

PAPERLESS RECORDER

Model: VR96E-G8

USERS MANUAL

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1. Introduction

Thank you for choosing us.
Before use, check the following information.

1.1 Before use...

This product is for use in general industrial environments, therefore may not be suitable for applications which require higher level of safety (e.g. safety or accident prevention systems) or of reliability (e.g. vehicle control or combustion control systems).

For safety, installation and maintenance of this product must be conducted by qualified personnel.

■PACKAGE INCLUDES:

Paperless recorder (body + watertight packing)....(1)

Mounting bracket(2)

■MODEL NO.

Confirm Model No. marking on the product to be exactly what you ordered.

■SD CARD

To store the data, prepare an SD card. (For the specified SD card, refer to 7.2.6 SD card.)

1.2 Corresponding versions

This Users Manual corresponds to the following versions of our products.

■DEVICE VERSION

This User Manual corresponds to the versions in the following table.

- For instructions on confirming the version of the Paperless Recorder (model: VR96E-G8), refer to 4.3.8.12 Information
- For instructions on confirming the version of the Configurator Software (model: VR96CFG), refer to 2.3.3 Confirming the version.
- For instructions on confirming the version of the TR30 Viewer Software (model: TRViewer), refer to the TRViewer Users Manual (EM-8633).

MODEL	VERSION
VR96E-G8	1.0.x
VR96CFG	1.0.x
TRViewer	1.6.21 or later

1.3 Precautions

■ CONFORMITY WITH EU DIRECTIVES

- The actual installation environments such as panel configurations, connected devices, connected wires, may affect the protection level of this device when it is integrated in a panel system. The user may have to review the CE requirements in regard to the whole system and employ additional protective measures* to ensure the CE conformity.

* For example, installation of noise filters and clamp filters for the power source, input and output connected to the device, etc.

- In order to enable the operator to turn off the power input immediately, install a switch or a circuit breaker according to the relevant requirements in IEC 60947-2 and properly indicate it.

■ POWER INPUT RATING & OPERATIONAL RANGE

- Locate the power input rating marked on the product and confirm its operational range as indicated below:
24V DC $\pm 10\%$, $\leq 2.4\text{W}$, $\leq 100\text{mA}$ (at 24V DC)
- Supplying any level of power other than specified above can damage the device or the power source.
- Power supply start-up characteristics must reach within 5 seconds to the operational voltage range of the device.
- Power cables and signal I/O cables for the device must be located separately.
- Power cables, signal I/O cables and communication cables for the device should not be bundled together.
- To increase noise resistance of the power input wires, twist the strands before connecting.

■ GENERAL PRECAUTIONS

- Before you remove the device or mount it, turn off the power supply and I/O signals for safety.
- Do not disassemble or modify the device in any way. Doing so may result in a fire or an electrical shock.
- Do not block the device's ventilation openings or use it in areas where heat accumulates.
- Additionally, do not store or use it under high-temperature conditions.
- Do not use this device in an environment where flammable/corrosive gases are present.
- Do not store or use this device in locations subject to direct sunlight, or where excessive dust, dirt or metal particles are present.
- This device is a precision instrument. Do not store or use it where large shocks or excessive vibration can occur.
- Do not store or use this device in environments subject to chemical evaporation (such as that of organic solvents), or where there are chemicals and/or acids present in the environment.
- Do not use paint thinner or organic solvents to clean this device.
- Observe the environmental conditions when using this device.
- Wait at least 15 seconds before turning on the power supply after it was turned off.

■ ENVIRONMENT

- Indoor use.
- This device is designed to be mounted on a vertical panel. It is not suitable for a slanted or a horizontal panel surface.
- Environmental temperature must be within -10 to $+55^{\circ}\text{C}$ (14 to 131°F) with relative humidity within 10 to 90% RH in order to ensure adequate life span and operation.

■ GROUNDING

- Be sure to determine in advance the most stable grounding point in the environment and earth the device's FE terminal and that of connected devices to it in order to protect the devices from dielectric breakdown.
- Grounding is also effective to eliminate noise that could cause errors in the device's operation.

■SD CARD

- Do not turn off the power supply to the device or reset it during data recording or history recording. The SD card may be destroyed.
- Observe the described procedure when you need to replace the SD card during recording.
- Confirm the sides and the connector position of the SD card when inserting one to the card slot.
- Do not touch the metal terminal with your hands or metallic tools.
- SD cards have a life span. Back up your important data.

■LCD PANEL

- The LCD panel's liquid contains an irritant. If the panel is damaged and the liquid contacts your skin, rinse immediately the contact area with running water for at least 15 minutes. If the liquid gets in your eyes, rinse immediately your eyes with running water for at least 15 minutes and consult a doctor.
- The following phenomena are LCD characteristics, and NOT a product defect:
 - LCD screen may show uneven brightness depending upon displayed images or contrast settings.
 - The LCD screen pixels may contain minute black-and-white-colored spots.
 - The color displayed on the LCD screen may appear different when seen from outside the specified viewing angle.
 - When the same image is displayed on the screen for a long time period, an afterimage may appear when the image is changed. If this happens, turn off the device and wait for a while before restarting it.
- To prevent an afterimage:
 - Set the screensaver when you plan to display the same image for a long time period.
 - Plan to change the screen image periodically so that the same image does not remain for the long time period.
- The LCD surface is covered with a protective film at the factory shipment. Remove it once the device is installed.

■MINIMIZING NOISE INTERFERENCE TO ANALOG SIGNAL CABLES

- Noise entering through the analog signal cables may cause irregular measurement values, degradation of overall accuracy, and malfunction of the product. We recommend that you would conduct wiring to the device with the following points of caution.
- Do not install cables close to noise sources (high frequency line, etc.).
- Do not bind the analog input cables together with those in which noises are present. Do not install them in the same duct.

■DO NOT APPLY OVERRANGE INPUT

- Do not apply voltages beyond the maximum input range to prevent failure.

■INTERNAL CLOCK

- The internal clock data is stored in memory powered by a backup battery while the device is without external power supply.
- The data will be reset to its default status when the battery is used up while the device is left without power supply for a long time period. The clock adjustment will be necessary once the power is restored.
- Once the power is restored, the device starts recharging the battery. It will be full in approximately in 36 to 48 hours.
- Battery backup: approx. 2 month

■AND

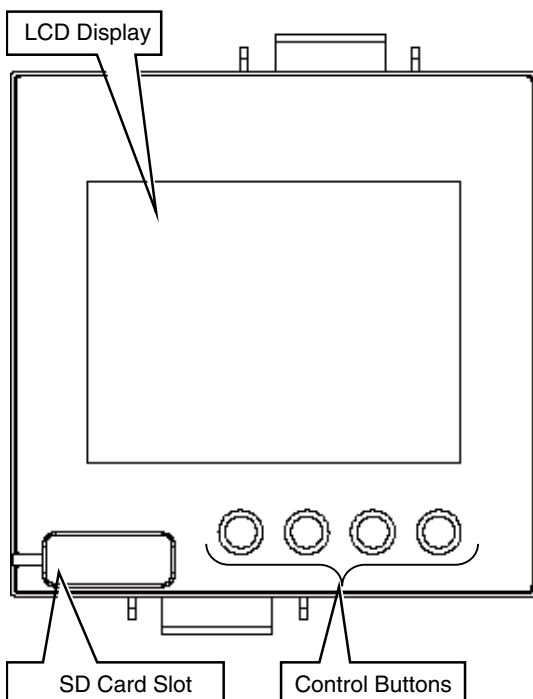
- We recommend use of an UPS to supply power backups.
- The device is designed to function as soon as power is supplied, however, a warm up for 10 minutes is required for satisfying complete performance described in the data sheet.

1.4 Explanation about the terms

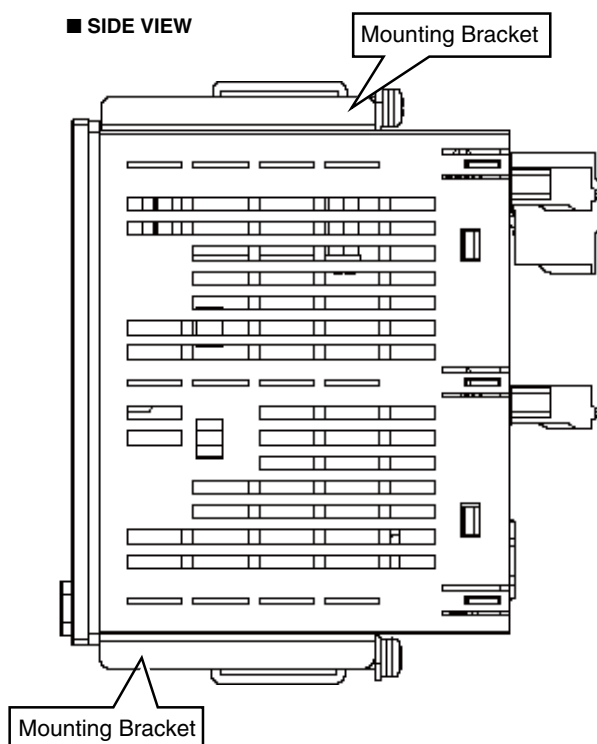
Term	Explanation
Channel CH	2 types of input channels and 1 type of output channel are defined in a device. The I/O signals are in the form of fully encoded digital data. AI : Analog input (16 bit signed integer, unsigned integer) DI : Discrete input (1 bit) OI : Operational input (32 bit floating point) DO : Discrete output (1 bit)
Pen	Pen is used in trend graph and trend data. To record waveform of I/O value or to record the trend data to a file, the channels need to be assigned to pens.
Zone transition	In case of AI and OI, the total zone in which input values can be obtained can be divided into maximum of 5 zones. The change of the zone caused by a change of the input value is called zone transition. In case of DI and DO, this can only be ON/OFF, and hence a change of the input signal is equivalent to the zone transition.
Event	Event indicates the information that [There has been a zone transition].
Trend data	Trend data includes the following. - The history of I/O values at the point of each timing for the respective channels assigned to pens. - The history of events in channels where the trend recording is enabled. - The history of comments.
Event log data	Event log data includes event log, system log and communication log. Event log : Data of events listed in chronological order of occurrence. System log : Data of the internal system activities listed in chronological order. Communication log: Data of communication results listed in chronological order.
Sampling rate	The time cycles used for acquiring I/O values for logging by the VR96E-G8; fixed at 100 msec.
Storing rate	The time cycles used for recording I/O values for logging data. Data acquired at the sampling rate are operated and stored at the storing rate.
Mail template	Specific combinations of subject, body and mail recipients can be predefined and stored. Each set is identified by the mail template number.

1.5 Component identification

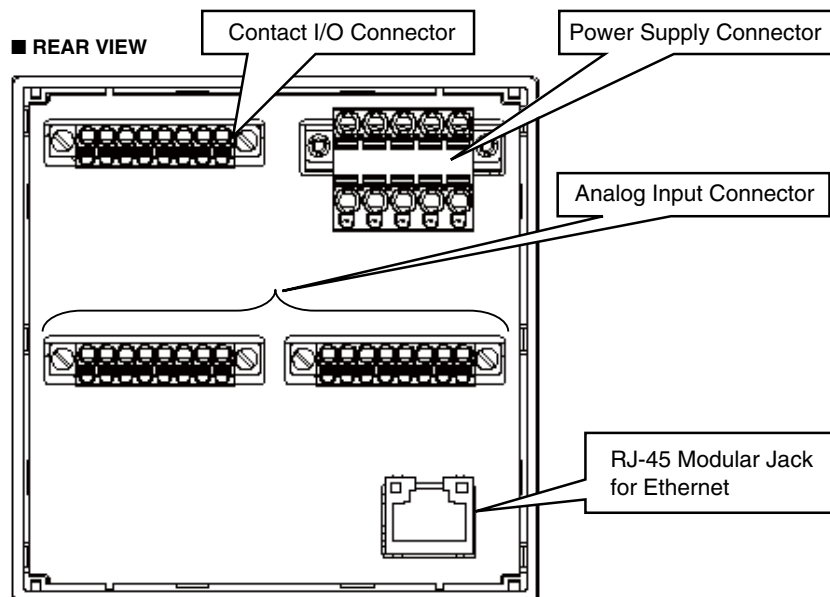
■ FRONT VIEW



■ SIDE VIEW



■ REAR VIEW



■ LCD DISPLAY

TFT color display showing multiple display screens.

■ CONTROL BUTTONS

Used to perform various settings.

■ SD CARD SLOT

Remove the watertight cap and insert an SD card.
Be sure to firmly attach the cap after replacing the card.

■ CONNECTORS

For details, refer to the Instruction Manual (EM-7064-A) attached to the VR96E-G8.

1.6 Main functions of the VR96E-G8

The VR96E-G8 is a paperless recorder featuring a color LCD display.
The VR96E-G8 has the following main functions.

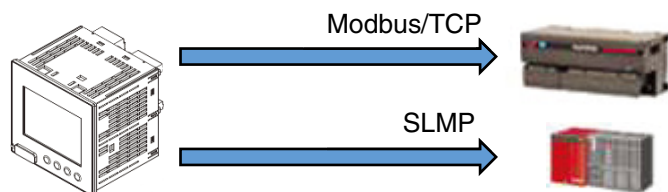
■BUILT-IN I/O

The VR96E-G8 has built-in I/Os of 8-point AI, 1-point DI, and 1-point DO, for direct input and output.

■MODBUS/TCP & SLMP CLIENT

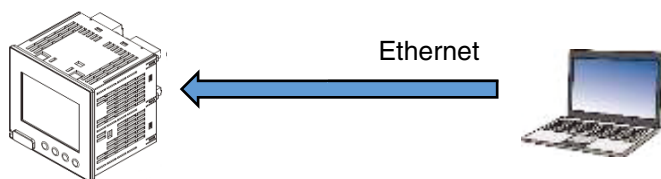
It is possible to expand I/O by connecting with remote I/O of MG Co., Ltd. that is compatible with Modbus/TCP. It is also possible to expand I/O by connecting with the SLMP-compatible CPU unit of Mitsubishi programmable-controller MELSEC.

Moreover, the recorder can handle data from measuring points in multiple locations.



■MODBUS/TCP SERVER

I/O data can be monitored by remote SCADA.



■COLOR LCD DISPLAY

Specified content can be displayed such as trend, event logs, etc.

■TREND DATA STORING

The trend data, event data and comment data can be stored to an SD card at the specified time intervals. The data stored in the SD card can be displayed on TR30 Viewer Software (model: TRViewer).

■LOGGING

The event logs, system logs and communication logs can be stored to an SD card.

■E-MAIL REPORTING

E-mail reporting function is available at event occurrence or at the specified time.

■FTP CLIENT/SERVER

Trend data or log data stored in the SD card can be uploaded to an FTP server. Also, reading and deleting files in the SD card by an FTP client is available.

2. Installation

2.1 Preparations

Prepare the following items other than the paperless recorder (model: VR96E-G8).

- PC
- LAN cable
- SD card (Refer to 7.2.6 SD card for recommended SD card.)
- VR96E-G8 Configurator Software (Model: VR96CFG) *1
- Viewer Software (Model: TRViewer) *1
- Remote I/O and/or SLMP-compatible PLC *2

Note 1) The software program can be downloaded from our website.

Note 2) Prepare in case of connecting via Modbus/TCP or SLMP.

2.2 Wiring

Connect the cables corresponding to the power supply connector, analog input connector and contact I/O connector of the paperless recorder (model: VR96E-G8).

For details, refer to the Instruction Manual (EM-7064-A) attached to the VR96E-G8.

2.3 Preparing the configurator software

Install the Configurator Software (model: VR96CFG) on the PC in order to configure the setting for the VR96E-G8.

2.3.1 Installation

Download VR96CFG from our website, and complete the installation simply by extracting it into any folder. Create a shortcut to VR96CFG.exe on the desktop if necessary.

2.3.2 Startup

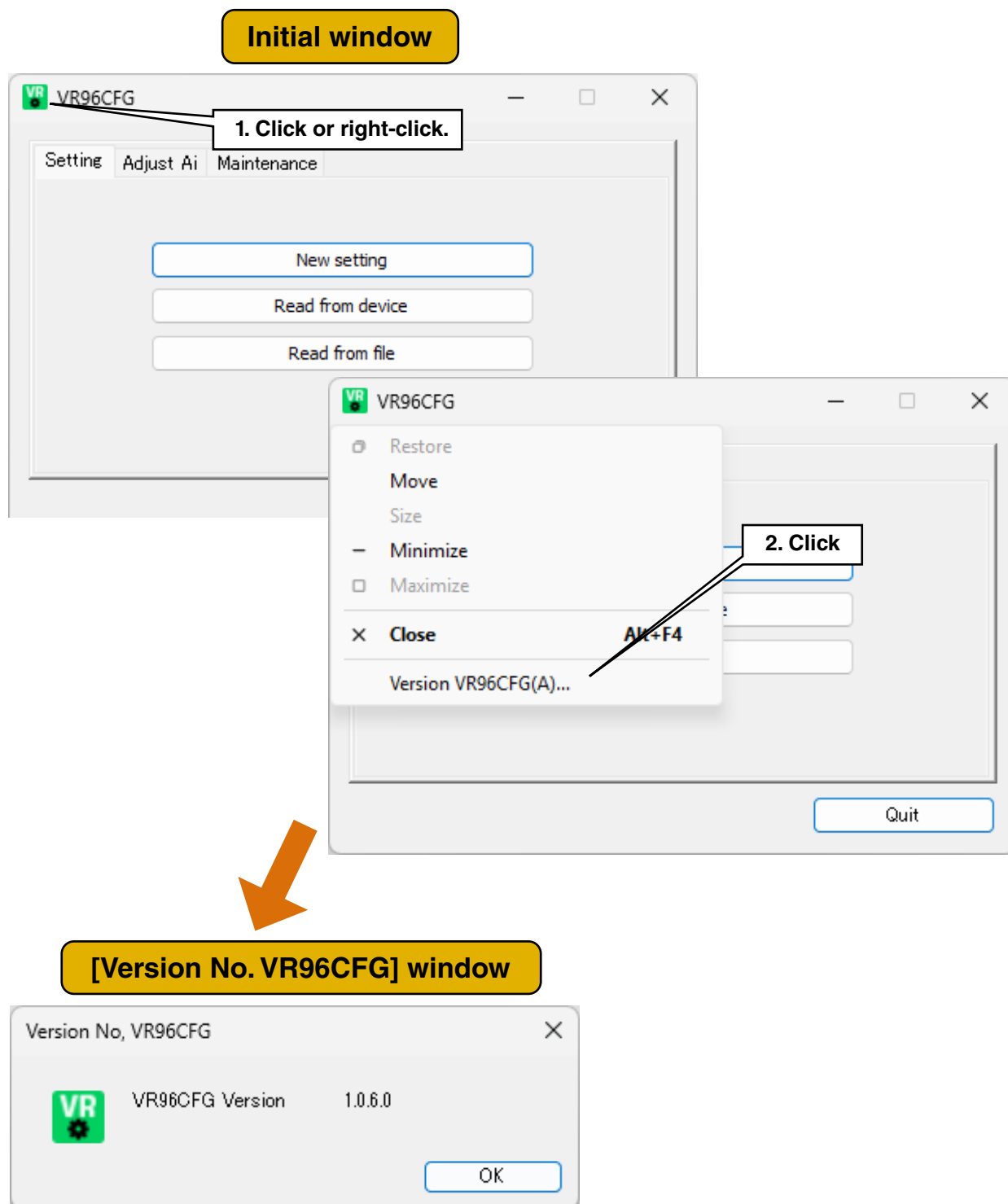
Connect the RJ-45 modular jack for Ethernet to the PC using LAN cable.

Start up VR96CFG, and then perform settings and maintenance of the VR96E-G8.

For details on VR96CFG, refer to 3. Setting.

2.3.3 Confirming the version

For confirming the version of VR96CFG, refer to the following procedure.



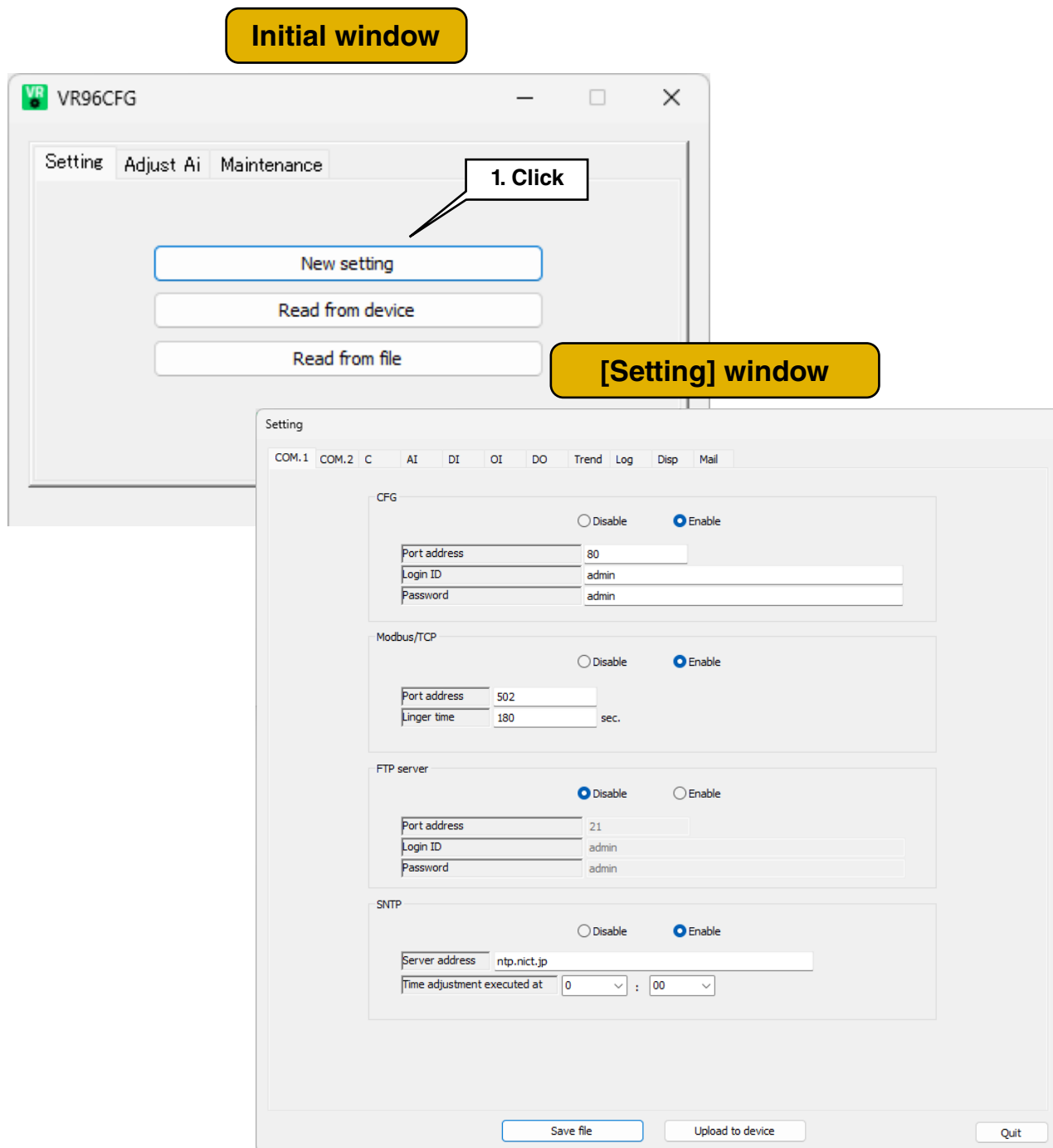
2.3.4 VR96E-G8 setting

There are multiple ways to configure the recorder as explained in the following sections.
For details, refer to the 3. Setting.

2.3.4.1 New setting

Click [New setting] button to configure a new setting for the VR96E-G8.

The new setting values are displayed on [Setting] window. Various settings can be performed on [Setting] window.

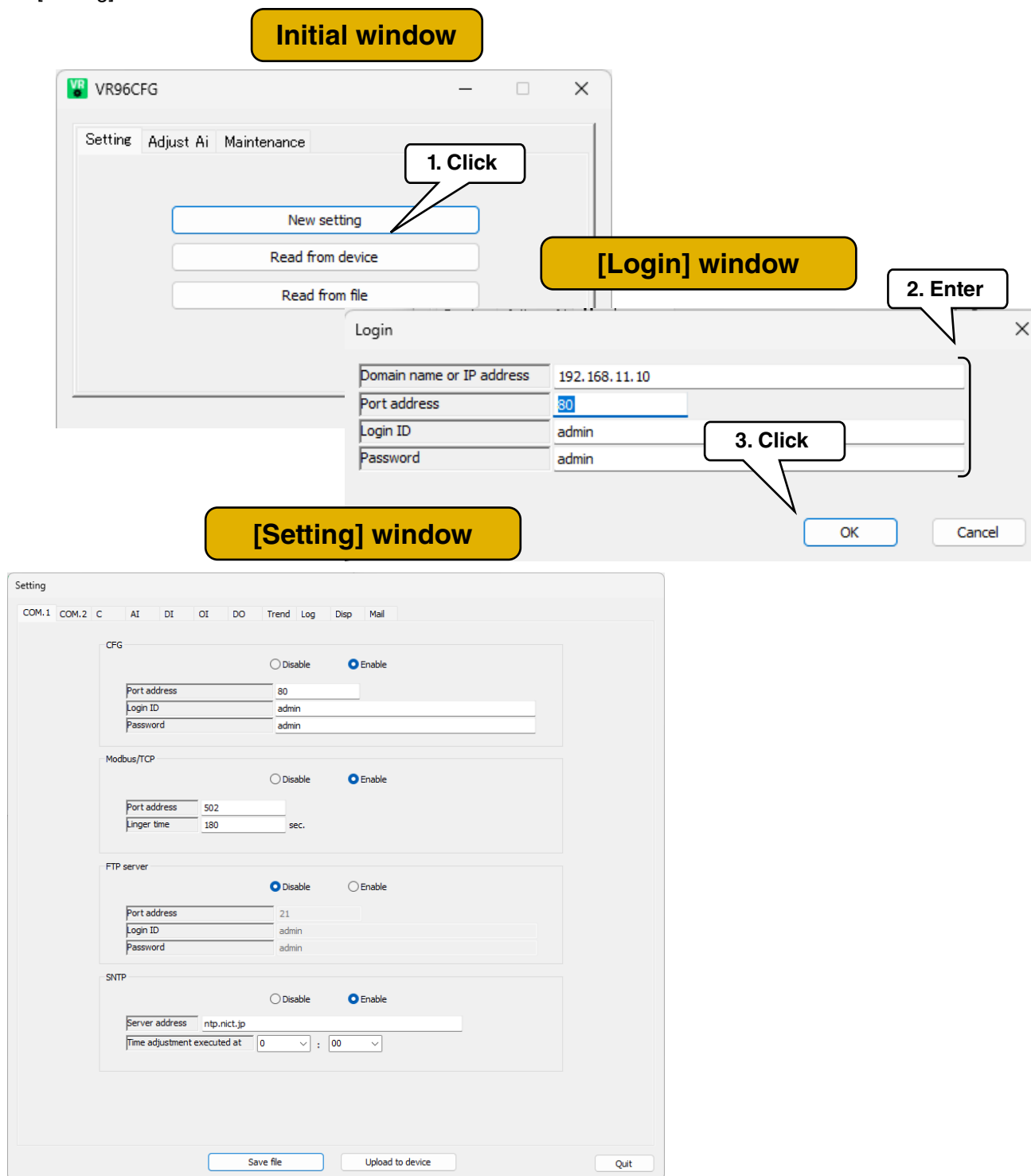


2.3.4.2 Reading from device

Click [Read from device] button to read and change the values set in the VR96E-G8.

Refer to the following table for the default values of [Login] window.

The imported setting values are reflected on [Setting] window. Various settings and changes can be performed on [Setting] window.



Default value on [Login] window

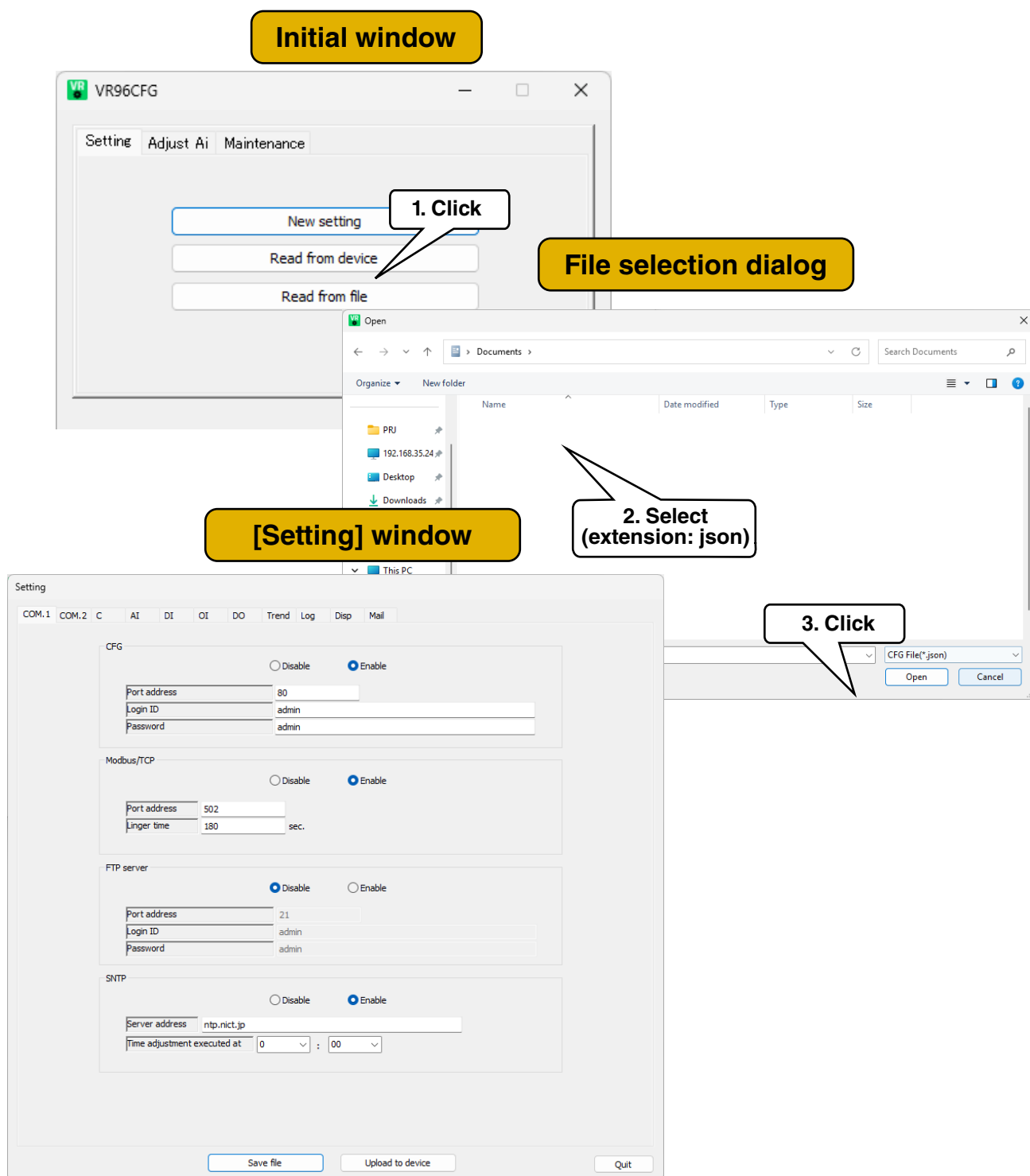
Parameter	Default
Domain name or IP address	192.168.0.10 → Changeable in 4.3.8.4 Network setting.
Port address	80 → Changeable in 3.2.1 CFG.
Login ID	admin → Changeable in 3.2.1 CFG.
Password	admin → Changeable in 3.2.1 CFG.

2.3.4.3 Reading from file

The imported setting values are reflected on [Setting] window. Various settings and changes can be performed on [Setting] window.

Click [Read from file] button to read out any setting file for the VR96E-G8 saved in the PC.

File selection dialog appears. Select the file to be read (extension: json).



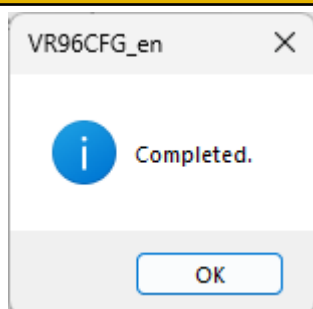
2.3.5 Transmitting the setting to the device

After completing the settings, click [Upload to device] button to transmit the settings to the device.
On completing transmission, [Completed] popup appears.
(For [Login] window, refer to 2.3.4.2 Reading from device.)

[Setting] window

The screenshot shows the 'Setting' window with the 'CFG' tab selected. The 'Port address' is set to 80, 'Login ID' is 'admin', and 'Password' is 'admin'. The 'Modbus/TCP' section is also visible with 'Port address' set to 502 and 'sec.' set to 180. A yellow callout box labeled '[Login] window' points to the 'Login' window. The 'Login' window has fields for 'Domain name or IP address' (192.168.11.10), 'Port address' (80), 'Login ID' (admin), and 'Password' (admin). A yellow callout box labeled '[Setting] window' points to the 'Setting' window. A yellow callout box labeled '2. Enter' points to the 'Port address' field in the 'Login' window. A yellow callout box labeled '3. Click' points to the 'OK' button in the 'Login' window. A yellow callout box labeled '1. Click' points to the 'Upload to device' button in the 'Setting' window.

Transmission completed



2.3.6 Saving the setting to file

After completing the settings, the setting values can be saved to a file.

Click [Save file] button to display the file saving dialog.

Specify the saving location and the file name (extension: json) and click [Save].

[Setting] window

Setting

COM.1 COM.2 C AI DI OI DO Trend Log Disp Mail

CFG

☐ Disable ☒ Enable

Port address 80

Login ID admin

Password admin

Modbus/TCP

☐ Disable ☒ Enable

Port address 502

Linger time 180 sec.

FTP server

☒ Disable ☐ Enable

Port address 21

Login ID admin

Password admin

SNTP

☐ Disable ☒ Enable

Server address ntp.nict.jp

Time adjustment executed at 0 : 00

1. Click

Save file

File saving dialog

Save As

Documents > VR96

Search VR4896

Organize New folder

Name	Date modified	Type	Size
vr96cfg.json	11/27/2024 9:18 AM	JSON ソース ファイル	18 KB

File name: vr96cfg.json

Save as type: CFG File (*.json)

2. Enter (extension: json)

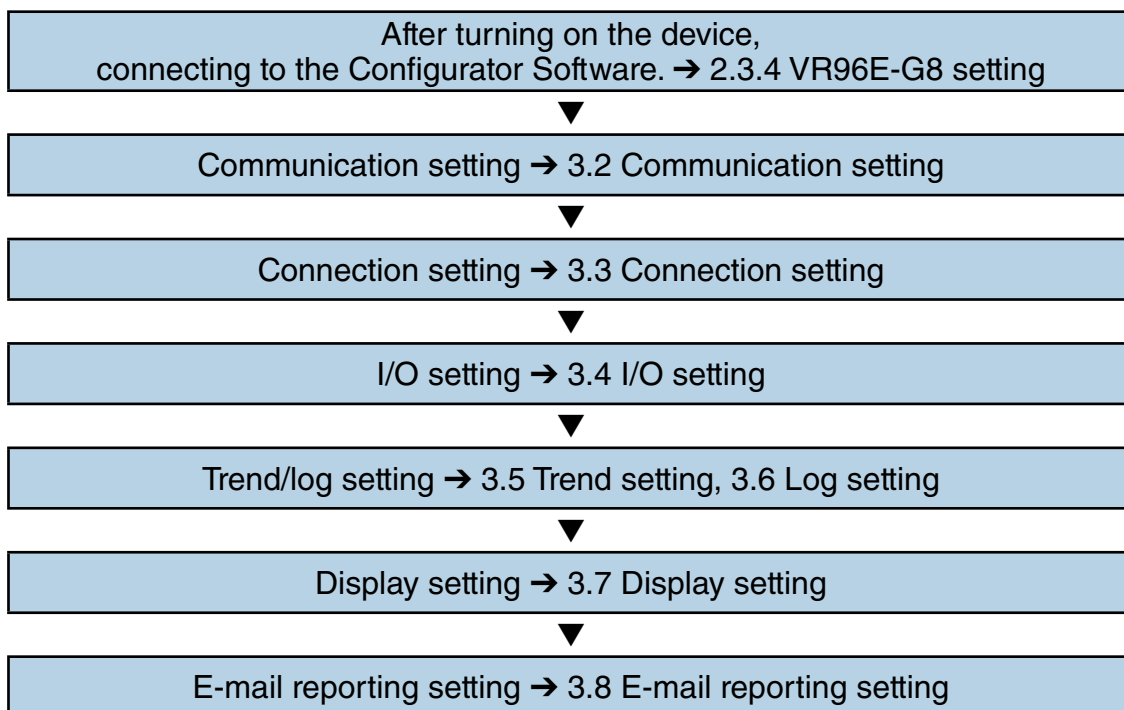
3. Click

Save Cancel

3. Setting

3.1 Setting flow

Before starting recording or reporting with the VR96E-G8, configure the settings according to the following procedure using the dedicated Configurator Software (model: VR96CFG).



3.2 Communication setting

Configure various communication settings with the VR96E-G8.

3.2.1 CFG

Configure the connection setting between VR96E-G8 and VR96CFG.

Click [COM.1] tab and set parameters according to the table below.

1. Click

[Setting] window

2. Enter

Setting

COM.1 COM.2 C AI DI OI DO Trend Log Disp Mail

CFG

☐ Disable ☒ Enable

Port address 80

Login ID admin

Password admin

Modbus/TCP

☐ Disable ☒ Enable

Port address 502

Linger time 180 sec.

FTP server

☒ Disable ☐ Enable

Port address 21

Login ID admin

Password admin

SNTP

☐ Disable ☒ Enable

Server address ntp.nict.jp

Time adjustment executed at 0 : 00

Save file Upload to device Quit

Parameter	Description
Disable/Enable	Set [Disable] or [Enable]. Set [Enable] in case of using CFG function.
Port address	Set the port address within 1 to 65535.
Login ID	Set login ID within 32 characters. (alphanumeric characters and "_")
Password	Set password within 32 characters. (alphanumeric characters and "_")

CAUTION

Disabling CFG will disable communication between VR96CFG and VR96E-G8.

3.2.2 Modbus/TCP (server)

Configure the Modbus/TCP server settings for the VR96E-G8.
Click [COM.1] tab and set parameters according to the table below.

The screenshot shows the 'Setting' window with the 'COM.1' tab selected. The 'Modbus/TCP' section is highlighted with a red box. The 'Enable' radio button is selected. The 'Port address' is set to 502 and the 'Linger time' is set to 180 sec. The 'CFG' section has 'Enable' selected and 'Port address' set to 80. The 'FTP server' section has 'Disable' selected and 'Port address' set to 21. The 'SNTP' section has 'Enable' selected and 'Server address' set to ntp.nict.jp. At the bottom are buttons for 'Save file', 'Upload to device', and 'Quit'.

Parameter	Description
Disable/Enable	Set [Disable] or [Enable]. Set [Enable] in case of using Modbus/TCP server function.
Port address	Set the port address of Modbus/TCP within 1 to 65535.
Linger time	Set the time until communication timeout within 1 to 600 (sec.)

3.2.3 FTP server

Configure the FTP server settings for the VR96E-G8.
Click [COM.1] tab and set parameters according to the table below.

1. Click

[Setting] window

Setting

COM.1COM.2CAltDIOTrendLogDispMail

CFG

DisableEnable

Port address80

Login IDadmin

Passwordadmin

Modbus/TCP

DisableEnable

Port address502

Linger time180sec.

FTP server

DisableEnable

Port address21

Login IDadmin

Passwordadmin

SNTP

DisableEnable

Server addressntp.nict.jp

Time adjustment executed at0:00

Save file

Upload to device

Quit

2. Enter

Parameter	Description
Disable/Enable	Set [Disable] or [Enable]. Set [Enable] in case of using FTP server function.
Port address	Set the port address of FTP server within 1 to 65535.
Login ID	Set the login ID within 32 characters. (alphanumeric characters and "_")
Password	Set the password within 32 characters. (alphanumeric characters and "_")

NOTE

Port address 45967 to 45970 are used for PASV.

3.2.4 SNTP

Configure the SNTP server settings for the VR96E-G8.
Click [COM.1] tab and set parameters according to the table below.

1. Click

[Setting] window

Setting

COM.1COM.2CAltDIOTrendLogDispMail

CFG

DisableEnable

Port address80

Login IDadmin

Passwordadmin

Modbus/TCP

DisableEnable

Port address502

Linger time180sec.

FTP server

DisableEnable

Port address21

Login IDadmin

Passwordadmin

SNTP

DisableEnable

Server addressntp.nict.jp

Time adjustment executed at0:00

Save file

Upload to device

Quit

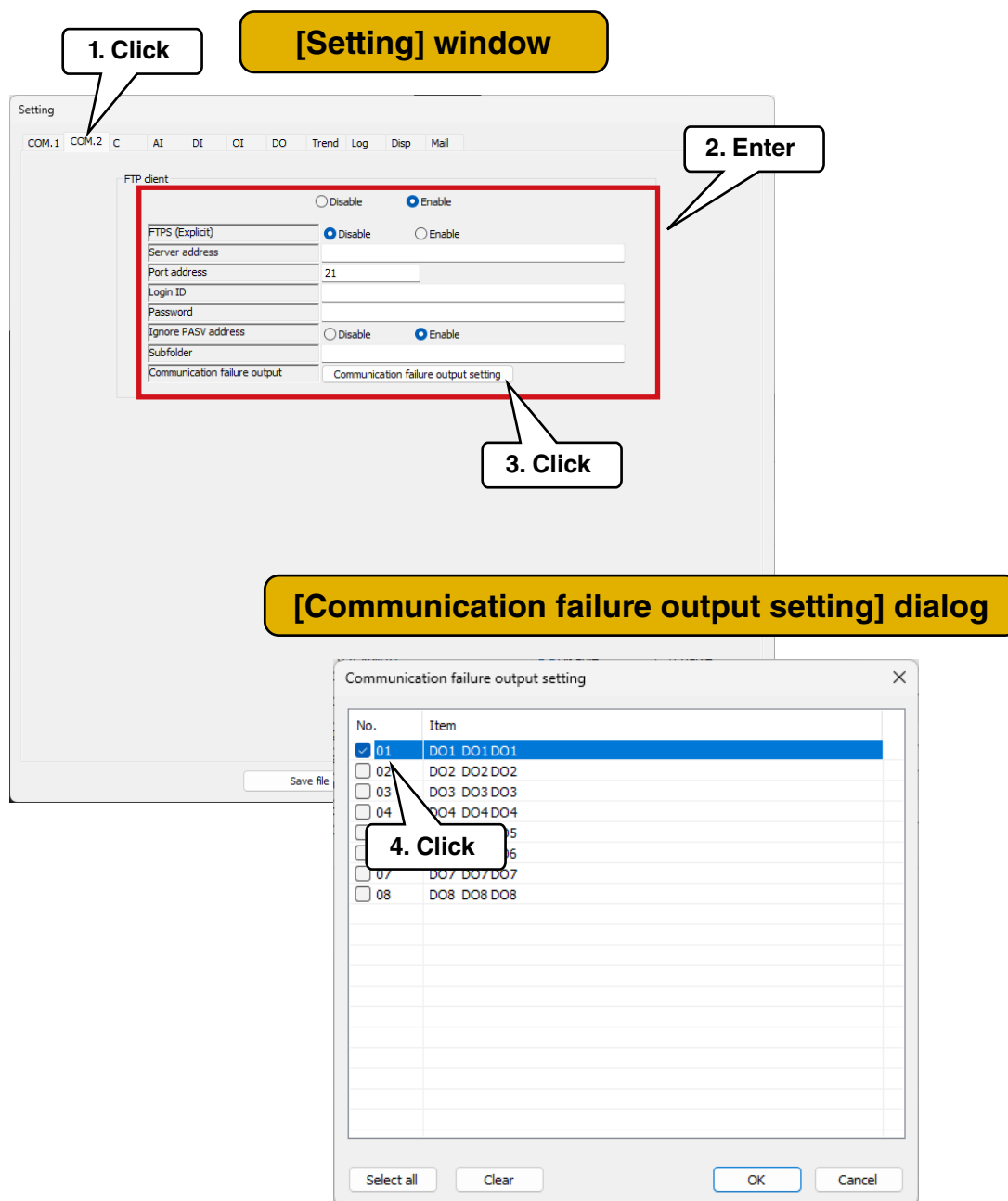
2. Enter

Parameter	Description
Disable/Enable	Set [Disable] or [Enable]. Set [Enable] in case of using SNTP client function.
Server address	Set the SNTP server address within 32 characters
Time adjustment executed at	Set the time when time adjustment will be performed. (0:00 to 23:59)

3.2.5 FTP client

Configure the FTP client settings for the VR96E-G8.

1. Click [COM.2] tab and enter the parameters according to the table below.
2. Click [Communication failure output setting] button to configure DO processing setting in case of communication failure. Click [Select all] or [Clear] button to enable batch setting.
When selecting the checkbox, DO is output in case of communication failure.



