

INSTRUCTION MANUAL

UCAM-80A

DATA LOGGER

[Control Command Manual]

Thank you for purchasing this KYOWA product.

Read this Instruction Manual carefully in order to make full use of the high performance capabilities of the product.

Use this product only as described in this Manual.

This Manual describes only the control commands for UCAM-80A.

Refer to the Hardware Instruction Manual for information on hardware.

Refer to the Control Software Instruction Manual for information on control software.

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KYOWA shall not be held responsible for any damage resulting from the use of these control commands.

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NOTATIONS USED IN THE INSTRUCTION MANUAL

Notations used in the instruction manual

- "This device" refers to the UCAM-80A Data Logger.
- "Tap" refers to lightly pressing the device screen with your finger.
- Screen names displayed on the device screen are enclosed with rectangle frames.

Ex.: Menu screen

Prohibitions, cautions, and references

The following notations are used in this document to draw attention to items that require special caution during use or information that could be of reference.



PROHIBITED

Indicates that mishandling could cause physical damage (product failure, etc.).



CAUTION

Indicates something that requires special caution during use.



Indicates something that could be of reference during use.

Text citations

When citing text from the Instruction Manual, the text will be enclosed in quotation marks (" ").

Ex.: Refer to "NOTATIONS USED IN THE INSTRUCTION MANUAL" for information on notations.

1. OUTLINE

This Instruction Manual describes control commands sent and received over RS-232C, Ethernet, and USB interface connections between UCAM-80A Data Logger ("this device") and a PC. Parameter setting and measurement can be performed by sending control commands from a PC to this device.

When a control command is sent from a PC to this device, this device will perform a certain process. Then, this device will send a response to the PC (if the control command requires a response).

If using this device on an Ethernet LAN, the PC will use an Application Program Interface (API) called a socket to communicate with this device. A socket is an API that uses the TCP/IP protocol, and is provided as a standard OS or middleware package. A PC will use the socket data transfer function to send control commands. If the control command requires a response, it then uses the data receipt function to receive the response.

If USB is being used, USB data from the PC will be converted inside this device into RS-232C data.

If using USB, use RS-232C communication to send control commands.

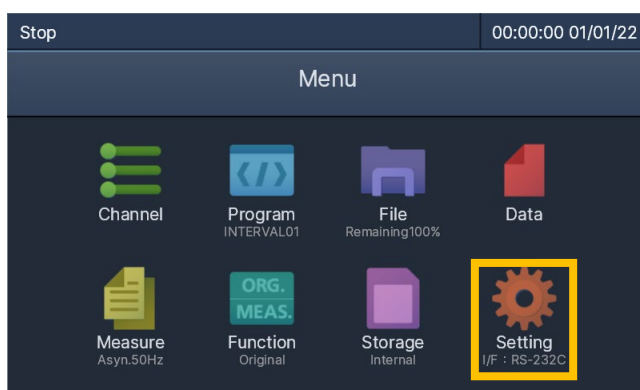
2. INTERFACE

This device is equipped with three types of interfaces for use with a PC: RS-232C, Ethernet, and USB.

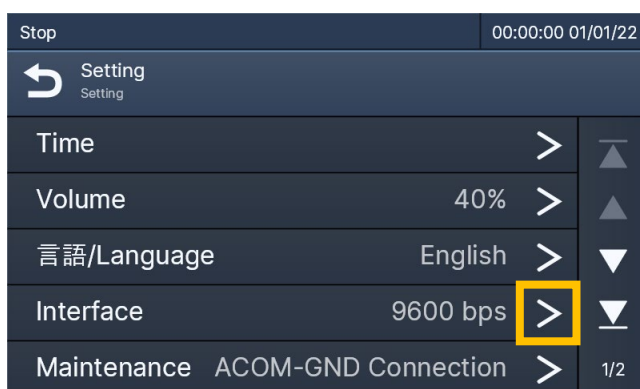
Follow the procedure below to select an interface. Note that multiple interfaces cannot be used at the same time.

2-1. INTERFACE SETTINGS

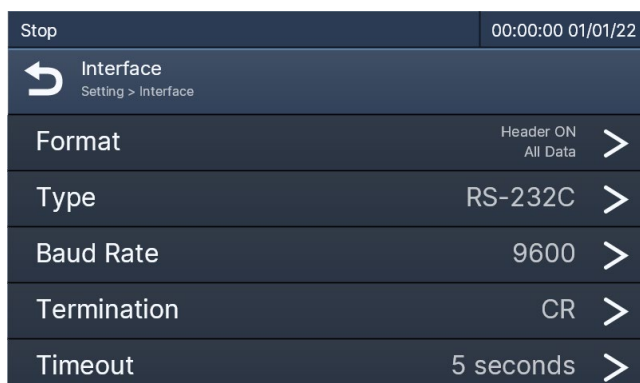
The procedure for configuring an interface on this device is shown below.



1. Tap **Setting** on the **Menu** screen.



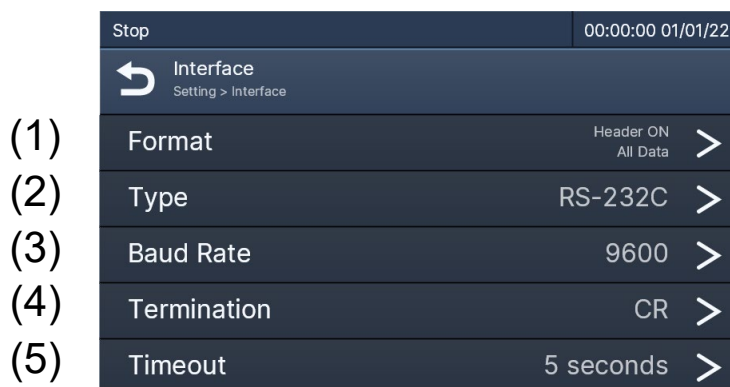
2. Tap **Interface**.



3. The **Interface** screen is displayed.

The **Interface** screen is used to configure the interface.

The following functions are available on the **Interface** screen.



Type: RS-232C or USB

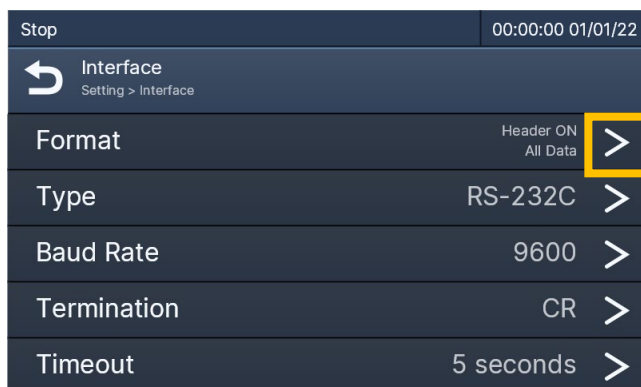


Type: Ethernet

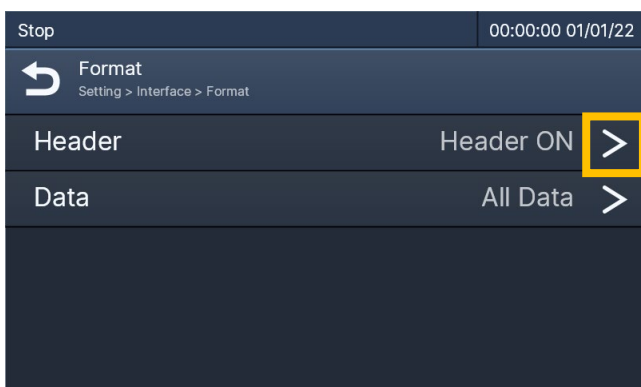
Number	Name	Function
1	Format	Output format settings
2	Type	Interface selection
3	Baud Rate	Communication speed settings
4	Termination	Termination code settings
5	Timeout	Timeout period settings
6	IP Address	IP address settings
7	Subnet Mask	Subnet mask settings
8	Gateway	Default gateway settings

2-1-1. Output Format

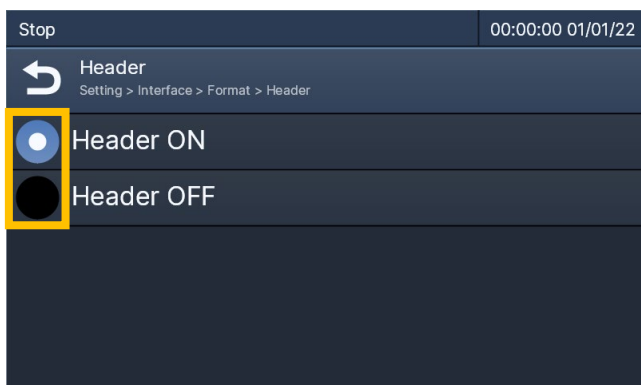
Set the output format for measurement values sent from this device to the PC.



1. Tap **Format**.

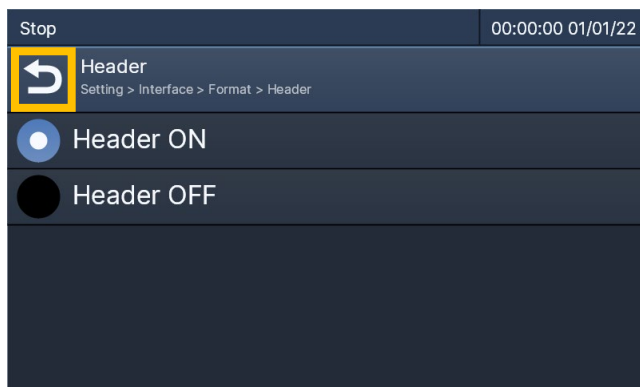


2. Tap **Header**.

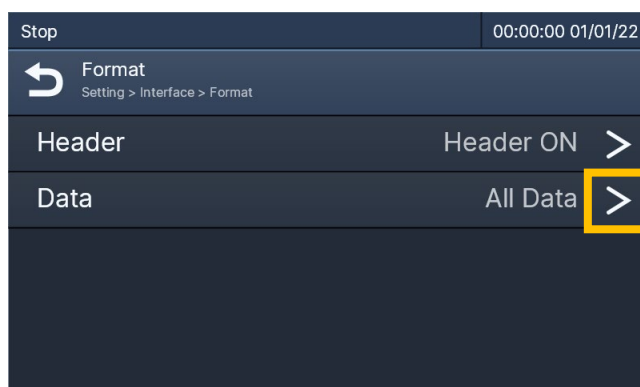


3. Tap **Header ON** or **Header OFF**.

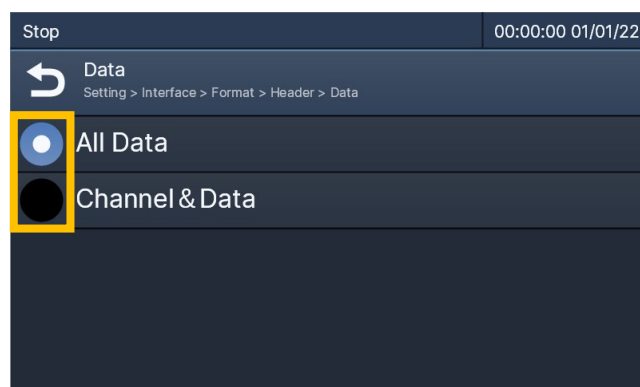
Header	Description
Header ON	Output a header with measurement values. Refer to "3-2. MEASUREMENT DATA FORMAT" for details.
Header OFF	Output only measurement values.



4. Tap the Back button.



5. Tap **Data**.

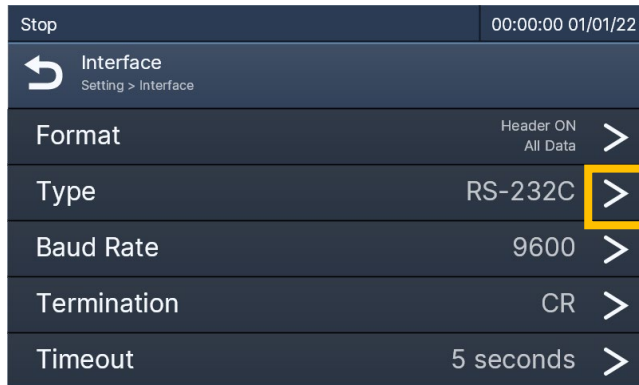


6. Tap **All data** or **Channel & Data**.

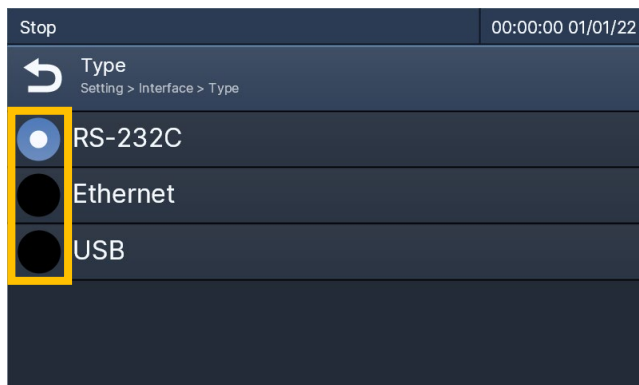
Data	Description
All data	Output data for all items. Refer to "3-2. MEASUREMENT DATA FORMAT" for details.
Channel & Data	Output only channel numbers and measurement values.

2-1-2. Type

Select the interface.



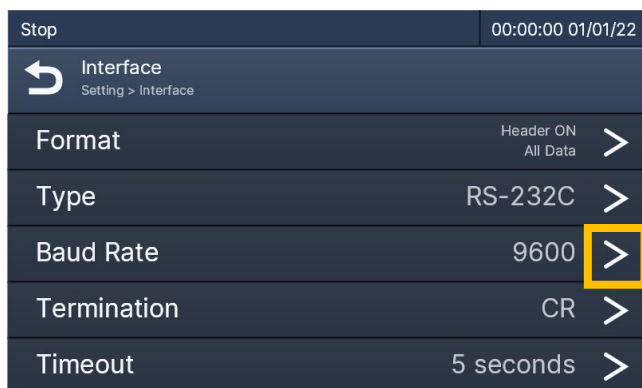
1. Tap **Type**.



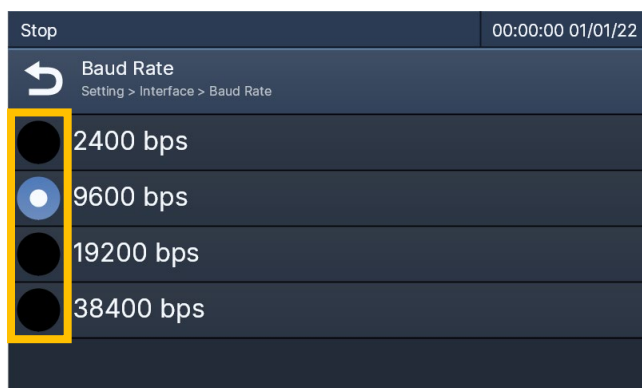
2. Tap the interface to use.

2-1-3. Baud Rate

Set the communication speed when using RS-232C.



