ch1 to ch4)
[2] Logical *OR* of Event 2 (ch1 to ch4)
[3] Logical *OR* of Event 3 (ch1 to ch4)
[4] Logical *OR* of Event 4 (ch1 to ch4)
[5] Temperature rise completion status (ON when temperature rise completion occurs for all channels for which event 3 is set to temperature rise completion.)
[6] Logical *OR* of HBA (ch1 to ch4)
[7] Logical *OR* of burnout state (ch1 to ch4)

6.5 Modbus Communication Protocol

The master controls communication between master and slave. A typical message consists of a request (query message) sent from the master followed by an answer (response message) from the slave (SRZ unit). When master begins data transmission, a set of data is sent to the slave in a fixed sequence. When it is received, the slave decodes it, takes the necessary action, and returns data to the master.

6.5.1 Message format

The message consists of four parts: slave address, function code, data, and error check code which are always transmitted in the same sequence.



Message format

■ Slave address

The slave address is a number from 0 to F manually set at the address setting switch located at the front of Z-COM module.

☞ For details, see **3.2.1 SRZ unit address setting (P. 3-3).**

Although all connected slave units receive the query message sent from the master, only the slave with the slave address coinciding with the query message will accept the message.

■ Function code

The function codes are the instructions set at the master and sent to the slave describing the action to be executed. The function codes are included when the slave responds to the master.

☞ For details, see **6.5.2 Function code (P. 6-56).**

■ Data

The data to execute the function specified by the function code is sent to the slave and corresponding data returned to the master from the slave.

☞ For details, see **6.5.6 Message format (P. 6-61), 6.5.7 Data configuration (P. 6-65)** and **6.5.8 Modbus data list (P. 6-71).**

■ Error check

An error checking code (CRC-16: Cyclic Redundancy Check) is used to detect an error in the signal transmission.

☞ For details, see **6.5.5 Calculating CRC-16 (P. 6-58).**

6.5.2 Function code

- **Function code contents**

Function code (Hexadecimal)	Function	Contents
03H	Read holding registers	Measured value, control output value, current transformer input measured value, Event status, etc.
06H	Preset single register	Set value, PID constants, event set value, etc.
08H	Diagnostics (loopback test)	Loopback test
10H	Preset multiple registers	Set value, PID constants, event set value, etc.

- **Message length of each function (Unit: byte)**

Function code (Hexadecimal)	Function	Query message		Response message	
		Min	Max	Min	Max
03H	Read holding registers	8	8	7	255
06H	Preset single register	8	8	8	8
08H	Diagnostics (loopback test)	8	8	8	8
10H	Preset multiple registers	11	255	8	8

6.5.3 Communication mode

Signal transmission between the master and slaves is conducted in Remote Terminal Unit (RTU) mode.

Items	Contents
Data bit length	8-bit (Binary)
Start mark of message	Unused
End mark of message	Unused
Message length	See **6.5.2 Function code**
Data time interval	Less than 24 bits' time *
Error check	CRC-16 (Cyclic Redundancy Check)

* When sending a command message from the master, set intervals of data configuring one message to time shorter than the 24 bits' time. If time intervals become time longer than the 24 bits' time the relevant slave assumes that message sending from the master is terminated to deform the message format. As a result, the slave does not make a response.

6.5.4 Slave responses

(1) Normal response

- In the response message of the Read Holding Registers, the slave returns the read out data and the number of data items with the same slave address and function code as the query message.
- In the response message of the Preset Single Register, the slave returns the same message as the query message.
- In the response message of the Diagnostics (Loopback test), the slave returns the same message as the query message.
- In the response message of the Preset Multiple Registers, the slave returns the slave address, the function code, starting number, and number of holding registers in the multi-query message.

(2) Defective message response

- If the query message from the master is defective, except for transmission error, the slave (SRZ unit) returns the error response message without any action.

  Example: If there is a problem in the data range of CH3 when writing data of four channels, the data of CH1 and CH2 will be written. The data of CH3 and CH4 will be disregarded and an error response message will be returned.

- If the self-diagnostic function of the slave (SRZ unit) detects an error, the slave (SRZ unit) will return an error response message to all query messages.
- The function code of each error response message is obtained by adding 80H to the function code of the query message.

Slave address
Function code
Error code
Error check CRC-16

Error response message

Error code	Contents
1	Function code error (An unsupported function code was specified)
2	When the mismatched address is specified.
3	• When the specified number of data items in the query message exceeds the maximum number of data items available • When the data written exceeds the setting range
4	Self-diagnostic error response

(3) No response

The slave (SRZ unit) ignores the query message and does not respond when:

- The slave address in the query message does not coincide with any slave address settings.
- The CRC code of the master does not coincide with that of the slave.
- Transmission error such as overrun, framing, parity and etc., is found in the query message.
- Data time interval in the query message from the master exceeds 24 bit's time.

6.5.5 Calculating CRC-16

The Cyclic Redundancy Check (CRC) is a 2 byte (16-bit) error check code. After constructing the data message, not including start, stop, or parity bit, the master calculates a CRC code and appends this to the end of the message. The slave will calculate a CRC code from the received message, and compare it with the CRC code from the master. If they do not coincide, a communication error has occurred and the slave does not respond.

The CRC code is formed in the following sequence:

1. Load FFFFH to a 16-bit CRC register.

2. *Exclusive OR* (⊕) the first byte (8 bits) of the message with the CRC register. Return the result to the CRC register.

3. Shift the CRC register 1 bit to the right.

4. If the carry flag is 1, *exclusive OR* the CRC register with A001 hexadecimal and return the result to the CRC register. If the carry flag is 0, repeat step ***3***.

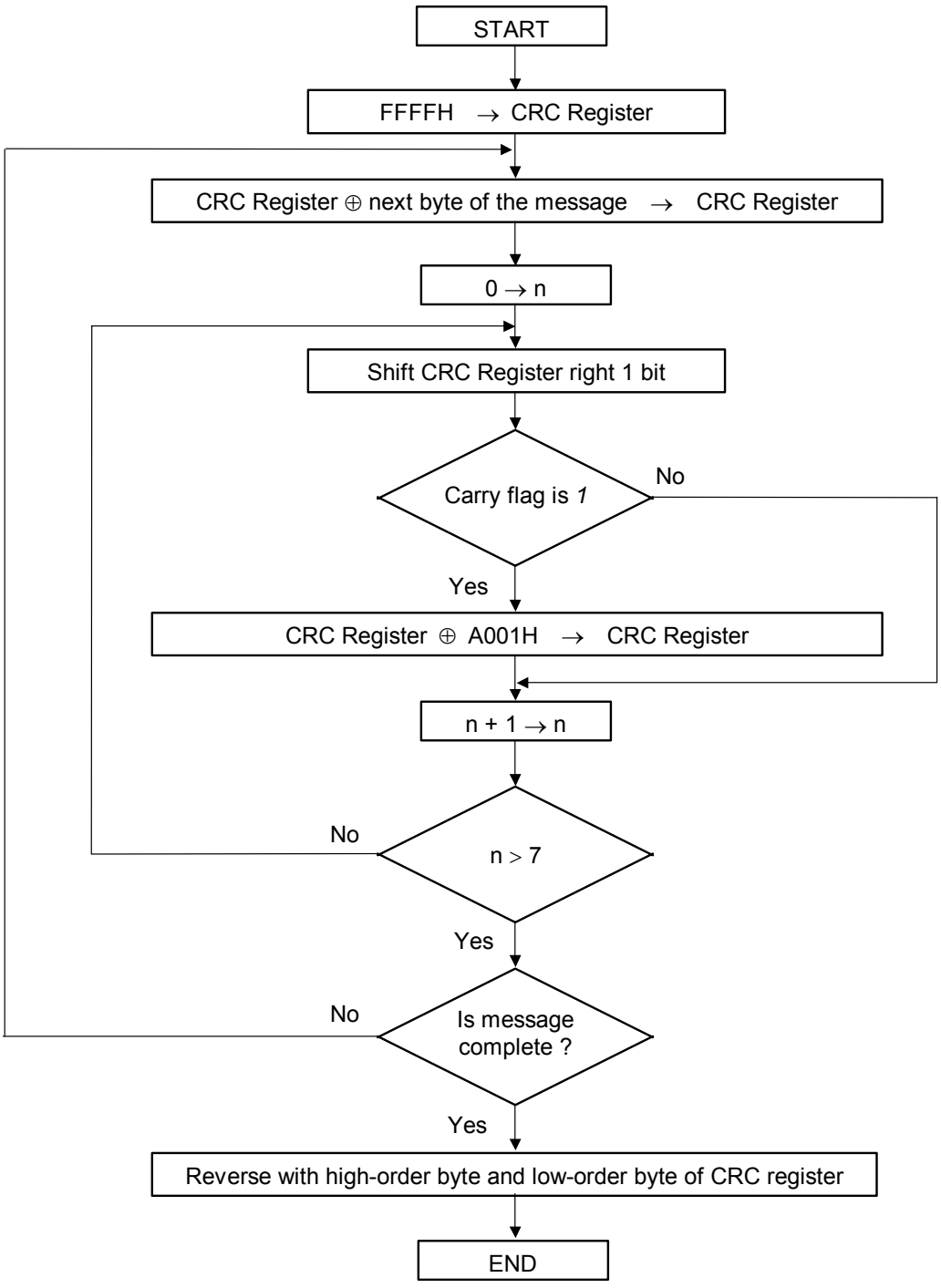
5. Repeat step ***3*** and ***4*** until there have been 8 shifts.

6. *Exclusive OR* the next byte (8 bits) of the message with the CRC register.

7. Repeat step ***3*** through ***6*** for all bytes of the message (except the CRC).

8. The CRC register contains the 2 byte CRC error code. When they are appended to the message, the low-order byte is appended first, followed by the high-order byte.

■ The flow chart of CRC-16



The ⊕ symbol indicates an *exclusive OR* operation. The symbol for the number of data bits is *n*.

■ Example of a CRC calculation in the 'C' language

This routine assumes that the data types 'uint16' and 'uint8' exists. Theses are unsigned 16-bit integer (usually an 'unsigned short int' for most compiler types) and unsigned 8-bit integer (unsigned char). 'z_p' is a pointer to a Modbus message, and 'z_messaage_length' is its length, excluding the CRC. Note that the Modbus message will probably contain NULL characters and so normal C string handling techniques will not work.

```
uint16 calculate_crc （byte *z_p, unit16 z_message_length）

/* CRC runs cyclic Redundancy Check Algorithm on input z_p      */
/* Returns value of 16 bit CRC after completion and       */
/* always adds 2 crc bytes to message             */
/* returns 0 if incoming message has correct CRC          */

{
uint16 CRC= 0xffff;
uint16 next;
uint16 carry;
uint16 n;
uint8 crch, crcl;

while (z_messaage_length--) {
next = (uint16) *z_p;
CRC ^= next;
for (n = 0; n < 8; n++) {
carry = CRC & 1;
CRC >>= 1;
if (carry) {
CRC ^= 0xA001;
}
}
z_p++;
}
crch = CRC / 256;
crcl = CRC % 256
z_p [z_messaage_length++] = crcl;
z_p [z_messaage_length] = crch;
return CRC;
}
```

6.5.6 Message format

■ Read holding registers [03H]

The query message specifies the starting register address and quantity of registers to be read.
The contents of the holding registers are entered in the response message as data, divided into two parts: the high-order 8-bit and the low-order 8-bit, arranged in the order of the register numbers.

Example: The contents of the four holding registers from 01FCH to 01FFH are the read out from slave address 2.

Query message

Slave address		02H	
Function code		03H	
Starting number	High	01H	} First holding register address
	Low	FCH	
Quantity	High	00H	} The setting must be between 1 (0001H) and 125 (007DH).
	Low	04H	
CRC-16	High	85H	
	Low	F6H	

Normal response message

Slave address		02H	
Function code		03H	
Number of data		08H	→ Number of holding registers × 2
First holding register contents	High	01H	
	Low	24H	
Next holding register contents	High	01H	
	Low	1BH	
Next holding register contents	High	01H	
	Low	2BH	
Next holding register contents	High	01H	
	Low	22H	
CRC-16	High	AAH	
	Low	F3H	

Error response message

Slave address		02H
80H + Function code		83H
Error code		03H
CRC-16	High	F1H
	Low	31H

■ Preset single register [06H]

The query message specifies data to be written into the designated holding register. The write data is arranged in the query message with high-order 8-bit first and low-order 8-bit next. Only R/W holding registers can be specified.

Example: Data is written into the holding register 0ADCH of slave address 1.

Query message

Slave address		01H
Function code		06H
Holding register number	High	0AH
	Low	DCH
Write data	High	00H
	Low	64H
CRC-16	High	4AH
	Low	03H

} Any data within the range

Normal response message

Slave address		01H
Function code		06H
Holding register number	High	0AH
	Low	DCH
Write data	High	00H
	Low	64H
CRC-16	High	4AH
	Low	03H

} Contents will be the same as query message data.

Error response message

Slave address		01H
80H + Function code		86H
Error code		02H
CRC-16	High	C3H
	Low	A1H

■ Diagnostics (Loopback test) [08H]

The master's query message will be returned as the response message from the slave (SRZ unit).
This function checks the communication system between the master and slave (SRZ unit).

Example: Loopback test for slave address 1

Query message

Slave address		01H	
Function code		08H	
Test code	High	00H	Test code must be set to 00.
	Low	00H	
Data	High	1FH	Any pertinent data
	Low	34H	
CRC-16	High	E9H	
	Low	ECH	

Normal response message

Slave address		01H	Contents will be the same as query message data.
Function code		08H	
Test code	High	00H	
	Low	00H	
Data	High	1FH	
	Low	34H	
CRC-16	High	E9H	
	Low	ECH	

Error response message

Slave address		01H
80H + Function code		88H
Error code		03H
CRC-16	High	06H
	Low	01H

■ Preset multiple registers [10H]

The query message specifies the starting register address and quantity of registers to be written.
The write data is arranged in the query message with high-order 8-bit first and low-order 8-bit next.
Only R/W holding registers can be specified.

Example: Data is written into the two holding registers from 0ADCH to 0ADDH of slave address 1.

Query message

Slave address		01H	
Function code		10H	
Starting number	High	0AH	First holding register address
	Low	DCH	
Quantity	High	00H	The setting must be between 1 (0001H) and 123 (007BH).
	Low	02H	
Number of data		04H	→ Number of holding registers × 2
Data to first register	High	00H	Any pertinent data
	Low	64H	
Data to next register	High	00H	
	Low	64H	
CRC-16	High	C0H	
	Low	32H	

Normal response message

Slave address		01H
Function code		10H
Starting number	High	0AH
	Low	DCH
Quantity	High	00H
	Low	02H
CRC-16	High	83H
	Low	EAH

Error response message

Slave address		01H
80H + Function code		90H
Error code		02H
CRC-16	High	CDH
	Low	C1H

6.5.7 Data configuration

The numeric range of data used in Modbus protocol is 0000H to FFFFH. Only the set value within the setting range is effective.

FFFFH represents –1.

■ Data processing with decimal points

(1) Communication data of Z-COM module

The communication data of the Z-COM module does not include any data with decimal points.

Communication data of Z-COM module

- Integrated operating time monitor (Z-COM module)
- Integrated operating time monitor (Functional module)
- Error code (Z-COM module)
- Error code (Functional module)
- Backup memory state monitor (Z-COM module)
- Backup memory state monitor (Functional module)
- System communication state
- SRZ normal communication flag
- PLC communication error code
- Unit recognition flag
- Monitor for the number of connected modules
- RUN/STOP transfer (Each SRZ unit)
- RUN/STOP transfer (Each module)
- Control RUN/STOP holding setting
- Communication 1 protocol
- Communication 1 communication speed
- Communication 1 data bit configuration
- Communication 1 interval time
- Communication 2 protocol
- Communication 2 communication speed
- Communication 2 data bit configuration
- Communication 2 interval time
- Station number
- PC number (CPU No.)
- Register type
- Register start number (High-order 4-bit)
- Register start number (Low-order 16-bit)
- System data address bias
- COM module link recognition time
- PLC scanning time
- PLC communication start time
- Method for setting the number of connected modules
- Slave mapping method
- Number of connected modules (Z-TIO module)
- Number of connected modules (Z-DIO module)

Example: When integrated operating time monitor is 72, 72 = 0048H

Integrated operating time monitor	High-order	00H
	Low-order	48H

(2) Communication data of Z-TIO/Z-DIO module

For information on decimal points in the communication data of Z-TIO and Z-DIO modules, see **7.3 Data Structure (P. 7-12) of the SRZ Instruction Manual (IMS01T04-E□).**

■ Caution for handling communication data

- In this communication, the variables that memory area includes handles different address with for control area and for setting area.
- If data (holding register) exceeding the accessible address range is accessed, an error response message is returned.
- Read data of unused item is a default value.
- Any attempt to write to an unused item is not processed as an error. Data cannot be written into an unused item.
- If data range or address error occurs during data writing, it is not processed as an error. Except the data that error occurred, normal data is written in data register. Therefore, it is necessary to confirm data after the end of setting data.
- Communication data includes data that becomes RO (read only) depending on the specification. No error occurs even if data is written when set to RO. However in this case, no data is written.

  ☞ For details, see **6.5.8 Modbus communication data list (P. 6-71).**

- Send the next command message at time intervals of 24 bits after the master receives the response message.

■ How to use memory area data

Memory area function can store up to 8 individual sets of SVs and parameters. One of the areas is used for control, and the currently selected area is "Control area."
Memory area data can be used to check and change settings that belong to memory areas other than the control area. Reading and writing of memory area data is performed by channel.

■ Read and write of memory area data

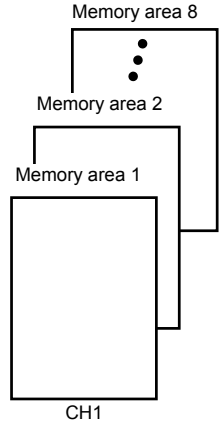
If any memory area number to perform data read and write is specified by the setting memory area number (386CH to 38ABH), data corresponding to the specified memory area number is called up to the register addresses from 38ACH to 3DABH. By using these register addresses from 38ACH to 3DABH, it becomes possible to read and write data in any memory area.

	Register address			
	CH1	CH2	·····	CH64
Setting memory area number	386CH	386DH	·····	38ABH
Event 1 set value (EV1)	38ACH	38ADH	·····	38EBH
Event 2 set value (EV2)	38ECH	38EDH	·····	392BH
Event 3 set value (EV3)	392CH	392DH	·····	396BH
Event 4 set value (EV4)	396CH	396DH	·····	39ABH
Control loop break alarm (LBA) time	39ACH	39ADH	·····	39EBH
LBA deadband	39ECH	39EDH	·····	3A2BH
Set value (SV)	3A2CH	3A2DH	·····	3A6BH
Proportional band [heat-side]	3A6CH	3A6DH	·····	3AABH
Integral time [heat-side]	3AACH	3AADH	·····	3AEBH
Derivative time [heat-side]	3AECH	3AEDH	·····	3B2BH
Control response parameter	3B2CH	3B2DH	·····	3B6BH
Proportional band [cool-side]	3B6CH	3B6DH	·····	3BABH
Integral time [cool-side]	3BACH	3BADH	·····	3BEBH
Derivative time [cool-side]	3BECH	3BEDH	·····	3C2BH
Overlap/Deadband	3C2CH	3C2DH	·····	3C6BH
Manual reset	3C6CH	3C6DH	·····	3CABH
Setting change rate limiter (up)	3CACH	3CADH	·····	3CEBH
Setting change rate limiter (down)	3CECH	3CEDH	·····	3D2BH
Area soak time	3D2CH	3D2DH	·····	3D6BH
Link area number	3D6CH	3D6DH	·····	3DABH

Register address to specify memory area

Register address of memory area data

☞ For the Memory area data list, see ■ **Memory area data address (P. 6-102).**



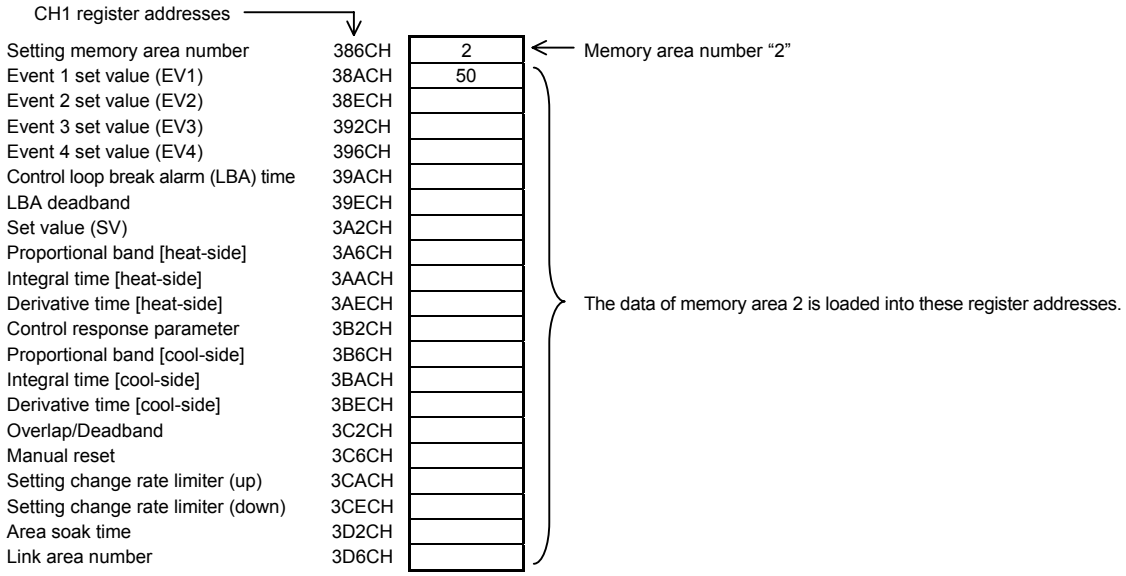
A memory area number which data is read/written is written to the register address, 386CH (for CH1).

Data corresponding to a specified memory area number is called up to the CH1 register addresses.

- Event 1 set value (EV1) (38ACH)
- Event 2 set value (EV2) (38ECH)
- Event 3 set value (EV3) (392CH)
- Event 4 set value (EV4) (396CH)
- Control loop break alarm (LBA) time (39ACH)
- LBA deadband (39ECH)
- Set value (SV) (3A2CH)
- Proportional band [heat-side] (3A6CH)
- Integral time [heat-side] (3AACH)
- Derivative time [heat-side] (3AECH)
- Control response parameter (3B2CH)
- Proportional band [cool-side] (3B6CH)
- Integral time [cool-side] (3BACH)
- Derivative time [cool-side] (3BECH)
- Overlap/Deadband (3C2CH)
- Manual reset (3C6CH)
- Setting change rate limiter (up) (3CACH)
- Setting change rate limiter (down) (3CECH)
- Area soak time (3D2CH)
- Link area number (3D6CH)

[Example 1] When data on the Event 1 set value in Memory area 2 of CH1 is read

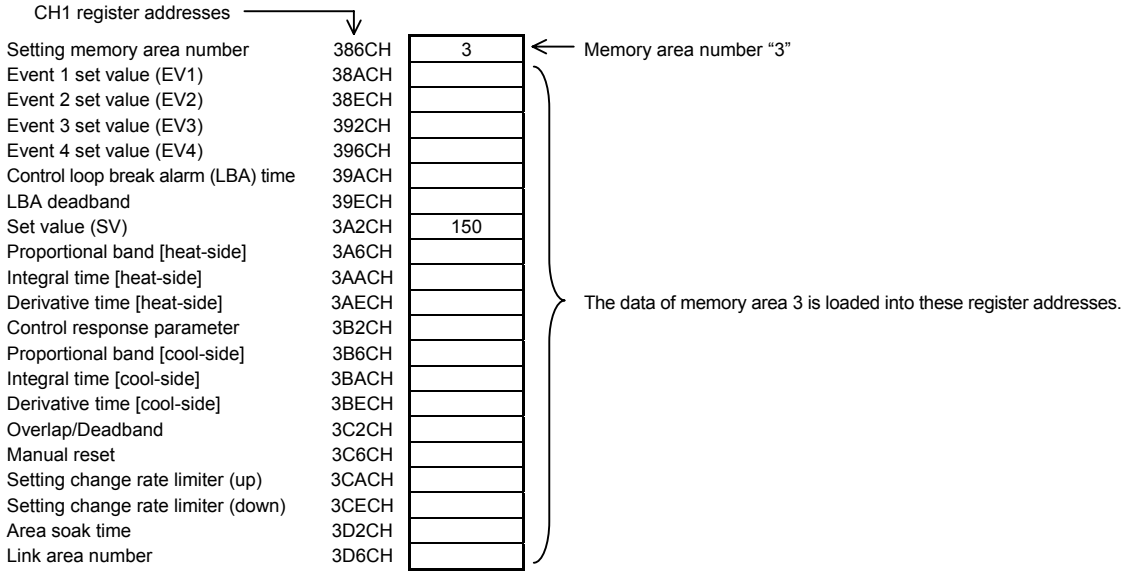
1. The memory area number, "2" is written to the CH1 setting memory area number (386CH). Data in Memory area 2 is called up to the CH1 register addresses.



2. Data "50" on Event 1 set value (38ACH) is read.

[Example 2] When the set value (SV) in Memory area 3 of CH1 is changed to 200

1. The memory area number, "3" is written to the CH1 setting memory area number (386CH). Data in Memory area 3 is called up to the CH1 register addresses.



2. "200" is written to the set value (SV) (3A2CH).

■ Control area transfer

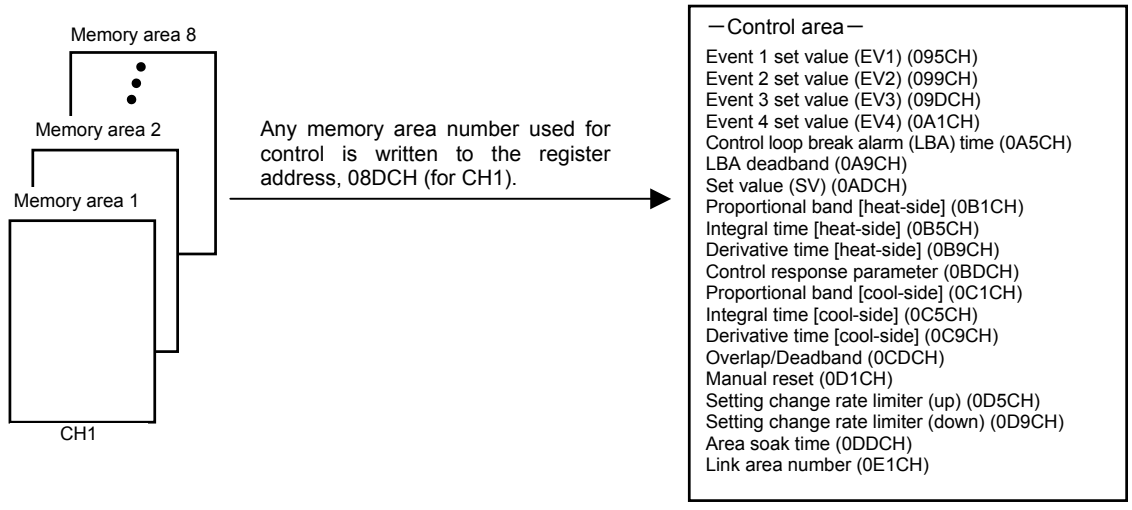
Any memory area used for control is specified by the memory area transfer (08DCH to 091BH). The area (095CH to 0E5BH) now used for control is called “Control area.”

The memory area number (control area) can be changed at either RUN or STOP.

	Register address			
	CH1	CH2	·····	CH64
Memory area transfer	08DCH	08DDH	·····	091BH
Event 1 set value (EV1)	095CH	095DH	·····	099BH
Event 2 set value (EV2)	099CH	099DH	·····	09DBH
Event 3 set value (EV3)	09DCH	09DDH	·····	0A1BH
Event 4 set value (EV4)	0A1CH	0A1DH	·····	0A5BH
Control loop break alarm (LBA) time	0A5CH	0A5DH	·····	049BH
LBA deadband	0A9CH	0A9DH	·····	0ADBH
Set value (SV)	0ADCH	0ADDH	·····	0B1BH
Proportional band [heat-side]	0B1CH	0B1DH	·····	0B5BH
Integral time [heat-side]	0B5CH	0B5DH	·····	0B9BH
Derivative time [heat-side]	0B9CH	0B9DH	·····	0BDBH
Control response parameter	0BDCH	0BDDH	·····	0C1BH
Proportional band [cool-side]	0C1CH	0C1DH	·····	0C5BH
Integral time [cool-side]	0C5CH	0C5DH	·····	0C9BH
Derivative time [cool-side]	0C9CH	0C9DH	·····	0CDBH
Overlap/Deadband	0CDCH	0CDDH	·····	0CDCH
Manual reset	0D1CH	0D1DH	·····	0D5BH
Setting change rate limiter (up)	0D5CH	0D5DH	·····	0D9BH
Setting change rate limiter (down)	0D9CH	0D9DH	·····	0DDBH
Area soak time	0DDCH	0DDDH	·····	0E1BH
Link area number	0E1CH	0E1CH	·····	0E5BH

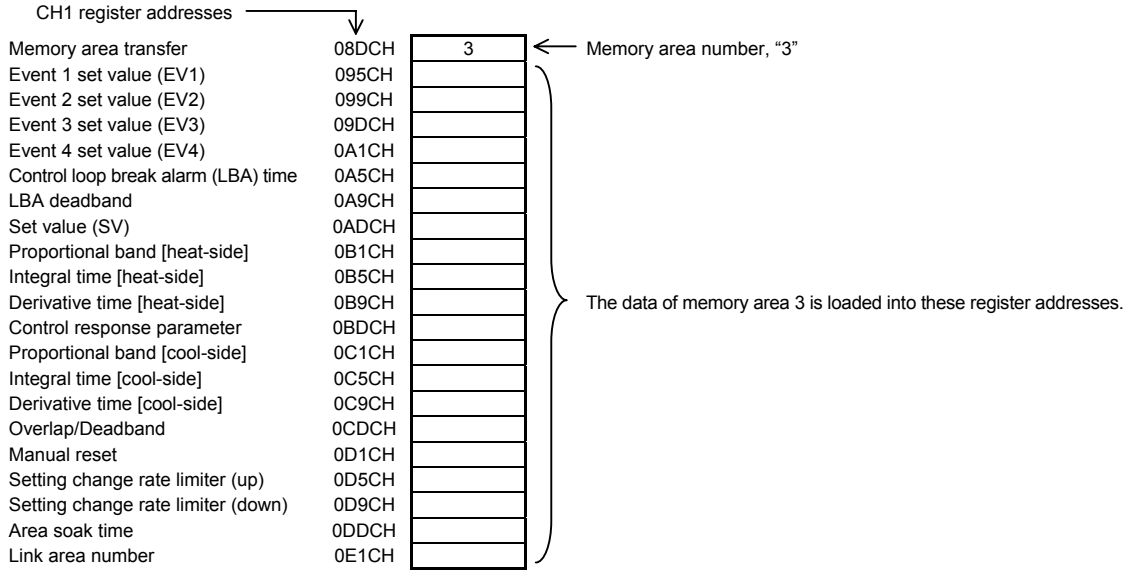
← Register address to specify control area

Register address of memory area data



[Example] When performing control by calling up data in Memory area 3 of CH1

1. The memory area number, "3" is written to the memory area transfer (08DCH).
Data in Memory area 3 is called up to the CH1 register addresses.



3. Control of CH1 is performed by using data in the register addresses.

If the memory area transfer (08DCH to 091BH) and the setting memory area number (386CH to 38ABH) are set to the same memory area number, the respective data can be synchronized.

- Values in the control areas (095CH to 0E5BH) and the setting memory area number (38ACH to 3DABH) are set to the same memory area number, the respective data can be synchronized.
- If data in the control area is changed, data in the memory area is also changed.
- If data in the memory area is changed, data in the control area is also changed.

■ Data mapping function

When using a Z-COM module joined to functional modules, the data mapping function cannot be used.

6.5.8 Modbus communication data list

■ Reference to communication data list

No. (1)	Name (1)	Chan-nel (2)	Resister address HEX (3)	Resister address DEC (3)	Attri-bute (4)	Struc-ture (5)	Data range (6)	Factory set value (7)
1	Error code (Z-COM module)	CH1	0000	0	RO	U	Bit data b0: Adjustment data error b1: Data back-up error b2: A/D conversion error b3: Unused b4: Unused b5: Logic output data error b6 to b15: Unused Data 0: OFF 1: ON [Decimal number: 0 to 63] The error condition is shown by the OR of each module. When multiple errors occur, the error No. is the sum value.	—

(1) Name: Communication data name

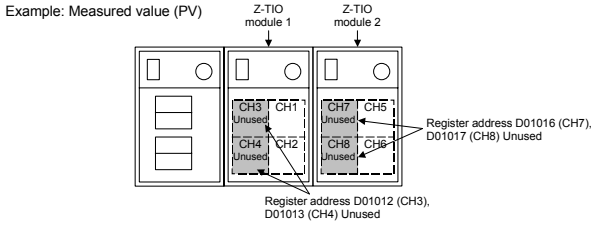
(2) Channel: Channel number of data of one unit.

(3) Register address:

Register addresses of each channel (HEX: Hexadecimal DEC: Decimal)

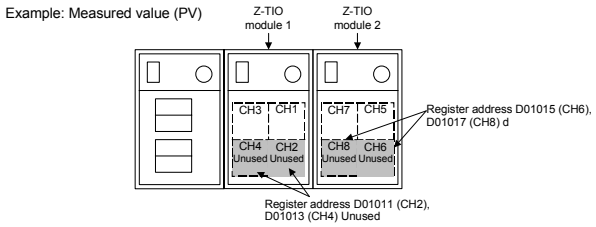
With respect to the following communication data of the Z-TIO module, the register addresses of the indicated channels are non-used areas.

- Two-channel type module:
  Register address of 3rd channel and 4th channel of Z-TIO module.



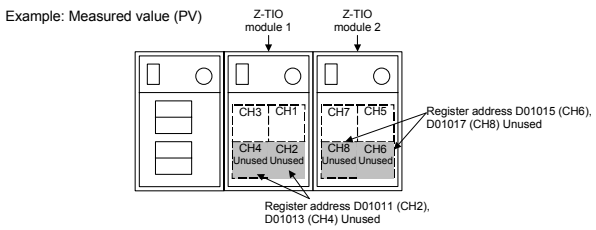
- Heat/cool control and position proportioning control:
  Register address of 2nd channel and 4th channel of Z-TIO module.*

  * Communication data with a ♣ mark in the name column.



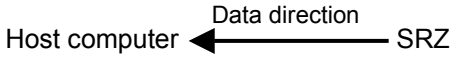
- Cool-only communication data of heat/cool control:
  Register address of 2nd channel and 4th channel of Z-TIO module.*

  * Communication data with a ♣ mark in the name column.

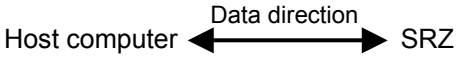


(4) Attribute: A method of how communication data items are read or written when viewed from the host computer is described

RO: Only reading data is possible.

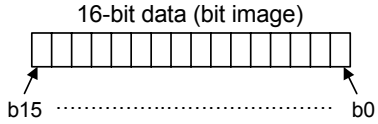


R/W: Reading and writing data is possible.



(5) Structure: C: Data for each channel M: Data for each module
U: Data for each SRZ unit

(6) Data range: Read or write range of communication data



(7) Factory set value: Factory set value of communication data

Some of the communication data of the Z-COM module will not be enabled until the power is turned on again, or control is switched from STOP to RUN.

Communication data No. 14 to 34

Communication includes both "Normal setting data" and "Engineering setting data". During RUN (control), the attribute of engineering setting data is RO. To configure engineering setting data, the RUN/STOP switch must be set to STOP (control stopped).

Z-TIO module: **Normal setting data No. 1 to 84,**
Engineering setting data No. 85 to 207

Z-DIO module: **Normal setting data No. 1 to 9,**
Engineering setting data No. 11 to 23

The Engineering setting data should be set according to the application before setting any parameter related to operation. Once the Engineering setting data are set correctly, those datas are 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 Engineering setting.

■ Communication data of Z-COM module

The communication data below is for PLC communication.

- No. 11 to 15: System data (monitoring item) for PLC communication
- No. 27 to 35, 37: System data (setting item) for PLC communication

☞ For the communication data of Z-COM module, see **Chapter 8 Communication data description (P. 8-1)**.

No.	Name	Chan-nel	Register address		Attri-bute	Struc-ture	Data range	Factory set value
			HEX	DEC				
1	Error code (Z-COM module)	CH1	0000	0	RO	U	Bit data b0: Adjustment data error b1: Data back-up error b2: A/D conversion error b3: Unused b4: Unused b5: Logic output data error b6: Program error (stack) * b7: Watchdog timer error * b8 to b15: Unused Data 0: OFF 1: ON [Decimal number: 0 to 255] The error condition is shown by the OR of each module * Error code of the Z-COM module	—
2	Error code (Functional module)	CH1 ⋮ CH100	0001 ⋮ 0064	1 ⋮ 100	RO	M	Bit data b0: Adjustment data error b1: Data back-up error b2: A/D conversion error b3: Unused b4: Unused b5: Logic output data error b6 to b15: Unused Data 0: OFF 1: ON [Decimal number: 0 to 63] Error condition is shown by the functional module.	—
3	Backup memory state monitor (Z-COM module)	CH1	0065	101	RO	M	0: The content of the backup memory does not coincide with that of the RAM. 1: The content of the backup memory coincides with that of the RAM.	—
4	Backup memory state monitor (Functional module)	CH1 ⋮ CH100	0066 ⋮ 00C9	102 ⋮ 201	RO	M	0: The content of the backup memory does not coincide with that of the RAM. 1: The content of the backup memory coincides with that of the RAM.	—
5	System communication state	CH1	00CA	202	RO	U	Bit data b0: Data collection condition b1 to b15: Unused Data 0: Before data collection is completed 1: Data collection is completed [Decimal number: 0, 1]	—
6	SRZ normal communication flag	CH1	00CB	203	RO	U	0/1 transfer (For communication checking) "0" and "1" are repeated for each communication period.	—

Continued on the next page.

Continued from the previous page.

