HYBRID RECORDER

HR-700

COMMUNICATION COMMAND MANUAL

Shinko

1. INTRODUCTION

1.1 General Description

This instruction manual describes the communication command of the HR-700 Recorder. Please refer to the instruction manual for the transmission of the measurement data, setup of communication and wiring.

Modbus RTU protocol as well as Original protocol can be used from version 4.00.

Contents	Wiring and communication procedure	Request measurement value	Setting of the recorder	Control of the recorder
HR-700 Hybrid Recorder instruction manual	O	O		
HR-700 Hybrid Recorder Communication Command manual			O	O

O: Please refer to the corresponding manual.

1.2 Difference between RS-485 and RS-232C

There is no difference between RS-232C and RS-485 with respect to the communication command in this recorder. However, wiring and signal levels may differ.

1.3 Basic item about the Original protocol command

The communication command consists of a command distinction code, a parameter, delimiter (comma), and terminator. The format of the command is as follows.

(Example) SR02 VOLT, 200mV, 0, 20000 (terminator)

Command distinction code:

    This code is defined by two capital letters. (e.g. SR)

    If the command needs a channel number, the channel number is described after the distinction code.

Parameter:

    Each parameter is divided by a comma.

    All the setting values are shown with an integer. (The plus sign can be omitted.)

    The space character in the input parameter is ignored. However, the space character in the unit code, the comment printout code and the tag printout code are not ignored. Parameters can be omitted unless the parameters are varied. However, the comma (,) cannot be omitted. Commas which come before the terminator can be omitted.

    (Example) SR02, VOLT␣␣␣ (CR)(LF)

                  ——————— Can be omitted.

    The date parameter, the time parameter and the channel number parameter have fixed length. Different length of these parameters may cause errors.

        (1) Date YY/MM/DD (8 characters)

        (2) Time HH:MM:SS (8 characters)

        (3) Channel Number: $_{CH}XX$ (2 characters)

1.4   Basic item about the Modbus RTU protocol

Modbus protocol is a communication protocol which was developed for PLC by Modicon Inc. (AEG Schneider Automation International SAS), and is listed in the protocol specification (PI-MBUS-300 Rev.J). Regarding the Modbus protocol specification, refer to the protocol specification (PI-MBUS-300 Rev.J).

In this manual, we describe the function codes and data contents of Modbus protocol which can be used for the recorder.

2. ORIGINAL PROTOCOL – DATA RECEPTION

2.1   Setup command

2.1.1   Setup command list

Table 2.1.1 Setup command list

Command	Setting item	Number of parameters	Contents of parameter
SR	Setting the range	MAX 7	Channel, Mode, Range (Reference Channel) Span lower limit value Span upper limit value Scaling lower limit value Scaling upper limit value
SA	Setting the Alarm	7	Channel Alarm level Alarm ON/OFF Alarm type, Alarm set point Relay ON/OFF, Relay No.
SN	Setting the Unit	2	Channel, Unit
SC	Setting the Chart Speed	1	1st Chart speed
SD	Setting the Date/Time	2	Date, time
SF	Setting the Digital Print	2	Channel Digital print ON/OFF
ST	Setting the Tag	2	Channel, Tag characters
SG	Setting the Comment	2	Comment number Comment characters
SZ	Setting the Zone recording	3	Channel Left end position Right end position
SP	Setting the Partial Compression/Expansion recording	4	Channel, Partial ON/OFF Compression Expansion
SE	Setting the Chart Speed	1	2nd chart speed
SY	Copying the Setting data	2	Channel to copy from Channel to copy to
SS	Setting the recording cycle	1	Recording Cycle (Multipoint type only)

2.1.2 Setting of INPUT RANGE/RECORD SPAN

Sets the input range and record span for each channel as follows.

<Format>

SR(CH), (Mode), (Pr1), (Pr2), (Pr3), (Pr4), (Pr5), (Pr6), (Pr7), (CR)(LF)

    CH: Specify a channel number to set.

    Mode: Mode setting

    Pr_N: The number of Pr_N varies depending on the contents of the Mode.

(1) Record skip setting

    The record of the specified channel (CH) stops.

    [For the pen type recorder, No. 1 pen (red) is fixed on the left side (approx. 15%) and No. 2 pen (green) on the right side (approx. 85%), respectively.]

    CH: Setting Channel 01 to 06 (01 and 02 for the pen type)

    Mode: SKIP

      Example) SR05,SKIP(CR)(LF)

        The 5th channel doesn't record.

(2) Input range setting of the Voltage, Current, Thermocouple and RTD

    CH: Setting Channel 01 to 06 (01 and 02 for the pen type)

    Mode: VOLT, TC or RTD

    Pr1: Range

    Pr2: Left end (Zero Input Value)   Refer to Table 2.1.2.

    Pr3: Right end (Span Input Value)

      Example）SR02,TC,K,0,3000(CR)(LF)

        The input of the 2nd channel is Thermocouple K, 0.0-300.0℃

(3) Difference/Sum/Mean operation setting.

    CH: Setting Channel 01 to 06 (01 and 02 for the pen type)

    Mode: DELT,SIGM or MEAN

    Pr1: Reference Channel

        ● Choose a smaller channel than CH.

        ● The reference channel must be VOLT, TC, RTD or SCL mode.

    Pr2: Left end (Zero Input Value)

                  Refer to Table 2.1.2.

    Pr3: Right end (Span Input Value)

      Example) SR05,02,DELT,0,3000(CR)(LF)

      The output of the 5th channel shows a difference between the input of the 5th channel and the 2nd channel (CH5-CH2). In this case, the input range of the 5th channel is the same as that of the 2nd channel.

(4) Scaling setting

    CH: Setting Channel 01 to 06 (01 and 02 for the pen type)

    Mode: SCL

    Pr1: VOLT, TC, RTD

    Pr2: Scaling Mode

    Pr3: Left End (Zero Input Value)   Refer to Table 2.1.2.

    Pr4: Right End (Span Input Value)

    Pr5: Scaling Left End

    Pr6: Scaling Right End

    Pr7: Decimal point position (0 to 4)

    Example) SR04,SCL,RTD,PT,0, 3000,0,30000,2(CR)(LF)

> **[CAUTION]**
>
> Pr5 through Pr7 can be omitted. When omitting parameters, three parameters must be omitted simultaneously.

(5) Square Root setting

    CH: Setting Channel 01 to 06 (01 and 02 for the pen type)

    Mode: SQRT

    Pr1: Range (Only VOLT Input)

    Pr2: Left End (Zero Input Value)

    Pr3: Right End (Span Input Value)   Refer to Table 2.1.2.

    Pr4: Scaling Left End

    Pr5: Scaling Right End

    Pr6: Decimal point position (0 to 4)

    Example) SR03,SQRT,mA,400,2000,0,10000,2(CR)(LF)

> **[CAUTION]**
>
> Pr5 through Pr7 can be omitted. When omitting parameters, three parameters must be omitted simultaneously.

(6) Decade setting

    CH: Setting Channel 01 to 06 (01 and 02 for the pen type)

    Mode: DECAD

    Pr1: Range (Only VOLT Input)

    Pr2: Left End (Zero Input Value)

    Pr3: Right End (Span Input Value)   Refer to Table 2.1.2.