1. Tap **Baud Rate**.



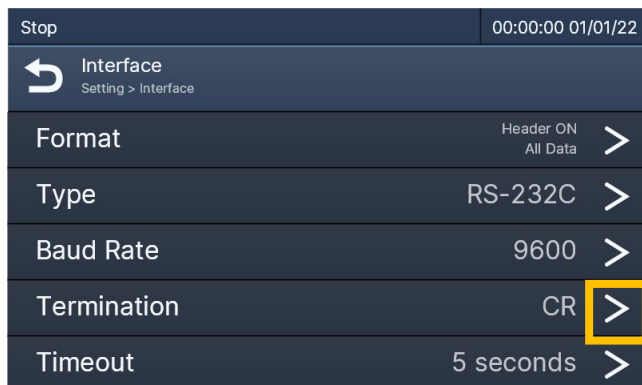
2. Tap the communication speed to use.



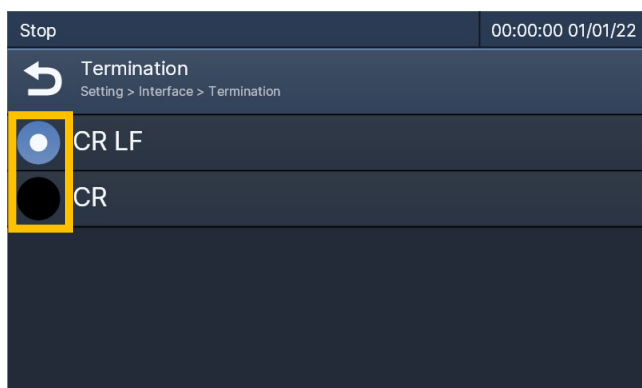
The baud rate cannot be set for Ethernet.
The baud rate is fixed at 9600 bps for USB.

2-1-4. Termination

Set the termination code for when using RS-232C.



1. Tap **Termination**.



2. Tap the termination code to use.

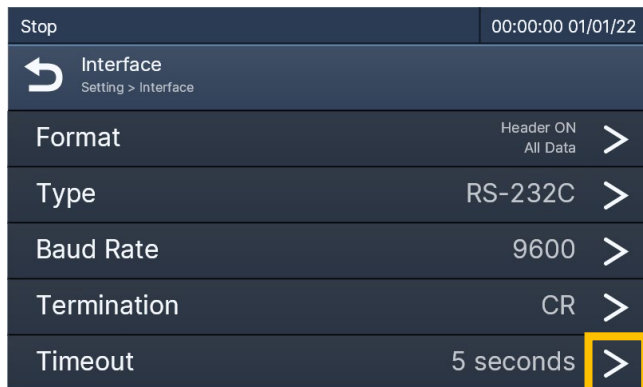


The termination code is fixed at null (0x00) for Ethernet.

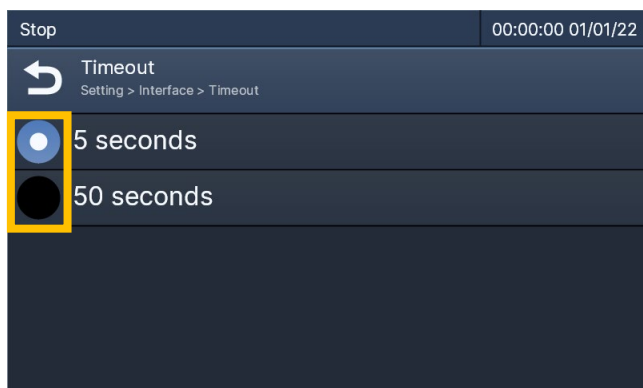
The termination code is fixed at CR (0x0D) for USB.

2-1-5. Timeout

Set the timeout period (the time that this device will wait to receive a control command from the PC) for when using RS-232C or USB.



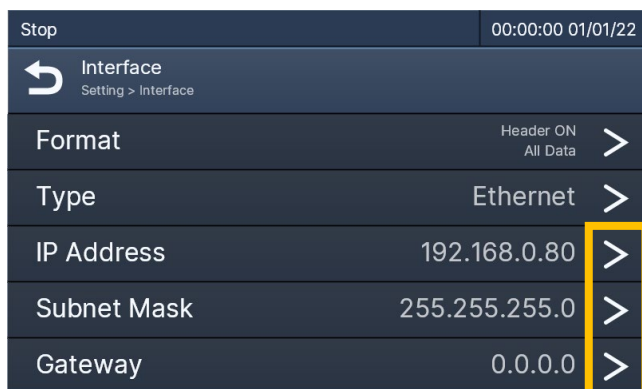
1. Tap **Timeout**.



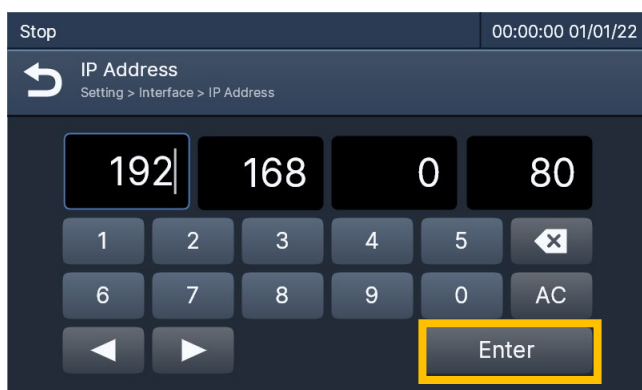
2. Set the timeout period to either **5** seconds or **50** seconds.

2-1-6. IP Address, Subnet Mask, Default Gateway

Set the IP address, subnet mask, or default gateway.



1. Tap the item to set.



2. Enter the value to set and then tap **Enter**.

2-2. RS-232C INTERFACE

This device is equipped with an RS-232C interface for use with a PC.

2-2-1. PC Connection Method and Preparations

- (1) Connect the PC and this device using an RS-232C crossover cable.
- (2) Set the baud rate, termination, and timeout on this device.

Refer to "2-1. INTERFACE SETTINGS" for details.

2-2-2. RS-232C Control Command Format

The format used when sending control commands from a PC to this device is as follows.
Note that XON/XOFF control is not supported.

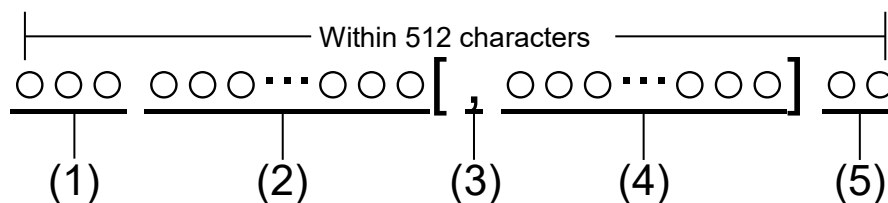
- Command: ASCII code (three characters, all uppercase)
Each control command consists of a "command" and "parameter."
Note that some commands do not have parameters.

Control command examples

- (1) Command without a parameter: "STA"
- (2) Command with a parameter: "CHR00000901X"

- Complex command separator: "," (comma)
Control commands can be sent in sequence separated by the separator (","). However, do not send commands that require replies or commands with a long processing time in series.
- Maximum characters that can be sent at once: Within 512 characters (including termination code)
Use within 512 characters when sending a complex command.
- Termination code: CR (0x0D) or CR (0x0D) LF (0x0A)
When sending a control command, add this to the end of the command or parameter.
- Baud rate: 2400, 9600, 19200, 38400 bps
- Data length: 8-bit (fixed)
- Parity: None (fixed)
- Stop bit: 1-bit (fixed)

- Timeout period: 5 sec or 50 sec
- Control command format



Number	Name	No. of Characters
1	Command	3
2	Parameter	Variable length
3	Complex command separator	1
4	Complex command	Variable length
5	Termination code	1 or 2

* The information in brackets ([]) is a character string added when sending a complex command.

2-2-3. RS-232C Response Format

The format used when sending control command responses from this device to a PC is as follows.

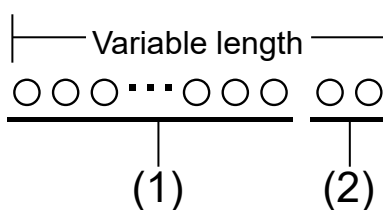
- Response: ASCII code (variable length)

The number of characters in a response will vary depending on the control command.

- Termination code: CR (0x0D) or CR (0x0D) LF (0x0A)

This is added to the end of the response.

- Response format



Number	Name	No. of Characters
1	Response	Variable length
2	Termination code	1 or 2

2-3. ETHERNET INTERFACE

This device is equipped with a 10BASE-T/100BASE-TX interface for use with a PC. TCP/IP (IPv4) is used as the communication protocol.

2-3-1. PC Connection Method and Preparations

- (1) Connect the PC to this device using a LAN cable (Category 5 or higher).
- (2) Set the IP address, subnet mask, and default gateway on this device.

Refer to "2-1. INTERFACE SETTINGS" for details.

The settings when shipped from the factory (default settings) are as follows.

- IP address: 192. 168. 0. 80
- Subnet mask: 255. 255. 255. 0
- Default gateway: 0. 0. 0. 0

- (3) Configure the network settings on the PC. Refer to the instruction manual for the PC for information on configuring settings.



CAUTION

- This device does not have firewall functionality.
Use sufficient caution when connecting it to a network.
- When connecting this device to a network, you will need to set the IP address, subnet mask, and default gateway. Ask your network administrator for details.

2-3-2. Ethernet Control Command Format

The format used when sending control commands from a PC to this device is as follows.

- Command: ASCII code (three characters, all uppercase)

Each control command consists of a "command" and "parameter."

Note that some commands do not have parameters.

Control command examples

(1) Command without a parameter: "STA"

(2) Command with a parameter: "CHR00000901X"

- Complex command separator: "," (comma)

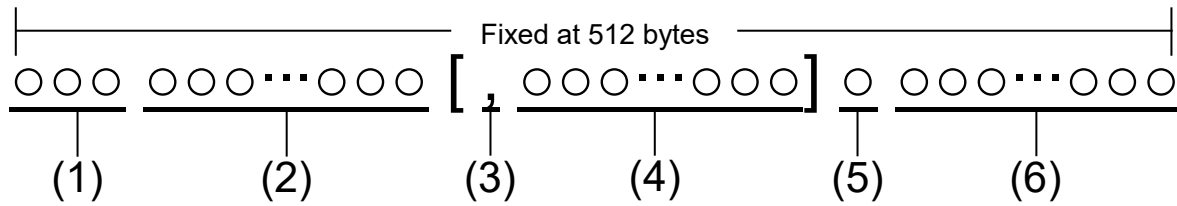
Control commands can be sent in sequence separated by the separator (","). However, do not send commands that require replies or commands with a long processing time in series.

- Bytes sent at once: Fixed at 512 bytes (including termination code)

- Termination code: null (0x00)

When sending a control command, add this to the end of the command or parameter.

● Control command format



Number	Name	No. of Bytes
1	Command	3
2	Parameter	Variable length
3	Complex command separator	1
4	Complex command	Variable length
5	Termination code	1
6	Padding	Variable length. 512 bytes must always be sent at once. Fill any blank space (with "0x00").

* The information in brackets ([]) is a character string added when sending a complex command.

2-3-3. Ethernet Response Format

The format used when sending control command responses from this device to a PC is as follows.

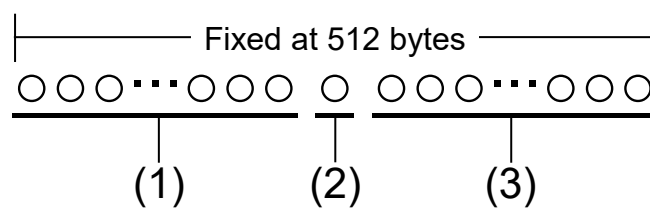
- Response: ASCII code (variable length)

The number of bytes in a response will vary depending on the original control command.

- Bytes sent at once: Fixed at 512 bytes (including termination code)

- Termination code: null (0x00)

- Response format



Number	Name	No. of Bytes
1	Response	Variable length
2	Termination code	1
3	Padding	Variable length

2-3-4. Communication Procedure

When using the Ethernet interface, a control program using a socket can be created to control this device from a PC. Use TCP/IP port number "9001" for this.

A summary of the communication procedure when using the Ethernet interface is provided below.

- (1) Prepare the socket corresponding to the port number, and then set the necessary options, etc.
- (2) Send a connection request to this device ("connect").
- (3) Send a control command to this device over the socket ("send").
- (4) If the control command requires a response, receive the control command response from this device over the socket ("recv").
- (5) If required, repeat steps (3) and (4).
- (6) Send a disconnection request to this device ("shutdown").
- (7) Release the socket that was used.

2-4. USB INTERFACE

This device is equipped with a USB interface for use with a PC.



USB data from the PC will be converted inside this device into RS-232C data.
If using USB, use RS-232C communication to send control commands.

2-4-1. PC Connection Method and Preparations

- (1) Connect the PC and this device using a USB cable.
- (2) Set the timeout on this device.

Refer to "2-1. INTERFACE SETTINGS" for details.

2-4-2. USB Control Command Format

USB data from the PC will be converted inside this device into RS-232C data. Therefore, the control command format will be the same as that of RS-232C. Refer to "2-2-2. RS-232C Control Command Format" for details. However, the termination code is fixed at CR (0x0D) and the baud rate is fixed at 9600 bps.

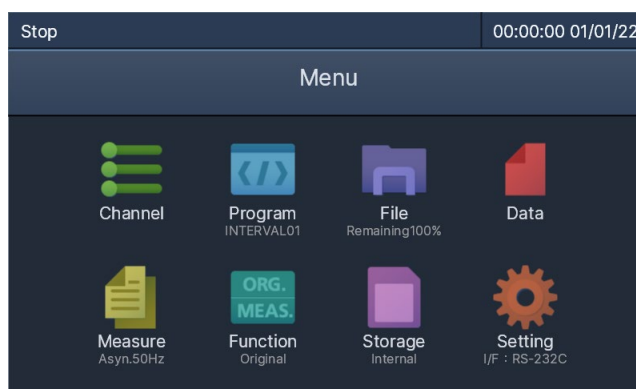
2-4-3. USB Response Format

USB data from the PC will be converted inside this device into RS-232C data. Therefore, the response format will be the same as that of RS-232C. Refer to "2-2-3. RS-232C Response Format" for details. However, the termination code is fixed at CR (0x0D) and the baud rate is fixed at 9600 bps.

2-5. PRECAUTIONS WHEN SENDING CONTROL COMMANDS

Some precautions when sending control commands are provided below.

- (1) Ensure that the following **Menu** screen is displayed when sending a control command. During communication using control commands, do not switch to any screen other than the **Menu** screen.



- (2) When this device receives a control command, key lock will be enabled. To cancel key lock, press and hold the key lock key on this device, or send a key lock release command (LOC).

3. CONTROL COMMANDS

A list of control commands is provided below. In the following table, "send only" indicates there will be no response from this device, while "send & receive" indicates there will be a response from this device.