No.	Name	Chan-nel	Register address HEX	Register address DEC	Attri-bute	Struc-ture	Data range	Factory set value
7	PLC communication error code	CH1	00CC	204	RO	U	Bit data b0: PLC register read/write error b1: Slave communication timeout b2: Unused b3: Internal communication error b4: Master communication timeout b5 to b15: Unused Data 0: OFF 1: ON [Decimal number: 0 to 31]	—
8	Unit recognition flag	CH1	00CD	205	RO	U	Bit data b0: SRZ unit 1 b1: SRZ unit 2 b2: SRZ unit 3 b3: SRZ unit 4 b4 to b15: Unused Data 0: No unit exists 1: Unit exists [Decimal number: 0 to 15]	—
9	Unused	—	00CE ⋮ 0131	206 ⋮ 305	—	—	—	—
10	Monitor for the number of connected modules	CH1	0132	306	RO	U	0 to 31	—
11	RUN/STOP transfer (Each SRZ unit)	CH1	0133	307	R/W	U	0: STOP (Control stop) 1: RUN (Control start)	0
12	RUN/STOP transfer (Each module)	CH1 ⋮ CH100	0134 ⋮ 0197	308 ⋮ 407	R/W	M	0: STOP (Control stop) 1: RUN (Control start)	0
13	Control RUN/STOP holding setting	CH1 ⋮ CH100	0198 ⋮ 01FB	408 ⋮ 507	R/W	M	0: Not holding (STOP start) 1: Holding (RUN/STOP hold)	1
The following items are enabled when the power is turned on again or when control is changed from STOP to RUN.								
14	Communication 1 protocol	CH1	8000	32768	R/W	U	0: RKC communication 1: Modbus	0
15	Communication 1 communication speed	CH1	8001	32769	R/W	U	0: 4800 bps 1: 9600 bps 2: 19200 bps 3: 38400 bps	2
16	Communication 1 data bit configuration	CH1	8002	32770	R/W	U	0 to 5 See **Table 1 (Data bit configuration)**	0
17	Communication 1 interval time	CH1	8003	32771	R/W	U	0 to 250 ms	10

Table1: Data bit configuration

Set value	Data bit	Parity bit	Stop bit
0	8	Without	1
1	8	Even	1
2	8	Odd	1
3	7	Without	1
4	7	Even	1
5	7	Odd	1

Set value	Data bit	Parity bit	Stop bit
6	8	Without	2
7	8	Even	2
8	8	Odd	2
9	7	Without	2
10	7	Even	2
11	7	Odd	2

No.	Name	Chan-nel	Register address HEX	Register address DEC	Attri-bute	Struc-ture	Data range	Factory set value
18	Communication 2 protocol	CH1	8004	32772	R/W	U	0: RKC communication 1: Modbus 2: MITSUBISHI MELSEC series special protocol A compatible, 1C frame (type 4), AnA/AnUCPU common command (QR/QW), AnA/QnA series, Q series QnA compatible, 3C frame (type 4), command (0401/1401) Only ZR register 3: OMRON SYSMAC series special protocol 4: MITSUBISHI MELSEC series special protocol A compatible, 1C frame (type 4), ACPU common command (WR/WW) (A series, FX2N/FX2NC series, FX3U/FX3UC series)	0
19	Communication 2 communication speed	CH1	8005	32773	R/W	U	0: 4800 bps 2: 19200 bps 1: 9600 bps 3: 38400 bps	2
20	Communication 2 data bit configuration	CH1	8006	32774	R/W	U	0 to 11 See **Table 1 (Data bit configuration) (P. 6-4)**.	0
21	Communication 2 interval time	CH1	8007	32775	R/W	U	0 to 250 ms	10
22	Station number	CH1	8008	32776	R/W	U	0 to 31	0
23	PC number (CPU No.)	CH1	8009	32777	R/W	U	0 to 255 Only set when connected to Mitsubishi's MELSEC Series.	255
24	Register type	CH1	800A	32778	R/W	U	MITSUBISHI MELSEC series 0: D register (Data register) 1: R register (File register) 2: W register (Link register) 3: ZR register (Method of specifying consecutive numbers when 32767 of R register is exceeded.) Only enabled when the "QnA compatible 3C frame" is used. 4 to 29: Unused --- OMRON SYSMAC series 0: DM register (Data memory) 1 to 9: Unused 10 to 22: EM register (Extended data memory) [Specify the bank No.] [Specify the bank No.+10] 23 to 28: Unused 29: EM register (Extended data memory) [Specify the current bank]	0
25	Register start number (High-order 4-bit)	CH1	800B	32779	R/W	U	0 to 15: QnA compatible 3C frame	0
26	Register start number (Low-order 16-bit)	CH1	800C	32780	R/W	U	0 to 9999: A compatible, 1C frame, ACPU common command (WR/WW), OMRON SYSMAC series 0 to 65535: A compatible, 1C frame, AnA/AnUCPU common command (QR/QW), QnA compatible 3C frame, command (0401/1401)	1000
27	System data address bias	CH1	800D	32781	R/W	U	0 to 65535	2100
28	COM module link recognition time	CH1	800E	32782	R/W	U	0 to 255 seconds	10
29	PLC scanning time	CH1	800F	32783	R/W	U	0 to 3000 ms	255

Continued on the next page.

Continued from the previous page.

No.	Name	Chan-nel	Register address		Attri-bute	Struc-ture	Data range	Factory set value
			HEX	DEC				
30	PLC communicationstart time	CH1	8010	32784	R/W	U	1 to 255 seconds	5
31	Method for setting the number of connected modules	CH1	8011	32785	R/W	U	0: Does nothing 1: The maximum number of connected modules for functional modules is automatically set only when the power is turned ON. 2: The maximum number of connected modules for functional modules is automatically set when the number of connected modules is changed.	1
32	Slave mapping method	CH1	8012	32786	R/W	U	0: Bias from the address setting switch [Register address + (Address setting switch%4) × System data address bias] 1: Bias disabled	0
33	Number of connected modules (Z-TIO module)	CH1	8013	32787	R/W	U	0 to 16 This is the maximum address of the Z-TIO module that is connected to the Z-COM module.	—
34	Number of connected modules (Z-DIO module)	CH1	8014	32788	R/W	U	0 to 16 This is the maximum address of the Z-DIO module that is connected to the Z-COM module.	—
35	Unused	—	8015 ⋮ 801A	32789 ⋮ 32794	—	—	—	—

■ Communication data of Z-TIO module

☞ For details of Z-TIO module communication data, see **SRZ Instruction Manual (IMS01T04-E□)**.

No.	Name	Chan-nel	Register address		Attri-bute	Struc-ture	Data range	Factory set value
			HEX	DEC				
1	Measured value (PV)	CH1 : CH64	01FC : 023B	508 : 571	RO	C	Input scale low to Input scale high	—
2	Comprehensive event state	CH1 : CH64	023C : 027B	572 : 635	RO	C	Bit data b0: Event 1 state b1: Event 2 state b2: Event 3 state b3: Event 4 state b4: Heater break alarm state b5: Temperature rise completion b6: Burnout b7 to b15: Unused Data 0: OFF 1: ON [Decimal number: 0 to 127]	—
3	Operation mode state monitor	CH1 : CH64	027C : 02BB	636 : 699	RO	C	Bit data b0: Control STOP b1: Control RUN b2: Manual mode * b3: Remote mode * b4 to b15: Unused Data 0: OFF 1: ON [Decimal number: 0 to 15] * During operation in manual mode, the manual mode of the operation mode state monitor is set to the "1: ON" state and the remote mode of the same monitor is se to the "0: OFF" state even if the parameter, "Remote/Local transfer" is set to "1: Remote mode."	—
4	Unused	—	02BC : 02CB	700 : 715	—	—	—	—
5	Manipulated output value (MV) monitor [heat-side] ♣	CH1 : CH64	02CC : 030B	716 : 779	RO	C	PID control or heat/cool PID control: −5.0 to +105.0 % Position proportioning control with feedback resistance (FBR) input: 0.0 to 100.0 %	—
6	Manipulated output value (MV) monitor [cool-side] ♣	CH1 : CH64	030C : 034B	780 : 843	RO	C	−5.0 to +105.0 %	—
7	Current transformer (CT) input value monitor	CH1 : CH64	034C : 038B	844 : 907	RO	C	CTL-6-P-N: 0.0 to 30.0A CTL-12-S56-10L-N: 0.0 to 100.0 A	—
8	Set value (SV) monitor	CH1 : CH64	038C : 03CB	908 : 971	RO	C	Setting limiter (low) to Setting limiter (high)	—
9	Remote setting (RS) input value monitor	CH1 : CH64	03CC : 040B	972 : 1035	RO	C	Setting limiter (low) to Setting limiter (high)	—

Continued on the next page.

Continued from the previous page.

No.	Name	Chan-nel	Register address HEX	Register address DEC	Attri-bute	Struc-ture	Data range	Factory set value
10	Burnout state monitor	CH1 : CH64	040C : 044B	1036 : 1099	RO	C	0: OFF 1: ON	—
11	Event 1 state monitor	CH1 : CH64	044C : 048B	1100 : 1163	RO	C	0: OFF 1: ON	—
12	Event 2 state monitor	CH1 : CH64	048C : 04CB	1164 : 1227	RO	C		—
13	Event 3 state monitor	CH1 : CH64	04CC : 050B	1228 : 1291	RO	C		—
14	Event 4 state monitor	CH1 : CH64	050C : 054B	1292 : 1355	RO	C		—
15	Heater break alarm (HBA) state monitor	CH1 : CH64	054C : 058B	1356 : 1419	RO	C	0: OFF 1: ON	—
16	Output state monitor	CH1 : CH16	058C : 059B	1420 : 1435	RO	M	Bit data b0: OUT1 b1: OUT2 b2: OUT3 b3: OUT4 b4 to b15: Unused Data 0: OFF 1: ON [Decimal number: 0 to 15] When control output is specified, this function is available only for a proportioning control.	—
17	Memory area soak time monitor	CH1 : CH64	059C : 05DB	1436 : 1499	RO	C	0 minutes 00 seconds to 199 minutes 59 seconds: 0 to 11999 seconds 0 hours 00 minutes to 99 hours 59 minutes: 0 to 5999 minutes Data range of Area soak time can be selected on the Soak time unit.	—
18	Unused	—	05DC : 05EB	1500 : 1515	—	—	—	—
19	Holding peak value ambient temperature monitor	CH1 : CH64	05EC : 062B	1516 : 1579	RO	C	−10.0 to +100.0 °C (14.0 to 212.0 °F)	—
20	Unused	—	062C : 063B	1580 : 1595	—	—	—	—
21	Logic output monitor 1	CH1 : CH16	063C : 064B	1596 : 1611	RO	M	Bit data b0: Logic output 1 b1: Logic output 2 b2: Logic output 3 b3: Logic output 4 b4: Logic output 5 b5: Logic output 6 b6: Logic output 7 b7: Logic output 8 b8 to b15: Unused Data 0: OFF 1: ON [Decimal number: 0 to 255]	—

Continued on the next page.

Continued from the previous page.

No.	Name	Chan-nel	Register address HEX	Register address DEC	Attri-bute	Struc-ture	Data range	Factory set value
22	Unused	—	064C : 080B	1612 : 2059	—	—	—	—
23	PID/AT transfer	CH1 : CH64	080C : 084B	2060 : 2123	R/W	C	0: PID control 1: Autotuning (AT)	0
24	Auto/Manual transfer	CH1 : CH64	084C : 088B	2124 : 2187	R/W	C	0: Auto mode 1: Manual mode	0
25	Remote/Local transfer	CH1 : CH64	088C : 08CB	2188 : 2251	R/W	C	0: Local mode 1: Remote mode When performing remote control by remote setting input and also performing cascade control and ratio setting, transfer to the Remote mode.	0
26	Unused	—	08CC : 08DB	2252 : 2267	—	—	—	—
27	Memory area transfer	CH1 : CH64	08DC : 091B	2268 : 2331	R/W	C	1 to 8	1
28	Interlock release	CH1 : CH64	091C : 095B	2332 : 2395	R/W	C	0: Normal state 1: Interlock release execution	0
29	Event 1 set value (EV1) ★	CH1 : CH64	095C : 099B	2396 : 2459	R/W	C	Deviation action, Deviation action between channels, Temperature rise completion range: −Input span to +Input span Process action, SV action: Input scale low to Input scale high MV action: −5.0 to +105.0 % If the Event type corresponds to "0: None," set to RO (Only reading data is possible). When temperature rise completion is selected at Event 3 action type. If Event 4 corresponds to "9: Control loop break alarm (LBA)," the Event 4 set value becomes RO (Only reading data is possible).	50
30	Event 2 set value (EV2) ★	CH1 : CH64	099C : 09DB	2460 : 2523	R/W	C		50
31	Event 3 set value (EV3) ★	CH1 : CH64	09DC : 0A1B	2524 : 2587	R/W	C		50
32	Event 4 set value (EV4) ★	CH1 : CH64	0A1C : 0A5B	2588 : 2651	R/W	C		50
33	Control loop break alarm (LBA) time ★	CH1 : CH64	0A5C : 0A9B	2652 : 2715	R/W	C	0 to 7200 seconds (0: Unused) If Event 4 is other than "9: Control loop break alarm (LBA)," set to RO (Only reading data is possible).	480
34	LBA deadband ★	CH1 : CH64	0A9C : 0ADB	2716 : 2779	R/W	C	0 (0.0) to Input span If Event 4 is other than "9: Control loop break alarm (LBA)," set to RO (Only reading data is possible).	0 (0.0)
35	Set value (SV) ★	CH1 : CH64	0ADC : 0B1B	2780 : 2843	R/W	C	Setting limiter (low) to Setting limiter (high)	TC/RTD: 0 °C [°F] V/I: 0.0 %

★: Parameters which can be used in multi-memory area function

Continued on the next page.

Continued from the previous page.

No.	Name	Chan-nel	Register address HEX	Register address DEC	Attri-bute	Struc-ture	Data range	Factory set value
36	Proportional band [heat-side] ★ ♣	CH1 : CH64	0B1C : 0B5B	2844 : 2907	R/W	C	TC/RTD inputs: 0 (0.0) to Input span (Unit: °C [°F]) Varies with the setting of the decimal point position selection. Voltage (V)/current (I) inputs: 0.0 to 1000.0 % of input span 0 (0.0): ON/OFF action (ON/OFF action for both heat and cool actions in case of a heat/cool control type.)	TC/RTD:30 V/I: 30.0
37	Integral time [heat-side] ★ ♣	CH1 : CH64	0B5C : 0B9B	2908 : 2971	R/W	C	PID control or heat/cool PID control: 0 to 3600 seconds or 0.0 to 1999.9 seconds (0, 0.0: PD action) Position proportioning control: 1 to 3600 seconds or 0.1 to 1999.9 seconds Varies with the setting of the integral/derivative time decimal point position selection.	240
38	Derivative time [heat-side] ★ ♣	CH1 : CH64	0B9C : 0BDB	2972 : 3035	R/W	C	0 to 3600 seconds or 0.0 to 1999.9 seconds (0, 0.0: PI action) Varies with the setting of the integral/derivative time decimal point position selection.	60
39	Control response parameter ★ ♣	CH1 : CH64	0BDC : 0C1B	3036 : 3099	R/W	C	0: Slow 1: Medium 2: Fast P or PD action: 2 (Fast) fixed	PID control, Position proportioning control: 0 Heat/cool PID control: 2
40	Proportional band [cool-side] ★ ♣	CH1 : CH64	0C1C : 0C5B	3100 : 3163	R/W	C	TC/RTD inputs: 1 (0.1) to Input span (Unit: °C [°F]) Varies with the setting of the decimal point position selection. Voltage (V)/current (I) inputs: 0.1 to 1000.0 % of input span If control is other than heat/cool PID control, set to RO (Only reading data is possible).	TC/RTD: 30 V/I: 30.0
41	Integral time [cool-side] ★ ♣	CH1 : CH64	0C5C : 0C9B	3164 : 3227	R/W	C	0 to 3600 seconds or 0.0 to 1999.9 seconds (0, 0.0: PD action) Varies with the setting of the integral/derivative time decimal point position selection. If control is other than heat/cool PID control, set to RO (Only reading data is possible).	240
42	Derivative time [cool-side] ★ ♣	CH1 : CH64	0C9C : 0CDB	3228 : 3291	R/W	C	0 to 3600 seconds or 0.0 to 1999.9 seconds (0, 0.0: PI action) Varies with the setting of the integral/derivative time decimal point position selection. If control is other than heat/cool PID control, set to RO (Only reading data is possible).	60
43	Overlap/Deadband ★ ♣	CH1 : CH64	0CDC : 0D1B	3292 : 3355	R/W	C	TC/RTD inputs: –Input span to +Input span (Unit:°C [°F]) Voltage (V)/current (I) inputs: –100.0 to +100.0 % of input span Minus (–) setting results in overlap. However, the overlapping range is within the proportional range. If control is other than heat/cool PID control, set to RO (Only reading data is possible).	0

★: Parameters which can be used in multi-memory area function

Continued on the next page.

Continued from the previous page.

No.	Name	Chan-nel	Register address		Attri-bute	Struc-ture	Data range	Factory set value
			HEX	DEC				
44	Manual reset ★	CH1 : CH64	0D1C : 0D5B	3356 : 3419	R/W	C	–100.0 to +100.0 % If the integral function is valid, set to RO (Only reading data is possible). When integral action (heating or cooling side) is zero, manual reset value is added to the control output.	0.0
45	Setting change rate limiter (up) ★	CH1 : CH64	0D5C : 0D9B	3420 : 3483	R/W	C	0 (0.0) to Input span/unit time * 0 (0.0): Unused	0 (0.0)
46	Setting change rate limiter (down) ★	CH1 : CH64	0D9C : 0DDB	3484 : 3547	R/W	C	* Unit time: 60 seconds (factory set value)	0 (0.0)
47	Area soak time ★	CH1 : CH64	0DDC : 0E1B	3548 : 3611	R/W	C	0 minutes 00 seconds to 199 minutes 59 seconds: 0 to 11999 seconds 0 hours 00 minutes to 99 hours 59 minutes: 0 to 5999 minuts Data range of Area soak time can be selected on the Soak time unit.	0
48	Link area number ★	CH1 : CH64	0E1C : 0E5B	3612 : 3675	R/W	C	0 to 8 (0: No link)	0
49	Heater break alarm (HBA) set value	CH1 : CH64	0E5C : 0E9B	3676 : 3739	R/W	C	When CT is CTL-6-P-N: 0.0 to 30.0 A (0.0: Not used) When CT is CTL-12-S56-10L-N: 0.0 to 100.0 A (0.0: Not used) If there is no current transformer (CT) or CT is assigned to "0: None," set to RO (Only reading data is possible).	0.0
50	Heater break determination point	CH1 : CH64	0E9C : 0EDB	3740 : 3803	R/W	C	0.0 to 100.0 % of HBA set value (0.0: Heater break determination is invalid) If there is no current transformer (CT) or CT is assigned to "0: None," set to RO (Only reading data is possible). If Heater break alarm (HBA) corresponds to "0: Type A," set to RO (Only reading data is possible).	30.0
51	Heater melting determination point	CH1 : CH64	0EDC : 0F1B	3804 : 3867	R/W	C	0.0 to 100.0 % of HBA set value (0.0: Heater melting determination is invalid) If there is no current transformer (CT) or CT is assigned to "0: None," set to RO (Only reading data is possible). If Heater break alarm (HBA) corresponds to "0: Type A," set to RO (Only reading data is possible).	30.0
52	PV bias	CH1 : CH64	0F1C : 0F5B	3868 : 3931	R/W	C	–Input span to +Input span	0
53	PV digital filter	CH1 : CH64	0F5C : 0F9B	3932 : 3995	R/W	C	0.0 to 100.0 seconds (0.0: Unused)	0.0
54	PV ratio	CH1 : CH64	0F9C : 0FDB	3996 : 4059	R/W	C	0.500 to 1.500	1.000
55	PV low input cut-off	CH1 : CH64	0FDC : 101B	4060 : 4123	R/W	C	0.00 to 25.00 % of input span If the Square root extraction corresponds to "0: Unused," set to RO (Only reading data is possible).	0.00

★: Parameters which can be used in multi-memory area function

Continued on the next page.

Continued from the previous page.

No.	Name	Chan-nel	Register address		Attri-bute	Struc-ture	Data range	Factory set value
			HEX	DEC				
56	RS bias *	CH1 ⋮ CH64	101C ⋮ 105B	4124 ⋮ 4187	R/W	C	−Input span to +Input span	0
57	RS digital filter *	CH1 ⋮ CH64	105C ⋮ 109B	4188 ⋮ 4251	R/W	C	0.0 to 100.0 seconds (0.0: Unused)	0.0
58	RS ratio *	CH1 ⋮ CH64	109C ⋮ 10DB	4252 ⋮ 4315	R/W	C	0.001 to 9.999	1.000
59	Output distribution selection	CH1 ⋮ CH64	10DC ⋮ 111B	4316 ⋮ 4379	R/W	C	0: Control output 1: Distribution output	0
60	Output distribution bias	CH1 ⋮ CH64	111C ⋮ 115B	4380 ⋮ 4443	R/W	C	−100.0 to +100.0 %	0.0
61	Output distribution ratio	CH1 ⋮ CH64	115C ⋮ 119B	4444 ⋮ 4507	R/W	C	−9.999 to +9.999	1.000
62	Proportional cycle time	CH1 ⋮ CH64	119C ⋮ 11DB	4508 ⋮ 4571	R/W	C	0.1 to 100.0 seconds This item becomes RO (Only reading data is possible) for the voltage/current output specification. This parameter is valid when “0: control output” has been selected at No.94 “Output assignment”.	Relay contact output: 20.0 seconds Voltage pulse output, triac output and open collector output: 2.0 seconds
63	Minimum ON/OFF time of proportioning cycle	CH1 ⋮ CH64	11DC ⋮ 121B	4572 ⋮ 4635	R/W	C	0 to 1000 ms This item becomes RO (Only reading data is possible) for the voltage/current output specification.	0
64	Manual manipulated output value ♣	CH1 ⋮ CH64	121C ⋮ 125B	4636 ⋮ 4699	R/W	C	PID control: Output limiter (low) to Output limiter (high) Heat/cool PID control: −Cool-side output limiter (high) to +Heat-side output limiter (high) Position proportioning control: When there is feedback resistance (FBR) input and it does not break: Output limiter (low) to Output limiter (high) When there is no feedback resistance (FBR) input or the feedback resistance (FBR) input is disconnected: 0: Close-side output OFF, Open-side output OFF 1: Close-side output ON, Open-side output OFF 2: Close-side output OFF, Open-side output ON	0.0
65	Area soak time stop function	CH1 ⋮ CH64	125C ⋮ 129B	4700 ⋮ 4763	R/W	C	0: No function 1: Event 1 2: Event 2 3: Event 3 4: Event 4	0

* Data on RS bias, RS ratio and RS digital filter is that in cascade control or ratio setting.

Continued on the next page.

Continued from the previous page.

No.	Name	Chan-nel	Register address HEX	Register address DEC	Attri-bute	Struc-ture	Data range	Factory set value
66	EDS mode (for disturbance 1)	CH1 : CH64	129C : 12DB	4764 : 4827	R/W	C	0: No function 1: EDS function mode 2: Learning mode 3: Tuning mode EDS function: External disturbance suppression function	0
67	EDS mode (for disturbance 2)	CH1 : CH64	12DC : 131B	4828 : 4891	R/W	C		0
68	EDS value 1 (for disturbance 1)	CH1 : CH64	131C : 135B	4892 : 4955	R/W	C	−100.0 to +100.0 %	0.0
69	EDS value 1 (for disturbance 2)	CH1 : CH64	135C : 139B	4956 : 5019	R/W	C		0.0
70	EDS value 2 (for disturbance 1)	CH1 : CH64	139C : 13DB	5020 : 5083	R/W	C	−100.0 to +100.0 %	0.0
71	EDS value 2 (for disturbance 2)	CH1 : CH64	13DC : 141B	5084 : 5147	R/W	C		0.0
72	EDS transfer time (for disturbance 1)	CH1 : CH64	141C : 145B	5148 : 5211	R/W	C	0 to 3600 seconds or 0.0 to 1999.9 seconds	0
73	EDS transfer time (for disturbance 2)	CH1 : CH64	145C : 149B	5212 : 5275	R/W	C		0
74	EDS action time (for disturbance 1)	CH1 : CH64	149C : 14DB	5276 : 5339	R/W	C	1 to 3600 seconds	600
75	EDS action time (for disturbance 2)	CH1 : CH64	14DC : 151B	5340 : 5403	R/W	C		600
76	EDS action wait time (for disturbance 1)	CH1 : CH64	151C : 155B	5404 : 5467	R/W	C	0.0 to 600.0 seconds	0.0
77	EDS action wait time (for disturbance 2)	CH1 : CH64	155C : 159B	5468 : 5531	R/W	C		0.0
78	EDS value learning times	CH1 : CH64	159C : 15DB	5532 : 5595	R/W	C	0 to 10 times (0: No learning mode)	1
79	EDS start signal	CH1 : CH64	15DC : 161B	5596 : 5659	R/W	C	0: EDS start signal OFF 1: EDS start signal ON (for disturbance 1) 2: EDS start signal ON (for disturbance 2)	0
80	Operation mode	CH1 : CH64	161C : 165B	5660 : 5723	R/W	C	0: Unused 1: Monitor 2: Monitor + Event function 3: Control	3

Continued on the next page.

Continued from the previous page.

No.	Name	Channel	Register address HEX	Register address DEC	Attribute	Structure	Data range	Factory set value
81	Startup tuning (ST)	CH1 : CH64	165C : 169B	5724 : 5787	R/W	C	0: ST unused 1: Execute once 2: Execute always The startup tuning (ST) function is activated according to the ST start condition selected. If control is position proportioning control, set to RO (Only reading data is possible).	0
82	Automatic temperature rise learning	CH1 : CH64	169C : 16DB	5788 : 5851	R/W	C	0: Unused 1: Learning If the Automatic temperature rise group corresponds to "0: Automatic temperature rise function OFF," set to RO (Only reading data is possible).	0
83	Communication switch for logic	CH1 : CH16	16DC : 16EB	5852 : 5867	R/W	M	Bit data b0: Communication switch 1 b1: Communication switch 2 b2: Communication switch 3 b3: Communication switch 4 b4 to b15: Unused Data 0: OFF 1: ON [Decimal number: 0 to 15]	0
84	Unused	—	16EC : 196B	5868 : 6507	—	—	—	—
Set data No. 85 or later are for engineering setting [Writable in the STOP mode]								
85	Input type	CH1 : CH64	196C : 19AB	6508 : 6571	R/W	C	0: TC input K 1: TC input J 2: TC input R 3: TC input S 4: TC input B 5: TC input E 6: TC input N 7: TC input T 8: TC input W5Re/W26Re 9: TC input PLII 12: RTD input Pt100 13: RTD input JPt100 14: Current input 0 to 20 mA DC 15: Current input 4 to 20 mA DC 16: Voltage (high) input 0 to 10 V DC 17: Voltage (high) input 0 to 5 V DC 18: Voltage (high) input 1 to 5 V DC 19: Voltage (low) input 0 to 1 V DC 20: Voltage (low) input 0 to 100 mV DC 21: Voltage (low) input 0 to 10 mV DC 22: Feedback resistance input 100 to 150 Ω 23: Feedback resistance input 151 Ω to 6 kΩ If changed to voltage (high) input from TC/RTD/current/voltage (low)/feedback resistance input, select the hardware by the input selector switch at the side of the module. See **SRZ Instruction Manual (IMS01T04-E□)**.	Depends on model code When not specifying: 0
86	Display unit	CH1 : CH64	19AC : 19EB	6572 : 6635	R/W	C	0: °C 1: °F The engineering unit for voltage/current input is expressed as %.	0

Continued on the next page.

Continued from the previous page.

No.	Name	Chan-nel	Register address		Attri-bute	Struc-ture	Data range	Factory set value
			HEX	DEC				
87	Decimal point position	CH1 : CH64	19EC : 1A2B	6636 : 6699	R/W	C	0: No decimal place 1: One decimal place 2: Two decimal places 3: Three decimal places 4: Four decimal places TC input: • K, J, T, E: Only 0 or 1 can be set. • R, S, B, N, PLII, W5Re/W26Re: Only 0 can be set. RTD input: Only 0 or 1 can be set. V/I inputs: From 0 to 4 can be set.	Depends on model code When not specifying: TC/RTD: 1 V/I: 1
88	Input scale high	CH1 : CH64	1A2C : 1A6B	6700 : 6763	R/W	C	TC/RTD inputs: Input scale low to Maximum value of the selected input range Voltage (V)/current (I) inputs: −19999 to +99999 Varies with the setting of the decimal point position	TC/RTD: Maximum value of the selected input range V/I: 100.0
89	Input scale low	CH1 : CH64	1A6C : 1AAB	6734 : 6827	R/W	C	TC/RTD inputs: Minimum value of the selected input range to Input scale high Voltage (V)/current (I) inputs: −19999 to +99999 Varies with the setting of the decimal point position	TC/RTD: Minimum value of the selected input range V/I: 0.0
90	Input error determination point (high)	CH1 : CH64	1AAC : 1AEB	6828 : 6891	R/W	C	Input error determination point (low limit) to (Input range high + 5 % of Input span)	Input range high + (5 % of Input span)
91	Input error determination point (low)	CH1 : CH64	1AEC : 1B2B	6892 : 6955	R/W	C	(Input range low − 5 % of Input span) to Input error determination point (high limit)	Input range low − (5 % of Input span)
92	Burnout direction	CH1 : CH64	1B2C : 1B6B	6956 : 7019	R/W	C	0: Upscale 1: Downscale Valid only when the TC input and voltage (low) input are selected.	0
93	Square root extraction	CH1 : CH64	1B6C : 1BAB	7020 : 7083	R/W	C	0: Unused 1: Used	0
94	Output assignment (Logic output selection function)	CH1 : CH64	1BAC : 1BEB	7084 : 7147	R/W	C	0: Control output 1: Logic output result 2: FAIL output	0
95	Energized/De-energized (Logic output selection function)	CH1 : CH64	1BEC : 1C2B	7148 : 7211	R/W	C	0: Energized 1: De-energized	0

Continued on the next page.

Continued from the previous page.

No.	Name	Chan-nel	Register address		Attri-bute	Struc-ture	Data range	Factory set value
			HEX	DEC				
96	Event 1 type	CH1 : CH64	1C2C : 1C6B	7212 : 7275	R/W	C	0: None 1: Deviation high (Using SV monitor value) [1] 2: Deviation low (Using SV monitor value) [1] 3: Deviation high/low (Using SV monitor value) [1] 4: Band (Using SV monitor value) [1] 5: Process high [1] 6: Process low [1] 7: SV high 8: SV low 9: Unused 10: MV high [heat-side] [1, 2] 11: MV low [heat-side] [1, 2] 12: MV high [cool-side] [1] 13: MV low [cool-side] [1] 14: Deviation high (Using local SV) [1] 15: Deviation low (Using local SV) [1] 16: Deviation high/low (Using local SV) [1] 17: Deviation (Using local SV) [1] 18: Deviation between channels high [1] 19: Deviation between channels low [1] 20: Deviation between channels high/low [1] 21: Deviation between channels band [1] [1] Event hold action is available. [2] If there is feedback resistance (FBR) input in position proportioning control, set to the feedback resistance (FBR) input value.	Depends on model code When not specifying: 0
97	Event 1 channel setting	CH1 : CH64	1C6C : 1CAB	7276 : 7277	R/W	C	1: Channel 1 2: Channel 2 3: Channel 3 4: Channel 4 This function is valid when “eviation between channels”is selected	1
98	Event 1 hold action	CH1 : CH64	1CAC : 1CEB	7340 : 7403	R/W	C	0: OFF 1: Hold action ON (When power turned on) 2: Re-hold action ON (When power turned on and SV changed) This function is valid when input value, deviation or manipulated value action has been selected. In case of a deviation action, this function is not available while in remote mode and while setting changing rate limiter is working.	Depends on model code When not specifying: 0
99	Event 1 interlock	CH1 : CH64	1CEC : 1C2B	7404 : 7467	R/W	C	0: Unused 1: Used	0
100	Event 1 differential gap	CH1 : CH64	1D2C : 1D6B	7468 : 7531	R/W	C	① Deviation, process, set value, or Deviation action between channels: 0 to Input span (Unit: °C [°F]) ② MV: 0.0 to 110.0 %	①: TC/RTD: 1 °C [°F] V/I: 0.1 % ②: 0.1 %
101	Event 1 delay timer	CH1 : CH64	1D6C : 1DAB	7532 : 7595	R/W	C	0 to 18000 seconds	0
102	Force ON of Event 1 action	CH1 : CH64	1DAC : 1DEB	7596 : 7659	R/W	C	Bit data b0: Event output turned on at input error occurrence b1: Event output turned on in manual mode b2: Event output turned on during the autotuning (AT) function is being executed b3: Event output turned on during the setting change rate limiter is being operated b4 to b15: Unused Data 0: Invalid 1: Valid [Decimal number: 0 to 15]	0

Continued on the next page.

Continued from the previous page.

No.	Name	Chan-nel	Register address		Attri-bute	Struc-ture	Data range	Factory set value
			HEX	DEC				
103	Event 2 type	CH1 : CH64	1DEC : 1E2B	7660 : 7723	R/W	C	0: None 1: Deviation high (SV monitor value used) [1] 2: Deviation low (SV monitor value used) [1] 3: Deviation high/low (SV monitor value used) [1] 4: Band (SV monitor value used) [1] 5: Process high [1] 6: Process low [1] 7: SV high 8: SV low 9: Unused 10: MV high [heat-side] [1, 2] 11: MV low [heat-side] [1, 2] 12: MV high [cool-side] [1] 13: MV low [cool-side] [1] 14: Deviation high (Local SV value used) [1] 15: Deviation low (Local SV value used) [1] 16: Deviation high/low (Local SV value used) [1] 17: Deviation (Local SV value used) [1] 18: Deviation between channels high [1] 19: Deviation between channels low [1] 20: Deviation between channels high/low [1] 21: Deviation between channels band [1] [1] Event hold action is available. [2] If there is feedback resistance (FBR) input in position proportioning control, set to the feedback resistance (FBR) input value.	Depends on model code When not specifying: 0
104	Event 2 channel setting	CH1 : CH64	1E2C : 1E6B	7724 : 7787	R/W	C	1: Channel 1 2: Channel 2 3: Channel 3 4: Channel 4 This function is valid when "eviation between channels"is selected	1
105	Event 2 hold action	CH1 : CH64	1E6C : 1EAB	7788 : 7851	R/W	C	0: OFF 1: Hold action ON (When power turned on) 2: Re-hold action ON (When power turned on and SV changed) This function is valid when input value, deviation or manipulated value action has been selected. In case of a deviation action, this function is not available while in remote mode and while setting changing rate limiter is working.	Depends on model code When not specifying: 0
106	Event 2 interlock	CH1 : CH64	1EAC : 1EEB	7852 : 7852	R/W	C	0: Unused 1: Used	0
107	Event 2 differential gap	CH1 : CH64	1EEC : 1F2B	7916 : 7979	R/W	C	① Deviation, process, set value, or Deviation action between channels: 0 to Input span (Unit: °C [°F]) ② MV: 0.0 to 110.0 %	①: TC/RTD: 1 °C [°F] V/I: 0.1 % ②: 0.1 %
108	Event 2 delay timer	CH1 : CH64	1F2C : 1F6B	7980 : 8043	R/W	C	0 to 18000 seconds	0
109	Force ON of Event 2 action	CH1 : CH64	1F6C : 1FAB	8044 : 8107	R/W	C	Bit data b0: Event output turned on at input error occurrence b1: Event output turned on in manual mode b2: Event output turned on during the autotuning (AT) function is being executed b3: Event output turned on during the setting change rate limiter is being operated b4 to b15: Unused Data 0: Invalid 1: Valid [Decimal number: 0 to 15]	0

Continued on the next page.

Continued from the previous page.

No.	Name	Chan-nel	Register address		Attri-bute	Struc-ture	Data range	Factory set value
			HEX	DEC				
110	Event 3 type	CH1 : CH64	1FAC : 1FEB	8108 : 8171	R/W	C	0: None 1: Deviation high (SV monitor value used) [1] 2: Deviation low (SV monitor value used) [1] 3: Deviation high/low (SV monitor value used) [1] 4: Band (SV monitor value used) [1] 5: Process high [1] 6: Process low [1] 7: SV high 8: SV low 9: Temperature rise completion 10: MV high [heat-side] [1, 2] 11: MV low [heat-side] [1, 2] 12: MV high [cool-side] [1] 13: MV low [cool-side] [1] 14: Deviation high (Local SV value used) [1] 15: Deviation low (Local SV value used) [1] 16: Deviation high/low (Local SV value used) [1] 17: Deviation (Local SV value used) [1] 18: Deviation between channels high [1] 19: Deviation between channels low [1] 20: Deviation between channels high/low [1] 21: Deviation between channels band [1] [1] Event hold action is available. [2] If there is feedback resistance (FBR) input in position proportioning control, set to the feedback resistance (FBR) input value.	Depends on model code When not specifying: 0
111	Event 3 channel setting	CH1 : CH64	1FEC : 202B	8172 : 8235	R/W	C	1: Channel 1 2: Channel 2 3: Channel 3 4: Channel 4 This function is valid when "deviation between channels" is selected	1
112	Event 3 hold action	CH1 : CH64	202C : 206B	8236 : 8299	R/W	C	0: OFF 1: Hold action ON (When power turned on) 2: Re-hold action ON (When power turned on and SV changed) This function is valid when input value, deviation or manipulated value action has been selected. In case of a deviation action, this function is not available while in remote mode and while setting changing rate limiter is working.	Depends on model code When not specifying: 0
113	Event 3 interlock	CH1 : CH64	206C : 20AB	8300 : 8363	R/W	C	0: Unused 1: Used	0
114	Event 3 differential gap	CH1 : CH64	20AC : 20EB	8364 : 8427	R/W	C	① Deviation, process, set value, Deviation action between channels, or Temperature rise completion: 0 to Input span (Unit: °C [°F]) ② MV: 0.0 to 110.0 %	①: TC/RTD: 1 °C [°F] V/I: 0.1 % ②: 0.1 %
115	Event 3 delay timer	CH1 : CH64	20EC : 212B	8428 : 8491	R/W	C	0 to 18000 seconds If Event 3 corresponds to "9: Temperature rise completion," the Event 3 delay timer becomes the temperature rise completion soak time.	0
116	Force ON of Event 3 action	CH1 : CH64	212C : 216B	8492 : 8555	R/W	C	Bit data b0: Event output turned on at input error occurrence b1: Event output turned on in manual mode b2: Event output turned on during the autotuning (AT) function is being executed b3: Event output turned on during the setting change rate limiter is being operated b4 to b15: Unused Data 0: Invalid 1: Valid [Decimal number: 0 to 15]	0

Continued on the next page.

Continued from the previous page.

No.	Name	Chan-nel	Register address		Attri-bute	Struc-ture	Data range	Factory set value
			HEX	DEC				
117	Event 4 type	CH1 : CH64	216C : 21AB	8556 : 8619	R/W	C	0: None 1: Deviation high (SV monitor value used) [1] 2: Deviation low (SV monitor value used) [1] 3: Deviation high/low (SV monitor value used) [1] 4: Band (SV monitor value used) [1] 5: Process high [1] 6: Process low [1] 7: SV high 8: SV low 9: Control loop break alarm (LBA) 10: MV high [heat-side] [1, 2] 11: MV low [heat-side] [1, 2] 12: MV high [cool-side] [1] 13: MV low [cool-side] [1] 14: Deviation high (Local SV value used) [1] 15: Deviation low (Local SV value used) [1] 16: Deviation high/low (Local SV value used) [1] 17: Deviation (Local SV value used) [1] 18: Deviation between channels high [1] 19: Deviation between channels low [1] 20: Deviation between channels high/low [1] 21: Deviation between channels band [1] [1] Event hold action is available. [2] If there is feedback resistance (FBR) input in position proportioning control, set to the feedback resistance (FBR) input value.	Depends on model code When not specifying: 0
118	Event 4 channel setting	CH1 : CH64	21AC : 21EB	8620 : 8683	R/W	C	1: Channel 1 2: Channel 2 3: Channel 3 4: Channel 4 This function is valid when "deviation between channels" is selected	1
119	Event 4 hold action	CH1 : CH64	21EC : 222B	8684 : 8747	R/W	C	0: OFF 1: Hold action ON (When power turned on) 2: Re-hold action ON (When power turned on and SV changed) This function is valid when input value, deviation or manipulated value action has been selected. In case of a deviation action, this function is not available while in remote mode and while setting changing rate limiter is working.	Depends on model code When not specifying: 0
120	Event 4 interlock	CH1 : CH64	222C : 226B	8748 : 8811	R/W	C	0: Unused 1: Used	0
121	Event 4 differential gap	CH1 : CH64	226C : 22AB	8812 : 8875	R/W	C	① Deviation, process, set value, or Deviation action between channels: 0 to Input span (Unit: °C [°F]) ② MV: 0.0 to 110.0 % Becomes invalid when the Event 4 type corresponds to "9: Control loop break alarm (LBA)."	①: TC/RTD: 1 °C [°F] V/I: 0.1 % ②: 0.1 %
122	Event 4 delay timer	CH1 : CH64	22AC : 22EB	8876 : 8939	R/W	C	0 to 18000 seconds	0
123	Force ON of Event 4 action	CH1 : CH64	22EC : 232B	8940 : 9003	R/W	C	Bit data b0: Event output turned on at input error occurrence b1: Event output turned on in manual mode b2: Event output turned on during the autotuning (AT) function is being executed b3: Event output turned on during the setting change rate limiter is being operated b4 to b15: Unused Data 0: Invalid 1: Valid [Decimal number: 0 to 15]	0

Continued on the next page.