    Pr4: Scaling Left End

    Pr5: Scaling Right End

    Example) SR01,DECAD,10mV,0,1000,10E+01,10E+06(CR)(LF)

Table 2.1.2 Setting range

Input Range	Range or Scaling Mode	Zero Input Value (Left End)	Span Input Value (Right End)	Decimal Point (Fixed)	Note
VOLT	10mV	-1000	1000	2	±10mV
	20mV	0	2000	2	0 to 20mV
	50mV	0	5000	2	0 to 50mV
	200mV	-2000	2000	1	±200mV
	1V	-1000	1000	3	±1V
	5V	0	5000	3	0 to 5V
	10V	-10000	10000	2	±10V
	mA	400	2000	2	4 to 20mA
TC	B	0	18200	1	0 to 1820℃
		320	33080	1	32 to 3308℉
	R	0	17600	1	0 to 1760℃
		320	32000	1	32 to 3200℉
	S	0	17600	1	0 to 1760℃
		320	32000	1	32 to 3200℉
	K	-2000	13700	1	-200 to 1370℃
		-3280	24980	1	-328 to 2498℉
	E	-2000	8000	1	-200 to 800℃
		-3280	14720	1	-328 to 1472℉
	J	-2000	11000	1	-200 to 1100℃
		-3280	20120	1	-328 to 2012℉
	T	-2000	4000	1	-200 to 400℃
		-3280	7520	1	-328 to 752℉
	C	0	23200	1	0 to 2320℃
		320	42080	1	32 to 4208℉
	Au-Fe	10	3000	1	1 to 300K
	N	0	13000	1	0 to 1300℃
		320	23720	1	32 to 2372℉
	PR40-20	0	18800	1	0 to 1880℃
		320	34160	1	32 to 3416℉
	PL-Ⅱ	0	13900	1	0 to 1390℃
		320	25340	1	32 to 2534℉
	U	-2000	4000	1	-200 to 400℃
		-3280	7520	1	-328 to 752℉
	L	-2000	9000	1	-200 to 900℃
		-3280	16520	1	-328 to 1652℉
RTD	Pt100	-2000	6500	1	-200 to 650℃
		-3280	12020	1	-328 to 1202℉
	JPt100	-2000	6300	1	-200 to 630℃
		-3280	11660	1	-328 to 1166℉

Example) When decimal point position is "1", the input value "1000" is recognized as "100.0".

2.1.3 Setting of the Alarm

Sets Alarm for each channel as follows.

<Format>

SA(CH), (LEVEL), (ON/OFF), (TYPE), (VALUE), (RLY ON/OFF), (RLY No.) (CR)(LF)

Item	Contents	Setting Range	Note
CH	Channel number	01 to 06 (multi) 01 to 02 (pen)	
LEVEL	Alarm level	1 to 4	
ON/OFF	Alarm ON/OFF	ON or OFF	Can be omitted.
TYPE	Alarm Type	H：Upper-limit L：Lower-limit	Can be omitted.
VALUE	Set Value		Can be omitted.
RLY ON/OFF	Relay ON/OFF	ON or OFF	Can be omitted.
RLY No.	Relay No.	I01 to I06 (multi) I01 to I03 (pen)	Can be omitted.

The underlined part can be omitted.

2.1.4 Setting of the Unit

Sets the Unit for each channel as follows.

<Format>

SN(CH),(UNIT)(CR)(LF)

  CH: Setting Channel 01 to 06 (01 and 02 for the pen type)

  UNIT: The Unit can be set with cods as shown in Table 2.1.13 (Within 6 characters).

    When you use the code beyond 7F$_{HEX}$, 8-bit data length must be used.

    Please refer to Section 7.2.7 of the instruction manual (HR-700) for the data

    length setting.

2.1.5 Setting of the 1st chart speed

Sets the 1st chart speed as follows.

<Format>

SC (CHART SPEED) (CR) (LF)

  A chart speed is chosen from the following table.

CHART SPEED (Dot printing type)

0	1	2	3	4	5	10	15	20	25
30	40	50	60	75	80	90	100	120	150
160	180	200	240	300	360	375	450	600	720
750	900	1200	1500						

CHART SPEED (Pen type)

5	10	15	20	25	30	40	50	60	75
80	90	100	120	150	160	180	200	240	300
360	375	450	600	720	750	900	1200	1500	1800
2400	3000	3600	4500	4800	5400	6000	7200	9000	10800
12000									

2.1.6 Setting of the date/time

Sets date/time of the internal clock of the recorder as follows.

    \<Format>

        SD(DATE),(TIME)(CR)(LF)

                DATE: YY/MM/DD

                        (YY) Year 00 to 99

                        (MM) Month 01 to 12

                        (DD) Day 01 to 31

                TIME: HH:MM:SS

                        (HH) Hour 00 to 23

                        (MM) Minute 00 to 59

                        (SS) Second 00 to 59

2.1.7 Copying the Setting Data of the channel

The setup data of any channel can be copied to another channel.

    \<Format>

        SY(CHS),(CHD) (CR)(LF)

                CHS: Channel to copy from, 01 to 05 (Only 01 for the Pen type)

                CHD: Channel to copy to (CHS < CHD)

                The number of the channel to be copied must be bigger than the channel to copy from.

2.1.8 Setting of the Printing cycle (Dot printing type only)

Sets Printing cycle of the recorder as follows.

    \<Format>

        SS(PRINTING CYCLE)(CR)(LF)

                PRINTING CYCLE: 10, 20, 30 and 60 (sec.)

2.1.9 Setting of the Zone Recording

Sets Zone Recording of each channel as follows.

    \<Format>

        SZ(CH),(<u>LEFTPOSITION</u>),(<u>RIGHTPOSITION</u>)(CR)(LF)

                CH: Setting Channel 01 to 06 (01 and 02 for the pen type)

                LEFT POSITION: 0 to 95%

                RIGHT POSITION: 5 to 100%

                  The underlined parts can be omitted.

2.1.10 Setting of the Partial Compression/Expansion

Sets Partial Compression/Expansion recording of each channel as follows.

<Format>

SP(CH),(ON/OFF),(BOUNDARY POSITION),(BOUNDARY VALUE)(CR)(LF)

CH: Setting Channel 01 to 06 (01 and 02 for the pen type)

ON/OFF: Partial Compression/Expansion function ON or OFF

BOUNDARY POSITION: 1 to 99%

BOUNDARY VALUE:

CH is VOLT, TC, RTD, DELT, SIGM or MEAN mode: In the span data

CH is SCALE, SQRT, DECAD mode: In the scale data

The underlined part can be omitted.

2.1.11 Setting of the Digital Print ON/OFF

Sets Digital Print ON/OFF of each channel as follows.

<Format>

SF(CH),(ON/OFF)(CR)(LF)

CH: Setting Channel 01 to 06 (01 and 02 for the pen type)

ON/OFF: ON or OFF

2.1.12 Setting of the Tag Character

Sets Tag Character of each channel.

<Format>

ST(CH),(TAG)(CR)(LF)

CH: Setting Channel 01 to 06 (01 and 02 for the pen type)

TAG: The Tag Character can be set with character codes shown in Table 2.1.13.

(Dot printing type is within 7 characters. Pen type is within 5 characters.)

When you use the character code beyond $7F_{HEX}$, 8-bit data length of communication function must be used.

Please refer to Section 7.2.7 of the instruction manual (HR-700) for the data length setting.

2.1.13 Setting of the Comment Character

Sets Comment Character to be printed by the Digital Input.