Type	Details		Command	Send/Receive	Reference
Start measurement	Start real-time measurement		STA	Send & receive	3-3-1
	Prepare initial value measurement		INT	Send only	3-3-2
	Start monitor		CAL	Send & receive	3-3-3
	Start interval measurement		ION	Send only	3-3-4
	Start trigger measurement		TRG	Send only	3-3-5
	Start trigger interval measurement		TGI	Send only	3-3-6
Suspend measurement	Suspend measurement		STP	Send only	3-4-1
	Suspend interval measurement		IOF	Send only	3-4-2
	Suspend trigger interval measurement		TIF	Send only	3-4-3
Basic settings	Set first channel, last channel		CHR	Send only	3-5-1
	Set measurement value	Measured value	MES	Send only	3-5-2
		Original value	ORG	Send only	3-5-3
	Set channel mode		MOD	Send only	3-5-4
	Set scanning speed		SPD	Send only	3-5-5
	Apply measurement conditions		SCS	Send & receive	3-5-6
ON/OFF settings	Printing ON/OFF		PON	Send only	3-6-1
			POF		3-6-2
	Calibration coefficient calculation ON/OFF		CON	Send only	3-6-3
			COF		3-6-4
	Measurement data file saving ON/OFF		SON	Send only	3-6-5
			SOF		3-6-6
	Screen display ON/OFF		VON	Send only	3-6-7
			VOF		3-6-8
	Sound ON/OFF		BON	Send only	3-6-9
			BOF		3-6-10

Type	Details	Command	Send/Receive	Reference
Misc. settings	Set time	TIM	Send only	3-7-1
	Set calibration coefficient	CST	Send only	3-7-2
	Set offset	OFS	Send only	3-7-3
	Set initial value	INI	Send only	3-7-4
	Set reference resistance value	ROC	Send only	3-7-5
	Set interval conditions	INV	Send only	3-7-6
	Set trigger conditions	TST	Send only	3-7-7
	Set trigger interval conditions	TIP	Send only	3-7-8
	Set measurement data file name (Fixed at 7 characters)	FNM	Send only	3-7-9
	Set measurement data file name (32 characters or less)	LNМ	Send only	3-7-10
	Enable/disable use of scanning unit	ISU	Send only	3-7-11
	Scanning unit usage channel range	ISC	Send only	3-7-12
	Enable/disable use of external scanner	ESU	Send only	3-7-13
	External scanner usage channel range	ESC	Send only	3-7-14
	Set volume	SND	Send only	3-7-15
	Set brightness	VFD	Send only	3-7-16
	System settings • Power management settings • Rainfall input settings • Scanning unit settings • Trigger mode settings • Cold junction compensation settings • Delta V settings • Delta T settings • Power frequency settings • Measurement timing settings • Header section output settings • Measurement value output format settings	DSW	Send only	3-7-17

Type	Details	Command	Send/Receive	Reference
Misc. loading	Load time	TRD	Send & receive	3-8-1
	• Channel mode	PRR00	Send & receive	3-8-2
	• Initial value	PRR01		3-8-3
	• Calibration coefficient	PRR02		3-8-4
	• Interval conditions	PRR03		3-8-5
	• Trigger conditions	PRR04		3-8-6
	• First channel, last channel, measurement value settings	PRR06		3-8-7
	• Parameter ON/OFF	PRR07		3-8-8
	• System settings	PRR08		3-8-9
	• Scanning speed	PRR09		3-8-10
	• Trigger interval conditions	PRR10		3-8-11
	• Offset	PRR11		3-8-12
	• Reference resistance value	PRR12		3-8-13
	• Alarm hysteresis	PRR14		3-8-14
	• Maintenance setting	PRR18		3-8-15
	• Volume	PRR19		3-8-16
Checks	• Insulation	CHK0	Send & receive	3-9-1
	• BV2V	CHK1		3-9-2
	• BV5V	CHK2		3-9-3
	• Input resistance	CHK3		3-9-4
	• Output resistance	CHK4		3-9-5
	• Terminal temperature	CHK5		3-9-6
	• Disconnection	CHK6		3-9-7
	• Burnout	CHK7		3-9-8
	• Channel mode detection	CHK8		3-9-9

Type	Details	Command	Send/Receive	Reference
File management	Switch measurement data file storage location	DEV	Send only	3-10-1
	Load file name	DIR	Send & receive	3-10-2
	Delete file	DEL	Send only	3-10-3
	Copy file	CPY	Send only	3-10-4
	Rename file	REN	Send only	3-10-5
	Delete all files	FMT	Send only	3-10-6
Reproduce	Reproduce measurement data file	REG	Send & receive	3-11-1
TEDS	Set TEDS sensor information loading	TCH	Send only	3-12-1
	Start TEDS sensor information loading	EID	Send & receive	3-12-2
	Load TEDS sensor information	GID	Send & receive	3-12-3
	Load detailed TEDS sensor information	SID	Send & receive	3-12-4
Groups	Switch monitor screen group and start monitoring	GRC	Send & receive	3-13-1
	Register channel number to group	GRP	Send only	3-13-2
	Load channel number registered to group	GRR	Send & receive	3-13-3
	Delete channel number registered to group	GRE	Send only	3-13-4

Type	Details	Command	Send/Receive	Reference
Programs	Create new program	PGN	Send only	3-14-1
	Load registered program name	PGI	Send & receive	3-14-2
	Set interval program	PIN	Send only	3-14-3
	Set trigger program	PTS	Send only	3-14-4
	Set trigger interval program	PTI	Send only	3-14-5
	Rename program	PNM	Send only	3-14-6
	Delete program	PGE	Send only	3-14-7
	Duplicate program	PGC	Send only	3-14-8
	Change assigned program	PGA	Send only	3-14-9
	Lock/unlock program	PGL	Send only	3-14-10
	Load automatic measurement mode set for program	PGM	Send & receive	3-14-11
	Load conditions set for program	PGR	Send & receive	3-14-12
Alarms	Set alarm hysteresis	HYS	Send only	3-15-1
	Set individual alarm hysteresis	HSS	Send only	3-15-2
	Load individual alarm hysteresis	HSR	Send & receive	3-15-3
	Set alarm conditions	ARM	Send only	3-15-4
	Alarm function ON/OFF	AON/ AOF	Send only	3-15-5 3-15-6
	Individual alarm function ON/OFF	ALS	Send only	3-15-7
	All alarm contacts OFF	ACL	Send only	3-15-8

Type	Details	Command	Send/Receive	Reference
Other	Test bus line	RS-LAN	Send & receive	3-16-1 3-16-2
	Load system information	SYS	Send & receive	3-16-3
	Load detailed system information	SNR	Send & receive	3-16-4
	Load detailed system information	VER	Send & receive	3-16-5
	Load error number	ERR	Send & receive	3-16-6
	Initialize error number	ECL	Send only	3-16-7
	Set duplicate channel	DUP	Send only	3-16-8
	Set maintenance	MTS	Send only	3-16-9
	Automatically set channel mode when channel mode is detected	MAS	Send only	3-16-10
	Initialize system	RST	Send only	3-16-11
	Revert to factory defaults	DFT	Send only	3-16-12
	Cancel key lock	LOC	Send only	3-16-13

3-1. WAITING TIME WHEN SENDING CONTROL COMMANDS

When sending control commands, a waiting time is required between commands.

The waiting time varies depending on whether the command is an "STA command" or a different command.

3-1-1. Command Other than STA

Waiting time between sending command, and sending next command: Approx. 100 msec

Waiting time between receiving response, and sending next command: Approx. 100 msec

Waiting Time Example (Command Other than STA)

Send 'RS-' command
Receive '232C'
Wait approx. 100 msec
Send 'CHR' command
Wait approx. 100 msec

3-1-2. STA Command

Waiting time between receiving last channel measurement data, and sending next STA command: Approx. 2 sec

Waiting Time Example (STA Command)

Send 'STA' command
Receive last channel measurement data
Wait approx. 2 sec
Send 'STP' command
Wait approx. 100 msec



CAUTION

The above waiting time is a rough standard.
If a timeout occurs, increase the waiting time.

3-2. MEASUREMENT DATA FORMAT

The format used for measurement data (responses to STA commands, etc.) is as follows.

"TC" below stands for "termination code."

- Measurement data: ASCII code
- Data separator: "," (comma)
- Termination code: Refer to the table below.

Interface	Termination Code	
RS-232C	CR selected	CR (0x0D)
	CRLF selected	CR (0x0D) LF (0x0A)
USB	CR (0x0D)	
Ethernet	null (0x00)	

- Header section format: Header section output to start of measurement data.

|———— 19 characters + Termination code ———|
 ○○○○, ○○, ○○, ○○, ○○, ○○ + TC
 Year Month Day Hour Min Sec

This device can also be set to not output a header section.

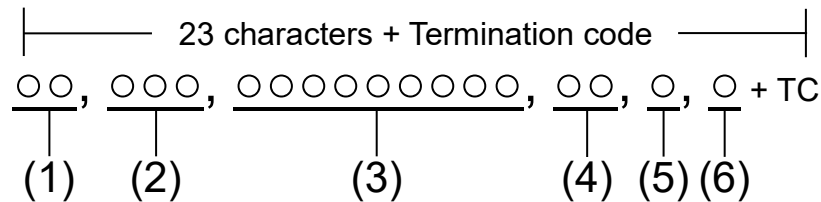
Refer to "2-1-1. Output Format" for details.

● Measurement data section format:

The format varies depending on whether all items are output, or only the channel number and measurement data are output.

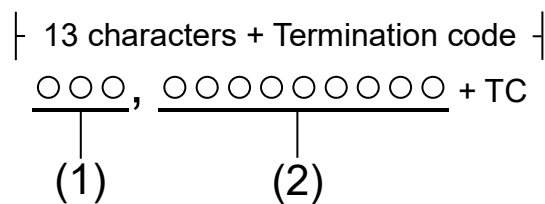
Refer to "2-1-1. Output Format" for details.

[All items output]



Number	Name	No. of Characters
1	Status number	2
2	Channel number	3
3	Measurement data	9 (including ± sign)
4	Unit number	2
5	Associated data determination code	1
6	End code	1

[Only channel number and measurement data output]



Number	Name	No. of Characters
1	Channel number	3
2	Measurement data	9 (including ± sign)

● Status number:

This number indicates the status of the measurement data. If the status number is any number than 00, the measurement data will be 999999.

Number	Status	Cause & Solution
00	Normal data	
01	Measurement data exceeded	The measurement data has been exceeded. → Check the following for failure in the sensor or this device. • Is there an excessive load on the sensor? • Is the sensor connected properly? • Is normal measurement possible on another channel? • Is the channel mode correct?
02	Initial value abnormal	The initial value has been exceeded. → Perform initial measurement again. Or, set the correct initial value.
03	Display/print digits exceeded	When performing calibration coefficient calculation, the number of resulting integer digits exceeded the decimal point position. → Check the calibration coefficient and decimal point position.
04	Unusable channel mode	The channel mode cannot be used. → Check the channel mode.
05	Measurement temperature range Exceeded	The measurement temperature range was exceeded. → Check whether the input voltage exceeds the electromotive force range of the thermocouple during thermocouple measurement.
06	No common dummy. Dummy channel measurement data is abnormal.	There is no dummy channel during true dummy measurement. → Check the channel mode. The dummy channel data is erroneous. → Check whether the dummy channel sensor is normal. Check whether the initial value of the dummy channel is normal.
07	Thermocouple measurement terminal temperature abnormal	The terminal temperature exceeded the temperature range. → Confirm by running the terminal temperature check.
08	Skipped channel	Measurement is OFF for this channel.

Number	Status	Cause & Solution
09	Disconnection error	The B and D terminals may be disconnected. → Check that the B and D terminals are connected properly. Check for a disconnection.
11	A/D converter fault	The A/D converter is faulty. → Remeasure and check whether this error occurs again. → If this occurs frequently, request service from KYOWA.
30	Device and USB-80A/70 channel mode mismatch	The channel mode of this device does not match that of USB-80A/70. → Check the channel mode of this device or USB-70A. → Check the MODE SET switch on USB-70A.
31	Scanner recognition not possible	→ If this error occurs frequently regardless of whether a scanning unit or external scanner is installed, request service from KYOWA.

- Channel number: 000 to 999
- Unit number: 00 to 58

Unit Number	Display Unit	Unit Number	Display Unit	Unit Number	Display Unit
00	$\times 10^{-6}$ strain	20	cm/s ²	40	m/s
01	$\mu\text{m/m}$	21	m/s ²	41	m/min
02	mN	22	G	42	km/h
03	N	23	g	43	Hz
04	kN	24	kg	44	kHz
05	MN	25	t	45	MHz
06	N · m	26	ms	46	rpm
07	kN · m	27	s	47	Ω
08	N · cm	28	min	48	k Ω
09	Pa	29	h	49	M Ω
10	hPa	30	mV	50	mW
11	kPa	31	V	51	W
12	MPa	32	mA	52	kW
13	N/mm ²	33	A	53	dB
14	N/m ²	34	K	54	%
15	mmHg	35	°C	55	ppm
16	kgf/cm ²	36	rad	56	pH
17	mm	37	°	57	R
18	cm	38	rad/s	58	(blank)
19	m	39	cm/s		

- Associated data determination code:

If the channel mode is set to "civil engineering transducer with temperature measuring function," two sets of measurement data will be output per single channel. The second set of measurement data here is called "associated data." For associated data, the associated data determination code will be "1." For channel modes other than "civil engineering transducer with temperature measuring function," the associated data determination code will be "0."

- End code:

[When measuring using the STA or CAL command]

- 0: Channel other than last channel
- 1: Last channel
- 3: Last channel during monitoring

[When reproducing a measurement data file using the REG command]

- 0: Channel other than last channel
- 1: Last channel when measurement data file reproduction has ended
- 2: Last channel during measurement data file reproduction
- 9: Channel when measurement was suspended by STP command, etc.

3-3. CONTROL COMMANDS (MEASUREMENT START)

Control command details are provided below.

"△" indicates a space (0x20).

",," indicates a comma (0x2C).

"X" indicates (0x58).

3-3-1. STA: Start Real-Time Measurement

- Starts real-time measurement, and outputs the header and measurement data.
- If this device sends a suspend measurement command (STP), measurement is suspended.
- This can be used together with the prepare initial value measurement command (INT) to perform initial value measurement.

◆◆ Control command ◆◆

STA

◆◆ Response ◆◆

- Outputs the header once, and then outputs measurement data in series.
Refer to "3-2. MEASUREMENT DATA FORMAT" for details.
- Measurement data is not output for channels where the channel mode is set to "measurement OFF."
- However, for the measurement start channel (first channel) and measurement end channel (last channel), measurement data will be output even if the channel mode is set to "measurement OFF."

For example, measurement data would be output for CH0, CH1, and CH3 in the following configuration.

Measurement channel range: CH0 to CH3

CH0 channel mode: Measurement OFF

CH1 channel mode: 4-gage (constant voltage, BV2V)

CH2 channel mode: Measurement OFF

CH3 channel mode: Measurement OFF

3-3-2. INT: Prepare Initial Value Measurement

- Sets this device to wait for initial value measurement to start.

Once this device receives STA, initial value measurement is started.

- Once initial value measurement has been performed, the measurement value setting automatically switches to measured value.

◆◆◆ Control command ◆◆◆

INT

3-3-3. CAL: Start Monitor

- Performs measurement for the specified monitor channel, and outputs measurement data.
- Up to three digits (up to 50 channels) can be specified for monitoring.
- If this device receives a suspend measurement command (STP), measurement is suspended.