Continued from the previous page.

No.	Name	Chan-nel	Register address		Attri-bute	Struc-ture	Data range	Factory set value
			HEX	DEC				
124	CT ratio	CH1 : CH64	232C : 236B	9004 : 9067	R/W	C	0 to 9999	CTL-6-P-N: 800 CTL-12-S56-10L-N: 1000
125	CT assignment	CH1 : CH64	236C : 23AB	9068 : 9131	R/W	C	0: None 1: OUT1 2: OUT2 3: OUT3 4: OUT4	1
126	Heater break alarm (HBA) type	CH1 : CH64	23AC : 23EB	9132 : 9195	R/W	C	0: Heater break alarm (HBA) type A (Time-proportional control output) 1: Heater break alarm (HBA) type B (Continuous control output and time-proportional control output)	1
127	Number of heater break alarm (HBA) delay times	CH1 : CH64	23EC : 242B	9196 : 9259	R/W	C	0 to 255 times	5
128	Hot/Cold start	CH1 : CH64	242C : 246B	9260 : 9323	R/W	C	0: Hot start 1 1: Hot start 2 2: Cold start	0
129	Start determination point	CH1 : CH64	246C : 24AB	9324 : 9387	R/W	C	0 to Input span (The unit is the same as input value.) (0: Action depending on the Hot/Cold start selection)	Depends on specification
130	SV tracking	CH1 : CH64	24AC : 24EB	9388 : 9451	R/W	C	0: Unused 1: Used	1
131	MV transfer function [Action taken when changed to Manual mode from Auto mode]	CH1 : CH64	24EC : 252B	9452 : 9515	R/W	C	0: MV in Auto mode is used. [Balanceless-bumpless function] 1: MV in previous Manual mode is used.	0
132	Control action	CH1 : CH64	252C : 256B	9516 : 9579	R/W	C	0: Brilliant II PID control (Direct action) 1: Brilliant II PID control (Reverse action) 2: Brilliant II Heat/Cool PID control [Water cooling type] 3: Brilliant II Heat/Cool PID control [Air cooling type] 4: Brilliant II Heat/Cool PID control [Cooling gain linear type] 5: Position proportioning control	Depends on model code When not specifying: 1
133	Integral/derivative time decimal point position ♣	CH1 : CH64	256C : 25AB	9580 : 9643	R/W	C	0: 1 second setting (No decimal place) 1: 0.1 seconds setting (One decimal place)	0
134	Derivative action ♣	CH1 : CH64	25AC : 25EB	9644 : 9707	R/W	C	0: Measured value derivative 1: Deviation derivative	0
135	Undershoot suppression factor ♣	CH1 : CH64	25EC : 262B	9708 : 9771	R/W	C	0.000 to 1.000	Water cooling: 0.100 Air cooling: 0.250 Cooling gain linear type: 1.000

Continued on the next page.

Continued from the previous page.

No.	Name	Chan-nel	Register address		Attri-bute	Struc-ture	Data range	Factory set value
			HEX	DEC				
136	Derivative gain ♣	CH1 : CH64	262C : 266B	9772 : 9835	R/W	C	0.1 to 10.0	6.0
137	ON/OFF action differential gap (upper) ♣	CH1 : CH64	266C : 26AB	9836 : 9899	R/W	C	TC/RTD inputs: 0 to Input span (Unit: °C [°F]) Voltage (V)/current (I) inputs: 0.0 to 100.0 % of input span	TC/RTD: 1 °C [°F] V/I: 0.1 %
138	ON/OFF action differential gap (lower) ♣	CH1 : CH64	26AC : 26EB	9900 : 9963	R/W	C		TC/RTD: 1 °C [°F] V/I: 0.1 %
139	Action (high) at input error ♣	CH1 : CH64	26EC : 272B	9964 : 10027	R/W	C	0: Normal control 1: Manipulated output value at input error	0
140	Action (low) at input error ♣	CH1 : CH64	272C : 276B	10028 : 10091	R/W	C		0
141	Manipulated output value at input error ♣	CH1 : CH64	276C : 27AB	10092 : 10155	R/W	C	−105.0 to +105.0 % Actual output values become those restricted by the output limiter. Position proportioning control: If there is no feedback resistance (FBR) input or the feedback resistance (FBR) input is disconnected, an action taken when abnormal is in accordance with the value action setting during STOP.	0.0
142	Manipulated output value at STOP mode [heat-side] ♣	CH1 : CH64	27AC : 27EB	10156 : 10219	R/W	C	−5.0 to +105.0 % Position proportioning control: Only when there is feedback resistance (FBR) input and it does not break, the manipulated output value [heat-side] at STOP is output.	−5.0
143	Manipulated output value at STOP mode [cool-side] ♣	CH1 : CH64	27EC : 282B	10220 : 10283	R/W	C		−5.0
144	Output change rate limiter (up) [heat-side] ♣	CH1 : CH64	282C : 286B	10284 : 10347	R/W	C	0.0 to 100.0 %/seconds (0.0: OFF) Becomes invalid when in position proportioning control.	0.0
145	Output change rate limiter (down) [heat-side] ♣	CH1 : CH64	286C : 28AB	10348 : 10411	R/W	C		0.0
146	Output limiter (high) [heat-side] ♣	CH1 : CH64	28AC : 28EB	10412 : 10475	R/W	C	Output limiter (low) to 105.0 % Position proportioning control: Becomes valid only when there is feedback resistance (FBR) input and it does not break.	105.0
147	Output limiter (low) [heat-side] ♣	CH1 : CH64	28EC : 292B	10476 : 10539	R/W	C	−5.0 % to Output limiter (high) Position proportioning control: Becomes valid only when there is feedback resistance (FBR) input and it does not break.	−5.0
148	Output change rate limiter (up) [cool-side] ♣	CH1 : CH64	292C : 296B	10540 : 10603	R/W	C	0.0 to 100.0 %/seconds (0.0: OFF)	0.0
149	Output change rate limiter (down) [cool-side] ♣	CH1 : CH64	296C : 29AB	10604 : 10667	R/W	C	Becomes invalid when in position proportioning control.	0.0

Continued on the next page.

Continued from the previous page.

No.	Name	Chan-nel	Register address HEX	Register address DEC	Attri-bute	Struc-ture	Data range	Factory set value
150	Output limiter (high) [cool-side] ♣	CH1 : CH64	29AC : 29EB	10668 : 10731	R/W	C	Output limiter (low) [cool-side] to 105.0 %	105.0
151	Output limiter (low) [cool-side] ♣	CH1 : CH64	29EC : 2A2B	10732 : 10795	R/W	C	−5.0 % to Output limiter (high) [cool-side]	−5.0
152	AT bias ♣	CH1 : CH64	2A2C : 2A6B	10796 : 10859	R/W	C	−Input span to +Input span	0
153	AT cycles ♣	CH1 : CH64	2A6C : 2AAB	10860 : 10923	R/W	C	0: 1.5 cycles 1: 2.0 cycles 2: 2.5 cycles 3: 3.0 cycles	1
154	Output value with AT turned on ♣	CH1 : CH64	2AAC : 2AEB	10924 : 10987	R/W	C	Output value with AT turned off to 105.0 % Actual output values become those restricted by the output limiter. Position proportioning control: Becomes valid only when there is feedback resistance (FBR) input and it does not break (high limit of feedback resistance input at AT).	105.0
155	Output value with AT turned off ♣	CH1 : CH64	2AEC : 2B2B	10988 : 11051	R/W	C	−105.0 % to Output value with AT turned on Actual output values become those restricted by the output limiter. Position proportioning control: Becomes valid only when there is feedback resistance (FBR) input and it does not break (low limit of feedback resistance input at AT).	−105.0
156	AT differential gap time ♣	CH1 : CH64	2B2C : 2B6B	11052 : 11115	R/W	C	0.0 to 50.0 seconds	10.0
157	Proportional band adjusting factor [heat-side] ♣	CH1 : CH64	2B6C : 2BAB	11116 : 11179	R/W	C	0.01 to 10.00 times	1.00
158	Integral time adjusting factor [heat-side] ♣	CH1 : CH64	2BAC : 2BEB	11180 : 11243	R/W	C	0.01 to 10.00 times	1.00
159	Derivative time adjusting factor [heat-side] ♣	CH1 : CH64	2BEC : 2C2B	11244 : 11309	R/W	C	0.01 to 10.00 times	1.00
160	Proportional band adjusting factor [cool-side] ♣	CH1 : CH64	2C2C : 2C6B	11308 : 11371	R/W	C	0.01 to 10.00 times	1.00
161	Integral time adjusting factor [cool-side] ♣	CH1 : CH64	2C6C : 2CAB	11372 : 11435	R/W	C	0.01 to 10.00 times	1.00
162	Derivative time adjusting factor [cool-side] ♣	CH1 : CH64	2CAC : 2CEB	11436 : 11499	R/W	C	0.01 to 10.00 times	1.00

Continued on the next page.

Continued from the previous page.

No.	Name	Channel	Register address HEX	Register address DEC	Attribute	Structure	Data range	Factory set value
163	Proportional band limiter (high) [heat-side] ♣	CH1 : CH64	2CEC : 2D2B	11500 : 11563	R/W	C	TC/RTD inputs: 0 (0.0) to Input span (Unit: °C [°F]) Varies with the setting of the decimal point position selection.	TC/RTD: Input span V/I: 1000.0 %
164	Proportional band limiter (low) [heat-side] ♣	CH1 : CH64	2D2C : 2D6B	11564 : 11627	R/W	C	Voltage (V)/current (I) inputs: 0.0 to 1000.0 % of input span 0 (0.0): ON/OFF action (ON/OFF action for both heat and cool actions in case of a heat/cool control type.)	TC/RTD: 0 V/I: 0.0 %
165	Integral time limiter (high) [heat-side] ♣	CH1 : CH64	2D6C : 2DAB	11628 : 11691	R/W	C	PID control or heat/cool PID control: 0 to 3600 seconds or 0.0 to 1999.9 seconds Position proportioning control: 1 to 3600 seconds or 0.1 to 1999.9 seconds Varies with the setting of the integral/derivative time decimal point position selection.	3600
166	Integral time limiter (low) [heat-side] ♣	CH1 : CH64	2DAC : 2DEB	11692 : 11755	R/W	C		PID control, Heat/cool PID control: 0 Position proportioning control: 1
167	Derivative time limiter (high) [heat-side] ♣	CH1 : CH64	2DEC : 2E2B	11756 : 11819	R/W	C	0 to 3600 seconds or 0.0 to 1999.9 seconds Varies with the setting of the integral/derivative time decimal point position selection.	3600
168	Derivative time limiter (low) [heat-side] ♣	CH1 : CH64	2E2C : 2E6B	11820 : 11883	R/W	C		0
169	Proportional band limiter (high) [cool-side] ♣	CH1 : CH64	2E6C : 2EAB	11884 : 11947	R/W	C	TC/RTD inputs: 1 to input span or 0.1 to input span (Unit: °C [°F]) Varies with the setting of the decimal point position selection. Voltage (V)/current (I) inputs: 0.1 to 1000.0 % of input span	TC/RTD: Input span V/I: 1000.0 %
170	Proportional band limiter (low) [cool-side] ♣	CH1 : CH64	2EAC : 2EEB	11948 : 12011	R/W	C		TC/RTD: 1 (0.1) V/I: 0.1 %
171	Integral time limiter (high) [cool-side] ♣	CH1 : CH64	2EEC : 2F2B	12012 : 12075	R/W	C	0 to 3600 seconds or 0.0 to 1999.9 seconds Varies with the setting of the integral/derivative time decimal point position selection. If control is other than heat/cool PID control, set to RO (Only reading data is possible).	3600
172	Integral time limiter (low) [cool-side] ♣	CH1 : CH64	2F2C : 2F6B	12076 : 12139	R/W	C		0
173	Derivative time limiter (high) [cool-side] ♣	CH1 : CH64	2F6C : 2FAB	12140 : 12203	R/W	C	0 to 3600 seconds or 0.0 to 1999.9 seconds Varies with the setting of the integral/derivative time decimal point position selection. If control is other than heat/cool PID control, set to RO (Only reading data is possible).	3600
174	Derivative time limiter (low) [cool-side] ♣	CH1 : CH64	2FAC : 2FEB	12204 : 12267	R/W	C		0
175	Open/Close output neutral zone ♣	CH1 : CH64	2FEC : 302C	12268 : 12331	R/W	C	0.1 to 10.0 %	2.0
176	Action at feedback resistance (FBR) input error ♣	CH1 : CH64	302C : 306B	12332 : 12395	R/W	C	0: Action depending on the valve action at STOP 1: Control action continued	0
177	Feedback adjustment ♣	CH1 : CH64	306C : 30AB	12396 : 12459	R/W	C	0: Adjustment end 1: Open-side adjustment start 2: Close-side adjustment start	—

Continued on the next page.

Continued from the previous page.

No.	Name	Chan-nel	Register address		Attri-bute	Struc-ture	Data range	Factory set value
			HEX	DEC				
178	Control motor time ♣	CH1 : CH64	30AC : 30EB	12460 : 12523	R/W	C	5 to 1000 seconds	10
179	Integrated output limiter ♣	CH1 : CH64	30EC : 312B	12524 : 12587	R/W	C	0.0 to 200.0 % of control motor time (0.0: OFF) Becomes invalid when there is feedback resistance (FBR) input	150.0
180	Valve action at STOP ♣	CH1 : CH64	312C : 316B	12588 : 12651	R/W	C	0: Close-side output OFF, Open-side output OFF 1: Close-side output ON, Open-side output OFF 2: Close-side output OFF, Open-side output ON Becomes valid when there is no feedback resistance (FBR) input or the feedback resistance (FBR) input is disconnected.	0
181	ST proportional band adjusting factor ♣	CH1 : CH64	316C : 31AB	12652 : 12715	R/W	C	0.01 to 10.00 times	1.00
182	ST integral time adjusting factor ♣	CH1 : CH64	31AC : 31EB	12716 : 12779	R/W	C	0.01 to 10.00 times	1.00
183	ST derivative time adjusting factor ♣	CH1 : CH64	31EC : 322B	12780 : 12843	R/W	C	0.01 to 10.00 times	1.00
184	ST start condition ♣	CH1 : CH64	322C : 326B	12844 : 12907	R/W	C	0: Activate the startup tuning (ST) function when the power is turned on; when transferred from STOP to RUN; or when the set value (SV) is changed. 1: Activate the startup tuning (ST) function when the power is turned on; or when transferred from STOP to RUN. 2: Activate the startup tuning (ST) function when the set value (SV) is changed.	0
185	Automatic temperature rise group ♣	CH1 : CH64	326C : 32AB	12908 : 12971	R/W	C	0 to 16 (0: Automatic temperature rise function OFF)	0
186	Automatic temperature rise dead time ♣	CH1 : CH64	32AC : 32EB	12972 : 13035	R/W	C	0.1 to 1999.9 seconds	10.0
187	Automatic temperature rise gradient data ♣	CH1 : CH64	32EC : 332B	13036 : 13099	R/W	C	0.1 to Input span/minutes	1.0
188	EDS transfer time decimal point position ♣	CH1 : CH64	332C : 336B	13100 : 13163	R/W	C	0: 1 second setting (No decimal place) 1: 0.1 seconds setting (One decimal place)	0
189	Output average processing time for EDS ♣	CH1 : CH64	336C : 33AB	13164 : 13227	R/W	C	0.1 to 200.0 seconds	1.0
190	Responsive action trigger point for EDS ♣	CH1 : CH64	33AC : 33EB	13228 : 13291	R/W	C	0 to Input span (Unit: °C [°F], %)	1

Continued on the next page.

Continued from the previous page.

No.	Name	Chan-nel	Register address		Attri-bute	Struc-ture	Data range	Factory set value
			HEX	DEC				
191	Setting change rate limiter unit time	CH1 : CH64	33EC : 342B	13292 : 13355	R/W	C	1 to 3600 seconds	60
192	Soak time unit	CH1 : CH64	342C : 346B	13356 : 13419	R/W	C	0: 0 to 5999 minutes [0 hours 00 minutes to 99 hours 59 minutes] 1: 0 to 11999 seconds [0 minutes 00 seconds to 199 minutes 59 seconds] Set the data range of Memory area soak time monitor and Area soak time.	1
193	Setting limiter (high)	CH1 : CH64	346C : 34AB	13420 : 13483	R/W	C	Setting limiter (low) to Input scale high	Input scale high
194	Setting limiter (low)	CH1 : CH64	34AC : 34EB	13484 : 13547	R/W	C	Input scale low to Setting limiter (high)	Input scale low
195	PV transfer function ♣	CH1 : CH64	34EC : 352B	13548 : 13611	R/W	C	0: Unused 1: Used	0
196	Operation mode assignment 1 (Logic output selection function) Logic output 1 to 4	CH1 : CH64	352C : 356B	13612 : 13675	R/W	C	0: No assignment 1: Operation mode (monitor, control) 2: Operation mode (monitor, event function, control) 3: Auto/Manual 4: Remote/Local 5: Interlock release	0
197	Operation mode assignment 2 (Logic output selection function) Logic output 5 to 8	CH1 : CH64	356C : 35AB	13676 : 13739	R/W	C	0: No assignment 1: Operation mode (monitor, control) 2: Operation mode (monitor, event function, control) 3: Auto/Manual 4: Remote/Local 5: Interlock release	0
198	SV select function	CH1 : CH64	35AC : 35EB	13740 : 13803	R/W	C	0: Remote SV function 1: Cascade control function 2: Ratio setting function 3: Cascade control 2 function	0
199	Remote SV function master channel module address	CH1 : CH64	35EC : 362B	13804 : 13867	R/W	C	–1 (Master channel is selected from itself) 0 to 99 (Master channel is selected from other modules)	–1
200	Remote SV function master channel selection	CH1 : CH64	362C : 366B	13868 : 13931	R/W	C	1 to 99	1
201	Output distribution master channel module address	CH1 : CH64	366C : 36AB	13932 : 13995	R/W	C	–1 (Master channel is selected from itself) 0 to 99 (Master channel is selected from other modules)	–1
202	Output distribution master channel selection	CH1 : CH64	36AC : 36EB	13996 : 14059	R/W	C	1 to 99	1

Continued on the next page.

Continued from the previous page.

No.	Name	Chan-nel	Register address		Attri-bute	Struc-ture	Data range	Factory set value
			HEX	DEC				
203	Address of interacting modules	CH1 : CH64	36EC : 372B	14060 : 14123	R/W	C	−1 (Interact with its own module address) 0 to 99 (Interact with the addresses of other modules)	−1
204	Channel selection of interacting modules	CH1 : CH64	372C : 376B	14124 : 14187	R/W	C	1 to 99 Becomes valid when the selected module is “Z-TIO module”.	1
205	Selection switch of interacting modules	CH1 : CH64	376C : 37AB	14188 : 14251	R/W	C	Bit data b0: Memory area number b1: Operation mode b2: Auto/Manual b3: Remote/Local b4: EDS start signal b5: Interlock release b6: Suspension of area soak time b7 to b15: Unused Data 0: No interaction 1: Interact with other channels [Decimal number: 0 to 127]	0
206	TIO Interval time	CH1 : CH64	37AC : 37BB	14252 : 14267	R/W	C	0 to 250 ms	10
207	Unused	—	37BC : 386B	14268 : 14443	—	—	—	—

■ Communication data of Z-DIO module

☞ For details of Z-DIO module communication data, see **SRZ Instruction Manual (IMS01T04-E□)**.

No.	Name	Chan-nel	Register address		Attri-bute	Struc-ture	Data range	Factory set value
			HEX	DEC				
1	Digital input (DI) state	CH1 : CH16	3E6C : 3E7B	15980 : 15995	RO	M	Bit data b0: DI1 state b1: DI2 state b2: DI3 state b3: DI4 state b4: DI5 state b5: DI6 state b6: DI7 state b7: DI8 state b8 to b15: Unused Data 0: Contact open 1: Contact closed [Decimal number: 0 to 255]	—
2	Digital output (DO) state	CH1 : CH16	3E7C : 3E8B	15996 : 16011	RO	M	Bit data b0: DO1 state b1: DO2 state b2: DO3 state b3: DO4 state b4: DO5 state b5: DO6 state b6: DO7 state b7: DO8 state b8 to b15: Unused Data 0: OFF 1: ON [Decimal number: 0 to 255]	—
3	Unused	—	3E8C : 3FDB	16012 : 16347	—	—	—	—
4	DO manual output 1	—	3FDC : 3FEB	16348 : 16363	R/W	M	Bit data b0: DO1 manual output b1: DO2 manual output b2: DO3 manual output b3: DO4 manual output b4: DO5 manual output b5: DO6 manual output b6: DO7 manual output b7: DO8 manual output b8 to b15: Unused Data 0: OFF 1: ON [Decimal number: 0 to 255]	0
5	DO output distribution selection	CH1 : CH128	3FEC : 406B	16364 : 16491	R/W	C	0: DO output 1: Distribution output	0
6	DO output distribution bias	CH1 : CH128	406C : 40EB	16492 : 16619	R/W	C	–100.0 to +100.0 %	0.0
7	DO output distribution ratio	CH1 : CH128	40EC : 416B	16620 : 16747	R/W	C	–9.999 to +9.999	1.000
8	DO proportional cycle time	CH1 : CH128	416C : 41EB	16748 : 16875	R/W	C	0.1 to 100.0 seconds	Depends on specification

Continued on the next page.

Continued from the previous page.

No.	Name	Chan-nel	Register address HEX	Register address DEC	Attri-bute	Struc-ture	Data range	Factory set value
9	DO minimum ON/OFF time of proportioning cycle	CH1 : CH128	41EC : 426B	16876 : 17003	R/W	C	0 to 1000 ms	0
10	Unused	—	426C : 433B	17004 : 17211	—	—	—	—
Set data No. 11 or later are for engineering setting [Writable in the STOP mode]								
11	DI function assignment	CH1 : CH16	433C : 434B	17212 : 17227	R/W	M	0 to 29 (see **P. 6-100**.)	1
12	Memory area setting signal	CH1 : CH16	434C : 435B	17228 : 17243	R/W	M	0: Valid 1: Invalid	1
13	DO signal assignment module address 1	CH1 : CH16	435C : 436B	17244 : 17259	R/W	M	−1, 0 to 99 When "−1" is selected, all of the signals of the same type (except temperature rise completion and DO manual output value) are *OR*-operated and produced as outputs from DO.	−1
14	DO signal assignment module address 2	CH1 : CH16	436C : 437B	17260 : 17276	R/W	M	−1, 0 to 99 When "−1" is selected, all of the signals of the same type (except temperature rise completion and DO manual output value) are *OR*-operated and produced as outputs from DO.	−1
15	DO output assignment 1 [DO1 to DO4]	CH1 : CH16	437C : 438B	17276 : 17291	R/W	M	0 to 13 (see **P. 6-101**.)	1
16	DO output assignment 2 [DO5 to DO8]	CH1 : CH16	438C : 439B	17292 : 17307	R/W	M	0 to 13 (see **P. 6-101**.)	1
17	DO energized/de-energized	CH1 : CH128	439C : 441B	17308 : 17435	R/W	C	0: Energized 1: De-energized	0
18	DO output distribution master channel module address	CH1 : CH128	441C : 448C	17436 : 17565	R/W	C	−1 (Master channel is selected from itself) 0 to 99 (Master channel is selected from other modules)	−1
19	DO output distribution master channel selection	CH1 : CH128	449C : 451B	17564 : 17691	R/W	C	1 to 99	1
20	DO manipulated output value (MV) at STOP mode	CH1 : CH128	451C : 459B	17692 : 17819	R/W	C	−5.0 to +105.0 %	−5.0
21	DO output limiter (high)	CH1 : CH128	459C : 461B	17820 : 17947	R/W	C	DO output limiter (low) to 105.0 %	105.0
22	DO output limiter (low)	CH1 : CH128	461C : 469B	17948 : 18075	R/W	C	−5.0 % to DO output limiter (high)	−5.0

Continued on the next page.

Continued from the previous page.

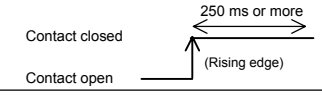
No.	Name	Chan-nel	Register address		Attri-bute	Struc-ture	Data range	Factory set value
			HEX	DEC				
23	Z-DIO Interval time	CH1 : CH16	469C : 46AB	18076 : 18091	R/W	M	0 to 250 ms	
24	Unused	—	46AC : 46BB	18092 : 18107	—	—	—	—

Table 1: DI assignment table

Set value	DI1	DI2	DI3	DI4	DI5	DI6	DI7	DI8
0	No assignment							
1	Memory area transfer (1 to 8) [1]			Area set [2]	Operation mode [3]		Interlock release	AUTO/MAN [4]
2								REM/LOC [4]
3								EDS start signal 1
4								Soak stop
5								RUN/STOP [4]
6							AUTO/MAN [4]	REM/LOC [4]
7								EDS start signal 1
8								Soak stop
9								RUN/STOP [4]
10							REM/LOC [4]	EDS start signal 1
11								Soak stop
12								RUN/STOP [4]
13							EDS start signal 1	Soak stop
14								RUN/STOP [4]
15							Soak stop	
16					Interlock release	AUTO/MAN [4]	REM/LOC [4]	EDS start signal 1
17								Soak stop
18								RUN/STOP [4]
19							EDS start signal 1	Soak stop
20								RUN/STOP [4]
21							Soak stop	
22					AUTO/MAN	REM/LOC	EDS start signal 1	Soak stop
23								RUN/STOP [4]
24							Soak stop	
25					REM/LOC	EDS start signal 1		
26	Memory area transfer (1, 2) [1]	Area set [2]	Interlock release	RUN/STOP [4]	AUTO/MAN [4]	REM/LOC [4]	Operation mode [3]	
27	Memory area transfer (1 to 8) [1]			Area set [2]	Operation mode [3]		EDS start signal 1	EDS start signal 2
28	Memory area transfer (1, 2) [1]	Area set [2]	Interlock release	RUN/STOP [4]	AUTO/MAN [4]	REM/LOC [4]		
29	EDS start signal 1	EDS start signal 2					Operation mode [3]	

RUN/STOP: RUN/STOP transfer (Contact closed: RUN)
AUTO/MAN: Auto/Manual transfer (Contact closed: Manual mode)
REM/LOC: Remote/Local transfer (Contact closed: Remote mode)
Interlock release (Contact closed: Interlock release)
EDS start signal 1 (Contact closed: EDS start signal ON [for disturbance 1])
EDS start signal 2 (Contact closed: EDS start signal ON [for disturbance 2])
Soak stop (Contact closed: Soak stop)

DI signal will become valid at rising edge after the closed contact is held for 250ms.



[1] Memory area transfer

(×:Contact open –: Contact closed)

	Memory area number							
	1	2	3	4	5	6	7	8
DI1	×	–	×	–	×	–	×	–
DI2	×	×	–	–	×	×	–	–
DI3	×	×	×	×	–	–	–	–

[2] Area set becomes invalid prior to factory shipment.

[3] Operation mode transfer

(×:Contact open –: Contact closed)

	Operation mode			
	Unused	Monitor	Monitor + Event function	Control
DI5 (DI7)	×	–	×	–
DI6 (DI8)	×	×	–	–

[4] Actual device states (AUTO/MAN, REM/LOC, RUN/STOP)

	DI-switched state	Communication-switched state	Actual device state
Auto/Manual transfer [a] (AUTO/MAN)	Manual (Contact closed)	Manual → Auto	Manual mode
		Auto → Manual	
	Auto (Contact open)	Manual → Auto	Auto mode
		Auto → Manual	
Remote/Local transfer [a] (REM/LOC)	Remote (Contact closed)	Remote → Local	Remote mode
		Local → Remote	
	Local (Contact open)	Remote → Local	Local mode
		Local → Remote	
RUN/STOP [b]	RUN (Contact closed)	STOP → RUN	RUN
		RUN → STOP	STOP
	STOP (Contact open)	STOP → RUN	STOP

[a] Device state when AUTO/MAN or REM/LOC assigned to DI is set so that the Z-TIO module and Z-DIO module are linked using the Master-slave mode of the Z-TIO module.

[b] STOP of RUN/STOP switching is given priority regardless of communication or DI switching.

Table 2: DO assignment table

[DO1 to DO4]

Set value	DO1	DO2	DO3	DO4
0	No assignment			
1	DO1 manual output	DO2 manual output	DO3 manual output	DO4 manual output
2	Event 1 comprehensive output [1]	Event 2 comprehensive output [2]	Event 3 comprehensive output [3]	Event 4 comprehensive output [4]
3	Event 1 (CH1)	Event 2 (CH1)	Event 3 (CH1)	Event 4 (CH1)
4	Event 1 (CH2)	Event 2 (CH2)	Event 3 (CH2)	Event 4 (CH2)
5	Event 1 (CH3)	Event 2 (CH3)	Event 3 (CH3)	Event 4 (CH3)
6	Event 1 (CH4)	Event 2 (CH4)	Event 3 (CH4)	Event 4 (CH4)
7	Event 1 (CH1)	Event 1 (CH2)	Event 1 (CH3)	Event 1 (CH4)
8	Event 2 (CH1)	Event 2 (CH2)	Event 2 (CH3)	Event 2 (CH4)
9	Event 3 (CH1)	Event 3 (CH2)	Event 3 (CH3)	Event 3 (CH4)
10	Event 4 (CH1)	Event 4 (CH2)	Event 4 (CH3)	Event 4 (CH4)
11	HBA (CH1)	HBA (CH2)	HBA (CH3)	HBA (CH4)
12	Burnout status (CH1)	Burnout status (CH2)	Burnout status (CH3)	Burnout status (CH4)
13	Temperature rise completion [5]	HBA comprehensive output [6]	Burnout state comprehensive output [7]	DO4 manual output

[DO5 to DO8]

Set value	DO5	DO6	DO7	DO8
0	No assignment			
1	DO5 manual output	DO6 manual output	DO7 manual output	DO8 manual output
2	Event 1 comprehensive output [1]	Event 2 comprehensive output [2]	Event 3 comprehensive output [3]	Event 4 comprehensive output [4]
3	Event 1 (CH1)	Event 2 (CH1)	Event 3 (CH1)	Event 4 (CH1)
4	Event 1 (CH2)	Event 2 (CH2)	Event 3 (CH2)	Event 4 (CH2)
5	Event 1 (CH3)	Event 2 (CH3)	Event 3 (CH3)	Event 4 (CH3)
6	Event 1 (CH4)	Event 2 (CH4)	Event 3 (CH4)	Event 4 (CH4)
7	Event 1 (CH1)	Event 1 (CH2)	Event 1 (CH3)	Event 1 (CH4)
8	Event 2 (CH1)	Event 2 (CH2)	Event 2 (CH3)	Event 2 (CH4)
9	Event 3 (CH1)	Event 3 (CH2)	Event 3 (CH3)	Event 3 (CH4)
10	Event 4 (CH1)	Event 4 (CH2)	Event 4 (CH3)	Event 4 (CH4)
11	HBA (CH1)	HBA (CH2)	HBA (CH3)	HBA (CH4)
12	Burnout status (CH1)	Burnout status (CH2)	Burnout status (CH3)	Burnout status (CH4)
13	Temperature rise completion [5]	HBA comprehensive output [6]	Burnout state comprehensive output [7]	DO8 manual output

[1] Logical *OR* of Event 1 (ch1 to ch4)
[2] Logical *OR* of Event 2 (ch1 to ch4)
[3] Logical *OR* of Event 3 (ch1 to ch4)
[4] Logical *OR* of Event 4 (ch1 to ch4)
[5] Temperature rise completion status (ON when temperature rise completion occurs for all channels for which event 3 is set to temperature rise completion.)
[6] Logical *OR* of HBA (ch1 to ch4)
[7] Logical *OR* of burnout state (ch1 to ch4)

■ Memory area data address (Z-TIO)

The register addresses, 386CH to 3DABH are used for checking and changing each set value belonging to the memory area.

No.	Name	Chan-nel	Register address		Attri-bute	Struc-ture	Data range	Factory set value
			HEX	DEC				
1	Setting memory area number	CH1 : CH64	386C : 38AB	14444 : 14507	R/W	C	1 to 8	1
2	Event 1 set value (EV1)	CH1 : CH64	38AC : 38EB	14508 : 14571	R/W	C	Deviation action, Deviation action between channels, Temperatue rise completion range: −Input span to +Input span Process action, SV action: Input scale low to Input scale high MV action: −5.0 to +105.0 %	50
3	Event 2 set value (EV2)	CH1 : CH64	38EC : 392B	14572 : 14635	R/W	C		50
4	Event 3 set value (EV3)	CH1 : CH64	392C : 396B	14636 : 14699	R/W	C		50
5	Event 4 set value (EV4)	CH1 : CH64	396C : 39AB	14700 : 14763	R/W	C		50
6	Control loop break alarm (LBA) time	CH1 : CH64	39AC : 39EB	14764 : 14827	R/W	C	0 to 7200 seconds (0: Unused)	480
7	LBA deadband	CH1 : CH64	39EC : 3A2B	14828 : 14791	R/W	C	0 (0.0) to Input span	0 (0.0)
8	Set value (SV)	CH1 : CH64	3A2C : 3A6B	14892 : 14955	R/W	C	Setting limiter (low) to Setting limiter (high)	TC/RTD: 0 °C [°F] V/I: 0.0 %
9	Proportional band [heat-side]	CH1 : CH64	3A6C : 3AAB	14956 : 15019	R/W	C	TC/RTD inputs: 0 (0.0) to Input span (Unit: °C [°F]) Voltage (V)/current (I) inputs: 0.0 to 1000.0 % of input span 0 (0.0): ON/OFF action (ON/OFF action for both heat and cool actions in case of a heat/cool control type.)	TC/RTD: 30 V/I: 30.0
10	Integral time [heat-side]	CH1 : CH64	3AAC : 3AEB	15020 : 15083	R/W	C	PID control or heat/cool PID control: 0 to 3600 seconds or 0.0 to 1999.9 seconds (0, 0.0: PD action) Position proportioning control: 1 to 3600 seconds or 0.1 to 1999.9 seconds	240
11	Derivative time [heat-side]	CH1 : CH64	3AEC : 3B2B	15084 : 15147	R/W	C	0 to 3600 seconds or 0.0 to 1999.9 seconds (0, 0.0: PI action)	60
12	Control response parameter	CH1 : CH64	3B2C : 3B6B	15148 : 15211	R/W	C	0: Slow 1: Medium 2: Fast P or PD action: 2 (Fast) fixed	PID control, Position proportioning control: 0 Heat/cool PID control: 2

Continued on the next page.

Continued from the previous page.

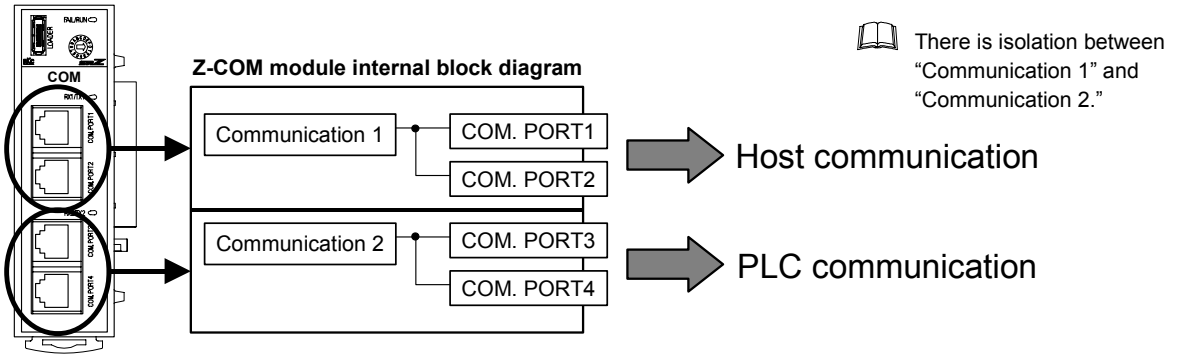
No.	Name	Chan-nel	Register address		Attri-bute	Struc-ture	Data range	Factory set value
			HEX	DEC				
13	Proportional band [cool-side]	CH1 ⋮ CH64	3B6C ⋮ 3BAB	15212 ⋮ 15275	R/W	C	TC/RTD inputs: 1 to Input span or 0.1 to Input span (Unit: °C [°F]) Voltage (V)/current (I) inputs: 0.1 to 1000.0 % of input span	TC/RTD: 30 V/I: 30.0
14	Integral time [cool-side]	CH1 ⋮ CH64	3BAC ⋮ 3BEB	15276 ⋮ 15339	R/W	C	0 to 3600 seconds or 0.0 to 1999.9 seconds (0, 0.0: PD action)	240
15	Derivative time [cool-side]	CH1 ⋮ CH64	3BEC ⋮ 3C2B	15340 ⋮ 15403	R/W	C	0 to 3600 seconds or 0.0 to 1999.9 seconds (0, 0.0: PI action)	60
16	Overlap/Deadband	CH1 ⋮ CH64	3C2C ⋮ 3C6B	15404 ⋮ 15467	R/W	C	TC/RTD inputs: −Input span to +Input span (Unit:°C [°F]) Voltage (V)/current (I) inputs: −100.0 to +100.0 % of input span	0
17	Manual reset	CH1 ⋮ CH64	3C6C ⋮ 3CAB	15468 ⋮ 15531	R/W	C	−100.0 to +100.0 %	0.0
18	Setting change rate limiter (up)	CH1 ⋮ CH64	3CAC ⋮ 3CEB	15532 ⋮ 15595	R/W	C	0 (0.0) to Input span/unit time * 0 (0.0): Unused	0 (0.0)
19	Setting change rate limiter (down)	CH1 ⋮ CH64	3CEC ⋮ 3D2B	15596 ⋮ 15659	R/W	C	* Unit time: 60 seconds (factory set value)	0 (0.0)
20	Area soak time	CH1 ⋮ CH64	3D2C ⋮ 3D6B	15660 ⋮ 15723	R/W	C	0 minutes 00 seconds to 199 minutes 59 seconds: 0 to 11999 seconds 0 hours 00 minutes to 99 hours 59 minutes: 0 to 5999 minutes	0
21	Link area number	CH1 ⋮ CH64	3D6C ⋮ 3DAB	15724 ⋮ 15787	R/W	C	0 to 8 (0: No link)	0
22	Unused	—	3DAC ⋮ 3E6B	15788 ⋮ 15979	—	—	—	—

MEMO

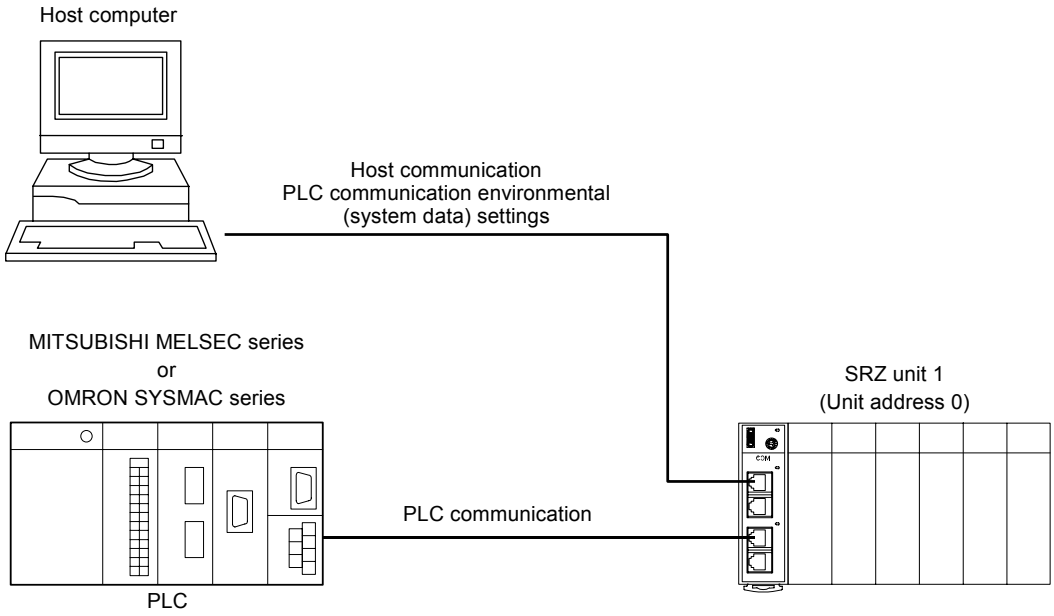
7 PLC COMMUNICATION

7.1 PLC Communication Outline

Communication system for Z-COM module contains “Communication 1 (COM. PORT1, COM. PORT2)” and “Communication 2 (COM. PORT3, COM. PORT4).” Communication 2 (COM. PORT3, COM. PORT4) can be used for PLC communication.