Parameter	Description
Disable/Enable	Set [Disable] or [Enable]. Set [Enable] in case of using FTP client function.
FTPS (Explicit)	Set [Disable] or [Enable]. Set [Enable] in case of connecting in Explicit mode.
Server address	Set the FTP server address. (within 64 characters)
Port address	Set the port address of the FTP server within 1 to 65535.
Login ID	Set the login ID. (within 32 characters)
Password	Set the password. (within 32 characters)
Ignore PASV address	Set [Disable] or [Enable]. Set [Enable] in case of ignoring the IP address returned by the PASV command.
Subfolder	Set the subfolder. (within 64 characters)

3.3 Connection setting

Configure connection settings between the VR96E-G8 and remote I/O or SLMP-compatible devices.
Two connections can be set. (C1 and C2)

3.3.1 Connection setting

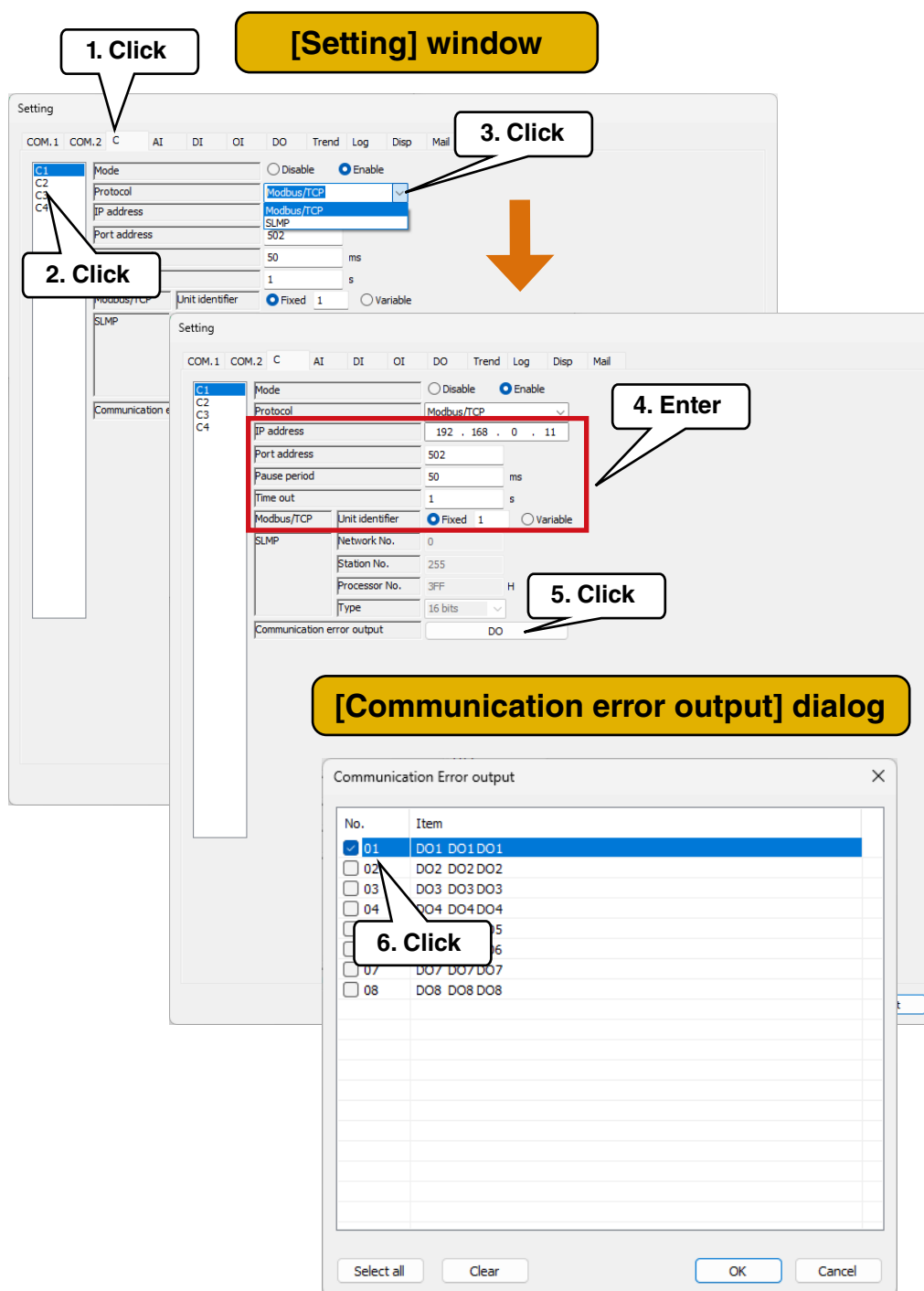
When communicating with remote I/O or SLMP-compatible device, set the IP address of each device per connection.

3.3.1.1 Modbus/TCP connection

Configure the Modbus/TCP connection (client) setting.

1. Click the connection to be set to display the current settings.
2. Click the protocol drop-down list and select [Modbus/TCP].
3. Set parameters according to the table on the next page.
4. Click [DO] button to configure DO processing setting in case of communication failure. Click [Select all] or [Clear] button to enable batch setting.

When selecting the checkbox, DO is output in case of communication failure.



Parameter	Description
Disable/Enable	Set [Disable] or [Enable]. Set [Enable] in case of communicating with remote I/O or SLMP-compatible device.
Protocol	Select [Modbus/TCP] or [SLMP].
IP address	Set the IP address of the connection destination. (0.0.0.0 to 255.255.255.255)
Port address	Set the port address within 1 to 65535.
Pause period	Set the communication interval with the connection destination by the millisecond. (50 to 30000)
Time out	Set the time until communication timeout with the connection destination by the millisecond. (1 to 60)
Modbus/TCP Unit identifier	Select [Fixed] or [Variable]. In case of [Fixed], set within 0 to 255.

3.3.1.2 SLMP connection

Configure the SLMP connection (client) setting.

1. Click the connection to be set to display the current settings.
2. Click the protocol drop-down list and select [SLMP].
3. Set parameters according to the table below.
4. Click [DO] button to configure DO processing setting in case of communication failure. Click [Select all] or [Clear] button to enable batch setting.

When selecting the checkbox, DO is output in case of communication failure.

[Setting] window

1. Click

2. Click

3. Click

4. Enter

5. Click

[Communication error output] dialog

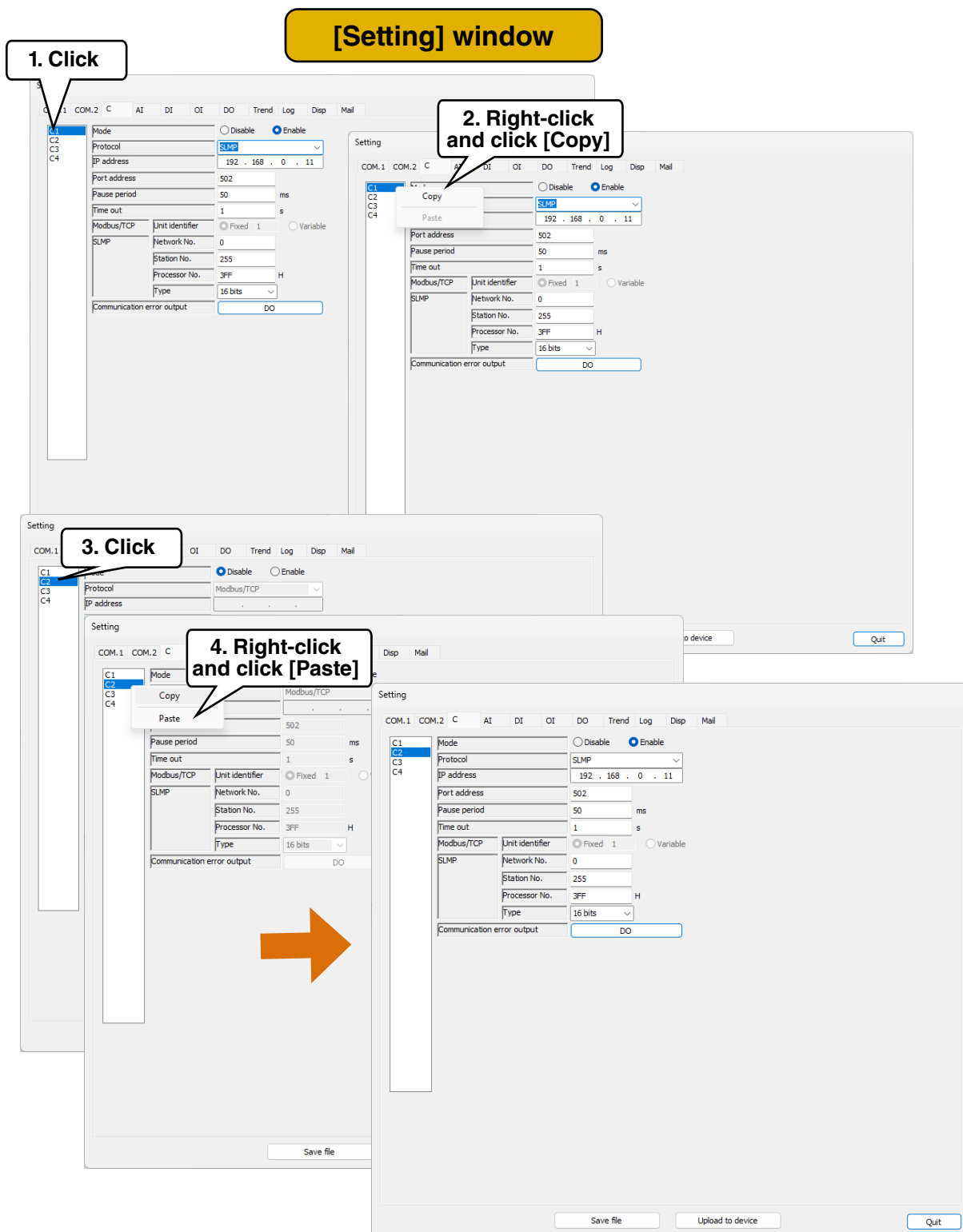
6. Click

No.	Item
☒ 01	DO1 DO1 DO1
☐ 02	DO2 DO2 DO2
☐ 03	DO3 DO3 DO3
☐ 04	DO4 DO4 DO4
☐ 05	DO5 DO5 DO5
☐ 06	DO6 DO6 DO6
☐ 07	DO7 DO7 DO7
☐ 08	DO8 DO8 DO8

Parameter	Description
Disable/Enable	Set [Disable] or [Enable]. Set [Enable] in case of communicating with remote I/O or SLMP-compatible device.
Protocol	Select [Modbus/TCP] or [SLMP].
IP address	Set the IP address of the connection destination. (0.0.0.0 to 255.255.255.255)
Port address	Set the port address within 1 to 65535.
Pause period	Set the communication interval with the connection destination by the millisecond. (50 to 30000)
Time out	Set the time until communication timeout with the connection destination by the millisecond. (1 to 60)
SLMP Network No.	Set the SLMP Network No. within 0 to 255.
SLMP Station No.	Set the SLMP Station No. within 1 to 255.
SLMP Processor No.	Set the SLMP Processor No. within 0x0000 to 0xFFFF.
SLMP Type	Select [16 bits] or [32 bits].

3.3.2 Copying the connection setting

It is possible to copy the connection settings configured on [Setting] window and to modify only the necessary parameters.



3.3.3 SLMP-compatible device

Up to four SLMP-compatible devices can be connected to one VR96E-G8.

Assign separate IP addresses to SLMP-compatible devices (C1 to C4) that are different from the VR96E-G8.

■SLMP-COMPATIBLE DEVICES THAT CAN BE CONNECTED

- MELSEC iQ-R Series CPU units (Mitsubishi Electric)
- MELSEC iQ-F Series CPU units (Mitsubishi Electric)
- MELSEC Q Series CPU units (Mitsubishi Electric)

(Tested and verified)

- R04CPU
- FX5U-32M
- Q03UDECPU

■CONNECTING WITH SLMP-COMPATIBLE DEVICE

The VR96E-G8 can be connected to SLMP-compatible devices via TCP/IP over Ethernet.

Register the SLMP device on the Ethernet device setting window and set as follows:

- Communication data code: Binary
- Communication method: SLMP
- Protocol: TCP
- IP address: IP address specified in the connection setting of the VR96E-G8
- Port address: Port address specified in the connection setting of the VR96E-G8

NOTE

Refer to the Users Manual of each product for the setting of the SLMP-compatible device.

3.4 I/O setting

Configure I/O signal settings with the VR96E-G8.

It is possible to assign remote I/O and SLMP-compatible device in addition to the built-in I/O.

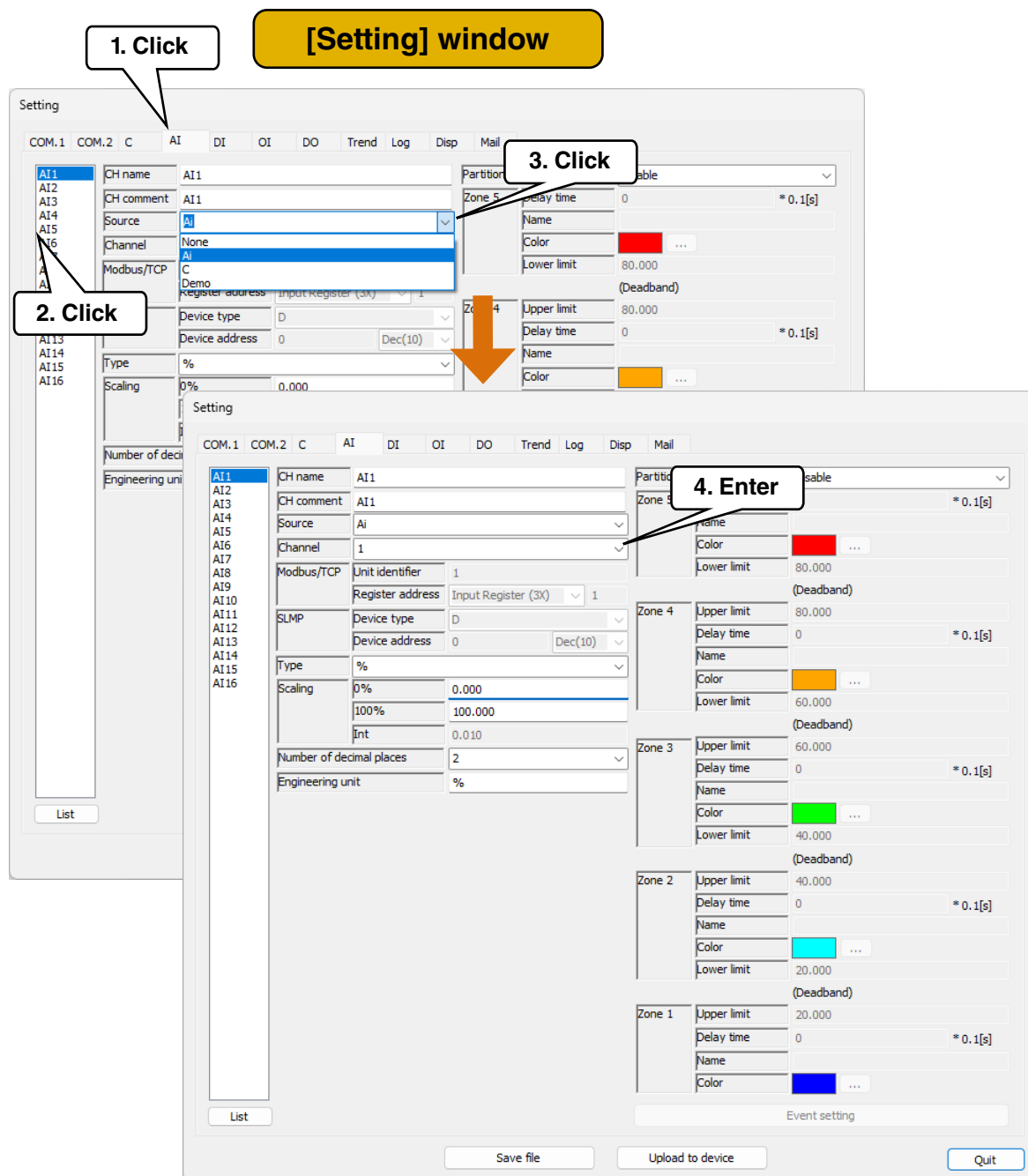
3.4.1 Analog input (AI)

Analog input signals can be monitored for maximum of 16 points (AI1 to AI16) using the VR96E-G8.

Assign the analog input from built-in I/O, remote I/O or SLMP-compatible device to the VR96E-G8 according to the following procedure.

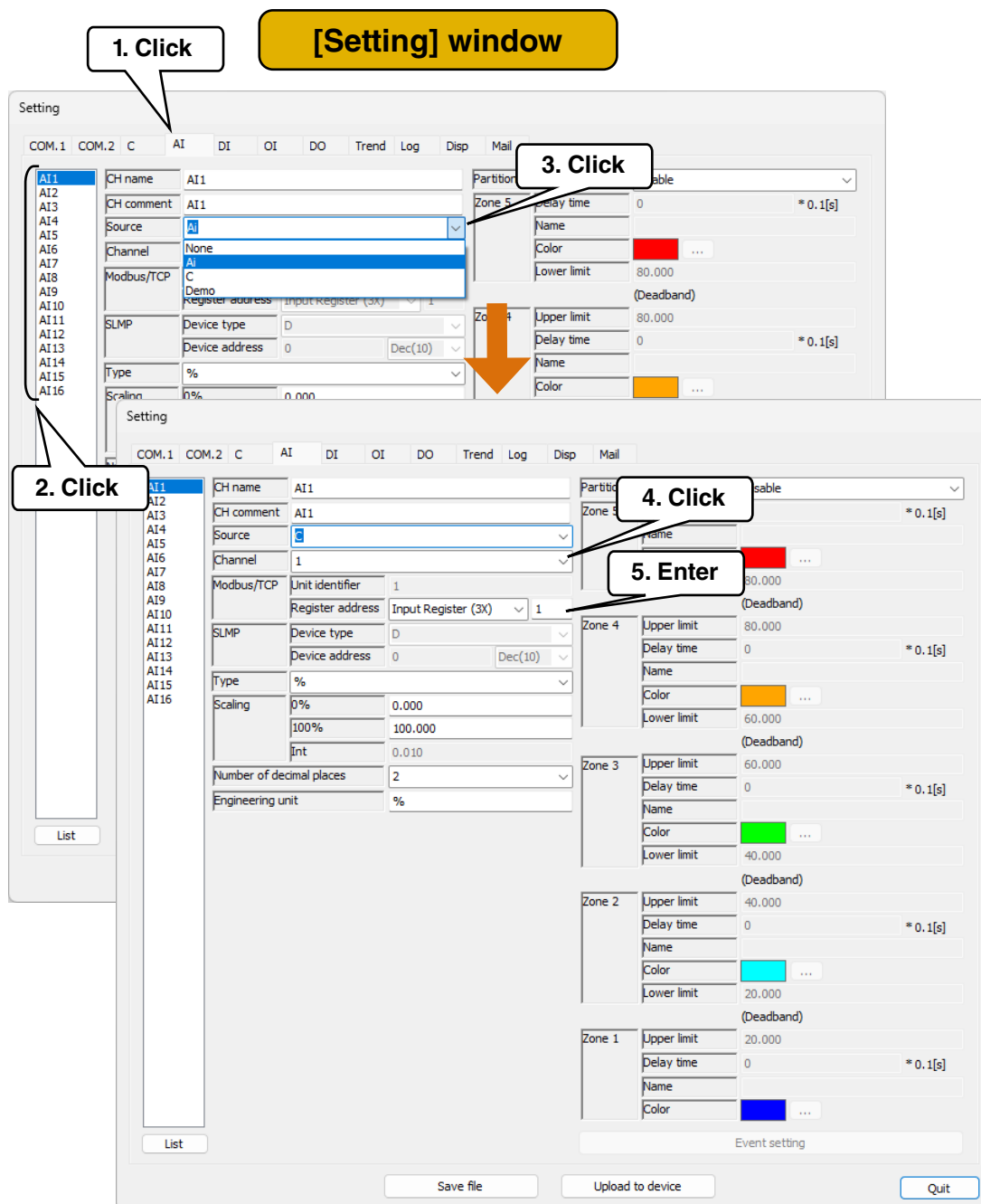
3.4.1.1 Assignment analog input to built-in I/O

1. Click the channel to be set to display the current settings.
2. Click the source drop-down list and select [AI].
3. Set the channel 1 to 8 of built-in AI.



3.4.1.2 Assignment analog input to remote I/O

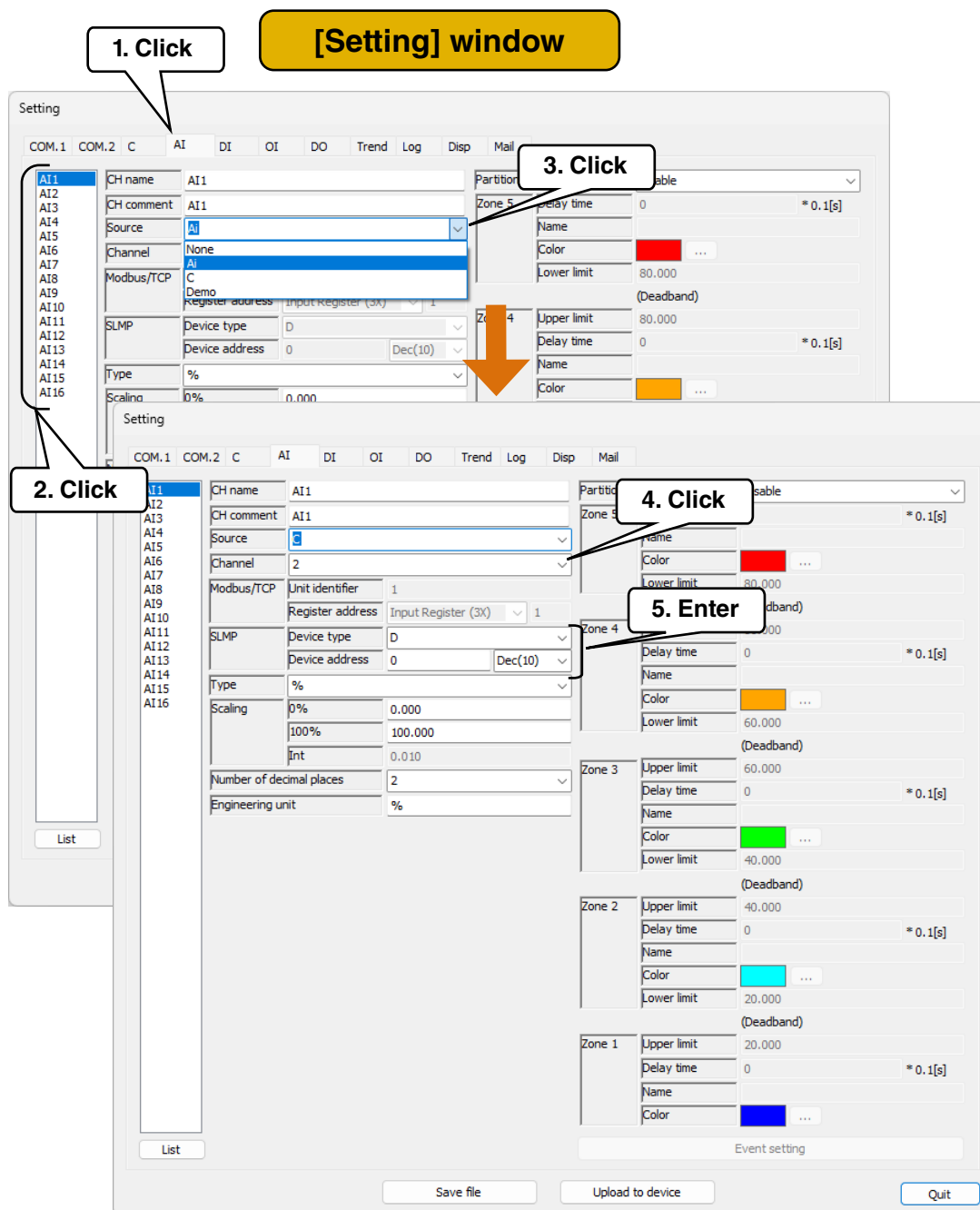
1. Click the channel to be set to display the current settings.
2. Click the source drop-down list and select [C].
3. Set the channel 1 to 4 for connection setting. In case that the selected connection channel is Modbus/TCP, the following window appears and assigning remote I/O becomes possible.
→ 3.3.1.1 Modbus/TCP connection
4. Set parameters according to the table below.



Parameter	Description
Modbus/TCP Unit identifier	In case that the unit identifier of the selected channel is [Variable], set the unit identifier number in the range of 0 to 255. → 3.3.1.1 Modbus/TCP connection
Modbus/TCP Register address	Select [Input Register (3X)] or [Holding Register (4X)]. Set the register address in the range of 0 to 65536.

3.4.1.3 Assignment analog input to SLMP-compatible device

1. Click the channel to be set to display the current settings.
2. Click the source drop-down list and select [C].
3. Set the channel 1 to 4 for connection setting. In case that the selected connection channel is SLMP, the following window appears and assigning SLMP becomes possible. → 3.3.1.2 SLMP connection
4. Set parameters according to the table below.



Parameter	Description
Device type	Select the device type of the SLMP-compatible device to be connected.
Device address	Enter the address of the SLMP-compatible device to be connected. (Dec(10): 0 to 4294967295, Hex(16): 0x00000000 to 0xFFFFFFFF, Oct(8): 0 to 037777777777)

3.4.1.4 Basic setting (AI)

After completing the assignment, configure the following basic setting.

[Setting] window

Setting

COM.1 COM.2 C AI DI OI DO Trend Log Disp Mail

AI1 CH name AI1

AI2 CH comment AI1

AI3 Source Ai

AI4 Channel 1

AI5 Modbus/TCP Unit identifier 1

AI6 Register address Input Register (3X) 1

AI7 SLMP Device type D

AI8 Device address 0 Dec(10)

AI9 IType %

AI10 Scaling 0% 0.000

AI11 100% 100.000

AI12 Int 0.010

AI13 Number of decimal places 2

AI14 Engineering unit %

AI15

AI16

List

Save file Upload to device Quit

1. Enter

2. Enter

Partitions

Zone 5 Delay time 0 * 0.1[s]

Name

Color

Lower limit 80.000

(Deadband)

Zone 3 Upper limit 80.000

Delay time 0 * 0.1[s]

Name

Color

Lower limit 60.000

(Deadband)

Zone 2 Upper limit 60.000

Delay time 0 * 0.1[s]

Name

Color

Lower limit 40.000

(Deadband)

Zone 1 Upper limit 40.000

Delay time 0 * 0.1[s]

Name

Color

Event setting

Parameter	Description
CH name	Set the channel name within 16 characters.
CH comment	Set the comment for the channel within 16 characters such as the tag name, etc.
Type	Select the data type from the following 3 types. % %×100 format data (-500 to 10500) (equivalent to the voltage/current data of remote I/O) - Int Signed 16 bit integer format data (-32768 to 32767) (equivalent to the temperature data of remote I/O) - UInt Unsigned 16 bit integer format data (0 to 65535)
Scaling	- If the data type is [%] Set the actual corresponding values at 0% and 100% respectively as numeric values. - If the data type is [Int] or [UInt] Set the multiplication factor in order to convert the data to its actual value. For example, if the temperature data is the actual value × 10, enter [0.1].
Number of decimal places	Set the number of digits after the decimal point for the values displayed on the trend data, etc. Set from 0, 1, 2 and 3.
Engineering unit	Set the engineering unit corresponding to the actual value set in the [Scaling]. Set within 8 characters.

3.4.1.5 Zone setting (AI)

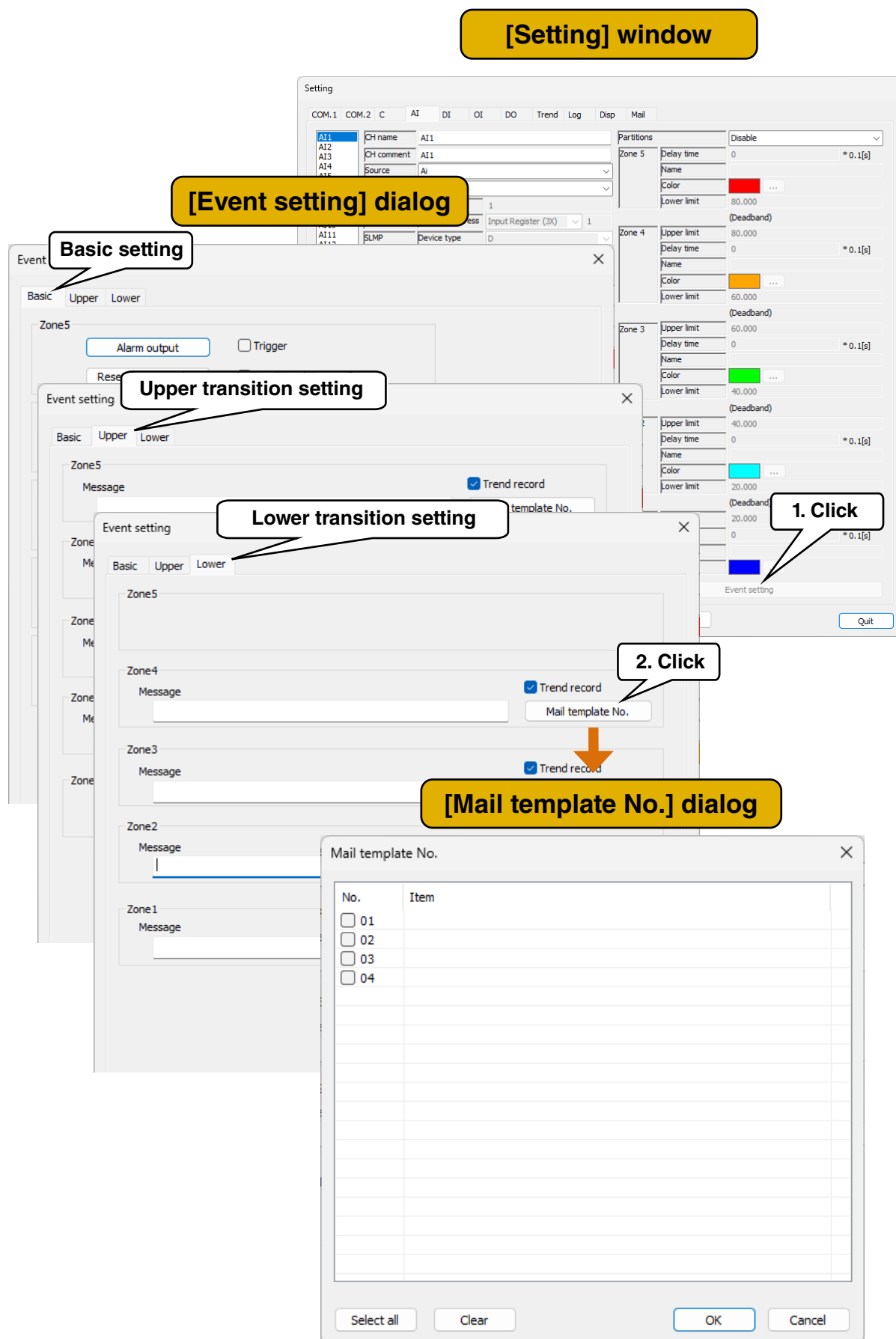
Configure zone setting corresponding to the input values. Up to 5 zones can be set, and deadbands can also be set between zones.

[Setting] window

Parameter	Description
Partitions	Set the number of zones to be used. Select from Disable / 2 / 3 / 4 / 5.
Name	Set the name for each zone within 16 characters.
Color	Set the color to represent each zone which will be displayed on the trend data.
Delay time	Set the time required for the transition from another zones to the corresponding zone to be confirmed in the range of 0.0 to 99.9 (sec.). When zone 1 is set to five seconds: The transition to zone 1 is confirmed five seconds after the input value changes in the state of zone 2 and becomes less than or equal to the upper limit of zone 1. It remains in zone 2 until five seconds have elapsed.
Upper limit : : : Lower limit	Set the upper and lower limit value for zones with actual values. Set as the upper limit > lower limit. - When the deadband is set When the deadband is set between zone 1 and zone 2, set the values so that the deadband is between the upper limit of zone 1 and the lower limit of zone 2. Set similarly for the other zones as well. - When the deadband is not set When the deadband is not set between zone 1 and zone 2, set the same value for the upper limit of zone 1 and the lower limit of zone 2. Set similarly for the other zones as well.

3.4.1.6 Event setting (AI)

An event occurs when transiting to the zone which has been set in the zone setting.



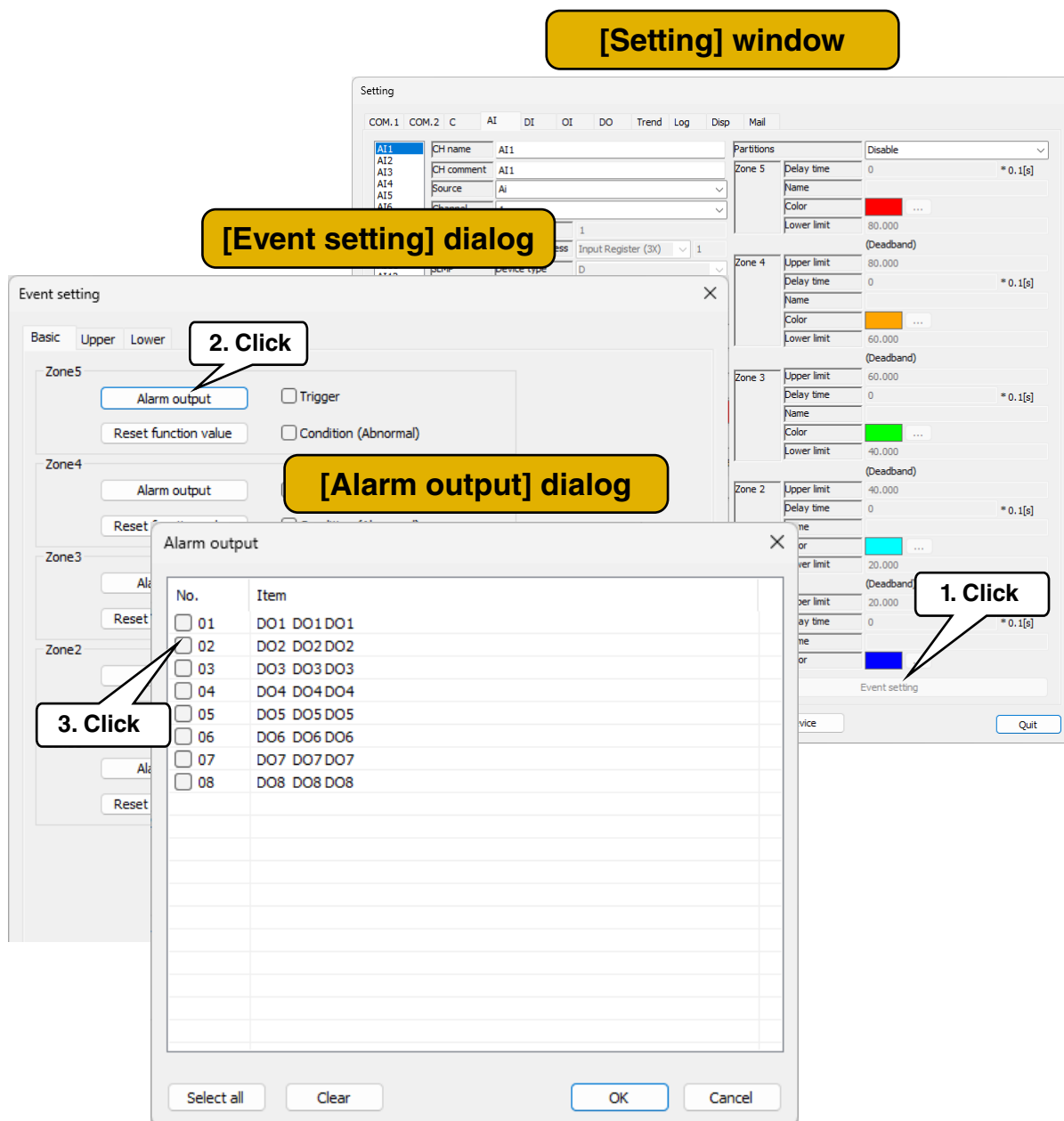
1. Click [Event setting] button on [Setting] window (AI) to display [Event setting] dialog. In case that the partitions is [Disable], [Event setting] button is disabled.
2. Set parameters according to the table below. Click [OK] button to go back to [Setting] window.
3. Click [Mail template No.] button to display [Mail template No.] dialog. An e-mail is sent according to the selected template when the input value changes and enters the corresponding zone.

Parameter	Description
Trigger	Set whether or not to perform trigger recording when the input value changes and enters the corresponding zone. Select the checkbox when performing the trigger recording. → 3.5.1.3 Trigger recording
Condition (Abnormal)	Select the checkbox to return from the screensaver and to enable flicker display on the digital view and on the overview when the input value changes and enters the corresponding zone. → 3.7.3 Other settings
Message	Set the message when an event occurs within 32 characters.
Trend record	Set whether or not to record a message to the trend when an event occurs. Select the checkbox when recording the message.

3.4.1.7 Alarm output setting (AI)

A specified DO can be turned ON for each zone.

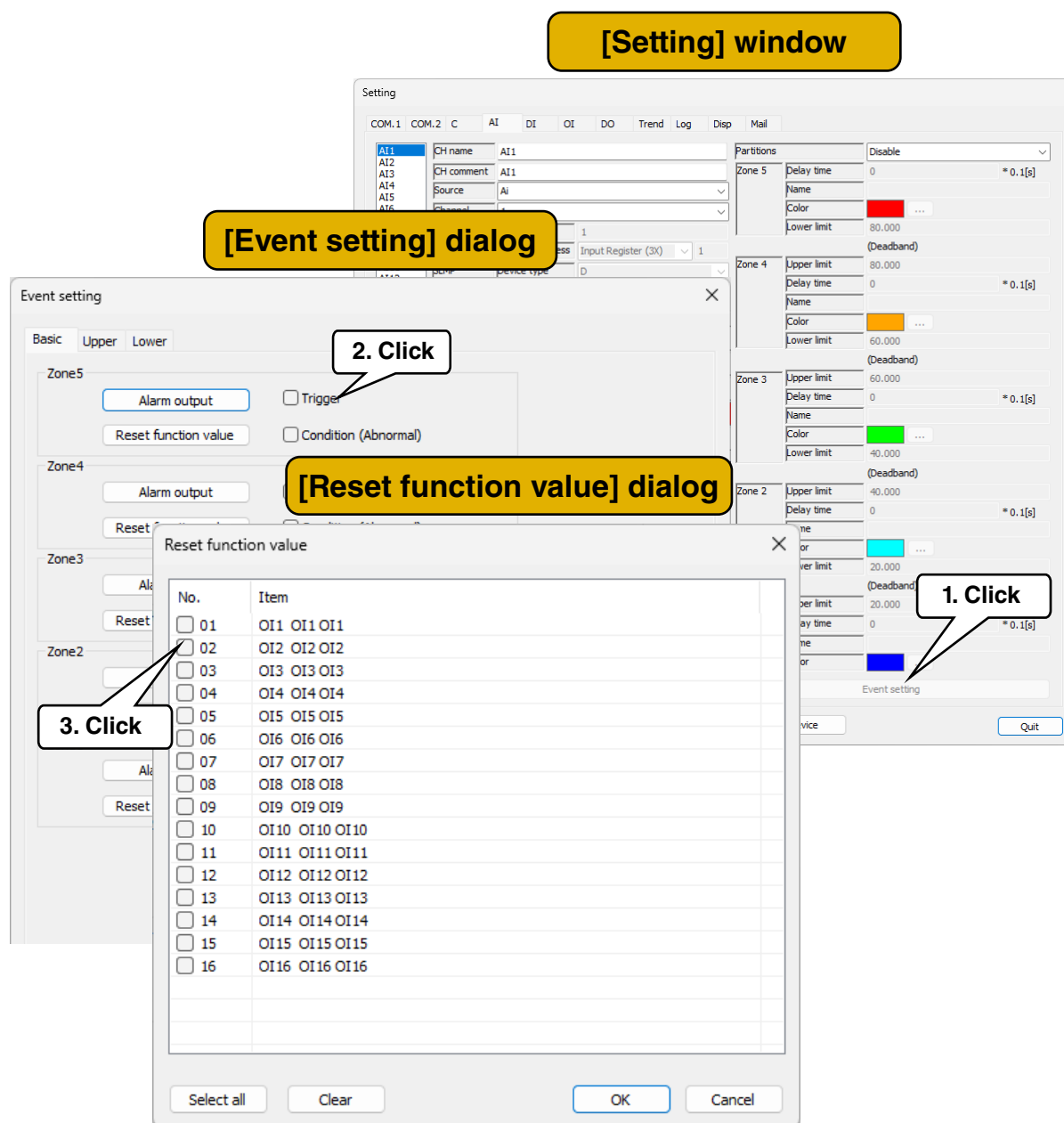
1. Click [Event setting] button on [Setting] window (AI) to display [Event setting] dialog. Click [Alarm output] button of the specified zone to display [Alarm output] dialog.
2. Select the checkbox of the DO channel to be set and click [OK].



3.4.1.8 Reset function value setting (AI)

The function value of the specified OI can be reset when zone transition occurs.

1. Click [Event setting] button on [Setting] window (AI) to display [Event setting] dialog. Click [Reset function value] button of the specified zone to display [Reset function value] dialog.
2. Select the checkbox of the OI channel to be set and click [OK].



Follow the above procedure to set all the channels.

The channel setting configured on [Analog input (AI)] window can also be copied to other channels and only the required parameters can be modified.

→ 3.4.5 Copying the I/O setting

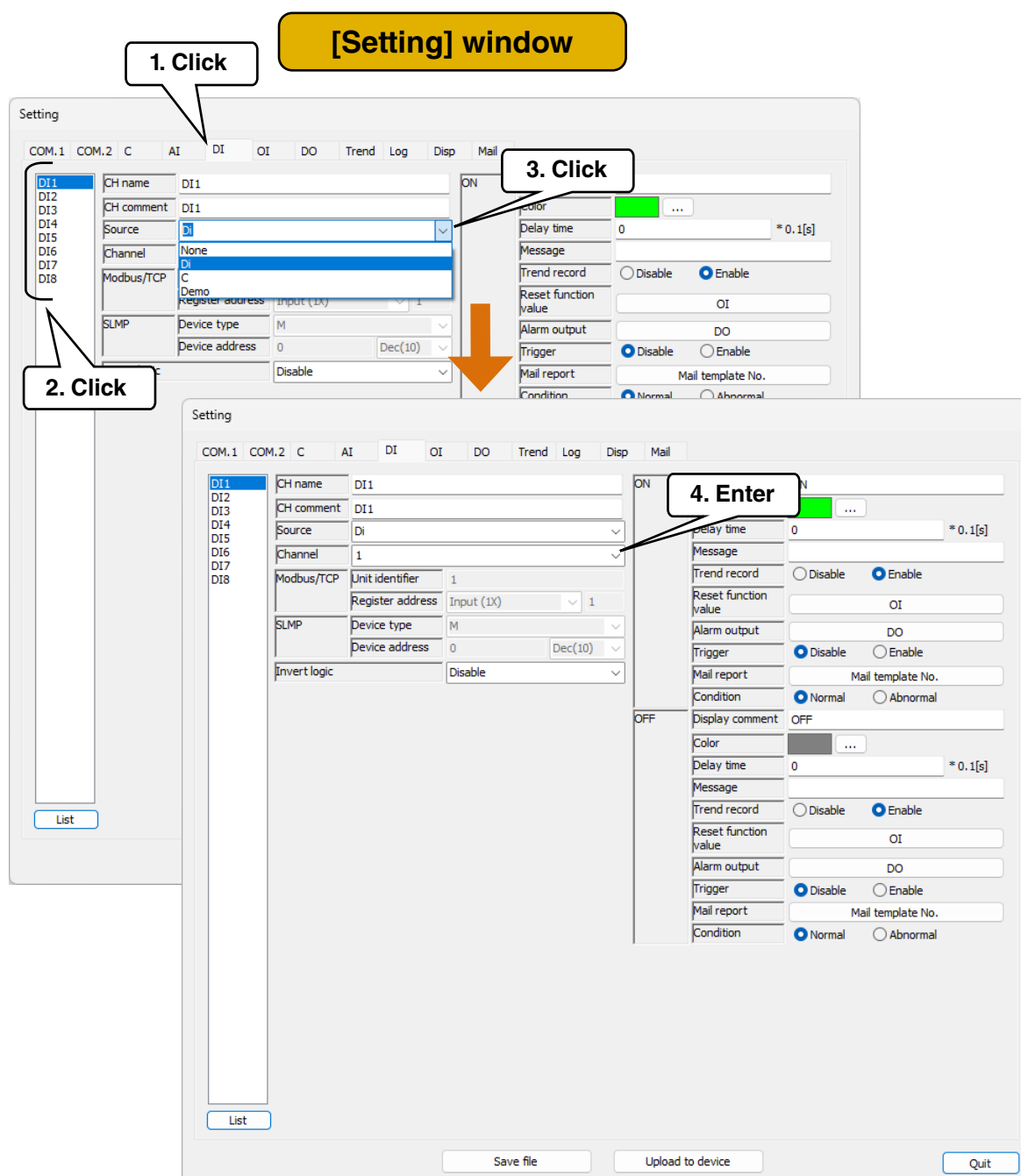
3.4.2 Discrete input (DI)

Discrete input signals can be monitored for maximum of 8 points (DI1 to DI8) using the VR96E-G8.

