Instruction manual

JCS, R, D-33A (C5)

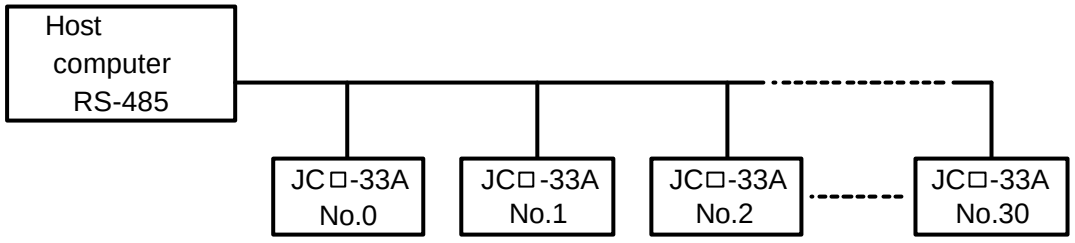
To prevent accidents arising from the misuse of this controller, please ensure the operator using it receives this manual.

⚠ Warning

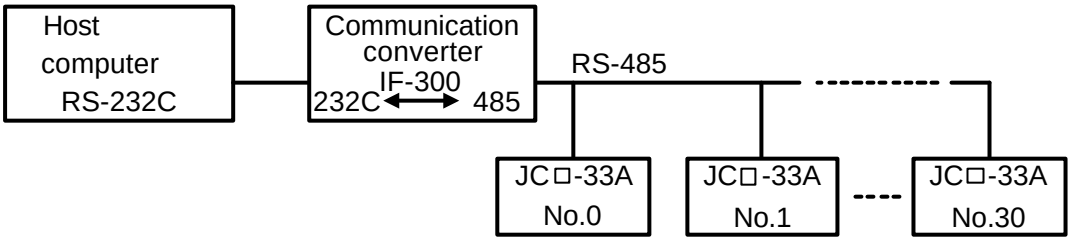
Turn the power supply to the instrument OFF before wiring or checking. Working or touching the terminal with the power switched ON may result in Electric Shock which may cause severe injury or death.

1. System configuration

RS-485 Multi-drop connection communication (Option: C5)



(Fig.1-1)



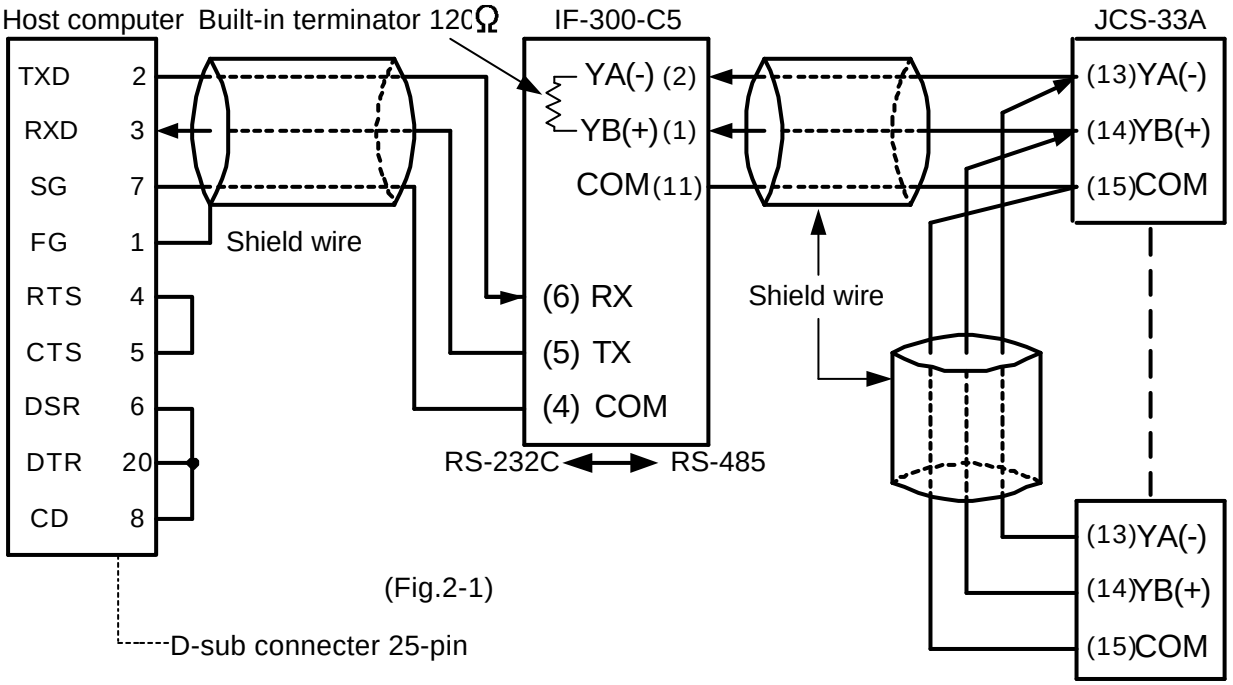
(Fig.1-2)