<Format>

SG(Cn),(COMMENT)(CR)(LF)

Cn: Comment Number(1 to 3)

COMMENT: A Comment Character is set up with the character code shown in Table 2.1.13.

(Dot printing type is within 16 characters. Pen type is within 12 characters.)

When you use the character code beyond $7F_{HEX}$, the data length of communication function must be used as 8 bits.

Please refer to Section 7.2.7 of the instruction manual (HR-700) for the data length setting.

Character Code Table

Table 2.1.13 Character Code Table

	2※	3※	4※	5※	6※	7※	A※	B※	C※	D※	E※	F※
※0	SP	0	@	P		p	0	0		Π		π
※1	!	1	A	Q	a	q	1	1	𝔸	P	α	ρ
※2	"	2	B	R	b	r	2	2	B	Σ	β	σ
※3	#	3	C	S	c	s	3	3	Γ	T	γ	τ
※4	$	4	D	T	d	t	4	4	△	Y	δ	υ
※5	%	5	E	U	e	u	5	5	E	Φ	ε	φ
※6	&	6	F	V	f	v	6	6	Z	X	ζ	χ
※7	'	7	G	W	g	w	7	7	H	Ψ	η	ψ
※8	(	8	H	X	h	x	8	8	Θ	Ω	θ	ω
※9	)	9	I	Y	i	y	9	9	I		ι	
※A	※	:	J	Z	j	z			K		κ	
※B	+	;	K	[	k	{	+	+	Λ		λ	
※C	,	<	L	¥	l	|	±	〒	M	∠	μ	
※D	−	=	M	]	m	}			N	◣	ν	
※E	.	>	N	^	n	―	-	-	Ξ	▷	ξ	
※F	/	?	O	__	o		°	°	O	◤	o	

Example) The character code "43$_{HEX}$" represents as the character "C".

2.2 Control command

2.2.1 Control command list

Table 2.2.1 Control command list

Command	Control item	Number of parameters	Explanation of operation
PS0	Recording Start	–	The same as the recording by the RUN key.
PS1	Recording Stop	–	
MP0	Manual Print start	–	The same as the manual print by key operation
MP1	Manual Print stop	–	
LS0	List Print start	–	The same as the List Print by key operation
LS1	List Print stop	–	
SU0	Engineering List Print start	–	The same as the Engineering List Print by key operation.
SU1	Engineering List Print stop	–	
UD0	Auto Display selection	–	When the manual display is selected, channel number can be set. However, the channel number can be omitted. (e.g.)Displaying the measurement value of the 5th channel: UD*1, 05* (CR)(LF)
UD1	Manual Display selection	1	
UD2	Date Display selection	–	
UD3	Time Display selection	–	
UD4	Display OFF selection	–	
PR0	Communication comment print out (Sync printout)	2	Prints out characters received by the communication function.
PR1	Communication comment print out (Async printout)	2	The parameter consists of printout colors and printout characters.
BO0	Byte output order (High byte earlier)	2	This command is valid only in the binary mode. (Please refer to Chapter 8 of the instruction manual for details.)
BO1	Byte output order (Low byte earlier)	2	
TS0	Measurement value output	–	The recorder sets output information in the memory, and returns the corresponding data after "ESC T" command is received. (Please refer to Chapter 8 of the instruction manual for details.)
TS1	Setting value output. (Refer to Chapter 3)	–	
TS2	Decimal point position and the unit character output. (Refer to Chapter 3)	–	
FM0	The ASCII mode output of the measurement data	2	This command outputs the measurement value. The parameter consists of the output start channel and output end channel. (Please refer to Chapter 8 of the instruction manual for details.)
FM1	The Binary mode output of the measurement data	2	
LF	The output of the setting value, the unit character and the decimal point position	2	This command outputs the setting value. The parameter consists of the output start channel and output end channel. (Please refer to Chapter 8 of the instruction manual for details.)

2.2.2 Recording Start/Stop

This command starts or stops recording.

<Format>

PS0(CR)(LF): The recorder starts recording.

PS1(CR)(LF): The recorder stops recording.

2.2.3 Manual Print Start/Stop

This command starts or stops the Manual print.

<Format>

MP0(CR)(LF): The manual print starts.

MP1(CR)(LF): The manual print stops.

2.2.4 List Print Start/Stop

This command starts or stops the List print.

<Format>

LS0(CR)(LF): The list print starts.

LS1(CR)(LF): The list print stops.

2.2.5 Engineering list Print Start/Stop

This command starts or stops the Engineering list print.

<Format>

SU0(CR)(LF): The Engineering list print starts.

SU1(CR)(LF): The Engineering list print stops.

2.2.6 Selection of the display contents

This command selects the display mode of the recorder.

The Auto Display, the Manual Display, the Date Display, the Time Display and Display OFF can be chosen.

When receiving this command, the display of the recorder changes automatically.

<Format>

UD0(CR)(LF)   : Auto Display

UD1, (CH)(CR)(LF) : Manual Display

UD2(CR)(LF)   : Date Display

UD3(CR)(LF)   : Time Display

UD4(CR)(LF)   : Display OFF

CH: The manual display channel 01 to 06 (01 and 02 for the pen type)

The underlined part can be omitted.

2.2.7 Communication comment print out

This command prints the character strings, which have been received by the communication function.

Please refer to Table 2.1.13 for the character code. When you use the character code beyond $7F_{HEX}$, 8-bit data length of communication function must be used.

Please refer to Section 7.2.7 of the instruction manual (HR-700) for the data length setting.

<Format>

    PR0, (COLOR), (TEXT)(CR)(LF): Sync printout

    PR1, (COLOR), (TEXT)(CR)(LF): Async printout

        COLOR: Chooses a printout color. (The Pen type has only PRP.)

        PRP: Purple, RED: Red, BLK: Black, GRN: Green, BRN: Brown, BLU: Blue

        TEXT: Maximum character number for the Dot printing type is 47.

            Maximum character number for the Pen type is 21.