◆◆◆ Control command ◆◆◆

CAL 000 001 002 X
(1) (1) (1)

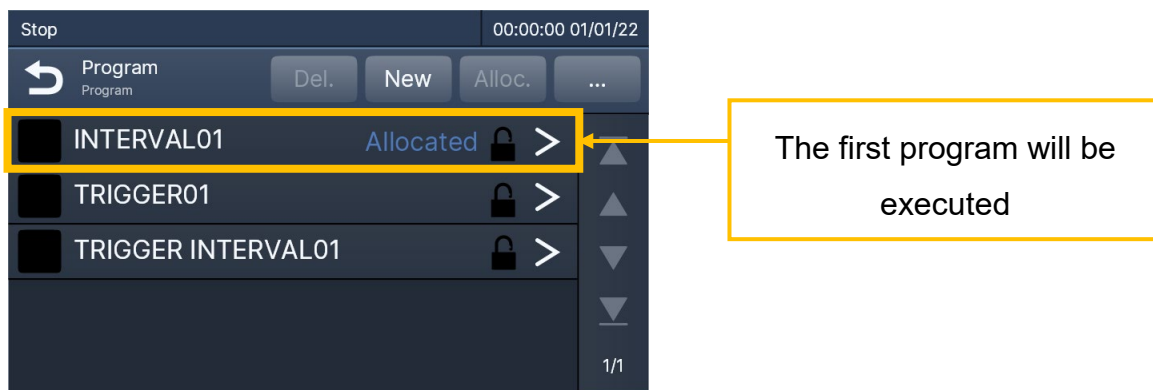
No.	Details	No. of Characters
1	Monitor channel (000-999)	3

◆◆◆ Response ◆◆◆

- Outputs measurement data in series.
Refer to "3-2. MEASUREMENT DATA FORMAT" for details.
- Also outputs measurement data for channels where the channel mode is set to "measurement OFF."

3-3-4. ION: Start Interval Measurement

- Starts interval measurement.
- If this device receives ION, the first program (refer to figure below) is executed.
The first program will be assigned at this time.
- However, if any of the following conditions are met, this device will not do anything.
 - (1) The automatic measurement mode of the first program is not "interval"
 - (2) There is no first program
- If this device receives a suspend measurement command (IOF), measurement is suspended.

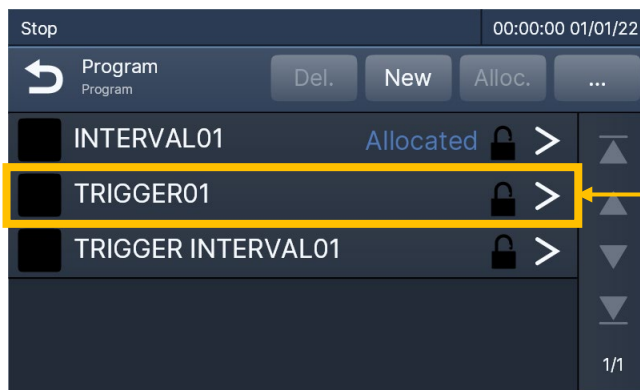


◆◆◆ Control command ◆◆◆

ION

3-3-5. TRG: Start Trigger Measurement

- Starts trigger measurement.
- If this device receives TRG, the second program (refer to figure below) is executed.
The second program will be assigned at this time.
- However, if any of the following conditions are met, this device will not do anything.
 - (1) The automatic measurement mode of the second program is not "trigger"
 - (2) There is no second program
- If this device receives a suspend measurement command (STP), measurement is suspended.



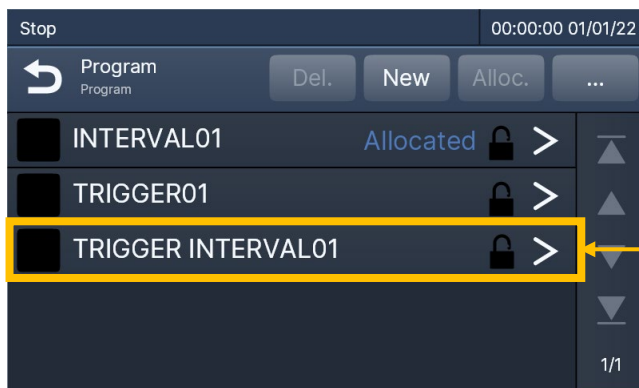
The second program will
be executed

◆◆ Control command ◆◆

TRG

3-3-6. TGI: Start Trigger Interval Measurement

- Starts trigger interval measurement.
- If this device receives TGI, the third program (refer to figure below) is executed.
The third program will be assigned at this time.
- However, if any of the following conditions are met, this device will not do anything.
 - (1) The automatic measurement mode of the third program is not "trigger interval"
 - (2) There is no third program
- If this device receives a suspend measurement command (TIF), measurement is suspended.



The third program will be executed

◆◆ Control command ◆◆

TGI

3-4. CONTROL COMMANDS (MEASUREMENT SUSPENSION)

3-4-1. STP: Suspend Measurement

- Suspends real-time measurement, trigger measurement, and monitoring.
- To suspend interval measurement, use IOF.
- To suspend trigger interval measurement, use TIF.

◆◆◆ Control command ◆◆◆

STP

3-4-2. IOF: Suspend Interval Measurement

- Suspends interval measurement.

◆◆◆ Control command ◆◆◆

IOF

3-4-3. TIF: Suspend Trigger Interval Measurement

- Suspends trigger interval measurement.

◆◆◆ Control command ◆◆◆

TIF

3-5. CONTROL COMMANDS (BASIC SETTINGS)

3-5-1. CHR: Set First Channel, Last Channel

- Sets the measurement channel range.
- The measurement channel range is set using the measurement start channel (first channel) and measurement end channel (last channel).

◆◆◆ Control command ◆◆◆

CHR 000 029 01 X
(1) (2) (3)

No.	Details	No. of Characters
1	First channel (000-999)	3
2	Last channel (000-999)	3
3	Repeat times (Fixed at 01)	2

3-5-2. MES: Change Measurement Value Setting to Measured Value

Changes the measurement value setting to measured value.

◆◆◆ Control command ◆◆◆

MES

3-5-3. ORG: Change Measurement Value Setting to Original Value

Changes the measurement value setting to original value.

◆◆◆ Control command ◆◆◆

ORG

3-5-4. MOD: Set Channel Mode

- Sets the channel mode.
- This is generally set for each channel. However, the set duplicate channel command (DUP) can be used to set the same channel mode on continuous channels.
- This will be set in order from the first channel set by CHR.

◆◆ Control command ◆◆◆

Example 1: Channel mode of first channel set to 12, next channel set to 13

MOD 12 X 13 X
(1) (1)

Example 2: Channel mode of first channel set to 12, next channel set to 13, and channels up to CH9 set to 13

MOD12X13X,DUP009X

No.	Details	No. of Characters
1	Channel mode number (Refer to the table below for details)	2

CH Mode Number	Function
00	Measurement OFF
01	1-gage (120 Ω , BV2V)
02	1-gage (240 Ω , BV2V)
03	1-gage (350 Ω , BV2V)
04	1-gage (120 Ω , dummy, BV2V)
05	1-gage (120 Ω , active, BV2V)
06	1-gage (350 Ω , dummy, BV2V)
07	1-gage (350 Ω , active, BV2V)
08	2-gage (active, dummy, BV2V)
09	2-gage (active, active, BV2V)
10	2-gage (common dummy, BV2V)
11	4-gage (opposite side active, BV2V)
12	4-gage (constant voltage, BV2V)
13	4-gage (constant voltage, BV5V) high-resolution mode
14	4-gage (constant current, 120 Ω)
15	4-gage (constant current, 350 Ω)
16	4-gage (constant current, 350 Ω) high-resolution mode
17	Civil engineering transducer with temperature measuring function
18	Voltage (500 mV)
19	Voltage (50 V)
20	Current (50 mA)
21	Thermocouple (K)
22	Thermocouple (T)
23	Thermocouple (E)
24	Thermocouple (J)
25	Thermocouple (R)
26	Platinum resistance thermometer 100 Ω (Pt100)
27	Platinum resistance thermometer 100 Ω (JPt100)
28	Potentiometer sensor

CH Mode Number	Function
29	1-gage (120 Ω , BV5V)
30	1-gage (240 Ω , BV5V)
31	1-gage (350 Ω , BV5V)
32	1-gage (120 Ω , dummy, BV5V)
33	1-gage (120 Ω , active, BV5V)
34	1-gage (350 Ω , dummy, BV5V)
35	1-gage (350 Ω , active, BV5V)
36	2-gage (active, dummy, BV5V)
37	2-gage (active, active, BV5V)
42	Set when using USB-70A on SCANNER side

- Do not set the following channel modes on scanning units.

10

42

- If the MODE SET switch on USB-70A is set to SCANNER, set channel mode 42 on the external scanner.

- If the MODE SET switch on USB-70A is set to REMOTE, or USB-80A/70B is used, the following channel modes can be used.

Other channel modes must not be set on external scanners.

External Scanner Used	Available Channel Mode Numbers
USB-70A-10/20 USB-70B-10/20 USB-80A-10/20	00 to 12, 15, 18 to 25, 28
USB-70A-30, USB-70B-30 USB-80A-30	00 to 12, 15, 17, 18 to 28

3-5-5. SPD: Set Scanning Speed

- Sets the scanning speed.
- This is generally set for each channel. However, the set duplicate channel command (DUP) can be used to set the same channel mode on continuous channels.
- This will be set in order from the first channel set by CHR.
- High speed can be set only for scanning units.

◆◆ Control command ◆◆

Example 1: Scanning speed of first channel set to 0, next channel set to 1
 SPD 0 X 1 X
 (1) (1)

Example 2: Scanning speed of first channel set to 0, next channel set to 1, and channels up to CH9 set to 1
 SPD0X1X,DUP009X

No.	Details	No. of Characters
1	Scanning speed (Refer to the table below for details)	1

Number	Scanning Speed
0	High speed (can be set only for scanning units)
1	Normal
2	0.28sec
3	0.5sec
4	1sec
5	2sec
6	5sec
7	10sec

3-5-6. SCS: Apply Measurement Conditions

- Applies measurement conditions to this device.
- Be sure to send this command prior to performing measurement.
- Once measurement conditions have been applied, this device will send "SCS." Ensure that this is received.

◆◆◆ Control command ◆◆◆

SCS

◆◆◆ Response ◆◆◆

SCS

3-6. CONTROL COMMANDS (ON/OFF SETTINGS)

3-6-1. PON: Printing ON

Enables the printing function.

◆◆ Control command ◆◆

PON

3-6-2. POF: Printing OFF

Disables the printing function.

◆◆ Control command ◆◆

POF

3-6-3. CON: Calibration Coefficient Calculation ON

Enables calibration coefficient calculation.

◆◆ Control command ◆◆

CON

3-6-4. COF: Calibration Coefficient Calculation OFF

Disables calibration coefficient calculation.

◆◆ Control command ◆◆

COF

3-6-5. **SON: Measurement Data File Saving ON**

Enables the measurement data file saving function.

◆◆◆ Control command ◆◆◆

SON

3-6-6. **SOF: Measurement Data File Saving OFF**

Disables the measurement data file saving function.

◆◆◆ Control command ◆◆◆

SOF

3-6-7. **VON: Screen Display ON**

Turns screen display ON.

◆◆◆ Control command ◆◆◆

VON

3-6-8. **VOF: Screen Display OFF**

Turns screen display OFF.

◆◆◆ Control command ◆◆◆

VOF

3-6-9. **BON: Sound ON**

Turns sound ON.

◆◆◆ Control command ◆◆◆

BON

3-6-10. **BOF: Sound OFF**

Turns sound OFF.

◆◆◆ Control command ◆◆◆

BOF

3-7. CONTROL COMMANDS (MISC. SETTINGS)

3-7-1. TIM: Set Time

- Sets the time.
- Do not set a time on or after January 19, 2038.

◆◆ Control command ◆◆

TIM 2022 01 02 12 30 00 X
 (1) (2)(3)(4)(5)(6)

No.	Details	No. of Characters
1	Year (2000-2038)	4
2	Month (01-12)	2
3	Day (01-31)	2
4	Hour (00-23)	2
5	Minutes (00-59)	2
6	Seconds (00-59)	2

3-7-2. CST: Set Calibration Coefficient

- Sets the calibration coefficient for changing measurement data into physical quantities.
- This is generally set for each channel. However, the set duplicate channel command (DUP) can be used to set the same channel mode on continuous channels.
- This will be set in order from the first channel set by CHR.

◆◆ Control command ◆◆

CST + 1.2345 +1 2 03 X
 (1) (2) (3)(4)(5)

No.	Details	No. of Characters
1	Significand portion sign for calibration coefficient (-, +, 0)	1
2	Significand portion of calibration coefficient (including decimal point) (0.0001-999999)	6
3	Exponent portion of calibration coefficient (-9 to +9)	2
4	Decimal point position (Refer to the table below for details)	1
5	Unit number (Refer to "3-2. MEASUREMENT DATA FORMAT" for details)	2

Number of Digits after Decimal Point	Measurement Data Format
0	#####
1	#####.
2	####.##
3	###.###
4	##.####
5	#.#####

3-7-3. OFS: Set Offset

- Sets the offset.
- This is generally set for each channel. However, the set duplicate channel command (DUP) can be used to set the same channel mode on continuous channels.
- This will be set in order from the first channel set by CHR.

◆◆◆ Control command ◆◆◆

OFS ± 00000100 X

(1) (2)

No.	Details	No. of Characters
1	Offset sign (-, +, 0)	1
2	Offset (including decimal point) (0-999999.9)	8

3-7-4. INI: Set Initial Value

- Sets the initial value.
- This is generally set for each channel. However, the set duplicate channel command (DUP) can be used to set the same channel mode on continuous channels.
- This will be set in order from the first channel set by CHR.

◆◆ Control command ◆◆

INI ± 00000100 X

(1) (2)

No.	Details	No. of Characters
1	Initial value sign (-, +, 0)	1
2	Initial value (including decimal point) (0-999999.9)	8

3-7-5. ROC: Set Reference Resistance Value

- Sets the reference resistance value.
- This is generally set for each channel. However, the set duplicate channel command (DUP) can be used to set the same channel mode on continuous channels.
- This will be set in order from the first channel set by CHR.

◆◆◆ Control command ◆◆◆

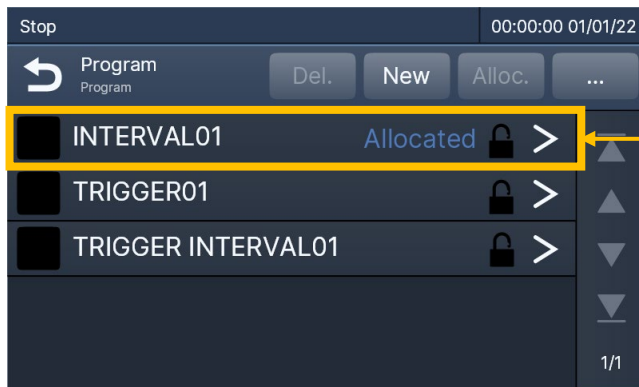
ROC 000000100 X

(1)

No.	Details	No. of Characters
1	Reference resistance value (0-999999.9)	9

3-7-6. INV: Set Interval Conditions

- This command can be sent in series to set interval conditions.
- During the first transmission, the measurement start time is sent.
- During the second through 16th transmissions, conditions for steps 1 through 15 are sent.
- The first program will be set (refer to figure below).
However, this device will do nothing if there is no first program.