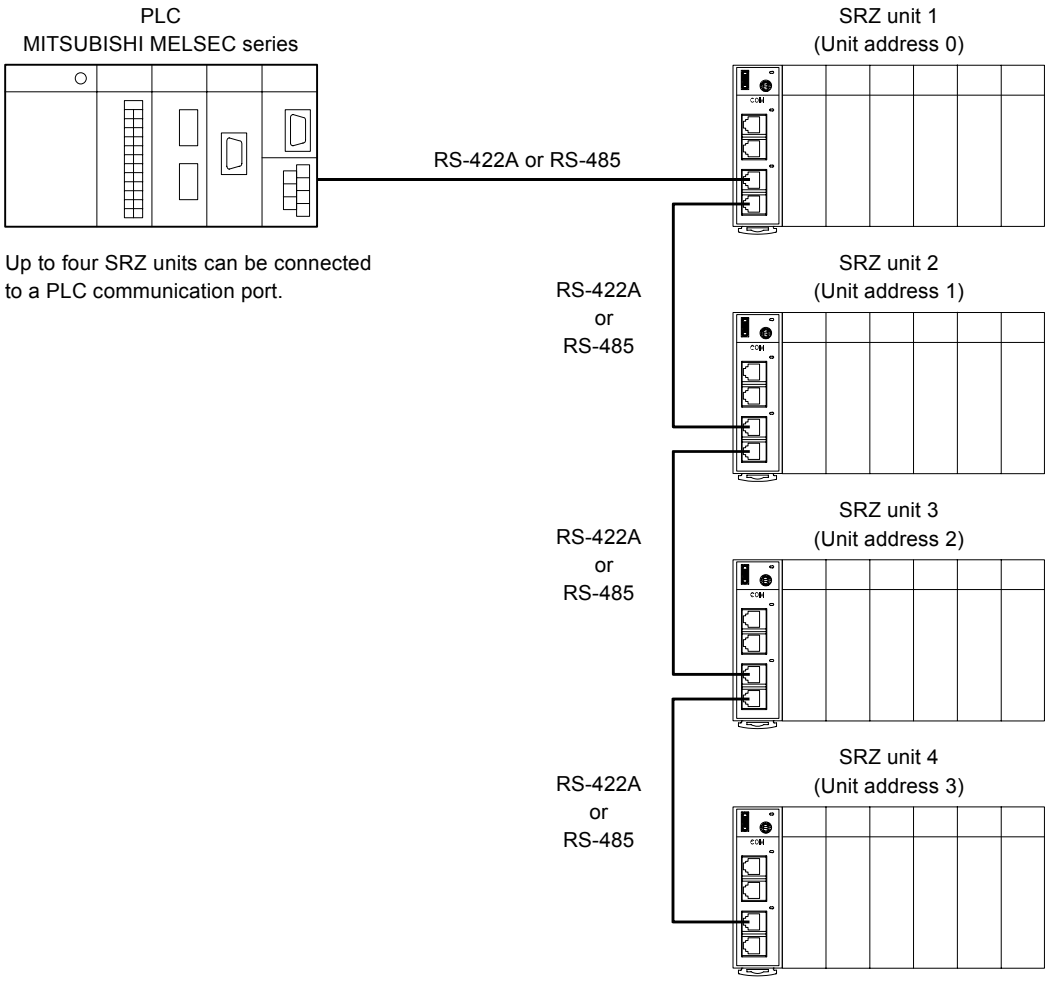
Communication is possible with a MITSUBISHI MELSEC series PLC or an OMRON SYSMAC series PLC.
The PLC communication environmental (system data) settings must be made to perform PLC communication. The system data settings are made via the host communication or loader communication.



7.2 MITSUBISHI MELSEC Series

7.2.1 Outline

The SRZ unit can be connected to the MITSUBISHI MELSEC series computer link module without using any program.



■ Usable PLC modules (MITSUBISHI MELSEC series)

Name	Type
Computer link module	● AJ71UC24 ● A1SJ71UC24-R4 ● A1SJ71C24-R4 The module which AnA/AnU CPU common command (type 4) can use.
Serial communication modules	● AJ71QC24N ● A1SJ71QC24N ● QJ71C24 The module which AnA/AnU CPU common command (type 4) can use.
Special adapter	● FX2NC-485ADP ● FX0N-485ADP ● FX3U-485ADP
Expanded function board	● FX2N-485BD ● FX3U-485-BD

■ Usable SRZ unit modules

Name	Type
Communication extension module	Z-COM-A
Temperature control module	Z-TIO-A (4-channel type)　　Z-TIO-B (2-channel type)
Digital I/O module	Z-DIO-A

Up to 31 functional modules can be connected to one Z-COM module.

☞ For the joinable number of functional modules, see **4.3 Joinable Number of Modules (P. 4-6).**

☞ For functional module, see Instruction Manual of the following.
- Temperature Control Module Z-TIO Instruction Manual (IMS01T01-E□)
- Digital I/O Module Z-DIO Instruction Manual (IMS01T03-E□)
- SRZ Instruction Manual (IMS01T04-E□)

7.2.2 Wiring

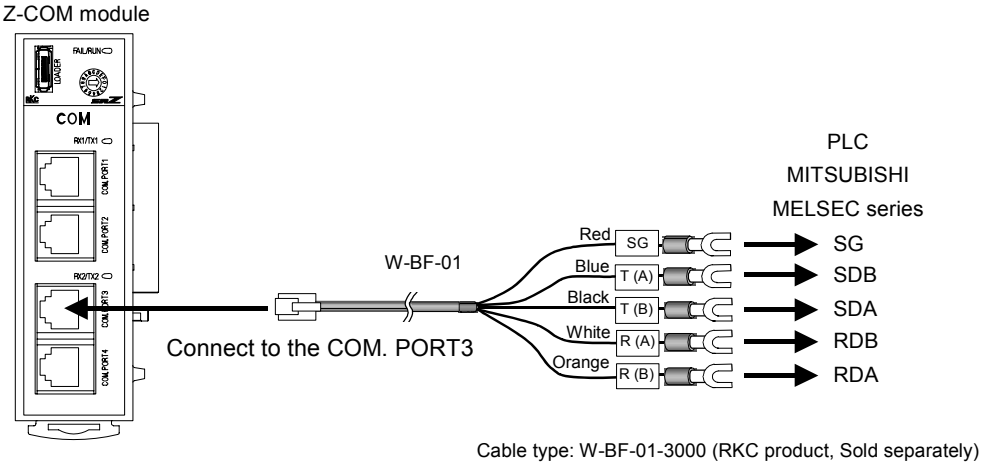
⚠ WARNING

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 in the both ends of the communication cable (nearest the connector).

■ RS-422A



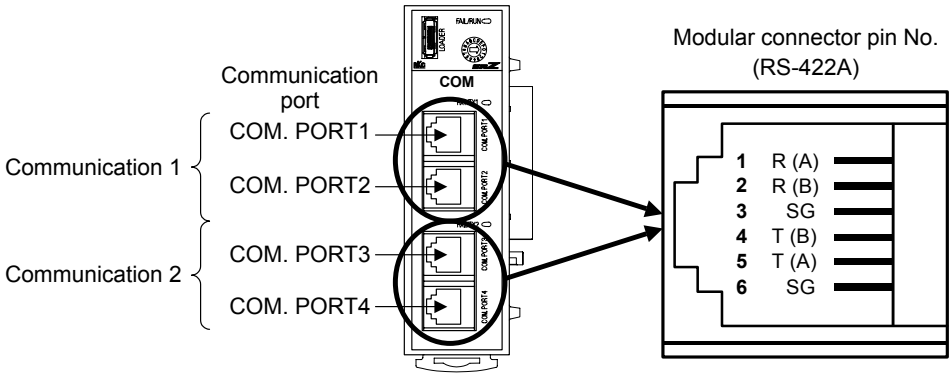
Cable type: W-BF-01-3000 (RKC product, Sold separately)
[Standard cable length: 3 m]

Connection cable W-BF-01 * (RKC product) can use to connect the PLC.
* Shields of the cable are connected to SG (No. 6 pin) of the COM. PORT3.

The details of the connectable connector for the PLC, see the instruction manual for the used PLC.

● Pin layout of modular connector

The contents of the modular connector signal are all the same from COM. PORT1 to COM. PORT4.

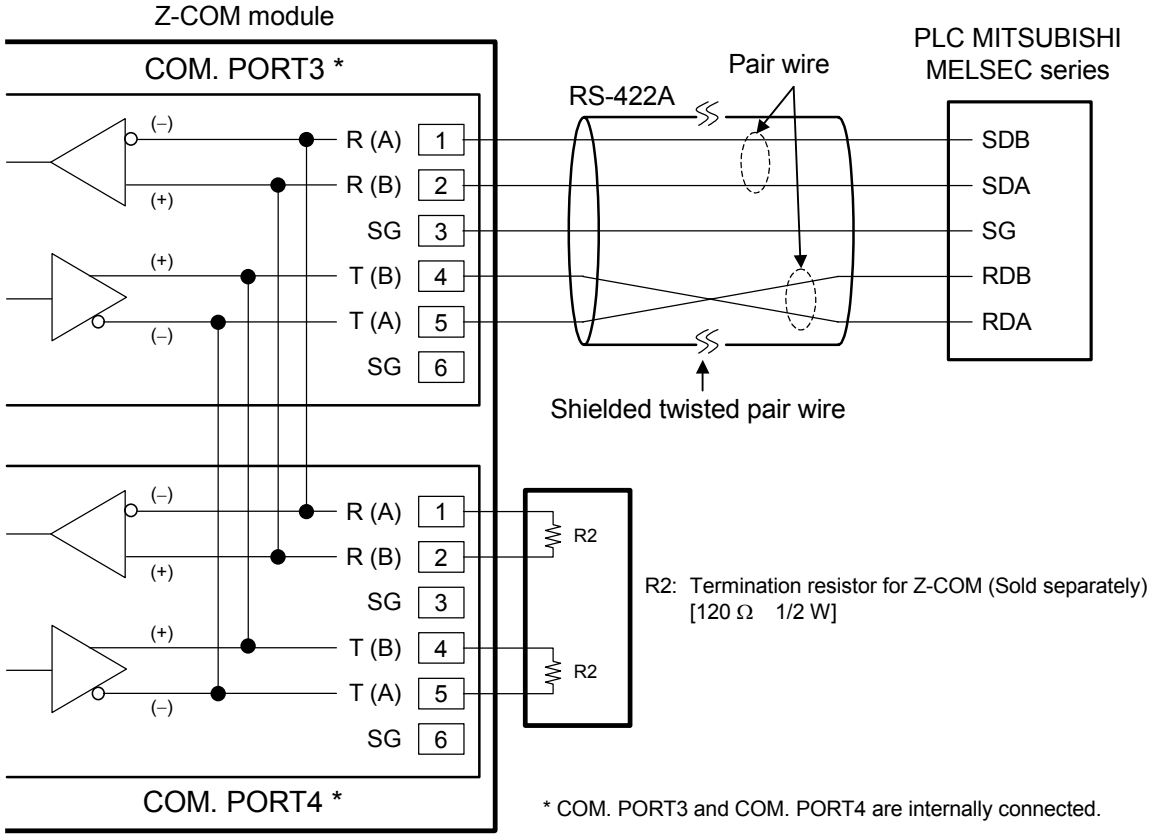


● Connector pin number and signal details

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

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

- **Diagram of RS-422A wiring**



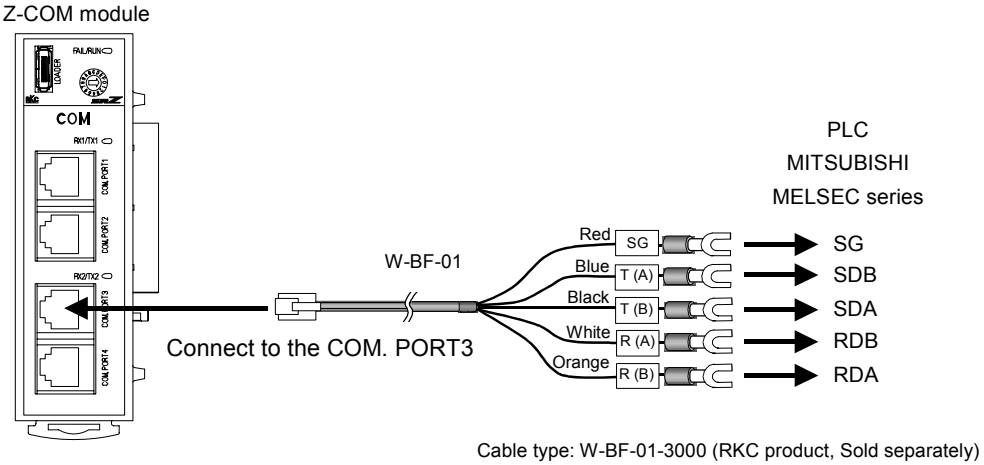
When preparing a cable of connecting the computer link module belonging to the MITSUBISHI MELSEC series to our Z-COM module, cross each pair of wires the A and B terminal positions on their terminal boards are not symmetrical.

Example: Connect the Z-COM module T (A) send data terminal to the RDB receive data terminal on the computer link module belonging to the MITSUBISHI MELSEC series.

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

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

■ RS-485



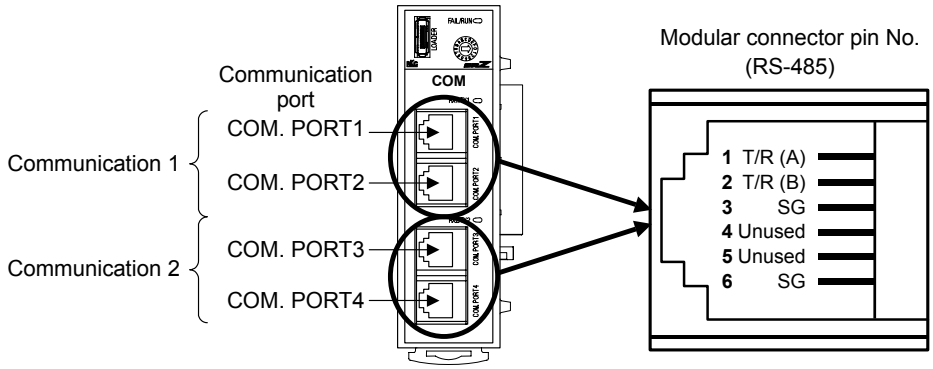
Cable type: W-BF-01-3000 (RKC product, Sold separately)
[Standard cable length: 3 m]

Connection cable W-BF-01 * (RKC product) can use to connect the PLC.
* Shields of the cable are connected to SG (No. 6 pin) of the COM. PORT3.
For information on terminating the cable (on the PLC side), please inquire when you place the order.

The details of the connectable connector for the PLC, see the instruction manual for the used PLC.

● Pin layout of modular connector

The contents of the modular connector signal are all the same from COM. PORT1 to COM. PORT4.

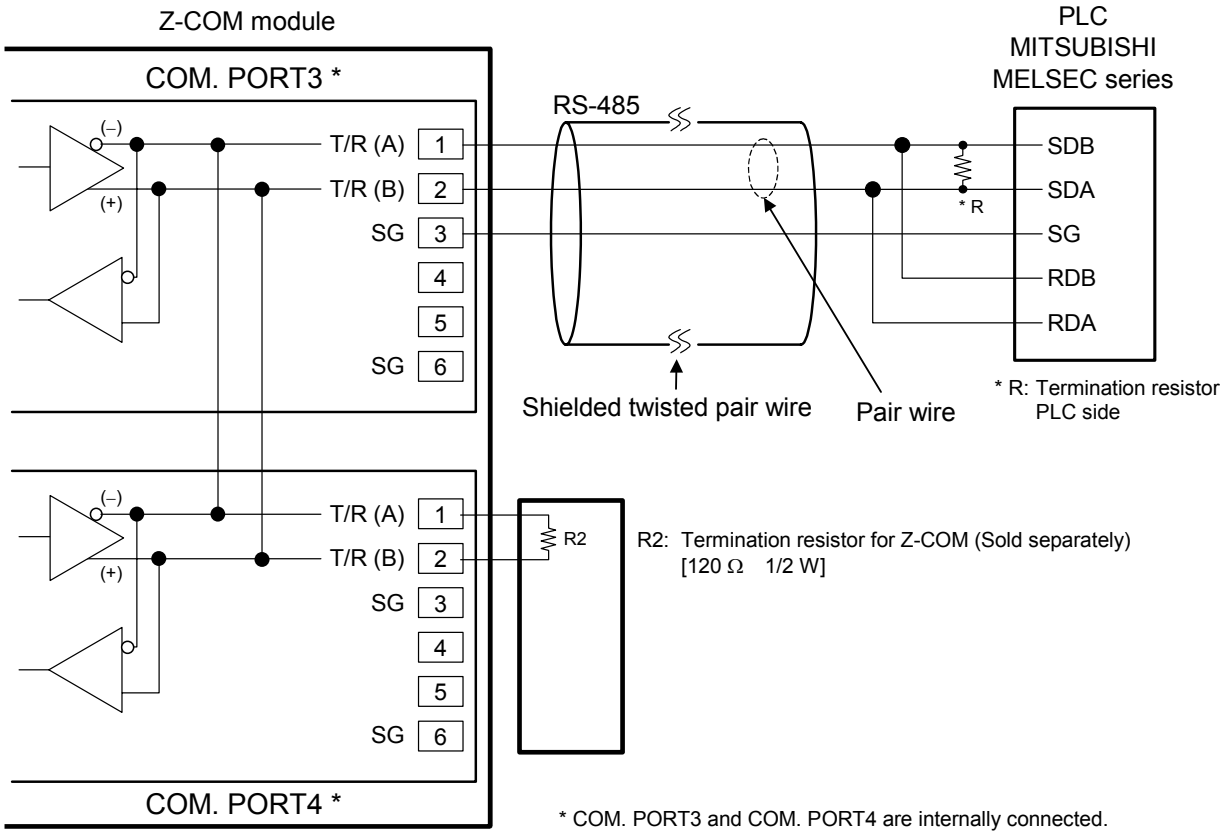


● Connector pin number and signal details

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

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

- **Diagram of RS-485 wiring**



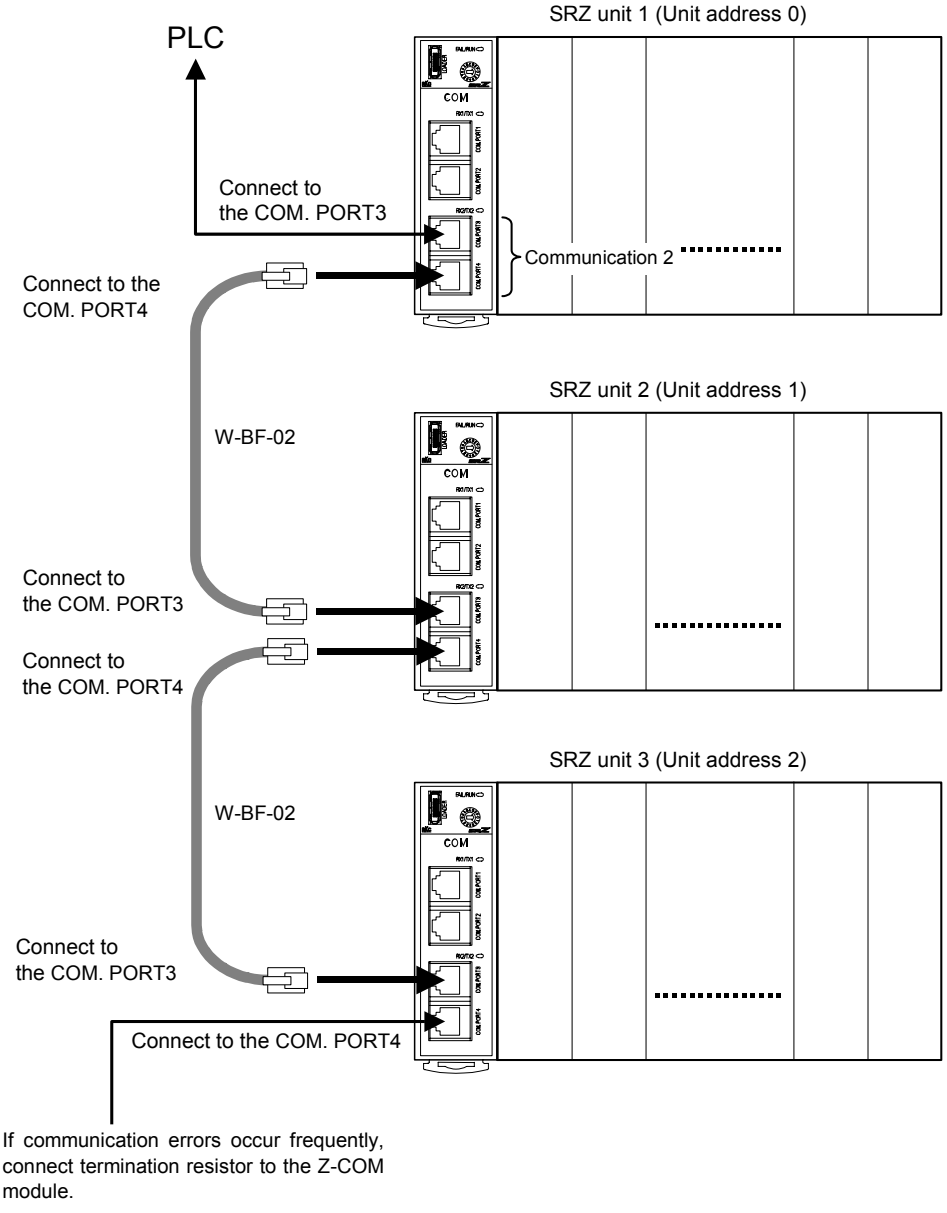
When preparing a cable of connecting the computer link module belonging to the MITSUBISHI MELSEC series to our Z-COM module, cross each pair of wires the A and B terminal positions on their terminal boards are not symmetrical.

Example: Connect the T/R (A) send data terminal on the Z-COM module to the receive data terminal (SDB, RDB) on the MITSUBISHI PLC MELSEC Series computer link module.

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

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

■ Multiple SRZ unit connections



If the interface is RS-422A, our connection cable (sold separately: W-BF-02) can be used to connect the SRZ unit.

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

COM. PORT3 and COM. PORT4 are internally connected.

For the termination resistor of Z-COM module, see **6.2.4 Termination resistor of Z-COM module (P. 6-13).**

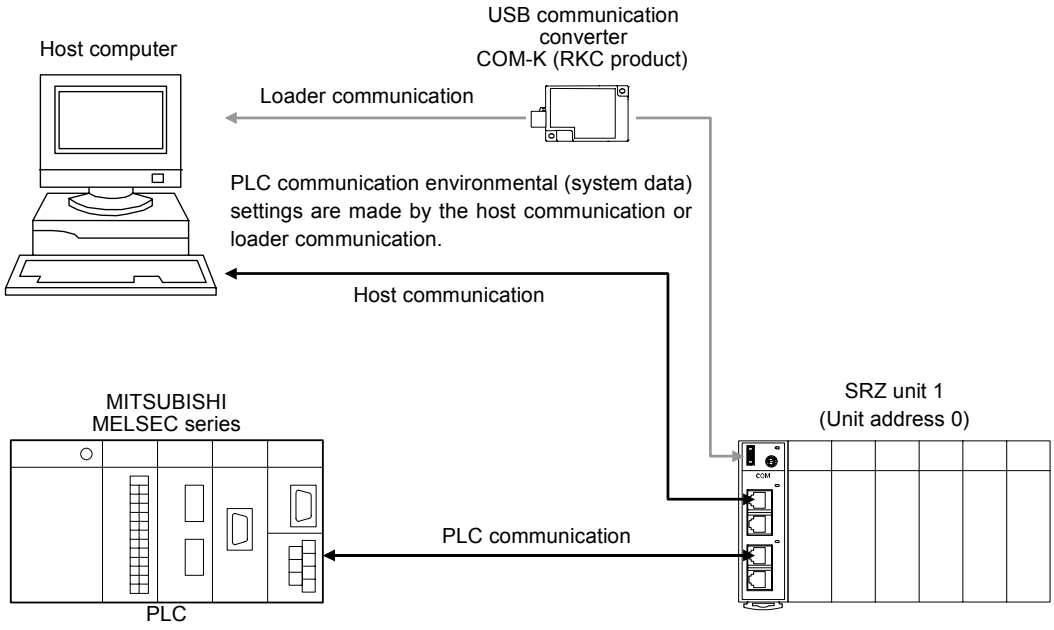
7.2.3 PLC communication environment setting

The PLC communication environmental (system data) settings must be made to perform PLC communication. The system data settings are made by the host communication or loader communication.
The system data contains setting items and monitor items. The monitor items require space in the PLC register.

After each item of the system data is set, the power of the SRZ unit must be turned off and then on to enable the data.
The items will also become valid by switching control from STOP to RUN.

The only system data is described here.

- For connection with host computer, see **6.2 Wiring (P. 6-3)**.
- For setting about host communication, see **3.2.2 Communication speed and communication protocol setting by DIP switch (P. 3-6).**
- For communication protocol of host communication, see **6.4 RKC Communication Protocol (P. 6-17)** or **6.5 Modbus Communication Protocol (P. 6-55)**.



(1) System data (setting items) list

The following items are set to the SRZ unit.

The following items become valid by turning off the power of the SRZ unit once, and then turning it on again after the settings are changed.
The items will also become valid by switching control from STOP to RUN.

All of the following items can be read and written (R/W). In addition, no channel designation is required.

"Identifier" and "Digits" are used for RKC communication and "Register address" is used for Modbus.

Name	Iden-tifier	Digits	Register address		Data range	Factory set value
			HEX	DEC		
Station number	**QV**	7	8008	32776	0 to 31 Set the PLC station number. Set it to the same number as the PLC.	0
PC number	**QW**	7	8009	32777	0 to 255 Set the PLC PC number. Set it to the same number as the PLC.	255
Register type (D, R, W, ZR)	**QZ**	7	800A	32778	0: D register (data register) 1: R register (file register) 2: W register (link register) 3: ZR register (Method of specifying consecutive numbers when 32767 of R register is exceeded.) Set the register types used in PLC communication. (See **P. 7-14**)	0
Register start number (High-order 4-bit)	**QS**	7	800B	32779	0 to 15 Set the start number of the register used in PLC communication. (QnA compatible 3C frame only) Set this if the register address 65535 is exceeded in the ZR register. (For the setting procedure, see **P.7-14.**)	0
Register start number (Low-order 16-bit)	**QX**	7	800C	32780	0 to 9999 A compatible, 1C frame, ACPU common command (WR/WW) If a value higher than 9999 is set, a "PLC register read/write error" will result. (excluding the W register) 0 to 65535 A compatible 1C frame AnA/AnUCPU common command (QR/QW), QnA compatible 3C frame Set the start number of the register used in PLC communication. (For the setting procedure, see **P.7-14.**)	1000

Continued on the next page.

Continued from the previous page.

Name	Iden-tifier	Digits	Register address		Data range	Factory set value
			HEX	DEC		
System data address bias	**QQ**	7	800D	32781	0 to 65535 When the SRZ unit is connected in a multi-drop connection, a bias is set for the register addresses of each unit so that no address duplication occurs. (See **P. 7-15**)	2100
COM module link recognition time	**QT**	7	800E	32782	0 to 255 seconds When connecting two or more SRZ units, set the time required until a unit after the second module is recognized. Set this item to the master unit.	10
PLC scanning time	**VT**	7	800F	32783	0 to 3000 ms Set the time of waiting for a response from the PLC. Usually, no factory set values are necessary to be changed.	255
PLC communication start time	**R5**	7	8010	32784	1 to 255 seconds Time until communication with the PLC starts is set after the power is turned on. The PLC communication start time is the time that writing of the system data (monitor items) starts. Actual communication with the PLC by request command can only take place after the system communication state (D01000) changes to "1."	5
Slave mapping method	**RK**	7	8012	32786	0: Bias from the Address setting switch [Register address + (Address setting switch %4) × System data address bias] 1: Bias disabled When the SRZ unit is connected in a multi-drop connection, this setting determines whether or not the bias set in "system data address bias" is applied to register addresses. (See **P. 7-15**)	0

■ Changing the register type

The register type used for PLC communication can be changed. The factory set value is set to D register (data register).

■ Setting method of the register start number

The start number of the register used for PLC communication can be changed. The factory set value is start from D01000 of the D register (data register). See the example below for the procedure for changing the start number.

- When any numbers from 0 to 65535 are set the register start number

1. Set the register start number (High-order 4-bit) to 0.

2. In the register start number (low-order 16-bit), set the register address to a value from 0 to 65535.

Example: When set the register start number to “10188”

Register start number (High-order 4-bit) Set the “0.”	Register start number (Low-order16-bit) Set the “10188.”

- When any numbers from 65536 to 1042431 are set the register start number (ZR register)

If set within the range from 65536 to 1042431, the register address must be converted. The converted register address is set in two parts in the register start number (high-order 4-bit) and the register start number (low-order 16-bit). Set the value as shown in the example below.

Example 1
When set the register start number to 65536

Convert **65536** to hexadecimal.

↓

10000 (Hexadecimal)

↓

Separate **10000** into the upper 4 digits and the lower four digits.
High-order Low-order
1 **0000** (Hexadecimal)

↓

Separately convert the upper digits and the lower digits back to decimal.

↓

High-order Low-order
1 **0** (Decimal)

↓

Set the register start number (High-order 4-bit) to “**1**.”

Set the register start number (Low-order 16-bit) to “**0**.”

Example 2
When set the register start number to 100000

Convert **100000** to hexadecimal.

↓

186A0 (Hexadecimal)

↓

Separate **186A0** into the upper 4 digits and the lower four digits.
High-order Low-order
1 **86A0** (Hexadecimal)

↓

Separately convert the upper digits and the lower digits back to decimal.

↓

High-order Low-order
1 **34464** (Decimal)

↓

Set the register start number (High-order 4-bit) to “**1**.”

Set the register start number (Low-order 16-bit) to “**34464**.”

Example 3
When set the register start number to 1040332

Convert **1040332** to hexadecimal.

↓

FDFCC (Hexadecimal)

↓

Separate **FDFCC** into the upper 4 digits and the lower four digits.
High-order Low-order
F **DFCC** (Hexadecimal)

↓

Separately convert the upper digits and the lower digits back to decimal.

↓

High-order Low-order
15 **57292** (Decimal)

↓

Set the register start number (High-order 4-bit) to “**15**.”

Set the register start number (Low-order 16-bit) to “**57292**.”

■ System data address bias and Slave mapping method

When the SRZ unit is connected in a multi-drop connection, a bias can be set to prevent duplication of register addresses. Setting the slave mapping method and the system data address bias prevents duplication of register addresses of each unit by the address setting switch.

- System data address bias: Set the bias value of register address.
  Factory set value is "2100."
- Slave mapping method: Sets bias validity/invalidity.
  The factory set value is "0: Bias from address setting switch" (bias enabled).

When the bias is enabled, a register address is calculated as shown below.

Register address when bias is enabled =

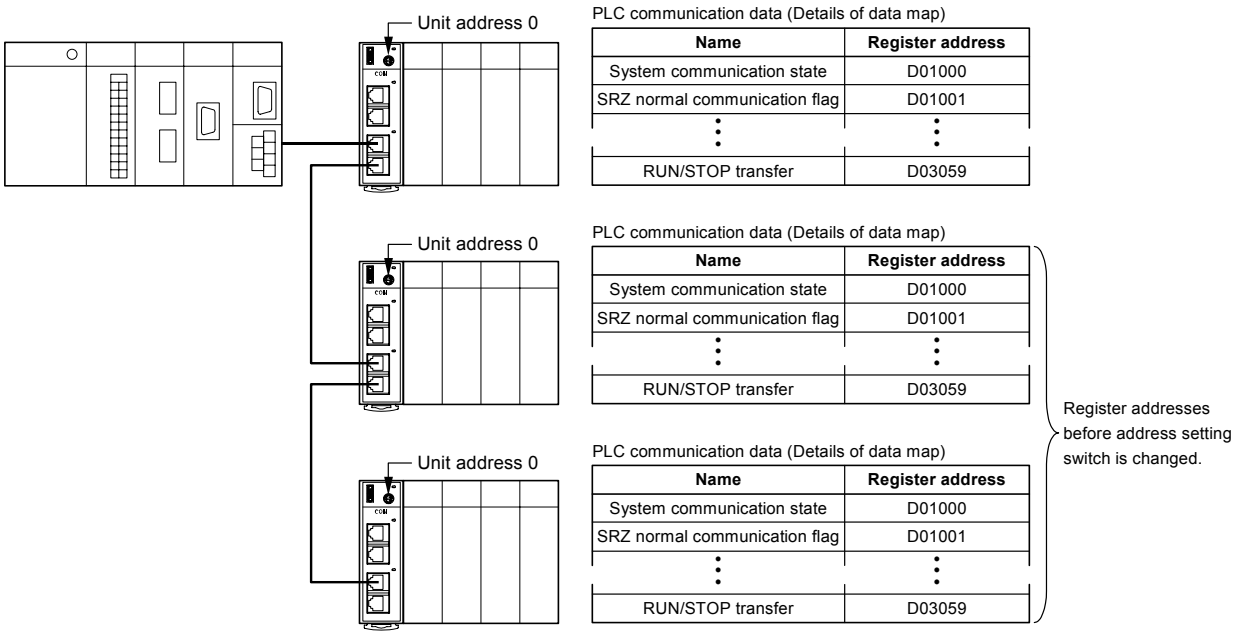
Register address + (Address setting switch%4) × System data address bias

Register address when bias is disabled	Remainder of address setting switch/4	Factory set value: 2100

Setting example

Condition:
PLC: 1
SRZ unit: 3
System data address bias: 2100 (factory set value)
Slave mapping method: 0 (factory set value)

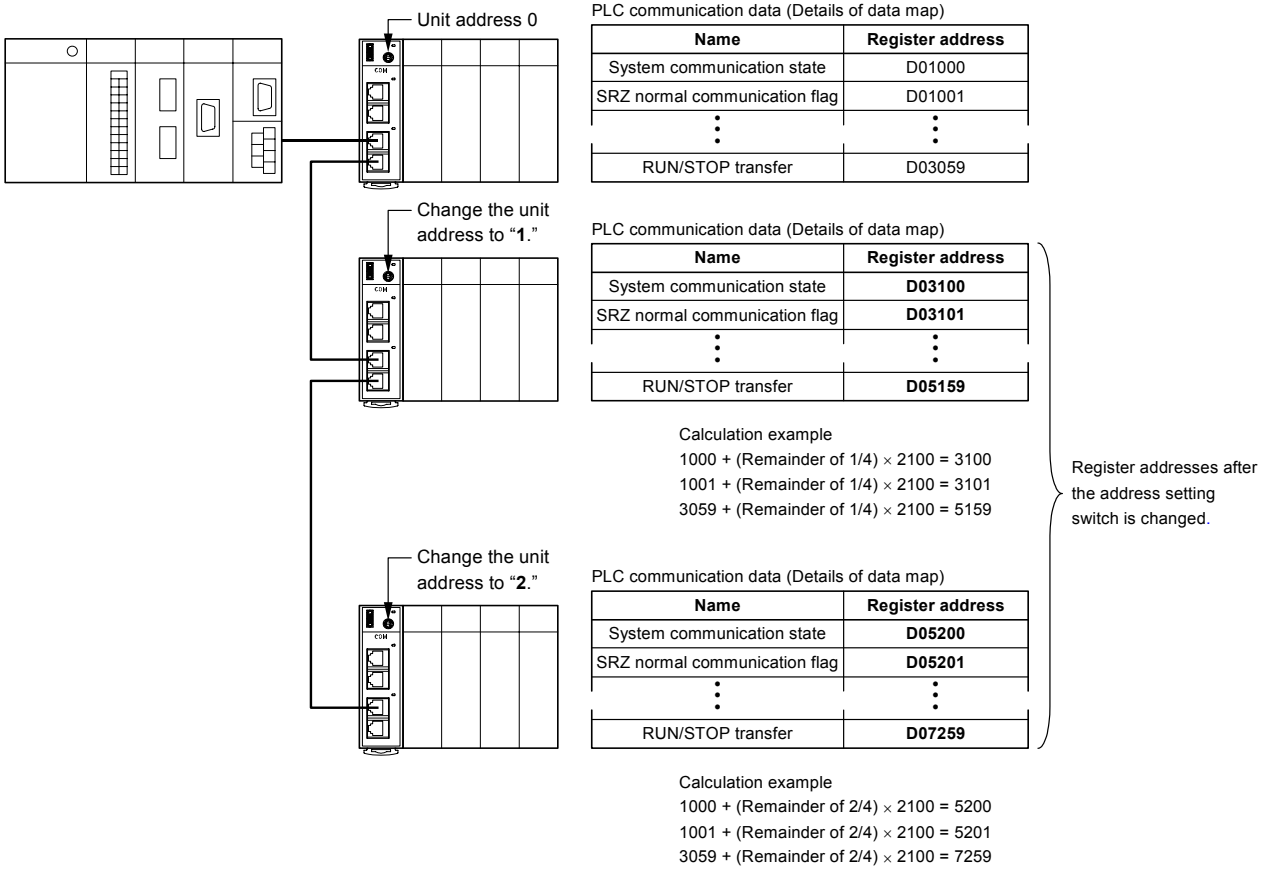
1. When multiple SRZ units are connected in the factory default state (SRZ unit address: 0), duplication of the register addresses in the PLC communication data occurs as indicated below.