3. ORIGINAL PROTOCOL - DATA TRANSMISSION

3.1 Setting Value Reading

When the recorder receives "(TS1)+ (ESC T) + (LF)", the recorder continuously sends the setting value according to Table 3.1 below.
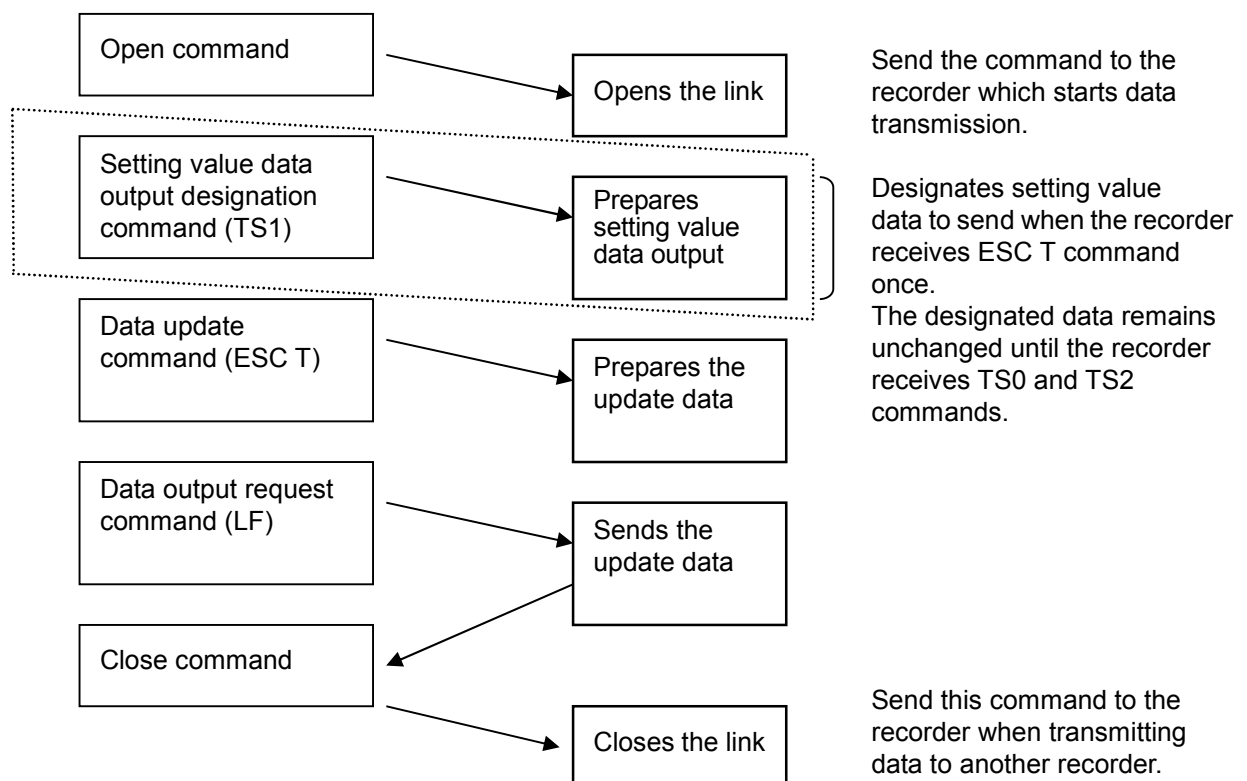
The output format of each command when reading is the same as that of when setting.

Table 3.1   Order of the setting value transmission

Order	Command	Description
1	PS	Recording start/ Recording stop
2	SR	Input range, recording span
3	SN	Unit
4	SA	Alarm
5	SC	1st chart speed
6	SS	Analog printing period (only for Dot printing type)
7	SZ	Zone recording
8	SP	Partial compression/expansion recording
9	SF	Digital printing
10	ST	Tag character
11	SG	Comment character
12	SE	2nd chart speed
13	UD	Display indication mode
14	EN	End

Send the setting value in this order

3.2 Data Reception Example

Open command	→	Opens the link
Setting value data output designation command (TS1)	→	Prepares setting value data output
Data update command (ESC T)	→	Prepares the update data
Data output request command (LF)	→	Sends the update data
Close command	→	Closes the link

Send the command to the recorder which starts data transmission.

Designates setting value data to send when the recorder receives ESC T command once.
The designated data remains unchanged until the recorder receives TS0 and TS2 commands.

Send this command to the recorder when transmitting data to another recorder.

4. ORIGINAL PROTOCOL - NOTES FOR COMMUNICATION

4.1 Half-Duplex Transmission

Half-duplex transmission is used for the recorder side. The recorder cannot receive data while it is sending data. When sending the command, the host computer should send the next command after it received data from the recorder.

4.2 Multiple access

Do not open another recorder when one recorder is open on the same line.

4.3 Continuation of Opening the Link

Do not allow an extended interval after sending the open command. A syntax error may occur when not sending data. Be sure to send the close command "ESC C" when you do not use communication function. If a syntax error occurs, send the status output command " ESC S" to reset the error. (The close command cannot reset syntax errors.)

4.4 Outputting the Status

When the open-link recorder has a data error on its link, the recorder saves the error in the internal status area as a communication error. The "ESC S" command reads this status. Issuing this command clears the on-going error. Refer to Section 8.5 in the instruction manual (HR-700).
Be sure to reset the error when setting data to the recorder. If the error is not reset, you may not be able to assess which command caused errors.

5. MODBUS RTU PROTOCOL – OVERVIEW

5.1 Modbus RTU protocol

Item	Specification
Interface	RS-485/RS-232C
Protocol	Modbus RTU
Communication speed	1200 /2400 /4800 /9600 /19200/ 38400 [bps]
Parity	None/Even/Odd
Data length	8bit（※)
Stop bit	1bit / 2bit
Slave address	1～247（0 invalid）

※Please use 8bit data length when using the Modbus RTU protocol.

Communication can't be performed successfully if you use 7bit.

5.2 Adding new items and Map version

Depending on the version up of the recorder, there is that the contents of the Modbus map is hanged.

If the Modbus map is modified, Modbus map version (address 30025) will also be updated.

Newly added setting items are available in the corresponding version or later. (Table below)

Body version	Map version	Contents	Note
before Ver4.00	―	Modbus RTU is not available.	
Ver4.00	01	The first release of the Modbus RTU function.	

［CAUTION］

In the old version, you can't use features added in the new version.

In that case, there is a possibility that it does not work properly when reading / writing to the address of the newly added function.

6. MODBUS RTU PROTOCOL - DATA TRANSMISSION AND RECEPTION

6.1 Communication protocol

This equipment is compatible with Modbus RTU protocol.

Data format of the protocol is as below. It is composed of slave address, function code, data, and CRC section.

Modbus RTU Data format

Slave address (1byte)	Function code (1byte)	Data (variable)	CRC (2byte)

6.2 Function codes

Function code that can be used in this equipment is as follows.

Code	Function	Maximum data length	Modbus original function (reference)
03H	Setting data read	123 words	Data read from holding register
04H	Input data read	123 words	Data read from input register
06H	One-time setting data write	1 words	Data write to holding register
10H	Continuous setting data writes	123 words	Data write to holding register

6.3 Error response

In accordance with the communication protocol for the pertinent function code, if an error occurs during command transmission, an error response is returned in the fixed format described in this section.

■ Example of slave response (function code = 06H, command error = 10H)

Configuration	Data length	Data
Slave address	1	─
Function code + 80H	1	86H
Error code	1	10H
Error check (Only for Modbus RTU)	2	CRC
Total number of bytes	5	─

●Error codes and their occurrence conditions.

Error code	Description	Occurrence condition(s)
01H	Invalid function code	An unsupported function code is specified.
02H	Invalid register address	The relative address range exceeds "9999."
03H	Invalid number of registers	- The length of the accessed data is "0" or the sum of the relative address and data length exceeds the limit. - It is assumed that two or more function codes, each executable for one area, are involved. - Data longer than 2 words is specified for a one-time write command. - The data length exceeds 123 words.
04H	Device error	The received data is shorter than the predefined data length.
10H	Command error	An attempt at a write over an area exceeding the writable range.

6.4 Reading of input register area

The input register area is a read-only area.

The current measured value and the current time are mapped. Specify the start

address (relative) and data count (assuming that one word is two bytes) of the data to be read.