Assign the discrete input from built-in I/O, remote I/O or SLMP-compatible device to the VR96E-G8 according to the following procedure.

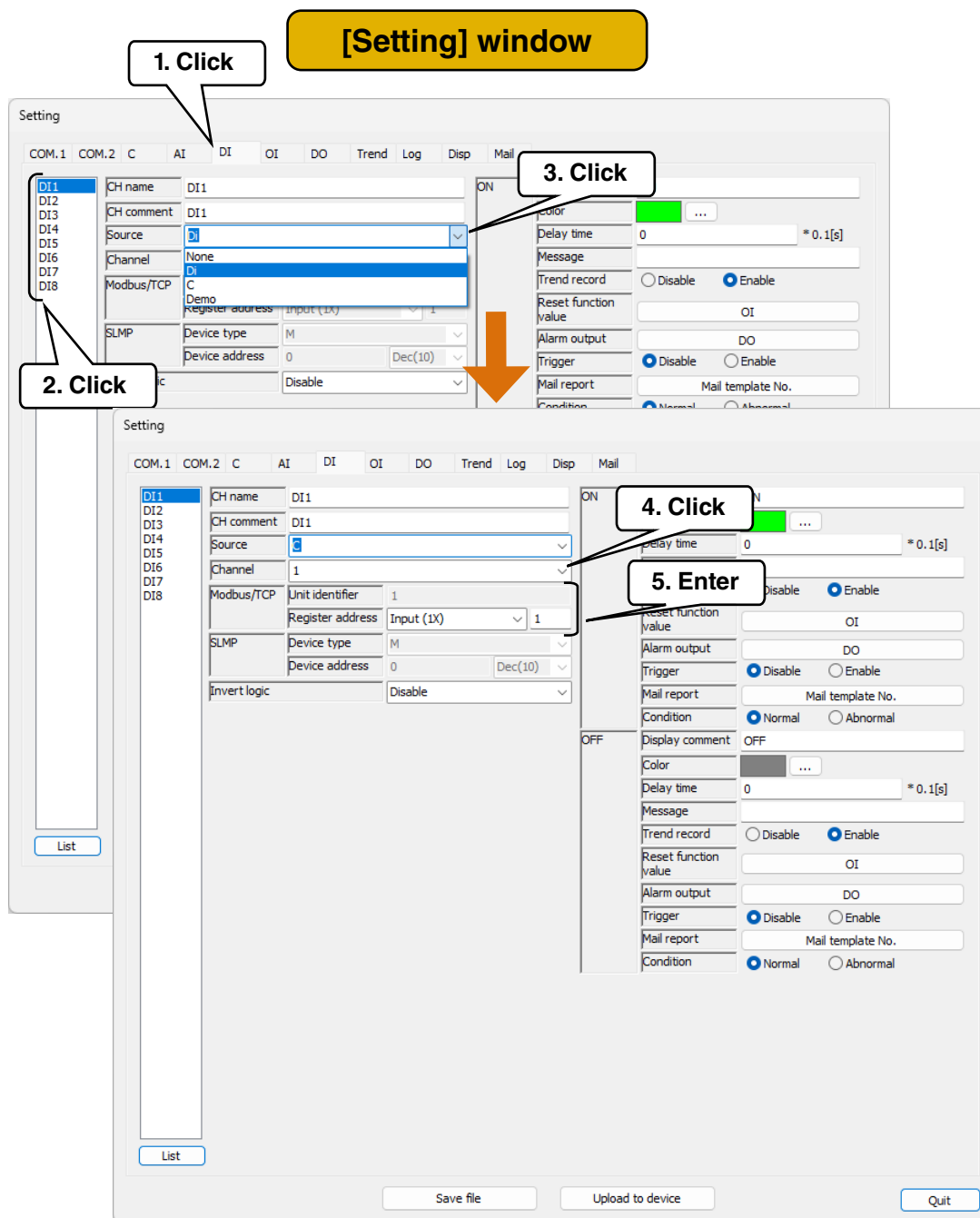
3.4.2.1 Assignment discrete input to built-in I/O

1. Click the channel to be set to display the current settings.
2. Click the source drop-down list and select [Di].
3. Set the channel of built-in DI.



3.4.2.2 Assignment discrete input to remote I/O

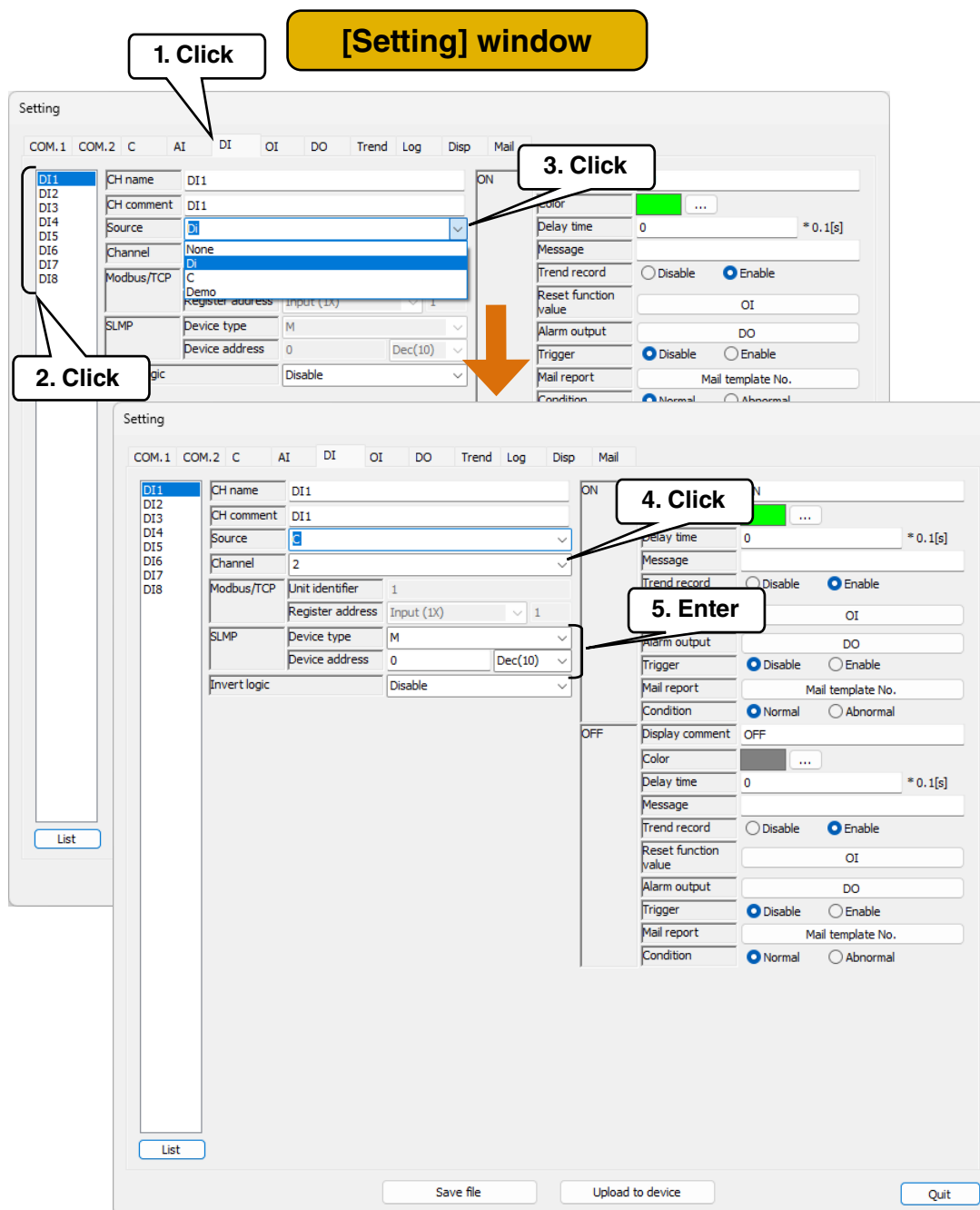
1. Click the channel to be set to display the current settings.
2. Click the source drop-down list and select [C].
3. Set the channel for connection setting. In case that the selected connection channel is Modbus/TCP, the following window appears and assigning remote I/O becomes possible. → 3.3.1.1 Modbus/TCP connection
4. Set parameters according to the table below.



Parameter	Description
Modbus/TCP Unit identifier	In case that the unit identifier of the selected channel is variable, set the unit identifier number in the range of 0 to 255. → 3.3.1.1 Modbus/TCP connection
Modbus/TCP Register address	Select [Input (1X)] or [Coil (0X)]. Set the register address in the range of 1 to 65536.

3.4.2.3 Assignment discrete input to SLMP-compatible device

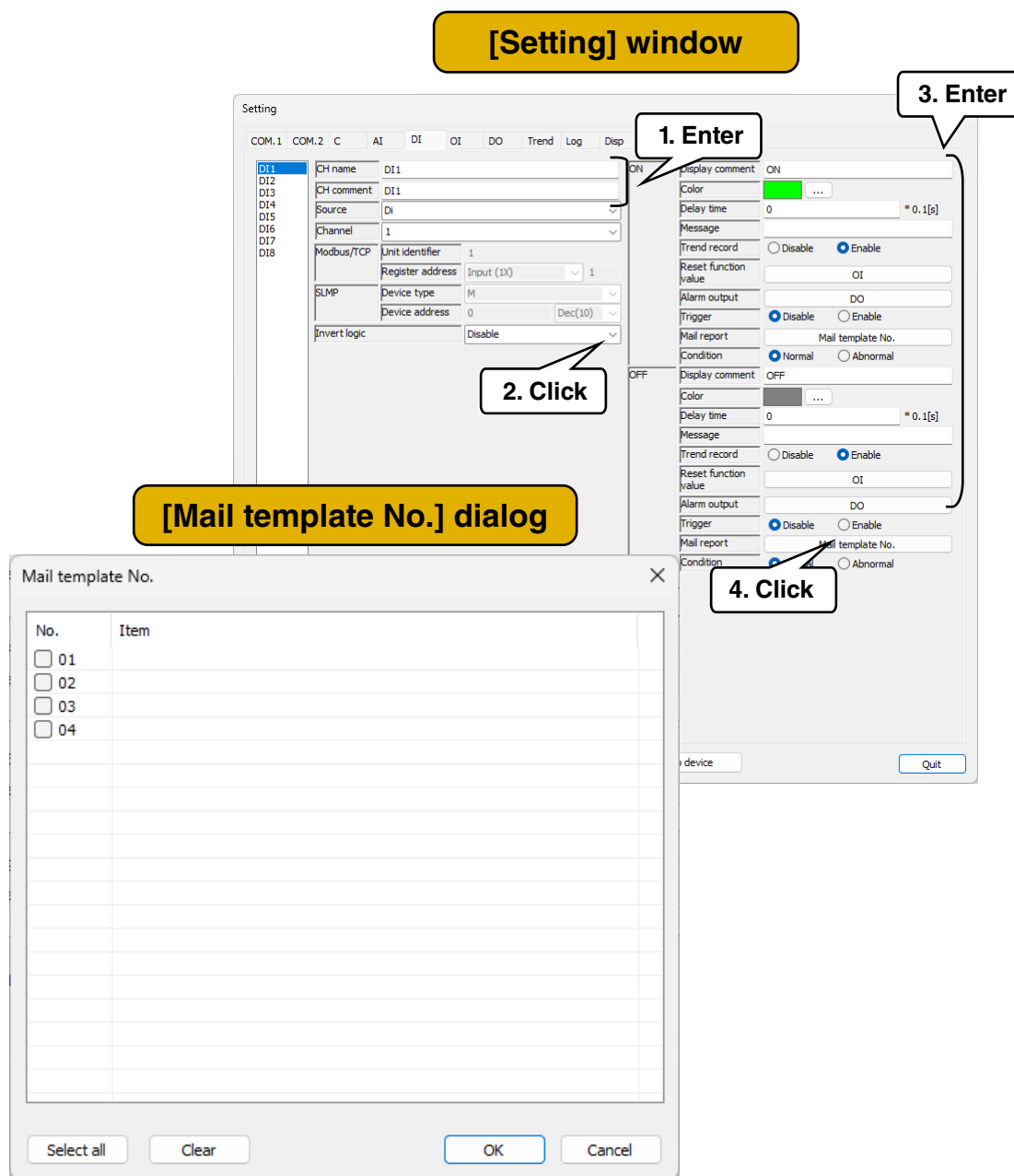
1. Click the channel to be set to display the current settings.
2. Click the source drop-down list and select [C].
3. Set the channel for connection setting. In case that the selected connection channel is SLMP, the following window appears and assigning SLMP becomes possible. → 3.3.1.2 SLMP connection
4. Set parameters according to the table below.



Parameter	Description
Device type	Select the device type of the SLMP-compatible device to be connected.
Device address	Enter the address of the SLMP-compatible device to be connected. (Dec(10): 0 to 4294967295, Hex(16): 0x00000000 to 0xFFFFFFFF, Oct(8): 0 to 037777777777)

3.4.2.4 Basic setting (DI)

After completing the assignment, configure the following basic setting.



1. Configure the basic setting.

Parameter	Description
CH name	Set the channel name within 16 characters.
CH comment	Set the comment for the channel within 16 characters such as the tag name, etc.
Invert logic	If the ON/OFF of the input signal and the ON/OFF of the application signal are the reverse of each other, select [Enable].

2. Set ON and OFF respectively.

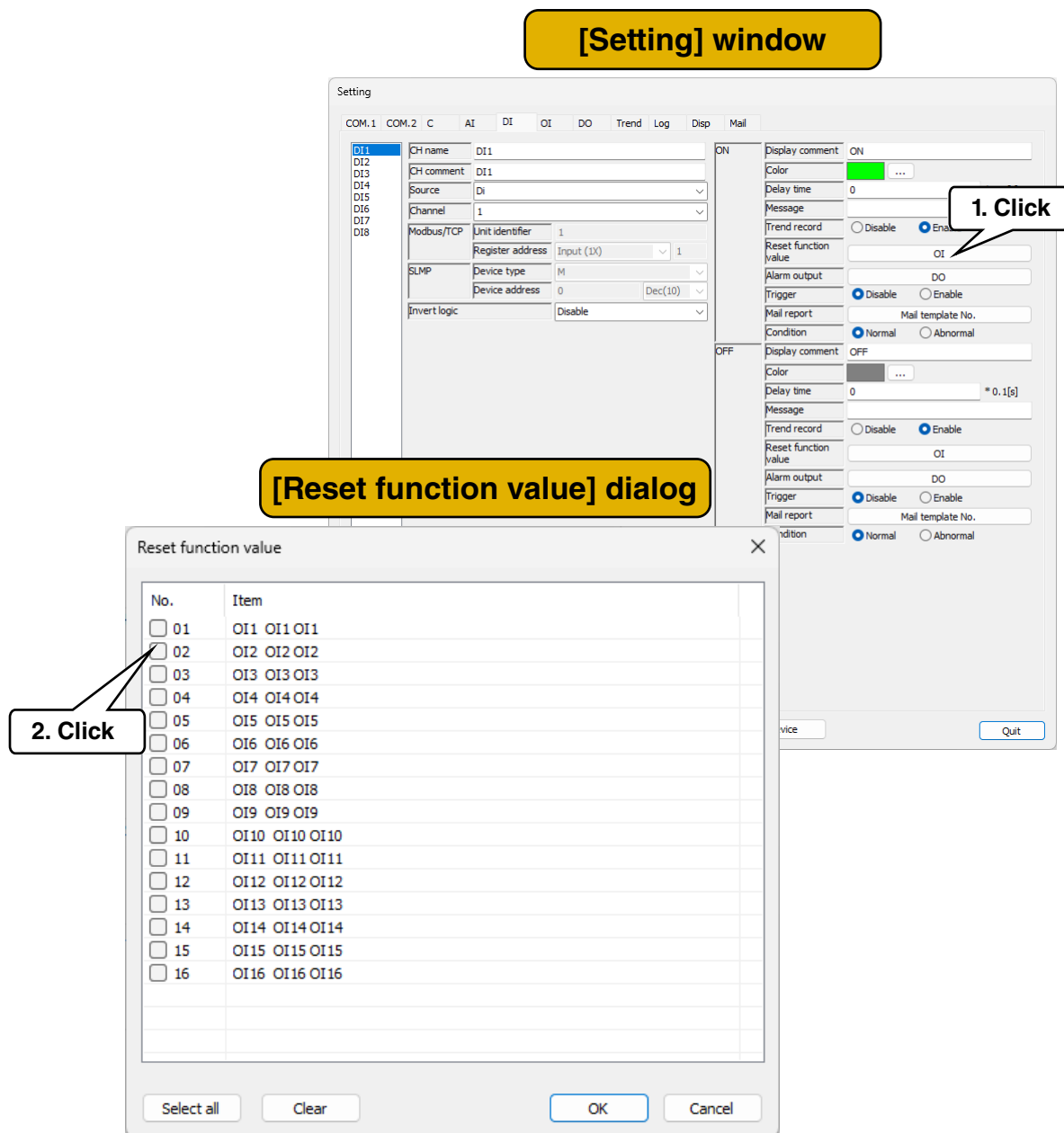
Parameter	Description
Display comment	Set the comment corresponding to ON and OFF respectively within 8 characters.
Color	Set the color which represents the status displayed on the trend data for ON and OFF respectively.
Delay time	Set the delay time for ON and OFF respectively within the range of 0.0 to 99.9 seconds.
Message	Set the message to be displayed when an event occurs within 32 characters.
Trend record	Set whether or not to record a message in trend when an event occurs. Select [Enable] when recording the message.
Trigger	Set whether or not to perform trigger recording when the input value changes and enters the corresponding zone. Select [Enable] when performing the trigger recording. → 3.5.1.3 Trigger recording
Condition	Select the checkbox to return from the screensaver and to enable flicker display on the digital view and on the overview when the input value changes and enters the corresponding zone. → 3.7.3 Other settings

3. Click [Mail template No.] button to display [Mail template No.] dialog. A mail is sent according to the selected template when the input value changes and enters the corresponding zone.

3.4.2.5 Reset function value setting (DI)

The function of the specified OI can be reset by turning DI ON → OFF and OFF → ON.

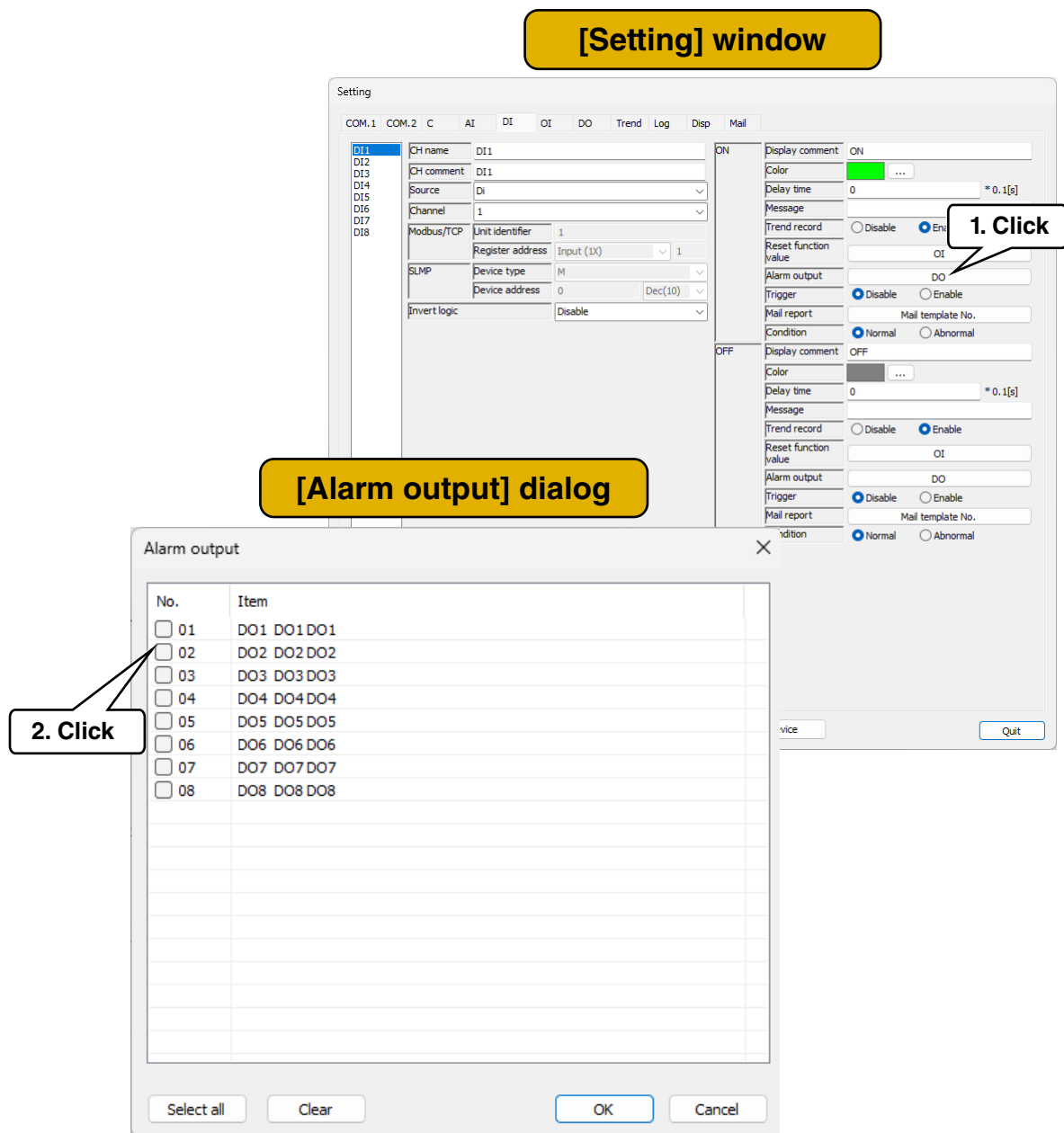
1. Click [OI] button to display [Reset function value] dialog.
2. Select the checkbox of the OI channel to be set and click [OK].



3.4.2.6 Alarm output setting (DI)

A specified DO can be turned ON by turning DI ON → OFF and OFF → ON.

1. Click [DO] button to display [Alarm output] dialog.
2. Select the checkbox of the DO channel to be set and click [OK].



Follow the above procedure to set all the channels.

The channel setting configured on [Discrete input (DI)] window can also be copied to other channels and only the required parameters can be modified.

→ 3.4.5 Copying the I/O setting

3.4.3 Operational input (OI)

Configure the operational input (OI) setting. There are 16 operational input channels (OI1 to OI16).

3.4.3.1 Basic setting (OI)

1. Click the channel to be set to display the current setting.
2. Configure the basic setting. Set the parameters according to the table below, .

[Setting] window

1. Click

2. Click

3. Enter

Setting

COM.1 COM.2 C AI DI OI DO Trend Log Disp Mail

CH name OI1

CH comment OI1

Number of decimal places 2

Engineering unit %

Function type Addition/Subtraction

$K1 \cdot X1 + K2 \cdot X2 + K3 \cdot X3 + A0$

K1 Const 1 0.000

X1 AI 1 0.000

K2 Const 1 0.000

X2 AI 1 0.000

X3 AI 1 0.000

A0 Const 1 0.000

Partitions

Zone 5 Delay time 0 * 0.1[s]

Name

Color

Lower limit 80.000

(Deadband)

Zone 4 Delay time 0 * 0.1[s]

Name

Color

Lower limit 60.000

(Deadband)

Zone 3 Upper limit 60.000

Delay time 0 * 0.1[s]

Name

Color

Lower limit 40.000

(Deadband)

Zone 2 Upper limit 40.000

Delay time 0 * 0.1[s]

Name

Color

Lower limit 20.000

(Deadband)

Zone 1 Upper limit 20.000

Delay time 0 * 0.1[s]

Name

Color

Event setting

List

Save file Upload to device Quit

Parameter	Description
CH name	Set the channel name within 16 characters.
CH comment	Set the comment for the channel within 16 characters such as the tag name, etc.
Number of decimal places	Set the number of digits after the decimal point for the values displayed on the trend data, etc. Set in the range of 0 to 3.
Engineering unit	Set the engineering unit within 8 characters.
Function type	Select from the following: Unused / Addition/Subtraction / Multiplication / Division / Extraction of square root / Moving average / First order lag / exp / Common logarithm / Natural logarithm / Peak hold (maximum) / Peak hold (minimum) / Power / Analog integration / F-value operation / antilogarithm / Scaling / Time.

Operation specifications

Parameter	Expression	Parameter
Addition/ Subtraction	$K1X1+K2X2+K3X3+A0$	K1, K2, K3, A0, X1, X2, X3: *1
Multiplication	$(K1X1+A1)(K2X2+A2)+A0$	K1, K2, A0, A1, A2, X1, X2: *1
Division	$(K1X1+A1)/(K2X2+A2)+A0$	K1, K2, A0, A1, A2, X1, X2: *1
Extraction of square root	$10K1 \sqrt{X1}$	K1, X1: *1
Moving average	$\frac{\sum_{n=0}^{N-1} x_n}{N}$	X1: *1 N: Moving average value (4/8/16/32/64) RST: Initialization
First order lag	$G(s) = \frac{K}{1 + Ts}$	G: *1 T: Time constant (0 to 100 seconds) K: Gain (Constant) RST: Reset
exp	e^{X1}	X1: *1
Common logarithm	$\log X1$	X1: *1
Natural logarithm	$\ln X1$	X1: *1
Peak hold (Maximum)	$MAX(X1)$	X1: *1 RST: Initialization (MAX=X1)
Peak hold (Minimum)	$MIN(X1)$	X1: *1 RST: Initialization (MAX=X1)
Analog integration *4	$\sum_{n=0}^N x_n$	X1: *2 K1: Integration rate K2: Unit (M/H/D) K3: Dropout (0.000 to 120.000%) RST: Initialization Note: Integrated value is reset in case of power failure or similar stoppage.
Power	$X1^{K1}$	X1, K1: *1
F-value operation	$\sum 10^{\frac{X1-K1}{K2}}$	X1: *1 K1: Reference temperature (°C) K2: Z-value (Positive real number) RST: Initialization
Antilogarithm	10^{X1}	X1: *1
Scaling	$K3+(K4-K3)*(X1-K1)/(K2-K1)$	X1: *1 K1: Zero (Input) *1 K2: Span (Input) *1 K3: Zero (Output) *1 K4: Span (Output) *1
Time	MM/DD hh:mm:ss	K1: 0: month, 1: day, 2: hour, 3: minute, 4: second, 5: day of week Day of week: 0: Sunday, 1: Monday, 2: Tuesday, 3: Wednesday, 4: Thursday, 5: Friday, 6: Saturday

Note 1) Constants (Const), AI1 to AI16, AI zone (AI_Zone1 to 5), DI1 to DI8, OI1 to OI16 can be set.

DI: ON → 1.0, OFF → 0.0

AI zone: Specified AI current value is operated as numeric value to determine which zone it is in.

Current value zone 1 to 5 can be operated as 1.0 to 5.0. If the partitions is set to [Disable], operation is performed with 0. → 3.4.1.5 Zone setting (AI)

Note 2) AI1 to AI16, AI zone (AI_Zone1 to 5), DI1 to DI8, OI1 to OI16 can be set. The value is same as note 1.

Note 3) The same value cannot be set for zero and span.

Note 4) Example for analog integration setting

This section explains how to capture flow rate as voltage as an example.

Assume that voltage 1V corresponds to 0 (m³/h) and 5V corresponds to 30 (m³/h).

When performing analog integration, set the input as 0 to 100.

In advance, set 0 to 5V as 0 to 100 in AI %, or perform scaling by calculation.

→ 3.4.1.4 Basic setting (AI), 3.4.3.1 Basic setting (OI)

The unit is m³/h, so set the time unit to "hour".

When the integration rate is set to 30, if 50% continues for 1 hour, the integrated value becomes 15.

If 100% continues for 1 hour, the integrated value becomes 30.

3.4.3.2 Zone setting (OI)

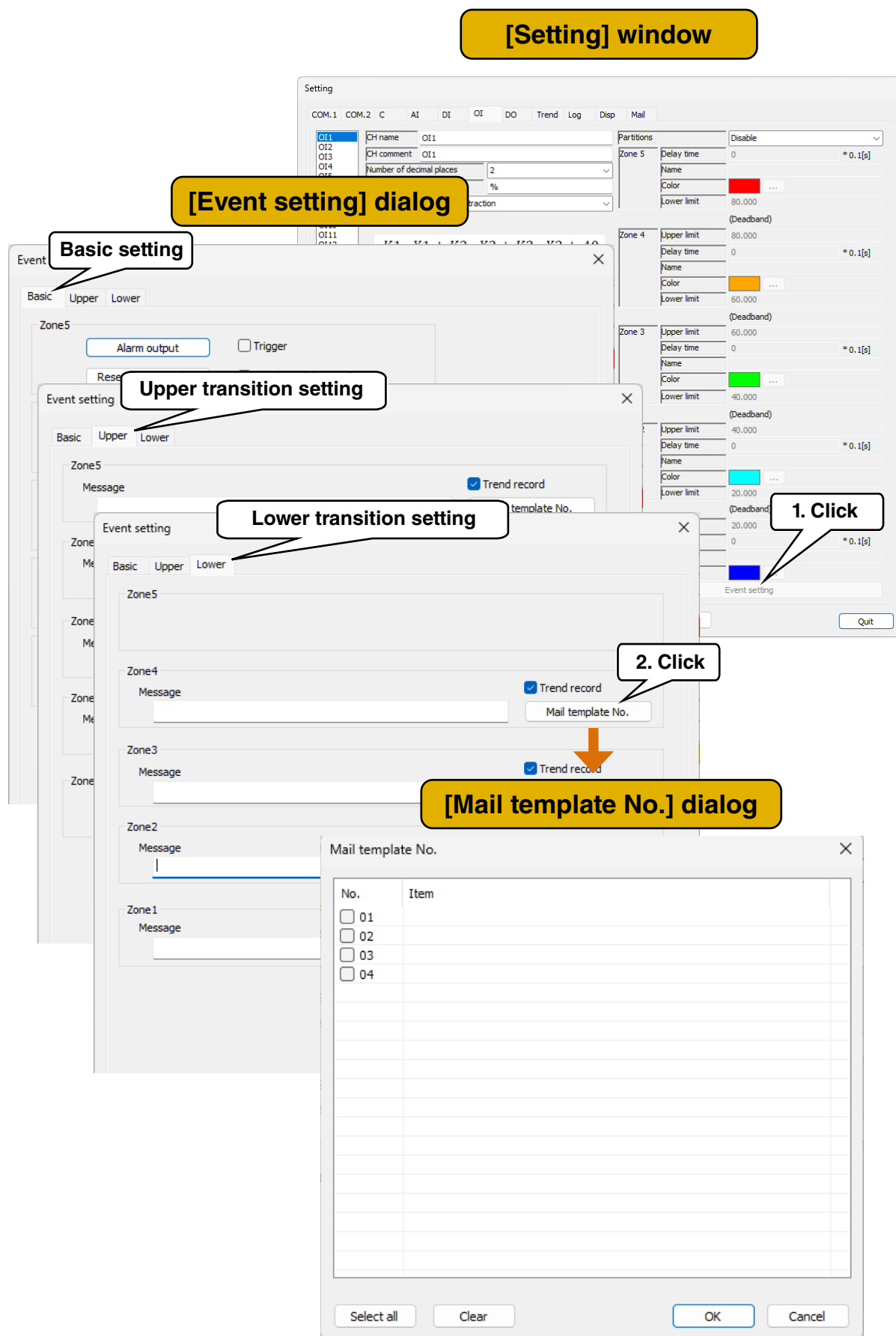
Configure zone setting corresponding to the input values. Up to 5 zones can be set, and deadbands can also be set between zones.

[Setting] window

Parameter	Description
Partitions	Set the number of zones to be used. Select from Disable / 2 / 3 / 4 / 5.
Name	Set the name within 16 characters for each zone.
Color	Set the color to represents each zone which will be displayed on the trend data.
Delay time	Set the time required for the transition from another zones to the corresponding zone to be confirmed in the range of 0.0 to 99.9 (sec.). When zone 1 is set to five seconds: The transition to zone 1 is confirmed five seconds after the input value changes in the state of zone 2 and becomes less than or equal to the upper limit of zone 1. It remains in zone 2 until five seconds have elapsed.
Upper limit : : : Lower limit	Set the upper and lower limit value for zones with actual values. Set as the upper limit > lower limit. - When the deadband is set When the deadband is set between zone 1 and zone 2, set the values so that the deadband is between the upper limit of zone 1 and the lower limit of zone 2. Set similarly for the other zones as well. - When the deadband is not set When the deadband is not set between zone 1 and zone 2, set the same value for the upper limit of zone 1 and the lower limit of zone 2. Set similarly for the other zones as well.

3.4.3.3 Event setting (OI)

An event occurs when transitting to the zone set in the zone setting.



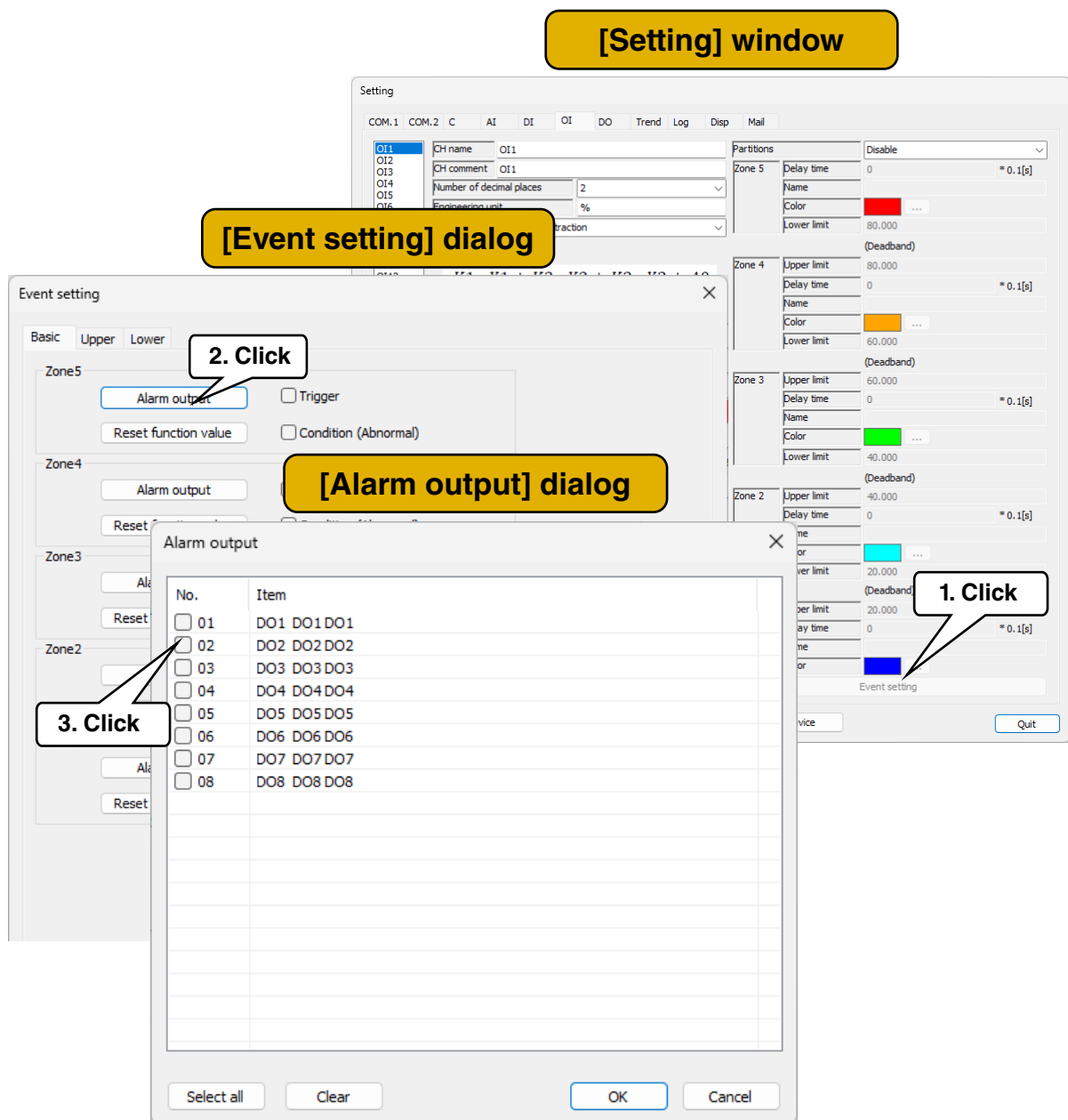
1. Click [Event setting] button on [Setting] window (OI) to display [Event setting] dialog. In case that the partitions is [Disable], [Event setting] button is disabled.
2. Set parameters according to the table below. Click [OK] button to go back to [Setting] window.
3. Click [Mail template No.] button to display [Mail template No.] dialog. A mail is sent according to the selected template when the input value changes and enters the corresponding zone.

Parameter	Description
Trigger	Set whether or not to perform trigger recording when the input value changes and enters the corresponding zone. Select the checkbox when performing the trigger recording. → 3.5.1.3 Trigger recording
Condition (Abnormal)	Select the checkbox to return from the screensaver and to enable flicker display on the digital view and on the overview when the input value changes and enters the corresponding zone. → 3.7.3 Other settings
Message	Set the message when an event occurs within 32 characters.
Trend record	Set whether or not to record a message in trend when an event occurs. Select the checkbox when recording the message.

3.4.3.4 Alarm output setting (OI)

A specified DO can be turned ON for each zone.

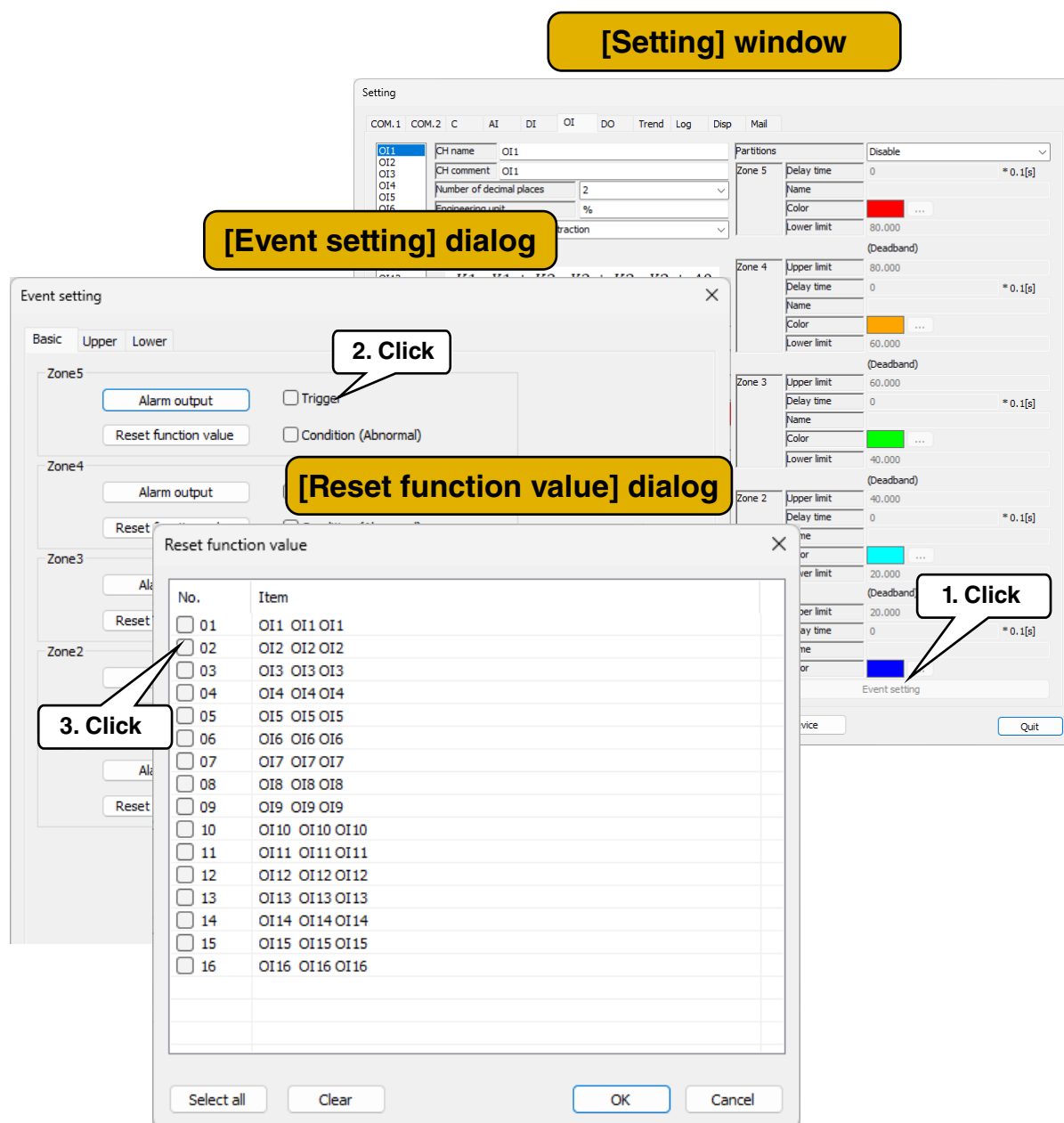
1. Click [Event setting] button on [Setting] window (OI) to display [Event setting] dialog. Click [Alarm output] button of the specified zone to display [Alarm output] dialog.
2. Select the checkbox of the DO channel to be set and click [OK].



3.4.3.5 Reset function value setting (OI)

A specified OI can be reset when zone transition occurs.

1. Click [Event setting] button on [Setting] window (OI) to display [Event setting] dialog. Click [Reset function value] button of the specified zone to display [Reset function value] dialog.
2. Select the checkbox of the OI channel to be set and click [OK].



Follow the above procedure to set all the channels.

The channel setting configured on [Operational input (OI)] window can also be copied to other channels and only the required parameters can be modified.

→ 3.4.5 Copying the I/O setting

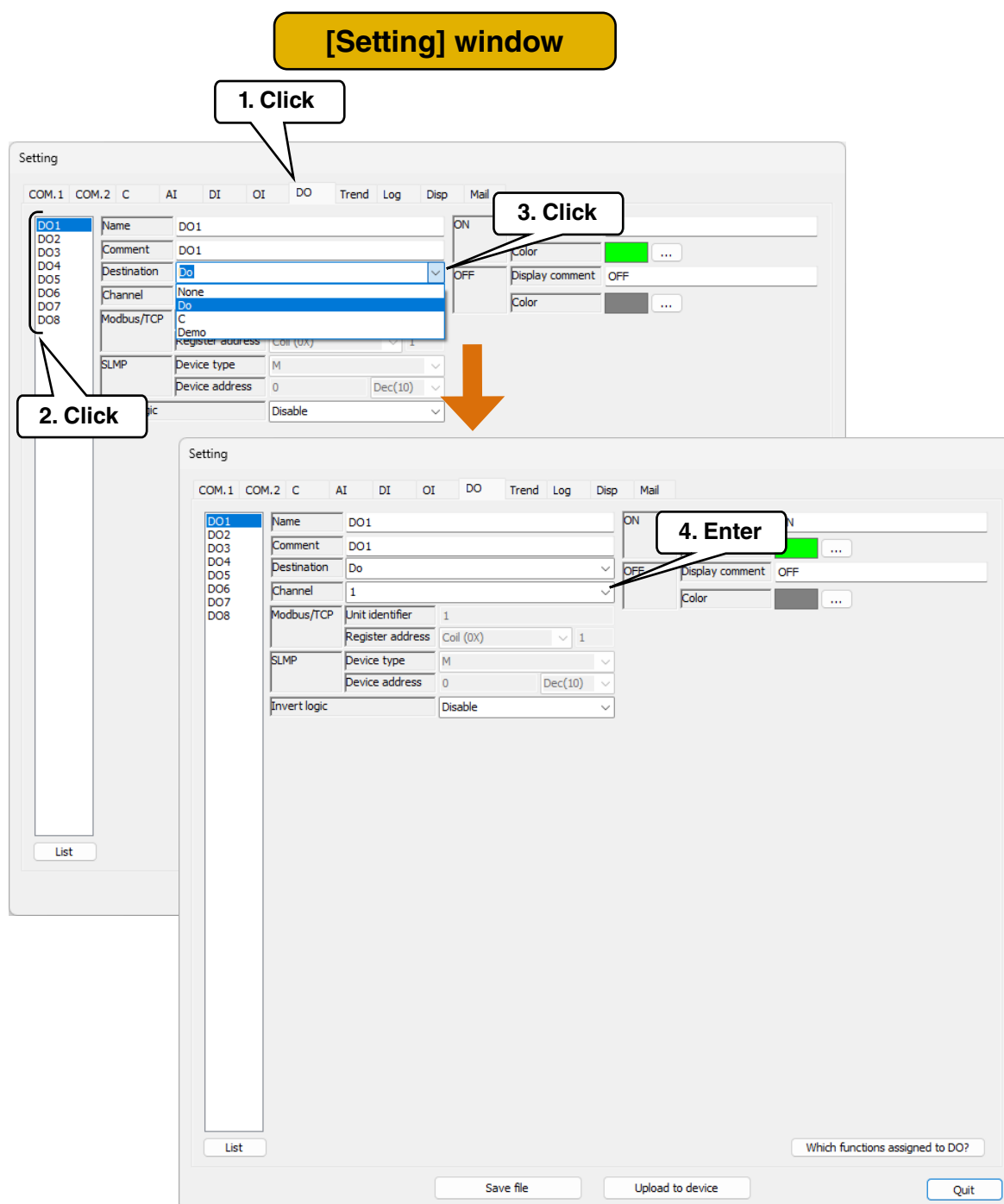
3.4.4 Discrete output (DO)

Discrete output signals can be monitored for maximum of 8 points (DO1 to DO8).