Continued on the next page.

Continued from the previous page.

2. Change the SRZ unit address by the address setting switch. The register address bias is enabled and there is no longer duplication of register addresses.



(2) System data (monitor items) list

When system data (setting items) are set, the following system data (monitor items) are written to the register of the PLC when PLC communication is performed. (Following register address is the factory set-value.)

📖 All of the following items can be read and written (R/W).

📖 Details of system data (monitor items) can be checked via host communication or loader communication.

☞ For details of system data (monitor items), see **7.5 PLC Communication Data Map (P.7-39)**.

Name	Register address	Struc-ture	Attri-bute	Data range	Factory set value
System communication state	D01000	U	RO	Bit data b0: Data collection condition b1 to b15: Unused Data 0: Before data collection is completed 1: Data collection is completed [Decimal number: 0, 1] This is the communication data collection state of the functional module joined to the Z-COM module.	0
SRZ normal communication flag	D01001	U	RO	0/1 transfer (For communication checking) "0" and "1" are repeated for each communication period.	—
—	D01002	—	—	Do not use this register address as it is used for the internal processing.	—
—	D01003	—	—		—
PLC communication error code	D01004	U	RO	Bit data b0: PLC register read/write error b1: Slave communication timeout b2: Unused b3: Internal communication error b4: Master communication timeout b5 to b15: Unused Data 0: OFF 1: ON [Decimal number: 0 to 31]	—
Unit recognition flag	D01005	U	RO	Bit data b0: SRZ unit 1 b1: SRZ unit 2 b2: SRZ unit 3 b3: SRZ unit 4 b4 to b15: Unused Data 0: No unit exists 1: Unit exists [Decimal number: 0 to 15]	—
Monitor for the number of connected modules	D01006	U	RO	0 to 31	—
—	D01007	—	—	Do not use this register address as it is used for the internal processing.	—

7.2.4 Setting on the PLC (Computer link module)

Sets the communication items of PLC side. Set the PLC as follows. (Recommend setting example)

☞ The setting item varies depending on the PLC. The details of the setting procedure for the PLC, see the instruction manual for the PLC being used.

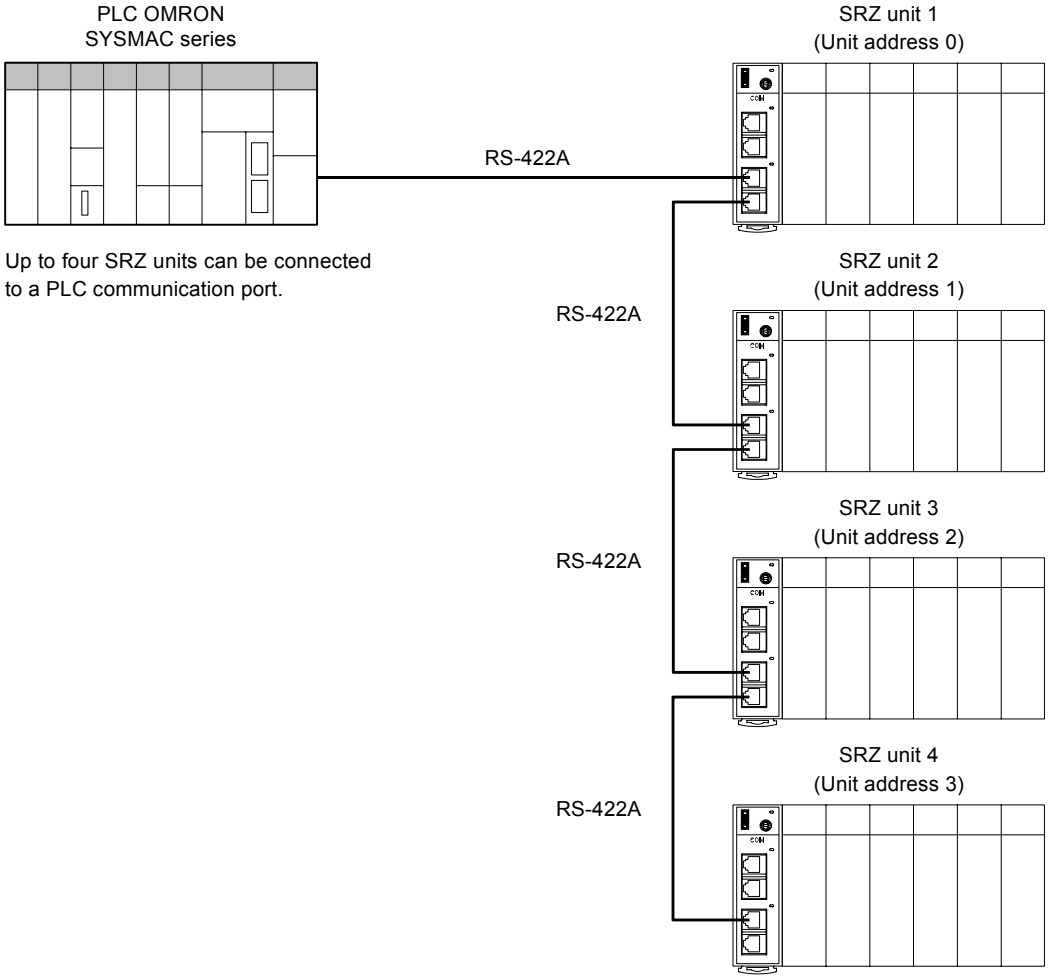
■ MELSEC-AnA/AnU/QnA/Q series

Item	Description
Protocol	Type 4 protocol mode
Station number	00
Computer link/multi-drop selection	Computer link
Communication rate	Set the same as SRZ unit (Z-COM module)
Operation setting	Independent
Data bit	7
Parity bit	Without
Stop bit	1
Sum check code	Provided
Writing during RUN	Allowed
Setting modification	Allowed
Termination resistor	Connect the termination resistor attached to the PLC

7.3 OMRON SYSMAC Series

7.3.1 Outline

The SRZ unit can be connected to the OMRON SYSMAC series computer link module without using any program.



■ Usable PLC units (OMRON SYSMAC series)

Name	Type
High-order link unit	C200H-LK202-V1, C500-LK203, C120-LK202-V1 (SYSMAC C series), etc.
CPU unit with a built in communication port	CPU unit of SYSMAC CS1 series CPU unit of SYSMAC CJ1 series
Serial communication board	CS1W-SCB41 (SYSMAC CS1 series), CS1W-SCB41 (SYSMAC CJ1 series), etc.

■ Usable SRZ unit modules

Name	Type
Communication Extension Module	Z-COM-A
Temperature control module	Z-TIO-A (4-channel type) Z-TIO-B (2-channel type)
Digital I/O module	Z-DIO-A

Up to 31 functional modules can be connected to one Z-COM module.

☞ For the joinable number of functional modules, see **4.3 Joinable Number of Modules (P. 4-6).**

☞ For function module, see Instruction Manual of the following.

- Temperature Control Module Z-TIO Instruction Manual (IMS01T01-E□)
- Digital I/O Module Z-DIO Instruction Manual (IMS01T03-E□)
- SRZ Instruction Manual (IMS01T04-E□)

7.3.2 Wiring

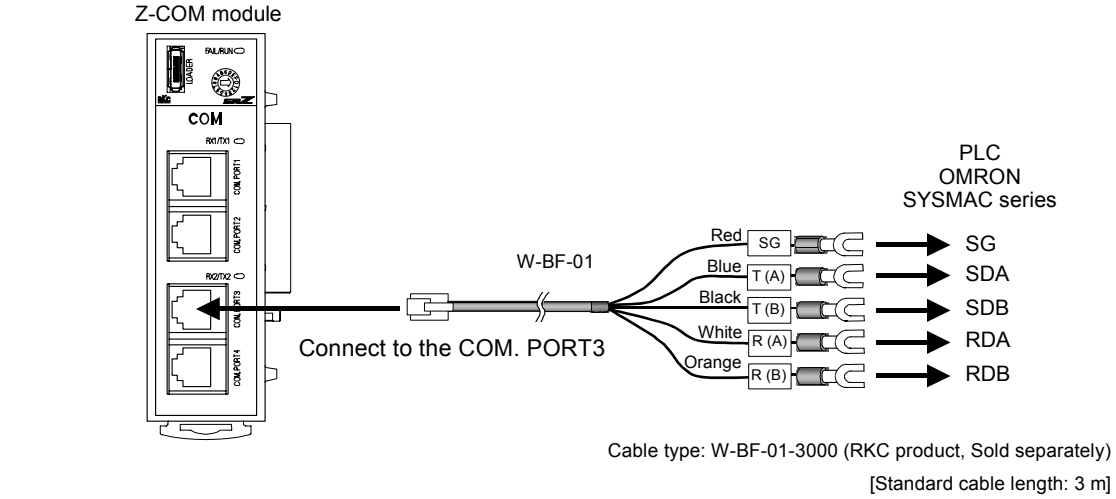
⚠ WARNING

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 in the both ends of the communication cable (nearest the connector).

■ RS-422A



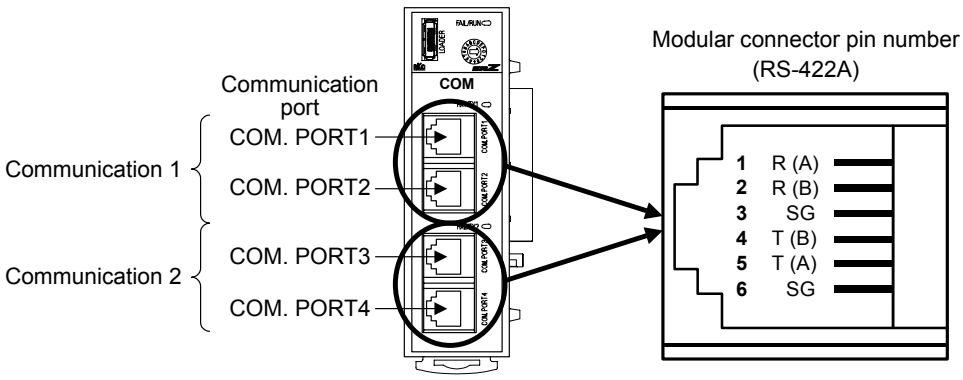
Cable type: W-BF-01-3000 (RKC product, Sold separately)
[Standard cable length: 3 m]

Connection cable W-BF-01 * (RKC product) can use to connect the PLC.
* Shields of the cable are connected to SG (No. 6 pin) of the COM. PORT3.

The details of the connectable connector for the PLC, see the instruction manual for the used PLC.

● Pin layout of modular connector

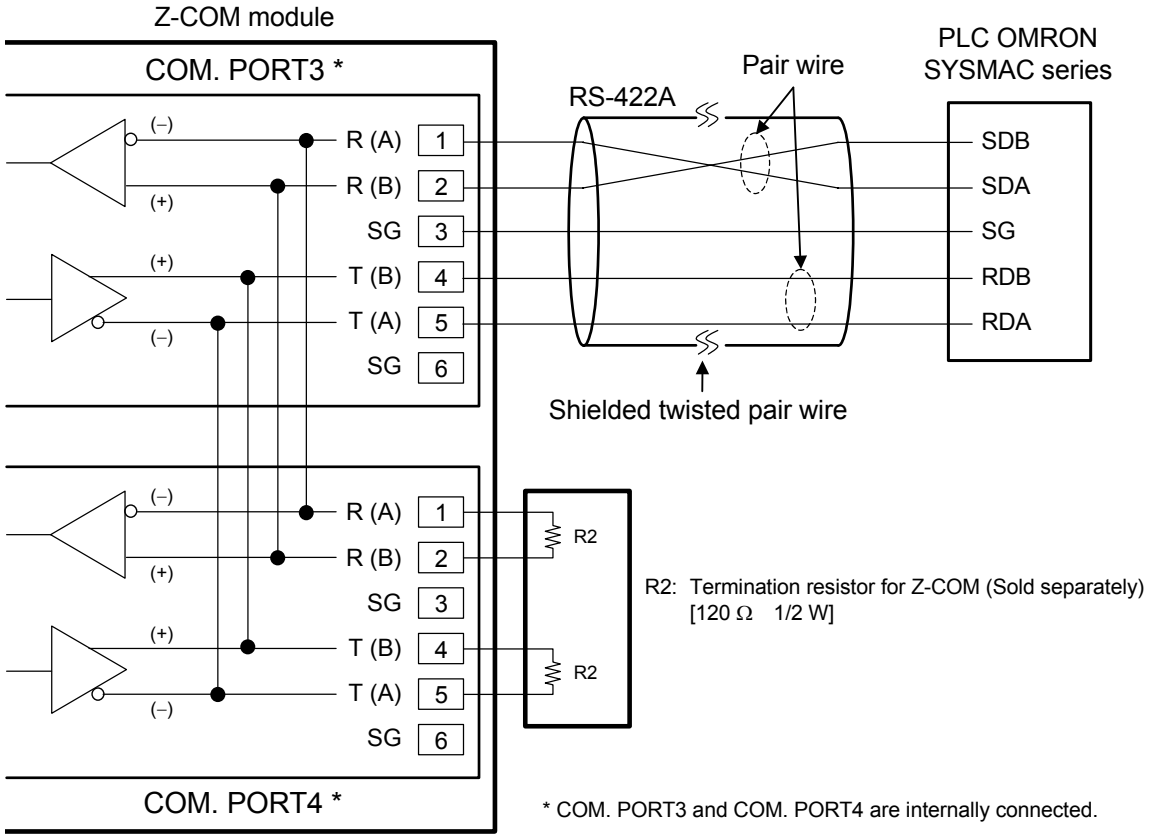
The contents of the modular connector signal are all the same from COM. PORT1 to COM. PORT4.



● Connector pin number and signal details

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

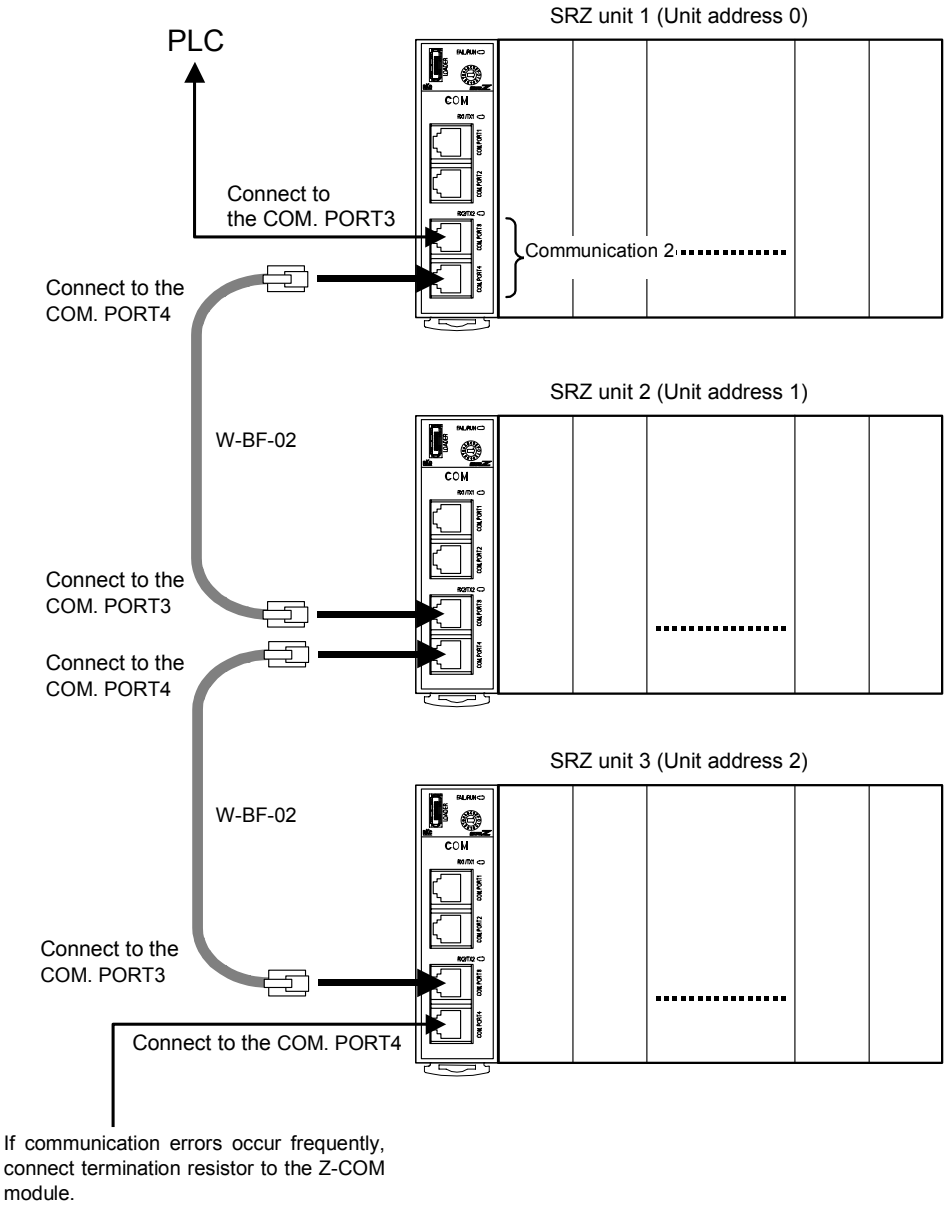
- **Diagram of RS-422A wiring**



The 6-pin type modular connector should be used for the connection to the Z-COM 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.

■ Multiple SRZ unit connections



If the interface is RS-422A, our connection cable (sold separately: W-BF-02) can be used to connect the SRZ unit.

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

COM. PORT3 and COM. PORT4 are internally connected.

For the termination resistor of Z-COM module, see **6.2.4 Termination resistor of Z-COM module (P. 6-13).**

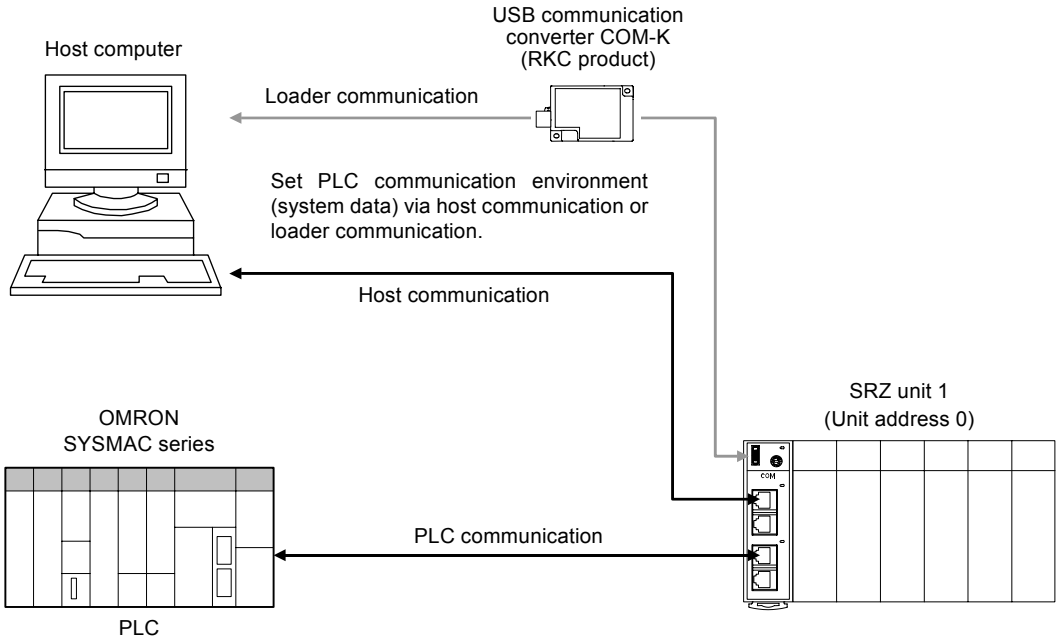
7.3.3 PLC communication environment setting

The PLC communication environmental (system data) settings must be made to perform PLC communication. The system data settings are made by the host communication or loader communication.
The system data contains setting items and monitor items. The monitor items require space in the PLC register.

After each item of the system data is set, the power of the SRZ unit must be turned off and then on to enable the data. The data can also be enabled by switching control from STOP to RUN.

The only system data is described here.

- For connection with host computer, see **6.2 Wiring (P. 6-3)**.
- For setting about host communication, see **3.2.2 Communication speed and communication protocol setting by DIP switch (P. 3-7).**
- For communication protocol of host communication, see **6.4 RKC Communication Protocol (P. 6-17)** or **6.5 Modbus Communication Protocol (P. 6-55)**.



(1) System data (setting items) list

The following items are set to the SRZ unit.

The following items become valid by turning off the power of the SRZ unit once, and then turning it on again after the settings are changed.
The items will also become valid by switching control from STOP to RUN.

All of the following items can be read and written (R/W). In addition, no channel designation is required.

"Identifier" and "Digits" are used for RKC communication and "Register address" is used for Modbus.

Name	Iden-tifier	Digits	Register address		Data range	Factory set value
			HEX	DEC		
Station number	**QV**	7	8008	32776	0 to 31 Set the PLC station number. Set it to the same number as the PLC.	0
Register type (DM, EM)	**QZ**	7	800A	32778	0: DM register (Data memory) 1 to 9: Unused 10 to 22: EM register (Extended data memory) [Specify the bank No.]] [Specify the bank No.+10] 23 to 28: Unused 29: EM register (Extended data memory) [Specify the current bank]) Set the register types used in PLC communication.	0
Register start number (Low-order 16-bit)	**QX**	7	800C	32780	0 to 9999 Set the start number of the register used in PLC communication. If a value higher than 9999 is set, a "PLC register read/write error" will result. (For the setting procedure, see **P. 7-14.**)	1000
System data address bias	**QQ**	7	800D	32781	0 to 9999 When the SRZ unit is connected in a multi-drop connection, a bias is set for the register addresses of each unit so that no address duplication occurs. (See **P. 7-15**)	2100

Continued on the next page.

Continued from the previous page.

Name	Iden-tifier	Digits	Register address		Data range	Factory set value
			HEX	DEC		
COM module link recognition time	**QT**	7	800E	32782	0 to 255 seconds When connecting two or more SRZ units, set the time required until a unit after the second module is recognized. Set this item to the master unit.	10
PLC scanning time	**VT**	7	800F	32783	0 to 3000 ms Set the time of waiting for a response from the PLC. Usually, no factory set values are necessary to be changed.	255
PLC communication start time	**R5**	7	8010	32784	1 to 255 seconds Time until communication with the PLC starts is set after the power is turned on. The PLC communication start time is the time that writing of the system data (monitor items) starts. Actual communication with the PLC by request command can only take place after the system communication state (D01000) changes to "1."	5
Slave mapping method	**RK**	7	8012	32786	0: Bias from the Address setting switch [Register address + (Address setting switch %4) × System data address bias] 1: Bias disabled When the SRZ unit is connected in a multi-drop connection, this setting determines whether or not the bias set in "system data address bias" is applied to register addresses. (See **P.7-15**)	0

(2) System data (monitor items) list

When system data (setting items) are set, the following system data (monitor items) are written to the register of the PLC when PLC communication is performed.

All of the following items can be read and written (R/W).

Details of System data (monitor items) can be checked via host communication or loader communication.

For details of system data (monitor items), see **7.5 PLC Communication Data Map (P.7-39)**.

Name	Register address	Struc-ture	Attri-bute	Data range	Factory set value
System communication state	D01000	U	RO	Bit data b0: Data collection condition b1 to b15: Unused Data 0: Before data collection is completed 1: Data collection is completed [Decimal number: 0, 1] This is the communication data collection state of the functional module joined to the Z-COM module.	0
SRZ normal communication flag	D01001	U	RO	0/1 transfer (For communication checking) "0" and "1" are repeated for each communication period.	—
—	D01002	—	—	Do not use this register address as it is used for the internal processing.	—
—	D01003	—	—		—
PLC communication error code	D01004	U	RO	Bit data b0: PLC register read/write error b1: Slave communication timeout b2: Unused b3: Internal communication error b4: Master communication timeout b5 to b15: Unused Data 0: OFF 1: ON [Decimal number: 0 to 31]	—
Unit recognition flag	D01005	U	RO	Bit data b0: SRZ unit 1 b1: SRZ unit 2 b2: SRZ unit 3 b3: SRZ unit 4 b4 to b15: Unused Data 0: No unit exists 1: Unit exists [Decimal number: 0 to 15]	—
Monitor for the number of connected modules	D01006	U	RO	0 to 31	—
—	D01007	—	—	Do not use this register address as it is used for the internal processing.	—

7.3.4 Setting on the PLC

Sets the communication items of PLC side. Set the PLC as follows. (Recommend setting example)

Item	Description
Serial communication mode	High-order link
Unit number (Model number)	0
Start bit	1
Data bit	7
Stop bit	2
Parity bit	Even
Transmission speed	Set the same as SRZ unit (Z-COM module)
I/O port selection	RS-422A
Synchronization selection	Internal synchronization
CTS selection	0 V (always ON)
5 V supply	OFF
Termination resistor	Termination resistor is inserted

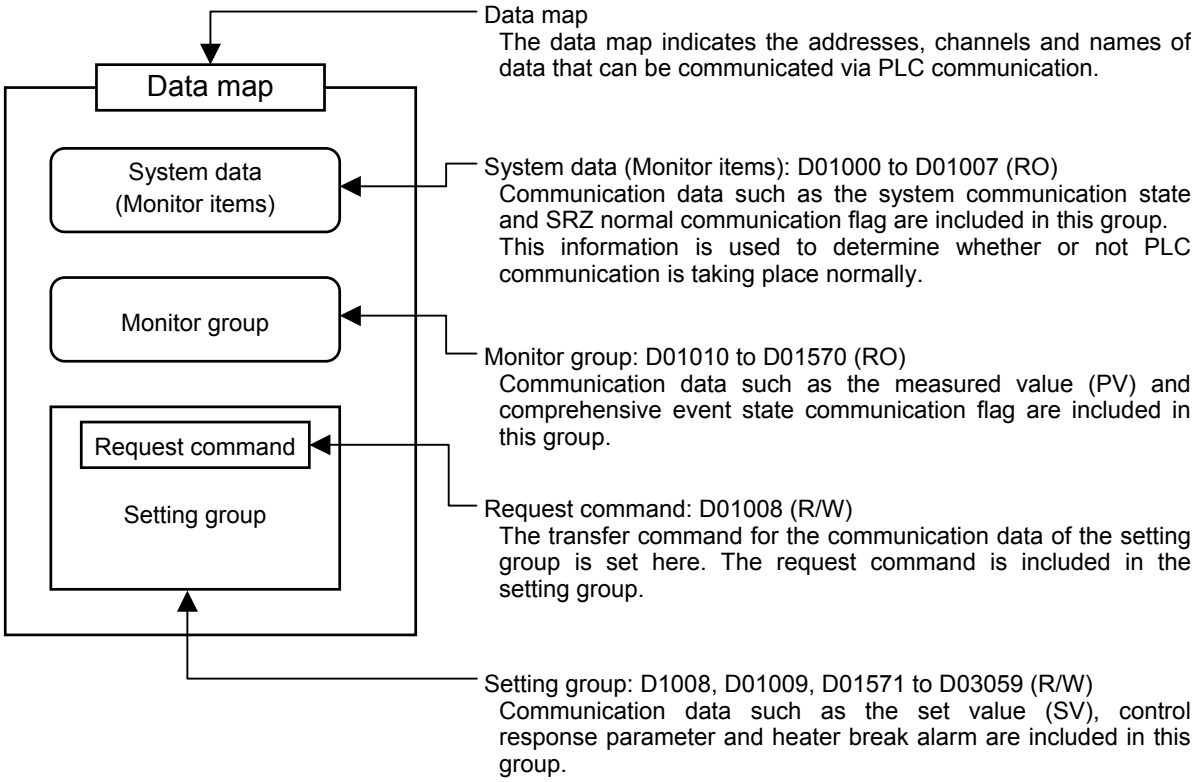
☞ The setting item varies depending on the PLC. The details of the setting procedure for the PLC, see the instruction manual for the PLC being used.

🕮 If the PLC is started in RUN mode, the SRZ unit automatically switches to monitor mode and performs communication.

7.4 Data Transfer

7.4.1 PLC communication data transfer

The data transmitted between the PLC and the SRZ unit is compiled in the PLC communication data map (hereafter, called data map).
In the PLC communication data map the communication data is classified into system data (monitor items), request command, monitor group, and setting group. The communication data is transmitted to every group.



☞ For the communication data, see **7.5 PLC communication data map (P.7-39).**

■ Request command

Data transfer between PLC and SRZ unit are executed by request command. For the request command, both "setting request bit" and "monitor request bit" are available.

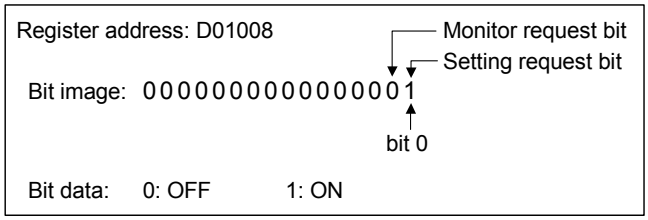
Request command	The setting request bit and monitor request bit of the request command are assigned to each bit datum as a binary number. [Register address: D01008 (Factory set value)] Monitor request bit Setting request bit Bit image: 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 bit 15 ---------- bit 0 Bit data: 0: OFF 1: ON

● Setting request bit (PLC → SRZ)

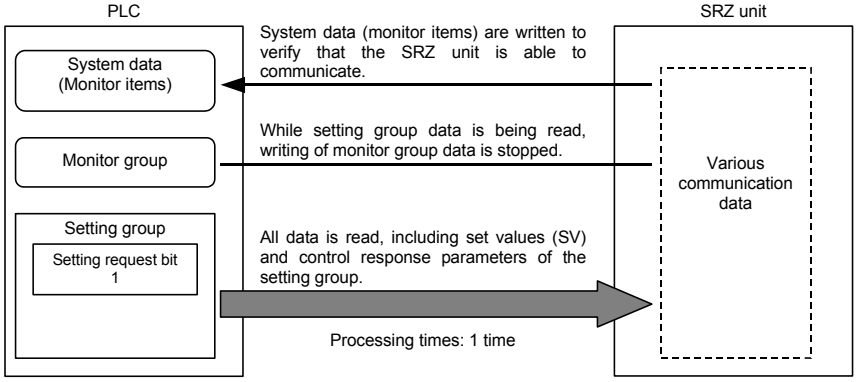
This command requests that the SRZ unit read the communication data of the setting group on the PLC side.

[Processing]

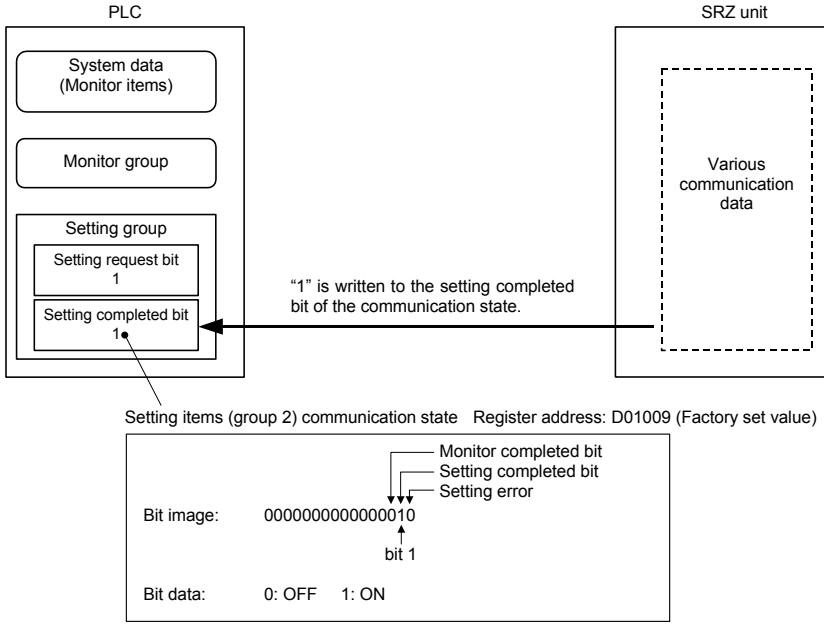
1. When the setting request bit of the request command (D01008) is set to "1," the SRZ unit starts to read the communication data of the setting group from the PLC.



2. All data of the setting group is transferred from PLC to the SRZ unit.

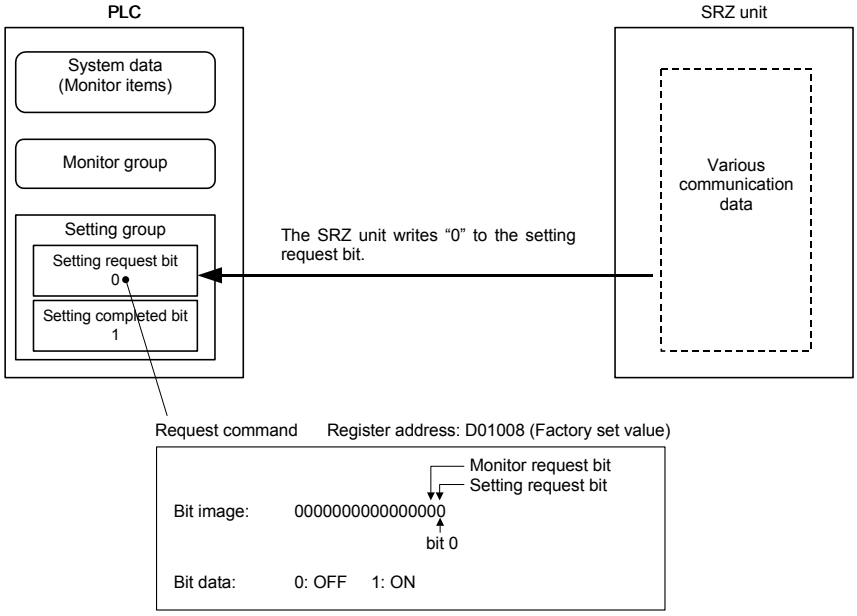


3. When reading is finished, the SRZ unit writes the communication state of the setting group to the setting completed bit of setting item (Group 2) communication state.



🕮 If there is an error in the setting range of the data, the flag of setting error will change to "1." Check and see if there is an error in the values set in the PLC register.

4. The setting request bit will change to "0" to indicate that reading of data from the PLC is finished.

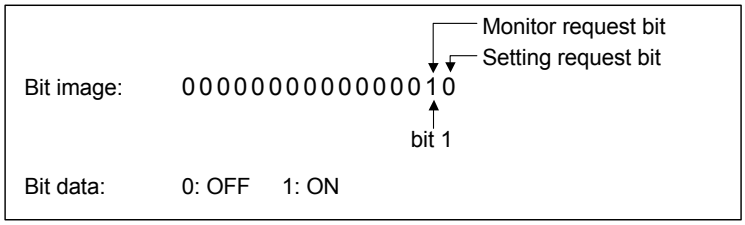


● Monitor request bit (PLC ← SRZ)

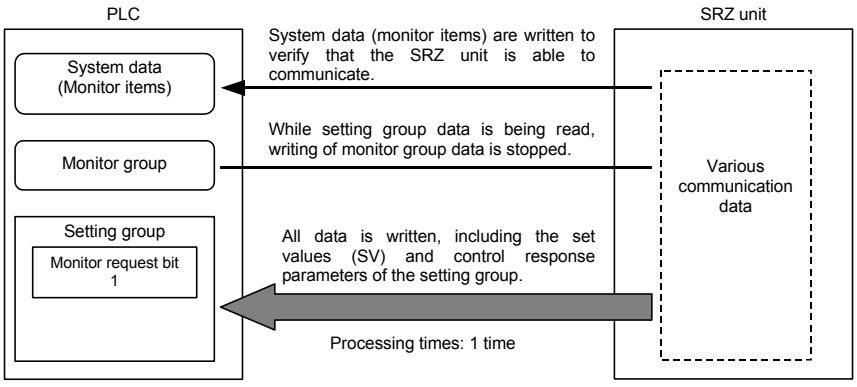
This command requests that the SRZ unit write the communication data of the setting group on the PLC side.

[Processing]

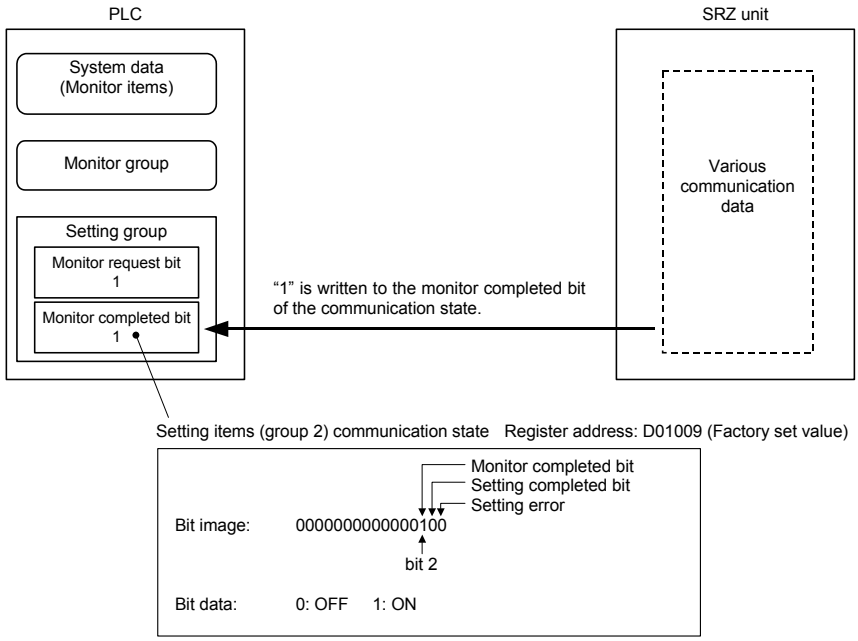
1. When the monitor request bit of the request command (D01008) is set to "1," the SRZ unit starts to write the communication data of the setting group to the PLC.