6.4.1 Reading of input register area

Function code : 04H

■ Example of master transmission (with a start address of 0032H and a data count of 2 words)

Component		Data length	Data
Slave address		1	─
Function code		1	04H
Data	Relative start address (high-order)	1	00H
	Relative start address (low-order)	1	32H
	Read data count (high-order)	1	00H
	Read data count (low-order)	1	02H
Error check		2	CRC (16 bits)
Total number of bytes		8	

■ Example of slave response (with a start address of 0032H and a data count of 2 words)

Component		Data length	Data
Slave address		1	─
Function code		1	04H
Data	Number of data bytes	1	04H
	Data 1 (high-order)	1	00H
	Data 1 (low-order)	1	09H
	Data 2 (high-order)	1	00H
	Data 2 (low-order)	1	0AH
Error check		2	CRC (16 bits)
Total number of bytes		9	

6.4.2 Input Register Area Map

【Input Register Area Map】Function code: 04H

Address	Relative address (HEX)	Name	Array	Content	Remarks
30001	0	Model type（1/8）	1	ASCII	Multipoint type　　:"MULTI"
30002	1	Model type（2/8）	2		Pen type　　　　　:"PEN"
30003	2	Model type（3/8）	3		After the blank
30004	3	Model type（4/8）	4		
30005	4	Model type（5/8）	5		
30006	5	Model type（6/8）	6		
30007	6	Model type（7/8）	7		
30008	7	Model type（8/8）	8		
30009	8	Software version（1/16）	1	ASCII	Version information on a system.
30010	9	Software version（2/16）	2		
30011	A	Software version（3/16）	3		
30012	B	Software version（4/16）	4		
30013	C	Software version（5/16）	5		
30014	D	Software version（6/16）	6		
30015	E	Software version（7/16）	7		
30016	F	Software version（8/16）	8		
30017	10	Software version（9/16）	9		
30018	11	Software version（10/16）	10		
30019	12	Software version（11/16）	11		
30020	13	Software version（12/16）	12		
30021	14	Software version（13/16）	13		
30022	15	Software version（14/16）	14		
30023	16	Software version（15/16）	15		
30024	17	Software version（16/16）	16		
30025	18	Modbus map version	1	Binary	
30026	19	Reserve			
30027	1A	Reserve			
30028	1B	Reserve			
30029	1C	Reserve			
30030	1D	Reserve			
30031	1E	Reserve			
30032	1F	Reserve			
30033	20	Reserve			
30034	21	Reserve			
30035	22	Reserve			
30036	23	Reserve			
30037	24	Reserve			
30038	25	Reserve			
30039	26	Reserve			
30040	27	Reserve			
30041	28	Reserve			
30042	29	Reserve			
30043	2A	Reserve			
30044	2B	Reserve			
30045	2C	Reserve			
30046	2D	Reserve			
30047	2E	Reserve			
30048	2F	Reserve			
30049	30	Reserve			

Address	Relative address (HEX)	Name	Array	Content	Remarks
30050	31	Reserve			
30051	32	Year		0～99	Every second update
30052	33	Month		1～12	
30053	34	Day		1～31	
30054	35	Hour		0～24	
30055	36	Minute		0～59	
30056	37	Second		0～59	
30057	38	Recording status		0～1	0：Recording not in progress 1：Recording in progress
30058	39	Chart sensor status		0～1	0：With chart 1：Without chart
30059	3A	Manual print status		0～1	0：Print stops 1：During printing
30060	3B	List print status		0～1	0：Print stops 1：During printing
30061	3C	Engineering list print status		0～1	0：Print stops 1：During printing
30062	3D	Reserve			
30100	63	Reserve			
30101	64	Channel status	CH01	00bit： Alarm 1 1= ON 0= OFF 01bit： Alarm 2 1= ON 0= OFF 02bit： Alarm 3 1= ON 0= OFF 03bit： Alarm 4 1= ON 0= OFF	
30102	65		CH02		
30103	66		CH03		
30104	67		CH04		
30105	68		CH05		
30106	69		CH06		
30107	6A	Measurement data（BIN）	CH01	-32000～32000	Data of more than±32000, the minus side will be 8181H, the plus side will be 7E7EH.
30108	6B		CH02		
30109	6C		CH03		
30110	6D		CH04		
30111	6E		CH05		
30112	6F		CH06		
30113	70	Decimal point position	CH01	0～4	
30114	71		CH02		
30115	72		CH03		
30116	73		CH04		
30117	74		CH05		
30118	75		CH06		
30119	76	Measurement data（Float）	CH01	Float (high-order 2 byte) Float (low-order 2 byte)	
30120	77				
30121	78		CH02		
30122	79				
30123	7A		CH03		
30124	7B				
30125	7C		CH04		
30126	7D				
30127	7E		CH05		
30128	7F				
30129	80		CH06		
30130	81				

Address	Relative address (HEX)	Name	Array	Content	Remarks
30131	82	Unit (1/4)	CH01		Current unit
30132	83	Unit (2/4)			
30133	84	Unit (3/4)			
30134	85	Unit (4/4)			
30135	86	Unit (1/4)	CH02		Current unit
30136	87	Unit (2/4)			
30137	88	Unit (3/4)			
30138	89	Unit (4/4)			
30139	8A	Unit (1/4)	CH03		Current unit
30140	8B	Unit (2/4)			
30141	8C	Unit (3/4)			
30142	8D	Unit (4/4)			
30143	8E	Unit (1/4)	CH04		Current unit
30144	8F	Unit (2/4)			
30145	90	Unit (3/4)			
30146	91	Unit (4/4)			
30147	92	Unit (1/4)	CH05		Current unit
30148	93	Unit (2/4)			
30149	94	Unit (3/4)			
30150	95	Unit (4/4)			
30151	96	Unit (1/4)	CH06		Current unit
30152	97	Unit (2/4)			
30153	98	Unit (3/4)			
30154	99	Unit (4/4)			
30155	9A	Reserve			
...	...				Unused or later.
39999	270E				

6.5 Reading and writing of the holding register area

The holding register area is a read-write area. Parameter settings and the start and stop command of the recording state are mapped. For read, specify the start address (relative) and data count (assuming that one word is two bytes) of the data to be read. For write, specify the start address and the data to be written.

6.5.1 Reading of the holding register area

It is used when calling the parameters that are currently set.

Also, it cannot be read in the case of the operation command system. It becomes writing only.

Function code (Reading): 03H

■ Example of transmitting master (starting address=00C8H, data length=2words)

Component		Data length	Data
Slave address		1	—
Function code		1	03H
Data	Relative start address (high-order)	1	00H
	Relative start address (low-order)	1	C8H
	Read data count (high-order)	1	00H
	Read data count (low-order)	1	02H
Error check		2	CRC (16 bits)
Total number of bytes		8	

■ Example of slave's responding (starting address=0032H, data length =2words)

Component		Data length	Data
Slave address		1	—
Function code		1	03H
Data	Number of data bytes	1	04H
	Data 1 (high-order)	1	00H
	Data 1 (low-order)	1	05H
	Data 2 (high-order)	1	00H
	Data 2 (low-order)	1	00H
Error check		2	CRC (16 bits)
Total number of bytes		9	

6.5.2 Writing of the holding register area (Single)

It is used when carrying out a set of command operations or parameters.

In the case of operation command, it will take effect immediately when you send.

In the case of parameter settings, it is reflected by sending a separate "settings save" command (address 40104 (relative address 0067H)).