Assign the discrete output from built-in I/O, remote I/O or SLMP-compatible device to the VR96E-G8 according to the following procedure.

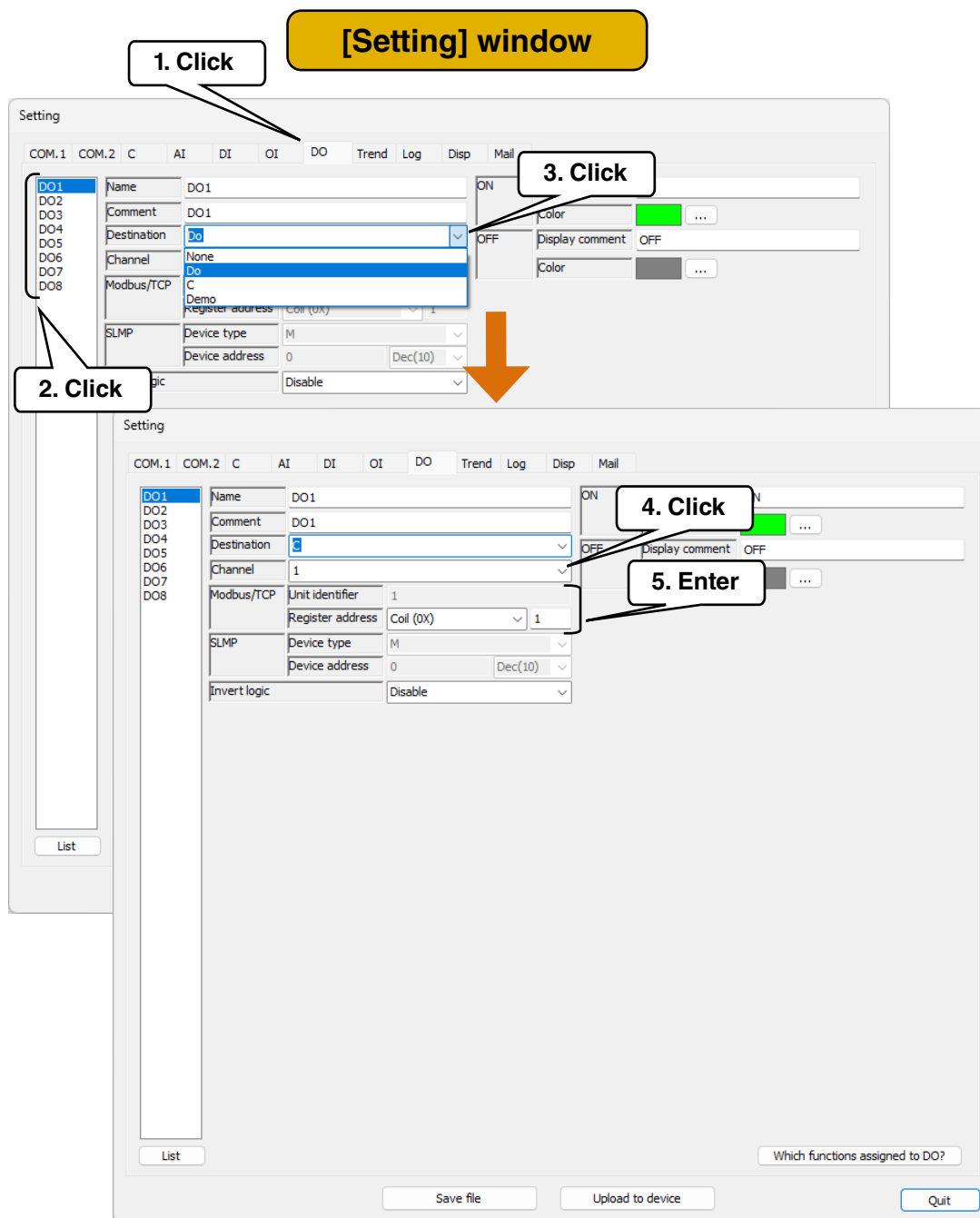
3.4.4.1 Assignment discrete output to built-in I/O

1. Click the channel to be set to display the current settings.
2. Click the destination drop-down list and select [Do].
3. Set the channel of built-in DO.



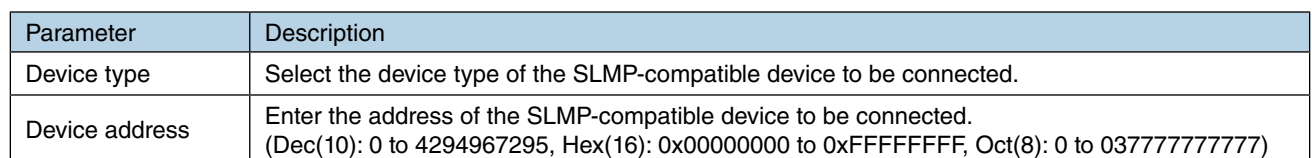
3.4.4.2 Assignment discrete output to remote I/O

1. Click the channel to be set to display the current settings.
2. Click the destination drop-down list and select [C].
3. Set the channel for connection setting. In case that the selected connection channel is Modbus/TCP, the following window appears and assigning remote I/O becomes possible. → 3.3.1.1 Modbus/TCP connection
4. Set parameters according to the table below.



Parameter	Description
Modbus/TCP Unit identifier	In case that the unit identifier of the selected channel is variable, set in the range of 0 to 255. → 3.3.1.1 Modbus/TCP connection
Modbus/TCP Register address	Select [Coil (0X)]. Set the register address in the range of 1 to 65536.

1. Click the channel to be set to display the current settings.
2. Click the destination drop-down list and select [C].
3. Set the channel for connection setting. In case that the selected connection channel is SLMP, the following window appears and assigning SLMP becomes possible. → 3.3.1.2 SLMP connection
4. Set parameters according to the table below.



3.4.4.4 Basic setting (DO)

After completing the assignment, configure the following basic setting.

[Setting] window

1. Configure the basic setting.

Parameter	Description
Name	Set the channel name within 16 characters.
Comment	Set the comment for the channel within 16 characters such as the tag name, etc.
Invert logic	If the ON/OFF of the output signal and the ON/OFF of the application signal are the reverse of each other, select [Enable].

2. Set ON and OFF respectively.

Parameter	Description
Display comment	Set the comment corresponding to ON and OFF respectively within 8 characters.
Color	Set the color which represents the status displayed on the trend data for ON and OFF respectively.

Follow the above procedure to set all the channels.

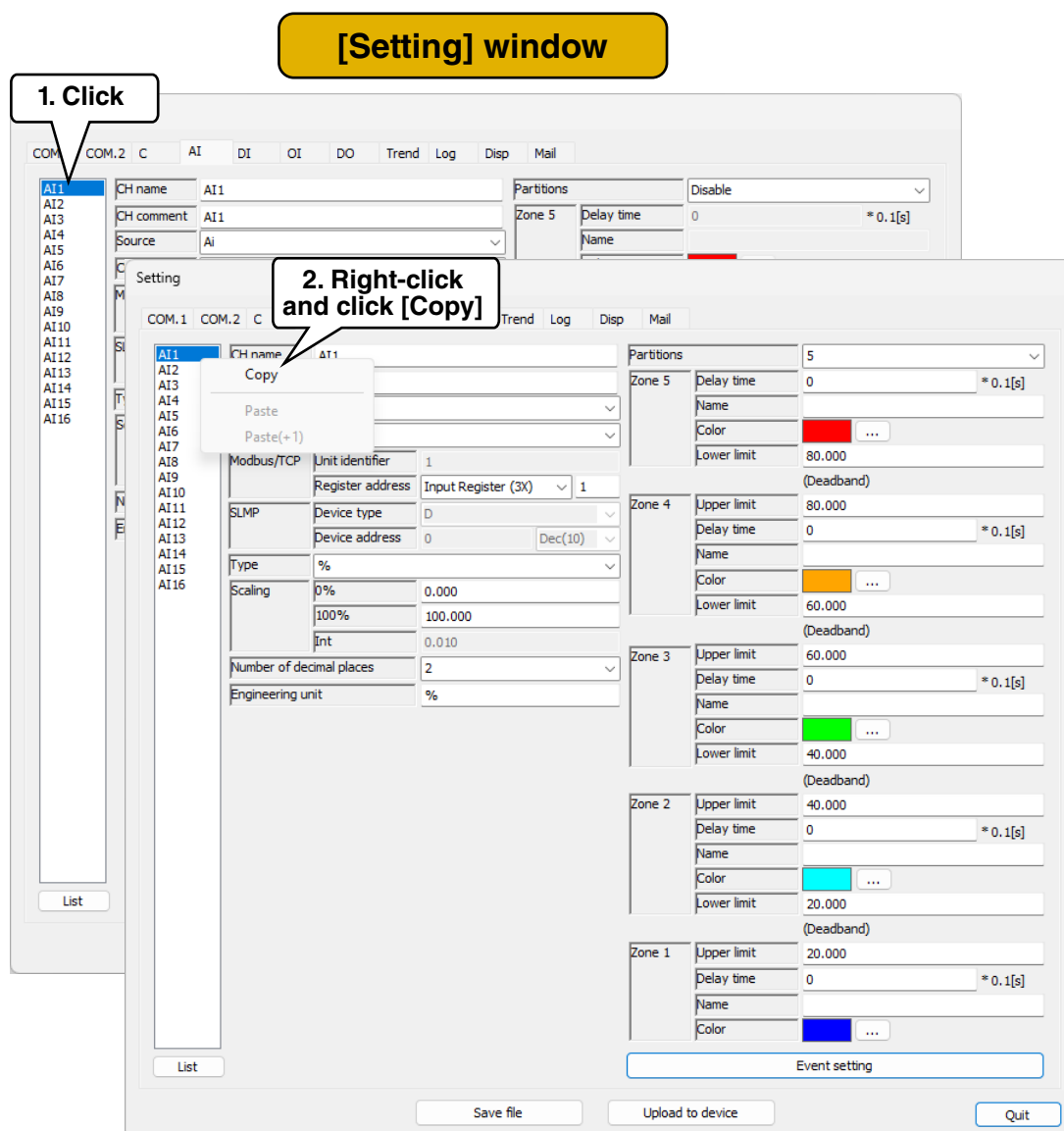
The channel setting configured on [Discrete Output (DO)] window can also be copied to other channels and only the required parameters can be modified. → 3.4.5 Copying the I/O setting

3.4.5 Copying the I/O setting

The channel setting configured on each I/O setting window can also be copied to other channels and only the required parameters can be modified.

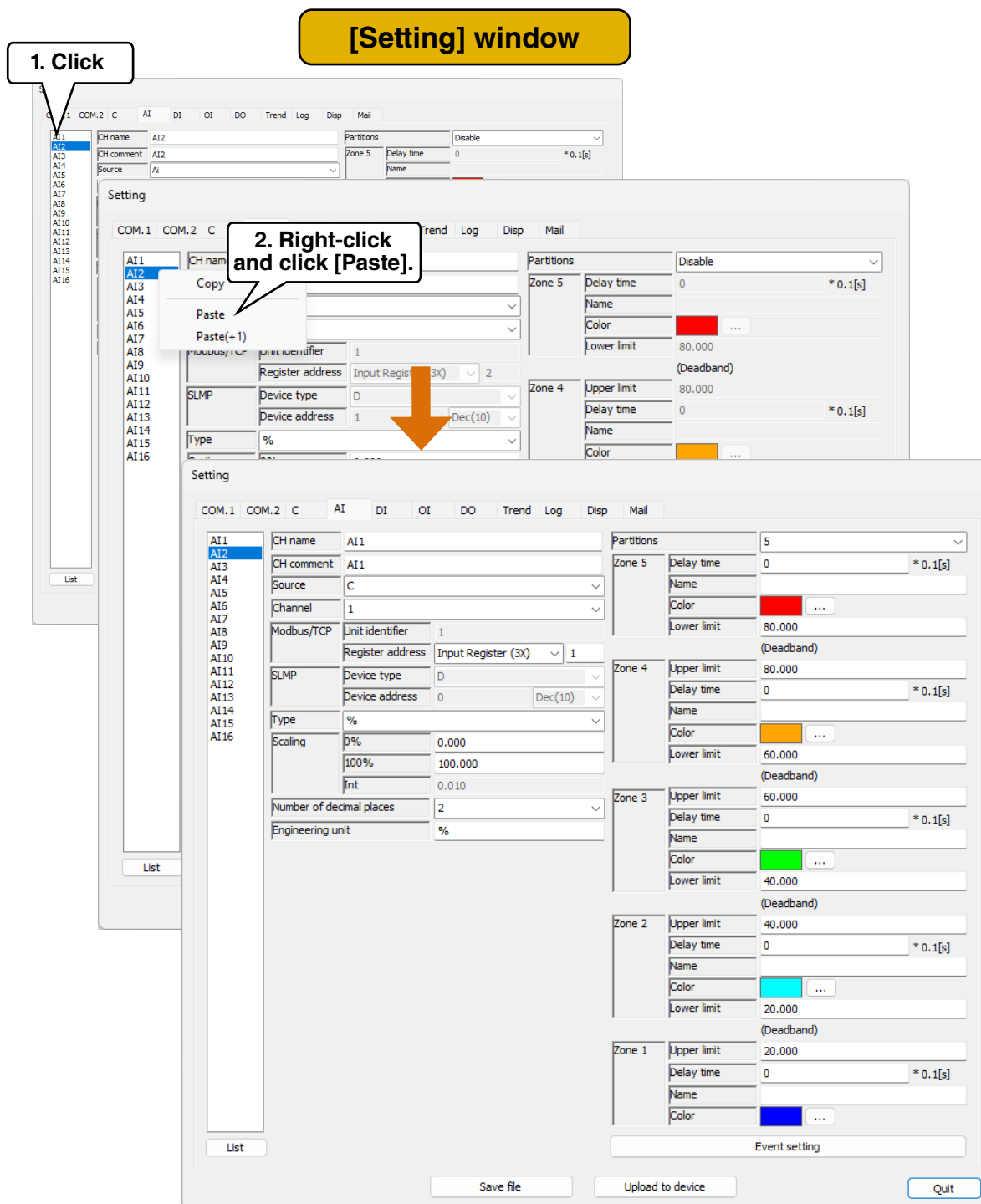
3.4.5.1 Copying

The procedure is common to each I/O setting window.



3.4.5.2 Pasting

Copied I/O settings can be pasted. The pasting procedure is common to each I/O setting window. Pasting is possible only in the same I/O tab.



3.4.5.3 Pasting (+1)

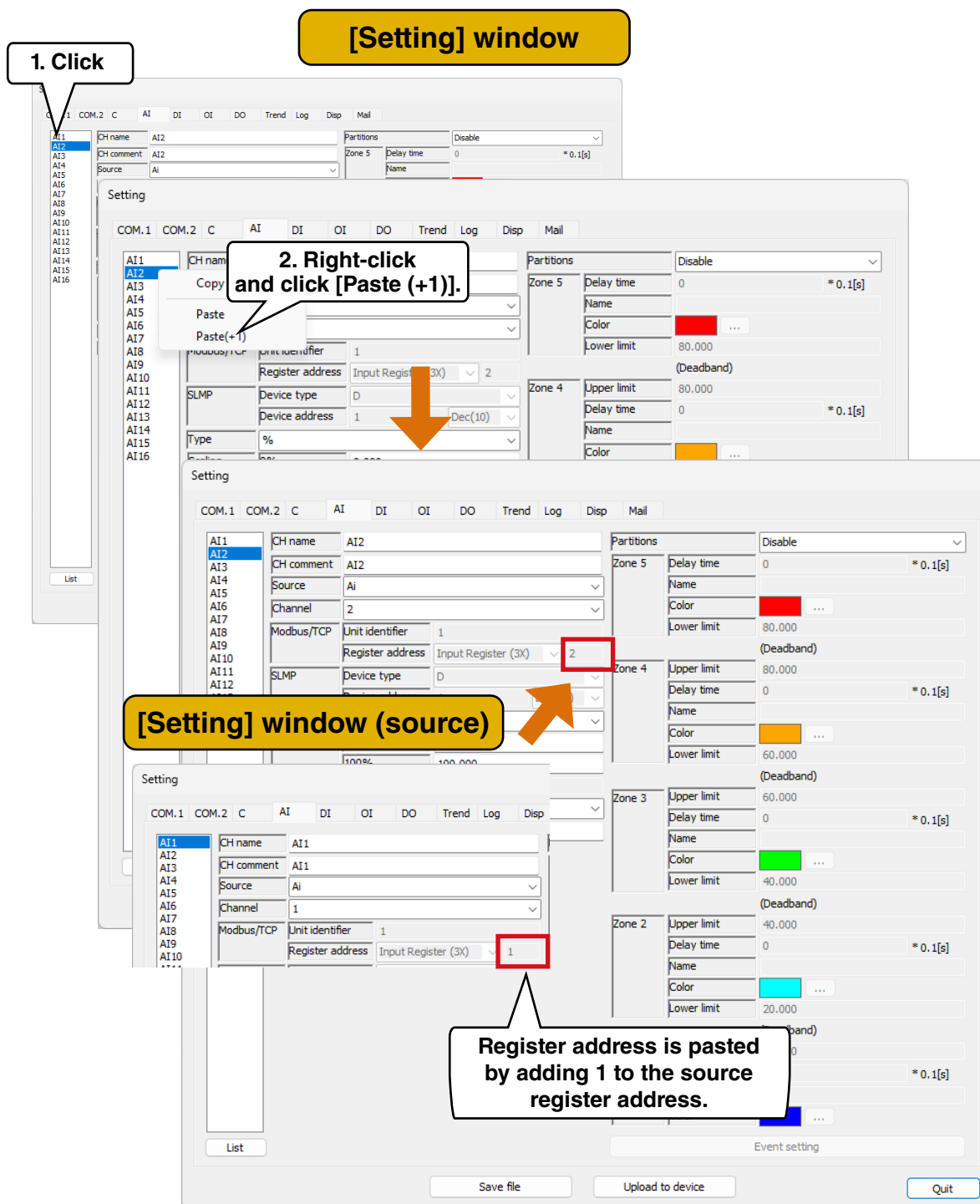
Copied I/O settings can be pasted.

[Paste (+1)] is useful when copying and pasting the channels assigned from remote I/O or SLMP-compatible device.

In case that the channel is assigned from built-in I/O, the procedure is same as normal pasting.

(1) Remote I/O

Register address is pasted by adding 1 to the source register address.



(2) SLMP

Device address is pasted by adding 1 to the source device address.

[Setting] window

1. Click

2. Right-click and click [paste (+1)].

[Setting] window (source)

Device address is pasted by adding 1 to the source device address.

3.5 Trend setting

Assign any channel set in I/O (AI, DI, OI, DO) to pen and set the pen's waveform to be recorded and displayed on the VR96E-G8 screen.

3.5.1 Basic setting

Configure the setting to record pen's waveform to a trend file.

When recording pen's waveform, event data and comment data occurred during the recording period are recorded to the same file.

3.5.1.1 Recording setting

Set the recording conditions of the trend.

[Setting] window

The screenshot shows the 'Setting' window with the 'Trend' tab selected. The window is divided into several sections: 'Common setting', 'Normal record', 'Trigger record', 'Pen', and 'Comment'. Callouts with numbered instructions are present:

- 1. Click**: Points to the 'Trend' tab in the top navigation bar.
- 2. Enter**: Points to the 'Auto start' dropdown menu in the 'Common setting' section.
- 3. Enter**: Points to the 'Normal record' section, specifically the 'Storing mode' dropdown.
- 4. Enter**: Points to the 'Trigger record' section, specifically the 'Mode' dropdown.

Common setting

Auto start	Stop
Auto delete	☐ Disable ☒ Enable
Storing rate	100ms
Encode	TRD

Normal record

Storing mode	Samples
Storing mode : Samples	2000
Time Interval	10min
Time	0
Day of week	Sun

Trigger record

Mode	Level
Pre trigger samples	100 (0-300)
	100 (1-300)

Pen

Pen	Source	Channel	Color	Upper limit	Lower limit
PEN1	AI	AI1 AI1 AI1	Red	100.000	0.000
PEN2					
PEN3					
PEN4					
PEN5					
PEN6					
PEN7					
PEN8					
PEN9					
PEN10					
PEN11					
PEN12					
PEN13					
PEN14					
PEN15					

Comment

Comment	Comment list
---------	--------------

Buttons at the bottom: Save file, Upload to device, Quit.

1. Configure the common setting. Set parameters according to the table below.

Parameter	Description
Auto start	Select from Stop / Normal recording / Trigger recording.
Auto delete	Select [Enable] to delete trend files automatically when the free space on the SD card falls below 100 MB.
Storing rate	Select from 100 ms / 500 ms / 1 sec. / 2 sec. / 5 sec. / 10 sec. / 1 min. / 2 min. / 5 min. / 10 min. / 30 min. / 1 hour.
Encode	Select the file saving format from TRD / CSV (UTF-8) / CSV (Shift-JIS).

2. Configure the settings for normal recording. Set parameters according to the table below.

Parameter	Description
Storing mode	Select from Samples / Time.
Storing mode: Samples	When [Samples] is selected in the storing mode, the number of samples can be set. Set in the range of 1000 to 50000.
Time	When [Time] is selected in the storing mode, the storing interval can be set. The selectable storing interval depends on the storing rate. Refer to the table below. - When [1 day] is selected for the storing interval, set [Time] from 0 to 23 (hour). - When [1 week] is selected for the storing interval, set [Time] and [Day of week]. Select from 0 to 23 (hour) and Sun / Mon / Tue / Wed / Thu / Fri / Sat. - When [1 month] is selected for the storing interval, set [Time] from 0 to 23 (hour).

Correspondence table of storing rate and storing interval (X: selectable)

Storing rate \ Storing interval	10 min.	30 min.	1 hour	6 hours	12 hours	1 day	1 week	1 month
100 ms	X	X	X	—	—	—	—	—
500 ms	—	X	X	X	—	—	—	—
1 sec.	—	—	X	X	X	—	—	—
2 sec.	—	—	X	X	X	X	—	—
5 sec.	—	—	—	X	X	X	—	—
10 sec.	—	—	—	X	X	X	—	—
1 min.	—	—	—	—	—	X	X	—
2 min.	—	—	—	—	—	X	X	—
5 min.	—	—	—	—	—	X	X	X
10 min.	—	—	—	—	—	X	X	X
30 min.	—	—	—	—	—	X	X	X
1 hour	—	—	—	—	—	—	X	X

3. Configure the settings for trigger recording. Set parameters according to the table below.

Parameter	Description
Mode	Select from Level / Edge.
Pre trigger samples	Set in the range of 0 to 300.
Post trigger samples	Set in the range of 1 to 300.

3.5.1.2 Normal recording

When the normal recording is set in [Auto start], trend recording starts upon VR96E-G8 startup.

(1) Storing mode: Samples

When samples is set in [Storing mode], the recorded data are stored to the trend files by the specified number of samples.

(2) Storing mode: Time

When time is set in [Storing mode], the recorded data are stored to the trend file at the specified timing.

For storing timing, refer to the table below.

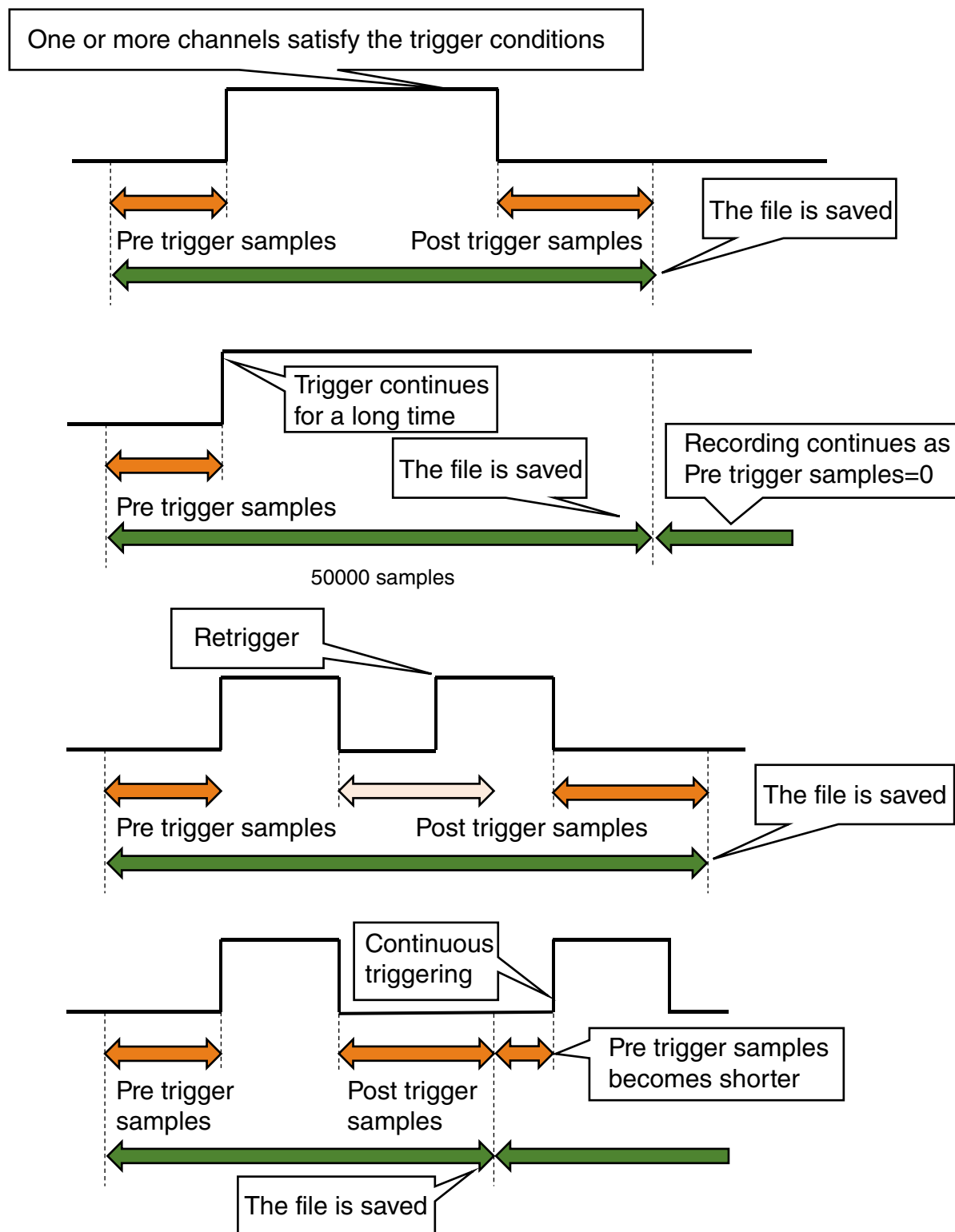
Storing interval	Storing timing
10 min.	0, 10, 20, 30, 40, 50 minutes and 0 second every hour
30 min.	0, 30 minutes and 0 second every hour
1 hour	0 minute and 0 second every hour
6 hours	0, 6, 12, 18 hours, 0 minute and 0 second
12 hours	0, 12 hours, 0 minute and 0 second
1 day	0 minute and 0 second of the hour set in [Time]
1 week	0 minute and 0 second of the hour set in [Time] on the day of the week set in [Day of week]
1 month	0 minute and 0 second of the hour set in [Time] on the first day of every month.

3.5.1.3 Trigger recording

When trigger recording is set in [Auto Start], the trend is recorded according to the trigger conditions set for each channel of AI, DI, and OI.

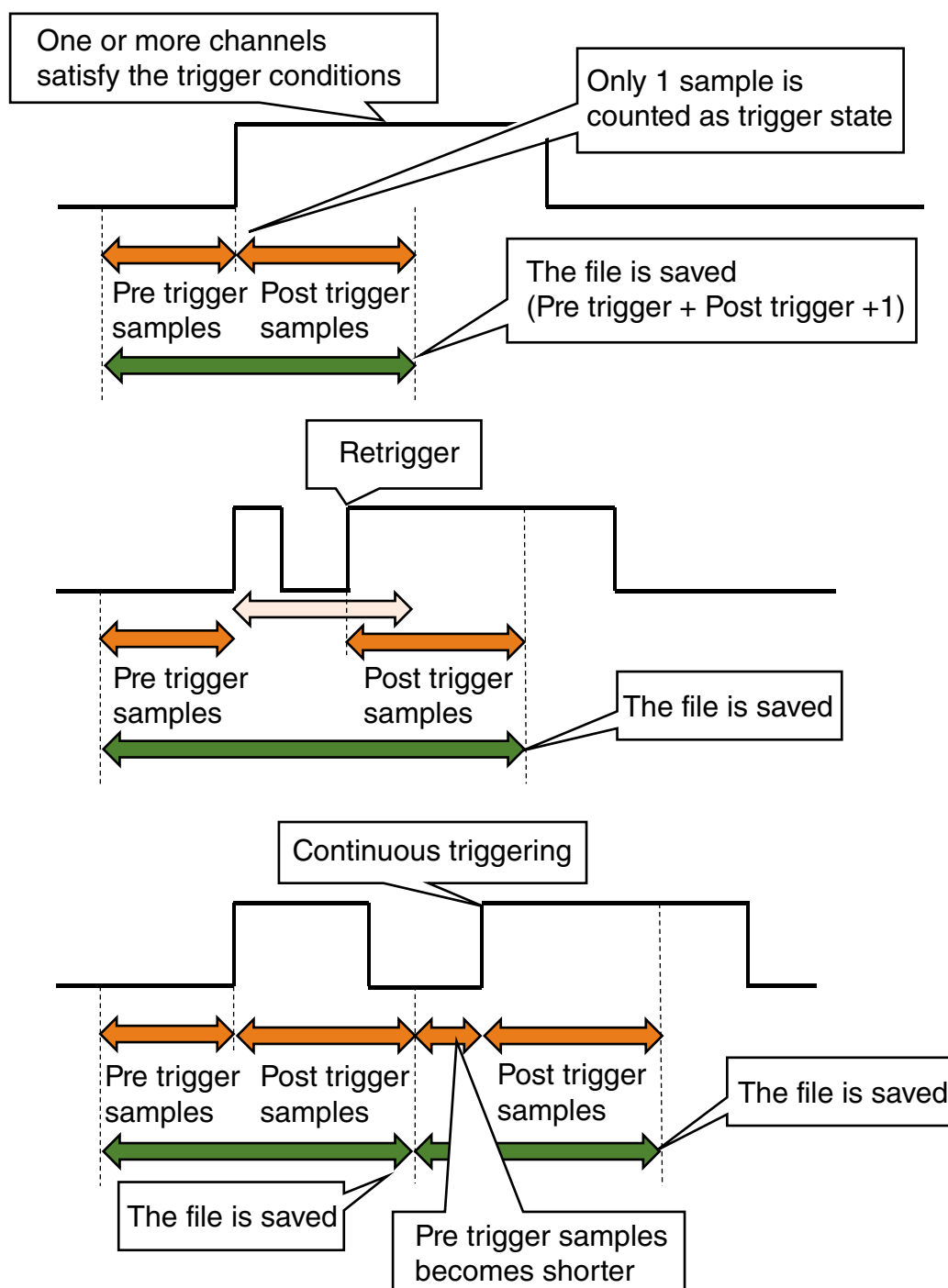
(1) Mode: Level

When the level is set in [Mode] of the trigger recording, the trend is recorded as long as one or more of the AI, DI, or OI channels with trigger settings satisfy the trigger conditions. The number of samples to be stored in the trend file should be set in [Pre trigger samples] and [Post trigger samples]. The data sample interval depends on the storing rate in [Common]. For details, refer to the following.



(2) Mode: Edge

When the edge is set in [Mode] of the trigger recording, trend are recorded with reference to the change point where one or more channels satisfy the trigger conditions from the non-trigger state of all channels among AI, DI, and OI channels configured trigger setting. The number of samples to be stored in the file should be set in [Pre trigger samples] and [Post trigger samples]. The data sample interval depends on the storing rate in [Common]. For details, refer to the following.



3.5.2 Pen setting

Perform assigning 16 pens to record to trend files and to display on the trend graph.

3.5.2.1 Pen setting

[Setting] window

Setting

COM.1 COM.2 C AI DI OI DO **Trend** Log Disp Mail

Common setting

Auto start: Stop

Auto delete: ☐ Disable ☒ Enable

Storing rate: 100ms

Encode: TRD

Normal record

Storing mode: Samples

Storing mode : Samples: 2000

Time Interval: 10min

Time: 0

Day of week: Sun

Trigger record

Mode: Level

Pre trigger samples: 100 (0-300)

Post trigger samples: 100 (1-300)

Pen

PEN1 PEN2 PEN3 PEN4 PEN5 PEN6 PEN7 PEN8 PEN9 PEN10 PEN11 PEN12 PEN13 PEN14 PEN15

Source: AI

Channel: AI1 AI1 AI1

Color: [Red]

Upper limit: 100.000

Lower limit: 0.000

Comment

Comment: []

Comment list: []

Save file Upload to device Quit

1. Select the pen to be set to display the current settings of the selected pen.

2. Assign the pen. Set the pen according to the table below.

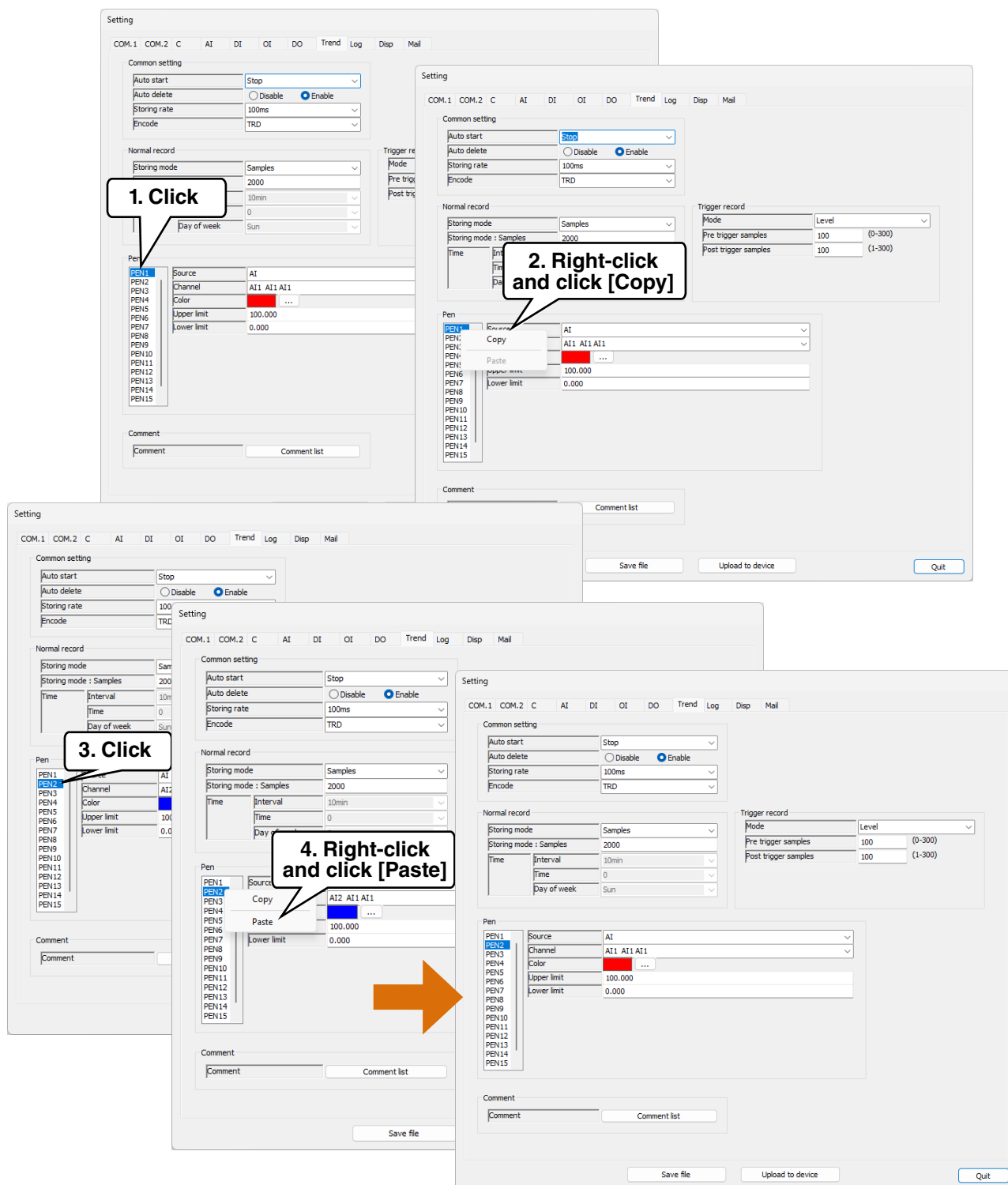
Parameter	Description
Source	Select the source to be assigned. Select from None / AI / DI / OI / DO.
Channel	Set the channel to be assigned. Select from the list of I/O channel selected in the source.
Color	Set the pen color.
Upper limit	Set the scaling value of 100% in the trend graph.
Lower limit	Set the scaling value of 0% in the trend graph.

3. Follow the above procedure to set all the pens. The pen setting already configured can also be copied to other pens and only the required parameters can be modified.

3.5.2.2 Copying pen setting

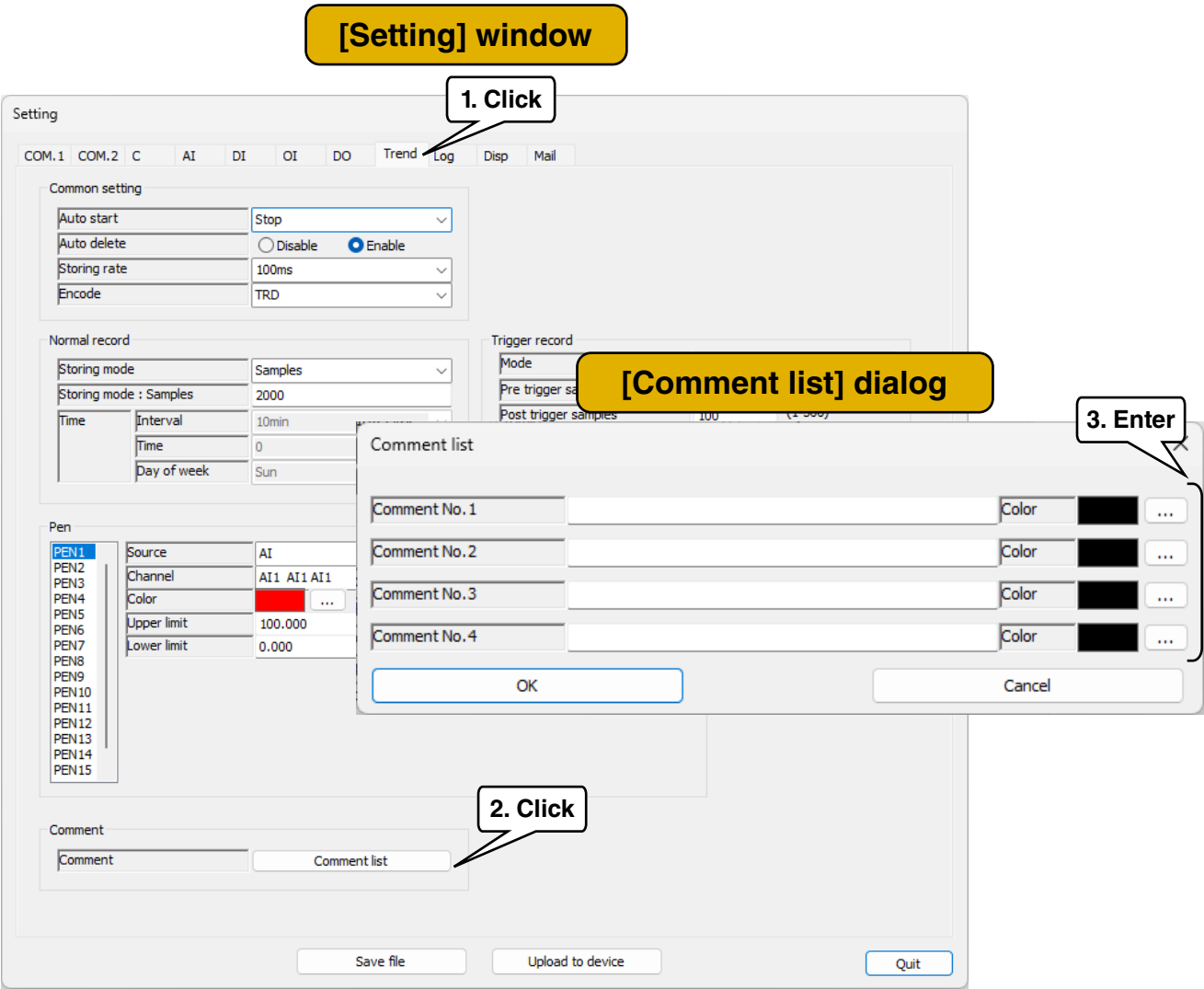
The pen setting configured on [Trend setting] window can also be copied to other pens and only the required parameters can be modified.

[Setting] window



3.5.3 Comment setting

Configure the comment setting registered to the trend graph. 4 comments can be set.

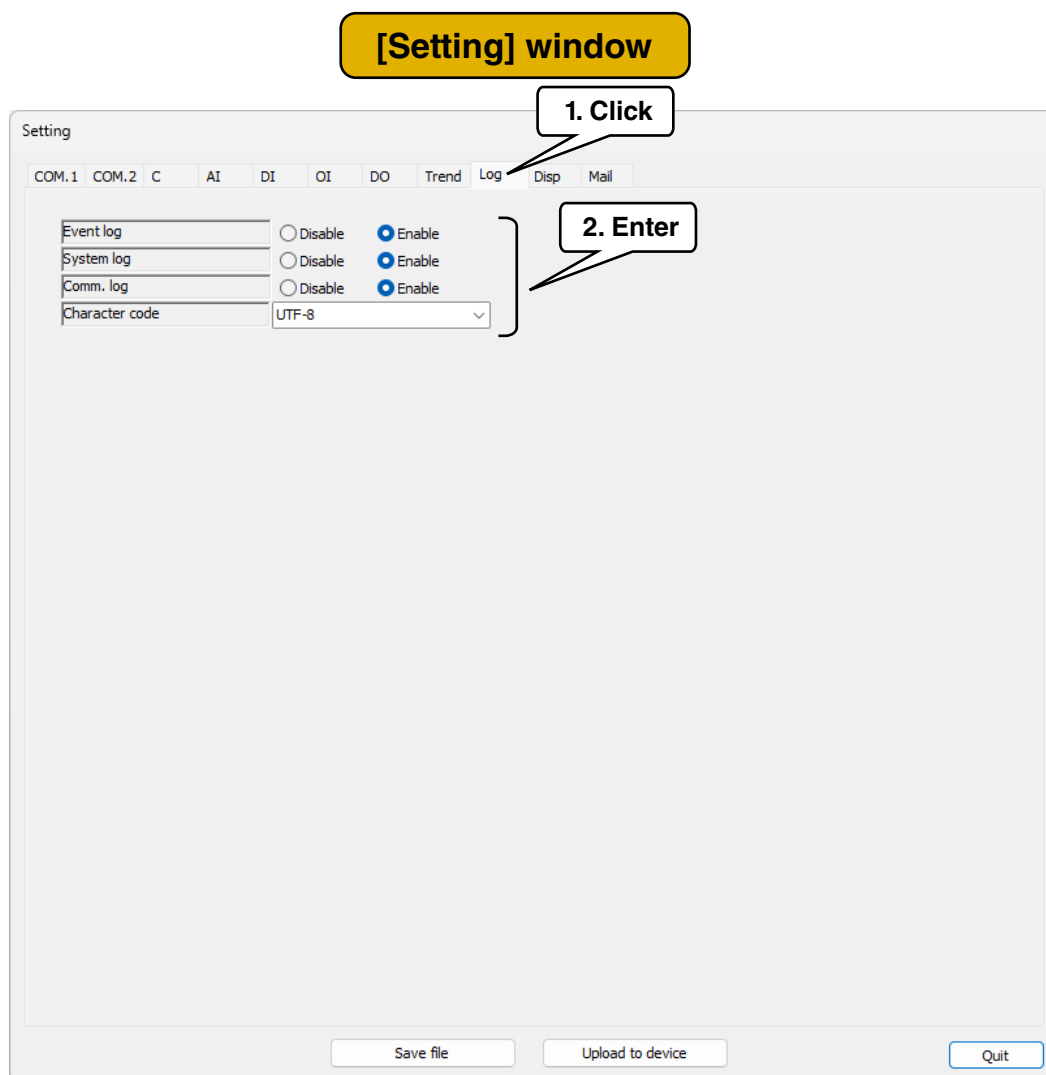


Click [Comment list] button to display [Comment list] dialog.
Set parameters according to the table below.