Wiring connection

When communication converter IF-300-C5 (RS-232C) is used

• Connector: D-sub connector 25-pin

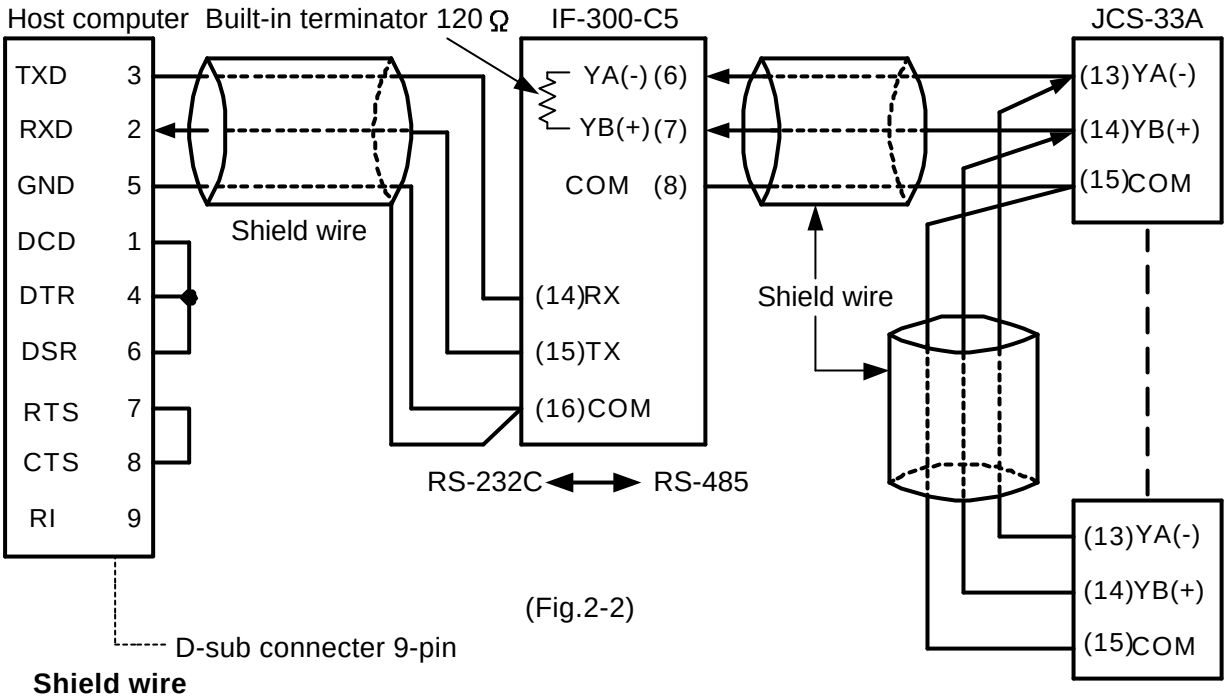
Connection: RS-232C ⟷ RS-485 (Data transfer rate: 2400, 4800, 9600, 19200bps)



(Fig.2-1)

• Connector: D-sub connector 9-pin

Connection: RS-232C ⟷ RS-485 (Data transfer rate: 2400, 4800, 9600, 19200bps)



(Fig.2-2)

Shield wire

Connect only one side of the shield wire to the FG or GND terminal so as not to allow current to flow into the shield section.

If both sides of the shield section are connected to the FG or GND terminal, closed circuit will be made between the shield wire and the ground.

As a result of this, current will run in the shield wire and **the current may cause noise.**

Never fail to ground FG or GND terminal.

Terminator

Do not connect terminator onto the communication line, because each of the JCS-33A, JCR-33A and JCD-33A has a built-in terminator.

IF-300-C5 (sold separately) is available as a communication converter.

3. Setting the instruments

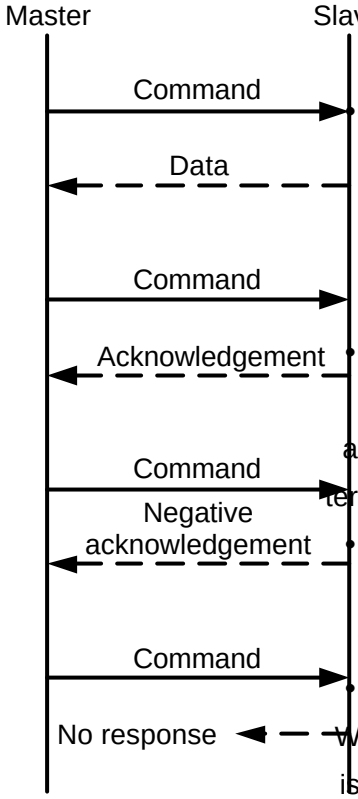
• It is necessary to set the instrument number individually to the instruments when plural units are connected in serial communication (Option: C5).

Select the data transfer rate of the JC □eries in accordance with that of the host computer.

• Refer to the JCS-33A, JCR-33A and JCD-33A instruction manual as for instrument number setting and transfer rate selection.