Function code(Writing): 06H

■ Example of transmitting master(starting address=00C8H, data =5)

Component		Data length	Data
Slave address		1	—
Function code		1	06H
Data	Relative start address (high-order)	1	00H
	Relative start address (low-order)	1	C8H
	Write data (high-order)	1	00H
	Write data (low-order)	1	05H
Error check		2	CRC (16 bits)
Total number of bytes		8	

■ Example of slave's responding (starting address=00C8H, data =5)

Component		Data length	Data
Slave address		1	—
Function code		1	06H
Data	Relative start address (high-order)	1	00H
	Relative start address (low-order)	1	C8H
	Write data (high-order)	1	00H
	Write data (low-order)	1	05H
Error check		2	CRC (16 bits)
Total number of bytes		8	

6.5.3 Writing of the holding register area (Continuation)

Time setting command and the like, and then used when the data needs to send in succession.

In the case of operation command, it will take effect immediately when you send.

In the case of parameter settings, it is reflected by sending a separate "settings save" command (address 40104 (relative address 0067H)).

Corresponding to that memory map is part. Please refer to Section 6.5.4 for the area which is corresponding.

Function code(Writing): 10H

■ Master transmission example (Start address =006EH, Number of data =7words

Data =AA01H, 000FH, 0001H, 0002H, 0017H, 001EH, 0000H）

（ Clock set command January 2, 2015 23:30:00)

Component		Data length	Data
Slave address		1	-
Function code		1	10H
Data	Relative start address (high-order)	1	00H
	Relative start address (low-order)	1	6EH
	Number of write register (high-order)	1	00H
	Number of write register (low-order)	1	07H
	Cut the number of bytes	1	0EH
	Write data 1 (high-order)	1	AAH
	Write data 1 (low-order)	1	01H
	Write data 2 (high-order)	1	00H
	Write data 2 (low-order)	1	0FH
	Write data 3 (high-order)	1	00H
	Write data 3 (low-order)	1	01H
	Write data 4 (high-order)	1	00H
	Write data 4 (low-order)	1	02H
	Write data 5 (high-order)	1	00H
	Write data 5 (low-order)	1	17H
	Write data 6 (high-order)	1	00H
	Write data 6 (low-order)	1	1EH
	Write data 7 (high-order)	1	00H
	Write data 7 (low-order)	1	00H
Error check		2	CRC(16bit)
Total number of bytes		23	-

■ Slave response example（Response of Start address =006EH, Number of data =7words）

Component		Data length	Data
Slave address		1	-
Function code		1	10H
Data	Relative start address (high-order)	1	00H
	Relative start address (low-order)	1	6EH
	Number of write register (high-order)	1	00H
	Number of write register (low-order)	1	07H
Error check		2	CRC(16bit)
Total number of bytes		8	-

6.5.4 Holding register area map

【Holding register area map】Function Code:03H(Reading),06H(Writing),10H(Continuous writing)

Address	Relative address (HEX)	Name	Array	Content	Remarks
40001	0	Reserve			Unused
…					
40100	63	Reserve			
Operation command					
40101	64	Recording start / stop		AA01：Start AA00：Stop	Invalid except left. The disabled in selecting DI.
40102	65	Reserve			
40103	66	Reserve			
40104	67	Save the settings		AA01：Save	Invalid except left.
40105	68	Manual print		AA01：Start AA00：Stop	
40106	69	LIST print			
40107	6A	ELIST print			
40108	6B	Comments 1 print		AA01：Sync AA02：Async	
40109	6C	Comments 2 print			
40110	6D	Comments 3 print			
40111	6E	Clock set		AA01：Run	AA01 ignored except **7 words continuous writing only valid** Clock sets in the received values. When isn't time has come ignored (month = 0, etc.).
40112	6F	Year(00～99)' 2 digits			
40113	70	Month(01～12)			
40114	71	Day(01～31)			
40115	72	Time(00～23)			
40116	73	Minute(00～59)			
40117	74	Second(00～59)			
40118	75	Reserve			
40119	76	Reserve			
40120	77	Reserve			
40121	78	Communication printing set		AA01：Sync AA02：Async	AA01 and AA02 ignored except **Multipoint type：3～26 words** **Pen type：3～13 words** **Continuous writing only valid**
40122	79	Printing color		0～5	Pen type recorder is invalid.
40123	7A	Printing character (01/24)		ASCII	**Multipoint type：0～47 character** **Pen type：0～21 character**
40124	7B	Printing character (02/)			
40125	7C	Printing character (03/)			
40126	7D	Printing character (04/)			
40127	7E	Printing character (05/)			
40128	7F	Printing character (06/)			
40129	80	Printing character (07/)			
40130	81	Printing character (08/)			
40131	82	Printing character (09/)			
40132	83	Printing character (10/)			
40133	84	Printing character (11/)			
40134	85	Printing character (12/)			
40135	86	Printing character (13/)			
40136	87	Printing character (14/)			
40137	88	Printing character (15/)			
40138	89	Printing character (16/)			
40139	8A	Printing character (17/)			

【Holding register area map】Function Code:03H(Reading),06H(Writing),10H(Continuous writing)

Address	Relative address (HEX)	Name	Array	Content	Remarks
40140	8B	Printing character (18/)			
40141	8C	Printing character (19/)			
40142	8D	Printing character (20/)			
40143	8E	Printing character (21/)			
40144	8F	Printing character (22/)			
40145	90	Printing character (23/)			
40146	91	Printing character(24/24)			
40147	92	Reserve			
…					
40200	C7	Reserve			
Setup mode parameters（channel）					
40201	C8	Mode	CH1	0〜6 , 8 (7: Error)	**(※1)Mode**
40202	C9	Input type		0〜34	**(※2)Range code**
40203	CA	Reference channel		0〜4	CH1 configurable value : None(Setting disable) CH2 configurable value：0 CH3 configurable value：0〜1 CH4 configurable value：0〜2 CH5 configurable value：0〜3 CH6 configurable value：0〜4
40204	CB	Measurement range (L)		depends on the range	**(※2) Measurement range**
40205	CC	Measurement range (H)		depends on the range	**(※2) Measurement range**
40206	CD	Scaling range (L)		-32000〜32000	**(※3) Depends on the Scaling**
40207	CE	Scaling range (H)		-32000〜32000	**(※3) Depends on the Scaling**
40208	CF	Decimal point position		0〜4	Only when a Scaling is "ON", this setting is enable.
40209	D0	Unit (1/3)		ASCII	Units at the time of the scaling "ON" **(Note.1)**
40210	D1	Unit (2/3)			
40211	D2	Unit (3/3)			
40212	D3	Reserve			
40213	D4	Tag (1/4)		ASCII	**Multipoint type：7 character** **Pen type：5 character**
40214	D5	Tag (2/4)			
40215	D6	Tag (3/4)			
40216	D7	Tag (4/4)			
40217	D8	Digital print ON/OFF		0〜1	0：OFF 1：ON
40218	D9	Partial compression / expansion ON/OFF		0〜1	0：OFF 1：ON
40219	DA	Zone L		0〜99	
40220	DB	Zone H		1〜100	
40221	DC	Partial compression boundary point position.		1〜99	
40222	DD	Partial compression boundary point measurements.		depends on the range	Scaling "ON" : Depends on the scaling Other ： measurement range. (※3) Scaling dependent

(Note 1) The setting of the unit is enabled, the range setting is only case of "SCALE", "SQRT", "DECAD", "DELT", "SIGM", "MEAN".

(However, "DELT" "SIGM" "MEAN" is valid only when the range setting of the reference channel is "SCALE".)

Otherwise the range setting, the unit is automatically determined according to the range.