Parameter	Description
Comment	Set the comments within 32 characters.
Color	Set the comment color.

3.6 Log setting

Configure log file setting stored to an SD card.



Set parameters according to the table below.

Parameter	Description
Event log	Select [Disable] in case of not storing event log files to the SD card.
System log	Select [Disable] in case of not storing system log files to the SD card.
Comm. log	Select [Disable] in case of not storing communication log files to the SD card.
Character code	Choose either UTF-8 or Shift-JIS character code used to save log files.

3.7 Display setting

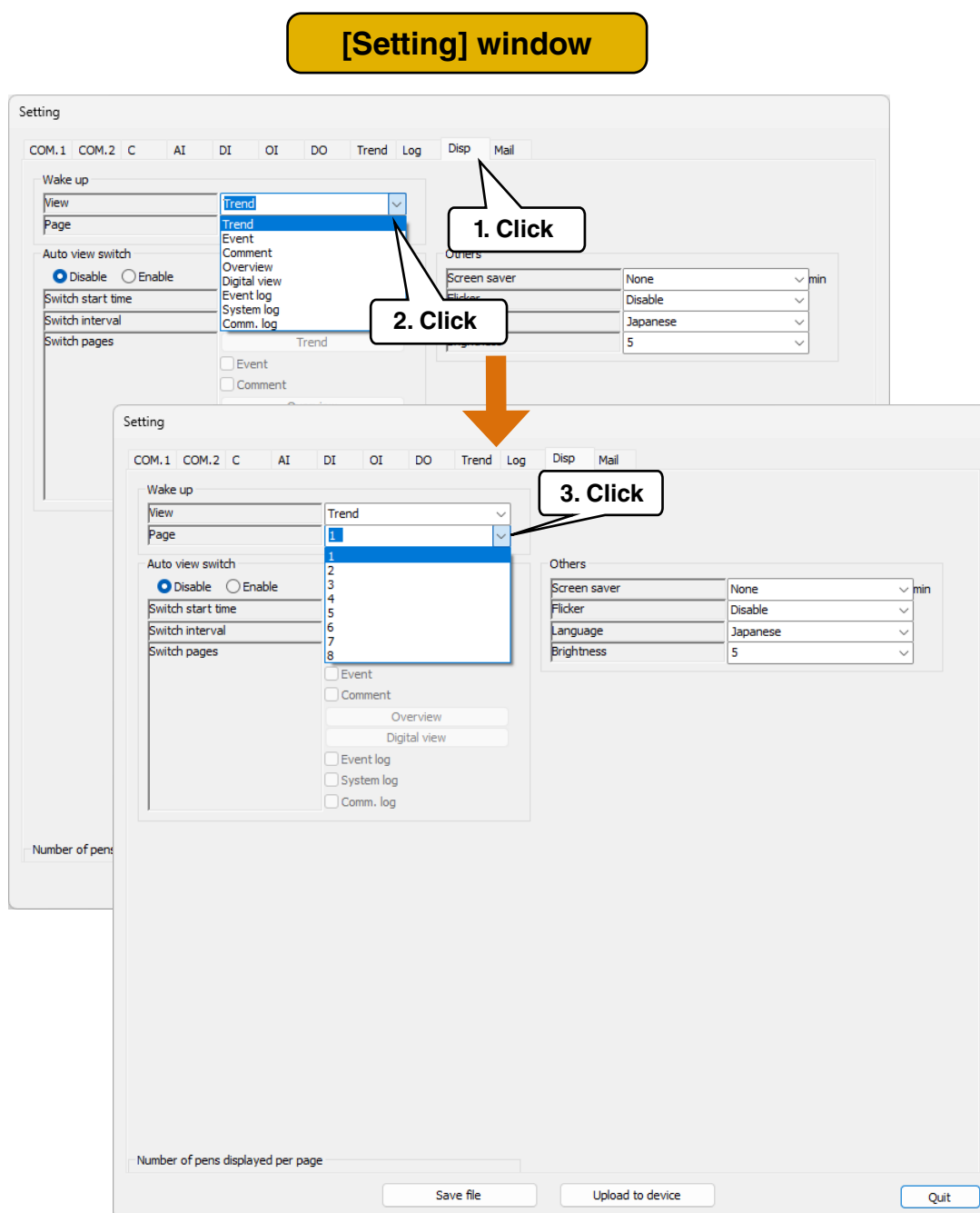
Configure the display setting of VR96E-G8.

3.7.1 Wake up screen setting

Configure the display setting when the VR96E-G8 is turned on.

3.7.1.1 Setting the trend screen to the wake up screen

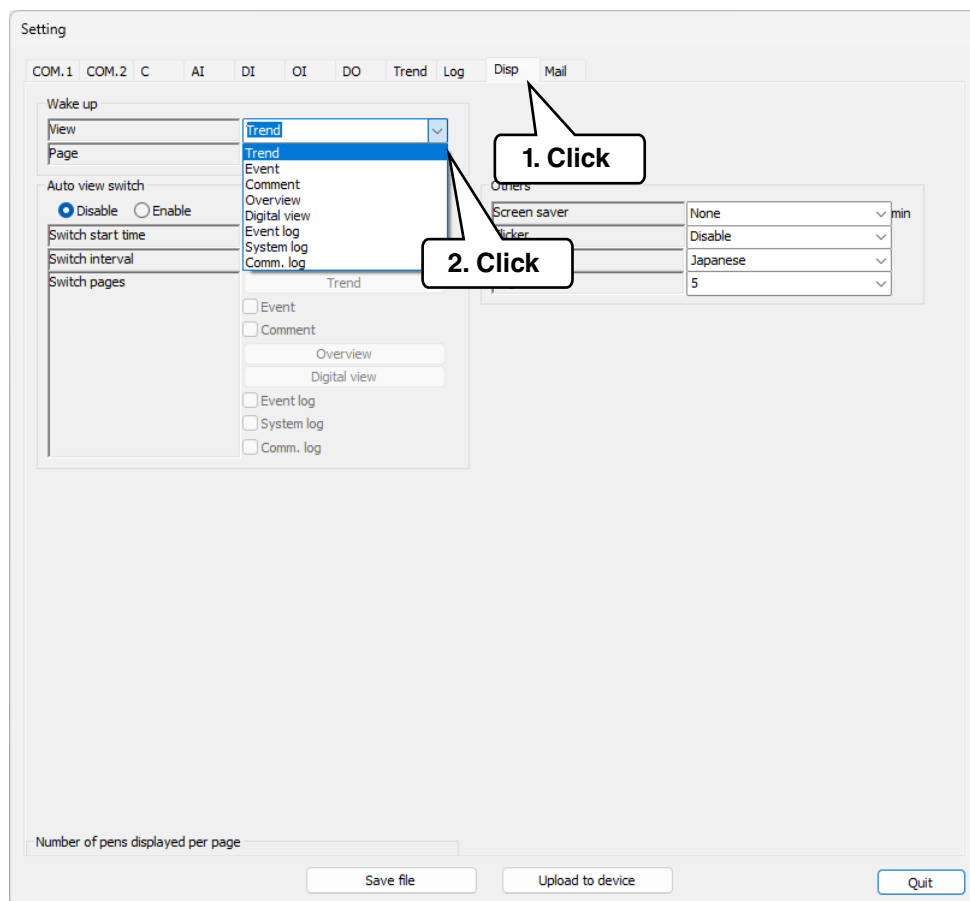
1. Click view drop-down list and select [Trend].
2. Click page drop-down list and select [1] to [8].
3. When selecting page [1], [PEN 1] and [PEN 2] set in pen setting are displayed on the wake up screen.
When selecting page [2], [PEN 3] and [PEN 4] set in pen setting are displayed on the wake up screen.
→ 3.5.2 Pen setting



3.7.1.2 Setting the event screen to the wake up screen

1. Click view drop-down list and select [Event].
2. The data of the latest 32 events for which checkboxes of [trend record] are selected or for which trend record is set to [Enable] is displayed.
→ 3.4.1.6 Event setting (AI), 3.4.1.4 Basic setting (AI), 3.4.3.3 Event setting (OI)

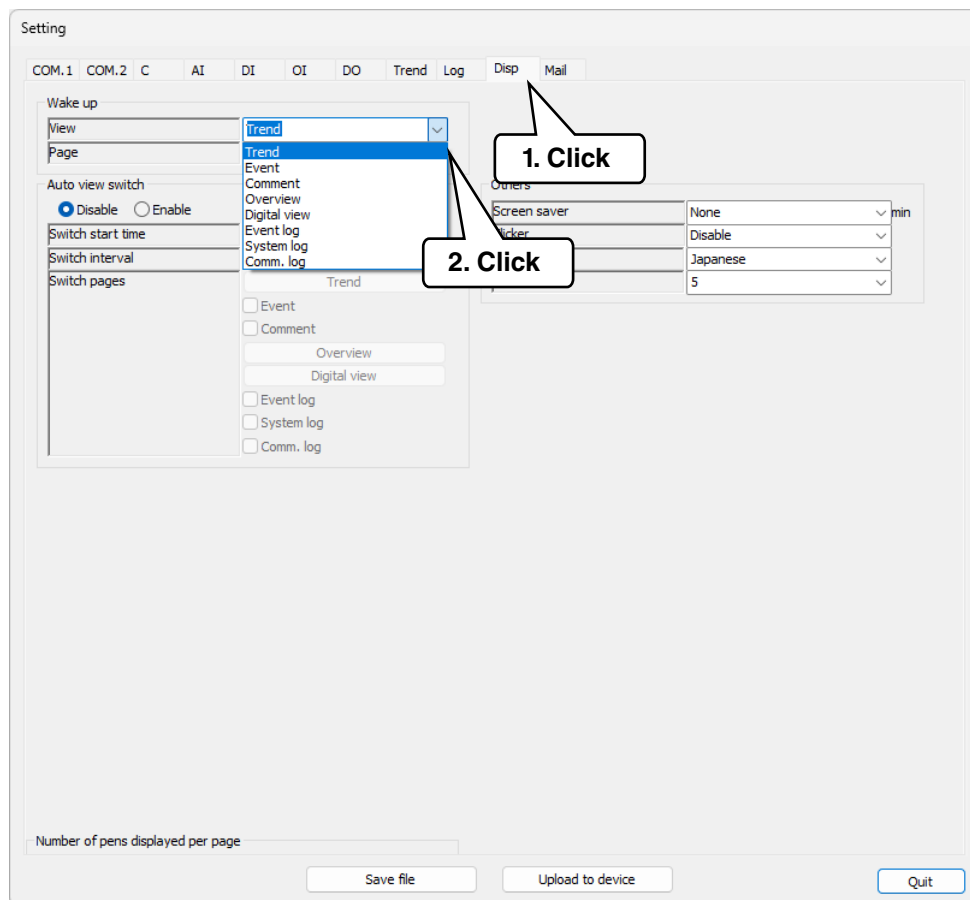
[Setting] window



3.7.1.3 Setting the comment screen to the wake up screen

1. Click view drop-down list and select [Comment].
2. The data of the latest 32 comments is displayed on the wake up screen. → 3.5.3 Comment setting

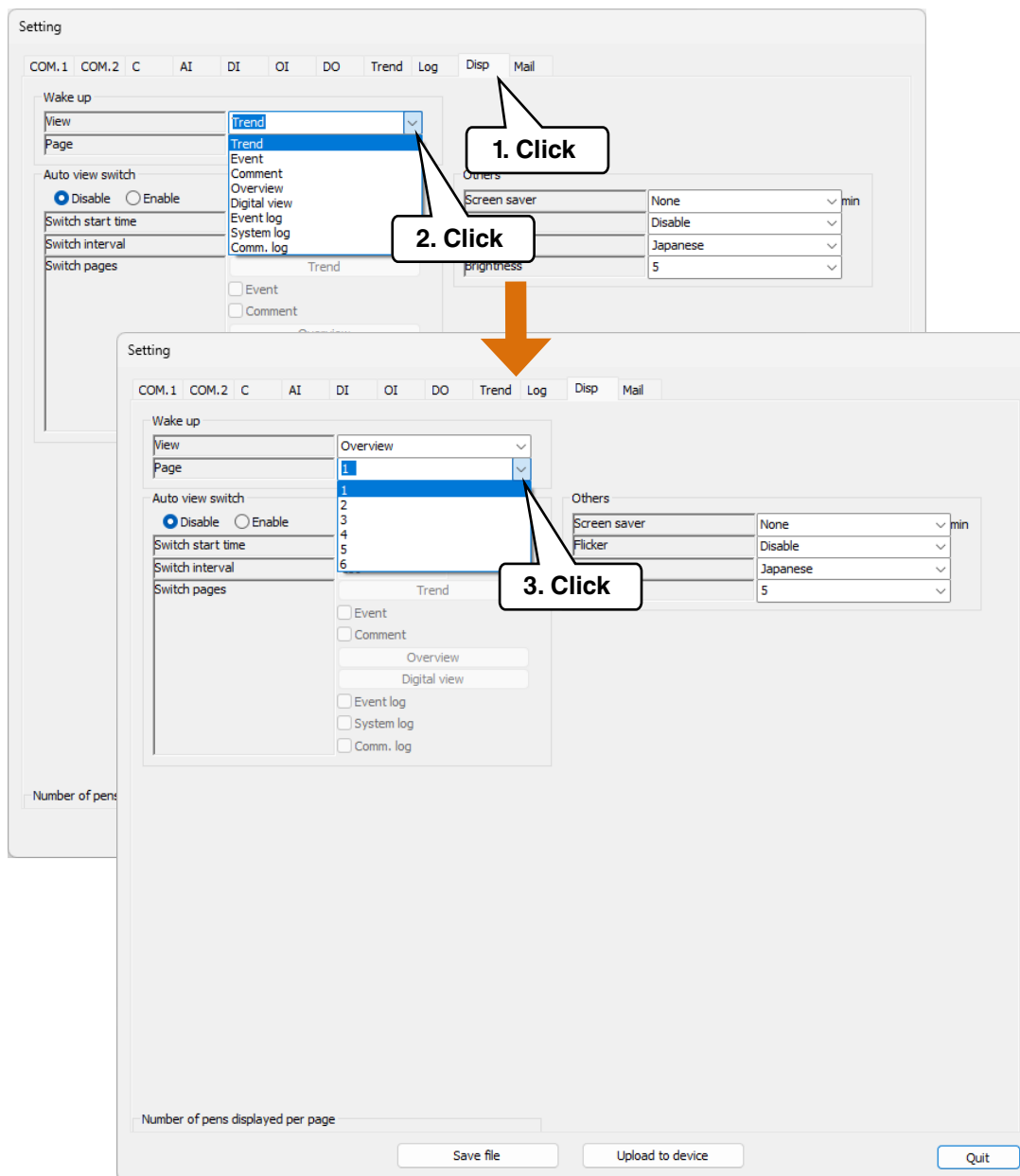
[Setting] window



3.7.1.4 Setting the overview screen to the wake up screen

1. Click view drop-down list and select [Overview].
2. Click page drop-down list and select from [1] to [6].
3. 8 channels are displayed per page in the order of AI1 to AI16, DI1 to DI8, OI1 to OI16, DO1 to DO8.
When selecting page [1], AI1 to AI8 are displayed on the wake up screen.
When selecting page [3], DI1 to DI8 are displayed on the wake up screen.

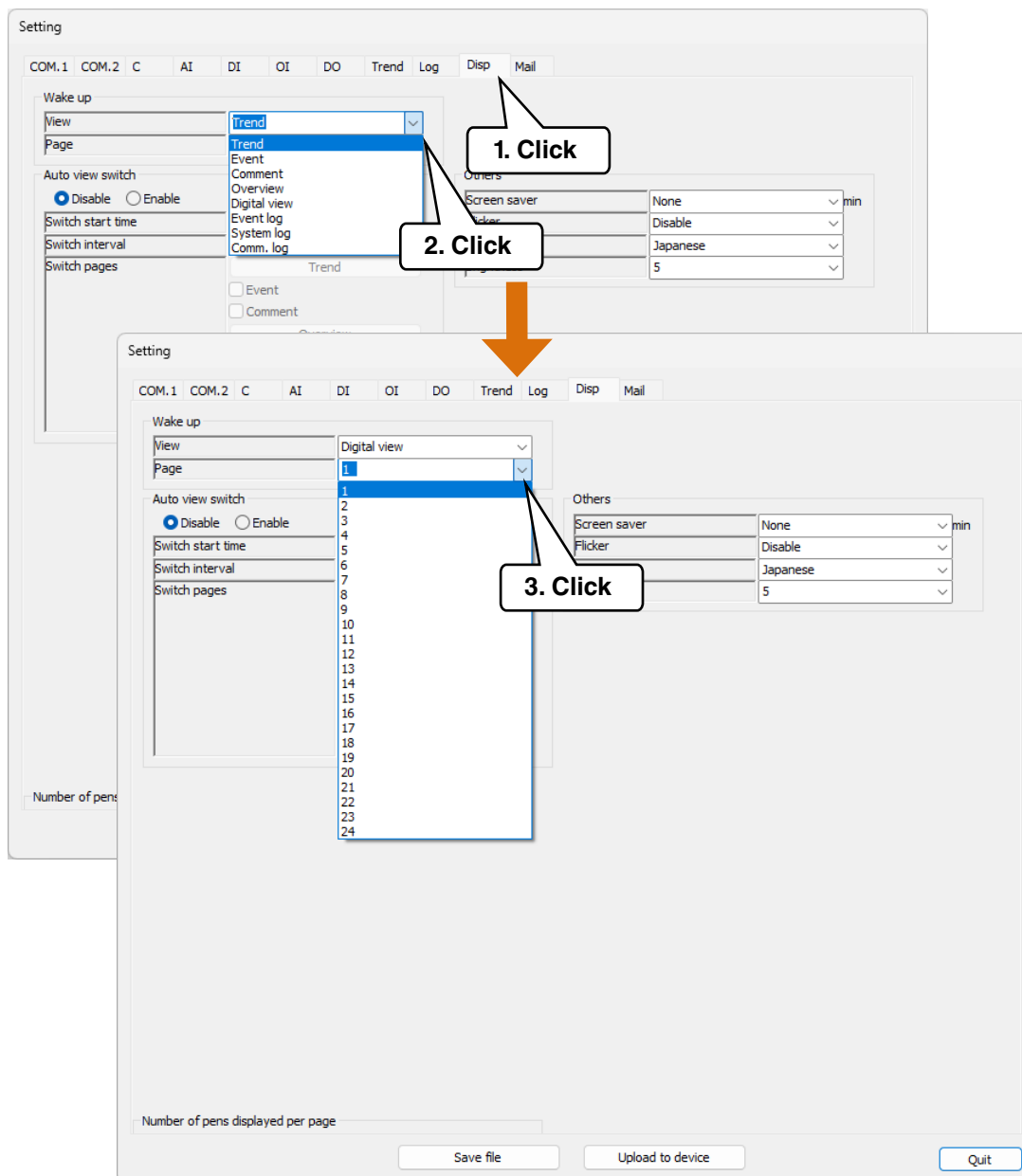
[Setting] window



3.7.1.5 Setting the digital view screen to the wake up screen

1. Click view drop-down list and select [Digital view].
2. Click page drop-down list and select from [1] to [24].
3. 2 channels are displayed per page in the order of AI1 to AI16, DI1 to DI8, OI1 to OI16, DO1 to DO8.
When selecting page [1], AI1 and AI2 are displayed on the wake up screen.
When selecting page [9], DI1 and DI2 are displayed on the wake up screen.

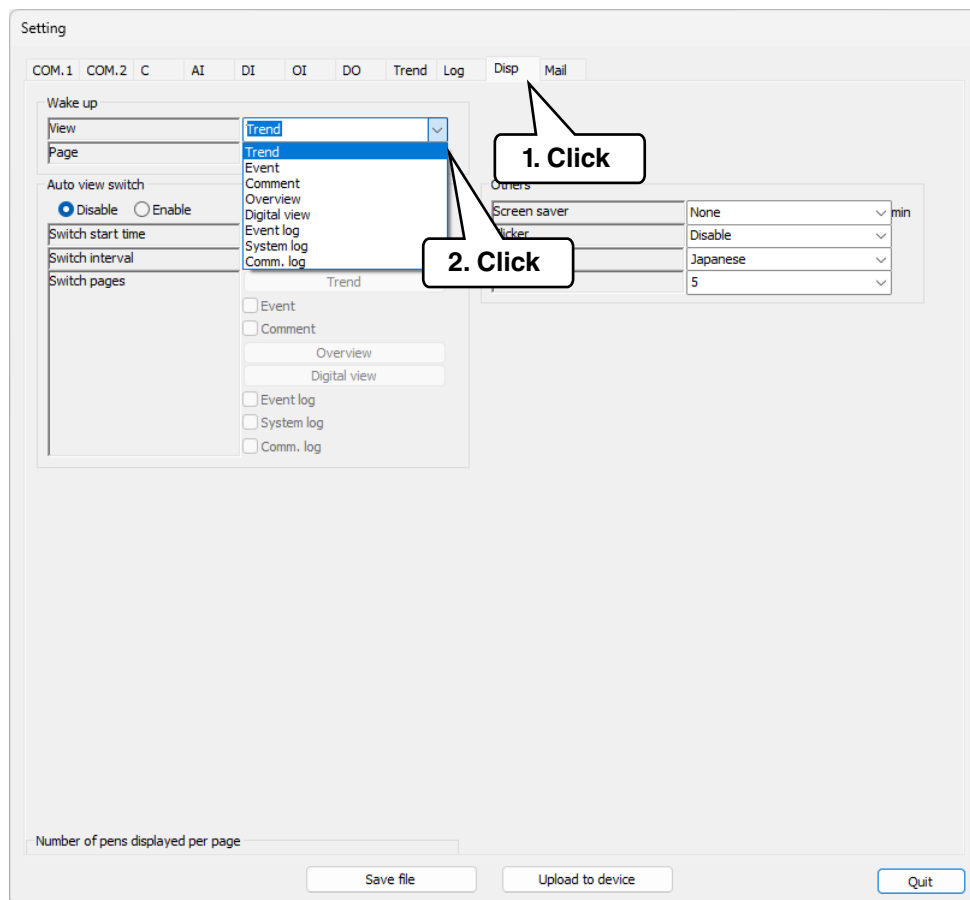
[Setting] window



3.7.1.6 Setting the event log screen to the wake up screen

1. Click view drop-down list and select [Event log].
2. The latest 32 event logs are displayed on the wake up screen.

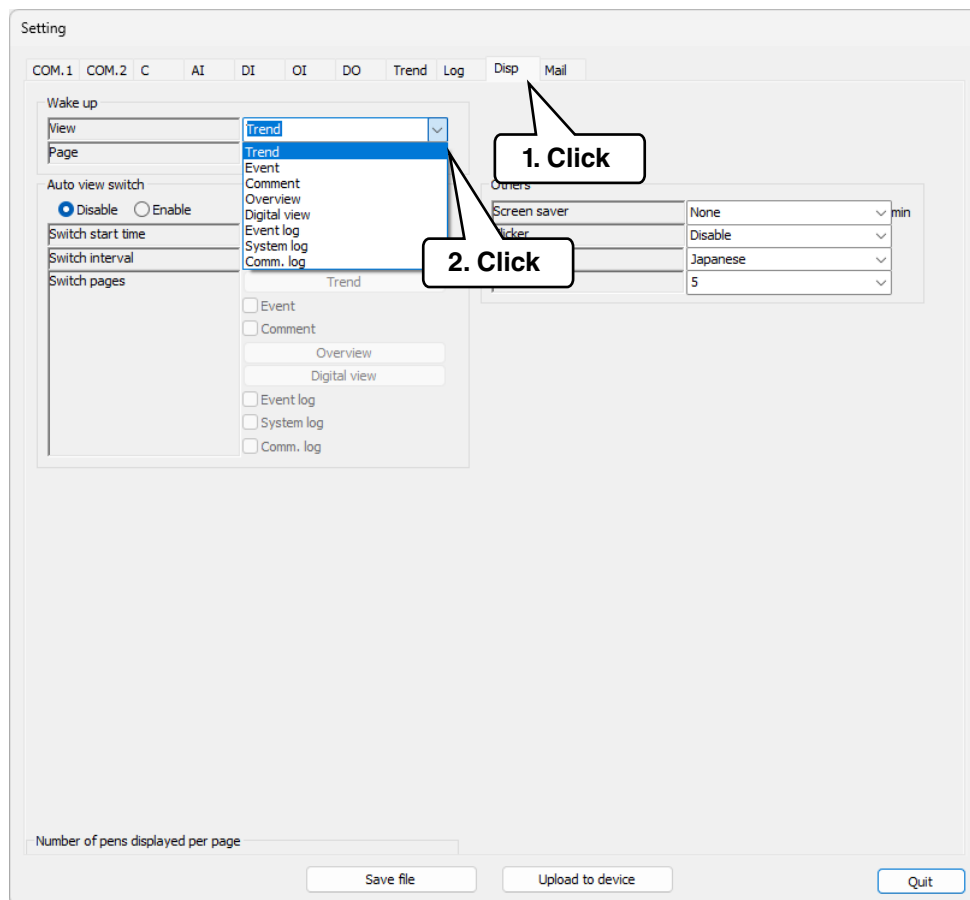
[Setting] window



3.7.1.7 Setting the system log screen to the wake up screen

1. Click view drop-down list and select [System log].
2. The latest 32 system logs are displayed on the wake up screen.

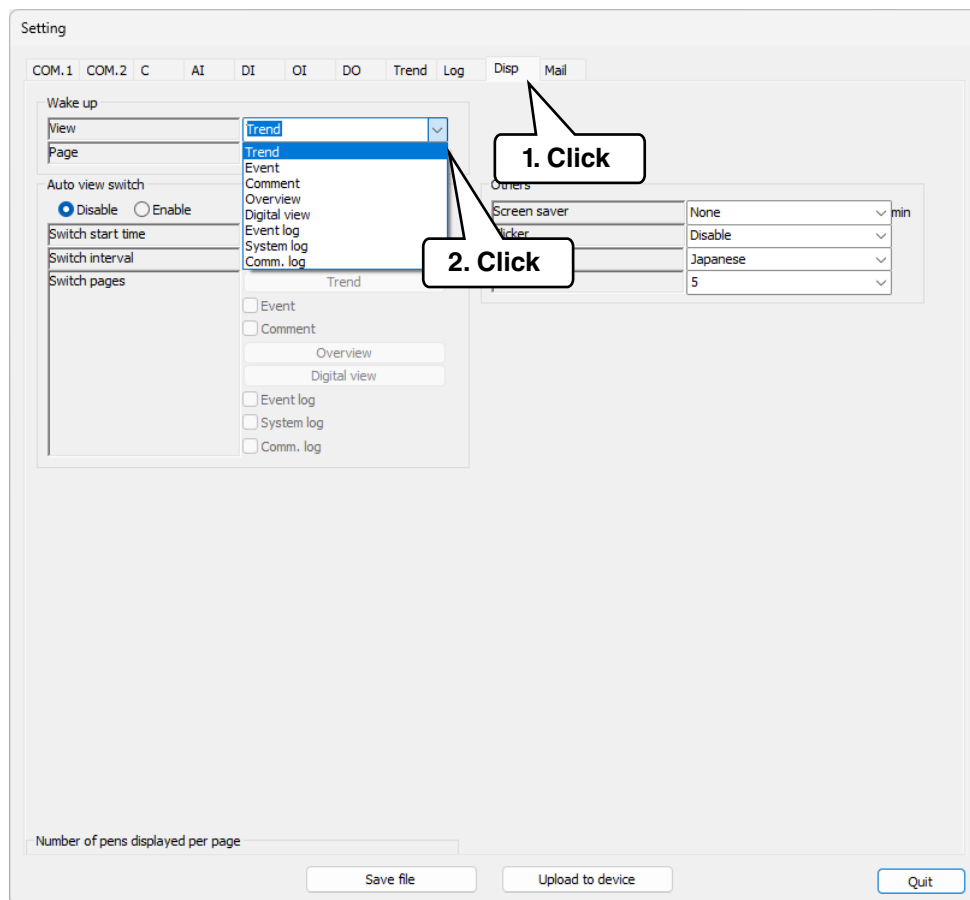
[Setting] window



3.7.1.8 Setting the communication log screen to the wake up screen

1. Click view drop-down list and select [Comm. log].
2. The latest 32 communication logs are displayed on the wake up screen.

[Setting] window



3.7.2 Auto view switch setting

Configure the auto view switch setting for the VR96E-G8.

1. When enabling auto view switch, click [Enable] in [Auto view switch].
2. Set parameters according to the table on the next page.
3. Configure the settings for the screen to be targeted for auto view switch.
Select checkboxes of the parameter to be targeted for auto view switch.
Click [Trend], [Overview], [Digital view] to display the corresponding dialog.

[Setting] window

1. Click

2. Click

3. Enter

4. Click

[Auto view switch: Trend] dialog

[Auto view switch: Overview] dialog

[Auto view switch: Digital view] dialog

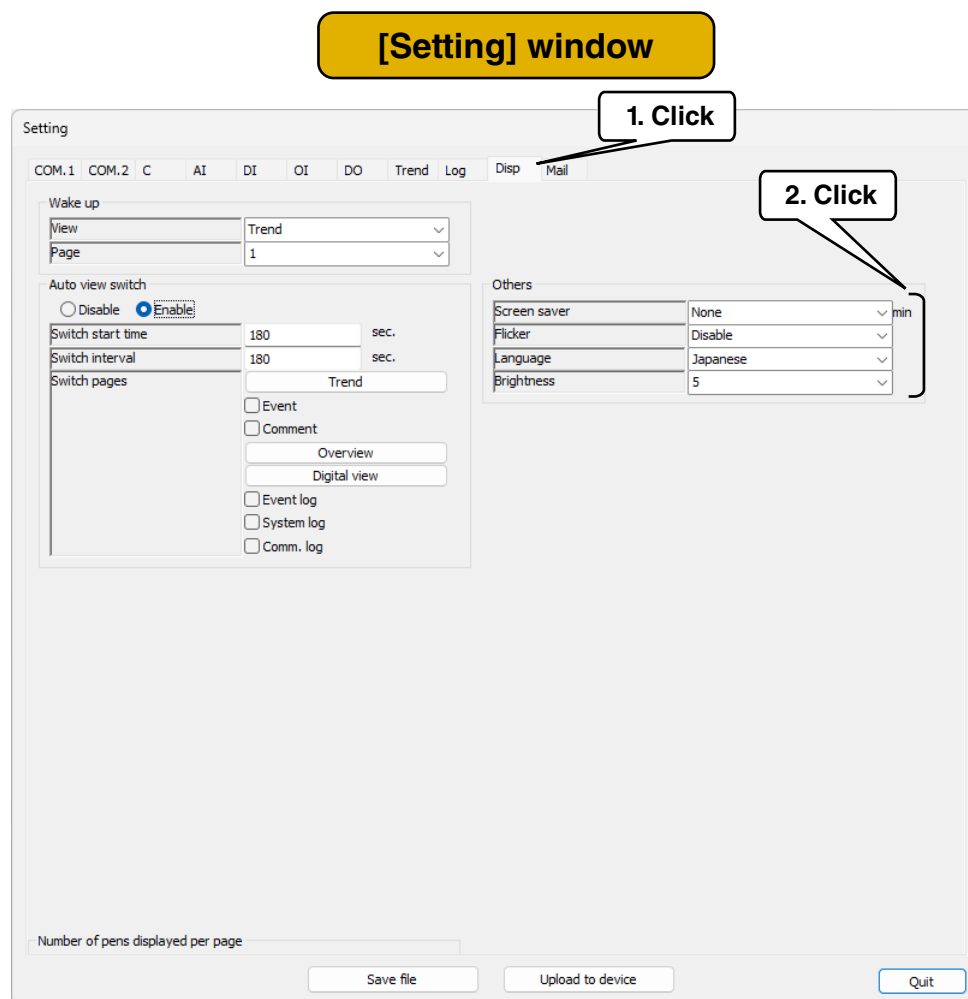
The Setting window displays various system parameters. The 'Auto view switch' section is highlighted, showing 'Enable' selected. The 'Switch start time' and 'Switch interval' are both set to 180 seconds. The 'Switch pages' section shows 'Trend' selected. The 'Others' section shows 'Screen saver' set to None, 'Flicker' set to Disable, 'Language' set to Japanese, and 'Brightness' set to 5. The 'Auto view switch: Trend' dialog shows 'Page1' and 'Page2' selected. The 'Auto view switch: Overview' dialog shows 'Page1' and 'Page2' selected. The 'Auto view switch: Digital view' dialog shows 'Page1' through 'Page19' listed.

Parameter	Description
Switch start time	Set the switch start time. If the VR96E-G8 is not operated for a period exceeding the switch start time, the view switches automatically. Set in the range of 10 to 180 (sec.).
Switch interval	Set the interval for auto view switch. After the switch interval time elapses, transition to the screen set as the target for auto view switch is performed automatically. Set in the range of 3 to 180 (sec.).

3.7.3 Other settings

Configure the screen, screen saver, flicker, language and brightness of the VR96E-G8.

1. Set parameters according to the table below.
2. When the screen saver is not disabled, the screen returns from screen saver if the current value zone of AI, DI, or OI is abnormal. (3.4.1.6 Event setting (AI), 3.4.2.4 Basic setting (DI), 3.4.3.3 Event setting (OI))
3. When the flicker is enabled, the display flickers if the current value zone of AI, DI, or OI is abnormal; otherwise, the display is normal.
(3.4.1.6 Event setting (AI), 3.4.2.4 Basic setting (DI), 3.4.3.3 Event setting (OI))



Parameter	Description
Screen saver	Set the time until the screen saver activates. The screen saver activates if the VR96E-G8 is not operated for the set time. Set it disable or within 1 to 10 minutes.
Flicker	Set the flicker mode on the digital view or on the overview screen.
Language	Set the language displayed on the VR96E-G8. Select English or Japanese.
Brightness	Set the brightness of the LCD panel of VR96E-G8. Set within 1 (dark) to 5 (bright).

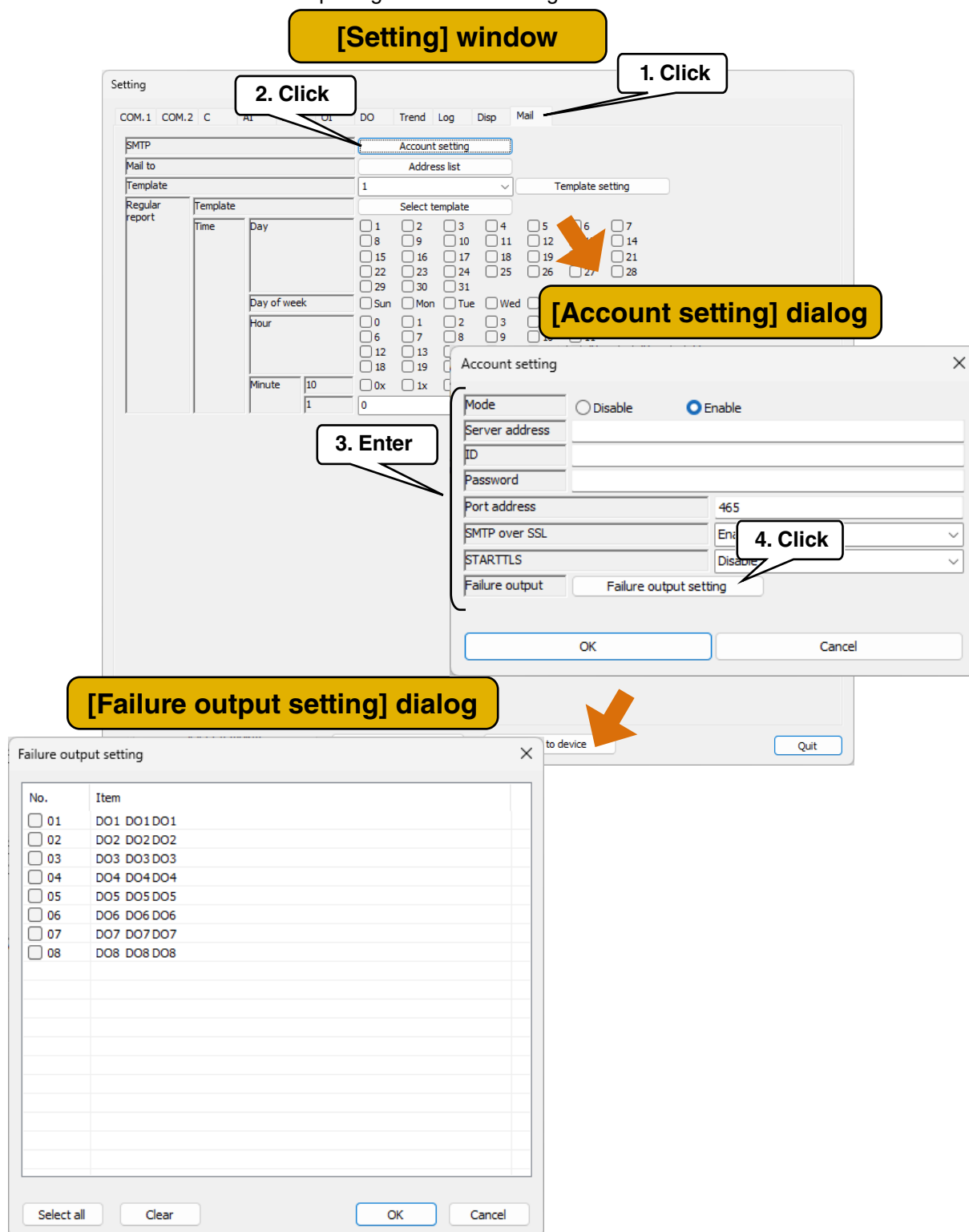
3.8 E-mail reporting setting

Configure e-mail reporting setting with the SMTP authentication.

3.8.1 Account setting

Configure the account for sending e-mails.

1. Click [Account setting] button to display [Account setting] dialog.
2. Set parameters according to the table below.
3. Click [Failure output setting] button to display [Failure output setting] dialog.
Select the checkbox in case of outputting DO when sending an e-mail fails.



Parameter	Description
Mode	Select [Disable] or [Enable].
Server address	Set the mail server address within 64 characters.
ID	Set the ID (e-mail account name) within 64 characters.
Password	Set the password within 64 characters.
Port address	Set the port address of the server.
SMTP over SSL	Set the encrypted communication. Select [Enable] to use it.
STARTTLS	Select [Disable] or [Enable] only when SMTP over SSL is [Enable].

CAUTION

- Mail receiving is not available for VR96E-G8.
- SMTP over SSL authentication is intended only for encryption. Therefore the certification issued by mail server is not verified.
- It is not guaranteed that this function can connect to all mail servers.
- For mail service, there are many kind of restrictions varying by each company. Also change of function or authentication may be carried out. Therefore according to these changes of restriction or function, check the mail communication on a regular basis and perform adequate operational administrative.

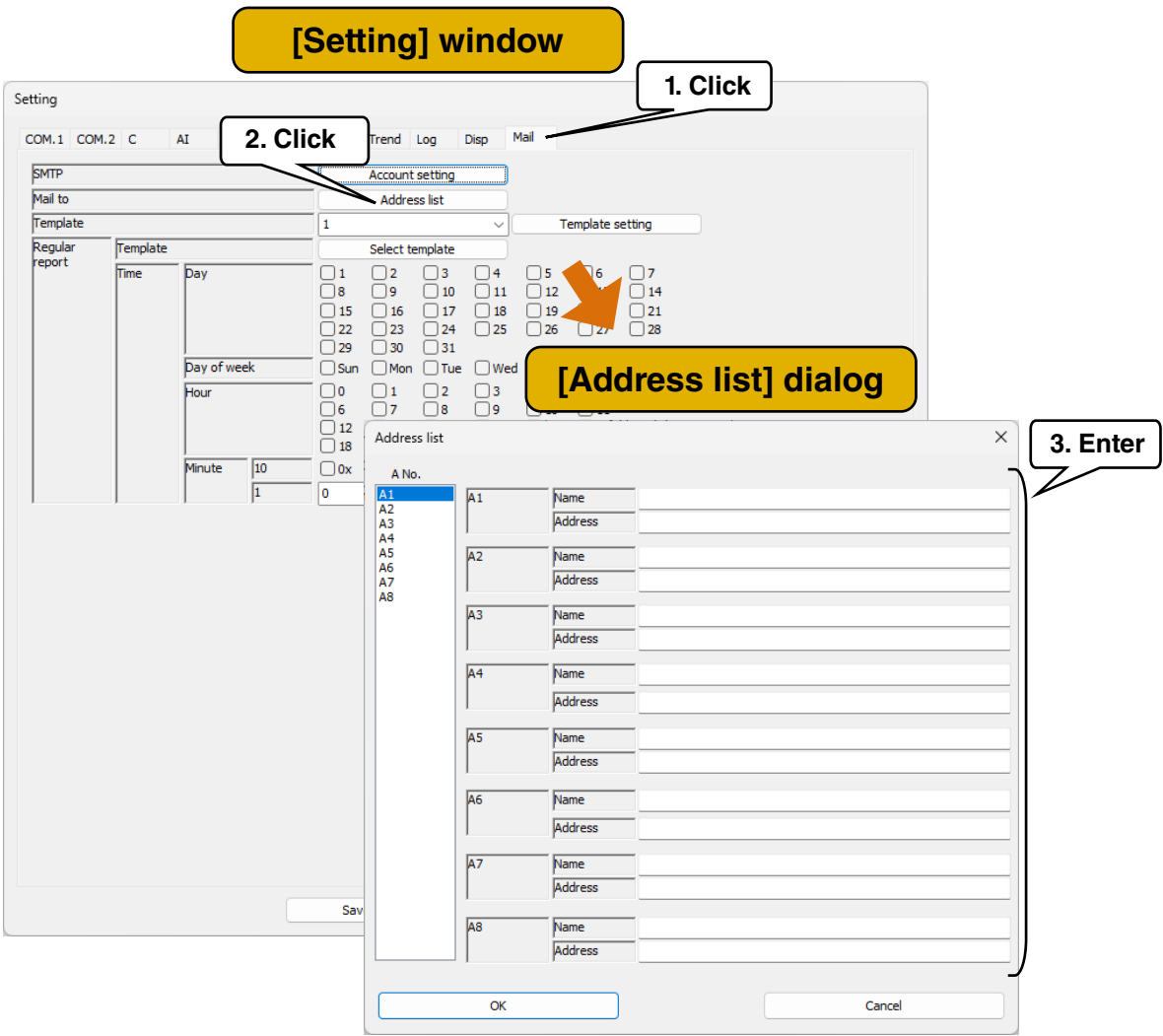
NOTE

- The following cipher suites are supported.
- TLS_RSA_WITH_AES_256_CBC_SHA
 - TLS_RSA_WITH_AES_128_CBC_SHA
 - TLS_RSA_WITH_RC4_128_SHA
 - TLS_RSA_WITH_RC4_128_MD5
 - TLS_RSA_WITH_3DES_EDE_CBC_SHA
 - TLS_RSA_WITH_DES_CBC_SHA

3.8.2 Recipient address setting

Configure the e-mail recipient address. Up to 8 addresses A1 to A8 can be set.

- 1. Click [Address list] button to display [Address list] dialog.
- 2. Set parameters according to the table below.