4. Communication procedure

Communication starts with command transmission of the host computer (hereafter Master) and ends with the response of the JCS-33A, JCR-33A and JCD-33A (hereafter Slave).



Response with data

When the Master sends reading command, the Slave returns the corresponding setting value or current action status as a response.

Acknowledgement

When the Master sends setting command, the Slave returns the acknowledgement as a response after the processing is terminated.

Negative acknowledgement

When the Master sends non-existent command or value out of the setting range, the Slave returns the negative acknowledgement.

No response

When global address is set or either of framing error and checksum is detected, the Slave will not respond to the Master.

(Fig.4-1)

Communication timing of the RS-485 (Option: C5)

Slave side;

When a slave starts transmission to RS-485 communication line, the JC□ series is arranged so as to provide **1 character transmission period or more** of idle status (mark status) before sending the response to ensure the synchronization on the receiving side.

The JC □series is arranged so as to disconnect the transmitter from the communication line **within the period of 1 character transmission** after sending the response.

Master side (Notice of making a program);

Set the program so that the host computer can provide **1 character transmission period or more of idle status** (mark status) before sending the command to ensure the synchronization on the receiving side when the host computer starts the transmission to RS-485 communication line.

Set the program so that the host computer can disconnect the transmitter from the communication line **within the period of 1 character transmission** after sending the command in preparation for reception of the response from the JC □eries.

To avoid the collision of transmissions between the host computer and the JC □series, send the next command after checking that the host computer received the response.

When the host computer communicates with the J□ series through the line converter (IF-300-C5), it is not required to manage the transmission timing described above, because the converter takes the timing interpreting the protocol automatically.

5. Shinko protocol

5.1 Command configuration

All commands are written in ASCII. The data (setting value, decimal number) is converted to Hexadecimal. ASCII is used for the command.

Negative numbers are represented by the 2's complement.

(1) Setting command

Header (02H)	Address	Sub address (20H)	Command type (50H)	Data item	Data	Checksum	Delimitter (03H)
1	1	1	1	4	4	2	1

← Number of characters

(Fig. 5.1-1)

(2) Reading command

Header (02H)	Address	Sub address (20H)	Command type(20H)	Data item	Checksum	Delimitter (03H)
1	1	1	1	4	2	1 ←

Number of characters

(Fig. 5.1-2)

(3) Response with data

Header (06H)	Address	Sub address (20H)	Command type(20H)	Data item	Data	Checksum	Delimitter (03H)
1	1	1	1	4	4	2	1 ←

Number of characters

(Fig. 5.1-3)

(4) Acknowledgement

Header (06H)	Address	Checksum	Delimitter (03H)
1	1	2	1 ←

Number of characters

(Fig. 5.1-4)

(5) Negative acknowledgement

Header (15H)	Address	Error code	Checksum	Delimiter (03H)
1	1	1	2	1 ←

Number of characters

(Fig. 5.1-5)

Header : Control code that represents the beginning of the command or response.
ASCII is used.
Setting command, Reading command : (02H) fixed
Response with data, Acknowledgement : (06H) fixed
Negative acknowledgement : (15H) fixed

Address : Numbers with which a master discerns slaves.
Instrument number 0 to 94 (20H to 7EH) and **Global address** 95 (7FH)
The numbers are used by giving 20H of bias, because 00H to 1FH are used for control code.
95 (7FH) is called **Global address**, which is used when the same command is sent to all the slaves connected. However, the response is not returned.

Sub address : (20H) fixed

Command type : Code to discern Setting command (50H) and Reading command (20H)

Data item : Data classification for the command object
Composed of hexadecimal 4 digits (Refer to the Communication command table.)

Data : The contents of Data (setting value) differ depending on the setting command
Composed of hexadecimal 4 digits (Refer to the Communication command table.)

Checksum : 2-character data to detect communication errors

Delimiter : Control code to indicate the end of command (03H) fixed

Error code : Indicates error type Composed of hexadecimal 1 digit
1 (31H)-----Non-existent command
2 (32H)-----Not used
3 (33H)-----Out of the setting value range
4 (34H)-----Status unable to set (e.g. AT is performing)
5 (35H)-----In setting mode by key operation