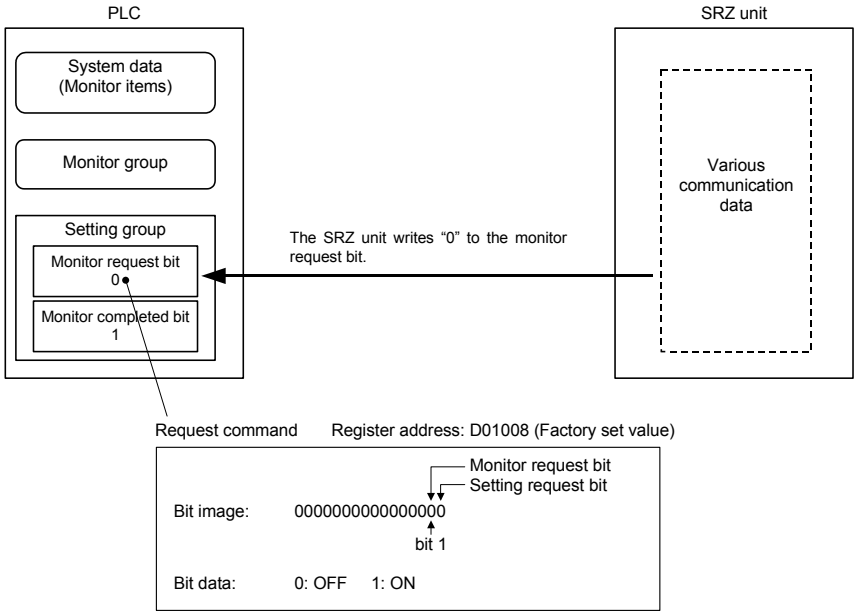
2. Setting group data is written from the SRZ unit to the PLC.



3. When writing is finished, the SRZ unit writes the communication state of the setting group to the monitor completed bit of setting item (Group 2) communication state.



4. The monitor request bit will change to "0" to indicate that reading of data from the PLC is finished.

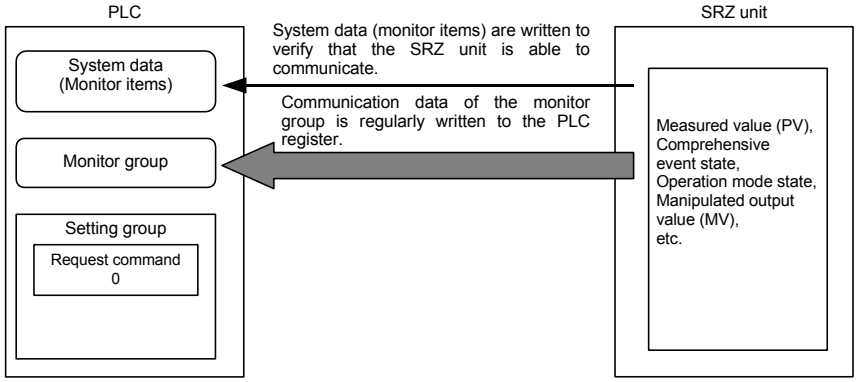


- **Caution for request command**

The request command is bit data, however, actual reading of the register takes place in words.
For example, after the setting request bit is set to "1," if the monitor request bit is set to "1" before the setting request bit returns to "0," when the setting request bit returns to "0," the monitor request bit will be overwritten with the state (monitor request bit "0") that obtained when the setting request bit was set to "1."

■ Monitor group (PLC ← SRZ)

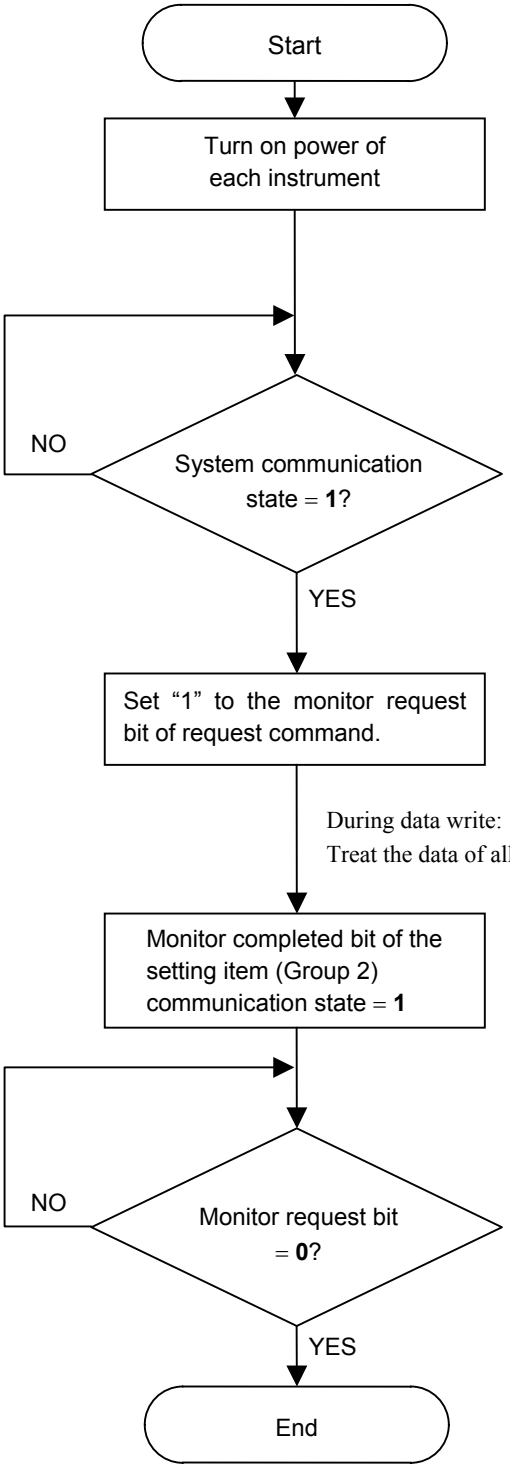
The communication data of the monitor group does not have a request command setting. The SRZ unit regularly repeats writing of communication data to the PLC each communication period.
Note that writing of monitor group data is stopped while the setting group reads or writes by request command.



7.4.2 Data transfer procedures

Change each set value of SRZ unit from the PLC after the initial settings are made. If each set value of SRZ unit 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 the power of the SRZ unit is turned on, data collection of the functional modules (Z-TIO and Z-DIO modules) joined to the Z-COM module starts.
In addition, writing of the system data (monitor items) begins after the PLC communication start time (factory set value is 5 seconds) has passed.

When data collection is finished, the SRZ unit starts writing the communication data of the monitor group to the PLC.
When monitor group writing starts, "system communication state" changes to "**1**."
When the system communication condition becomes "**1**," PLC communication can be performed.

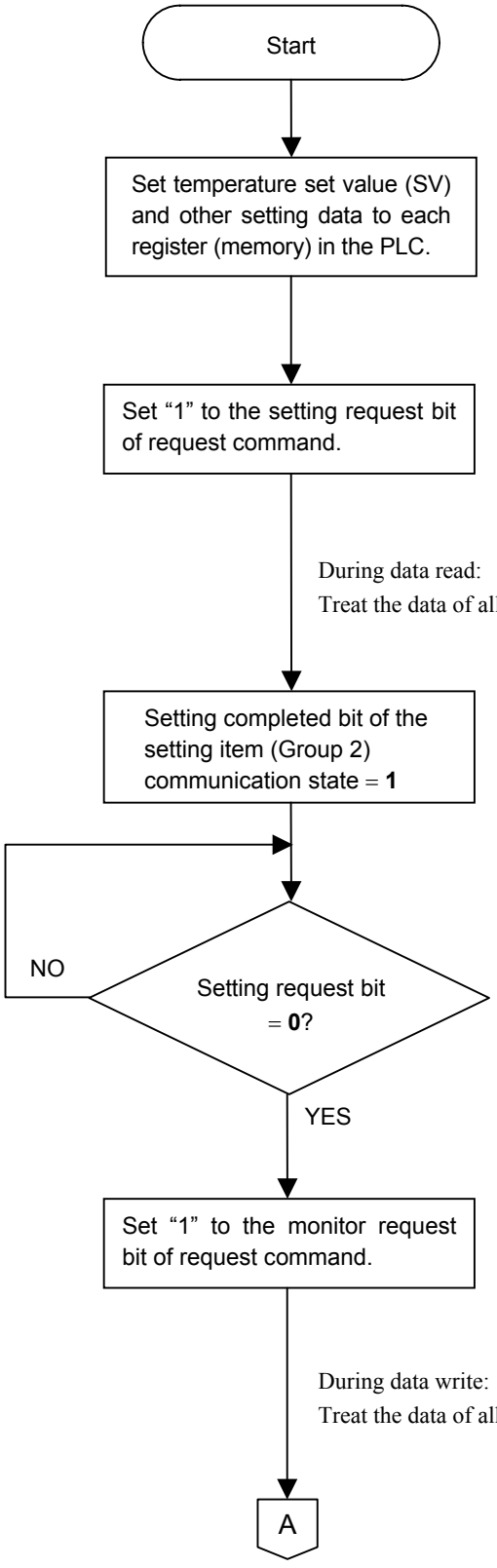
When the monitor request bit of the request command of the PLC register is set to "**1**," the SRZ unit starts writing the setting group data to the PLC.

During data write:
Treat the data of all items as inconsistent during the data write.

When writing is finished, the SRZ unit writes the communication state of the setting group to the monitor completed bit of the setting item (Group 2) communication state of the PLC.

If the monitor request bit of the request command of the PLC register is "**0**," this indicates that writing of data to the PLC is finished.

■ When the setting group communication data is transferred from PLC to the SRZ unit.



[Data setting]
When the setting request bit of the request command of the PLC register is set to "**1**," the SRZ unit starts reading the setting group data that is set in the register (memory) of the PLC.

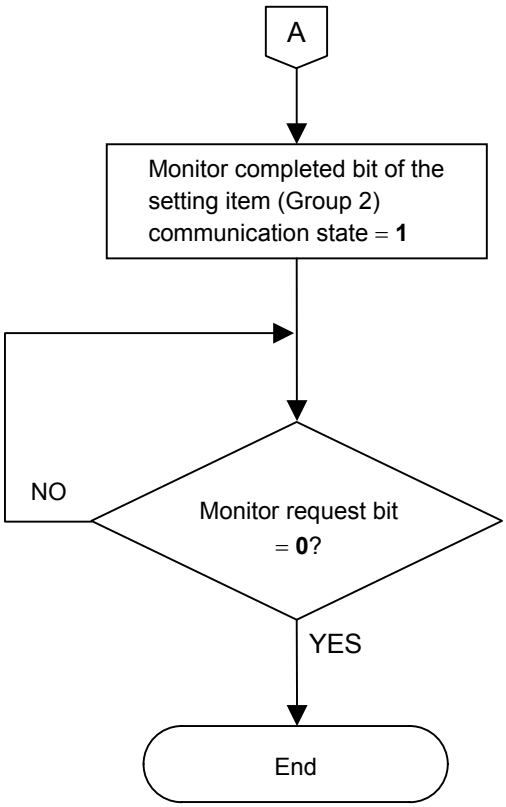
During data read:
Treat the data of all items as inconsistent during the data read.

When reading is finished, the SRZ unit writes the communication state of the setting group to the setting completed bit of the setting item (Group 2) communication state of the PLC.

If the setting request bit of the request command of the PLC register is "0," this indicates that reading of data from the PLC is finished.

[Confirmation of setting data]
To check the data read by the SRZ unit from the PLC, the SRZ unit starts writing the setting group data to the PLC when the monitor request bit of the request command of the PLC register is set to "**1**."

During data write:
Treat the data of all items as inconsistent during the data write.



When writing is finished, the SRZ unit writes the communication state of the setting group to the monitor completed bit of the setting item (Group 2) communication state of the PLC.

If the monitor request bit of the request command of the PLC register is "**0**," this indicates that writing of data to the PLC is finished.

7.4.3 Data processing precautions

- 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.

  [Example] Setting of proportional band
  Initial value of internal data: 3.0
  Communication data: 30

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

- Autotuning (AT) starts autotuning when PID/AT transfer is set to "1: Autotuning (AT)" and the setting request bit is set to "1." After the autotuning function finishes its execution, PID/AT transfer returns to "0: PID control operation" and thus the PID constants are updated.

- Some communication data may become invalid depending on the module selection or the module configuration. If any one of the conditions listed below occurs and data items written are within the setting range.

7.5 PLC Communication Data Map

The data map summarizes data addresses, channels and names which enable PLC communication.

■ Reference to data map

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

Name	Register address	Struc-ture	Attri-bute	Data range and Number of data	Factory set value
System communication state	D01000 (DM01000)	U	RO	Bit data b0: Data collection condition b1 to b15: Unused Data 0: Before data collection is completed 1: Data collection is completed [Decimal number: 0, 1] [1]	—

Number of data

(1) Name: Name of communication data

(2) Register address: A register address of communication data in PLC communication
Upper section: A register address of MITSUBISHI MELSEC series
Inside of ( ): A register address of OMRON SYSMAC series

Register addresses in this manual are those assigned when the PLC communication environment is set as follows.

- Register type: 0 (MITSUBISHI PLC: D register)
  (OMRON PLC: DM register)
- Register start number: 1000

Setting of "Register type" and "Register start number" changes an assignment of a register address.

Name	Register address	
System communication state	D01000 (DM01000)	← Register start number
SRZ normal communication flag	D01001 (DM01001)	
⋮	⋮	
Measured value (PV)	D01010 to D01073 (DM01010 to DM01073)	← Measured value (PV) CH1 to CH64
Comprehensive event state	D01074 to D01137 (DM01074 to DM01137)	← Comprehensive event state CH1 to CH64
Operation mode state monitor	D01138 to D01201 (DM01138 to DM01201)	← Operation mode state monitor CH1 to CH64

For the PLC communication environment setting, see **7.2.3 PLC communication environment setting (P. 7-11)** [MITSUBISHI PLC] or **7.3.3 PLC communication environment setting (P. 7-25)** [OMRON PLC].

Continued on the next page.

Continued from the previous page.

(3) Structure: C: Data for each channel [1, 2]
M: Data for each module
U: Data for each SRZ unit

[1] On a Z-TIO module (2-channel type), there is no communication data for the 3rd and 4th channels.
[2] ♣: Parameters only used for heat/cool control, therefore data for CH2 and CH4 are unused.
[Read is possible (0 is shown), but the result of Write is disregarded.]

(4) Attribute: RO: At the time of monitor request bit "1," SRZ unit writes in data to the PLC.
(PLC ← SRZ)

R/W: At the time of setting request bit "1," SRZ unit read out data from the PLC.
At the time of monitor request bit "1," SRZ unit writes in data to the PLC.
(PLC ↔ SRZ)

(5) Data range and Number of data:
Data range: Read or write range of communication data
Number of data: This is the maximum number per communication data that can be handled by one SRZ unit.

(6) Factory set value: Factory set value of communication data

The total number of communication data is 2,060 items. When the maximum of four SRZ units are connected to the PLC communication port, the total number of communication data items is 8240.

The data map classifications of the communication data are shown below.

System data (Monitor items)	D01000 [System communication state] to D01007
Monitor group	D01010 [Measured value (PV)] to D01570 [Error code]
Setting group	D01008 [Request command]
	D01009 [Setting item (Group 2) communication state]
	D01571 [PID/AT transfer] to D03059 [RUN/STOP transfer]

■ Data map list

Name	Register address	Struc-ture	Attri-bute	Data range and Number of data	Factory set value
System communication state [1]	D01000 (DM01000)	U	RO	Bit data b0: Data collection condition b1 to b15: Unused Data 0: Before data collection is completed 1: Data collection is completed [Decimal number: 0, 1] [1]	—
SRZ normal communication flag [2]	D01001 (DM01001)	U	RO	0/1 transfer (For communication checking) "0" and "1" are repeated for each communication period. [1]	—
—	D01002 (DM01002)	—	RO	Internal processing Do not use the register address	—
—	D01003 (DM01003)	—	RO	Internal processing Do not use the register address	—
PLC communication error code [3]	D01004 (DM01004)	U	RO	Bit data b0: PLC register read/write error b1: Slave communication timeout b2: Unused b3: Internal communication error b4: Master communication timeout b5 to b15: Unused Data 0: OFF 1: ON [Decimal number: 0 to 31] [1]	—

[1] When the power of the SRZ unit is turned on, the Z-COM module begins collecting the data of the connected Z-TIO and Z-DIO modules. When system communication state becomes "1," PLC communication can be performed.

Data collection condition is assigned as a bit image in binary numbers.

Bit image: 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

bit 15 ---------- bit 0

[2] The SRZ unit writes alternating zeros and ones (0→1→0) to this area each communication period. By periodically monitoring this area in the PLC program, it can be determined whether or not the SRZ unit has stopped communicating.

[3] b0: PLC register read/write error
To be turned on when data read and write cannot be made to/from the PLC register.
Three seconds after the normal communication state is restored, this turns OFF.

b1: Slave communication timeout
To be turned on when communication with slave units is timed out during communication with the PLC with SRZ units multi-drop connected. If the slave unit detects the timeout, data send to the PLC stops to be set to the standby state. Communication re-starts after data send re-opens from the master unit.
In addition, if the master unit detects the timeout, data re-send starts.

b3: Internal communication error
This turns ON when an internal communication error occurs in the SRZ unit.

b4: Master communication timeout
This turns ON when a timeout occurs during communication between the PLC and the master unit.

Each error state is assigned as a bit image in binary numbers.

Bit image: 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

bit 15 ---------- bit 0

Continued on the next page.

Continued from the previous page.

Name	Register address	Struc-ture	Attri-bute	Data range and Number of data	Factory set value
Unit recognition flag [1]	D01005 (DM01005)	U	RO	Bit data b0: SRZ unit 1 b1: SRZ unit 2 b2: SRZ unit 3 b3: SRZ unit 4 b4 to b15: Unused Data 0: No unit exists 1: Unit exists [Decimal number: 0 to 15] [1]	—
Monitor for the number of connected modules	D01006 (DM01006)	U	RO	0 to 31 Number of functional modules connected to one Z-COM module. [1]	—
—	D01007 (DM01007)	—	—	Internal processing Do not use the register address	—
Request command [2]	D01008 (DM01008)	U	R/W	Bit data b0: Setting request bit b1: Monitor request bit Data 0: OFF 1: ON [Decimal number: 0 to 3] [1]	0

[1] Indicates the connection state of the SRZ unit. A slave unit (other than a master unit with unit address 0, 4, 8, C) can only recognize its own state.

The unit recognition flag state is assigned as a bit image in binary numbers.

Bit image: 0000000000000000

bit 15 ---------- bit 0

For the unit address, **3.2.1 SRZ unit address setting (P. 3-3).**

[2] Request command

b0: Setting request bit

This command requests that the SRZ unit read the communication data of the setting group on the PLC side.

b1: Monitor request bit

This command requests that the SRZ unit write the communication data of the setting group on the PLC side.

The setting request bit and monitor request bit is assigned as a bit image in binary numbers.

Bit image: 0000000000000000

bit 15 ---------- bit 0

Continued on the next page.

Continued from the previous page.

Name	Register address	Struc-ture	Attri-bute	Data range and Number of data	Factory set value
Setting item (Group 2) communication state [1]	D01009 (DM01009)	U	RO	Bit data b0: Setting error b1: Setting completed bit b2: Monitor completed bit Data 0: OFF 1: ON [Decimal number: 0 to 7] [1]	—
Measured value (PV) [2]	D01010 to D01073 (DM01004 to DM01073)	C	RO	Input scale low to Input scale high [64]	—
Comprehensive event state [3]	D01074 to D01137 (DM01074 to DM01137)	C	RO	Bit data b0: Event 1 state b1: Event 2 state b2: Event 3 state b3: Event 4 state b4: Heater break alarm state b5: Temperature rise completion b6: Burnout b7 to b15: Unused Data 0: OFF 1: ON [Decimal number: 0 to 127] [64]	—

[1] This is the communication state of setting group.

b0: Setting error

Turns ON when the PLC data and SRZ data do not agree due to a setting range error or other error. Also turns ON when data cannot be set.

When setting error is "1" (ON), it will return to "0" (OFF) the next time data is set normally.

b1: Setting completed bit

When there is a request by setting request bit for a PLC setting data read, this will turn ON when the PLC data read is finished.

b2: Monitor completed bit

When there is a request by monitor request bit for a SRZ unit setting data write, this will turn ON when the SRZ unit setting data write is finished.

The setting error, setting completed bit, and monitor completed bit is assigned as a bit image in binary numbers.

Bit image: 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

bit 15 ---------- bit 0

[2] Measured value (PV) is a temperature input value of Z-TIO module. There are the TC, RTD, voltage, current, and feedback resistance inputs.

[3] Each event state such as Event 1 to Event 4, heater break alarm, temperature rise completion or burnout is expressed in bit data items.

Each event state is assigned as a bit image in binary numbers.

Bit image: 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

bit 15 ---------- bit 0

Continued on the next page.

Continued from the previous page.

Name	Register address	Struc-ture	Attri-bute	Data range and Number of data	Factory set value
Operation mode state monitor [1]	D01138 to D01201 (D01138 to DM01201)	C	RO	Bit data b0: Control STOP b1: Control RUN b2: Manual mode (Including Remote mode) b3: Remote mode b4 to b15: Unused Data 0: OFF 1: ON [Decimal number: 0 to 15] [64]	—
Manipulated output value (MV) monitor [heat-side] [2] ♣	D01202 to D01265 (DM1202 to DM01265)	C	RO	PID control or heat/cool PID control: −5.0 to +105.0 % Position proportioning control with feedback resistance (FBR) input: 0.0 to 100.0 % [64]	—
Manipulated output value (MV) monitor [cool-side] [3] ♣	D01266 to D01329 (DM1266 to DM01329)	C	RO	−5.0 to +105.0 % [64]	—
Current transformer (CT) input value monitor [4]	D01330 to D01393 (DM01330 to DM01393)	C	RO	CTL-6-P-N: 0.0 to 30.0A CTL-12-S56-10L-N: 0.0 to 100.0 A [64]	—
Set value (SV) monitor	D01394 to D01457 (D01138 to DM01457)	C	RO	Setting limiter (low) to Setting limiter (high) This value is a monitor of the set value (SV) that is a desired value for control. [64]	—

[1] Indicates an operation mode state of temperature control channel.

The operation mode state is assigned as a bit image in binary numbers.

Bit image: 0000000000000000

bit 15 ---------- bit 0

[2] Heat-side output value for PID control or heat/cool PID control. When feedback resistance (FBR) input is used in position proportioning control, the feedback resistance (FBR) input value is monitored.

When there is feedback resistance (FBR) input and the feedback resistance (FBR) is not connected, overscale will occur and cause a burnout state.

[3] Cool-side output value of heat/cool PID control.

The manipulated output value on the cool-side is valid only during Heat/Cool PID control.

[4] This item is current transformer input value to use by a heater break alarm (HBA) function.

The CT input cannot measure less than 0.4 A.

Continued on the next page.

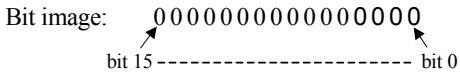
Continued from the previous page.

Name	Register address	Struc-ture	Attri-bute	Data range and Number of data	Factory set value
Remote setting (RS) input value monitor [1]	D01458 to D01521 (DM01458 to DM01521)	C	RO	Setting limiter (low) to Setting limiter (high) [64]	—
Output state monitor [2]	D01522 to D01537 (DM01522 to DM01537)	M	RO	Bit data b0: OUT1 b1: OUT2 b2: OUT3 b3: OUT4 b4 to b15: Unused Data 0: OFF 1: ON [Decimal number: 0 to 15] [16]	—
Digital input (DI) state 1 [3]	D01538 to D01553 (DM01538 to DM01553)	M	RO	Bit data b0: DI1 state b1: DI2 state b2: DI3 state b3: DI4 state b4: DI5 state b5: DI6 state b6: DI7 state b7: DI8 state b8 to b15: Unused Data 0: Contact open 1: Contact closed [Decimal number: 0 to 255] [16]	—

[1] Input value when remote mode is used. This monitors the remote SV of the action selected by the SV selection function.

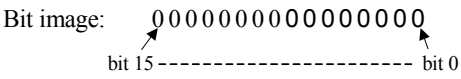
[2] ON/OFF state of output (OUT1 to OUT4) is expressed as a bit image in decimal number.

The output state is assigned as a bit image in binary numbers.



[3] Each digital input (DI) state of the Z-DIO module is expressed in bit data items.

The digital input (DI) state is assigned as a bit image in binary numbers.



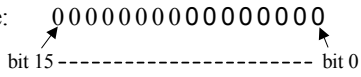
Continued on the next page.

Continued from the previous page.

Name	Register address	Struc-ture	Attri-bute	Data range and Number of data	Factory set value
Digital output (DO) state 1 [1]	D01554 to D01569 (DM01554 to DM01569)	M	RO	Bit data b0: DO1 state b1: DO2 state b2: DO3 state b3: DO4 state b4: DO5 state b5: DO6 state b6: DO7 state b7: DO8 state b8 to b15: Unused Data 0: OFF 1: ON [Decimal number: 0 to 255] [16]	—
Error code [2]	D01570 (DM01570)	U	RO	Bit data b0: Adjustment data error b1: Data back-up error b2: A/D conversion error b3: Unused b4: Unused b5: Logic output data error b6: Program error (stack) * b7: Watchdog timer error * b8 to b15: Unused Data 0: OFF 1: ON [Decimal number: 0 to 255] * These are error code only of the Z-COM module [1]	—

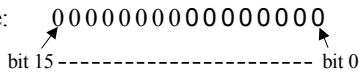
[1] Each digital output (DO) state of the Z-DIO module is expressed in bit data items.

The digital output (DO) state is assigned as a bit image in binary numbers.



[2] Each error state of the SRZ unit is expressed in bit data items. The error condition is shown by the *OR* of each module.

Each error state is assigned as a bit image in binary numbers.



Continued from the previous page.

Name	Register address	Struc-ture	Attri-bute	Data range and Number of data	Factory set value
PID/AT transfer [1]	D01571 to D01634 (DM01571 to DM01634)	C	R/W	0: PID control 1: Autotuning (AT) [64]	0

[1] Activation or deactivation of the Autotuning (AT) function is selected.

● Caution for using the autotuning (AT)

- When a temperature change (UP and/or Down) is 1 °C or less per minute during autotuning (AT), autotuning (AT) 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.
- If the output change rate limiter is set, the optimum PID values may not be calculated by autotuning (AT).
- When the cascade control is activated, the AT function cannot be turned on.

● Requirements for autotuning (AT) start

Start the autotuning (AT) when all following conditions are satisfied:
The autotuning (AT) function can start from any state after power on, during arise in temperature or in stable control.

Operation mode state	RUN/STOP transfer	RUN
	PID/AT transfer	PID control
	Auto/Manual transfer	Auto mode
	Remote/Local transfer	Local mode
Parameter setting		Output limiter (high) ≥ 0.1 %, Output limiter (low) ≤ 99.9 %
Input value state		The measured value (PV) is not underscale or overscale.
		Input error determination point (high) ≥ Measured value (PV) ≥ Input error determination point (low)
Operation mode (Identifier: EI)		Control

● Requirements for autotuning (AT) cancellation

If the autotuning (AT) is canceled according to any of the following conditions, the controller immediately changes to PID control. The PID values will be the same as before autotuning (AT) was activated.

When the Operation mode is transferred	When the RUN/STOP mode is changed to the STOP mode.
	When the PID/AT transfer is changed to the PID control.
	When the Auto/Manual mode is changed to the Manual mode.
	When the Remote/Local mode is changed to the Remote mode.
Operation mode (Identifier: EI)	When changed to unused, monitor, or the monitor + event function.
When the parameter is changed	When the temperature set value (SV) is changed.
	When the PV bias, the PV digital filter, or the PV ratio is changed.
	When the AT bias is changed.
	When the control area is changed.
When the input value becomes abnormal	When the measured value (PV) goes to underscale or overscale.
	When the measured value (PV) goes to input error range. (Measured value (PV) ≥ Input error determination point (high) or Input error determination point (low) ≥ Measured value (PV))
When the AT exceeded the execution time	When the AT does not end in two hours after AT started
Power failure	When the power failure of more than 4 ms occurs.
Instrument error	When the instrument is in the FAIL state.

Continued on the next page.

Continued from the previous page.

Parameters for autotuning (AT) are provided to compute the PID values suitable for various controlled systems and control actions. Set them, as required.

Example 1: When you want to find each constant suited for P control, PI control, or PD control by autotuning.

For P control:
Set "0" to Integral time limiter (high) [heat-side] and Derivative time limiter (high) [heat-side].

For PI control:
Set "0" to Derivative time limiter (high) [heat-side].

For PD control:
Set "0" to Integral time limiter (high) [heat-side].

When autotuning (AT) is executed by making the settings above, the control constants suited for P, PI, or PD control are found.

Also corresponds to heat/cool PID control cool-side and position proportioning control.

Example 2: When you want to limit on/off output only at autotuning (AT)
Autotuning (AT) that limits the ON/OFF output values only at autotuning (AT) can be executed by setting the output value with AT turned on and the output value with AT turned off.

Only when the feedback resistance (FBR) input is connected in the position proportioning control, the "Output value with AT turned on" and "Output value with AT turned off" setting becomes valid.

Name	Register address	Structure	Attribute	Data range and Number of data	Factory set value
Auto/Manual transfer	D01635 to D01698 (DM01635 to DM01698)	C	R/W	0: Auto mode Automatic control is performed. 1: Manual mode The manipulated output value can be manually changed. Use to transfer the Auto mode or Manual mode. [64]	0
Event 1 set value (EV1)	D01699 to D01762 (DM01699 to DM01762)	C	R/W	Deviation action, Deviation action between channels, Temperature rise completion range*: –Input span to +Input span * When temperature rise completion is selected at Event 3 action type. Process action, SV action: Input scale low to Input scale high MV action: –5.0 to +105.0 % Use to set setting value of an event action. [Each 64]	50
Event 2 set value (EV2)	D01763 to D01826 (DM01763 to DM01826)	C	R/W		50
Event 3 set value (EV3)	D01827 to D01890 (DM01827 to DM01890)	C	R/W		50
Event 4 set value (EV4)	D01891 to D01954 (DM01891 to DM01954)	C	R/W		50
Set value (SV) [Local set value (SV)]	D01955 to D02018 (DM01955 to DM02018)	C	R/W	Setting limiter (low) to Setting limiter (high) Set value (SV) is desired value of the control. [64]	TC/RTD: 0 °C [°F] V/I: 0.0 %

Continued on the next page.

Continued from the previous page.

Name	Register address	Structure	Attribute	Data range and Number of data	Factory set value
Proportional band [heat-side] ♣	D02019 to D02082 (DM02019 to DM02082)	C	R/W	TC/RTD inputs: 0 (0.0) to Input span (Unit: °C [°F]) Voltage (V)/current (I) inputs: 0.0 to 1000.0 % of Input span 0 (0.0): ON/OFF action Use to set the proportional band of the P, PI, PD and PID control. [64]	TC/RTD: 30 V/I: 30.0
Integral time [heat-side] ♣	D02083 to D02146 (DM02083 to DM02146)	C	R/W	PID control or heat/cool PID control: 0 to 3600 seconds or 0.0 to 1999.9 seconds (0, 0.0: PD action) Position proportioning control: 1 to 3600 seconds or 0.1 to 1999.9 seconds Integral action is to eliminate offset between set value (SV) and measured value (PV) by proportional action. The degree of Integral action is set by time in seconds. [64]	240
Derivative time [heat-side] [2] ♣	D02147 to D02210 (DM02147 to DM02210)	C	R/W	0 to 3600 seconds or 0.0 to 1999.9 seconds (0, 0.0: PI action) Derivative action is to prevent rippling and make control stable by monitoring output change. The degree of Derivative action is set by time in seconds. [64]	60
Proportional band [cool-side] ♣	D02211 to D02274 (DM02211 to DM02274)	C	R/W	TC/RTD inputs: 1 (0.1) to Input span (Unit: °C [°F]) Voltage (V)/current (I) inputs: 0.1 to 1000.0 % of Input span Use to set the proportional band of the P, PI, PD and PID control. The proportional band [cool-side] is valid only during heat/cool PID control.[64]	TC/RTD: 30 V/I: 30.0
Integral time [cool-side] ♣	D02275 to D02338 (DM02275 to DM02338)	C	R/W	0 to 3600 seconds or 0.0 to 1999.9 seconds (0, 0.0: PD action) Integral action is to eliminate offset between set value (SV) and measured value (PV) by proportional action. The degree of Integral action is set by time in seconds. The integral time [cool-side] is valid only during heat/cool PID control. [64]	240

Continued on the next page.

Continued from the previous page.

Name	Register address	Struc-ture	Attri-bute	Data range and Number of data	Factory set value
Derivative time [cool-side] ♣	D02339 to D02402 (DM02339 to DM02402	C	R/W	0 to 3600 seconds or 0.0 to 1999.9 seconds (0, 0.0: PI action) Derivative action is to prevent rippling and make control stable by monitoring output change. The degree of Derivative action is set by time in seconds. The derivative time [cool-side] is valid only during heat/cool PID control. [64]	60
Control response parameter [1] ♣	D02403 to D02466 (DM02403 to DM02466)	C	R/W	0: Slow 1: Medium 2: Fast P or PD action: 2 (Fast) fixed [64]	PID control, Position proportioning control: 0 Heat/cool PID control: 2
Overlap/Deadband [2] ♣	D02467 to D02530 (DM02467 to DM02530)	C	R/W	TC/RTD inputs: −Input span to +Input span (Unit: °C [°F]) Voltage (V)/current (I) inputs: −100.0 to +100.0 % of input span [64]	0

[1] The control response for the set value (SV) change can be selected among Slow, Medium, and Fast.

The control response for the set value (SV) change can be selected among Slow, Medium, and Fast. If a fast response is required, Fast is chosen. Fast may cause overshoot. If overshoot is critical, Slow is chosen.

Fast	Selected when rise time needs to be shortened (operation needs to started fast). However in this case, slight overshooting may not be avoided.
Medium	Middle between “Fast” and “Slow.” Overshooting when set to “Medium” becomes less than that when set to “Fast.”
Slow	Selected when no overshooting is allowed. Used when material may be deteriorated if the temperature becomes higher that the set value.

For P control and PD control, the control response is fixed at 2 (Fast).

[2] This is the overlapped range of proportional bands (on the heat and cool sides) or the deadband range when Heat/Cool PID control is performed.

Overlap (OL):
Range in which the proportional band [heat-side] and the proportional band [cool-side] are overlapped. If a measured value (PV) is within the overlapped range, manipulated output values (heat-side and cool-side) may be simultaneously output.

Deadband (DB):
This is a control dead zone existing between the proportional band [heat-side] and the proportional band [cool-side]. If a measured value (PV) is within the deadband range, neither the manipulated output value (heat-side) nor the manipulated output value (cool-side) is output.

Continued on the next page.

Continued from the previous page.

Name	Register address	Struc-ture	Attri-bute	Data range and Number of data	Factory set value
Setting change rate limiter (up)	D02531 to D02594 (DM02531 to DM02594)	C	R/W	0 (0.0) to Input span/unit time 0 (0.0): Unused Unit time: 60 seconds (factory set value) This function is to allow the set value (SV) to be automatically changed at specific rates when a new set value (SV). [Each 64]	0 (0.0)
Setting change rate limiter (down)	D02595 to D02658 (DM02595 to DM02658)	C	R/W		0 (0.0)
Heater break alarm (HBA) set value [1]	D02659 to D02722 (DM02659 to DM02722)	C	R/W	When CT is CTL-6-P-N: 0.0 to 30.0 A (0.0: Not used) When CT is CTL-12-S56-10L-N: 0.0 to 100.0 A (0.0: Not used) [64]	0.0
Heater break determination point	D02723 to D02786 (DM02723 to DM02786)	C	R/W	0.0 to 100.0 % of HBA set value (0.0: Heater break determination is invalid) Set the heater break determination point for the heater break alarm (HBA) type B. [64]	30.0
Heater melting determination point	D02787 to D02850 (DM02787 to DM02850)	C	R/W	0.0 to 100.0 % of HBA set value (0.0: Heater melting determination is invalid) Set the heater melting determination point for the heater break alarm (HBA) type B. [64]	30.0

[1] HBA is to set the set values for the heater break alarm (HBA) function.
The HBA function detects a fault in the heating circuit by monitoring the current flowing through the load by a dedicated current transformer (CT).

For type “A” HBA,
- Set the set value to approximately 85 % of the maximum reading of the CT input.
- Set the set value to a slightly smaller value to prevent a false alarm if the power supply may become unstable.
- When more than one heater is connected in parallel, it may be necessary to increase the HBA set value to detect a single heater failure.

For type “B” HBA,
Set the set value to the maximum CT input value. This will be the current when the control is at 100 % control output. The set value is used to calculate the width of a non-alarm range.

Continued on the next page.

Continued from the previous page.

Name	Register address	Struc-ture	Attri-bute	Data range and Number of data	Factory set value
PV bias	D02851 to D02914 (DM02851 to DM02914)	C	R/W	−Input span to +Input span PV bias adds bias to the measured value (PV). The PV bias is used to compensate the individual variations of the sensors or correct the difference between the measured value (PV) of other instruments. [64]	0
Manual manipulated output value ♣	D02915 to D02978 (DM02915 to DM02978)	C	R/W	PID control: Output limiter (low) to Output limiter (high) Heat/cool PID control: −Cool-side output limiter (high) to +Heat-side output limiter (high) Position proportioning control (with FBR input): Output limiter (low) to Output limiter (high) Position proportioning control (without FBR input): 0: Close-side output OFF, Open-side output OFF 1: Close-side output ON, Open-side output OFF 2: Close-side output OFF, Open-side output ON Use to set the output value in the manual control. [64]	0.0
Operation mode	D02979 to D03042 (DM02979 to DM03042)	C	R/W	0: Unused Neither monitor nor control is performed 1: Monitor Only data monitor is performed 2: Monitor + Event function Data monitor and event action (temperature rise completion, including LBA) are performed. 3: Control Control is performed [64]	3

Continued on the next page.

Continued from the previous page.

Name	Register address	Struc-ture	Attri-bute	Data range and Number of data	Factory set value
DO manual output 1 *	D03043 to D03058 (DM03043 to DM03058)	C	R/W	Bit data b0: DO1 manual output b1: DO2 manual output b2: DO3 manual output b3: DO4 manual output b4: DO5 manual output b5: DO6 manual output b6: DO7 manual output b7: DO8 manual output b8 to b15: Unused Data 0: OFF 1: ON [Decimal number: 0 to 255] [64]	0
RUN/STOP transfer (Each unit)	D03059 (DM03059)	U	R/W	0: STOP (Control stop) 1: RUN (Control start) Control RUN/STOP is switched to every SRZ unit. [1]	0

* ON/OFF signal for each digital output (DO1 to DO8).

The DO manual output is assigned as a bit image in binary numbers.