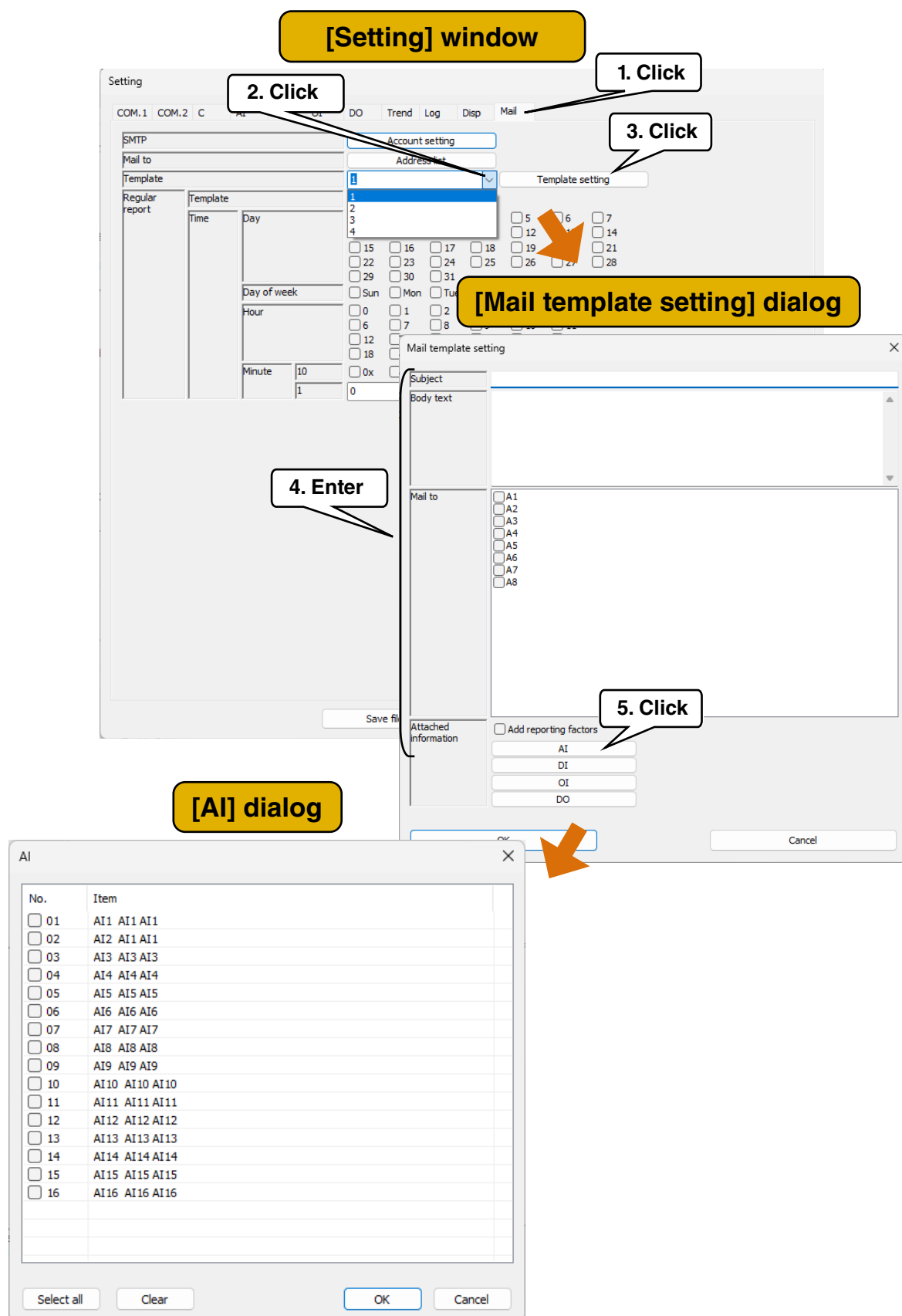
Parameter	Description
Name	Set within 16 characters.
Address	Set the e-mail recipient address within 64 characters.

3.8.3 Template setting

Configure the mail template setting. Up to 4 templates can be set.

1. Click template drop-down list and select a template to be set.
2. Click [Template setting] button to display [Mail template setting] dialog.
3. Click [AI], [DI], [OI] or [DO] button to set the I/O information attached to the body text.
4. Set parameters according to the table below.

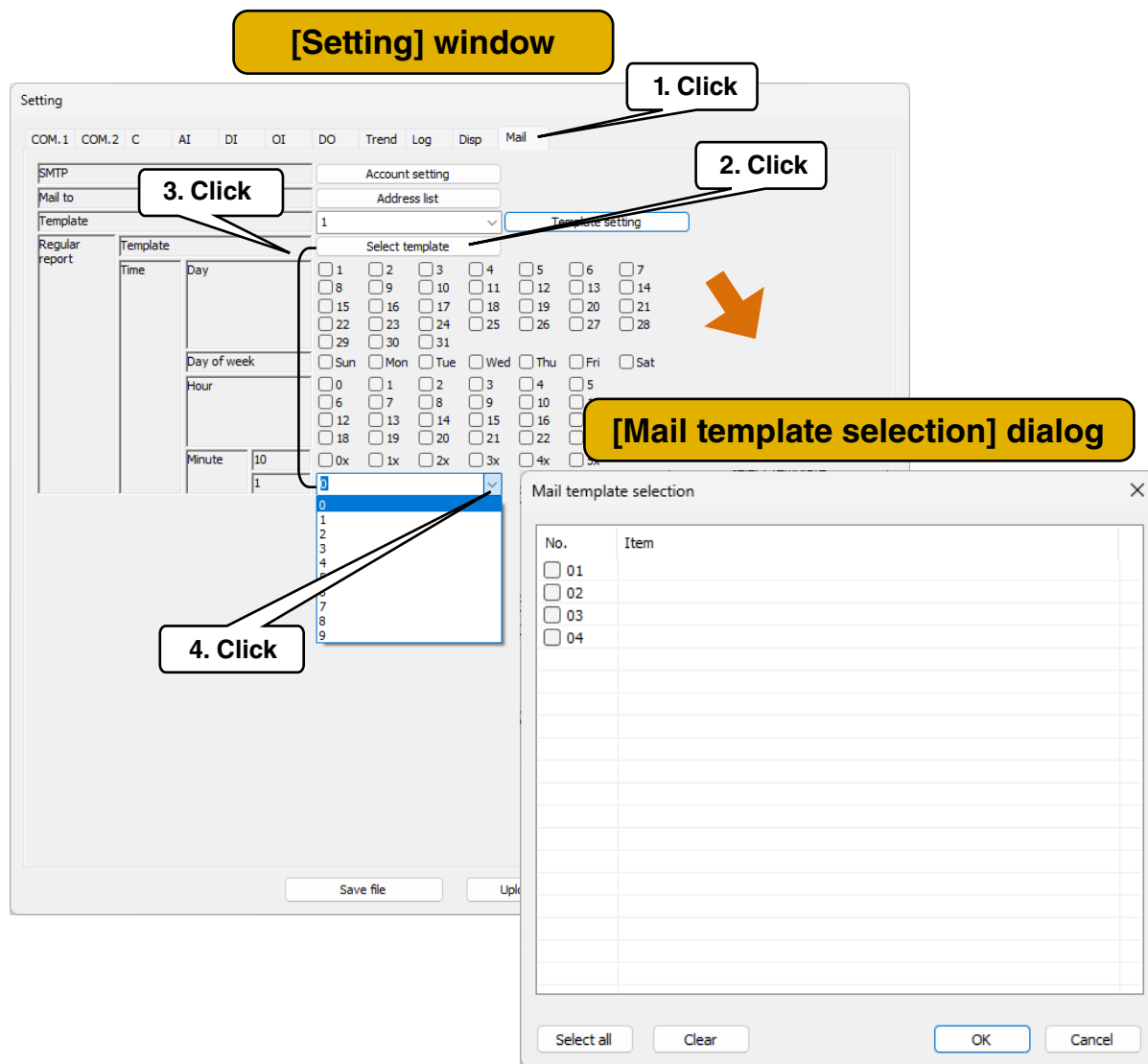
Parameter	Description
Subject	Set the subject of e-mail within 32 characters.
Body text	Set the body text of e-mail within 128 characters.
Mail to	Select the checkbox of the addresses specified for e-mail recipient.
Attached information Add reporting factors	Select the checkbox when adding reporting factors at the end of the body text.



3.8.4 Regular reporting setting

Configure the regular reporting setting.

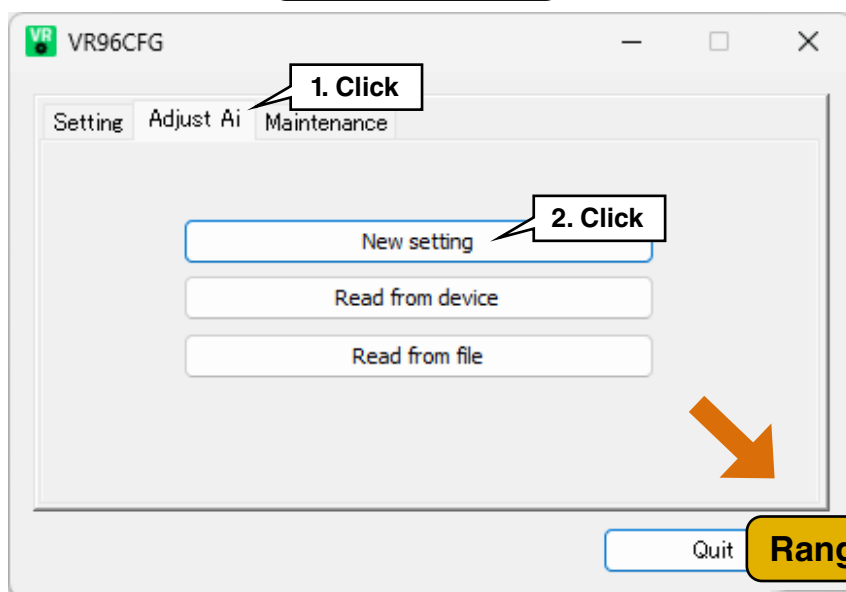
1. Click [Select template] button to display [Mail template selection] dialog.
Select the template to be used for regular reporting.
2. Enter the day and time for regular reporting. Multiple items can be selected for each parameter.
An e-mail will be sent on the selected day and time of the week.



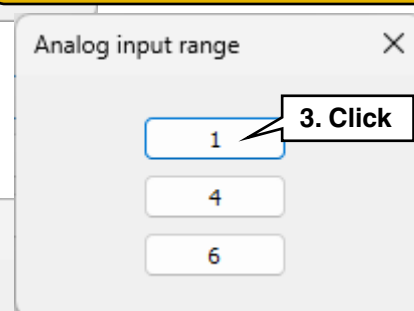
3.9 Adjusting Ai

Follow the procedure below in order to adjust Ai value.

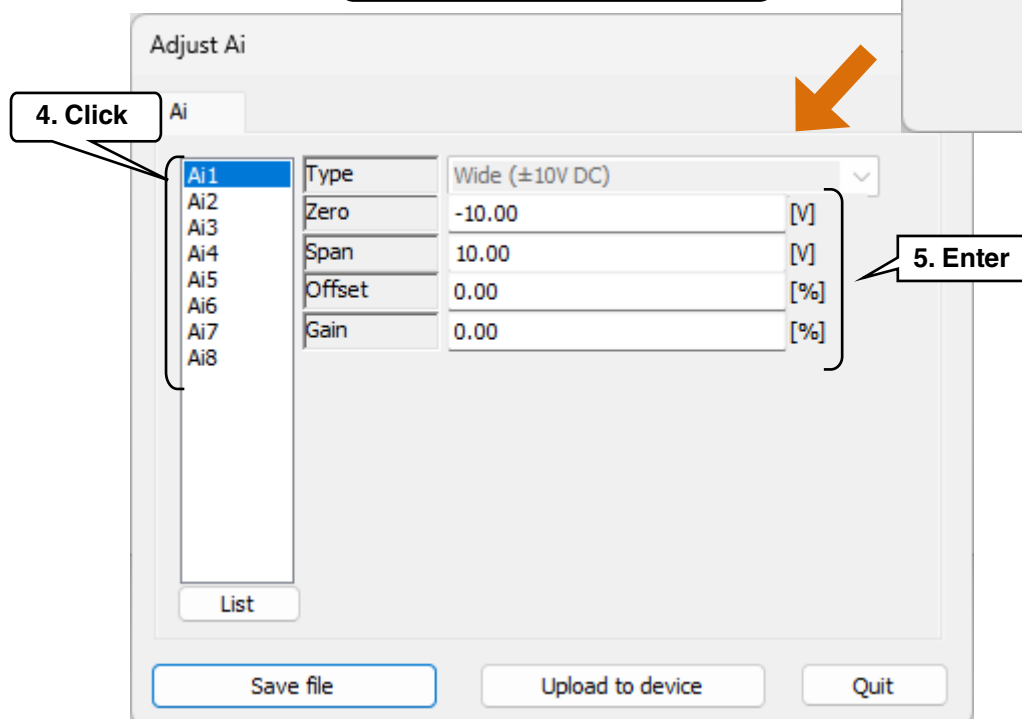
Initial window



Range selecting window



Adjust Ai window



1. Click [Adjust AI] tab.
2. Click [New setting] button to configure a new Ai adjustment setting.
 Click [Read from device] button to read the Ai adjusted values set in the device and change the values.
 (same as 2.3.4.2 Reading from device)
 Click [Read from file] button to read the Ai adjusted values saved in the PC.
 (same as 2.3.4.3 Reading from file)
3. Select the analog input range by referring to the option code of the device.
 The range selecting window appears only when [New setting] button is clicked.
4. Adjust the Ai values. Click an Ai channel to display the current values.
5. Set the values by referring to the following table.
6. Click [Upload to device] to transmit the adjusted values to the device.
 Refer to 2.3.5 Transmitting the setting to the device for details.
7. Click [Save file] to save the adjusted values to a file.
 Refer to 2.3.6 Saving the setting to file for details.

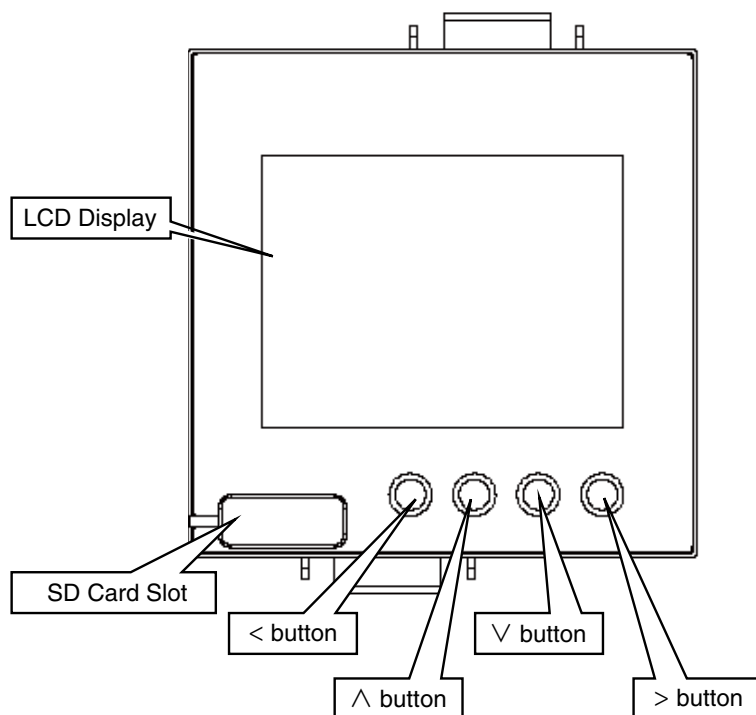
Parameter	Detail
Type	The range corresponding to the Ai channel is displayed.
Zero / Span	Depends on the analog input specification. • Type [Wide (± 10 V DC)]: -10.00 to +10.00 V (minimum range 1.6 V) • Type [Middle (± 0.8 V DC)]: -800 to +800 mV (minimum range 160 mV) • Type [Narrow (± 80 mV DC)]: -80 to +80 mV (minimum range 20 mV)
Offset	Set within -5.00 to +5.00 (%)
Gain	

4. VR96E-G8 operation

This chapter describes the details of the VR96E-G8 screen and how to operate it.

4.1 Component identification

The following illustration shows the component identification of the VR96E-G8.
Press the buttons to operate the screen.



4.2 Wake up screen

After the power is turned on, the wake up screen is displayed until the initialization process is complete.

After the initialization process is complete, the configured wake up screen is displayed.

Select the wake up screen from trend, event, comment, bar graph, overview, digital display, event log, system log, or communication log. (The figure below shows the case when the trend graph is set.)

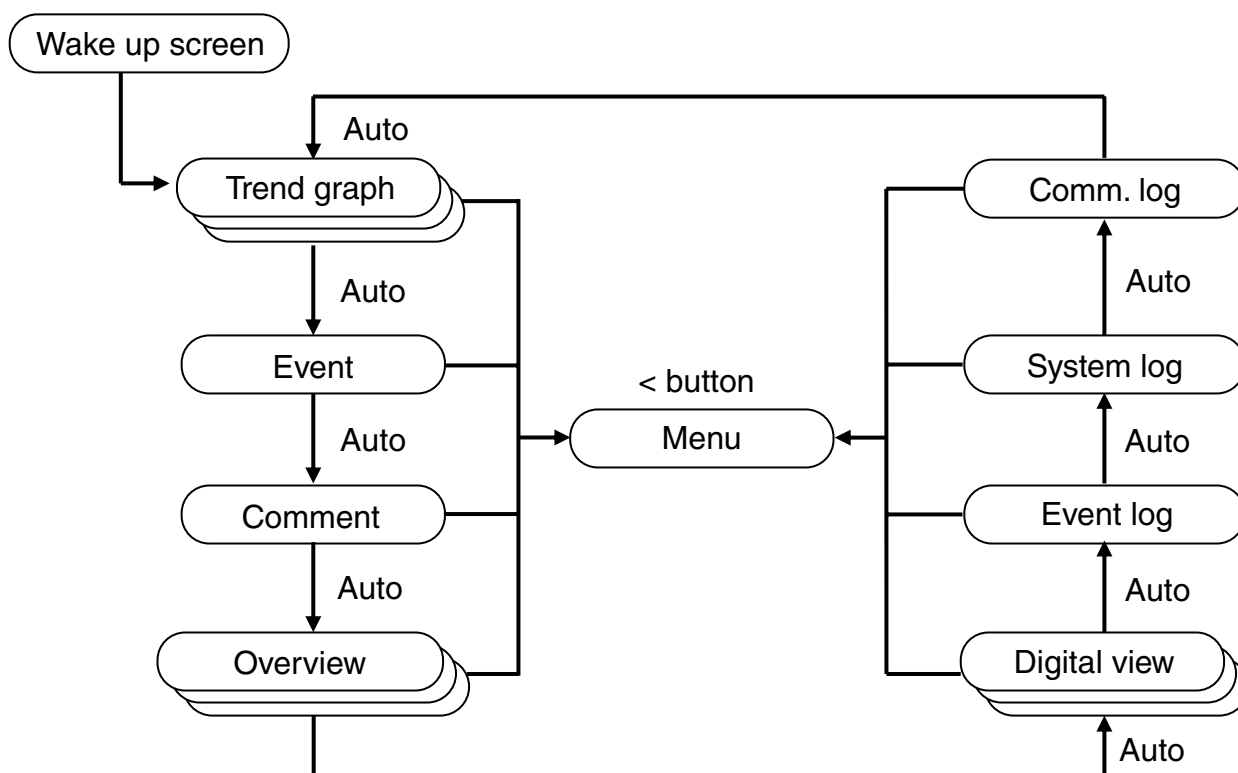
If automatic switching is enabled, the screen switches at the specified timing.

Configure the wake up screen and automatic switching using the configurator software (model: VR96CFG) or 4.3.8.3 User setting.

→ 3.7.1 Wake up screen setting, 3.7.2 Auto view switch setting

Press < button to transition to the menu screen. → 4.3 Configuration of the menu screen

For details on each screen, refer to the sections for each screen on the following pages.



4.2.1 Power-up screen

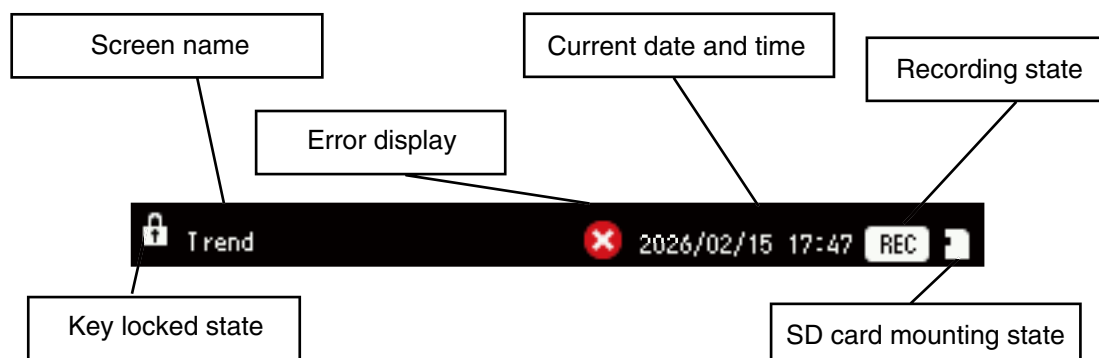
For the period from turning on the device until the configured wake up screen (3.7.1 Wake up screen setting, 4.3.8.3 User setting) is displayed, the following message appears at the lower right corner of the screen. The message is deleted when the waiting state is released, and then the wake up screen appears.

Message	Description
progress (DHCP / IP address)	Waiting for obtaining DHCP IP
progress (SNTP)	Waiting for initial SNTP processing
progress (I/O)	Waiting for initial I/O communication processing
progress (SD)	Waiting for recognizing SD card

4.2.2 Common area for each screen

4.2.2.1 Header

Header is the common area for all screens.



Item	Description
Key lock	The icon  is displayed when the button operation is disabled.
Screen name	The name of the currently displayed screen is displayed.
Error display	The icon  is displayed when the following errors occur. - Built-in I/O abnormality - Modbus/TCP or SLMP communication error - Recording abnormality - Log abnormality - SD card abnormality
Current date and time	The date and time are displayed. Refer to 4.3.8.9 Time adjust, 5.1.1 Date/Time for the setting.
Recording state	The icons indicate recording state. Refer to the table below.
SD card mounting state	When the SD card is mounted, the icon  turns on.

Recording state

When the normal trend recording starts, the icon  turns on.

When the trigger recording starts, the icon  turns on.

For the recording display, refer to the table below.

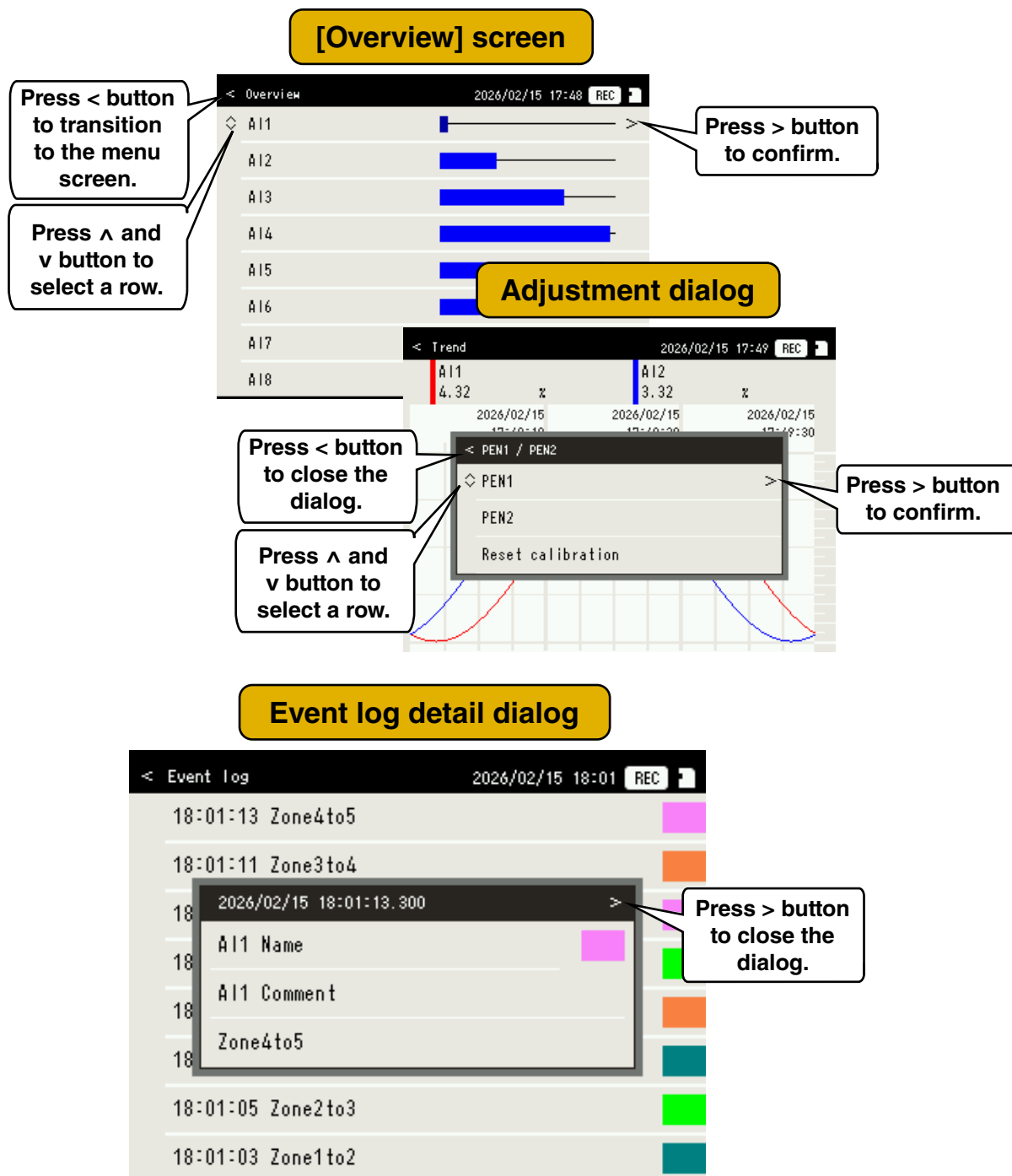
Item	Description	Display
Stop recording	Recording stops.	REC OFF
Normal recording	Recording is in progress.	REC ON
	SD card mounting is released.	REC Blinking
Trigger recording	The device is waiting for trigger.	T-REC OFF
	Recording is in progress.	T-REC ON
	SD card mounting is released.	T-REC Blinking

4.2.2.2 Screen operation

The following icons appear when the screen operation is enabled or a dialog is displayed.

The screen can be operated by using the buttons under the LCD display.

Refer to the following screen example and the table on the next page.



Icon	Description
	^ and v button is enabled. Moving the row or page is possible. Press ^ button to move the row upward or move to the previous page. Press v button to move the row downward or move to the next page. The row in which the icon  is displayed is selected.
	v button is enabled. Selecting the row is possible. Press v button to move the row downward. The icon  is displayed when the row on the top is selected.
	^ button is enabled. Selecting the row is possible. Press ^ button to move the row upward. The icon  is displayed when the row on the bottom is selected.
	> button is enabled. The row in which the icon  is displayed is confirmed.
	> button is enabled. The dialog is closed.
	< button is enabled. Press < button to move to the menu screen. When a dialog is displayed, the dialog is closed.

Hold down < or > button to control key lock or trend recording.
Refer to the table below for details.

Button	Description	Reference
Hold down >	"Normal recording" is started or stopped. (If trigger recording is in progress, it switches to normal recording.)	3.5.1.1 Recording setting
Hold down <	The key lock is set or released.	

4.2.3 Trend screen

4.2.3.1 Trend screen

Follow the procedure below in order to display the trend graph of PEN1 to PEN16 configured in the pen setting.

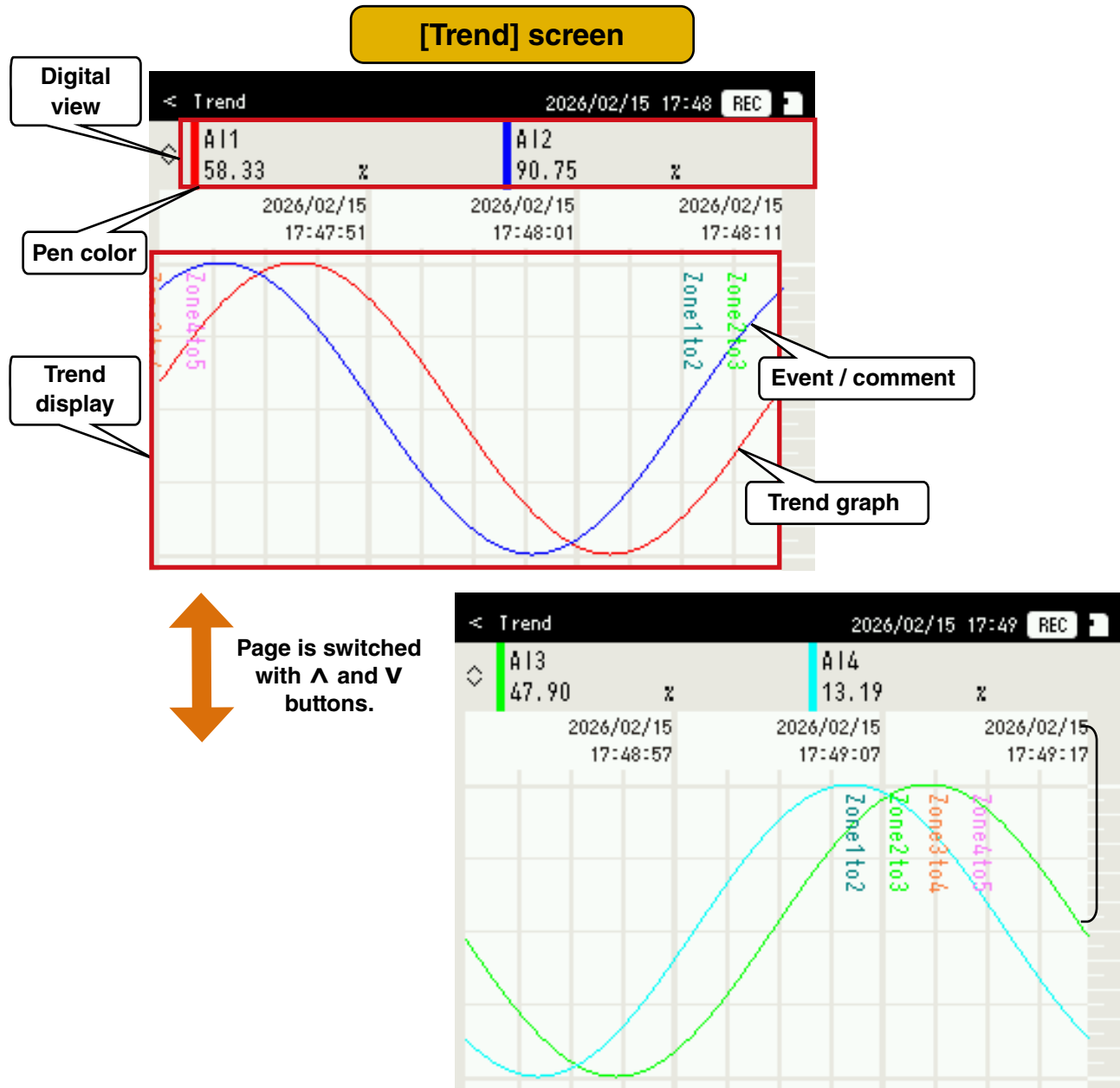
1. 2 pens are displayed per page starting from PEN1. → 3.5.2 Pen setting

2. The recorded event/comment data is displayed on the trend graph.

Refer to the following table for the displayed item.

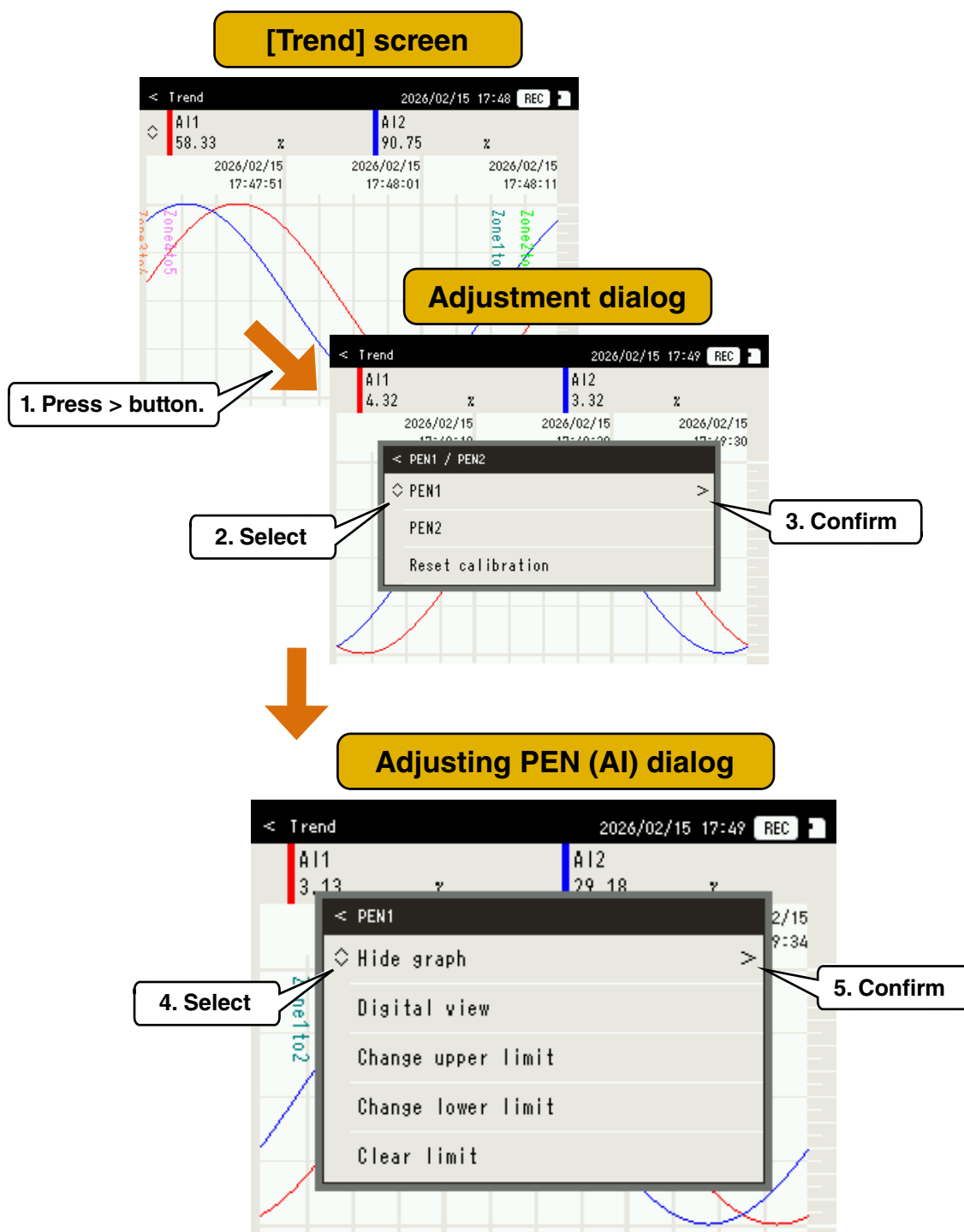
Refer to 4.2.3.3 Digital view for the digital view.

3. Press $\wedge$ or $\vee$ button to switch the page.



Item	Description	Reference
Pen color	The color set in the pen setting is displayed.	3.5.2 Pen setting
Trend display	Trend graph: The data of the latest 300 samplings are displayed with the color set in the pen setting. Event: The latest 16 events are displayed with the set color. Comment: The latest 16 comments are displayed with the set color.	3.5.2 Pen setting 3.4.1.5 Zone setting (AI) 3.4.2.4 Basic setting (DI) 3.4.3.2 Zone setting (OI) 3.5.3 Comment setting

4. Press > button to display the adjustment dialog. Refer to 4.2.2.2 Screen operation for the operation.
5. When PEN is selected, the adjusting PEN (AI) dialog appears.
The content in digital view is selectable in the adjusting PEN dialog.
Refer to 4.2.3.3 Digital view for details on the adjusting PEN dialog.
The values set in the adjusting PEN dialog are initialized when [Reset calibration] is selected.



4.2.3.2 Adjusting PEN

The content displayed on the trend screen is adjustable in the adjusting PEN dialog.

1. Press $\wedge$ or $\vee$ button to select the parameter to be adjusted. Press $>$ to confirm.

Refer to 4.2.2.2 Screen operation for the operation.

2. Select [Digital view] to open the selecting digital view dialog.

Press $\wedge$ or $\vee$ button to select the parameter to be displayed on the digital view.

[●] is the current setting.

3. Select [Change upper limit] to open [Change upper limit] dialog.

Press $\wedge$ or $\vee$ or $>$ button to set the upper value for plotting the trend graph.

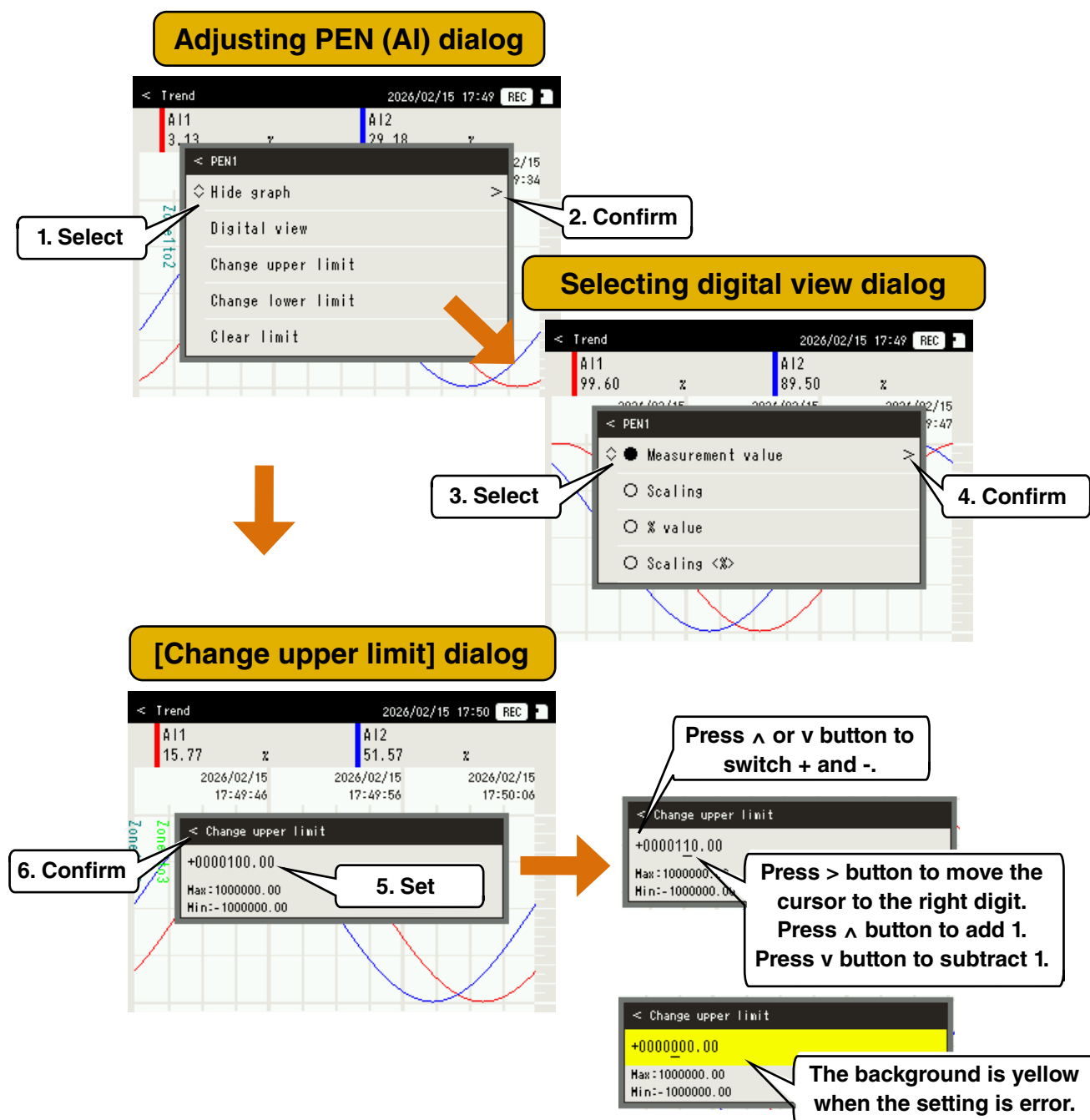
Press $>$ button to move the cursor to the right digit.

Press $\wedge$ or $\vee$ button to change the number on the cursor.

The background will be yellow when the setting is error.

4. After the setting is complete, the dialog is closed and the new setting is effective.

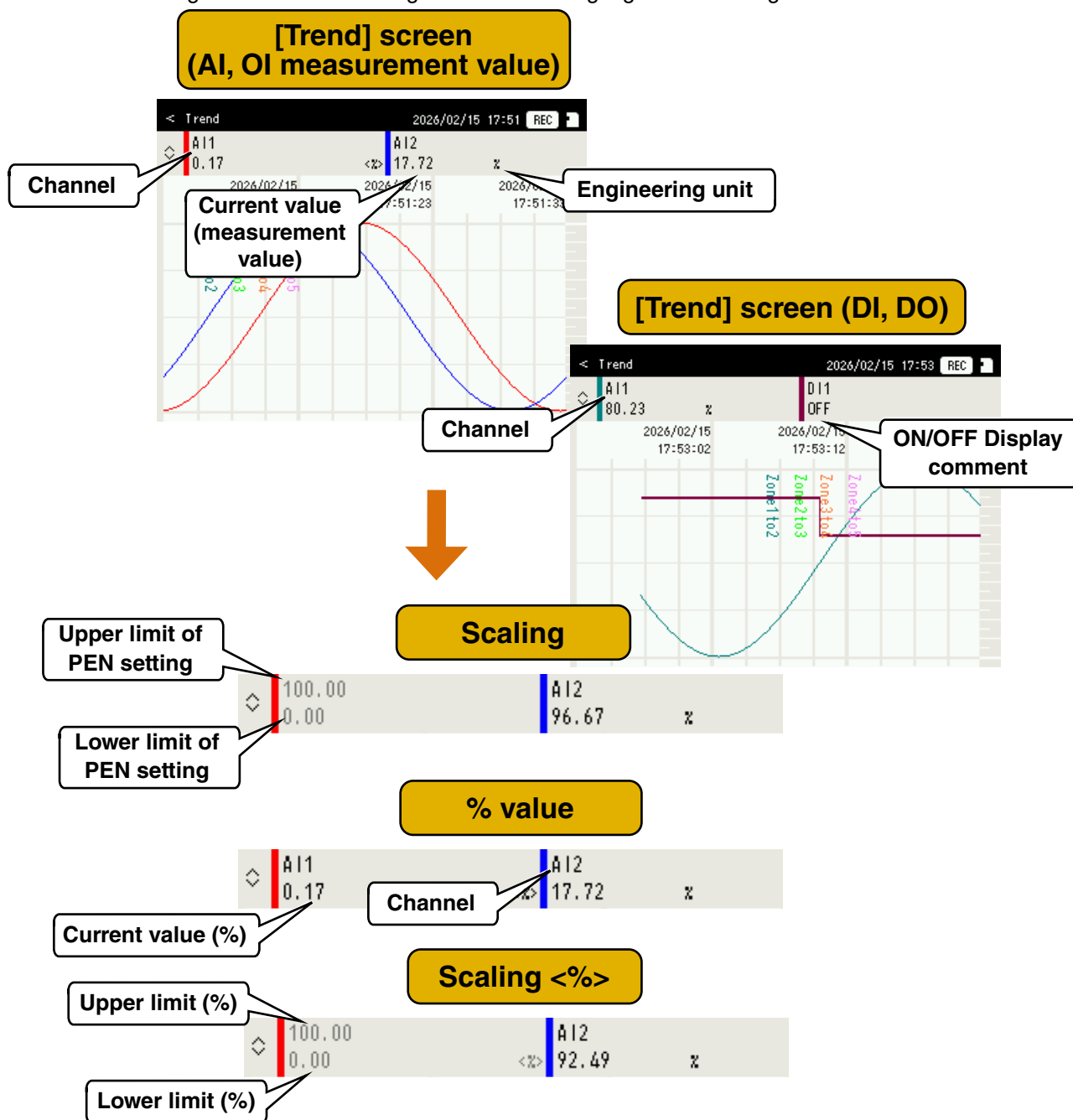
Refer to the table on the next page for each parameter.