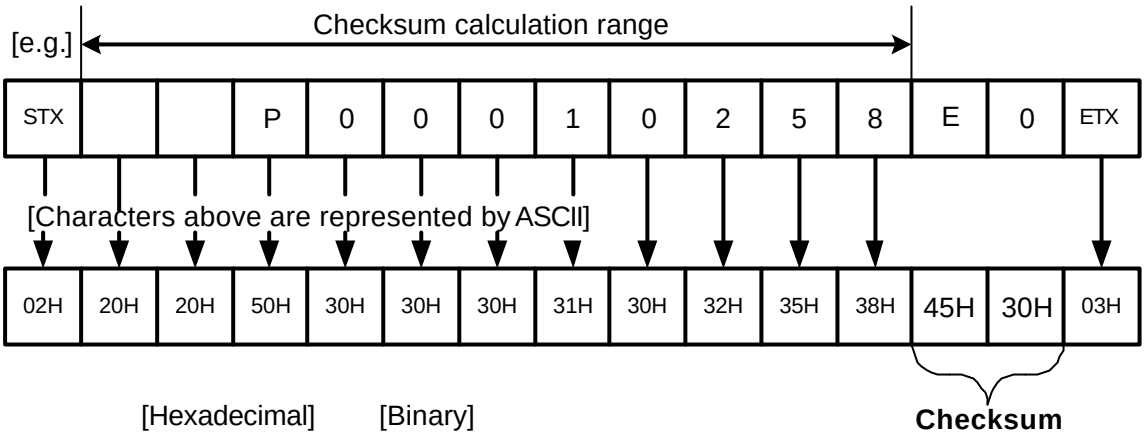
5.2 Checksum calculation

Checksum is used for detecting received command or data errors.
Make a program for the host computer side as well to calculate the checksum of the response data from the slaves so that the communication errors can be checked.

The checksum range is from the address (instrument number) up to the character before the checksum. Adding up all the character codes in the range, obtain 2's complement to the total value, and then describe it in hexadecimal number.
The lower 2-digit of the total value shown by the hexadecimal number is described by ASCII, that is checksum.

Checksum calculation example for setting the Main setting value: 600℃ (0258H) with the Address (instrument number): 0 (20H) is shown as follows.

- 1's complement: Make each bit of binary 0 and 1 reverse.
- 2's complement: Add 1 to 1's complement.



[Hexadecimal]	[Binary]
20H	0010 0000
20H	0010 0000
50H	0101 0000
30H	0011 0000
30H	0011 0000
30H	0011 0000
31H	0011 0001
30H	0011 0000
32H	0011 0010
35H	0011 0101
+ 38H	0011 1000
10	0010 0000

[1's complement] 1101 1111
\+ 1
[2's complement] 1110 0000
[Hexadecimal] E 0
[ASCII] 45H 30H
Checksum

5.3 Command contents

Notice of setting and reading command

- Possible to set the setting value by setting command of the communication function even if the setting value is locked
- Even if the option is not applied, it is possible to set it by the setting command, however, the contents of the command is ineffective.
- The setting value can be extended around 1,000,000 times before the memory expires. If the number of setting times exceeds the limit, it cannot memorize data. So frequent transmission via communication is not recommended.
- When connecting plural JC □eries, instrument numbers (address) must not be duplicated.
- When sending a command by Global address [95 (7FH)], the same command is sent to all the slaves connected. However, the response is not returned to the Master.
- The instrument number and data transfer rate of the JC □eries cannot be set by communication.

Setting command

- The settable range is the same as the one in the case of key operation. Refer to the communication command table of this manual as for communication command.
- All commands are written in ASCII.
- The data (setting value) is converted from decimal to a hexadecimal number, and ASCII is used. Negative numbers are represented by 2's complement. When the data (setting value) has a decimal point, use the whole number as response omitting decimal point.

Reading command

- All commands are written in ASCII.
- The data (setting value) is converted from decimal to hexadecimal number, and ASCII is used. Negative number is represented by 2's complement. When the data (setting value) has a decimal point, it returns the whole number with the decimal point omitted.

6. Modbus protocol

6.1 Transmission mode

There are 2 transmission modes (ASCII mode and RTU mode) in Modbus protocol.

[ASCII mode]

Hexadecimal (0 to 9 A to F), which is divided to MSD (4-bit) and LSB (4-bit) out of 8-bit binary

data in command is transmitted as ASCII characters.

Data structure Start bit : 1 bit
Data bit : 7-bit
Parity bit : Even/ None/ Odd (Selectable)
Stop bit : 1 bit/ 2-bit (Selectable)
Error detection: LRC (Longitudinal redundancy check)
Data interval : 1 second or less

[RTU mode]

8-bit binary data in command is sent as it is.

Data structure Start bit : 1 bit
Data bit : 8-bit
Parity bit : Even/ None/ Odd (Selectable)
Stop bit : 1 bit/2-bit (Selectable)
Error detection: CRC-16 (Cyclic redundancy check)
Data interval : 3.5 characters transmission time or less

6.2 Message configuration

ASCII mode message is configured to start by [: (colon)(3AH)] and end by [CR (carriage return) (0DH) + LF (Line feed)(0AH)]. (Fig. 6.2-1)

(Fig. 6.2-1)

Header (:)	Slave address	Function code	Data	Error check LRC	Delimiter (CR)	Delimiter (LF)

RTU mode is configured to start after idle time processing more than 3.5 character transmission time and end after idle time processing more than 3.5 character transmission time (Fig. 6.2-2)

(Fig. 6.2-2)

3.5 idle characters	Slave address	Function code	Data	Error check LRC	3.5 idle characters

6.3 Slave address

Slave address is set within the range 0 to 95 by the individual instrument number of slave side.
The master identifies slaves by the slave address of the requested message.
The slaves inform the master which slave is responding to the master adding their own slave address to the response message.
(Slave address 0, broadcast address can identify all the slaves. However slaves do not respond.)