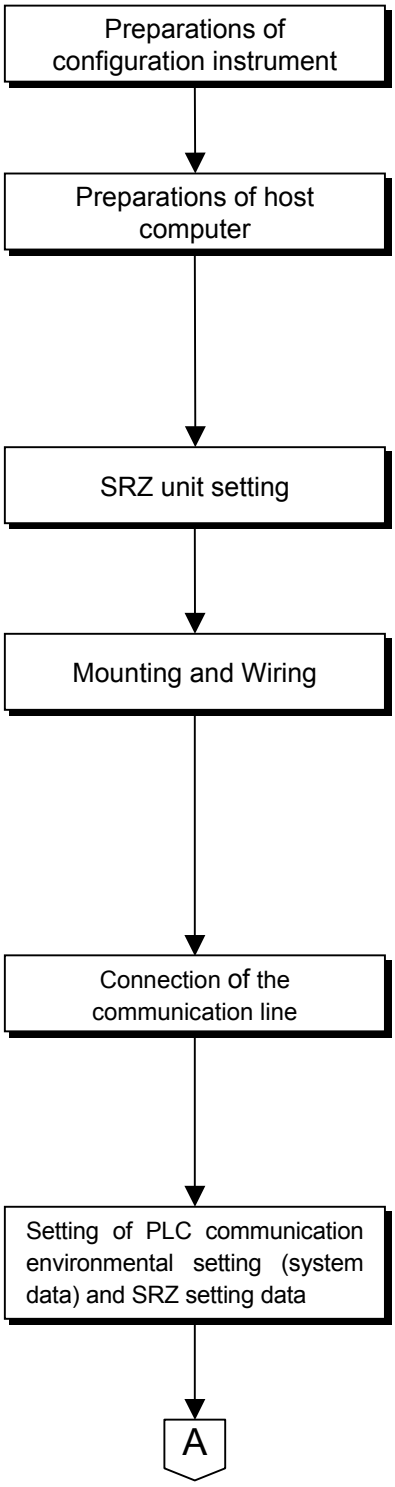
Bit image: 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

bit 15 ---------- bit 0

7.6 Usage Example

In this Chapter, an example of data setting procedure is explained when the SRZ unit is connected to a PLC of MITSUBISHI MELSEC series.

7.6.1 Handling procedures



☞ See **7.6.2 System configuration (P. 7-54).**

Please make a host communication program by the customer.
☞ See **6.4 RKC Communication Protcol (P. 6-17).**

Set the communication speed, data bit configuration and protocol.
☞ See the instruction manual for the used host computer.

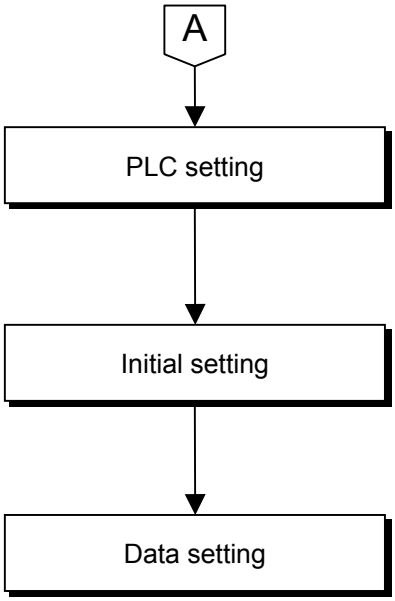
☞ See **7.6.3 SRZ unit setting (P. 7-57).**

☞ For information on joining the Z-COM module to functional modules and mounting, see **Chapter 4, "MOUNTING" (P. 4-1)**.
☞ For the power supply wiring, see **Chapter 5. WIRING (P. 5-1)**.
☞ For the input/output wiring of Z-TIO, Z-DIO module, see **SRZ Instruction Manual (IMS01T04-E□).**
☞ To mount the PLC and connect the wiring, see the manual for the PLC.

☞ For information on connecting the SRZ unit to a host computer, see **7.6.4 Connection to host computer (P. 7-59)**.
☞ For information on connecting the SRZ unit to a PLC, see **7.6.5 Connection with PLC (P. 7-59)**.

☞ See **7.6.6 Setting of PLC communication environmental setting (system data) and SRZ setting data (P. 7-60).**

☞ For the communication data description of Z-TIO, Z-DIO module, **SRZ Instruction Manual (IMS01T04-E□).**

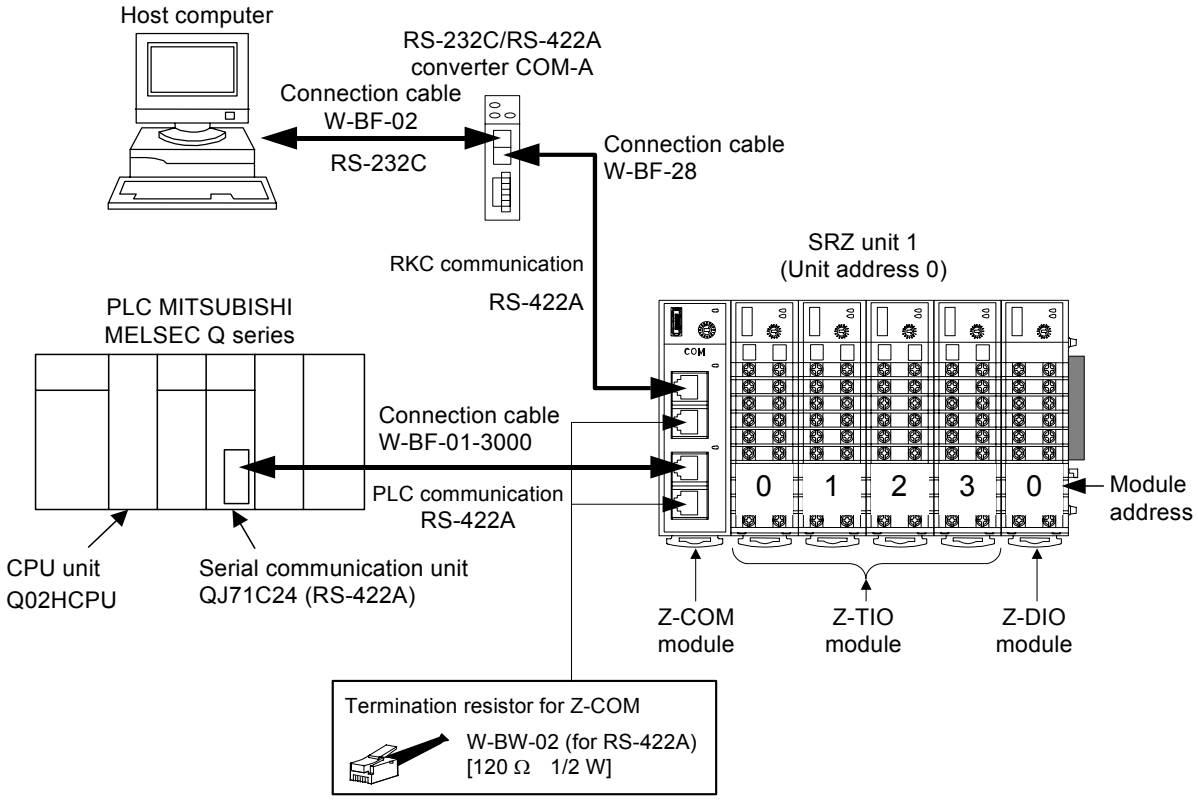


☞ See **7.6.7 PLC setting (P. 7-64).**

☞ See **7.6.8 Initial setting (P. 7-66).**

☞ See **7.6.9 Data setting (P. 7-67).**

7.6.2 System configuration



■ Use instruments

- **PLC MITSUBISHI MELSEC Q series**

  CPU unit Q02HCPU 1
  Serial communication unit QJ71C24 (RS-422A) 1
  Power supply, I/O module, etc.

- **SRZ unit**

  Communication extension module Z-COM-A 1
  Temperature control module Z-TIO-A 4
  Digital I/O module Z-DIO-A 1

- **Connection cable for connecting SRZ unit and PLC**

  W-BF-01-3000 (RKC product, Sold separately) [Standard cable length: 3 m] 1

- **Communication converter**

  Communication level converter COM-A (RKC product)..... 1

- **Connection cable for connecting SRZ unit and host computer**

  W-BF-02-3000 (RKC product, Sold separately) [Standard cable length: 3 m] 1
  W-BF-28-3000 (RKC product, Sold separately) [Standard cable length: 3 m] 1

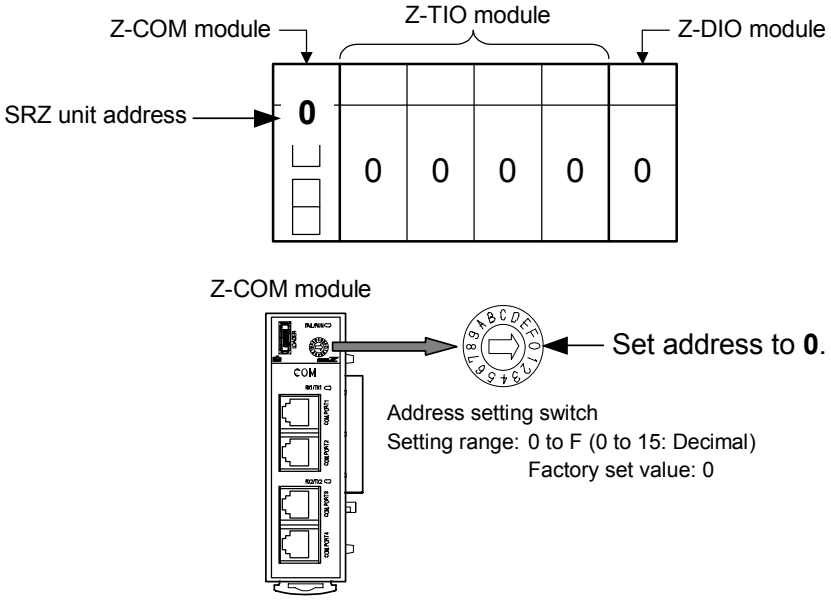
- **Termination resistors**

Termination resistor for Z-COM W-BW-02 [for RS-422A] (RKC product)..... 2

7.6.3 SRZ unit setting

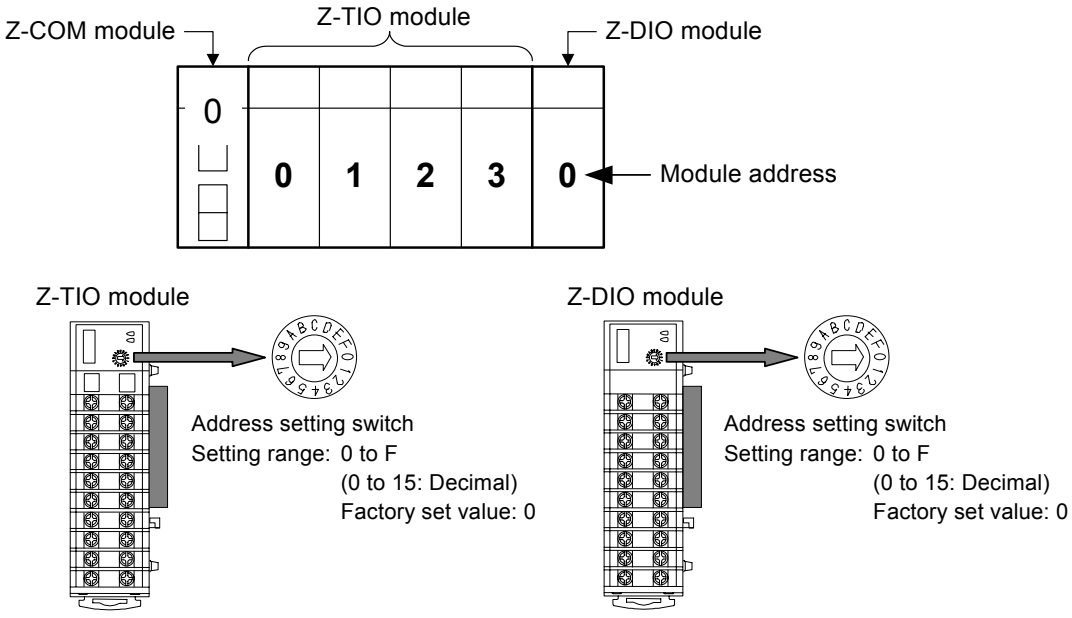
(1) SRZ unit address setting

Set the SRZ unit address by address setting switch of front of Z-COM module. For this setting, use a small blade screwdriver. In this application, make the setting as follows.
(SRZ unit address: 0)



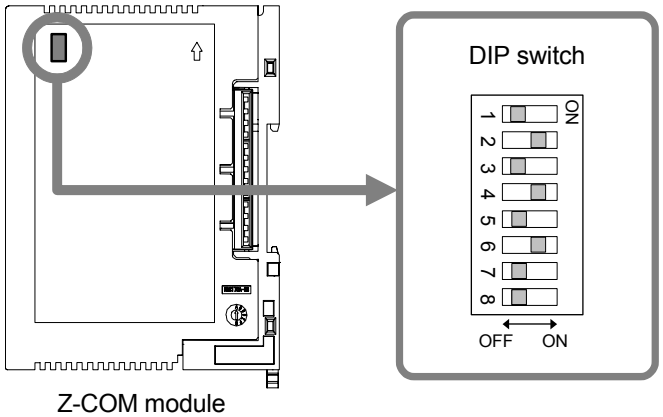
(2) Functional modules (Z-TIO and Z-DIO modules) address setting

Set the module address by address setting switch of front of module. For this setting, use a small blade screwdriver. In this application, make the setting as follows.
(Z-TIO module address: 0, 1, 2, 3 Z-DIO module address: 0)



(3) Communication setting of the Z-COM module

Conduct the host communication and PLC communication settings by the DIP switch.

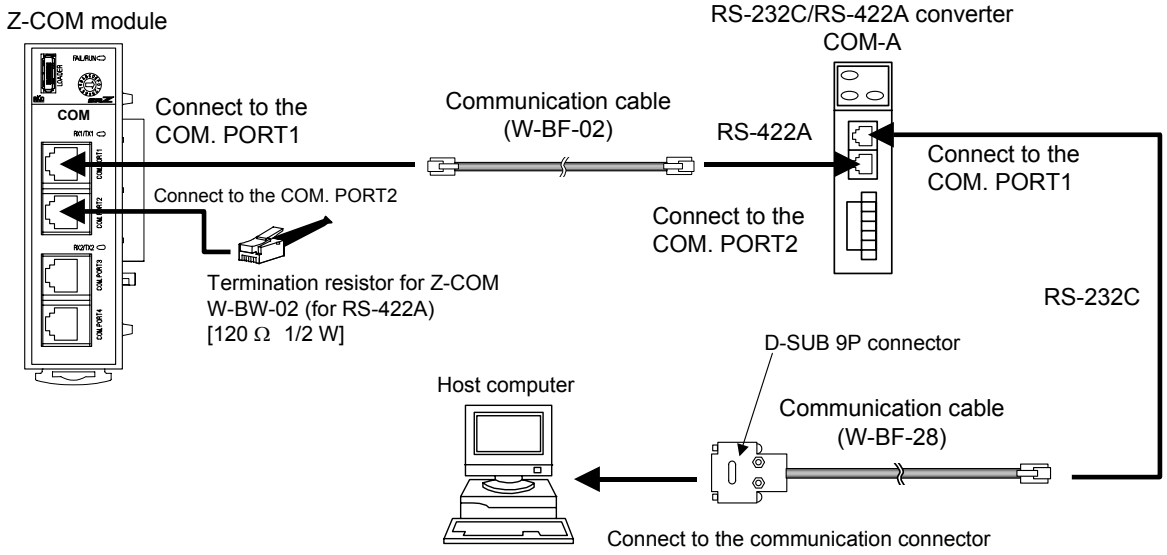


PLC communication setting switch		Setting contents
1	OFF	Communication speed (Host communication): 19200 bps
2	ON	
3	OFF	RKC communication protocol (Host communication) Data bit configuration: Data 8-bit, Without parity, Stop 1-bit
4	ON	Communication speed (PLC communication): 19200 bps
5	OFF	Protocol (PLC communication): MITSUBISHI MELSEC series special protocol A compatible 1C frame type 4 AnA/AnUCPU common command (QR/QW)
6	ON	
7	OFF	Data bit configuration: Data 7-bit, Without parity, Stop 1-bit
8	OFF	DIP switch setting validity/invalidity Valid

☞ For details of setting, see **3.2.2 Communication speed and communication protocol setting by DIP switch (P. 3-6).**

7.6.4 Connection to host computer

Connect a SRZ unit to converter COM-A and host computer by connection cable. In addition, connect a termination resistor for Z-COM to the COM. PORT2.

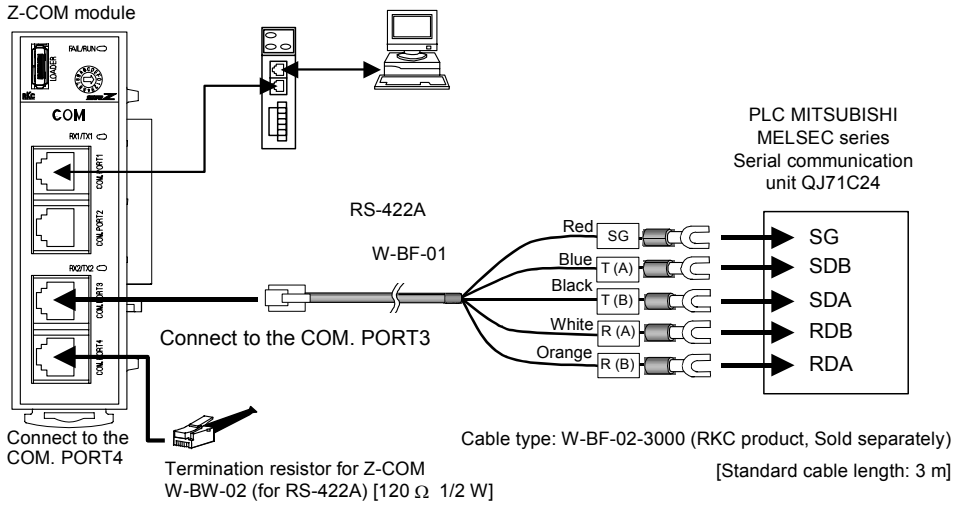


Cable type: W-BF-02-3000 (RKC product, Sold separately) [Standard cable length: 3 m]
W-BF-28-3000 (RKC product, Sold separately) [Standard cable length: 3 m]

☞ When be prepared cable with a customer, see **6.2 Wiring (P. 6-3).**

7.6.5 Connection with PLC

Connect a SRZ unit to PLC (serial communication unit QJ71C24) by our cable (Sold separately: W-BF-01-3000).



Connection cable W-BF-01 * (RKC product) can use to connect the PLC.
* Shields of the cable are connected to SG (No. 6 pin) of the COM. PORT3.

☞ The details of the connectable connector for the PLC, see the instruction manual for the used PLC.

☞ When be prepared cable with a customer, see **7.2.2 Wiring (P. 7-5).**

7.6.6 Setting of PLC communication environmental setting (system data) and SRZ setting data

(1) Turn on the power of the host computer and SRZ unit

The Z-COM module starts collecting data on function modules (Z-TIO and Z-DIO modules) jointed from the time when the power is turned on. Data collection takes about 8 seconds.
If you will use host communication to configure the communication data of the functional modules (Z-TIO and Z-DIO modules), do so after data collection is finished.
Z-COM module system data (settings) can be configured immediately after the power is turned on.

(2) Set the PLC communication environmental setting (system data)

Set the PLC communication environmental setting (system data) via host communication. In this application, use the factory set value.

Setting items	Identifier	Set value (Factory set value)
Station number	QV	0
PC number	QW	255
Register type (D, R, W, ZR)	QZ	0 (D register)
Register start number (High-order 4 bit)	QS	0
Register start number (Low-order 16 bit)	QX	1000
System data address bias	QQ	2100
COM module link recognition time	QT	10 seconds
PLC scanning time	VT	255 ms
PLC communication start time *	R5	5 seconds
Slave mapping method	RK	0

These values can be changed to change the starting number of the PCL communication data register.

* The PLC communication start time is the time that writing of the system data (monitor items) starts. Actual communication with the PLC by request command can only take place after the system communication state (D01000) changes to "1."

■ PLC communication register address

Having set the register type to "D register" and the register start number to "1000" in the system data (setting items), the register address of each data item in PLC communication becomes the following.

Register address	Communication items
D01000	System communication state
D01001	SRZ normal communication flag
D01002	Do not use this register address as it is used for the internal processing.
D01003	
D01004	PLC communication error code
D01005	Unit recognition flag
D01006	Monitor for the number of connected modules
D01007	Do not use this register address as it is used for the internal processing.
D01008	Request command
D01009	Setting items (group 2) communication state

Continued on the next page.

Continued from the previous page.

The SRZ unit occupies a number of PLC registers equal to the maximum number of data items. Even if there are fewer functional modules (Z-TIO/Z-DIO modules) connected to the Z-COM module, or there are unused communication items, the number of registers occupied does not change. If functional modules (Z-TIO/Z-DIO modules) are not connected or there are unused data items, "0" is sent.

Register address	Communication item	
D01010 to D01025	Measured value (PV)	CH1 to CH16
D01025 to D01073	Unused	CH17 to CH64
D01074 to D01089	Comprehensive event monitor	CH1 to CH16
D01090 to D01137	Unused	CH17 to CH64
D01038 to D01053	Operation mode state monitor	CH1 to CH16
D01054 to D01201	Unused	CH17 to CH64
D01202 to D01217	Manipulated output value (MV) monitor [heat-side]	CH1 to CH16
D01218 to D01265	Unused	CH17 to CH64
D01266 to D01281	Manipulated output value (MV) monitor [cool-side]	CH1 to CH16
D01282 to D01329	Unused	CH17 to CH64
D01330 to D01345	Current transformer (CT) input value monitor	CH1 to CH16
D01346 to D01393	Unused	CH17 to CH64
D01394 to D01409	Set value (SV) monitor	CH1 to CH16
D01410 to D01457	Unused	CH17 to CH64
D01458 to D01473	Remote setting (RS) input value monitor	CH1 to CH16
D01474 to D01521	Unused	CH17 to CH64
D01522 to D01525	Output state monitor	CH1 to CH4
D01525 to D01537	Unused	CH5 to CH16
D01538	Digital input (DI) state 1	CH1
D01539 to D01553	Unused	CH2 to CH16
D01554	Digital output (DO) state 1	CH1
DD1555 to D01569	Unused	CH2 to CH16
D01570	Error code	CH1
D01571 to D01586	PID/AT transfer	CH1 to CH16
D01586 to D01634	Unused	CH17 to CH64
D01635 to D01650	Auto/Manual transfer	CH1 to CH16
D01651 to D01698	Unused	CH17 to CH64
D01699 to D01714	Event 1 set value	CH1 to CH16
D01715 to D01762	Unused	CH17 to CH64
D01763 to D01778	Event 2 set value	CH1 to CH16
D01779 to D01826	Unused	CH17 to CH64
D01827 to D01842	Event 3 set value	CH1 to CH16
D01843 to D01890	Unused	CH17 to CH64
D01891 to D01906	Event 4 set value	CH1 to CH16
D01907 to D01954	Unused	CH17 to CH64

Continued on the next page.

Continued from the previous page.

Register address	Communication item	
D01955 to D01970	Set value (SV)	CH1 to CH16
D01971 to D02018	Unused	CH17 to CH64
D02019 to D02034	Proportional band [heat-side]	CH1 to CH16
D02035 to D02082	Unused	CH17 to CH64
D02083 to D02098	Integral time [heat-side]	CH1 to CH16
D02099 to D02146	Unused	CH17 to CH64
D02147 to D02162	Derivative time [heat-side]	CH1 to CH16
D02163 to D02210	Unused	CH17 to CH64
D02211 to D02226	Proportional band [cool-side]	CH1 to CH16
D02227 to D02274	Unused	CH17 to CH64
D02275 to D02290	Integral time [cool-side]	CH1 to CH16
D02291 to D02338	Unused	CH17 to CH64
D02339 to D02354	Derivative time [cool-side]	CH1 to CH16
D02355 to D02402	Unused	CH17 to CH64
D02403 to D02418	Control response parameter	CH1 to CH16
D02419 to D02466	Unused	CH17 to CH64
D02467 to D02482	Overlap/Deadband	CH1 to CH16
D02483 to D02530	Unused	CH17 to CH64
D02531 to D02546	Setting change rate limiter (up)	CH1 to CH16
D02547 to D02594	Unused	CH17 to CH64
D02595 to D02610	Setting change rate limiter (down)	CH1 to CH16
D02611 to D02658	Unused	CH17 to CH64
D02659 to D02674	Heater break alarm (HBA) set value	CH1 to CH16
D02675 to D02722	Unused	CH17 to CH64
D02723 to D02738	Heater break determination point	CH1 to CH16
D02739 to D02786	Unused	CH17 to CH64
D02787 to D02802	Heater melting determination point	CH1 to CH16
D02803 to D02850	Unused	CH17 to CH64
D02851 to D02866	PV bias	CH1 to CH16
D02867 to D02914	Unused	CH17 to CH64
D02915 to D02930	Manual manipulated output value	CH1 to CH16
D02931 to D02978	Unused	CH17 to CH64
D02979 to D02994	Operation mode	CH1 to CH16
D02995 to D03042	Unused	CH17 to CH64
D03043	DO manual output 1	CH1
D03044 to D03058	Unused	CH2 to CH16
D03059	RUN/STOP transfer (Each unit)	CH1

(3) Setting SRZ setting data by host communication

The host computer is used to set communication data of functional modules (Z-TIO/Z-DIO modules) that cannot be set by PLC communication (engineering data, operation data, etc.).

If the control is the control start (RUN), transfer the control stop (STOP).
Engineering data can only be set in functional modules (Z-TIO and Z-DIO modules) when the SRZ unit is stopped.

☞ For the communication data range of functional modules (Z-TIO and Z-DIO modules), see **6.4.5 RKC communication data list (P. 6-31).**

☞ For the function description of functional modules (Z-TIO and Z-DIO modules) communication data, **see SRZ Instruction Manual (IMS01T04-E□)**.

(4) Turn off the power of the host computer and SRZ unit

To make the newly configured system data (settings) take effect, turn off the power of the host computer and SRZ unit.
(The settings will take effect the next time the power is turned on.)

7.6.7 PLC setting

(5) Power on the PLC

Turn on the power of the PLC.

(6) Conduct the PLC setting

Set the Serial communication module of MITSUBISHI MELSEC Q series as follows.

Setting item	Description
Operation setting	Independent
Data bit	7
Parity bit	NO
Even/odd parity	Odd
Stop bit	1
Sum check code	YES

Setting item	Description
Writing during RUN	Allowed
Setting modification	Allowed
Communication rate	19200 bps
Communication protocol	MC protocol, Format 4
Station number	0

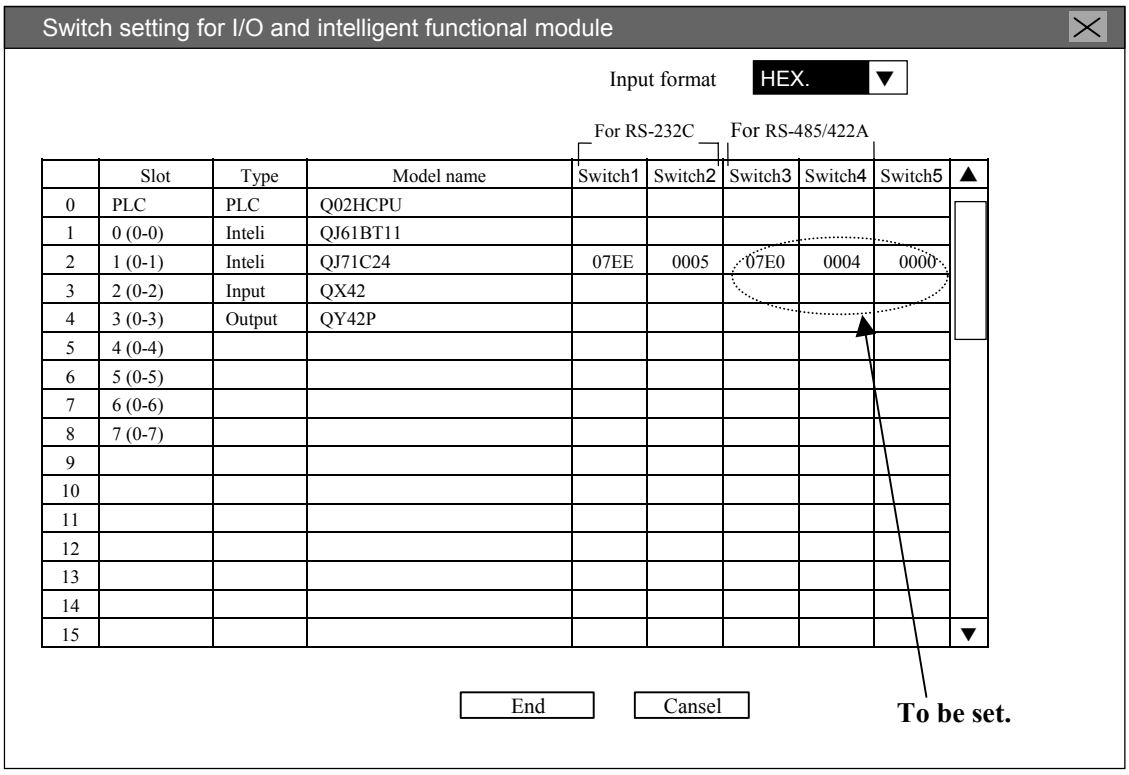
Setting in the serial communication module (QJ71C24) belonging to the MITSUBISHI MELSEC Q series do with the GX Developer of the MITSUBISHI MELSEC PLC programming software (SW□D5C-GPPW-E).
Setting set the following set value with switch setting for I/O and intelligent functional module.

Switch 3: **07E0** *　　Switch 4: **0004** *　　Switch 5: **0000** *　　* Hexadecimal

[Setting procedure]

[GX Developer] → [PLC parameters] → [I/O assignment setting] → **Switch setting**

[Setting screen]



Continued from the previous page.

- **Description Switches 1 to 5**

Switch number	Description	
Switch 1	b15 to b8	b7 to b0
	CH1 Communication rate setting	CH1 Transmission setting
Switch 2	CH1 Communication protocol setting	
Switch 3	b15 to b8	b7 to b0
	CH2 Communication rate setting	CH2 Transmission setting
Switch 4	CH2 Communication protocol setting	
Switch 5	Station number setting	

Set the transmission specifications and communication protocol of each interface using the combinations of setting values for each switch with 16-bit binary data.

- **Setting on switch 3 (CH2 Transmission setting)**

Bit	Description	OFF (0)	ON (1)	Setting	Set value
b0	Operation setting *	Independent	Link	0	0
b1	Data bit	7	8	0	
b2	Parity bit	No	Yes	0	
b3	Even/Odd parity	Odd	Even	0	
b4	Stop bit	1	2	0	E
b5	Sum check code	No	Yes	1	
b6	Write during RUN	Prohibited	Allowed	1	
b7	Setting modifications	Prohibited	Allowed	1	

* Must be set to OFF (0) on CH1

- **Setting on switch 3 (CH2 Communication rate setting)**

Communication rate (Unit: bps)	Bit position b15 to b8	Communication rate (Unit: bps)	Bit position b15 to b8
300	00H	14400	06H
600	01H	19200	07H
1200	02H	28800	08H
2400	03H	38400	09H
4800	04H	57600	0AH
9600	05H	115200	0BH

Set 19200 bps on communication rate. (Set value: 07H)

- **Setting on switch 4 (CH2 Communication protocol setting)**

Set number	Description	
0H	GX Developer connection	
1H	MC protocol	Format 1
2H		Format 2
3H		Format 3
4H		Format 4
5H		Format 5

Set number	Description
6H	Non procedure protocol
7H	Bidirectional protocol
8H	For linked operation setting
9 to DH	Setting prohibited
EH	ROM/RAM/switch test
FH	Individual station loopback test

Set MC protocol Format 4 on communication protocol setting. (Set value: 4H)

- **Setting on switch 5 (Station number setting)**

This setting is common for both CH1 and CH2 sides.
Set the station number to 0.

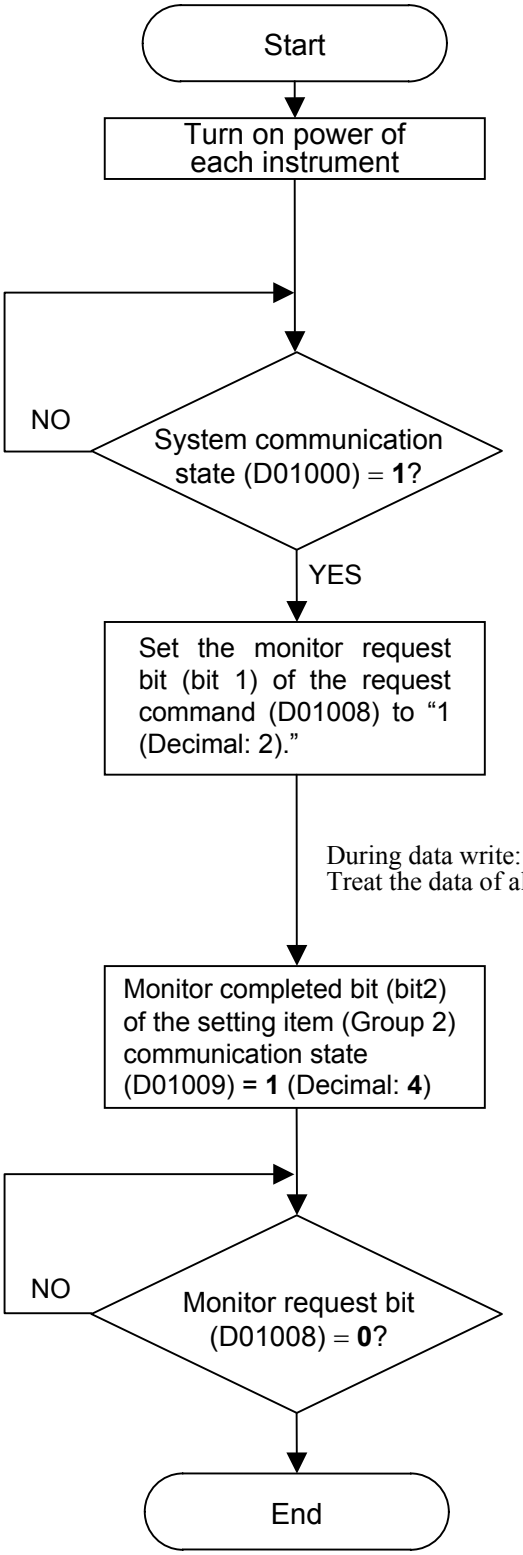
☞ The details of the switch setting for the PLC, see the instruction manual for the PLC being used.

(7) Power off the PLC

Temporarily turn off the power of the PLC.

7.6.8 Initial setting

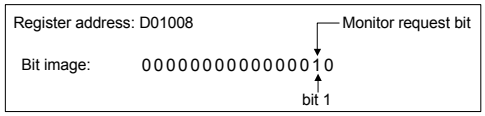
Change each set value of SRZ unit from the PLC after the initial settings are made.



Turn on the power of the SRZ unit, the PLC, and the host computer. The Z-COM module starts collecting data on function modules (Z-TIO and Z-DIO modules) jointed from the time when the power is turned on.
In addition, writing of the system data (monitor items) begins after the PLC communication start time (factory set value is 5 seconds) has passed.

When data collection is finished, the SRZ unit starts writing the communication data of the monitor group to the PLC.
When monitor group writing starts, "system communication state" changes to "**1**."
When the system communication condition becomes "**1**," PLC communication can be performed.

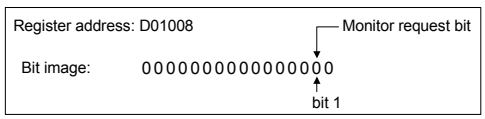
When the monitor request bit (bit 1) of request command (**D01008)** of the PLC register is set to "**1** (Decimal: **2**)," the SRZ unit begins writing the setting group to the PLC.



During data write:
Treat the data of all items as inconsistent during the data write.

When writing is finished, the SRZ unit writes the communication state of the setting group to the monitor completed bit (bit 2) of the setting item (Group 2) communication state (**D01009**) of the PLC.

If the monitor request bit (bit 1) of the request command (**D01008**) of the PLC register is "**0**," this indicates that writing of data to the PLC is finished.



7.6.9 Data setting

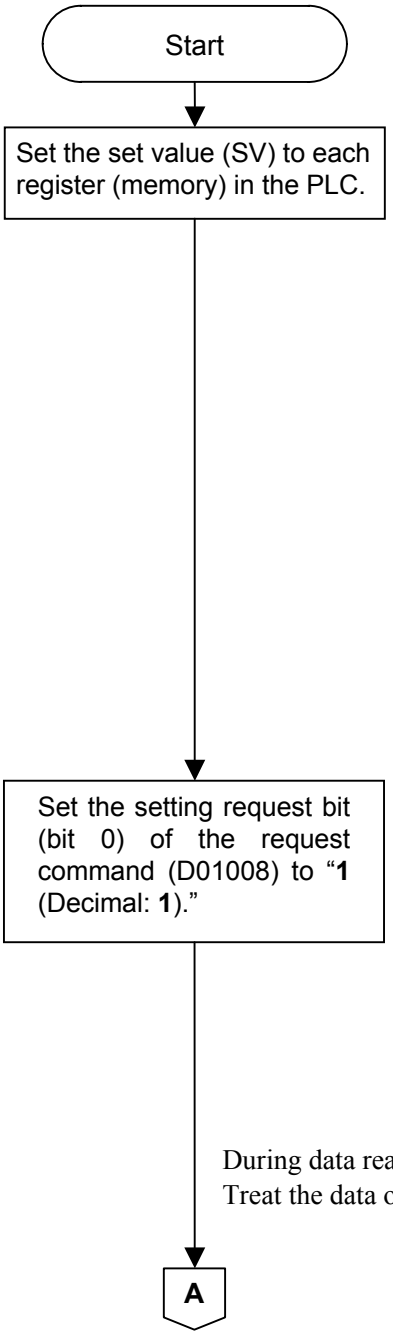
It is assumed that initial setting is finished.

If each set value of SRZ unit 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.