Item	Description	Pen setting source
Hide graph	The trend graph is hidden.	AI, DI, OI, DO
Digital view	- Measurement value - Scaling: The upper/lower limit value of PEN setting is displayed as the default value. After changing the upper/lower limit, the changed value is displayed. - % value - Scaling <%>: 0 to 100 % is displayed as the default value. After changing the value, the changed value is displayed. When the source set in the PEN setting is OI and the AI data type set in the PEN setting is Int or Uint, only [Measurement value] or [Scaling] is selectable.	AI, OI 3.5.2 Pen setting 3.4.1.4 Basic setting (AI)
Change upper/lower limit	When [% value] or [Scaling <%>] is set in the digital view, change the upper/lower limit of % value. Similarly, change the upper/lower limit of measurement value for [Measurement value] and [Scaling].	AI, OI
Clear limit	The upper/lower limit setting is initialized.	AI, OI

4.2.3.3 Digital view

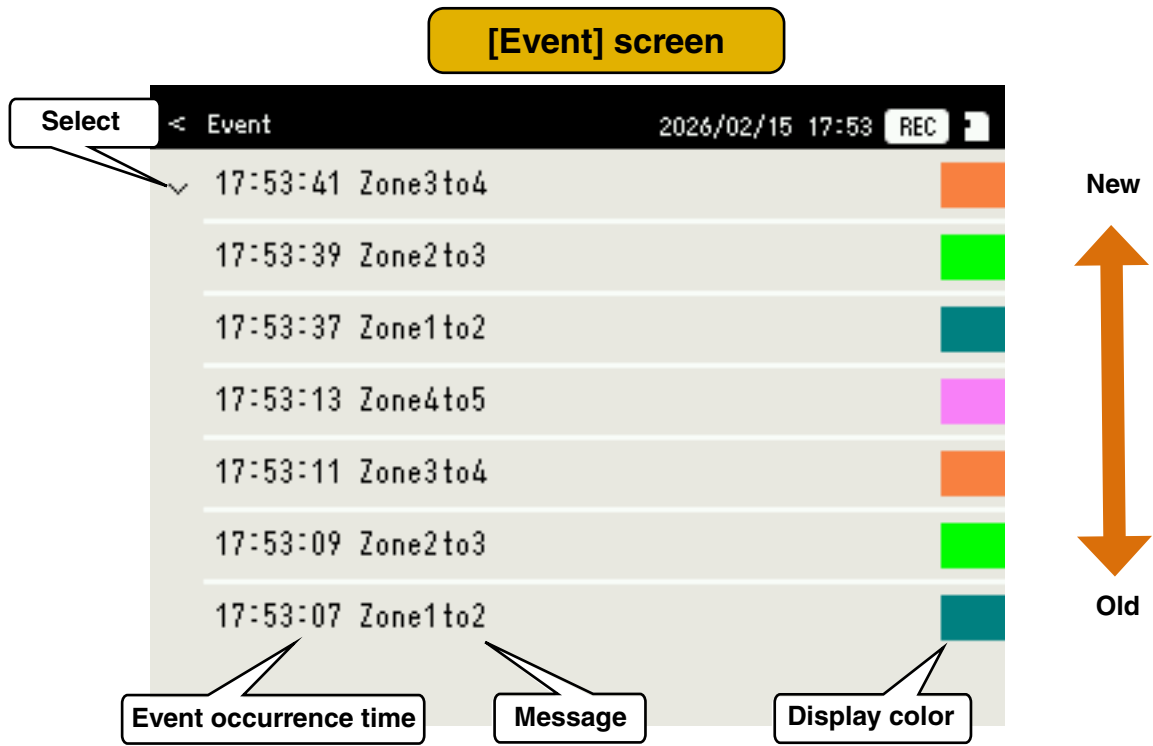
The content of digital view can be changed in the selecting digital view dialog.



Displayed item	Description	Reference
Name	The name set in I/O setting is displayed. (If the name is long, the display may be abbreviated.)	AI: 3.4.1.4 Basic setting (AI) DI: 3.4.2.4 Basic setting (DI) OI: 3.4.3.1 Basic setting (OI) DO: 3.4.4.4 Basic setting (DO)
Current value	Analog Input (AI): The measurement value or % value is displayed. Discrete Input (DI): The current status is displayed by ON or OFF. Operational input (OI): The operation result is displayed. Discrete Output (DO): The current status is displayed by ON or OFF.	
Engineering unit	The engineering unit set in I/O setting is displayed. (If it is long, the display may be abbreviated.)	AI: 3.4.1.4 Basic setting (AI) OI: 3.4.3.1 Basic setting (OI)
Upper/lower limit of PEN setting	The upper/lower limit for plotting the trend graph is displayed in measurement value.	3.5.2 Pen setting
Upper/lower limit (%)	The upper/lower limit for plotting the trend graph is displayed in % value.	

4.2.4 Event screen

The latest 32 events registered in the trend graph are displayed.
The latest events appear on the top.
The oldest data is deleted when the number of registered events exceeds 32.
When a memory block switches to new one, the data in the new memory block is displayed. → 6. Recorded data



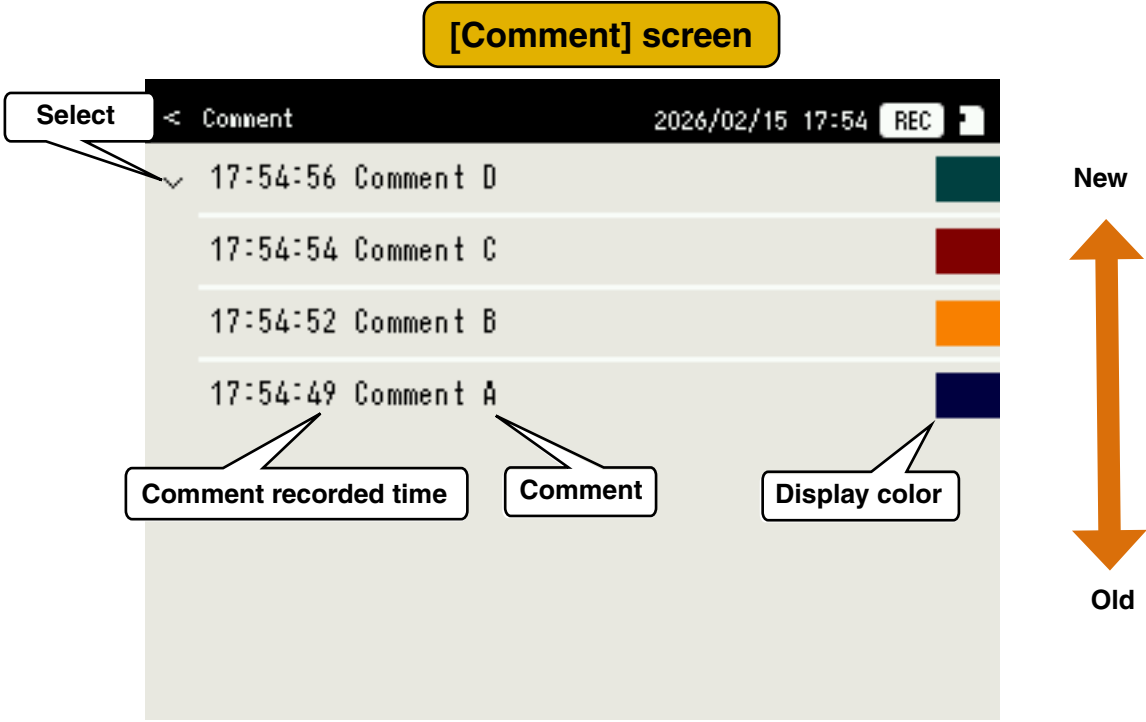
1. Refer to the table below for displayed items.

Item	Description	Reference
Event occurrence time	The time when the events occurred is displayed.	
Message	Analog Input (AI): The message set in the event setting is displayed. Discrete Input (DI): The message set in ON and OFF is displayed. Operational input (OI): The message set in the event setting is displayed. Discrete Output (DO): The message set in ON and OFF is displayed. (If the character string is long, the display may be abbreviated.)	AI: 3.4.1.6 Event setting (AI) DI: 3.4.2.4 Basic setting (DI) OI: 3.4.3.3 Event setting (OI) DO: 3.4.4.4 Basic setting (DO)
Display color	Analog Input (AI): The color set in zone setting 1 to 5 is displayed. Discrete Input (DI): The color set in ON and OFF is displayed. Operational input (OI): The color set in zone setting 1 to 5 is displayed. Discrete Output (DO): The color set in ON and OFF is displayed.	AI: 3.4.1.5 Zone setting (AI) DI: 3.4.2.4 Basic setting (DI) OI: 3.4.3.2 Zone setting (OI) DO: 3.4.4.4 Basic setting (DO)

2. Select an event by using the buttons. Refer to 4.2.2.2 Screen operation for the button operation.

4.2.5 Comment screen

The latest 32 comments registered in the trend graph are displayed.
The latest comments appear on the top.
The oldest data is deleted when the number of registered comments exceeds 32.
When a memory block switches to new one, the data in the new memory block is displayed. → 6. Recorded data



1. Refer to the table below for displayed items.

Item	Description	Reference
Comment recorded time	The time when the comments were recorded is displayed.	
Comment	The comment set in the trend setting is displayed. (If the comment is long, the display may be abbreviated.)	3.5.3 Comment setting
Display color	The color set in the trend setting is displayed.	

2. Select a comment by using the buttons. Refer to 4.2.2.2 Screen operation for the button operation.
3. Refer to 4.3.2 Selecting trend screen for how to record a comment.

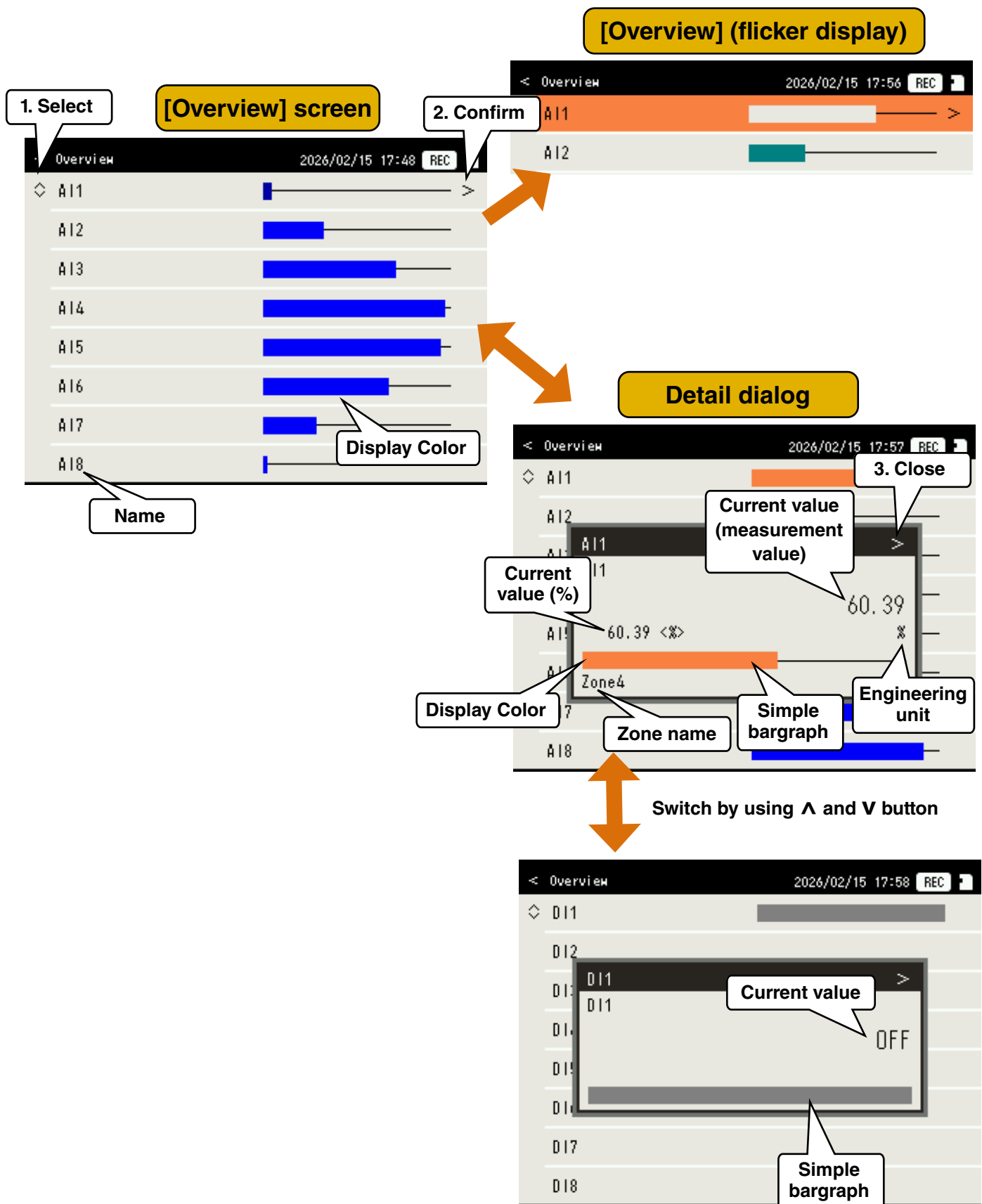
4.2.6 Overview screen

Follow the procedure below in order to display the latest I/O values.

1. 8 channels are displayed per page in the order of AI1 to AI16, DI1 to DI8, OI1 to OI16, and DO1 to DO8.
Press Δ or ∇ button to switch the page.
2. Press $\triangleright$ button to display the detail of selected data on a dialog.
3. When [Flicker] is enabled and the zone is specified as abnormal, the display will be in flicker mode with the zone color. → 3.7.3 Other settings
4. Refer to the table below for displayed items.

Item	Description	Reference
Name	The name set in I/O setting is displayed. (If the name is long, the display may be abbreviated.)	AI: 3.4.1.4 Basic setting (AI) DI: 3.4.2.4 Basic setting (DI) OI: 3.4.3.1 Basic setting (OI) DO: 3.4.4.4 Basic setting (DO)
Simple bargraph	The latest I/O values are displayed in a simple bargraph.	
Color	The color of simple bargraph is as follows. Analog Input (AI): The color set in zone setting 1 to 5 is displayed. Discrete Input (DI): The color set in ON and OFF is displayed. Operational input (OI): The color set in zone setting 1 to 5 is displayed. Discrete Output (DO): The color set in ON and OFF is displayed. Regarding AI and OI, the blue color is displayed when the zone is set to be unused in zone setting.	AI: 3.4.1.5 Zone setting (AI) DI: 3.4.2.4 Basic setting (DI) OI: 3.4.3.2 Zone setting (OI) DO: 3.4.4.4 Basic setting (DO)
Current value	Analog Input (AI): The measurement value or % value is displayed. When the data type is Int or Uint, only the measurement value is displayed. Discrete Input (DI): The current status is displayed by ON or OFF. Operational input (OI): The operation result is displayed. Discrete Output (DO): The current status is displayed by ON or OFF.	AI: 3.4.1.4 Basic setting (AI) DI: 3.4.2.4 Basic setting (DI) OI: 3.4.3.1 Basic setting (OI) DO: 3.4.4.4 Basic setting (DO)
Engineering unit	The engineering unit set in I/O setting is displayed. (If it is long, the display may be abbreviated.)	AI: 3.4.1.4 Basic setting (AI) OI: 3.4.3.1 Basic setting (OI)
Zone name	The zone name set in the zone setting 1 to 5 is displayed when AI or OI zone setting is enabled.	AI: 3.4.1.5 Zone setting (AI) OI: 3.4.3.2 Zone setting (OI)

5. Press Δ or ∇ button on the detail dialog to switch the displayed channel.
Refer to 4.2.2.2 Screen operation for the button operation.



4.2.7 Digital view screen

Follow the procedure below in order to display the latest I/O values.

1. 2 channels are displayed per page in the order of AI1 to AI16, DI1 to DI8, OI1 to OI16, and DO1 to DO8.

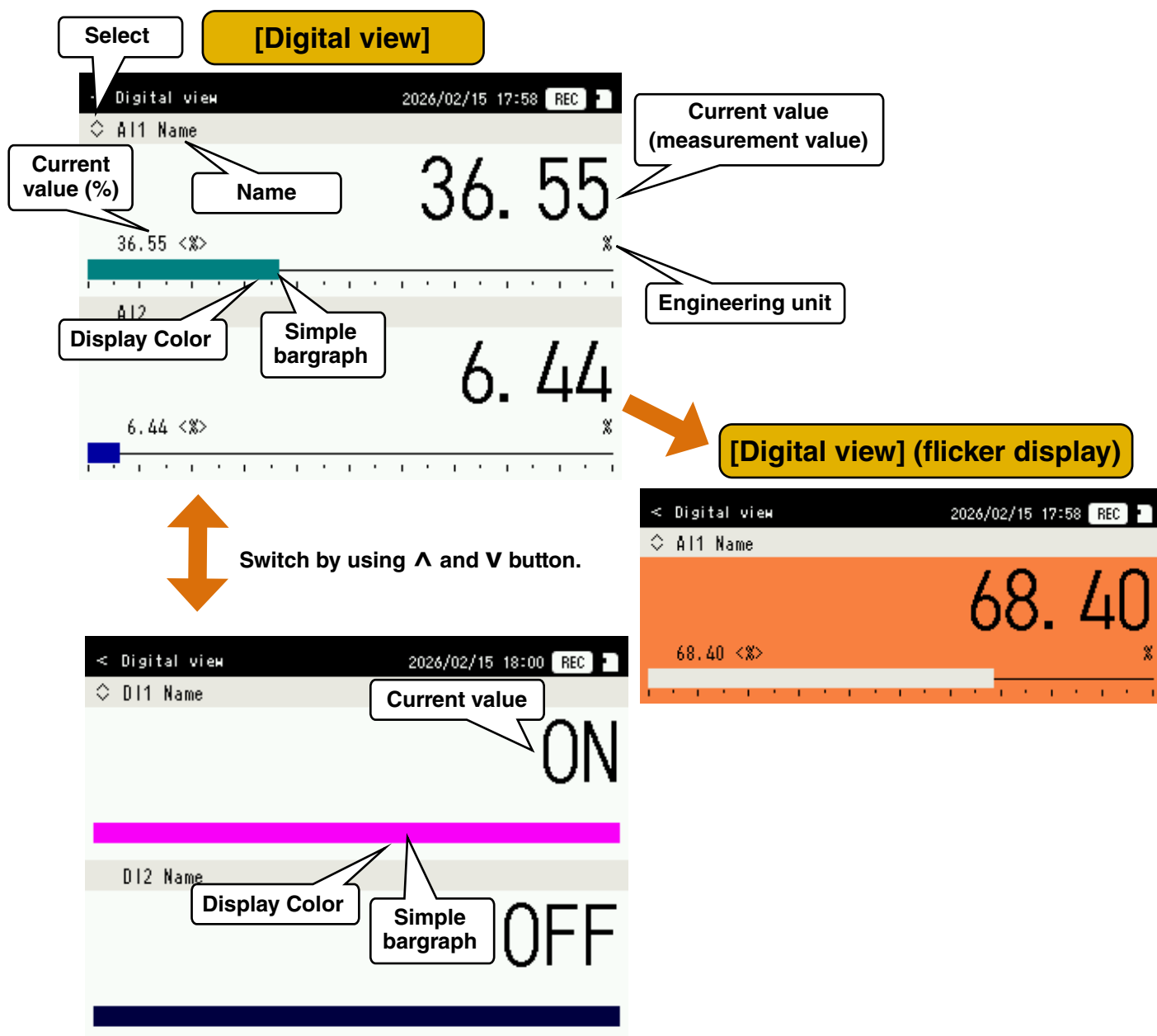
Press $\wedge$ or $\vee$ button to switch the page.

2. When [Flicker] is enabled and the zone is specified as abnormal, the display will be in flicker mode with the zone color. → 3.7.3 Other settings

3. Refer to the table below for displayed items.

Displayed item	Description	Reference
Name	The name set in I/O setting is displayed. (If the name is long, the display may be abbreviated.)	AI: 3.4.1.4 Basic setting (AI) DI: 3.4.2.4 Basic setting (DI) OI: 3.4.3.1 Basic setting (OI) DO: 3.4.4.4 Basic setting (DO)
Simple bargraph	The latest I/O values in a simple bargraph are displayed.	
Color	The color of simple bargraph is as follows. Analog Input (AI): The color set in zone setting 1 to 5 is displayed. Discrete Input (DI): The color set in ON and OFF is displayed. Operational input (OI): The color set in zone setting 1 to 5 is displayed. Discrete Output (DO): The color set in ON and OFF is displayed. (Regarding AI and OI, the blue color is displayed when the zone is set to be unused in zone setting.)	AI: 3.4.1.5 Zone setting (AI) DI: 3.4.2.4 Basic setting (DI) OI: 3.4.3.2 Zone setting (OI) DO: 3.4.4.4 Basic setting (DO)
Current value	Analog Input (AI): The measurement value or % value is displayed. When the data type is Int or Uint, only the measurement value is displayed. Discrete Input (DI): The current status is displayed by ON or OFF. Operational input (OI): The operation result is displayed. Discrete Output (DO): The current status is displayed by ON or OFF.	AI: 3.4.1.4 Basic setting (AI) DI: 3.4.2.4 Basic setting (DI) OI: 3.4.3.1 Basic setting (OI) DO: 3.4.4.4 Basic setting (DO)
Engineering unit	The engineering unit set in I/O setting is displayed. (If it is long, the display may be abbreviated.)	AI: 3.4.1.4 Basic setting (AI) OI: 3.4.3.1 Basic setting (OI)

4. Refer to 4.2.2.2 Screen operation for the button operation.



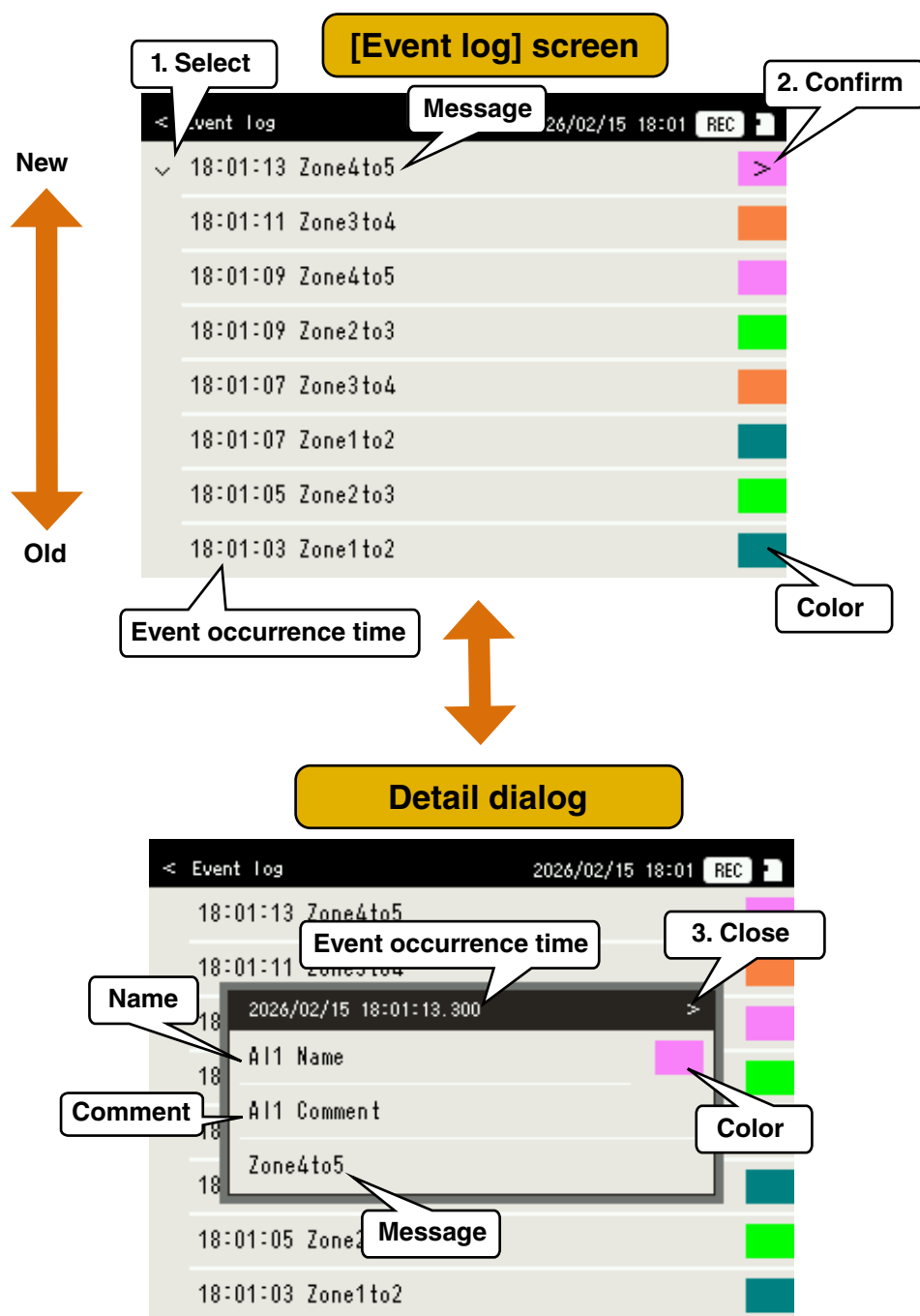
4.2.8 Event log screen

Regardless of whether event log recording is enabled or disabled, the latest 32 event logs are displayed. The latest event logs appear on the top.

1. Press $\wedge$ or $\vee$ button to select an event log. Press $>$ button to display the detail of selected data on a dialog.
Press $>$ button to close the dialog.
2. Refer to the table below for displayed items.

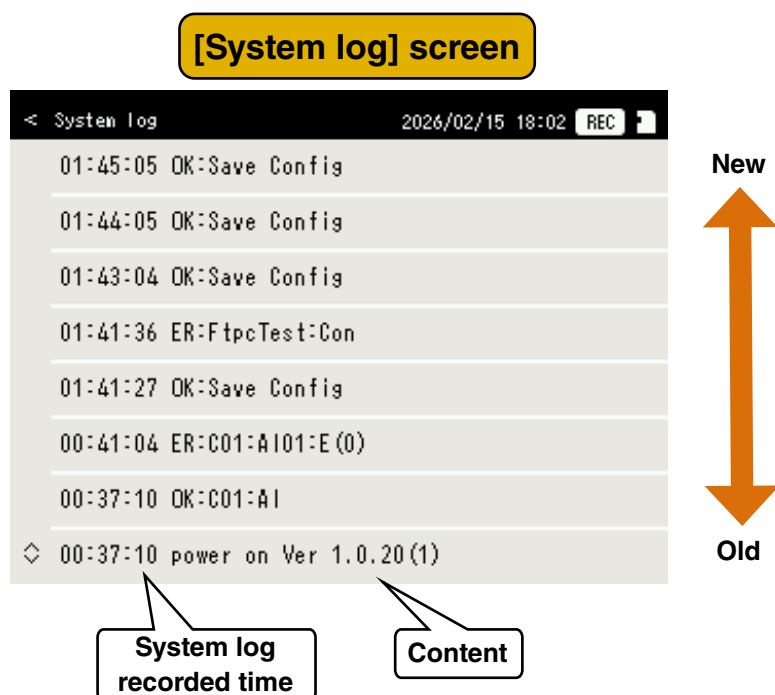
Displayed item	Description	Reference
Event occurrence time	The time when the events occurred is displayed.	
Message	Analog Input (AI): The message set in the event setting is displayed. Discrete Input (DI): The message set in ON and OFF is displayed. Operational input (OI): The message set in the event setting is displayed. Discrete Output (DO): The message set in ON and OFF is displayed. (If the message is long, the display may be abbreviated.)	AI: 3.4.1.6 Event setting (AI) DI: 3.4.2.4 Basic setting (DI) OI: 3.4.3.3 Event setting (OI) DO: 3.4.4.4 Basic setting (DO)
Color	Analog Input (AI): The color set in zone setting 1 to 5 is displayed. Discrete Input (DI): The color set in ON and OFF is displayed. Operational input (OI): The color set in zone setting 1 to 5 is displayed. Discrete Output (DO): The color set in ON and OFF is displayed.	AI: 3.4.1.5 Zone setting (AI) DI: 3.4.2.4 Basic setting (DI) OI: 3.4.3.2 Zone setting (OI) DO: 3.4.4.4 Basic setting (DO)
Name Comment	The name and the comment set in I/O setting is displayed. (If they are long, the display may be abbreviated.)	AI: 3.4.1.4 Basic setting (AI) DI: 3.4.2.4 Basic setting (DI) OI: 3.4.3.1 Basic setting (OI) DO: 3.4.4.4 Basic setting (DO)

3. Refer to 4.2.2.2 Screen operation for the button operation.



4.2.9 System log screen

Regardless of whether system log recording is enabled or disabled, the latest 32 system logs are displayed. The latest ones appear on the top. For the log details, refer to 5.1.3 System log. Refer to 4.2.2.2 Screen operation for the button operation.

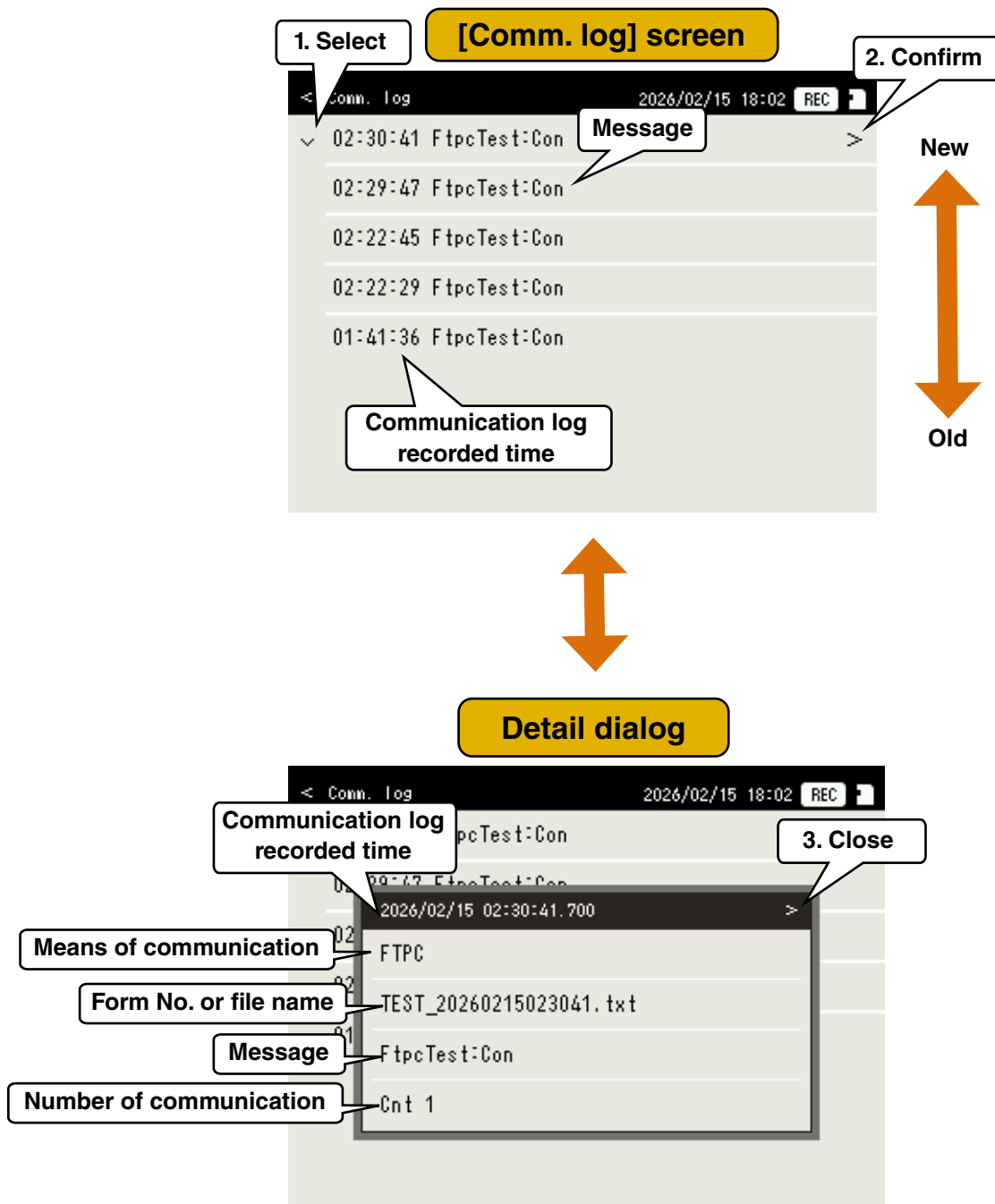


4.2.10 Communication log screen

Regardless of whether communication log recording is enabled or disabled, the latest 32 logs about SNTP, e-mail reporting, success/failure of FTP client are displayed.

The latest ones appear on the top. For the log details, refer to 5.1.4 Communication log.

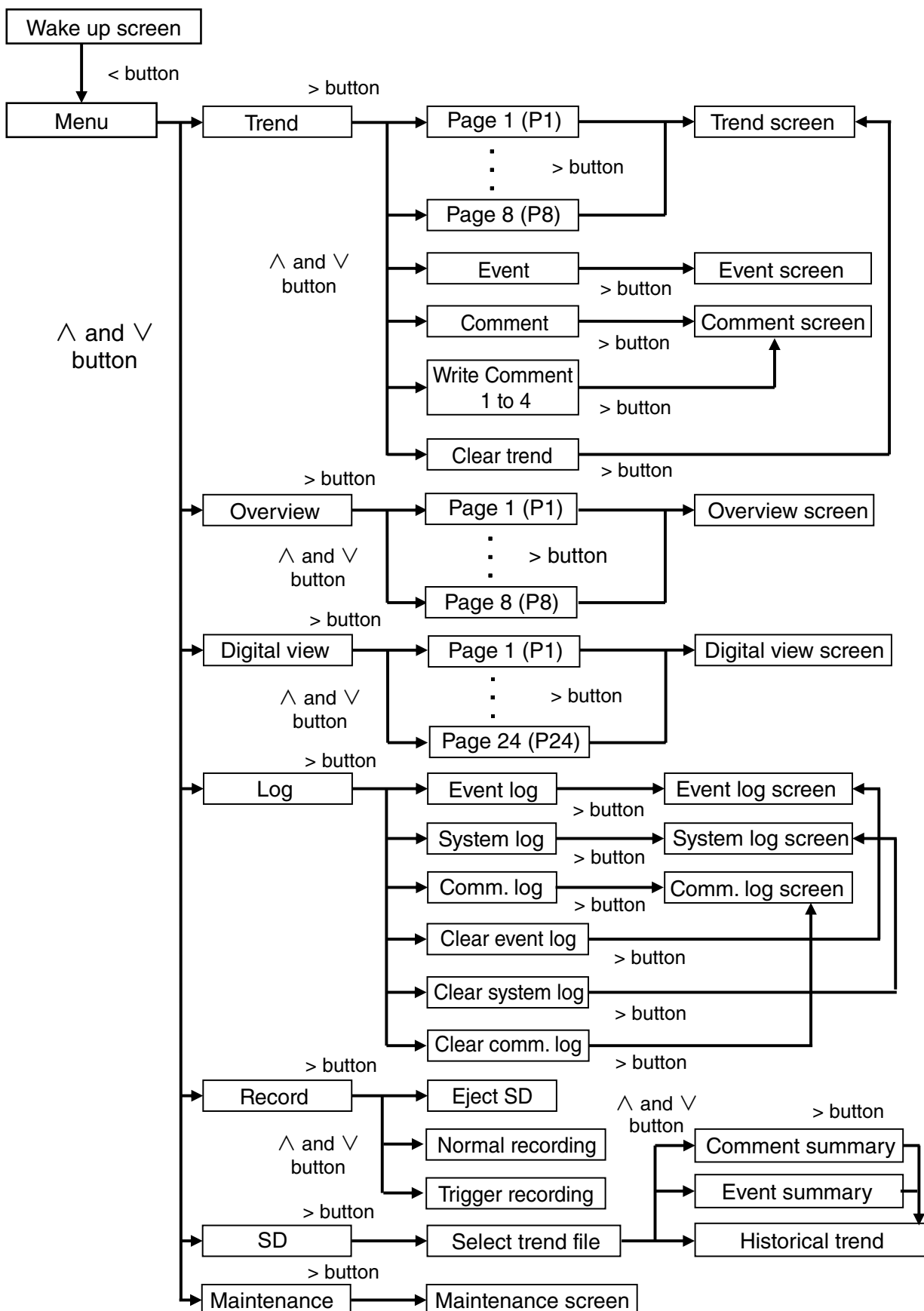
1. Press $\wedge$ or $\vee$ button to select a communication log. Press $\rightarrow$ button to display the detail of selected data on a dialog. Press $\rightarrow$ button to close the dialog.
2. Refer to 4.2.2.2 Screen operation for the button operation.



4.3 Configuration of the menu screen

Press < button to shift from the wake up screen to the menu screen.

Refer to the following diagram for the menu configuration and structure.

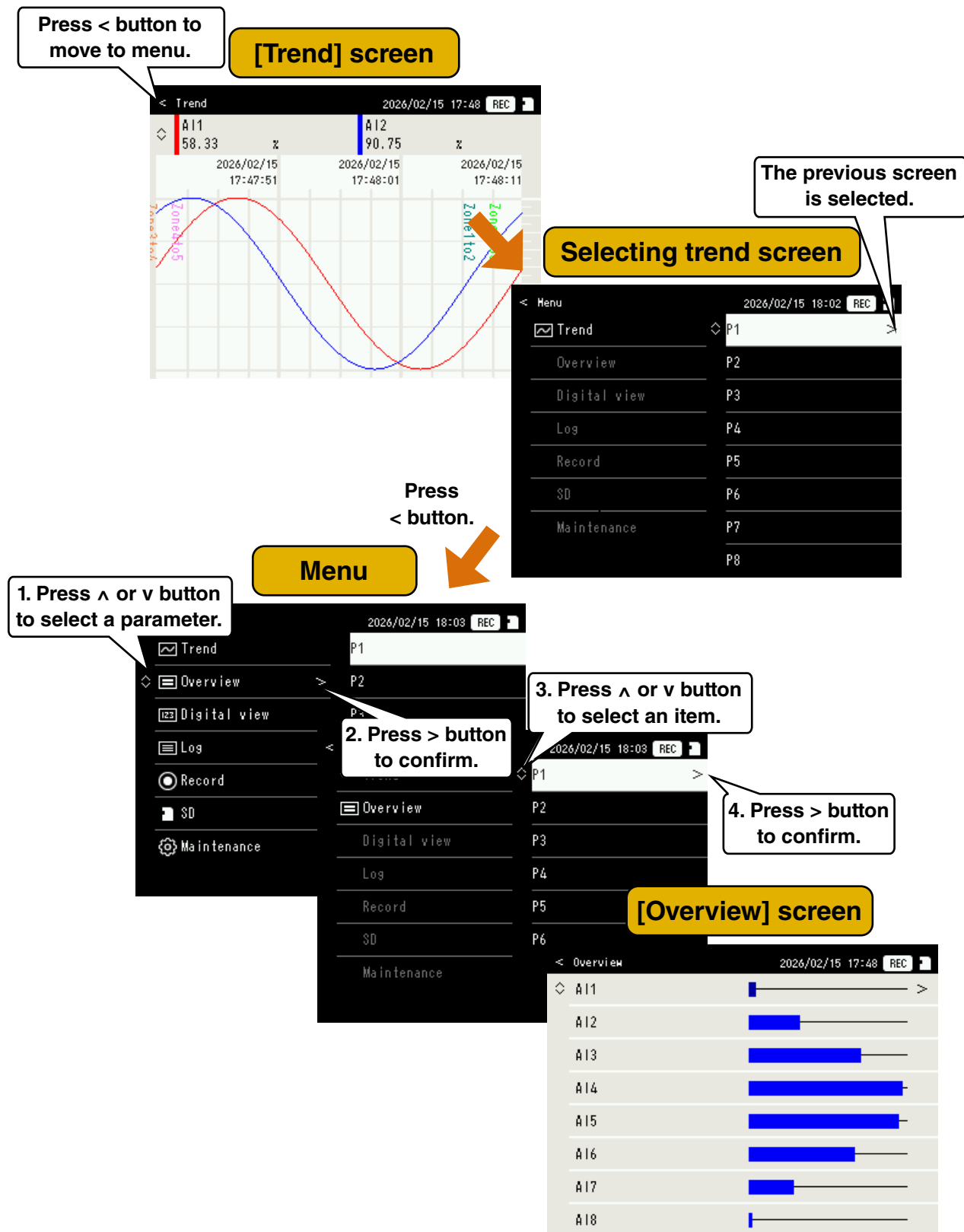


4.3.1 Common area for each screen

The common area for each screen is as follows.

Press the buttons under the LCD display to operate the screen.

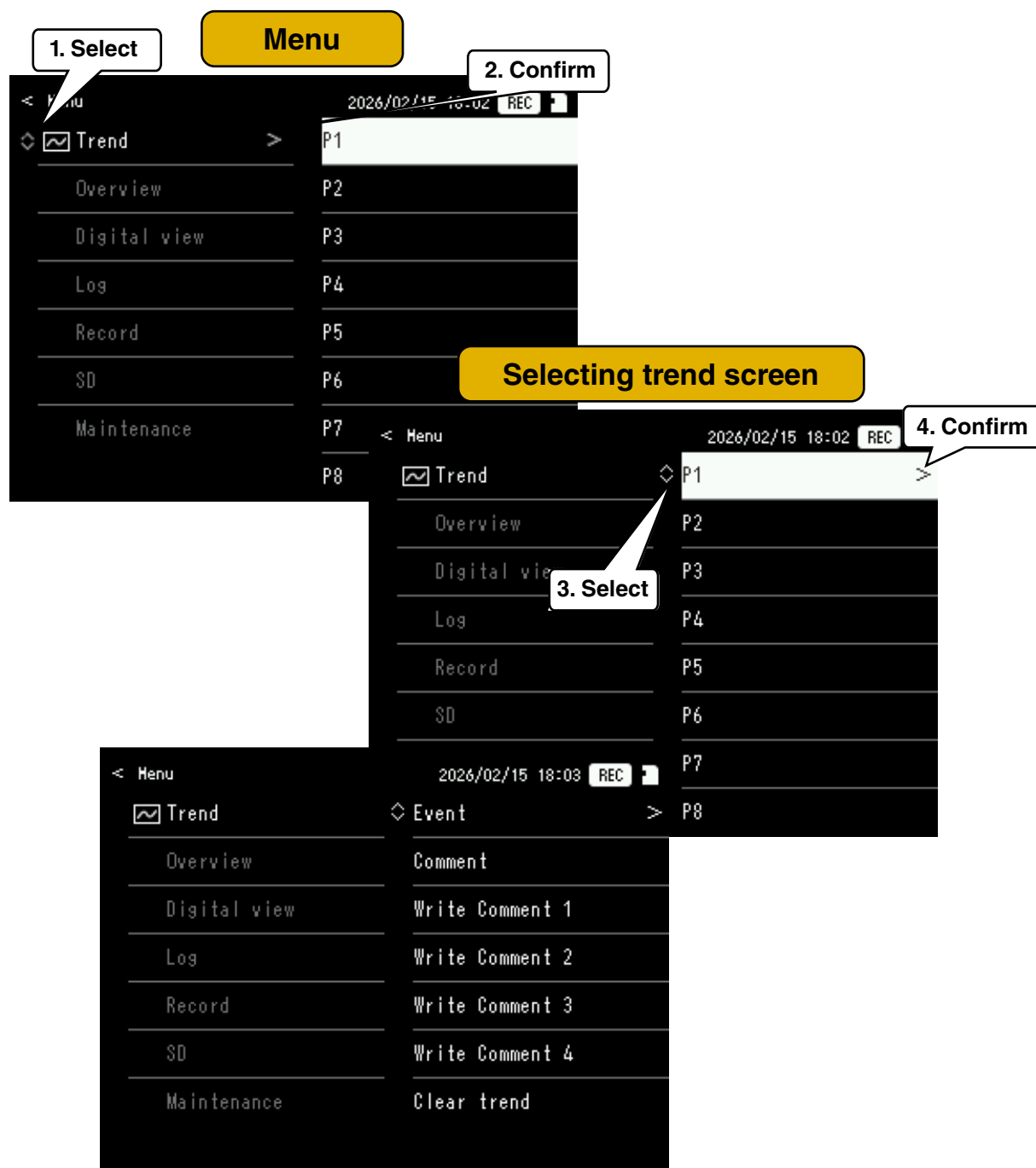
Refer to the following screen example and the table.



Action	Icon	Description
Select		The parameter with the icon  is selected. Press ^ button to select the upper row. Press v button to select the lower row.
Confirm		Press > button to confirm the parameter with the icon  .
Cancel	-	Press < button to cancel the current selection and return to the previous screen.

4.3.2 Selecting trend screen

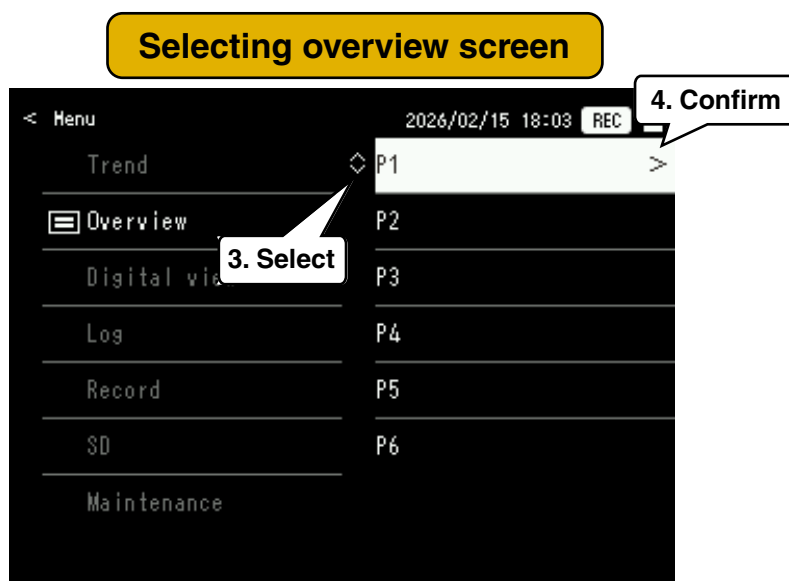
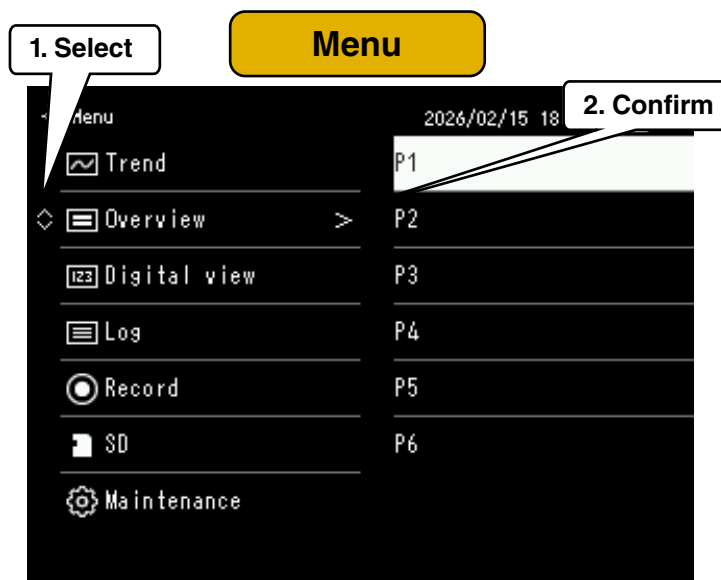
Select the trend screen. The selected trend screen is displayed.
It is also possible to write comments.