6.4 Function code

The function code is the command code what action to take. (Table 6.4-1)

(Table 6.4-1)

Function code	Contents
03 (03H)	Reading setting value and information of slaves
06 (06H)	Setting to slaves

Function code is used as a pointer whether it is a normal response (acknowledgement) or an error (negative acknowledgement) when the Slave returns responsive message to the Master.
When acknowledgement is returned, original function code is returned with its response.
When negative acknowledgement is returned, MSD of the original function code with 1 is returned.
(For example, when the Master sends request message setting 10H to function code by mistake, Slave returns 90H setting 1 to the MSD, because it is illegal function.)
For negative acknowledgement, abnormal code (Table 6.4-2) below is set to the data of response message and returned to the Maser in order to inform it that what kind of error has occurred.

(Table 6.4-2)

Abnormal code	Contents
1 (01H)	Illegal Function (Non-existent function)
2 (02H)	Illegal data address (Non-existent data address)
3 (03H)	Illegal data value (Value out of the setting range)
17 (11H)	Shinko error code 4 (Unsettable status)
18 (12H)	Shinko error code 5 (During setting by key operation mode, etc)

6.5 Data

Data differs depending on the function code.
A request message from master side is composed of data item, number of data and setting data.
A response message is composed of number of bytes, data and abnormal code in negative acknowledgement from slave side. Effective range of data is -32768 to 32767 (8000H to 7FFFH).

6.6 Error check

Error check differs depending on the type of transmission mode.

[ASCII mode]

After calculating LRC (Longitudinal redundancy check) from slave address to data section, calculated 8-bit data is converted to ASCII 2 characters and they are added to the end of data.

How LRC is calculated,

(1) Create a message in RTU mode.
(2) Add the start data (slave address) to the end of data. --X
(3) Complement X (bit reverse). --X
(4) Add 1 (X=X+1)
(5) Add X as an LRC to the end of the message.
(6) Convert the whole data to ASCII characters.

[RTU mode]

After calculating CRC-16 (cyclic redundancy checksum) from slave address to data section, calculated 16-bit data is added to the end of data in the order of LSB and MSD

How CRC is calculated,

In the CRC system, the information to be transmitted is divided by a generating polynomial, the resulting remainder being added to the data. The generation polynomial is as follows.
($X^{16} + X^{15} + X^2 + 1$)
(1) Initialize the CRC-16 data (assumed as X) (FFFFH)
(2) Exclusive logical sum (EX-OR) between data 1 and X ⟶X
(3) Shift X 1 bit to the right ⟶X
(4) When a carry is generated, take A001H and EX-OR. If not, go to 5.⟶X
(5) Repeat (3) and (4) until shifting 8 times.
(6) EX-OR between the next data and X ⟶X
(7) Same as (3) to (5).
(8) Repeat up to the last data.
(9) Create a message in the sequence from lower to upper orders of the calculated 16-bit data (X).

6.7 Message example

[ASCII mode]

(1) Reading of the instrument number (address) 1 and SV

• A request message from the master side

Header	Slave address	Function code	Data item	Number of data	Error check LRC	Delimiter
(:)	(01H)	(03H)	(0001H)	(0001H)	(FAH)	(CR • ELF)
1	2	2	4	4	2	2 ← Number of characters

(Fig. 6.7-1)

• A response message from slave side in normal status (When SV=100℃)

Header	Slave address	Function code	Number of response bytes	Data	Error check LRC	Delimiter
(:)	(01H)	(03H)	(02H)	(0064H)	(96H)	(CR • ELF)
1	2	2	2	4	2	2 ← Number of characters

(Fig. 6.7-2)

• A response message from slave side in abnormal status (When data item is mistaken)

Header	Slave address	Function code	Abnormal code	Error check LRC	Delimiter
(• F)	(01H)	(83H)	(02H)	(7AH)	(CR • ELF)
1	2	2	2	4	2 ← Number of characters

(Fig. 6.7-3)

1 is set to the MSD of function code for response message in abnormal status. (83H)
An abnormal code (02H: Illegal data address) is returned as a content of error.

(2) Setting (Address 1, SV=100℃)

• A request message from master side

Header	Slave address	Function code	Data item	Data	Error check LRC	Delimiter
(• F)	(01H)	(06H)	(0001H)	(0064H)	(94H)	(CR • ELF)
1	2	2	4	4	2	2 ← Number of characters

(Fig. 6.7-4)

• A response message from slave side in normal status

Header	Slave address	Function code	Data item	Data	Error check LRC	Delimiter
(•F)	(01H)	(06H)	(0001H)	(0064H)	(94H)	(CR •ELF)
1	2	2	4	4	2	2 ← Number of characters

(Fig. 6.7-5)

• A response message from slave side in abnormal status
(When a value out of the setting range is set.)