The first program will be set

◆◆◆ Control command (1st time sent) ◆◆◆

Example 1: Start measurement on January 2, 2022 at 12:30:00

INV 2022 01 02 12 30 00 X

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

Example 2: Start measurement when the program run/stop key is pressed

INV-----X

No.	Details	No. of Characters
1	Year (2000-2038)	4
2	Month (01-12)	2
3	Day (01-31)	2
4	Hour (00-23)	2
5	Minutes (00-59)	2
6	Seconds (00-59)	2

- If measurement will begin when the program run/stop key is pressed, parameters (1) through (6) will be filled with hyphens ("- [0x2D]).

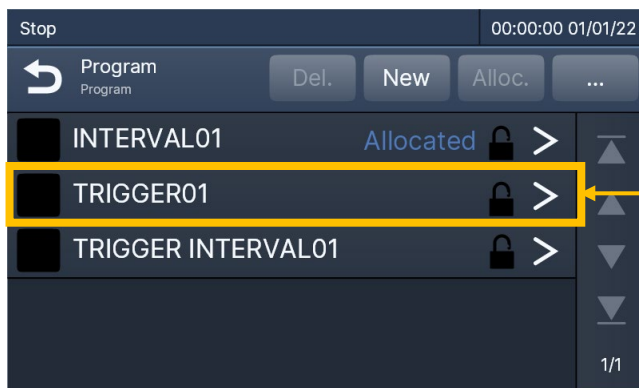
◆◆◆ Control command (2nd through 16th time sent) ◆◆◆

INV 00 01 02 03 04 9999 E X
 (1)(2)(3)(4)(5) (6) (7)

No.	Details	No. of Characters
1	Step number (00-14)	2
2	Day (00-31)	2
3	Hour (00-23)	2
4	Minutes (00-59)	2
5	Seconds (00-59)	2
6	Times (0000-9999)	4
7	Status (C, E, 00-14)	1-2

3-7-7. TST: Set Trigger Conditions

- This command can be sent in series to set trigger conditions.
- During the first transmission, the trigger channel number is sent.
- During the second transmission, the reference value is sent (transmission is not required if the trigger mode is "absolute value").
- During the third through 17th transmissions, conditions for steps 1 through 15 are sent.
- The second program will be set (refer to figure below).
However, this device will do nothing if there is no second program.



The second program will
be set

◆◆◆ Control command (1st time sent) ◆◆◆

TST 000 X
(1)

No.	Details	No. of Characters
1	Trigger channel number (000-999)	3

◆◆◆ Control command (2nd time sent) ◆◆◆

TST +00000100 X
(1)

No.	Details	No. of Characters
1	Reference value (9 digits, including ± sign and decimal point)	9

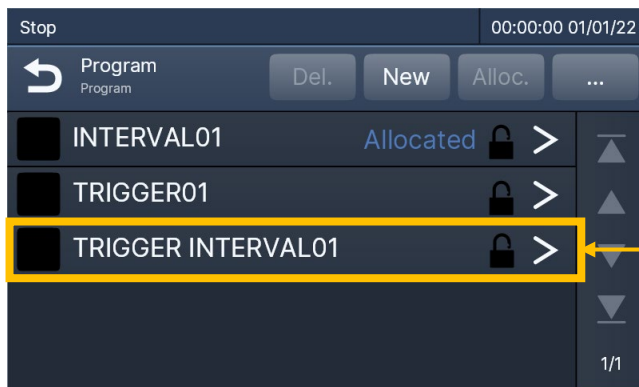
◆◆◆ Control command (3rd through 17th time sent) ◆◆◆

TST 00 +00000100 9999 E X
(1) (2) (3) (4)

No.	Details	No. of Characters
1	Step number (00-14)	2
2	Trigger value (9 digits, including ± sign and decimal point)	9
3	Times (0000-9999)	4
4	Status (C, E, 00-14)	1-2

3-7-8. TIP: Set Trigger Interval Conditions

- This command can be sent in series to set trigger interval conditions.
- During the first transmission, the trigger channel number is sent.
- During the second transmission, the reference value is sent.
- During the third through 17th transmissions, conditions for steps 1 through 15 are sent.
- The third program will be set (refer to figure below).
However, this device will do nothing if there is no third program.



The third program will be set

◆◆◆ Control command (1st time sent) ◆◆◆

TIP 000 X
(1)

No.	Details	No. of Characters
1	Trigger channel (000-999)	3

◆◆◆ Control command (2nd time sent) ◆◆◆

TIP +00000100 X
(1)

No.	Details	No. of Characters
1	Reference value (9 digits, including ± sign and decimal point)	9

◆◆◆ Control command (3rd through 17th time sent) ◆◆◆

TIP 00 01 02 03 04 9999 E X
(1)(2)(3)(4)(5) (6) (7)

No.	Details	No. of Characters
1	Step number (00-14)	2
2	Day (00-31)	2
3	Hour (00-23)	2
4	Minutes (00-59)	2
5	Seconds (00-59)	2
6	Times (0000-9999)	4
7	Status (C, E, 00-14)	1-2

3-7-9. FNM: Set Measurement Data File Name (Fixed at 7 Characters)

- Sets the file name when saving a measurement data file.
- When using FNM, the file name must always be 1-7 characters long.

◆◆◆ Control command ◆◆◆

FNM test123
(1)

No.	Details	No. of Characters
1	File name (1-7 characters) (Alphanumeric lower case characters and some symbols only)	1-7

3-7-10. LNM: Set Measurement Data File Name (32 Characters or Less)

- Sets the file name when saving a measurement data file.
- When using LNM, the file name must be between 1 and 32 characters long.

◆◆◆ Control command ◆◆◆

LNM 0 test123456
(1) (2)

No.	Details	No. of Characters
1	Fixed character string attached to end of file name 0: yymmdd_XXX.extension 1: yymmdd_hhmmss.extension 2: XXX.extension 3: .extension	1
2	File name (from 1 to 32 characters) (Alphanumeric characters and some symbols only)	1-32

- The "yymmdd" portion will be replaced with the year (yy), month (mm), and day (dd) when saving the file.
- The "hhmmss" portion will be replaced with the hour (hh), minutes (mm), and seconds (ss) when saving the file.
- The "XXX" portion will be replaced with a fixed character string (000).
- The "extension" portion will be replaced with the file extension.

3-7-11. ISU: Enable/Disable Use of Scanning Unit

Enables/disables use of scanning unit.

◆◆◆ Control command ◆◆◆

ISU 0
(1)

No.	Details	No. of Characters
1	0: Do not use 1: Use	1

3-7-12. ISC: Scanning Unit Usage Channel Range

Sets the scanning unit usage channel range.

◆◆◆ Control command ◆◆◆

ISC 000 029
(1) (2)

No.	Details	No. of Characters
1	First channel (000-029)	3
2	Last channel (000-029)	3

3-7-13. ESU: Enable/Disable Use of External Scanner

Enables/disables the use of the external scanner.

◆◆◆ Control command ◆◆◆

ESU 0
(1)

No.	Details	No. of Characters
1	0: Do not use 1: Use	1

3-7-14. ESC: External Scanner Usage Channel Range

Sets the external scanner usage channel range.

◆◆◆ Control command ◆◆◆

ESC 030 039
(1) (2)

No.	Details	No. of Characters
1	First channel (000-999)	3
2	Last channel (000-999)	3



CAUTION

- If using internal scanners and external scanners, set the external scanner channel numbers from 30 or more.
- If using internal scanners and external scanners, the external scanner channel numbers must be larger than the internal scanner channel numbers.

3-7-15. SND: Set Volume

Sets the volume.

◆◆◆ Control command ◆◆◆

SND 000
(1)

No.	Details	No. of Characters
1	Volume 020: 20% 040: 40% 060: 60% 080: 80% 100: 100%	3

3-7-16. VFD: Set Brightness

Sets the brightness of the screen.

◆◆◆ Control command ◆◆◆

VFD 0
(1)

No.	Details	No. of Characters
1	Brightness 0: OFF 1: 20% 2: 20% 3: 40% 4: 40% 5: 60% 6: 60% 7: 80% 8: 80% 9: 100%	1

3-7-17. DSW: System Settings

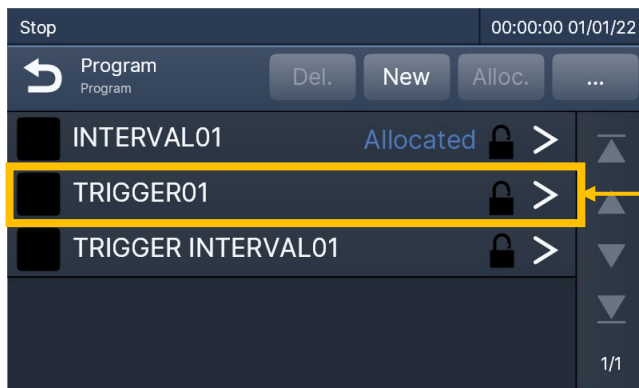
Configures system settings.

◆◆◆ Control command ◆◆◆

DSW 0 1 0 1 0 1 0 1 0 1 0 X
 (1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11)

No.	Details	No. of Characters
1	Measurement data output format (0: Channel number and measurement data, 1: All items)	1
2	Header output (0: Do not output, 1: Output)	1
3	Trigger mode (0: Relative value, 1: Absolute value)	1
4	Power frequency used (0: 50 Hz, 1: 60 Hz)	1
5	Measurement timing (0: Power synchronized, 1: Power non-synchronized)	1
6	Scanning unit (0: Do not use, 1: Use)	1
7	Cold junction compensation (0: Internal, 1: External)	1
8	Delta T (0: Disabled, 1: Enabled)	1
9	Delta V (0: Disabled, 1: Enabled)	1
10	Rainfall input (0: Do not use, 1: 1 mm, 2: 0.5 mm)	1
11	Fixed at 0	1

- Trigger mode (3) will be set for the second program (refer to figure below).



The second program
trigger mode will be set

3-8. CONTROL COMMANDS (LOADING)

3-8-1. TRD: Load Time

Loads the time.

◆◆ Control command ◆◆

TRD

◆◆ Response ◆◆

2022 01 02 12 30 00
(1) (2) (3) (4) (5) (6)

No.	Details	No. of Characters
1	Year (2000-2038)	4
2	Month (01-12)	2
3	Day (01-31)	2
4	Hour (00-23)	2
5	Minutes (00-59)	2
6	Seconds (00-59)	2

3-8-2. PRR00: Load Channel Mode

Outputs the channel mode in series, from the first channel to the last channel.

◆◆◆ Control command ◆◆◆

PRR00

◆◆◆ Response ◆◆◆

000△12

(1) (2)

No.	Details	No. of Characters
1	Channel number (000-999)	3
2	Channel mode (Refer to "3-5-4. MOD: Set Channel Mode" for details)	2

For example, if the first channel is 0, the last channel is 2, and the channel mode for all is 12, the response to this command would be as follows.

000△12 (first response)
 001△12 (second response)
 002△12 (third response)

3-8-3. PRR01: Load Initial Value

Outputs the initial value in series, from the first channel to the last channel.

◆◆◆ Control command ◆◆◆

PRR01

◆◆◆ Response ◆◆◆

000△-1234.567

(1) (2)

No.	Details	No. of Characters
1	Channel number (000-999)	3
2	Initial value (9 digits, including ± sign and decimal point) Spaces will be added if less than 9 digits.	9

For example, if the first channel is 0, the last channel is 2, and initial value for all is -1234.567, the response to this command would be as follows.

000△-1234.567 (first response)

001△-1234.567 (second response)

002△-1234.567 (third response)

3-8-4. PRR02: Load Calibration Coefficient

Outputs the calibration coefficient in series, from the first channel to the last channel.

◆◆◆ Control command ◆◆◆

PRR02

◆◆◆ Response ◆◆◆

000△-1.2345 +1△0△12
 (1) (2) (3) (4) (5)

No.	Details	No. of Characters
1	Channel number (000-999)	3
2	Significand (7 digits, including ± sign and decimal point)	7
3	Exponent portion (-9 to +9)	2
4	Decimal point position (0-5)	1
5	Unit number (Refer to "3-2. MEASUREMENT DATA FORMAT" for details)	2

For example, if the first channel is 0, the last channel is 2, and the calibration coefficient for all is -12.345, the response to this command would be as follows.

000△-1.2345+1△0△12 (first response)
 001△-1.2345+1△0△12 (second response)
 002△-1.2345+1△0△12 (third response)

3-8-5. PRR03: Load Interval Conditions

Outputs interval conditions in series (measurement start time, steps 1 through 15).

◆◆◆ Control command ◆◆◆

PRR03

◆◆◆ Response (1st time received) ◆◆◆

2022/01/02△12:30:00

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

No.	Details	No. of Characters
1	Year (2000-2038)	4
2	Month (01-12)	2
3	Day (01-31)	2
4	Hour (00-23)	2
5	Minutes (00-59)	2
6	Seconds (00-59)	2

- If measurement will begin when the program run/stop key is pressed, parameters (1) through (6) will be filled with hyphens ("- [0x2D]).

◆◆◆ Response (2nd through 16th time received) ◆◆◆

00△01-02-03-04△9999△E
 (1) (2) (3) (4)

No.	Details	No. of Characters
1	Step number (00-14)	2
2	Day-Hour-Minutes-Seconds	11
3	Repeat times (0000-9999)	4
4	Status (C, E, 00-14)	1-2

3-8-6. PRR04: Load External Trigger Conditions

Outputs trigger conditions in series (trigger channel number, reference value, steps 1 through 15).

◆◆◆ Control command ◆◆◆

PRR04

◆◆◆ Response (1st time received) ◆◆◆

000

(1)

No.	Details	No. of Characters
1	Trigger channel number (000-999)	3

◆◆◆ Response (2nd time received) ◆◆◆

-1234.567 (a second response will be output only when the trigger mode is "relative value")
(1)

No.	Details	No. of Characters
1	Reference value (9 digits, including ± sign and decimal point) Spaces will be added if less than 9 digits.	9

◆◆◆ Response (3rd through 17th time received) ◆◆◆

00△-1234.567△9999△E

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

No.	Details	No. of Characters
1	Step number (00-14)	2
2	Trigger value (9 digits, including ± sign and decimal point) "0" will be added if less than 9 digits.	9
3	Repeat times (0000-9999)	4
4	Status (C, E, 00-14)	1-2

3-8-7. PRR06: Load First Channel Number, Etc.

Loads information such as the first channel number.

◆◆◆ Control command ◆◆◆

PRR06

◆◆◆ Response ◆◆◆

000-029△01△MES

(1) (2) (3)

No.	Details	No. of Characters
1	First channel number-Last channel number	7
2	Fixed at 01	2
3	Measurement value setting MES: Measured value ORG: Original value	3

3-8-8. PRR07: Load Parameter ON/OFF

Loads parameter setting values (ON/OFF).