【Holding register area map】Function Code:03H(Reading),06H(Writing),10H(Continuous writing)

Address	Relative address (HEX)	Name	Array	Content	Remarks
40223	DE	Alarm 1 action ON/OFF	CH1	0～1	0：OFF 1：ON
40224	DF	Alarm 1 type		0～1	0：H 1：L
40225	E0	Alarm 1 Set value		-32000～32000	(※3) Depends on the Scaling
40226	E1	Alarm 1 RLY output ON/OFF		0～1	0：OFF 1：ON
40227	E2	Alarm 1 DO No.		0～5	**Multipoint type：0～5（RLY1～RLY6）** **Pen type：0～2 （RLY1～RLY3）**
40228	E3	Alarm 2 action ON/OFF		0～1	0：OFF 1：ON
40229	E4	Alarm 2 type		0～1	0：H 1：L
40230	E5	Alarm 2 Set value		-32000～32000	(※3) Depends on the Scaling
40231	E6	Alarm 2 RLY output ON/OFF		0～1	0：OFF 1：ON
40232	E7	Alarm 2 DO No.		0～5	**Multipoint type：0～5（RLY1～RLY6）** **Pen type：0～2 （RLY1～RLY3）**
40233	E8	Alarm 3 action ON/OFF		0～1	0：OFF 1：ON
40234	E9	Alarm 3 type		0～1	0：H 1：L
40235	EA	Alarm 3 Set value		-32000～32000	(※3) Depends on the Scaling
40236	EB	Alarm 3 RLY output ON/OFF		0～1	0：OFF 1：ON
40237	EC	Alarm 3 DO No.		0～5	**Multipoint type：0～5（RLY1～RLY6）** **Pen type：0～2 （RLY1～RLY3）**
40238	ED	Alarm 4 action ON/OFF		0～1	0：OFF 1：ON
40239	EE	Alarm 4 type		0～1	0：H 1：L
40240	EF	Alarm 4 Set value		-32000～32000	(※3) Depends on the Scaling
40241	F0	Alarm 4 RLY output ON/OFF		0～1	0：OFF 1：ON
40242	F1	Alarm 4 DO No.		0～5	**Multipoint type：0～5（RLY1～RLY6）** **Pen type：0～2 （RLY1～RLY3）**
40243	F2	Reserve			
・・・					
40250	F9	Reserve			
40251	FA	Scaling range (L) (float)			**2 words continuous writing only**
40252	FB				**is valid. (※4)float Format**
40253	FC	Scaling range (H) (float)			**2 words continuous writing only**
40254	FD				**is valid. (※4)float Format**
40255	FE	Alarm1 set value (float)			**2 words continuous writing only**
40256	FF	Alarm1 set value (float)			**is valid. (※4)float Format**
40257	100	Alarm2 set value (float)			**2 words continuous writing only**
40258	101	Alarm2 set value (float)			**is valid. (※4)float Format**
40259	102	Alarm3 set value (float)			**2 words continuous writing only**
40260	103	Alarm3 set value (float)			**is valid. (※4)float Format**
40261	104	Alarm4 set value (float)			**2 words continuous writing only**
40262	105	Alarm4 set value (float)			**is valid. (※4)float Format**

【Holding register area map】Function Code:03H(Reading),06H(Writing),10H(Continuous writing)

Address	Relative address (HEX)	Name	Array	Content	Remarks
40263	106	Reserve	CH01		
…					
40300	12B	Reserve			
40301	12C	Mode	CH02	Input channel	
…					
40400	18F	Reserve			
40401	190	Mode	CH03	Input channel	
…					
40500	1F3	Reserve			
40501	1F4	Mode	CH04	Input channel	
…					
40600	257	Reserve			
40601	258	Mode	CH05	Input channel	
…					
40700	2BB	Reserve			
40701	2BC	Mode	CH06	Input channel	
…					
40800	31F	Reserve			
Setup mode parameters（Other）					
40801	320	Recording paper feed speed (1st)		Multipoint：0〜33	**(※5) Recording paper feed speed**
40802	321	Recording paper feed speed (2nd)		Pen type：0〜40	
40803	322	Recording period		0〜3	**(Multipoint Type only)** 0：10sec 1：20sec 2：30sec 3：60sec
40804	323	Reserve			
40805	324	Comment (1/8)	Cmt1	ASCII	**Multipoint type：0〜8 Words** **Pen type：0〜6 Words**
40806	325	Comment (2/8)			
40807	326	Comment (3/8)			
40808	327	Comment (4/8)			
40809	328	Comment (5/8)			
40810	329	Comment (6/8)			
40811	32A	Comment (7/8)			
40812	32B	Comment (8/8)			
40813	32C	Reserve			
40814	32D	Reserve			
40815	32E	Comment (1/8)	Cmt2	ASCII	**Multipoint type：0〜8 Words** **Pen type：0〜6 Words**
40816	32F	Comment (2/8)			
40817	330	Comment (3/8)			
40818	331	Comment (4/8)			
40819	332	Comment (5/8)			
40820	333	Comment (6/8)			
40821	334	Comment (7/8)			
40822	335	Comment (8/8)			
40823	336	Reserve			
40824	337	Reserve			

【Holding register area map】Function Code:03H(Reading),06H(Writing),10H(Continuous writing)

Address	Relative address (HEX)	Name	Array	Content	Remarks
40825	338	Comment (1/8)	Cmt3	ASCII	**Multipoint type：0～8 Words**
40826	339	Comment (2/8)			**Pen type：0～6 Words**
40827	33A	Comment (3/8)			
40828	33B	Comment (4/8)			
40829	33C	Comment (5/8)			
40830	33D	Comment (6/8)			
40831	33E	Comment (7/8)			
40832	33F	Comment (8/8)			
…					
40900	383	Reserve			
Engineering parameters					
40901	384	Burnout	CH1	0～1	0：OFF 1：ON
40902	385	Offset		±32000	
40903	386	Offset DP		0～4	
40904	387	RJC setting		0～2	0：INT 1：EXT 2：CH
40905	388	RJC EXT fixed value		-32000～32000	Uv
40906	389	RJC CH destination		Multipoint type :0～5 Pen type：0～1	
40907	38A	Printing color		0～5	**(Multipoint type only)** **(※6)Printing color**
40908	38B	Digital filter		0～10000	**(Pen type only)** Decimal point:4-digit fixed
40909	38C	Reserve			
40910	38D	Reserve			
40911	38E	Burnout	CH2		Same as CH1
…					
40920	397	Reserve			
40921	398	Burnout	CH3		Same as CH1
…					
40930	3A1	Reserve			
40931	3A2	Burnout	CH4		Same as CH1
…					
40940	3AB	Reserve			
40941	3AC	Burnout	CH5		Same as CH1
…					
40950	3B5	Reserve			
40951	3B6	Burnout	CH6		Same as CH1
…					
40960	3BF	Reserve			
40961	3C0	Hysteresis setting		0～1	0：OFF 1：ON
40962	3C1	Alarm printing function		0～2	0：OFF 1：Alarm printing 1 2：Alarm printing 2
40963	3C2	RUN trigger setting		0～1	0：INT 1：EXT
40964	3C3	CH / TAG printing switching		0～1	0：CH 1：TAG

【Holding register area map】Function Code:03H(Reading),06H(Writing),10H(Continuous writing)