Header	Slave address	Function code	Abnormal code	Error check LRC	Delimiter
(•F)	(01H)	(86H)	(03H)	(76H)	(CR •ELF)
,P	,Q	,Q	,Q	,S	,Q ← Number of characters

(Fig. 6.7-6)

1 is set to the MSD of function code for response message in abnormal status. (86H)
An abnormal code (03H: A value out of the setting range) is returned as a content of error.

[RTU mode]

(3) Reading (Address1, SV)

• Request message from the master side

3.5 idle characters	Slave address	Function code	Data item	Number of data	Error check CRC	3.5 idle characters
	(01H)	(03H)	(0001H)	(0001H)	(D5CAH)	
	1	1	2	2	2 ← Number of characters	

(Fig. 6.7-7)

• Response message of slave side in normal status (When SV=100℃)

3.5 idle characters	Slave address	Function code	Number of response bytes	Data	Error check CRC	3.5 idle characters
	(01H)	(03H)	(02H)	(0064H)	(B9AFH)	
	1	1	1	2	2 ← Number of characters	

(Fig. 6.7-8)

• Response message of slave in abnormal status (When data item is mistaken)

3.5 idle characters	Slave address	Function code	Abnormal code	Error check CRC	3.5 idle characters
	(01H)	(83H)	(02H)	(COF1H)	
	1	1	1	2 ← Number of characters	

(Fig. 6.7-9)

1 is set to the MSD of function code for response message in abnormal status. (83H)
An abnormal code (02H: Illegal data address) is returned as a content of error.

(4) Setting (Address 1, SV=100℃)

• Request message from master side

3.5 idle characters	Slave address	Function code	Data item	Data	Error check CRC	3.5 idle characters
	(01H)	(06H)	(0001H)	(0064H)	(D9E1H)	
	1	1	2	2	2 ← Number of characters	

(Fig. 6.7-10)

• Response message of slave in normal status

3.5 idle characters	Slave address	Function code	Data item	Data	Error check CRC	3.5 idle characters
	(01H)	(06H)	(0001H)	(0064H)	(D9E1H)	
	1	1	2	2	2 ← Number of characters	

(Fig. 6.7-11)

• Response message in abnormal status (When a value out of the setting range is set)

3.5 idle characters	Slave address	Function code	Abnormal code	Error check CRC	3.5 idle characters
	(01H)	(86H)	(03H)	(0261H)	
	1	1	1	2 ← Number of characters	

(Fig. 6.7-12)

1 is set to the MSD of function code for response message in abnormal status. (86H)
An abnormal code (03H: A value out of the setting range) is returned as an content of error.

7. Communication command table

When the data (setting value) has a decimal point, remove the decimal point and represent it as a whole number, then describe the whole number in hexadecimal number.

Shinko standard command type	Modbus function code	Data item	Data
20H/50H	06H/03H	0001H: SV1	Setting value
20H/50H	06H/03H	0002H: Not used	
20H/50H	06H/03H	0003H: AT setting	0: Cancel 1: Perform
20H/50H	06H/03H	0004H: OUT1 proportional band setting	Setting value
20H/50H	06H/03H	0005H: OUT2 proportional band setting	Setting value
20H/50H	06H/03H	0006H: Integral time setting	Setting value
20H/50H	06H/03H	0007H: Derivative time setting	Setting value
20H/50H	06H/03H	0008H: OUT1 proportional cycle setting	Setting value
20H/50H	06H/03H	0009H: OUT2 proportional cycle setting	Setting value
20H/50H	06H/03H	000AH: Not used	
20H/50H	06H/03H	000BH: A1 setting	Setting value
20H/50H	06H/03H	000CH: A2 setting	Setting value
20H/50H	06H/03H	000DH: Not used	
20H/50H	06H/03H	000EH: Not used	
20H/50H	06H/03H	000FH: HB (Heater burnout alarm setting)	Setting value
20H/50H	06H/03H	0010H: LA(Loop break alarm time setting)	Setting value
20H/50H	06H/03H	0011H: LA(Loop break alarm span setting)	Setting value
20H/50H	06H/03H	0012H: Setting value lock selection (*1)	0: Unlock 2: Lock 2 1: Lock 1 3: Lock 3
20H/50H	06H/03H	0013H: SV high limit setting	Setting value
20H/50H	06H/03H	0014H: SV low limit setting	Setting value
20H/50H	06H/03H	0015H: Sensor correction value setting	Setting value
20H/50H	06H/03H	0016H: Overlap/ Dead band setting	Setting value
20H/50H	06H/03H	0017H: Not used	
20H/50H	06H/03H	0018H: Scaling high limit setting	Setting value
20H/50H	06H/03H	0019H: Scaling low limit setting	Setting value
20H/50H	06H/03H	001AH: Decimal point place selection	0: XXXX (No decimal point) 1: XXX.X(1 digit after decimal point) 2: XX.XX(2 digit after decimal point) 3: X.XXX(3 digit after decimal point))
20H/50H	06H/03H	001BH: PV filter time constant setting	Setting value
20H/50H	06H/03H	001CH: OUT1 high limit setting	Setting value
20H/50H	06H/03H	001DH: OUT1 low limit setting	Setting value
20H/50H	06H/03H	001EH: OUT1 ON/OFF action hysteresis setting	Setting value
20H/50H	06H/03H	001FH: OUT2 action mode selection	0: Air cooling 1: Oil cooling 2: Water cooling
20H/50H	06H/03H	0020H: OUT2 high limit setting	Setting value
20H/50H	06H/03H	0021H: OUT2 low limit setting	Setting value
20H/50H	06H/03H	0022H: OUT2 ON/OFF action hysteresis	Setting value
20H/50H	06H/03H	0023H: A1 action type selection (*2) 0024H: A2 action type selection (*2)	0: No alarm action 1: High limit alarm 2: Low limit alarm 3: High/Low limits alarm 4: High/Low limit range alarm 5: Process high alarm 6: Process low alarm 7: High limit alarm w/standby 8: Low limit alarm w/standby 9: High/Low limits alarm