◆◆◆ Control command ◆◆◆

PRR07

◆◆◆ Response ◆◆◆

PON, COF, ION, SOF, AON

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

No.	Details	No. of Characters
1	Printing PON: Printing ON POF: Printing OFF	3
2	Calibration coefficient calculation CON: Calibration coefficient calculation ON COF: Calibration coefficient calculation OFF	3
3	Interval measurement ION: Interval measurement ON IOF: Interval measurement OFF	3
4	Measurement data file saving SON: Saving ON SOF: Saving OFF	3
5	Alarms AON: Any alarm ON AOF: All alarms OFF	3

3-8-9. PRR08: Load System Settings

Loads system settings.

◆◆◆ Control command ◆◆◆

PRR08

◆◆◆ Response ◆◆◆

0 1 0 1 0 1 0 1 0 1 0

(1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11)

No.	Details	No. of Characters
1	Measurement data output format (0: Channel number and measurement data, 1: All items)	1
2	Header output (0: Do not output, 1: Output)	1
3	Trigger mode (0: Relative value, 1: Absolute value)	1
4	Power frequency used (0: 50 Hz, 1: 60 Hz)	1
5	Measurement timing (0: Power synchronized, 1: Power non-synchronized)	1
6	Scanning Unit (0: Do not use, 1: Use)	1
7	Cold junction compensation (0: Internal, 1: External)	1
8	Delta T (0: Disabled, 1: Enabled)	1
9	Delta V (0: Disabled, 1: Enabled)	1
10	Rainfall input (0: Do not use, 1: 1 mm, 2: 0.5 mm)	1
11	Fixed at 0	1

3-8-10. PRR09: Load Scanning Speed

Outputs the scanning speed in series, from the first channel to the last channel.

◆◆◆ Control command ◆◆◆

PRR09

◆◆◆ Response ◆◆◆

000 1

(1) (2)

No.	Details	No. of Characters
1	Channel number (000-999)	3
2	Scanning speed number (Refer to "3-5-5. SPD: Set Scanning Speed" for details)	1

3-8-11. PRR10: Load Trigger Interval Conditions

Outputs trigger interval conditions in series (trigger channel number, reference value, steps 1 through 15).

◆◆ Control command ◆◆

PRR10

◆◆ Response (1st time received) ◆◆

000
(1)

No.	Details	No. of Characters
1	Trigger channel number (000-999)	3

◆◆◆ Response (2nd time received) ◆◆◆

-1234.567

(1)

No.	Details	No. of Characters
1	Reference value (9 digits, including ± sign and decimal point) Spaces will be added if less than 9 digits.	9

◆◆◆ Response (3rd through 17th time received) ◆◆◆

00△01-02-03-04△9999△E

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

No.	Details	No. of Characters
1	Step number (00-14)	2
2	Day-Hour-Minutes-Seconds	11
3	Repeat times (0000-9999)	4
4	Status (C, E, 00-14)	1-2

3-8-12. PRR11: Load Offset

Outputs the offset in series, from the first channel to the last channel.

◆◆◆ Control command ◆◆◆

PRR11

◆◆◆ Response ◆◆◆

000△-1234.567

(1) (2)

No.	Details	No. of Characters
1	Channel number (000-999)	3
2	Offset (9 digits, including ± sign and decimal point)	9

3-8-13. PRR12: Load Reference Resistance Value

Outputs the reference resistance value in series, from the first channel to the last channel.

◆◆ Control command ◆◆

PRR12

◆◆ Response ◆◆

000△+100.0000
(1) (2)

No.	Details	No. of Characters
1	Channel number (000-999)	3
2	Reference resistance value (9 digits, including + sign and decimal point)	9

3-8-14. PRR14: Load Alarm Hysteresis

Loads Alarm 1 hysteresis.

◆◆◆ Control command ◆◆◆

PRR14

◆◆◆ Response ◆◆◆

123.45

(1)

No.	Details	No. of Characters
1	Alarm 1 hysteresis (including decimal point)	6

3-8-15. PRR18: Load Maintenance Setting

Loads the maintenance setting.

◆◆◆ Control command ◆◆◆

PRR18

◆◆◆ Response ◆◆◆

0
(1)

No.	Details	No. of Characters
1	Maintenance setting 0: Connect ACOM-GND 1: Disconnect ACOM-GND	1

3-8-16. PRR19: Load Volume

Loads the volume.

◆◆◆ Control command ◆◆◆

PRR19

◆◆◆ Response ◆◆◆

020

(1)

No.	Details	No. of Characters
1	Volume 020: 20% 040: 40% 060: 60% 080: 80% 100: 100%	3

3-9. CONTROL COMMANDS (CHECKING)

3-9-1. CHK0: Perform Insulation Check

Performs an insulation check, and outputs check results in series, from the first channel to the last channel.

@@@ However, results are not output for channels where the channel mode is set to "measurement OFF."

◆◆◆ Control command ◆◆◆

CHK0

◆◆◆ Response ◆◆◆

00, 000, △△△△△HIGH, 49

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

No.	Details	No. of Characters
1	Status number Refer to "3-2. MEASUREMENT DATA FORMAT" for details.	2
2	Channel number (000-999)	3
3	Check result (insulation resistance value) HIGH: Higher than 100 MΩ LOW: Less than 1 MΩ 1-100: From 1 MΩ to 100 MΩ -----: Not checked	See to left
4	Unit number Fixed at 49 (49 represents MΩ)	2

3-9-2. CHK1: Perform BV2V Check

Performs a BV2V check, and outputs check results in series, from the first channel to the last channel. However, results are not output for channels where the channel mode is set to "measurement OFF."

◆◆◆ Control command ◆◆◆

CHK1

◆◆◆ Response ◆◆◆

00, 000, △△△△2.000, 31
 (1) (2) (3) (4)

No.	Details	No. of Characters
1	Status number Refer to "3-2. MEASUREMENT DATA FORMAT" for details.	2
2	Channel number (000-999)	3
3	Bridge voltage (including decimal point)	5
4	Unit number Fixed at 31 (31 represents V)	2

3-9-3. CHK2: Perform BV5V Check

Performs a BV5V check, and continuously outputs the check results, from the first channel to the last channel. However, results are not output for channels where the channel mode is set to "measurement OFF."

◆◆◆ Control command ◆◆◆

CHK2

◆◆◆ Response ◆◆◆

00, 000, △△△△5.000, 31
 (1) (2) (3) (4)

No.	Details	No. of Characters
1	Status number Refer to "3-2. MEASUREMENT DATA FORMAT" for details.	2
2	Channel number (000-999)	3
3	Bridge voltage (including decimal point)	5
4	Unit number Fixed at 31 (31 represents V)	2

3-9-4. CHK3: Perform Input Resistance Check

Performs an input resistance check, and outputs check results in series, from the first channel to the last channel. However, results are not output for channels where the channel mode is set to "measurement OFF."

◆◆◆ Control command ◆◆◆

CHK3

◆◆◆ Response ◆◆◆

00, 000, △△△△120.5, 47
 (1) (2) (3) (4)

No.	Details	No. of Characters
1	Status number Refer to "3-2. MEASUREMENT DATA FORMAT" for details.	2
2	Channel number (000-999)	3
3	Input resistance (9 digits, including decimal point) Spaces will be added if less than 9 digits.	9
4	Unit number Fixed at 47 (47 represents Ω)	2

3-9-5. CHK4: Perform Output Resistance Check

Performs an output resistance check, and outputs check results in series, from the first channel to the last channel. However, results are not output for channels where the channel mode is set to "measurement OFF."

◆◆◆ Control command ◆◆◆

CHK4

◆◆◆ Response ◆◆◆

00, 000, △△△△120.5, 47
 (1) (2) (3) (4)

No.	Details	No. of Characters
1	Status number Refer to "3-2. MEASUREMENT DATA FORMAT" for details.	2
2	Channel number (000-999)	3
3	Output resistance (9 digits, including decimal point) Spaces will be added if less than 9 digits.	9
4	Unit number Fixed at 47 (47 represents Ω)	2

3-9-6. CHK5: Perform Terminal Temperature Check

- Performs a terminal temperature check, and outputs check results in series.
- Terminal temperature is checked for each scanner. The check result channel number will therefore be the first channel of the scanner.

◆◆◆ Control command ◆◆◆

CHK5

◆◆◆ Response ◆◆◆

00, 000, △△△△△23.4, 35
 (1) (2) (3) (4)

No.	Details	No. of Characters
1	Status number Refer to "3-2. MEASUREMENT DATA FORMAT" for details.	2
2	Scanner first channel number (000, 010, 020, ...)	3
3	Terminal temperature (9 digits, including decimal point) Spaces will be added if less than 9 digits.	9
4	Unit number Fixed at 35 (35 represents °C)	2

3-9-7. CHK6: Perform Disconnection Check

Performs a disconnection check, and outputs check results in series, from the first channel to the last channel. However, results are not output for channels where the channel mode is set to "measurement OFF."

◆◆◆ Control command ◆◆◆

CHK6

◆◆◆ Response ◆◆◆

000△OK
(1) (2)

No.	Details	No. of Characters
1	Channel number (000-999)	3
2	Check result OK: Not disconnected NG: Disconnected --: Channel mode not "strain"	2

3-9-8. CHK7: Perform Burnout Check

Performs a burnout check, and outputs check results in series, from the first channel to the last channel. However, results are not output for channels where the channel mode is set to "measurement OFF."

◆◆◆ Control command ◆◆◆

CHK7

◆◆◆ Response ◆◆◆

000△OK
(1) (2)

No.	Details	No. of Characters
1	Channel number (000-999)	3
2	Check result OK: Not disconnected NG: Disconnected --: Channel mode not "thermocouple"	2

3-9-9. CHK8: Perform Channel Mode Detection

Performs channel mode detection, and outputs detection results in series, from the first channel to the last channel. However, results are not output for channels where the channel mode is set to "measurement OFF."

◆◆◆ Control command ◆◆◆

CHK8

◆◆◆ Response ◆◆◆

000△12△4G

(1) (2) (3)

No.	Details	No. of Characters
1	Channel number (000-999)	3
2	Detected channel mode number	2
3	Detected channel mode name 1G120Ω 1G240Ω 1G350Ω 2G/A-A 4G 4G/T --- (indicates that the mode could not be detected)	2-6

3-10. CONTROL COMMANDS (FILE MANAGEMENT)

3-10-1. DEV: Switch Measurement Data File Storage Location

Switches the measurement data file storage location.

◆◆◆ Control command ◆◆◆

DEV 0
(1)

No.	Details	No. of Characters
1	Storage location 0: Internal memory 1: SD card 2: Mirroring	1

3-10-2. DIR: Load File Name

Outputs names of files in the specified storage location in series.

◆◆◆ Control command ◆◆◆

DIR 0 : test0??.rtm
(1) (2)

No.	Details	No. of Characters
1	Storage location 0: Internal memory 1: SD card 2: USB memory device	1
2	File name (only alphanumeric characters and some symbols can be loaded) Wildcard characters ("*" or "?") can be used. "*" indicates any character string, while "?" indicates any single character. Example 1: *.rtm Files with extension "rtm" Example 2: test*.rtm Files that begin with "test" and have extension "rtm" Example 3: *.* All files Example 4: test?.rtm Files that begin with "test" followed by any single character, and that have extension "rtm"	1-32

◆◆◆ Response ◆◆◆

test000.rtm, 0
(1) (2)

No.	Details	No. of Characters
1	Applicable file name Or NOFILES (no applicable files)	1-32
2	End code 0: Indicates there are more files 1: Indicates this is the last file	1

3-10-3. DEL: Delete File

Deletes a file.

◆◆◆ Control command ◆◆◆

DEL 0 : test000.rtm
(1) (2)

No.	Details	No. of Characters
1	Storage location 0: Internal memory 1: SD card 2: USB memory device	1
2	File name (only alphanumeric characters and some symbols can be set)	1-32

3-10-4. CPY: Copy File

Copies a file.

◆◆◆ Control command ◆◆◆

CPY 0 : test000.rtm▲ 1

(1) (2) (3)

No.	Details	No. of Characters
1	Copy source 0: Internal memory 1: SD card 2: USB memory device	1
2	File name (only alphanumeric characters and some symbols can be set)	1-32
3	Copy destination 0: Internal memory 1: SD card 2: USB memory device	1

3-10-5. REN: Rename File

Renames a file.

◆◆◆ Control command ◆◆◆

REN 0 : test000.rtm△test111.rtm
 (1) (2) (3)

No.	Details	No. of Characters
1	Storage location 0: Internal memory 1: SD card 2: USB memory device	1
2	File to change (only alphanumeric characters and some symbols can be set)	1-32
3	File name (only alphanumeric characters and some symbols can be set)	1-32

3-10-6. FMT: Delete All Files

Deletes all files.

◆◆◆ Control command ◆◆◆

FMT 0
(1)

No.	Details	No. of Characters
1	Storage location to delete 0: Internal memory 1: SD card 2: USB memory device	1

3-11. CONTROL COMMANDS (REPRODUCTION)

3-11-1. REG: Reproduce Measurement Data File

Outputs measurement data file data.

◆◆◆ Control command ◆◆◆

REG 0 : test000.rtm

(1) (2)

No.	Details	No. of Characters
1	Measurement data file storage location 0: Internal memory 1: SD card 2: USB memory device	1
2	Measurement data file name	1-32

◆◆◆ Response (1st time received) ◆◆◆

2, "RTM", 01, 02, 2022, 12, 30, 00
 (1) (2) (3) (4) (5) (6) (7) (8)

No.	Details	No. of Characters
1	Fixed at 2	1
2	Measurement data file type "RTM": Real-time measurement "IT1": Interval measurement "TRG": Trigger measurement "T_I": Trigger interval measurement "INI": Initial measurement	5
3	Measurement time (month) (01-12)	2
4	Measurement time (day) (01-31)	2
5	Measurement time (year) (2000-2038)	4
6	Measurement time (hour) (00-23)	2
7	Measurement time (minutes) (00-59)	2
8	Measurement time (seconds) (00-59)	2

◆◆◆ Response (from 2nd time received onward) ◆◆◆

00, 000, △△△-1234, 00, 0, 0, 0
 (1) (2) (3) (4)(5)(6)(7)

No.	Details	No. of Characters
1	Status number Refer to "3-2. MEASUREMENT DATA FORMAT" for details.	2
2	Channel number (000-999)	3
3	Measurement data (8 digits, including $\pm$ sign and decimal point) Spaces will be added if less than 8 digits.	8
4	Unit number	2
5	Number of digits after decimal point	1
6	Associated data determination code	1
7	End code	1

3-12. CONTROL COMMANDS (TEDS)

3-12-1. TCH: Set TEDS Sensor Information Loading

- Sets whether to load TEDS sensor information for each channel.
- The set duplicate channel command (DUP) can be used to set the same setting value for continuous channels.

- The initial settings will be the first channel set with CHR.

◆◆◆ Control command ◆◆◆

TCH 1 X 0 X, DUP 009 X
(1) (1)

No.	Details	No. of Characters
1	0: Do not load TEDS sensor information 1: Load TEDS sensor information	1

3-12-2. EID: Start TEDS Sensor Information Loading

- Loads TEDS sensor information and automatically sets channel conditions.
- Once setting is complete, loading results from first channel to last channel are output.