■ Setting example

When set the set value (SV) of SRZ unit as follows:

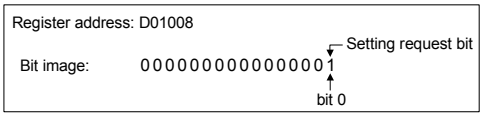
Set value (SV): CH1 = 100 CH2 = 100 CH3 = 110 CH4 = 110 CH5 = 120 CH6 = 120
CH7 = 130 CH8 = 130 CH9 = 140 CH10 = 140 CH11 = 150 CH12 = 150
CH13 = 80 CH14 = 80 CH15 = 50 CH16 = 50

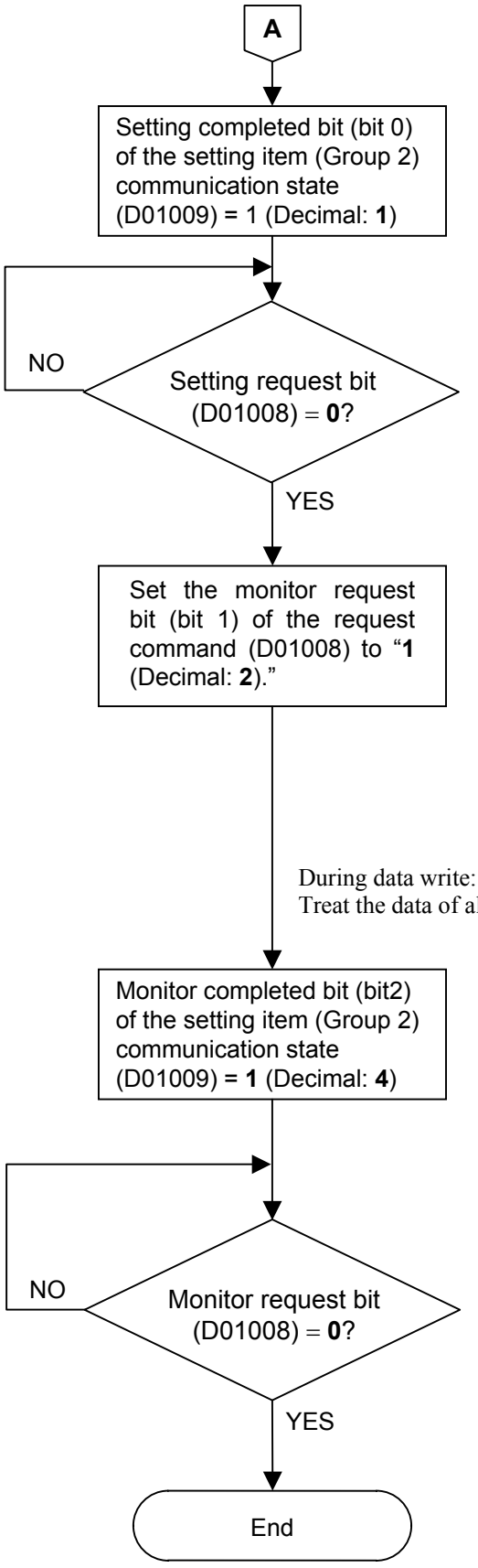


Register address of set value (SV) (See P. 7-62)

Register address	Communication item	Set value
D01955	Set value (SV) CH1	100
D01956	Set value (SV) CH2	100
D01957	Set value (SV) CH3	110
D01958	Set value (SV) CH4	110
D01959	Set value (SV) CH5	120
D01960	Set value (SV) CH6	120
D01961	Set value (SV) CH7	130
D01962	Set value (SV) CH8	130
D01963	Set value (SV) CH9	140
D01964	Set value (SV) CH10	140
D01965	Set value (SV) CH11	150
D01966	Set value (SV) CH12	150
D01967	Set value (SV) CH13	80
D01968	Set value (SV) CH14	80
D01969	Set value (SV) CH15	50
D01970	Set value (SV) CH16	50

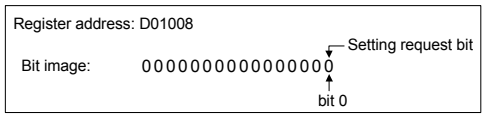
When the setting request bit (bit 0) of request command (**D01008**) of the PLC register is set to "**1** (Decimal: **1**) ," the SRZ unit begins reading the setting group data set in the PLC register (memory).



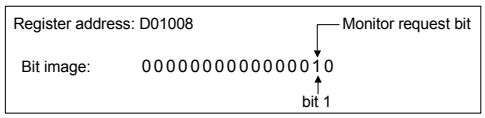


When reading of the setting group data ends, the SRZ unit writes the setting group communication state to the setting completed bit (bit 1) of PLC setting item (Group 2) communication state (**D01009**).

If the setting request bit (bit 0) of the request command (**D01008**) of the PLC register is "**0**," this indicates that reading of data from the PLC is finished.



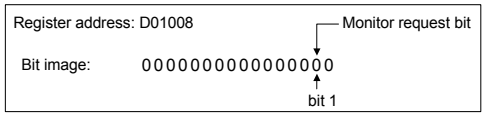
[Confirmation of setting data]
To confirm the data read by the SRZ unit from the PLC, the SRZ unit will begin writing the setting group data to the PLC when "**1**" (Decimal: **2**) is set in monitor request bit (bit 1) of request command (**D01008)** of the PLC register.



During data write:
Treat the data of all items as inconsistent during the data write.

When writing is finished, the SRZ unit writes the communication state of the setting group to the monitor completed bit (bit 2) of the setting item (Group 2) communication state (**D01009**) of the PLC.

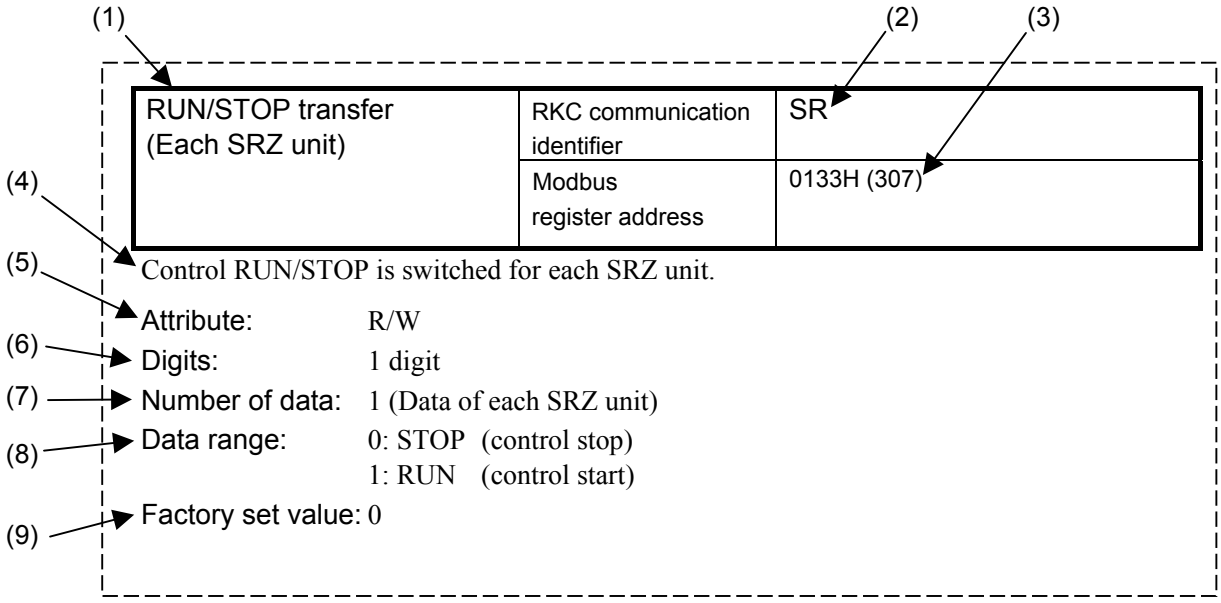
If the monitor request bit (bit 1) of the request command (**D01008**) of the PLC register is "**0**," this indicates that writing of data to the PLC is finished



COMMUNICATION DATA DESCRIPTION

8

8.1 Reference to Communication Data Contents



(1) Name: Communication data name

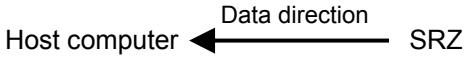
(2) RKC communication identifier:
Communication identifier of RKC communication
The PLC communication environment setting items are indicated as "system data (setting items or monitor items)."

(3) Modbus register address:
Modbus communication data register addresses of each channel
These register addresses are written using both of hexadecimal and decimal (in parentheses) numbers.

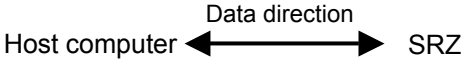
(4) Description: A short description of the communication data item

(5) Attribute: A method of how communication data items are read or written when viewed from the host computer is described.

RO: Read only data



R/W: Read and Write data



(6) Digits: The number of communication data digits in RKC communication

(7) Number of data: The number of communication data in Modbus

(8) Data range: Read or Write range of communication data

(9) Factory set value: Factory set value of communication data

There is item including the functional description.

8.2 Communication Data of Z-COM Module

Model code (Z-COM module)	RKC communication identifier	ID
	Modbus register address	—

This value is the type identifier code of the Z-COM module.

Attribute: RO
Digits: 32 digits
Number of data: —
Data range: —
Factory set value: —

Model code (Functional module)	RKC communication identifier	IE
	Modbus register address	—

This value is the type identifier code of the Z-TIO/Z-DIO module joined to the Z-COM module.

Attribute: RO
Digits: 32 digits
Number of data: 100 (Data of each module)
Data range: —
Factory set value: —

ROM version (Z-COM module)	RKC communication identifier	VR
	Modbus register address	—

This value is a version of the ROM loaded on the Z-COM module.

Attribute: RO
Digits: 8 digits
Number of data: —
Data range: The version of loading software
Factory set value: —

ROM version (Functional module)	RKC communication identifier	VQ
	Modbus register address	—

This value is a version of the ROM on the Z-TIO/Z-DIO module joined to the Z-COM module.

Attribute: RO
Digits: 8 digits
Number of data: 100 (Data of each module)
Data range: The version of loading software
Factory set value: —

Integrated operating time monitor (Z-COM module)	RKC communication identifier	UT
	Modbus register address	—

This value is an integrated operating time of the Z-COM module.

Attribute: RO
Digits: 7 digits
Number of data: —
Data range: 0 to 19999 hours
Factory set value: —

Integrated operating time monitor (Functional module)	RKC communication identifier	UV
	Modbus register address	—

This value is an integrated operating time of the Z-TIO/Z-DIO module joined to the Z-COM module.

Attribute: RO
Digits: 7 digits
Number of data: 100 (Data of each module)
Data range: 0 to 19999 hours
Factory set value: —

Error code (Z-COM module)	RKC communication identifier	ER
	Modbus register address	0000H (0)

Each error state of the SRZ unit is expressed in bit data items. For the identifier ER, the error condition is shown by the *OR* of each module.

Attribute: RO

Digits: 7 digits

Number of data: 1 (Data of each SRZ unit)

Data range: 0 to 255 (bit data)
The error state is assigned as a bit image in binary numbers.
However, send data from the SRZ unit be changed to decimal ASCII code from the bit image in binary numbers for RKC communication.

Bit image: 0000000000000000

bit 15 ····· bit 0

Bit data: 0: OFF 1: ON

Modbus

bit 0	Adjustment data error
bit 1	Data back-up error
bit 2	A/D conversion error
bit 3	Unused
bit 4	Unused
bit 5	Logic output data error
bit 6	Program error (stack) *
bit 7	Watchdog timer error *
bit 8 to bit 15	Unused

* These are error items only of the Z-COM module.

RKC communication (ASCII code data)

1	Adjustment data error
2	Data back-up error
4	A/D conversion error
32	Logic output data error
64	Program error (stack) *
128	Watchdog timer error *

* These are error items only of the Z-COM module.

Factory set value: —

Error code (Functional module)	RKC communication identifier	EZ
	Modbus register address	ch1: 0001H (1) to ch100: 0064H (100)

Each error state of the Z-TIO/Z-DIO module joined to the Z-COM module is expressed in bit data items.

Attribute: RO
Digits: 7 digits
Number of data: 100 (Data of each module)
Data range: 0 to 63 (bit data)
The error state is assigned as a bit image in binary numbers.
However, send data from the SRZ unit be changed to decimal ASCII code from the bit image in binary numbers for RKC communication.

Bit image: 0000000000000000

bit 15 ····· bit 0

Bit data: 0: OFF 1: ON

Modbus

bit 0	Adjustment data error
bit 1	Data back-up error
bit 2	A/D conversion error
bit 3	Unused
bit 4	Unused
bit 5	Logic output data error
bit 6 to bit 15	Unused

RKC communication (ASCII code data)

1	Adjustment data error
2	Data back-up error
4	A/D conversion error
32	Logic output data error

Factory set value: —

Backup memory state monitor (Z-COM module)	RKC communication identifier	EM
	Modbus register address	0065H (101)

Allows the state of the contents of the RAM and backup memory (FRAM) of the Z-COM module to be checked.

Attribute: RO
Digits: 1 digit
Number of data: 1 (Data of each SRZ unit)
Data range: 0: The content of the backup memory does not coincide with that of the RAM.
1: The content of the backup memory coincides with that of the RAM.
Factory set value: —

Backup memory state monitor (Functionanl module)	RKC communication identifier	CZ
	Modbus register address	ch1: 0066H (102) to ch100: 00C9H (201)

Allows the state of the contents of the RAM and backup memory (FRAM) of the Z-TIO or Z-DIO module joined to the Z-COM module to be checked.

Attribute: RO
Digits: 1 digit
Number of data: 100 (Data of each module)
Data range: 0: The content of the backup memory does not coincide with that of the RAM.
1: The content of the backup memory coincides with that of the RAM.
Factory set value: —

System communication state	RKC communication identifier	QM
Syetem data (monitor items)	Modbus register address	00CAH (202)

When the power is turned on, collects data of the functional modules joined to the Z-COM module. When data collection ends, the system communication state changes to "1." When system communication state becomes "1," PLC communication can be performed.

Attribute: RO
Digits: 1 digit
Number of data: 1 (Data of each SRZ unit)
Data range: 0 or 1 (bit data)
The error state is assigned to a bit 0 in binary numbers.

Bit image: 0000000000000000
bit 15 ····· bit 0

Bit data: 0: Before data collection is completed
1: Data collection is completed

bit 0	Data collection condition
bit 1 to bit 15	Unused

Factory set value: —

SRZ normal communication flag	RKC communication identifier	QL
Syetem data (monitor items)	Modbus register address	00CBH (203)

Communication verification flag. When the SRZ unit is performing communication normally, "0" and "1" are repeated for each communication period. If the SRZ unit stops communicating, the communication flag does not change.

Action of SRZ normal communication flag

- When the system communication state is "0," the system data (monitor items) are written from the SRZ unit to the PLC. The flag switches between "0" and "1" each write of system data (monitor items).
- When the system communication state is "1," "0" and "1" are repeated for each period of communication of the monitor group and setting group of PLC communication.
  The more communication data there is, the longer the communication period.
  The communication period is also longer when a request command is performed.

Attribute: RO
Digits: 1 digit
Number of data: 1 (Data of each SRZ unit)
Data range: 0/1 transfer (For communication checking)
Factory set value: —

PLC communication error code	RKC communication identifier	ES
Syetem data (monitor items)	Modbus register address	00CCH (204)

Indicates an error state of PLC communication by bit data.

Error code type

- PLC register read/write error

  Turns ON when it is not possible to read from or write to the PLC register.
  Three seconds after the normal communication state is restored, this turns OFF.

- Slave communication timeout

  To be turned on when communication with slave units is timed out during communication with the PLC with SRZ units multi-drop connected.
  If the slave unit detects the timeout, data send to the PLC stops to be set to the standby state.
  Communication re-starts after data send re-opens from the master unit.
  In addition, if the master unit detects the timeout, data re-send starts.

- Internal communication error

  This turns ON when an internal communication error occurs in the SRZ unit.

- Master communication timeout

  This turns ON when a timeout occurs during communication between the PLC and the master unit.

Attribute: RO
Digits: 7 digit
Number of data: 1 (Data of each SRZ unit)
Data range: 0 to 31 (bit data)
The error state is assigned as a bit image in binary numbers.

Bit image: 0000000000000000
bit 15 ····· bit 0

Bit data: 0: OFF 1: ON

bit 0	PLC register read/write error
bit 1	Slave communication timeout
bit 2	Unused
bit 3	Internal communication error
bit 4	Master communication timeout
bit 1 to bit 15	Unused

Factory set value: —

Unit recognition flag	RKC communication identifier	QN
Syetem data (monitor items)	Modbus register address	00CDH (205)

Indicates the connection state of the SRZ unit. A slave unit (other than a master unit with unit address 0, 4, 8, C) can only recognize its own state.

Attribute: RO
Digits: 7 digit
Number of data: 1 (Data of each SRZ unit)
Data range: 0 to 15 (bit data)
The unit recognition flag state is assigned as a bit image in binary numbers.

Bit image: 0000000000000000
bit 15 ····· bit 0

Bit data: 0: No unit exists
1: Unit exists

bit 0	SRZ unit 1
bit 1	SRZ unit 2
bit 2	SRZ unit 3
bit 3	SRZ unit 4
bit 4 to bit 15	Unused

Factory set value: —

Monitor for the number of connected modules	RKC communication identifier	QK
Syetem data (monitor items)	Modbus register address	0132H (306)

This value is the number of the Z-TIO/Z-DIO module joined to the Z-COM module.

Attribute: RO
Digits: 7 digit
Number of data: 1 (Data of each SRZ unit)
Data range: 0 to 31
Data range: —

RUN/STOP transfer (Each SRZ unit)	RKC communication identifier	SR
	Modbus register address	0133H (307)

Control RUN (control start)/STOP (control stop) is transferred for each SRZ unit.

Attribute: R/W
Digits: 1 digit
Number of data: 1 (Data of each SRZ unit)
Data range: 0: STOP (control stop)
1: RUN (control start)
Factory set value: 0

RUN/STOP transfer (Each module)	RKC communication identifier	SW
	Modbus register address	ch1: 0134H (308) to ch100: 0197H (407)

Control RUN (control start)/STOP (control stop) is transferred for each module.

Attribute: R/W
Digits: 1 digit
Number of data: 100 (Data of each module)
Data range: 0: STOP (control stop)
1: RUN (control start)
Factory set value: 0

Control RUN/STOP holding setting	RKC communication identifier	X1
	Modbus register address	ch1: 0198H (408) to ch100: 01BFH (507)

It is set whether or not the operation mode before the power supply is turned off is held when the power supply is turned on or power failure recovers.

Attribute: R/W
Digits: 1 digit
Number of data: 1 (Data of each module)
Data range: 0: Not holding (STOP start)
1: Holding (RUN/STOP hold)
Factory set value: 1 (Holding)

When "0: Not holding (STOP mode)" is selected, the action at restoration of power will be as follows.

	Operation mode when power failure recovers	Output value when power failure recovers
STOP mode	Started in the control stop (STOP) state regardless of the RUN mode before power failure. [1]	Manipulated output value at STOP mode [2]

[1] If changed to RUN from STOP by RUN/STOP selection after start, set to the operation mode before power failure occurs.
[2] For position proportioning control (no feedback resistance input), the action will be the same as the "Valve action at STOP" setting.

Communication 1 protocol	RKC communication identifier	VK
	Modbus register address	8000H (32768)

Use to set a protocol of communication 1 via host communication or loader communication.

Attribute: R/W
Digits: 1 digit
Number of data: 1 (Data of each SRZ unit)
Data range: 0: RKC communication
1: Modbus
Factory set value: 0

Communication 1 communication speed	RKC communication identifier	VL
	Modbus register address	8001H (32769)

Use to set a communication speed of communication 1 via host communication or loader communication.

Attribute: R/W
Digits: 1 digit
Number of data: 1 (Data of each SRZ unit)
Data range: 0: 4800 bps
1: 9600 bps
2: 19200 bps
3: 38400 bps
Factory set value: 2

Communication 1 data bit configuration	RKC communication identifier	VM
	Modbus register address	8002H (32770)

Use to set a data bit configuration of communication 1 via host communication or loader communication.

Attribute: R/W
Digits: 7 digits
Number of data: 1 (Data of each SRZ unit)
Data range: 0 to 5

Set value	Data bit	Parity bit	Stop bit
0	8	Without	1
1	8	Even	1
2	8	Odd	1
3	7	Without	1
4	7	Even	1
5	7	Odd	1

Factory set value: 0

Communication 1 interval time	RKC communication identifier	VN
	Modbus register address	8003H (32771)

Use to set an interval time of communication 1 via host communication or loader communication.

Attribute: R/W
Digits: 7 digits
Number of data: 1 (Data of each SRZ unit)
Data range: 0 to 250 ms
Factory set value: 10

Communication 2 protocol	RKC communication identifier	VP
	Modbus register address	8004H (32772)

Use to set a protocol of communication 2 via host communication or loader communication.

Attribute: R/W
Digits: 1 digit
Number of data: 1 (Data of each SRZ unit)
Data range:
0: RKC communication
1: Modbus
2: MITSUBISHI MELSEC series special protocol
A compatible, 1C frame (type 4), AnA/AnUCPU common command (QR/QW), AnA/QnA series, Q series
QnA compatible, 3C frame (type 4), command (0401/1401) *
* Use to only ZR register.
3: OMRON SYSMAC series special protocol
C mode command (RD/WD)
4: MITSUBISHI MELSEC series special protocol
A compatible, 1C frame (type 4), ACPU common command (WR/WW)
(A series, FX2N/FX2NC series, FX3U/FX3UC series)
Factory set value: 0

Communication 2 communication speed	RKC communication identifier	VU
	Modbus register address	8005H (32773))

Use to set a communication speed of communication 2 via host communication or loader communication.

Attribute: R/W
Digits: 1 digit
Number of data: 1 (Data of each SRZ unit)
Data range:
0: 4800 bps
1: 9600 bps
2: 19200 bps
3: 38400 bps
Factory set value: 2

Communication 2 data bit configuration	RKC communication identifier	VW
	Modbus register address	8006H (32774)

Use to set a data bit configuration of communication 2 via host communication or loader communication.

Attribute: R/W
Digits: 7 digits
Number of data: 1 (Data of each SRZ unit)
Data range: 0 to 11

Set value	Data bit	Parity bit	Stop bit
0	8	Without	1
1	8	Even	1
2	8	Odd	1
3	7	Without	1
4	7	Even	1
5	7	Odd	1

Set value	Data bit	Parity bit	Stop bit
6	8	Without	2
7	8	Even	2
8	8	Odd	2
9	7	Without	2
10	7	Even	2
11	7	Odd	2

Factory set value: 0

Communication 2 interval time	RKC communication identifier	VX
	Modbus register address	8007H (32775)

Use to set an interval time of communication 2 via host communication or loader communication.

Attribute: R/W
Digits: 7 digits
Number of data: 1 (Data of each SRZ unit)
Data range: 0 to 250ms
Factory set value: 10

Station number System data (setting items)	RKC communication identifier	QV
	Modbus register address	8008H (32776)

Set the PLC station number. Set it to the same number as the PLC.

Attribute: R/W
Digits: 7 digits
Number of data: 1 (Data of each SRZ unit)
Data range: 0 to 31
Factory set value: 0

PC number	RKC communication identifier	QW
System data (setting items)	Modbus register address	8009H (32777)

Set the PLC PC number. Set it to the same number as the PLC.

Attribute: R/W
Digits: 7 digits
Number of data: 1 (Data of each SRZ unit)
Data range: 0 to 255
Factory set value: 0

Register type	RKC communication identifier	QZ
System data (setting items)	Modbus register address	800AH (32778)

Set the register types used in PLC communication.

Attribute: R/W
Digits: 7 digits
Number of data: 1 (Data of each SRZ unit)
Data range:

MITSUBISHI MELSEC series	
Set value	Register type
0	D register (data register)
1	R register (file register)
2	W register (link register)
3	ZR register (Method of specifying consecutive numbers when 32767 of R register is exceeded.)
4 to 29	Unused

OMRON SYSMAC series	
Set value	Register type
0	DM register (Data memory)
1 to 9	Unused
10 to 22	EM register (Extended data memory) Specify the bank No. (Specify the bank No.+10)
23 to 28	Unused
29	EM register (Extended data memory) Specify the current bank

Factory set value: 0

Register start number (High-order 4-bit)	RKC communication identifier	QS
System data (setting items)	Modbus register address	800BH (32779)

Set the start number of the register used in PLC communication. Set this if the register address 65535 is exceeded in the ZR register.

Attribute: R/W
Digits: 7 digits
Number of data: 1 (Data of each SRZ unit)
Data range: 0 to 15
Factory set value: 0

Register start number (Low-order 16-bit)	RKC communication identifier	QX
System data (setting items)	Modbus register address	800CH (32780)

Set the start number of the register used in PLC communication.

Attribute: R/W
Digits: 7 digits
Number of data: 1 (Data of each SRZ unit)
Data range: 0 to 9999
A compatible, 1C frame (type 4), CPU common command (WR/WW), OMRON SYSMAC series
If a value higher than 9999 is set, a "PLC register read/write error" will result. (excluding the W register)
0 to 65535
A compatible, 1C frame (type 4), AnA/AnUCPU common command (QR/QW), QnA compatible, 3C frame (type 4), command
Factory set value: 1000

System data address bias	RKC communication identifier	QQ
System data (setting items)	Modbus register address	800DH (32781)

When the SRZ unit is connected in a multi-drop connection, a bias is set for the register addresses of each unit so that no address duplication occurs.

Attribute: R/W
Digits: 7 digits
Number of data: 1 (Data of each SRZ unit)
Data range: 0 to 65535
Factory set value: 2100

COM module link recognition time System data (setting items)	RKC communication identifier	QT
	Modbus register address	800EH (32782)

When connecting two or more SRZ units, set the time required until a unit after the second module is recognized. Set this item to the master unit.

Attribute: R/W
Digits: 7 digits
Number of data: 1 (Data of each SRZ unit)
Data range: 0 to 255 seconds
Factory set value: 10

PLC scanning time System data (setting items)	RKC communication identifier	VT
	Modbus register address	800FH (32783)

Set the time of waiting for a response from the PLC.

Usually, no factory set values are necessary to be changed.

Attribute: R/W
Digits: 7 digits
Number of data: 1 (Data of each SRZ unit)
Data range: 0 to 3000 ms
Factory set value: 255

PLC communication start time System data (setting items)	RKC communication identifier	R5
	Modbus register address	8010H (32784)

Time until communication with the PLC starts is set after the power is turned on.
The PLC communication start time is the time that writing of the system data (monitor items) starts. Actual communication with the PLC by request command can only take place after the system communication state (D01000) changes to "1."

Attribute: R/W
Digits: 7 digits
Number of data: 1 (Data of each SRZ unit)
Data range: 1 to 255 seconds
Factory set value: 5

Method for setting the number of connected modules	RKC communication identifier	RY
System data (setting items)	Modbus register address	8011H (32785)

The Z-COM module calculates the number of channels of communication data during RKC communication, and thus the maximum module address of each functional module is set in the number of connected modules (identifier: QY, QU). Select the setting method for this operation.
The maximum module address set in the number of connected modules (identifier QY, QU) will be the maximum value of the address setting switch + 1.

Attribute: R/W
Digits: 7 digits
Number of data: 1 (Data of each SRZ unit)
Data range: 0: Does nothing
Automatic setting in the number of connected modules (identifier QY, QU) is not performed. (It is possible to manually set the maximum module address of the functional module.)
1: The maximum number of connected modules for functional modules is automatically set only when the power is turned ON.
When the power is turned on, the maximum module address of the functional module is automatically set in number of connected modules (identifier QY, QU).
2: The maximum number of connected modules for functional modules is automatically set when the number of connected modules is changed.
When the number of connected modules is changed, the maximum module address of the functional modules is automatically set in the number of connected modules (identifier QY, QU).
Factory set value: 1

Slave mapping method	RKC communication identifier	RK
System data (setting items)	Modbus register address	8012H (32786)

When the SRZ unit is connected in a multi-drop connection, this setting determines whether or not the bias set in "system data address bias" is applied to register addresses.
When the bias is enabled, a register address is calculated as shown below.

Register address when bias is enabled =

Register address + (Address setting switch%4) × System data address bias

- Register address when bias is disabled
- Remainder of address setting switch/4
- Factory set value: 2100

Attribute: R/W
Digits: 7 digits
Number of data: 1 (Data of each SRZ unit)
Data range: 1: Bias from the address setting switch
2: Bias disabled
Factory set value: 1

Number of connected modules (Z-TIO module)	RKC communication identifier	QY
	Modbus register address	8013H (32787)

This is the maximum address of Z-TIO modules joined to the Z-COM module. The setting method can be selected using “Method for setting the number of connected modules” (identifier RY).
The maximum module address that is set will be the maximum value + 1 of the address setting switch of the Z-TIO module.

Attribute: R/W
Digits: 7 digits
Number of data: 1 (Data of each SRZ unit)
Data range: 0 to 16
Factory set value: —

Number of connected modules (Z-DIO module)	RKC communication identifier	QU
	Modbus register address	8014H (32788)

This is the maximum address of Z-DIO modules joined to the Z-COM module. The setting method can be selected using “Method for setting the number of connected modules” (identifier RY).
The maximum module address that is set will be the maximum value + 1 of the address setting switch of the Z-DIO module.

Attribute: R/W
Digits: 7 digits
Number of data: 1 (Data of each SRZ unit)
Data range: 0 to 16
Factory set value: —

TROUBLE SHOOTING

9

Solutions for Problems

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 the wiring is completed.
- 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. 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.

When replacing the module with a new one, always use the module with the same model code. If the module is replaced, it is necessary to re-set each data item.

■ Each module

Problem	Probable cause	Solution
FAIL/RUN lamp does not light up	Power not being supplied	Check external breaker etc.
	Appropriate power supply voltage not being supplied	Check the power supply
	Power supply terminal contact defect	Retighten the terminals
	Power supply section defect	Replace module
RX1/TX1 or RX2/TX2 lamp does not flash	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
	CPU section defect	Replace module
The FAIL/RUN lamp is lit (red): FAIL status	CPU section or power section defect	Replace module

■ PLC communication

Problem	Probable cause	Solution
• Even if "1" is set to the sitting request bit or monitor request bit in request command, transfer is not finished. Request command does not return to "0: Monitor" • RX1/TX1 lamp or RX2/TX2 lamp is lit, and it can be seen to communicate normally, but monitor value is not transferred to PLC • 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
	Mismatch of the setting data of communication speed, data bit configuration and protocol with those of the PLC	• Confirm the communication settings of Z-COM module DIP switch and set them correctly • If the communication settings of Z-COM module are set via host or loader communications, confirm the communication settings of host communication and set them correctly.
	Wrong setting of PLC communication data	Confirm the PLC communication settings and set them correctly
		Setting of termination resistor in accordance with PLC or the insertion is done
	Setting of PLC becomes write inhibit	Setting of PLC is turned into write enable (Write enable in RUN, shift to monitor mode, etc.)
	Accesses outside the range of memory address of PLC (wrong setting of address)	Confirm the PLC communication environment setting and set them correctly
If two or more units are connected, no units after the second unit are recognized	COM module Link recognition time is short	Lengthen COM module link recognition time
When the setting request command of request command is set in "1," setting error (bit 0 of setting item (Group2) communication state) is become	Data rang error	Confirm the setting range of set value and set them correctly

☞ For the "PLC communication environment setting" and "COM module link recognition time," see **7.2.3 PLC communication environment setting (P.7-11) [MITSUBISHI PLC]** or **7.3.3 PLC communication environment setting (P.7-25) [OMRON PLC]**.

■ RKC communication

Problem	Probable 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
	Mismatch of the setting data of communication speed and data bit configuration with those of the host computer	Confirm the settings and set them correctly
	Wrong address setting	
	Error in the data format	Reexamine the communication program
	Transmission line is not set to the receive state after data send	
EOT return	The specified identifier is invalid	Confirm the identifier is correct or that with the correct function is specified. Otherwise correct it
	Error in the data format	Reexamine the communication program
NAK return	Error occurs on the line (parity bit error, framing error, etc.)	Confirm the cause of error, and solve the problem appropriately. (Confirm the transmitting data, and resend data)
	BCC error	
	The data exceeds the setting range	Confirm the setting range and transmit correct data
	The block data length of the transmission exceeds 128 bytes	Divide the block using ETB before sending it
	The specified identifier is invalid	Confirm the identifier is correct or that with the correct function is specified. Otherwise correct it

■ Modbus

Problem	Probable 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
	Mismatch of the setting data of communication speed and data bit configuration with those of the host computer	Confirm the settings and set them correctly
	Wrong address setting	
	There is length of query message exceeds set range	
	A transmission error (overrun error, framing error, parity error or CRC-16 error) is found in the query message	Re-transmit after time-out occurs or verify communication program
	The time interval between adjacent data in the query message is too long, exceeding 24 bit's time	
Error code 1	Function cod error (Specifying nonexistent function code)	Confirm the function code
Error code 2	When the mismatched address is specified	Confirm the address of holding register
Error code 3	• When the specified number of data items in the query message exceeds the maximum number of data items available • When the data written exceeds the setting range	Confirm the setting data
Error code 4	Self-diagnostic error	Turn off the power to the instrument. If the same error occurs when the power is turned back on, please contact RKC sales office or the agent.

SPECIFICATIONS

10

10.1 Communication Specifications

■ PLC communication

Interface: Communication 2 (COM. PORT3, COM. PORT4):
Based on EIA, RS-422A standard
Based on EIA, RS-485 standard

Connection method: RS-422A 4-wire system, half-duplex multi-drop connection
RS-485 2-wire system, half-duplex multi-drop connection

Synchronous method: Start/stop synchronous type

Communication speed: 4800 bps. 9600 bps, 19200 bps, 38400 bps

Data bit configuration: Start bit: 1
Data bit: 7 or 8
Parity bit: Without, Odd or Even
Stop bit: 1 or 2

Protocol:
- MITSUBISHI MELSEC series special protocol (type 4)
  - A compatible, 1C frame, AnA/AnUCPU common command (QR/QW) (AnA/AnU/QnA series, Q series)
  - QnA compatible, command for 3C frame (QnA/Q series)
  - A compatible, 1C frame, ACPU common command (WR/WW) (A series, FX2N/FX2NC series or FX3U/FX3UC series)

- OMRON SYSMAC series special protocol (0401/1401)
  - C mode command (RD/WD)

Maximum connections: Four SRZ units per communication port of PLC
(Up to one Z-COM module can be connected to one SRZ unit)

Usable PLC type:
- MITSUBISHI MELSEC series
  - Computer link unit
    AJ71UC24, A1SJ71UC24-R4, A1SJ71C24-R4, etc.
    The unit which AnA/AnU CPU common command (type 4) can use
  - Serial communication unit
    AJ71QC24N, A1SJ71QC24N, QJ71C24, etc.
    The unit which AnA/AnUCPU common command (type 4) can use.
  - Adapter
    FX0N-485ADP, FX2NC-485ADP, FX3U-485ADP
  - Expanded function board
    FX2N-485BD, FX3U-485-BD

- OMRON SYSMAC series
  - High-order link unit
    C200H-LK202-V1, C500-LK203, C120-LK202-V1 (SYSMAC C series), etc.
  - CPU unit with a built-in communication port
    CPU unit of SYSMAC CS1 series and CJ1 series
  - Serial communication board
    CS1W-SCB41 (SYSMAC CS1 series),
    CJ1W-SCU41 (SYSMAC CJ1 series), etc.

■ RKC communication (host communication)

Interface: Communication 1 (COM. PORT1, COM. PORT2):
Based on EIA, RS-422A standard
Based on EIA, RS-485 standard
Communication 2 (COM. PORT3, COM. PORT4):
Based on EIA, RS-422A standard
Based on EIA, RS-485 standard

Connection method: RS-422A 4-wire system, half-duplex multi-drop connection
RS-485 2-wire system, half-duplex multi-drop connection

Synchronous method: Start/stop synchronous type

Communication speed: 4800 bps, 9600 bps, 19200 bps, 38400 bps

Data bit configuration: Start bit: 1
Data bit: 7 or 8
Parity bit: Without, Odd or Even
Stop bit: 1

Protocol: Based on ANSI X3.28 subcategory 2.5 B1
Polling/selecting type

Error control: Vertical parity (with parity bit selected)
Horizontal parity (BCC check)

Data types: ASCII 7-bit code

Interval time: 0 to 250 ms

Maximum connections: 16 SRZ units per communication port of host computer
(Up to one Z-COM module can be connected to one SRZ unit)

■ Modbus (host communication)

Interface: Communication 1 (COM. PORT1, COM. PORT2):
Based on EIA, RS-422A standard
Based on EIA, RS-485 standard
Communication 2 (COM. PORT3, COM. PORT4):
Based on EIA, RS-422A standard
Based on EIA, RS-485 standard

Connection method: RS-422A 4-wire system, half-duplex multi-drop connection
RS-485 2-wire system, half-duplex multi-drop connection

Synchronous method: Start/stop synchronous type

Communication speed: 4800 bps, 9600 bps, 19200 bps, 38400 bps

Data bit configuration: Start bit: 1
Data bit: 8
Parity bit: Without, Odd or Even
Stop bit: 1

Protocol: Modbus

Signal transmission mode: Remote Terminal Unit (RTU) mode

Function codes: 03H Read holding registers
06H Preset single register
08H Diagnostics (loopback test)
10H Preset multiple registers

Error check method: CRC-16

Error codes: 1: Function code error
(An unsupported function code was specified)
2: When the mismatched address is specified.
3: • When the data written exceeds the setting range.
• When the specified number of data items in the query message exceeds the maximum number (1 to 125) of data items available
4: Self-diagnostic error response

Interval time: 0 to 250 ms

Maximum connections: 16 SRZ units per communication port of host computer
(Up to one Z-COM module can be connected to one SRZ unit)

■ Loader communication function

Interface: Connection with a loader communication cable for our USB converter COM-K (sold separately).

Synchronous method: Start/stop synchronous type

Communication speed: 38400 bps

Data bit configuration:
Address: 0
Start bit: 1
Data bit: 8
Parity bit: Without
Stop bit: 1

Protocol: Based on ANSI X3.28 subcategory 2.5 B1

Maximum connections: 1 point

10.2 Product Specifications

■ Indication lamp

Number of indicates: 3 points

Indication contents:
- Operation state indication (1 point)
  - When normal (RUN): A green lamp is on
  - Self-diagnostic error (FAIL): A green lamp flashes
  - Instrument abnormality (FAIL): A red lamp is on
- Communication state indication (2 points)
  - During data send or receive (RX1/TX1): A green lamp is on
  - During data send or receive (RX2/TX2): A green lamp is on

■ Self-diagnostic function

Function stop: Data back-up error (Error code 2)

Action stop (Error number is not displayed [Operation: Impossible]):
Power supply voltage monitoring
Watchdog timer

Instrument status: Display: A green lamp flashes (Self-diagnostic error)
A red lamp is on (Instrument abnormality)

■ Power

Power supply voltage: 21.6 to 26.4 V DC [Including power supply voltage variation]
(Rating 24 V DC)

Power consumption (at maximum load):
30 mA max. (at 24 V DC)
Rush current: 10 A or less

■ Standard

Safety standards: UL: UL61010-1
cUL: CAN/CSA-C22.2 No. 61010-1

CE marking: LVD: EN61010-1
OVERVOLTAGE CATEGORYII,
POLLUTION DEGREE 2,
Class II (Reinforced insulation)
EMC: EN61326

C-Tick: AS/NZS CISPR 11 (equivalent to EN55011)

■ General specifications

Insulation resistance: 20 MΩ or more at 500 V DC (Between each insulation block)

Withstand voltage:

Time: 1 min.	①	②	③
①Grounding terminal			
②Power terminal	750 V AC		
③COM. PORT1, COM. PORT2	750 V AC	750 V AC	
④COM. PORT3, COM. PORT4	750 V AC	750 V AC	750 V AC

Power failure: A power failure of 4 ms or less will not affect the control action.

Memory backup: Backed up by non-volatile memory (FRAM)
Number of writing: Approx. 10,000,000,000 times or more
Data storage period: Approx. 10 years

Allowable ambient temperature: −10 to +50 °C

Allowable ambient humidity: 5 to 95 % RH
(Absolute humidity: MAX.W.C 29.3 g/m^3 dry air at 101.3kPa)

Installation environment conditions:
Indoor use
Altitude up to 2000 m

Transportation and Storage environment conditions:
Vibration:
- Amplitude: < 7.5 mm (2 to 9 Hz)
- Acceleration: < 20 m/s^2 (9 to 150 Hz)

Each direction of XYZ axes

Shock: Height 800 mm or less
Temperature:
- At storage: −25 to +70 °C
- At transport: −40 to +70 °C

Humidity: 5 to 95 % RH (Non condensing)
Storage period: Within the warranty period

Mounting and Structure: Mounting method: DIN rail mounting or Panel mounting
Case material: PPE [Flame retardancy: UL94 V-1]
Panel sheet material: Polyester

Weight: Terminal type module: Approx. 110 g

■ Isolation between Inputs and Outputs

▬ : Isolated
—— : Not isolated

Power supply
COM. PORT1
COM. PORT2
COM. PORT3
COM. PORT4
Communication

The first edition: AUG. 2006 [IMQ00]

www.rkc-usa.com RKC (800) 576 - 6308
Distributed By FLW Inc,