			w/standby
20H/50H	06H/03H	0025H: A1 action hysteresis setting	Setting value
20H/50H	06H/03H	0026H: A2 action hysteresis setting	Setting value
20H/50H	06H/03H	0027H: Not used	
20H/50H	06H/03H	0028H: Not used	
20H/50H	06H/03H	0029H: A1 action delayed timer setting	Setting value
20H/50H	06H/03H	002AH: A2 action delayed timer setting	Setting value
20H/50H	06H/03H	002BH: Not used	
20H/50H	06H/03H	0036H: Not used	
20H/50H	06H/03H	0037H: OUT/OFF selection	0: OUT 1: OFF
20H/50H	06H/03H	0038H: Auto/Manual control	0: Automatic control 1: Manual control
20H/50H	06H/03H	0039H: Manual manipulated variable	Setting value
20H/50H	06H/03H	003AH: Not used	
20H/50H	06H/03H	003FH: Not used	
20H/50H	06H/03H	0040H: A1 action Energized/Deenergized	0: Energized 1: Deenergized
20H/50H	06H/03H	0041H: A2 action Energized/Deenergized	0: Energized 1: Deenergized
20H/50H	06H/03H	0042H: Not used	
20H/50H	06H/03H	0043H: Not used	
20H/50H	06H/03H	0044H: Input type selection	0: K [-200 to 1370℃] 1: K [-199.9 to 400.0℃] 2: J [-200 to 1000℃] 3: R [0 to 1760℃] 4: S [0 to 1760℃] 5: B [0 to 1820℃] 6: E [-200 to 800℃] 7: T [-199.9 to 400.0℃] 8: N [-200 to 1300℃] 9: PL-Ⅱ [0 to 1390℃] 10: C (W/Re5-26) [0 to 2315℃] 11: Pt100 [-199.9 to 850.0℃] 12: JPt100 [-199.9 to 500.0℃] 13: Pt100 [-200 to 850℃] 14: JPt100 [-200 to 500℃] 15: K [-320 to 2500℉] 16: K [-199.9 to 750.0℉] 17: J [-320 to 1800℉] 18: R [0 to 3200℉] 19: S [0 to 3200℉] 20: B [0 to 3300℉] 21: E [-320 to 1500℉] 22: T [-199.9 to 750.0℉] 23: N [-320 to 2300℉] 24: PL-Ⅱ [0 to 2500℉] 25: C (W/Re5-26) [0 to 4200℉] 26: Pt100 [-199.9 to 999.9℉] 27: JPt100 [-199.9 to 900.0℉] 28: Pt100 [-300 to 1500℉] 29: JPt100 [-300 to 900℉] 30: 4 to 20mA DC [-1999 to 9999] 31: 0 to 20mA DC [-1999 to 9999] 32: 0 to 1V DC [-1999 to 9999] 33: 0 to 5V DC [-1999 to 9999] 34: 1 to 5V DC [-1999 to 9999] 35: 0 to10V DC [-1999 to 9999]
20H/50H	06H/03H	0045H: Direct/Reverse action selection	0: Heating (Reverse action) 1: Cooling (Direct action)
20H/50H	06H/03H	0046H: Not used	
20H/50H	06H/03H	0047H: AT bias setting	Setting value
20H/50H	06H/03H	0048H: ARW (anti reset windup) setting	Setting value