◆◆◆ Control command ◆◆◆

EID

◆◆◆ Response ◆◆◆

000△OK

(1) (2)

No.	Details	No. of Characters
1	Channel number (000-999)	3
2	Loading result OK: Loaded normally NG: Unable to load TEDS sensor information	2

3-12-3. GID: Load TEDS Sensor Information

Loads TEDS sensor information.

◆◆◆ Control command ◆◆◆

GID 000 X
(1)

No.	Details	No. of Characters
1	Channel number (000-999)	3

◆◆◆ Response ◆◆◆

Outputs the following TEDS sensor information.

Manufacture ID

Model Number

Version Letter

Version Number

Serial Number

3-12-4. SID: Load Detailed TEDS Sensor Information

Loads detailed TEDS sensor information.

◆◆ Control command ◆◆

SID 000 X

(1)

No.	Details	No. of Characters
1	Channel number (000-999)	3

◆◆ Response ◆◆

Outputs the following detailed TEDS sensor information.

Pattern number
 Channel number
 Number of sending items (lines)
 ROM ID
 Manufacture ID
 Model Number
 Version Letter
 Version Number
 Serial Number
 Selector
 Template ID
 Physical Measurand
 Minimum physical value
 Maximum physical value
 Transducer Electrical Signal Type
 Full Scale Electrical Value Precision
 Minimum electrical output
 Maximum electrical output
 Mapping Method
 Bridge Type
 Bridge element Impedance
 Response Time
 Excitation level,normal
 Excitation level,min
 Excitation level,max
 Calibration Date
 Calibration initials
 Calibration period
 Measurement location ID
 Selector
 Extended Selector

3-13. CONTROL COMMANDS (GROUPS)

3-13-1. GRC: Switch Monitor Screen Group and Start Monitoring

- Switches the group of channels to measure during monitoring, performs measurement of monitor channels registered to the group, and then outputs measurement data.
- If this device receives a suspend measurement command (STP), measurement is suspended.

◆◆◆ Control command ◆◆◆

GRC 00
(1)

No.	Details	No. of Characters
1	01-20 : Group number to switch 00 : All CH	2

◆◆◆ Response ◆◆◆

Outputs measurement data in series.
Refer to "3-2. MEASUREMENT DATA FORMAT" for details.

3-13-2. GRP: Register Channel Number to Group

- Registers a channel number to a group.
- Channel numbers can be specified in series of 3 characters each.
- Up to 50 channel numbers can be registered in series.

◆◆ Control command ◆◆

GRP 01 000 001 002

(1) (2) (2) (2)

No.	Details	No. of Characters
1	Group number (01-20)	2
2	Channel number to register (000-999)	3

3-13-3. GRR: Load Channel Number Registered to Group

Loads channel numbers registered to a group.

◆◆◆ Control command ◆◆◆

GRR 01
(1)

No.	Details	No. of Characters
1	Group number (01-20)	2

◆◆◆ Response ◆◆◆

000, 001, 002
(1) (1) (1)

No.	Details	No. of Characters
1	Channel number	3

3-13-4. GRE: Delete Channel Number Registered to Group

Deletes a channel number registered to a group.

- Channel numbers can be specified in series of 3 characters each.
- Up to 50 channel numbers can be deleted in series.

◆◆◆ Control command ◆◆◆

GRE 01 000 001 002

(1) (2) (2) (2)

No.	Details	No. of Characters
1	Group number (01-20)	2
2	Channel number to delete (000-999)	3

3-14. CONTROL COMMANDS (PROGRAMS)

3-14-1. PGN: Create New Program

Creates a new program.

◆◆◆ Control command ◆◆◆

PGN NewProgram

(1)

No.	Details	No. of Characters
1	Program name (from 1 to 32 characters) (ASCII codes only)	1-32

3-14-2. PGI: Load Registered Program Name

Outputs registered program names in series.

◆◆◆ Control command ◆◆◆

PGI

◆◆◆ Response (1st time received) ◆◆◆

01

(1)

No.	Details	No. of Characters
1	Number of registered programs (01-15)	2

◆◆◆ Response (from 2nd time received onward) ◆◆◆

NewProgram

(1)

No.	Details	No. of Characters
1	Program name (from 1 to 32 characters) (ASCII codes only)	1-32

3-14-3. PIN: Set Interval Program

- Sets interval conditions for a program.
- During the first transmission, the program number to set is sent.
- During the second transmission, the measurement start time is sent.
- During the third through 17th transmissions, conditions for steps 1 through 15 are sent.

◆◆◆ Control command (1st time sent) ◆◆◆

PIN 00 X
(1)

No.	Details	No. of Characters
1	Program number to set (00-14)	2

◆◆◆ Control command (2nd time sent) ◆◆◆

Example 1: Start measurement on January 2, 2022 at 12:30:00

PIN 2022 01 02 12 30 00 X

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

Example 2: Start measurement when the program run/stop key is pressed

PIN----- X

No.	Details	No. of Characters
1	Year (2000-2038)	4
2	Month (01-12)	2
3	Day (01-31)	2
4	Hour (00-23)	2
5	Minutes (00-59)	2
6	Seconds (00-59)	2

- If measurement will begin when the program run/stop key is pressed, parameters (1) through (6) will be filled with hyphens ("- [0x2D]).

◆◆◆ Control command (3rd through 17th time sent) ◆◆◆

PIN 00 01 02 03 04 9999 E X
 (1) (2) (3) (4) (5) (6) (7)

No.	Details	No. of Characters
1	Step number (00-14)	2
2	Day (00-31)	2
3	Hour (00-23)	2
4	Minutes (00-59)	2
5	Seconds (00-59)	2
6	Times (0000-9999)	4
7	Status (C, E, 00-14)	1-2

3-14-4. PTS: Set Trigger Program

- Sets trigger conditions for a program.
- During the first transmission, the program number to set is sent.
- During the second transmission, the trigger channel number is sent.
- During the third transmission, the reference value is sent.
- During the fourth through 18th transmissions, conditions for steps 1 through 15 are sent.

◆◆◆ Control command (1st time sent) ◆◆◆

PTS 00 X
(1)

No.	Details	No. of Characters
1	Program number to set (00-14)	2

◆◆◆ Control command (2nd time sent) ◆◆◆

PTS 000 X
(1)

No.	Details	No. of Characters
1	Trigger channel number (000-999)	3

◆◆◆ Control command (3rd time sent) ◆◆◆

PTS 0 X (Trigger mode : Absolute value)
(1)

No.	Details	No. of Characters
1	Fixed at 0	1

PTS 1 +1234.567 X (Trigger mode : Relative value)
(1) (2)

No.	Details	No. of Characters
1	Fixed at 1	1
2	Reference value (9 digits, including ± sign and decimal point)	9

◆◆◆ Control command (4th through 18th time sent) ◆◆◆

PTS 00 1234.5678 9999 E X
(1) (2) (3) (4)

No.	Details	No. of Characters
1	Step number (00-14)	2
2	Trigger value (9 digits, including ± sign and decimal point)	9
3	Times (0000-9999)	4
4	Status (C, E, 00-14)	1-2

3-14-5. PTI: Set Trigger Interval Program

- Sets trigger interval conditions for a program.
- During the first transmission, the program number to set is sent.
- During the second transmission, the trigger channel number is sent.
- During the third transmission, the reference value is sent.
- During the fourth through 18th transmissions, conditions for steps 1 through 15 are sent.

◆◆◆ Control command (1st time sent) ◆◆◆

PTI 00 X
(1)

No.	Details	No. of Characters
1	Program number to set (00-14)	2

◆◆◆ Control command (2nd time sent) ◆◆◆

PTI 000 X
(1)

No.	Details	No. of Characters
1	Trigger channel (000-999)	3

◆◆◆ Control command (3rd time sent) ◆◆◆

PTI +1234.567 X
(1)

No.	Details	No. of Characters
1	Reference value (9 digits, including ± sign and decimal point)	9

◆◆◆ Control command (4th through 18th time sent) ◆◆◆

PTI 00 01 02 03 04 9999 E X
(1) (2) (3) (4) (5) (6) (7)

No.	Details	No. of Characters
1	Step number (00-14)	2
2	Day (00-31)	2
3	Hour (00-23)	2
4	Minutes (00-59)	2
5	Seconds (00-59)	2
6	Times (0000-9999)	4
7	Status (C, E, 00-14)	1-2

3-14-6. PNM: Rename Program

Renames a program.

◆◆◆ Control command ◆◆◆

PNM 00 NewProgram
(1) (2)

No.	Details	No. of Characters
1	Number of program to change (00-14)	2
2	Program name (from 1 to 32 characters) (ASCII codes only)	1-32

3-14-7. PGE: Delete Program

Deletes a program.

◆◆◆ Control command ◆◆◆

PGE 00
(1)

No.	Details	No. of Characters
1	Number of program to delete (00-14)	2

3-14-8. PGC: Duplicate Program

Duplicates a program.

◆◆◆ Control command ◆◆◆

PGC 00
(1)

No.	Details	No. of Characters
1	Number of program to duplicate (00-14)	2

3-14-9. PGA: Change Assigned Program

Changes the program executed when the program run/stop key is pressed.

◆◆◆ Control command ◆◆◆

PGA 00 1
(1)(2)

No.	Details	No. of Characters
1	Number of program to change (00-14)	2
2	0: Remove assignment 1: Assign	1

3-14-10. PGL: Lock/Unlock Program

Locks (prevents setting or deleting) a program.
Or, unlocks a program.

◆◆ Control command ◆◆

PGL 00 1
(1)(2)

No.	Details	No. of Characters
1	Number of program to lock (00-14)	2
2	0: Unlock 1: Lock	1

3-14-11. PGM: Load Automatic Measurement Mode Set for Program

Loads the automatic measurement mode set for a program.

◆◆◆ Control command ◆◆◆

PGM 00
(1)

No.	Details	No. of Characters
1	Number of program to load (00-14)	2

◆◆◆ Response ◆◆◆

0
(1)

No.	Details	No. of Characters
1	Automatic measurement mode 0: Interval 1: Trigger 2: Trigger interval	1

3-14-12. PGR: Load Conditions Set for Program

Loads conditions set for a program.

◆◆◆ Control command ◆◆◆

PGR 00
(1)

No.	Details	No. of Characters
1	Number of program to load (00-14)	2

When the automatic measurement mode is "interval," the response will be as follows.

◆◆ Response (1st time received) ◆◆

2022/01/02▲12:30:00

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

No.	Details	No. of Characters
1	Year (2000 to 2038)	4
2	Month (01 to 12)	2
3	Day (01 to 31)	2
4	Hour (00 to 23)	2
5	Minutes (00 to 59)	2
6	Seconds (00 to 59)	2

- If measurement will begin when the program run/stop key is pressed, parameters (1) through (6) will be filled with hyphens ("- [0x2D]).

◆◆ Response (2nd through 16th time received) ◆◆

00▲01-02-03-04▲9999▲E

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

No.	Details	No. of Characters
1	Step number (00-14)	2
2	Day-Hour-Minutes-Seconds	11
3	Repeat times (0000-9999)	4
4	Status (C, E, 00-14)	1-2

When the automatic measurement mode is "trigger," the response will be as follows.

◆◆◆ Response (1st time received) ◆◆◆

000

(1)

No.	Details	No. of Characters
1	Trigger channel number (000-999)	3

◆◆◆ Response (2nd time received) ◆◆◆

-1234.567 (a second response will be output only when the trigger mode is "relative value")
(1)

No.	Details	No. of Characters
1	Reference value (9 digits, including ± sign and decimal point) Spaces will be added if less than 9 digits.	9

◆◆◆ Response (3rd through 17th time received) ◆◆◆

00▲-1234.567▲9999▲E

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

No.	Details	No. of Characters
1	Step number (00-14)	2
2	Trigger value (9 digits, including ± sign and decimal point) "0" will be added if less than 9 digits.	9
3	Repeat times (0000-9999)	4
4	Status (C, E, 00-14)	1-2

When the automatic measurement mode is "trigger interval," the response will be as follows.

◆◆◆ Response (1st time received) ◆◆◆

000
(1)

No.	Details	No. of Characters
1	Trigger channel number (000-999)	3

◆◆◆ Response (2nd time received) ◆◆◆

-123.4567
(1)

No.	Details	No. of Characters
1	Reference value (9 digits, including ± sign and decimal point) Spaces will be added if less than 9 digits.	9

◆◆◆ Response (3rd through 17th time received) ◆◆◆

00 ▲ 01-02-03-04 ▲ 9999 ▲ E
(1) (2) (3) (4)

No.	Details	No. of Characters
1	Step number (00-14)	2
2	Day-Hour-Minutes-Seconds	11
3	Repeat times (0000-9999)	4
4	Status (C, E, 00-14)	1-2

3-15. CONTROL COMMANDS (ALARMS)

3-15-1. HYS: Set Alarm Hysteresis

Collectively sets hysteresis for Alarm 1 through Alarm 4.

◆◆◆ Control command ◆◆◆

HYS 123.45
(1)

No.	Details	No. of Characters
1	Alarm hysteresis (000.00-999.99)	6

3-15-2. HSS: Set Individual Alarm Hysteresis

Sets individual alarm hysteresis.

◆◆◆ Control command ◆◆◆

HSS 1 123.45
(1) (2)

No.	Details	No. of Characters
1	Alarm number (1-4)	1
2	Alarm hysteresis (000.00-999.99)	6

3-15-3. HSR: Load Individual Alarm Hysteresis

Loads individual alarm hysteresis.

◆◆◆ Control command ◆◆◆

HSR 1
(1)

No.	Details	No. of Characters
1	Alarm number (1-4)	1

◆◆◆ Response ◆◆◆

123.45
(1)

No.	Details	No. of Characters
1	Alarm hysteresis (000.00-999.99)	6

3-15-4. ARM: Set Alarm Conditions

- This command can be sent in series to set Alarm conditions.
- Collectively sets conditions for Alarm 1 through Alarm 4.

◆◆ Control command ◆◆

ARM 000 +1234.567 -1234.567
 (1) (2) (3)

No.	Details	No. of Characters
1	Applicable alarm channel 000-999: Channel number ---: Do not use alarm	3
2	Alarm upper limit value (including ± sign)	9
3	Alarm lower limit value (including ± sign)	9

3-15-5. **AON: Alarm Function ON**

Collectively turns Alarm 1 through Alarm 4 functions ON.

◆◆◆ Control command ◆◆◆

AON

3-15-6. **AOF: Alarm Function OFF**

Collectively turns functionality OFF for Alarm 1 through Alarm 4.

◆◆◆ Control command ◆◆◆

AOF

3-15-7. ALS: Individual Alarm Function ON/OFF

Sets individual alarm function ON/OFF.

◆◆◆ Control command ◆◆◆

ALS 1 1
(1)(2)

No.	Details	No. of Characters
1	Alarm number (1-4)	1
2	Alarm function ON/OFF 0: OFF 1: ON	1

3-15-8. ACL: All Alarm Contacts OFF

Turns all alarm contacts OFF.

◆◆◆ Control command ◆◆◆

ACL

3-16. CONTROL COMMANDS (OTHER)

3-16-1. RS-: Test Bus Line

If this device receives this command, it outputs a fixed character string.