Address	Relative address (HEX)	Name	Array	Content	Remarks
40965	3C4	Logging print ON/OFF		0〜1	0：OFF 1：ON
40966	3C5	Logging print interval		0〜11	**(※7) Logging print interval**
40967	3C6	Logging print reference time		0〜23	Unit：Hour
40968	3C7	Logging print criteria minute		0〜59	Unit：Minute
40969	3C8	Logging print Sync/Async		0〜1	0：Sync 1：Async
40970	3C9	Record start/end print presence or absence		0〜2	0：OFF 1：Sync 2：Async
40971	3CA	Host address		1〜32	
40972	3CB	Communication speed **(Note.1)**		0〜5	0：1200 bps 1：2400 bps 2：4800 bps 3：9600 bps 4：19200 bps 5：38400 bps
40973	3CC	Data length **(Note.2)**		0〜1	0：7bit 1：8bit
40974	3CD	Parity **(Note.2)**		0〜2	0：Even 1：Odd 2：OFF
40975	3CE	Stop bit **(Note.2)**		0〜1	0：1bit 1：2bit
40976	3CF	Communication protocol		0〜1	0：Original 1：Modbus RTU
40977	3D0	Logging print scale presence or absence		0〜1	**(Multipoint type only)** 0：OFF 1：ON
40978	3D1	Printing gap setting		0〜1	**(Pen type only)** 0：OFF 1：ON
40979	3D2	DI1 function		0〜12	**(※8)DI function** Can't select the same function in DI1,2,3.
40980	3D3	DI2 function		0〜12	**(※8)DI function**
40981	3D4	DI3 function		0〜12	**(※8)DI function**
40982	3D5	Reserve			Unused later
…					
49999	270E	Reserve			

6.5.5 Holding register area setting range detail

Setting range of register on the map written in the ※are listed below.

※1 Mode

Value	Content	Remarks
0	Scaling OFF	
1	Scaling ON	
2	Square root calculation (SQRT)	It can be set only when the range code is 0 to 7 (voltage current range).
3	exponent display (DECAD)	It can be set only when the range code is 0 to 7 (voltage current range).
4	Difference calculation (DELT)	Change of input width after calculation, please change by entering a value in the "measurement range".
5	Sum calculation (SIGM)	Change of input width after calculation, please change by entering a value in the "measurement range".
6	Average calculation (MEAN)	Change of input width after calculation, please change by entering a value in the "measurement range".
7	Disable	If you select this, it will result in an error.
8	Skip	

※2 Range code, Measurement range.

Code	Input type		Measurement range ※
0	DC voltage	±10mV	(-10.00 to 10.00)
1		0-20mv	(0.00 to 20.00)
2		0-50mV	(0.00 to 50.00)
3		±200.0mV	(-200.0 to 200.0)
4		±1V	(-1.000 to 1.000)
5		0-5V	(-0.000 to 5.000)
6		±10V	(-10.00 to 10.00)
7	DC current	4-20mA	(4.00 to 20.00)
8	TC	B	(0.0 to 1820.0)
9	(Unit: ℃)	R1	(0.0 to 1760.0)
10	(Au-Fe is K)	R2	(0.0 to 1200.0)
11		S	(0.0 to 1760.0)
12		K1	(-200.0 to 1370.0)
13		K2	(-200.0 to 600.0)
14		K3	(-200.0 to 300.0)
15		E1	(-200.0 to 800.0)
16		E2	(-200.0 to 300.0)
17		E3	(-200.0 to 150.0)
18		J1	(-200.0 to 1100.0)
19		J2	(-200.0 to 400.0)
20		J3	(-200.0 to 200.0)
21		T1	(-200.0 to 400.0)
22		T2	(-200.0 to 400.0)
23		C	(0.0 to 2320.0)
24		Au-Fe	(1.0 to 300.0)
25		N	(0.0 to 1300.0)
26		PR40-20	(0.0 to 1880.0)
27		PL2	(0.0 to 1390.0)
28		U	(-200.0 to 400.0)
29		L	(-200.0 to 900.0)
30	RTD	Pt100-1	(-200.0 to 650.0)
31	(Unit: ℃)	Pt100-2	(-200.0 to 200.0)
32		JPt100-1	(-200.0 to 630.0)
33		JPt100-2	(-200.0 to 200.0)

※3 Depends on the Scaling

Scaling range, the alarm set value, partial compression boundary point measurement is depends on the holding register address 40201 "mode" and 40208 "decimal point position".

The set value is reflected in the form that is dependent on the "decimal point position" if the mode is scaling ON ("SCALE" and "SQRT"). In the case of OFF will reflect decimal point position of the range.

Example 1: "Scaling range (L)" set to 123.45 at Scaling "ON".
   Holding register address "40208 (decimal point position)" : Set the value to 2.
   Holding register address "40206(scaling range (L))" : Set the value to 12345.
Example 2: "Alarm 1 Set value" set to 12.3 at Scaling "OFF" (In the case of range code 4 selection).
   (Range code 4 ±1V(Measurement range：-1.000〜1.000))
   Holding register address "40224(Alarm 1 Set value)" : Set the value to 12300.

※4 float(Floating point)

Floating-point notation in IEEE-compliant.

※5 Chart speed

There is a difference in the contents of the numbers in Multipoint type and Pen type.

[Multipoint type]

Value	Speed (mm/h)	Value	Speed (mm/h)	Value	Speed (mm/h)	Value	Speed (mm/h)
0	0	10	30	20	160	30	750
1	1	11	40	21	180	31	900
2	2	12	50	22	200	32	1,200
3	3	13	60	23	240	33	1,500
4	4	14	75	24	300		
5	5	15	80	25	360		
6	10	16	90	26	375		
7	15	17	100	27	450		
8	20	18	120	28	600		
9	25	19	150	29	720		

[Pen type]

Value	Speed (mm/h)	Value	Speed (mm/h)	Value	Speed (mm/h)	Value	Speed (mm/h)	Value	Speed (mm/h)	Value	Speed (mm/h)
0	5	10	80	20	360	30	2,400	40	12,000		
1	10	11	90	21	375	31	3,000				
2	15	12	100	22	450	32	3,600				
3	20	13	120	23	600	33	4,500				
4	25	14	150	24	720	34	4,800				
5	30	15	160	25	750	35	5,400				
6	40	16	180	26	900	36	6,000				
7	50	17	200	27	1200	37	7,200				
8	60	18	240	28	1500	38	9,000				
9	75	19	300	29	1800	39	10,800				

※6 Printing color

Value	Content	Remarks
0	Purple	
1	Red	
2	Green	
3	Blue	
4	Brown	
5	Black	

※7 Logging print interval

Value	Content	Remarks
0	10min	
1	15min	
2	20min	
3	30min	
4	1H	
5	2H	
6	3H	
7	4H	
8	6H	
9	8H	
10	12H	
11	24H	

※8 DI function

Value	Content	Remarks
0	OFF(No function)	
1	RCD(Recording Start/Stop)	ON:RUN OFF:STOP
2	SPEED(Chart speed change)	ON:Spd-1 OFF:Spd-2
3	CMNT1(Comment print (Sync))	ON Rising:Start
4	CMNT2(Comment print (Sync))	
5	CMNT3(Comment print (Sync))	
6	MAN-P(Manual print (Sync))	
7	TIM-P(Time print(Sync))	
8	A.CMT1(Comment print (Async))	
9	A.CMT2(Comment print (Async))	
10	A.CMT3(Comment print (Async))	
11	AMAN.P(Manual print (Async))	
12	ATIM.P(Time print (Async))	