20H/50H	06H/03H	006FH: Key LOCK selection	0: Key enabled 1: LOCK
50H	03H	0070H: Key operation change flag clearing	0: No action 1: All clearing
20H	06H	0080H: PV (input) value reading	Present PV (input) value
20H	06H	0081H: OUT1 MV reading	Setting value
20H	06H	0082H: OUT2 MV reading	Setting value
20H	06H	0083H: Not used	
20H	06H	0084H: Not used	
20H	06H	0085H: OUT status reading	0000 0000 0000 0000 2^{15} to 2^{0} 2^0 digit: OUT1 0: OFF 1: ON 2^1 digit: OUT2 2^2 digit: A1output 0: OFF 1: ON 2^3 digit: A2 output 0: OFF 1: ON 2^4 digit: Not used (Always 0) 2^5 digit: Not used (Always 0) 2^6 digit: HB(Heater burnout alarm output) 0: OFF 1: ON (When sensor burnout 0: OFF) 2^7 digit: LA(Loop break alarm output) 0: OFF 1: ON 2^8 digit: Overscale 0: OFF 1: ON 2^9 digit: Underscale 0: OFF 1: ON 2^{10} digit: OUT/OFF selection 2^{11} digit: AT/ AT reset is active 0: OFF 1: ON 2^{12} digit: OFF key selection 0: OFF 1: MANU 2^{13} digit: Not used (Always 0) 2^{14} digit: Auto/Manual control 0: Auto 1: MANU 2^{15} digit: Key operation change 0: No 1: Yes
20H	06H	0086H: Not used	
20H	06H	0087H: Not used	
20H	06H	00A0H: Not used	
20H	06H	00A1H: Instrument info reading	0000 0000 0000 0000 2^{15} to 2^{0} 2^0 digit: Not used (Always 0) 2^1 digit: Cooling function 0: No 1: Yes 2^2 digit: A1 function 0: No 1: Yes 2^3 digit: A2 function 0: No 1: Yes 2^4 digit: Not used (Always 0) 2^5 digit: Not used (Always 0) 2^6 digit: Heater burnout alarm 0: No 1: Yes 2^7 digit: LA (Loop break alarm) 0: No 1: Yes 2^8 to 2^{15} digit: Not used (Always 0)

(*1) When Lock 3 is designated, the setting data is not saved in memory.
This is why the setting value reverts to the previous value before Lock 3 when power is turned OFF.

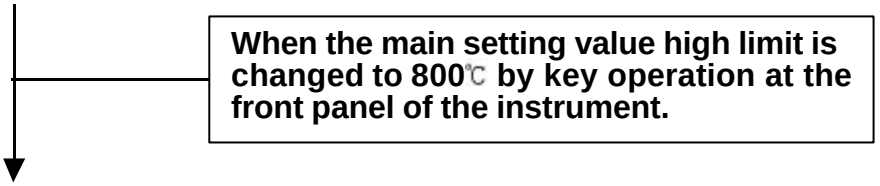
(*2) When alarm action type is changed, the alarm setting values reverts to the one when this instrument is shipped and alarm output status is initialized too.

*** Notice**

When data setting is changed by key operation at the front panel of the instrument, the data that is related to the changed item is also changed automatically as shown the example 1 below.

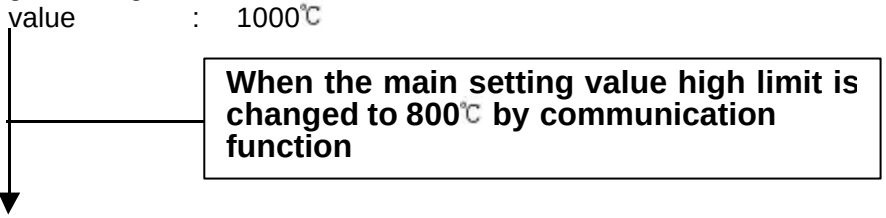
However, when the data setting is changed by communication function, the related data does not change as shown the example 2 below. (Only the changed data changes.)

(Example 1) Main setting value high limit: 1370℃
Main setting value : 1000℃



Both main setting value high limit and main setting value are changed to 800℃

(Example 2) Main setting value high limit: 1370℃
Main setting value : 1000℃



Main setting value high limit is 800℃ but main setting value keeps the same temperature (1000℃)

8. Specifications

Communication	: Half-duplex
Data transfer rate	: 9600bps (2400, 4800, 9600, 19200bps) Selectable by key operation
Synchronous system	: Start-stop synchronous
Code form	: ASCII
Error correction	: Command request repeat system
Error detection	: Parity check, Checksum
Data format	Start bit: 1 Data bit: 7 Parity : Even Stop bit: 1

9. Troubleshooting

If any malfunction occurs, refer to the following items after checking if the power is supplied to the host computer and the JC □series.

• Phenomenon: If it is unable to communicate,

Check the following
The connection or wiring of communication is securely done.
Burnout or imperfect contact on the communication cable and the connector.
Data transfer rate of the JC □series coincides with that of the host computer.
Whether the data bit, parity and stop bit of the host computer accord with those of the J□ series.
The instrument number of the JC□ series coincides with that of the command.
The instrument numbers are duplicated in multiple JC□ series.
When communicating by RS-485 (option: C5) without IF-300-C5 (communication converter), make sure that the program is proper for the transmission timing.

• Phenomenon: Though it is able to communicate, 'NAK' is responded.

Check the following
The command code is surely existent or not.
Whether the setting command exceeds the setting range or not.
In the case of the situation being unable to set (such as AT of J□ series performing)
Whether the operation mode is under the setting mode by the key operation

• If you have any inquiries, please consult our agency or the shop where you purchased the unit.

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