◆◆◆ Control command ◆◆◆

RS-

◆◆◆ Response ◆◆◆

232C

3-16-2. LAN: Test Bus Line

If this device receives this command, it outputs a fixed character string.

◆◆◆ Control command ◆◆◆

LAN

◆◆◆ Response ◆◆◆

ETHERNET

3-16-3. SYS: Load System Information

Outputs system information, such as the model and version.

◆◆◆ Control command ◆◆◆

SYS

◆◆◆ Response ◆◆◆

UCAM-80A, 01.00, 01.00, 1, 1, 1, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0

(1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14) (15) (16)

No.	Details	No. of Characters
1	Model	8
2	Main firmware version	5
3	Sub firmware version	5
4	Scanning unit in SLOT1 (0: Not installed, 1: Installed)	1
5	Scanning unit in SLOT2 (0: Not installed, 1: Installed)	1
6	Scanning unit in SLOT3 (0: Not installed, 1: Installed)	1
7-11	Reserved	1
12	UIO-80A (0: Not installed, 1: Installed)	1
13-16	Reserved	1

3-16-4. SNR: Load Detailed System Information

Outputs detailed system information, such as the model and version.

◆◆◆ Control command ◆◆◆

SNR

◆◆◆ Response ◆◆◆

UCAM-80A-AC,△123456789,△01.00,△01.00,△01.00,△△SYNC,△50Hz,
(1) (2) (3) (4) (5) (6) (7)

△1,△1,△1,△0,△0,△0,△0,△0,△1,△0,△0,△0,△0
(8) (9) (10) (11) (12) (13) (14) (15) (16) (17) (18) (19) (20)

No.	Details	No. of Characters
1	Model	11
2	Manufacturing number	10
3	Main firmware version	6
4	FPGA version	6
5	Sub firmware version	6
6	Power synchronization (SYNC: Synchronized, ASYNC: Non-synchronized)	6
7	Power frequency	5
8	Scanning unit in SLOT1 (0: Not installed, 1: Installed)	2
9	Scanning unit in SLOT2 (0: Not installed, 1: Installed)	2
10	Scanning unit in SLOT3 (0: Not installed, 1: Installed)	2
11-15	Reserved	2
16	UIO-80A (0: Not installed, 1: Installed)	2
17-20	Reserved	2

3-16-5. VER: Load Detailed System Information

Outputs detailed system information, such as the model and version, sub FPGA version.

◆◆◆ Control command ◆◆◆

VER

◆◆◆ Response ◆◆◆

UCAM-80A-AC,△123456789,△01.00,△01.00,△01.00,△01.00,△△SYNC,△50Hz,
 (1) (2) (3) (4) (5) (6) (7) (8)

△1,△1,△1,△0,△0,△0,△0,△0,△1,△0,△0,△0,△0
 (9) (10) (11) (12) (13) (14) (15) (16) (17) (18) (19) (20) (21)

No.	Details	No. of Characters
1	Model	11
2	Manufacturing number	10
3	Main firmware version	6
4	FPGA version	6
5	Sub firmware version	6
6	Sub FPGA version	6
7	Power synchronization (SYNC: Synchronized, ASYNC: Non-synchronized)	6
8	Power frequency	5
9	Scanning unit in SLOT1 (0: Not installed, 1: Installed)	2
10	Scanning unit in SLOT2 (0: Not installed, 1: Installed)	2
11	Scanning unit in SLOT3 (0: Not installed, 1: Installed)	2
12-16	Reserved	2
17	UIO-80A (0: Not installed, 1: Installed)	2
18-21	Reserved	2

3-16-6. ERR: Load Error Number

- Loads the error number.
- Refer to "4. ERROR NUMBERS" for details on error numbers.

◆◆ Control command ◆◆

ERR

◆◆ Response ◆◆

00

(1)

No.	Details	No. of Characters
1	Error number	2

3-16-7. ECL: Initialize Error Number

- Initializes the error number to 00.
- Refer to "4. ERROR NUMBERS" for details on error numbers.

◆◆ Control command ◆◆

ECL

3-16-8. DUP: Set Duplicate Channel

Channels can be set in series by adding "DUPnnnX" at the end of the corresponding command.

In the following example, the channel mode of first channel is 12, the next channel is 13, and channels up to CH9 are 13.

MOD12X13X,DUP009X

Corresponding commands are shown below.

No.	Command
1	MOD: Set Channel Mode
2	SPD: Set Scanning Speed
3	CST: Set Calibration Coefficient
4	OFS: Set Offset
5	INI: Set Initial Value
6	ROC: Set Reference Resistance Value
7	TCH: Set TEDS Sensor Information Loading

3-16-9. MTS: Set Maintenance

Switches between ACOM-GND connected/disconnected for maintenance.

◆◆ Control command ◆◆

MTS 0 X
(1)

No.	Details	No. of Characters
1	0: Connect ACOM-GND 1: Insulate ACOM-GND	1

3-16-10. MAS: Automatically Set Channel Mode When Channel Mode Is Detected

- When check function mode detection is performed, sets whether to automatically set the detected channel mode (automatic setting is valid for scanning units only).
- Automatic setting is valid only when detecting the mode using the CHK8 command, and is disabled for mode detection performed on the screen of this device.

◆◆◆ Control command ◆◆◆

MAS 0 X
(1)

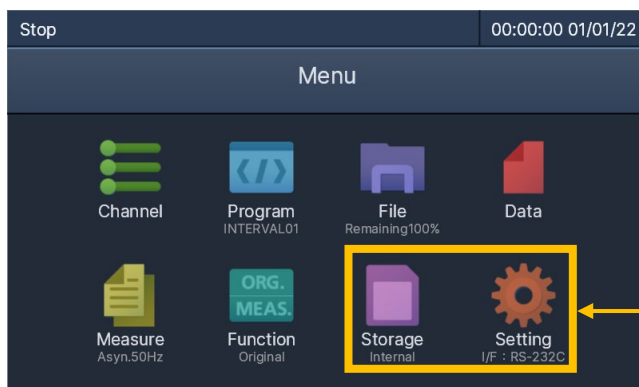
No.	Details	No. of Characters
1	0: Do not perform automatic setting 1: Perform automatic setting	1

3-16-11. RST: Initialize System

- Reverts the system to the default status.
- The **Storage** and **Setting** will not be initialized.

◆◆◆ Control command ◆◆◆

RST



The settings to the left will not be initialized

3-16-12. **DFT: Revert to Factory Defaults**

- Reverts this device to factory defaults.
- However, the date and time set on this device will not be changed.

◆◆◆ Control command ◆◆◆

DFT

3-16-13. **LOC: Cancel Key Lock**

Cancels key lock.

◆◆◆ Control command ◆◆◆

LOC

4. ERROR NUMBERS

If this device detects an error while setting conditions, the load error number command (ERR) can be used to determine the cause.

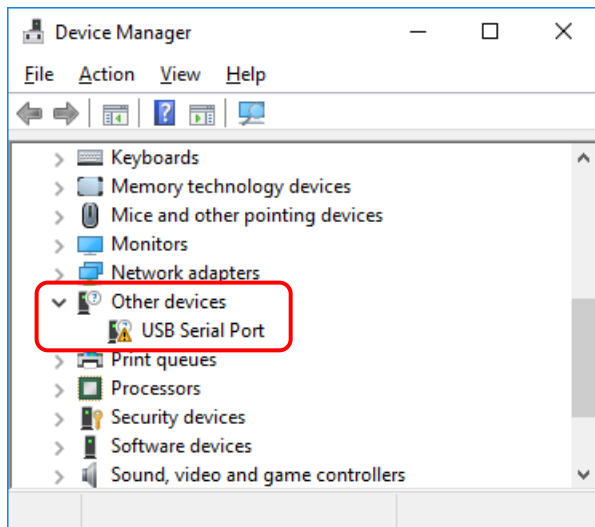
A list of error numbers is provided below.

Number	Details	Cause & Solution
30	First channel or last channel error	Check the channel number setting value.
31	First channel number is larger than the last channel number	Check the channel number setting value.
33	Channel mode error	Check the channel mode setting value.
34	Calibration coefficient error	Check the following setting values. • Significant portion of calibration coefficient • Exponent portion of calibration coefficient • Decimal point position • Unit number
35	Time error	Check the time setting value.
36	Interval measurement error	Check the following setting values. • Measurement start time • Step
37	Initial value error	Check the initial value setting value.
38	Monitor channel error	Check the following setting values. • Channel number of monitor channel • Are there more than 50 monitor channels?
40	Alarm error	Check the alarm setting value.
57	Offset value error	Check the offset value setting value.
58	Reference resistance value error	Check the reference resistance value setting value.
80	Undefined command received	Check the command (3 characters).
81	Parameter abnormal	Check the command parameter.
92	Scanning speed error	Check the scanning speed setting value.
93	Measurement data file cannot be reproduced	Check whether a nonexistent file name was specified.

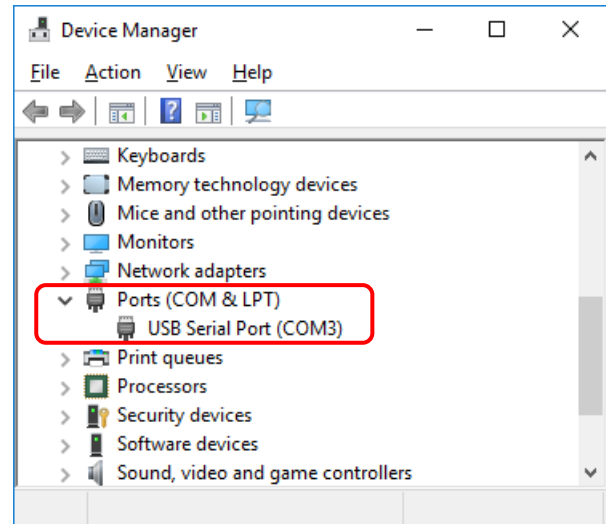
5. USB DRIVER INSTALLATION

After connecting this device to the PC with a USB cable, confirm the USB driver in Device Manager on the PC.

No driver



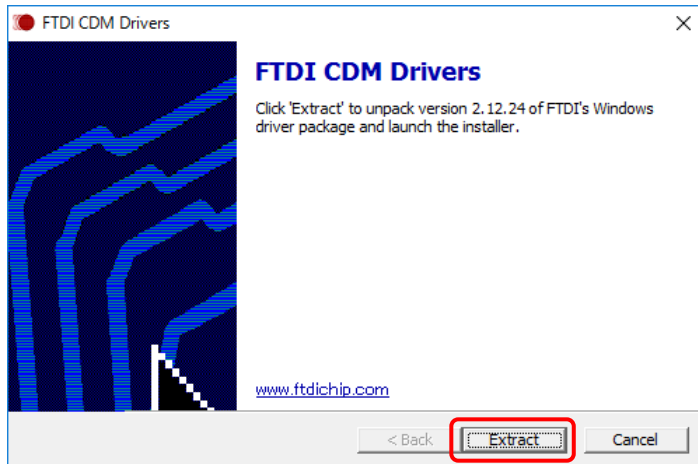
Driver installed



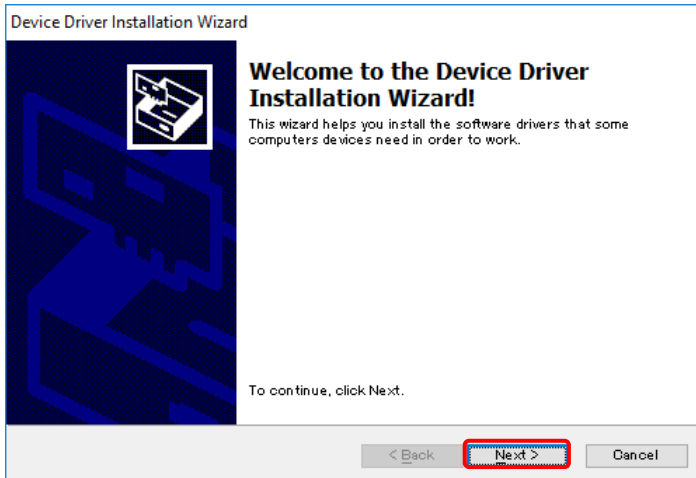
If no USB driver is installed, the driver will need to be installed.

Follow the procedure below to install the USB driver.

- (1) Select CDM212364_Setup.exe on the included CD-ROM, right-click, and then select "Run as administrator (A)."
- (2) If the User Account Control pop-up window is displayed, click **Yes (Y)** to continue.
- (3) Click **Extract**.



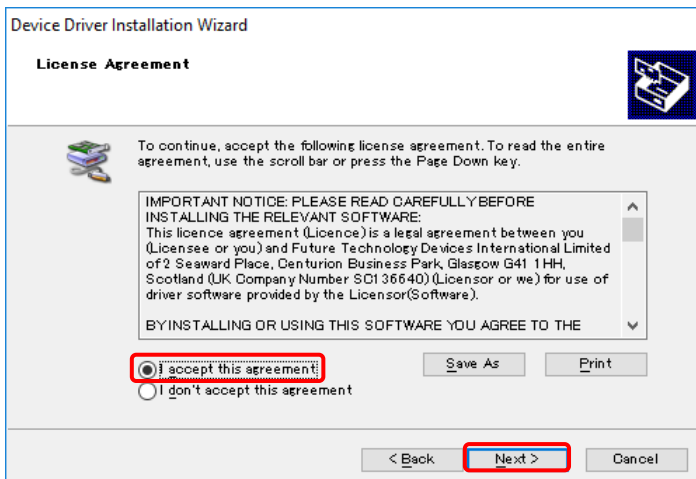
(4) Click **Next >**.



(5) The license agreement is displayed.

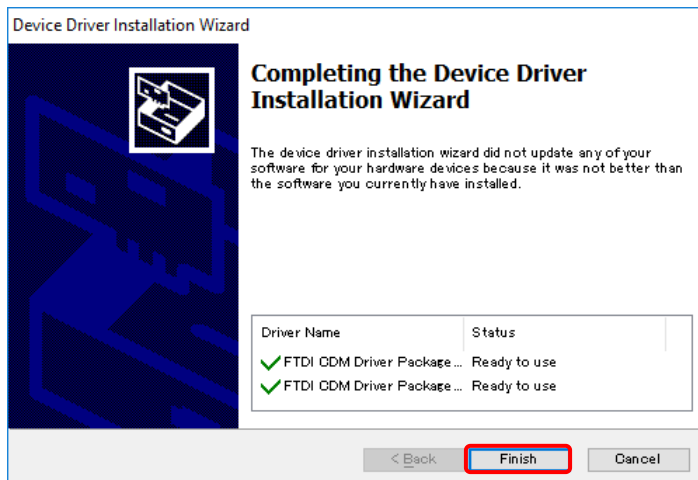
To agree to the license agreement, select "I accept this agreement" and then click **Next >** to start installation.

Selecting "I don't accept this agreement" will prevent installation from continuing.



(6) Installation is complete.

Click **Finish** to finish installation.



If no USB driver is installed on the PC, connecting this device to the PC will cause the PC to automatically search for the required driver on the network and then install it.

If the PC is not connected to the network or the driver cannot be found, the USB driver will need to be installed.



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