1. Select [Trend] on the menu screen.
2. Select the trend screen to be displayed on the selecting trend screen to transit to the selected screen.
→ 4.2.3 Trend screen, 4.2.4 Event screen, 4.2.5 Comment screen
3. When writing comments, select [Write Comment 1] to [Write Comment 4].
The comments are written to the trend at the timing of confirming with the > button.
→ 3.5.3 Comment setting
4. Select [Clear trend] to clear the trend data displayed on the trend screen.

4.3.3 Selecting overview screen

Select the overview screen. The selected overview screen is displayed.

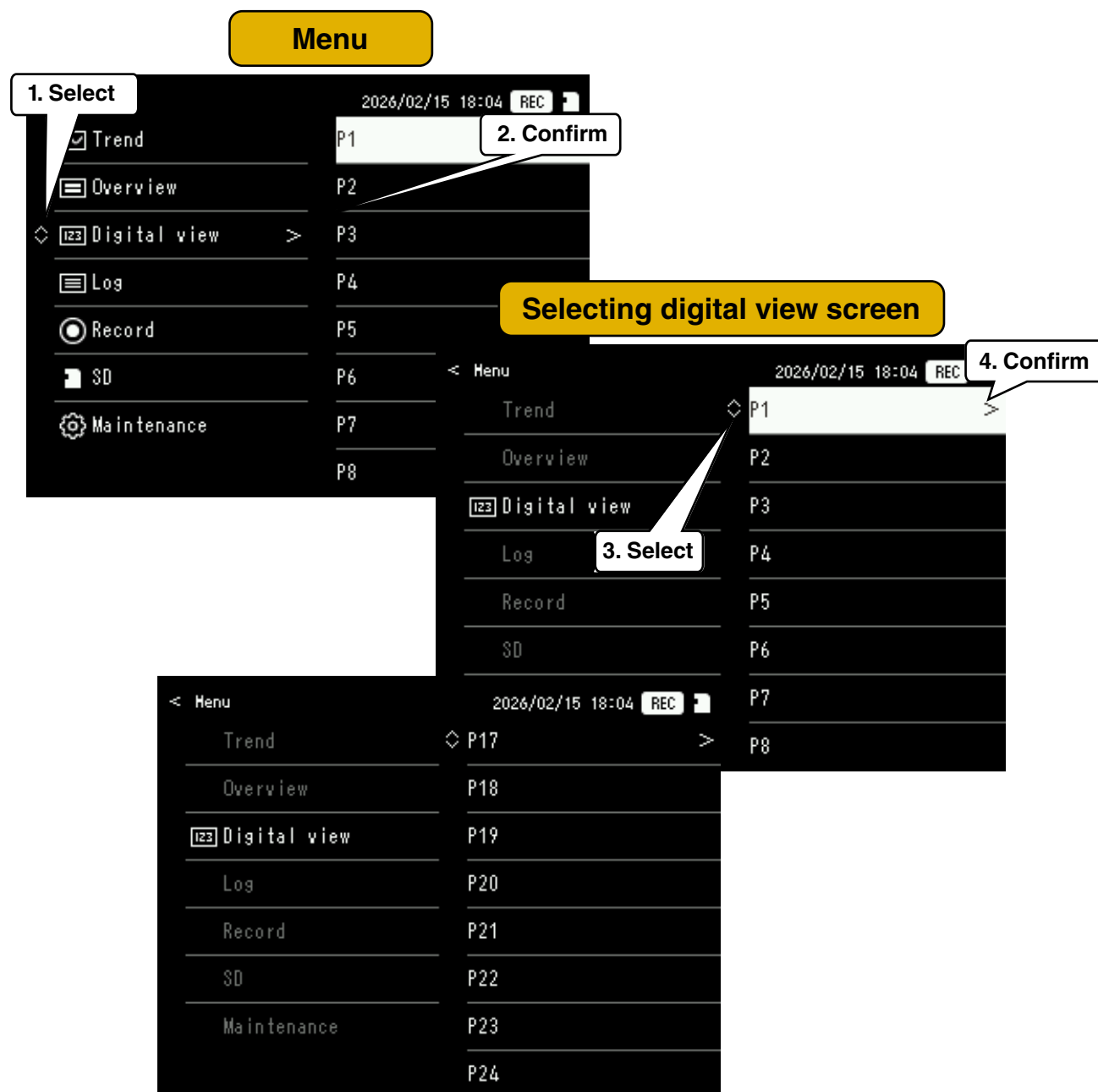


1. Select [Overview] on the menu screen.
2. Select the overview screen to be displayed to transit to the selected screen.
→ 4.2.6 Overview screen

4.3.4 Selecting digital view screen

Select the digital view screen.

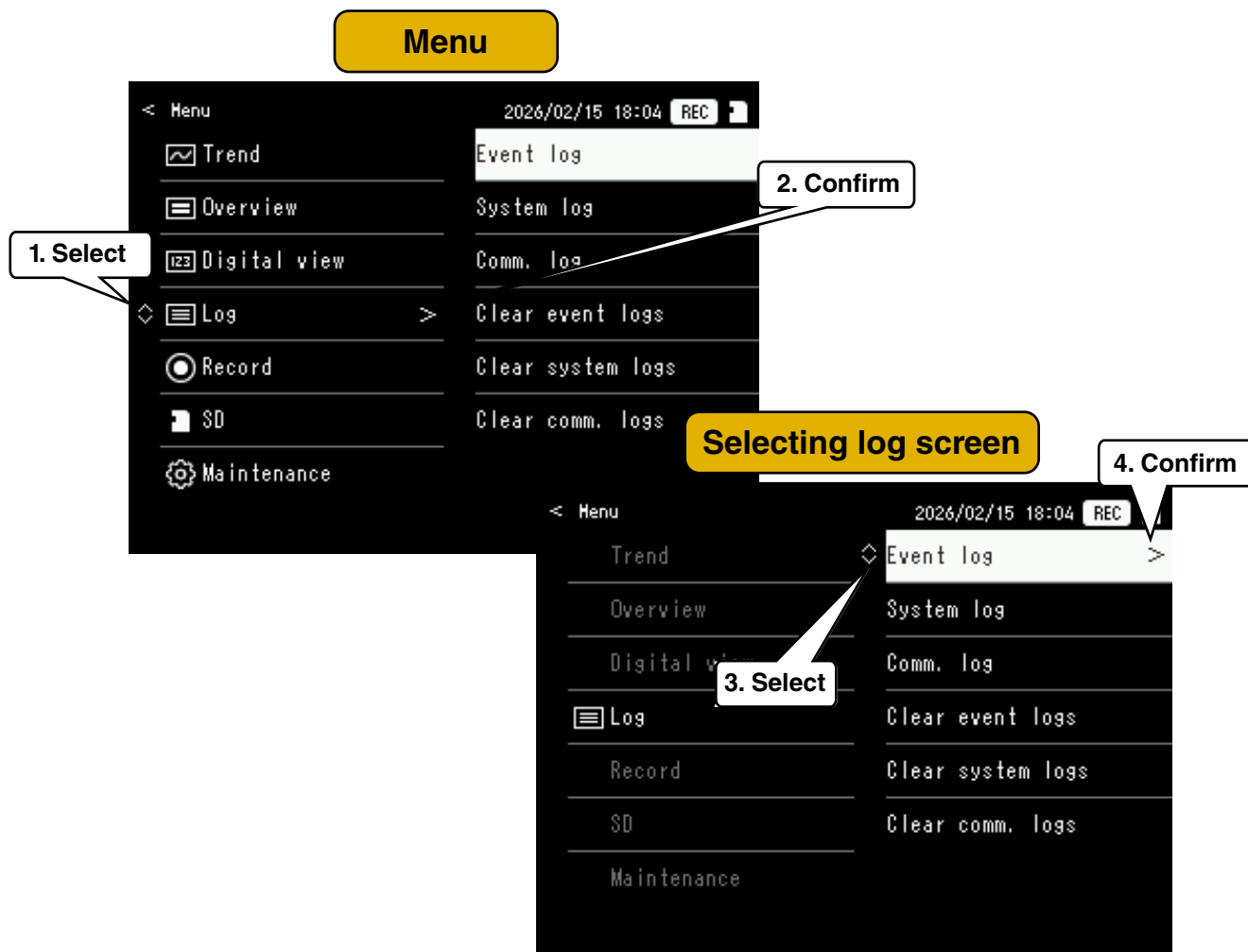
The latest I/O value of the selected channel is displayed in digital view.



1. Select [Digital view] on the menu screen.
2. Select the digital view to be displayed to transit to the selected screen.
→ 4.2.7 Digital view screen

4.3.5 Selecting log screen

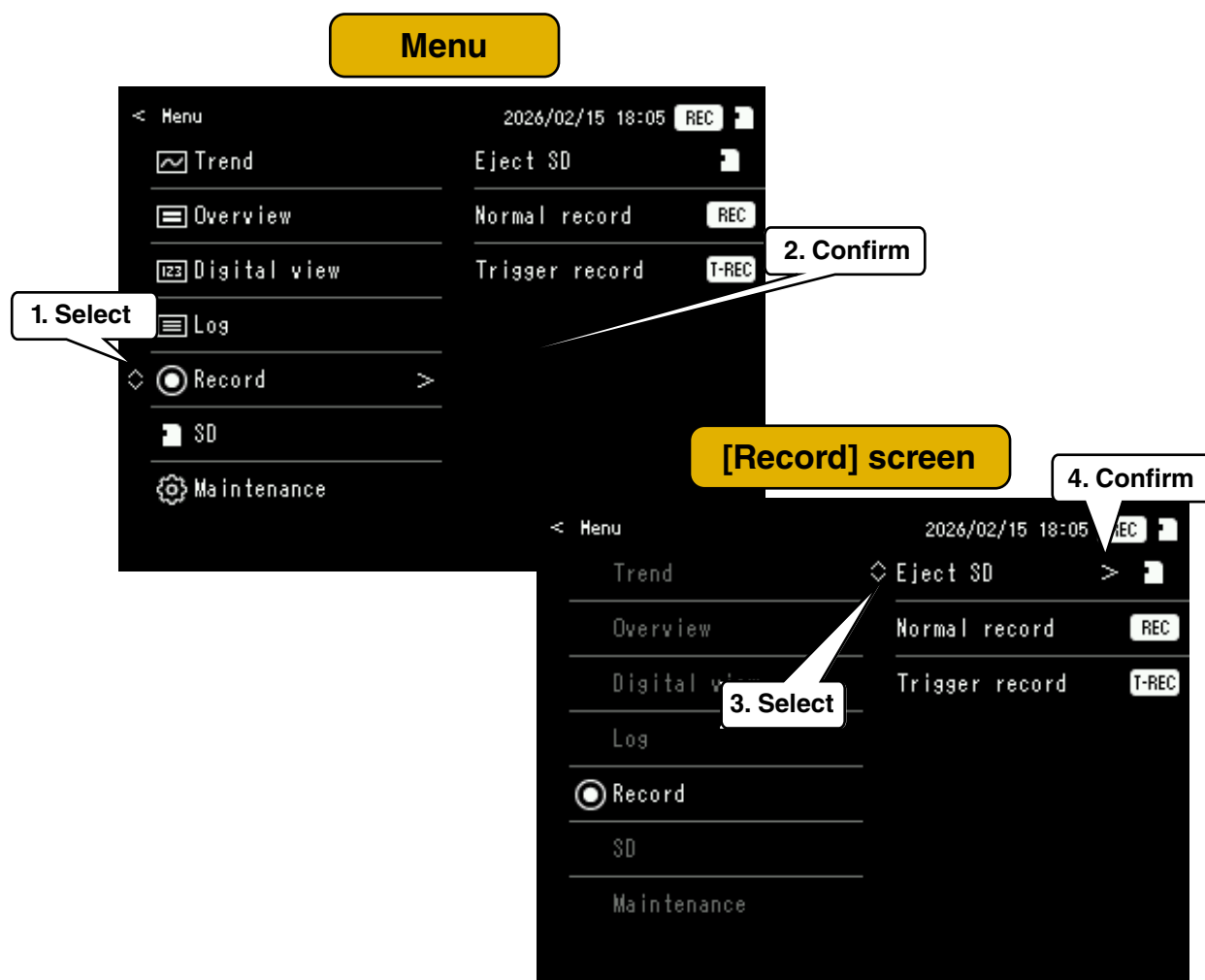
Select the log screen. The list of the selected log is displayed.



1. Select [Log] on the menu screen.
2. Select the log to be displayed on the selecting log screen to transit to the list of the selected log.
→ 4.2.8 Event log screen, 4.2.9 System log screen, 4.2.10 Communication log screen
3. When [Clear logs] is selected, the displayed data on the log screen is cleared.
After clearing, the selected log screen is displayed.

4.3.6 Record screen

Configure the record setting.



1. Select [Record] on the menu screen.
2. Before inserting or removing an SD card from the VR96E-G8, select [Eject SD].
Insert or remove the SD card after changing to  icon which means to release mounting.
3. When [Normal record] is selected, normal recording of the trend starts. When recording starts,  icon turns on. The recorded content is based on the settings in the configurator software.
→ 3.5.1 Basic setting, 3.5.2 Pen setting
4. When [Trigger record] is selected, trigger recording of the trend starts. When recording starts,  icon turns on. The recorded content is based on the settings in the configurator software.
→ 3.5.1 Basic setting, 3.5.2 Pen setting

4.3.7 SD screen

The trend data (trend graph, event log and comment log) in the SD card is displayed.

4.3.7.1 Selecting a file

Follow the procedure below to select a trend data file (extension: TRD) in the specified directory of SD card.

1. Select [SD] on the menu screen.

Select a trend data file on the selecting SD file screen.

Trend files are saved in a hierarchy of year, month, and day. → 6.6 Folder structure

2. After selecting a trend file, the selecting display screen appears.

Trend graph, event or comment can be selected.

3. Select [Trend Graph P1] to [Trend Graph P8] to display the historical trend of the corresponding PEN.

→ 4.3.7.2 Historical trend

4. Select [Event] to display the event summary.

Select an event to display historical trend at the moment of recording the event.

5. Select [Comment] to display the comment summary.

Select a comment to display historical trend at the moment of recording the comment.

6. Press [<] to return to the selecting display screen.

The data selected in step 3 to 5 is displayed in blue.

7. Press [<] on the selecting display screen to return to the selecting SD file screen.

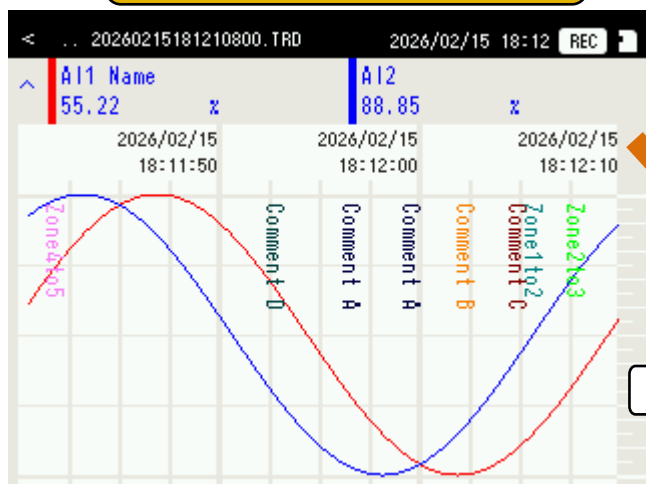
The trend data file selected in step 2 is displayed in blue.

4.3.7.2 Historical trend

The trend data saved in the trend data file is displayed.

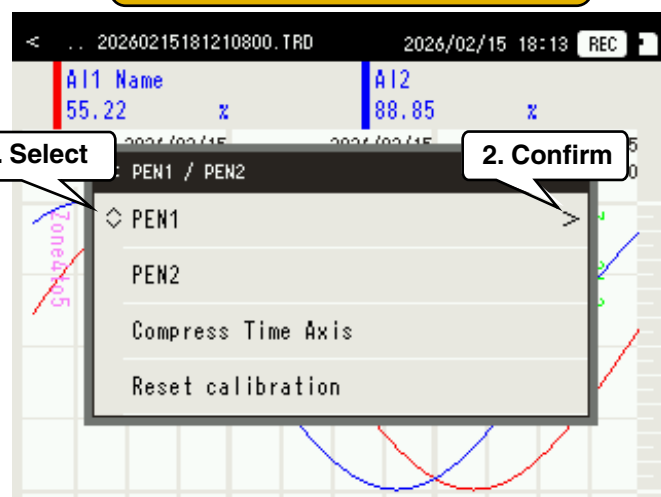
1. The newest data is displayed on the right side, and the older data is displayed on the left side.
2. Press Δ or ∇ button to move the displayed graph range.
Press Δ button to move the display range to the left side (older data).
Press ∇ button to move the display range to the right side (newer data).
3. Press $>$ button to display the adjustment dialog.
For PEN adjustment, refer to 4.2.3.2 Adjusting PEN and 4.2.3.3 Digital view.
4. Select [Compress Time Axis] in the adjustment dialog to change the time axis of the trend graph to $\times 1$, $\times 1/2$, $\times 1/5$, or $\times 1/10$.
5. Select [Reset calibration] in the adjustment dialog to initialize the values set in the adjustment dialog.

Historical trend screen

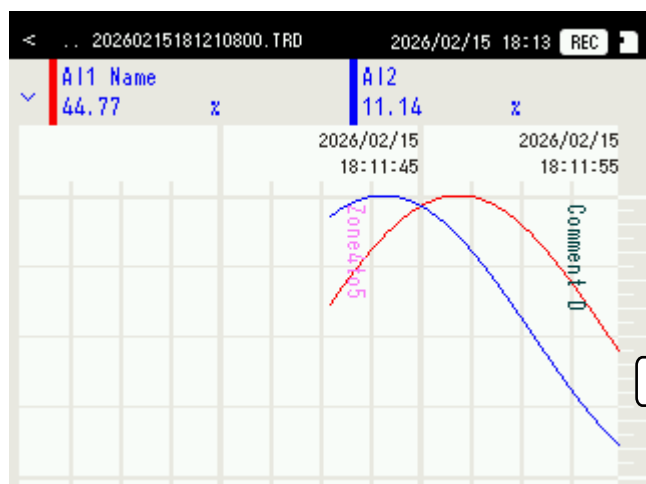


Press $>$ button.

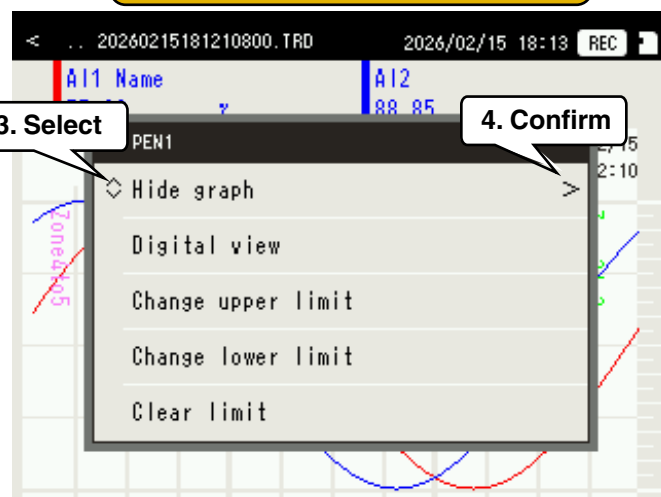
Adjustment dialog



Press Δ or ∇ button to move the displayed range.



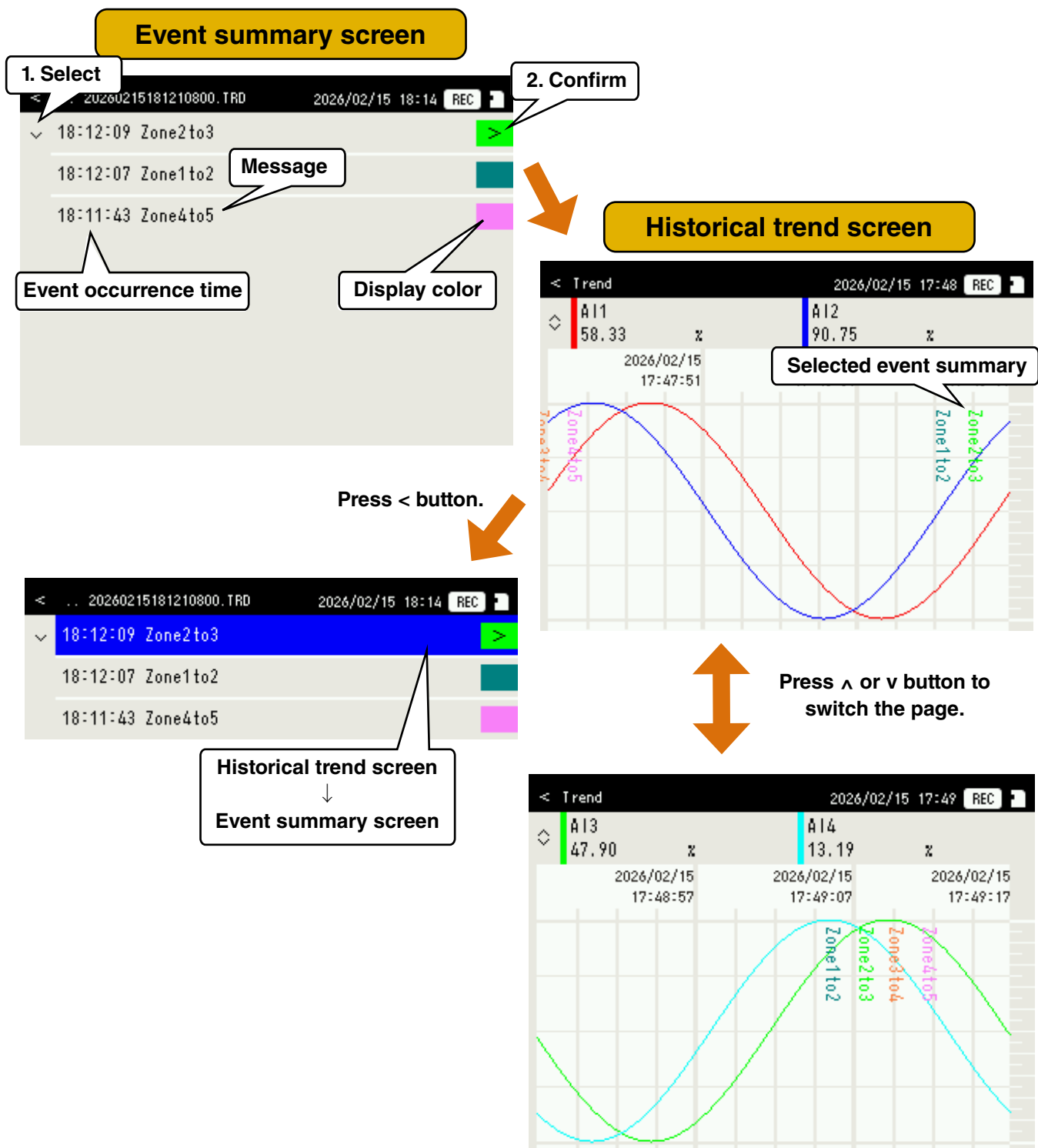
PEN (AI) adjustment dialog



4.3.7.3 Event summary

The event data saved in a trend data file is displayed.

1. Press $\wedge$ or $\vee$ button to select an event data.
2. Press $>$ button to display the historical trend with the selected event on the rightmost position of the graph.
Press $\wedge$ or $\vee$ button to switch the page.
3. Press $<$ button on the historical trend screen to return to the event summary screen.
The event summary selected in step 2 is displayed in blue.
4. For displayed items, refer to 4.2.4 Event screen.



4.3.7.4 Comment summary

The comment data saved in a trend data file is displayed.

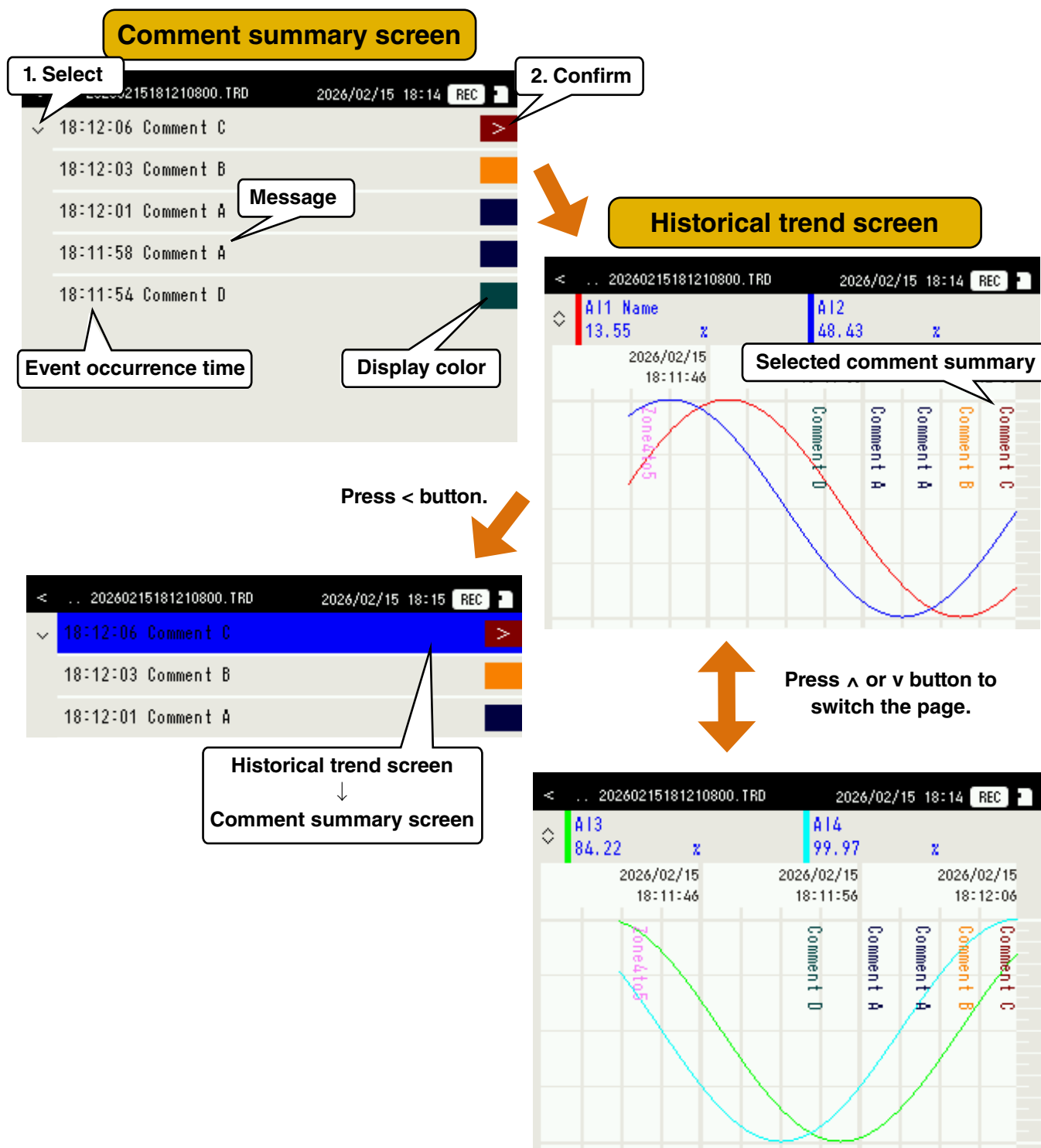
1. Press $\wedge$ or $\vee$ button to select an comment data.
2. Press $>$ button to display the historical trend with the selected comment on the rightmost position of the graph.

Press $\wedge$ or $\vee$ button to switch the page.

3. Press $<$ button on the historical trend screen to return to the comment summary screen.

The comment summary selected in step 2 is displayed in blue.

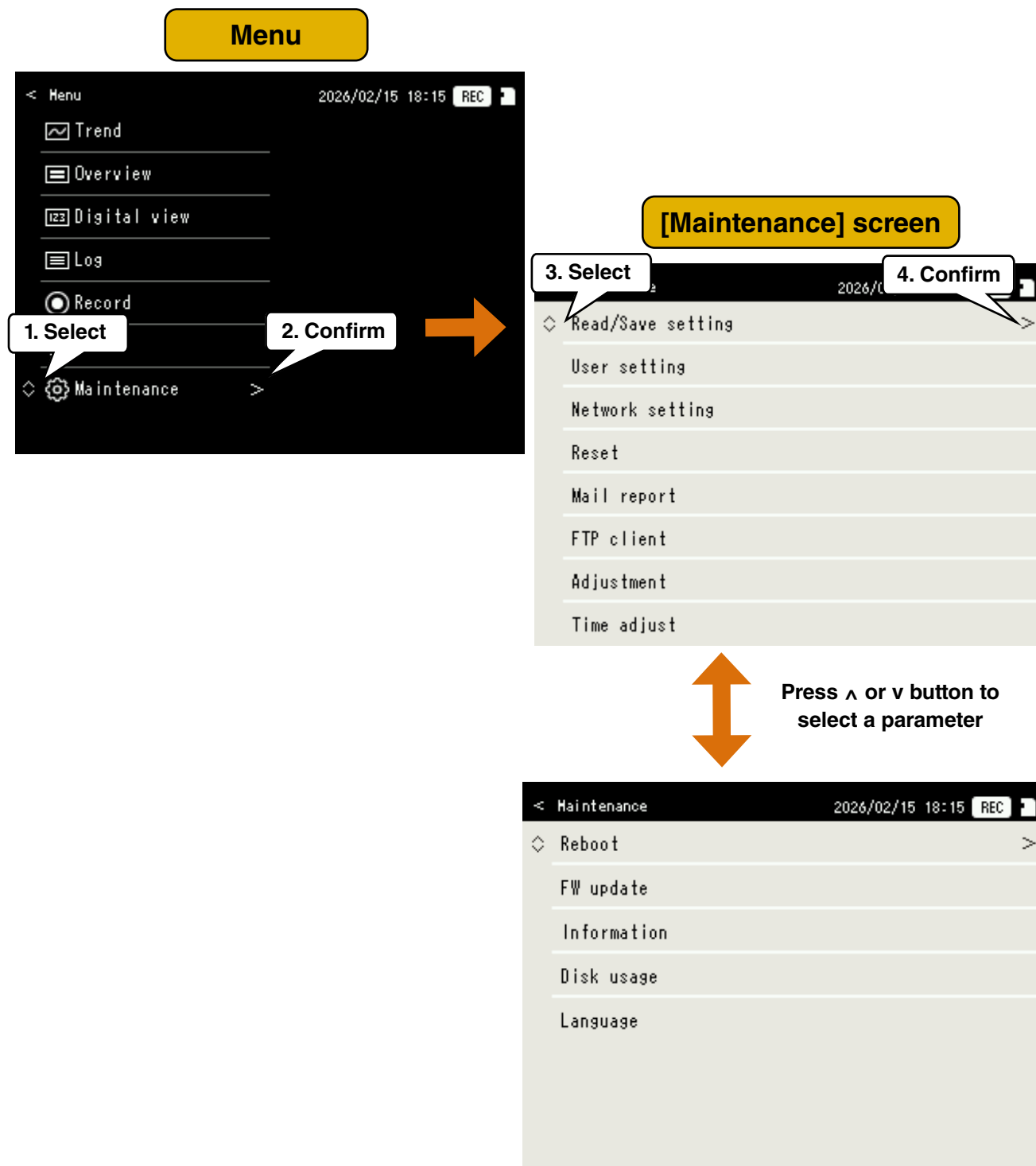
4. For displayed items, refer to 4.2.5 Comment screen.



4.3.8 Maintenance screen

This section describes how to operate on the maintenance screen.

1. Select [Maintenance] on the menu screen.
2. Select a parameter to be changed.
3. For details on the parameters, refer to the next pages.



4.3.8.1 Common

Some settings of the device can be changed on the maintenance screen.
Refer to the following pages for how to change.

Changing numerical values

If the setting value is numeric, follow the procedure below.

This page takes for example how to change the Z5 lower limit in the AI1 zone setting.

1. Select [AI1] in the zone setting and press > button to confirm.
2. Select [Z5 Lower limit] and press > button.
3. Press Δ , ∇ , and > buttons to change the settings.
 - Press > button to move the cursor to the right position.
 - Press Δ or ∇ button to change the value on the cursor.
 - If the setting is error, the background color will be yellow.
4. Press < button to complete the change.
 - Other parameters of the same channel can be changed by following the above steps.
5. Press < button to return to the zone setting screen.
 - Other channels can be changed by following the above steps.
6. Press < button on the zone setting screen to display the saving setting pop-up.
 - Select [OK] to save and apply the changes.
 - Select [Cancel] to clear the changes and exit the zone setting.

[Zone setting] screen

1. Select

Zone setting

2026/02/15 18:16 REC

2. Confirm

◇ A11 A11 Name
A12 A12
A13 A13
A14 A14
A15 A15
A16 A16
A17 A17
A18 A18

3. Select

< A11 2026/02/15 18:16 REC

◇ Z5 Lower limit	80.000
Z5 Delay time	0
Z5 Trigger	Disable
Z5 Condition	Abnormal
Z4 Upper limit	80.000
Z4 Lower limit	60.000
Z4 Delay time	0
Z4 Trigger	Disable

Press > button to confirm.

Press ^ or v button to switch + and -.

Z5 Lower limit +0000090.000

Press > button to move the cursor to the right position.

Z5 Lower limit +0000090.000

Press ^ or v button to change the value on the cursor.

Press < button to complete the change.

Setting error

Z5 Lower limit -0000080.000

5. Return

< A11 2026/02/15 18:16 REC

Z5 Lower limit	+0000090.000
Z5 Delay time	0

6. Return

< Zone setting 2026/02/15 18:16 REC

◇ A11 A11 Name >

Saving setting pop-up

< Zone setting 2026/02/15 18:17 REC

A11 A11 Name
A12 A12
A13 A13
A14 A14
A15 A15
A16 A16
A17 A17
A18 A18

< Save the settings?

◇ OK
Cancel

7. Select

8. Confirm

Changing a choice

If the setting value is selected from multiple options, follow the procedure below.

This page takes for example trend setting, Basic, and storing rate.

1. Select [Basic] in the trend setting and press > button to confirm.
2. Select [Storing rate] and press > button.
3. Press $\wedge$ and $\vee$ buttons to change the choice.
4. Press < button to complete the change.

Other parameters of the same common setting can be changed by following the above steps.

5. Press < button to return to the trend setting screen.

PEN can be changed by following the above steps.

6. Press < button on the trend setting screen to display the saving setting pop-up.

Select [OK] to save and apply the changes.

Select [Cancel] to clear the changes and exit the trend setting.

[Trend setting] screen

1. Select

Trend setting 2026/02/15 18:17 REC

◇ Basic >

PEN

2. Confirm

< Common setting 2026/02/15 18:17 REC

Auto start	Stop
◇ Storing rate	100msec
Auto delete	Enable
Encode	TRD

3. Select

Press > button to confirm.

Press ^ or v button to select a choice.

Storing rate 100msec

Storing rate 500msec

Storing rate 1hour

Cursor

5. Return

< Common setting 2026/02/15 18:18 REC

Auto start	Stop
Storing rate	1hour

Press < button to complete the change.

6. Return

< Trend setting 2026/02/15 18:17 REC

◇ Basic >

PEN

Saving setting pop-up

< Trend setting 2026/02/15 18:18 REC

Basic

PEN

< Save the settings?

◇ OK >

Cancel

7. Select

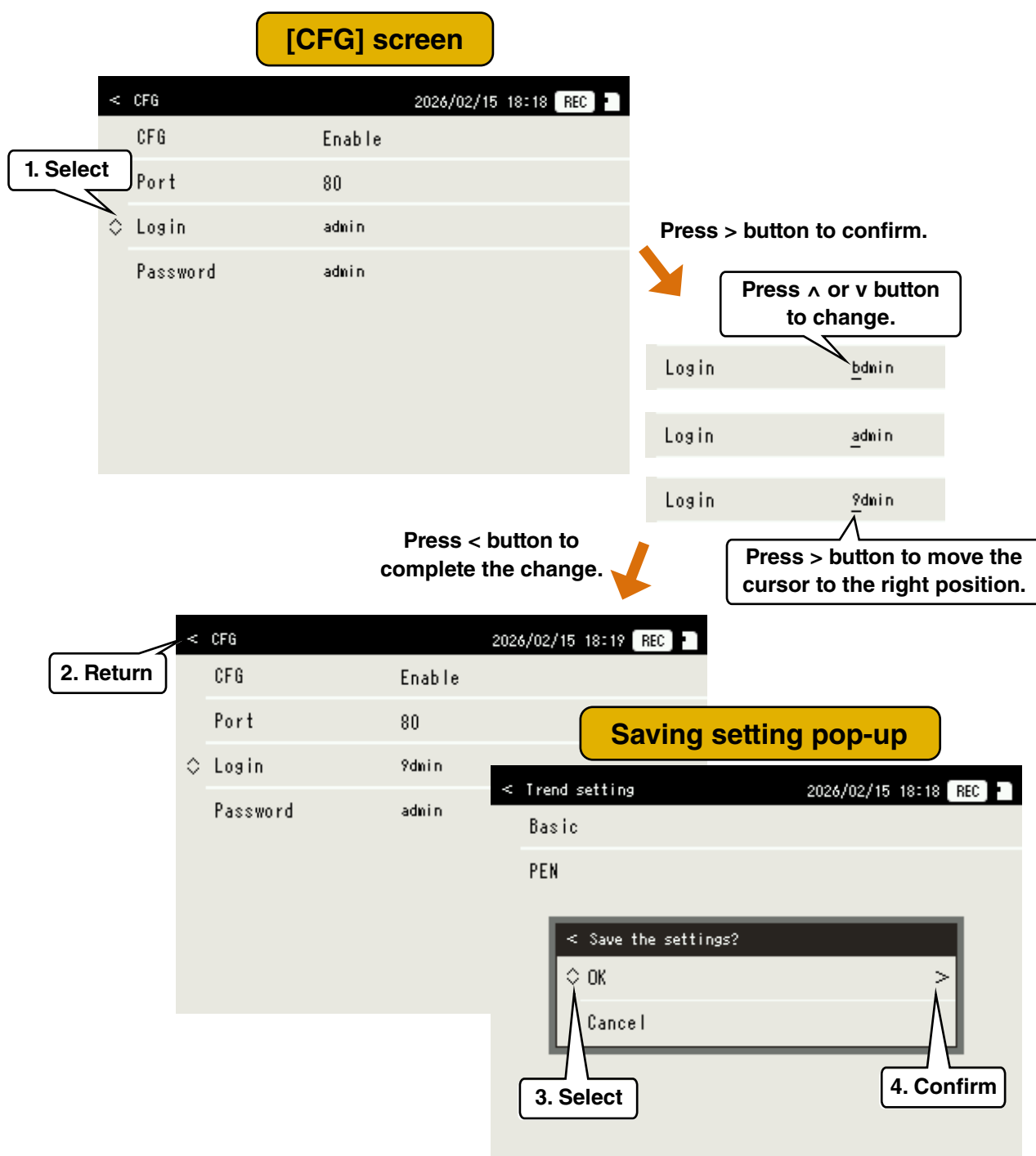
8. Confirm

Changing a character string

If the setting value is a character string, follow the procedure below.

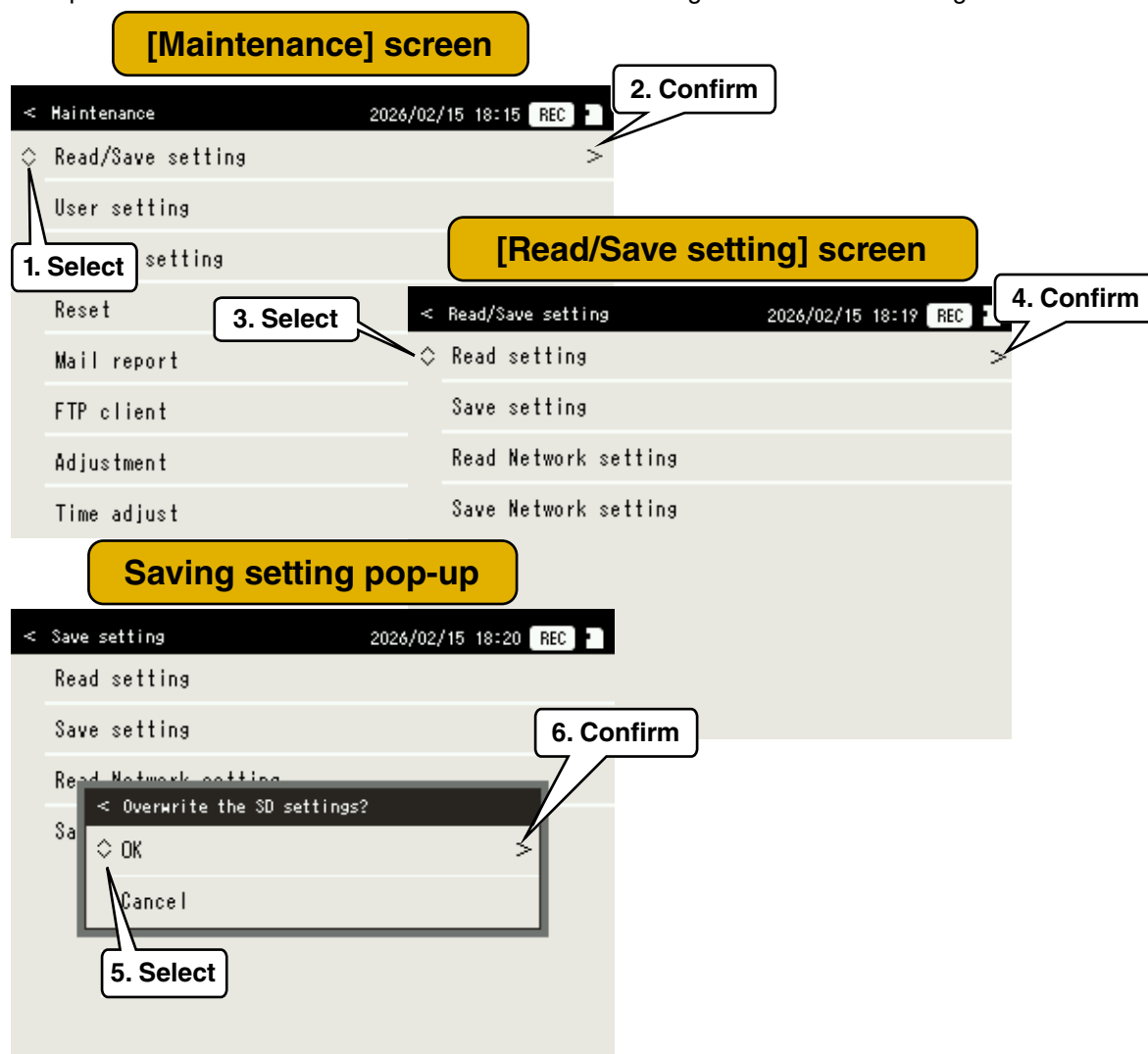
This page takes for example [Login] in [CFG].

1. Select [Login] in the CFG screen and press > button.
2. Press ^, V, and > buttons to change the settings.
Press > button to move the cursor to the right position.
Press ^ or V button to change the character on the cursor.
The character is displayed in the order of 0 to 9, a to z, A to Z, _, and blank.
3. Press < button to complete the change.
Other CFG parameters can be changed by following the above steps.
4. Press < button on the CFG screen to display the saving setting pop-up.
Select [OK] to save and apply the changes.
Select [Cancel] to clear the changes and exit the CFG screen.



4.3.8.2 Reading/saving setting

Follow the procedure below in order to read/save the device settings or the network setting stored in an SD card.



1. Select [Read/Save setting] on the maintenance screen.
2. Select the parameter to be read or saved and confirm.
3. For the file name and the saving destination, refer to the table below. → 6.6 Folder structure

Button	File name	Saving destination
Read setting	vr96cfg.json	The setting file in the base folder is exported to the device. The contents are reflected to the device.
Save setting	vr96cfg.json	The setting file is saved to the base folder.
Read Network setting	vr96net.json	The setting file in the base folder is exported to the device. The contents are reflected to the device.
Save Network setting	vr96net.json	The setting file is saved to the base folder.

"vr96cfg.json" is the same format as the settings saved to the file with the configurator software.

→ 2.3.6 Saving the setting to file

"vr96net.json" is the same content as the one set with the configurator software.

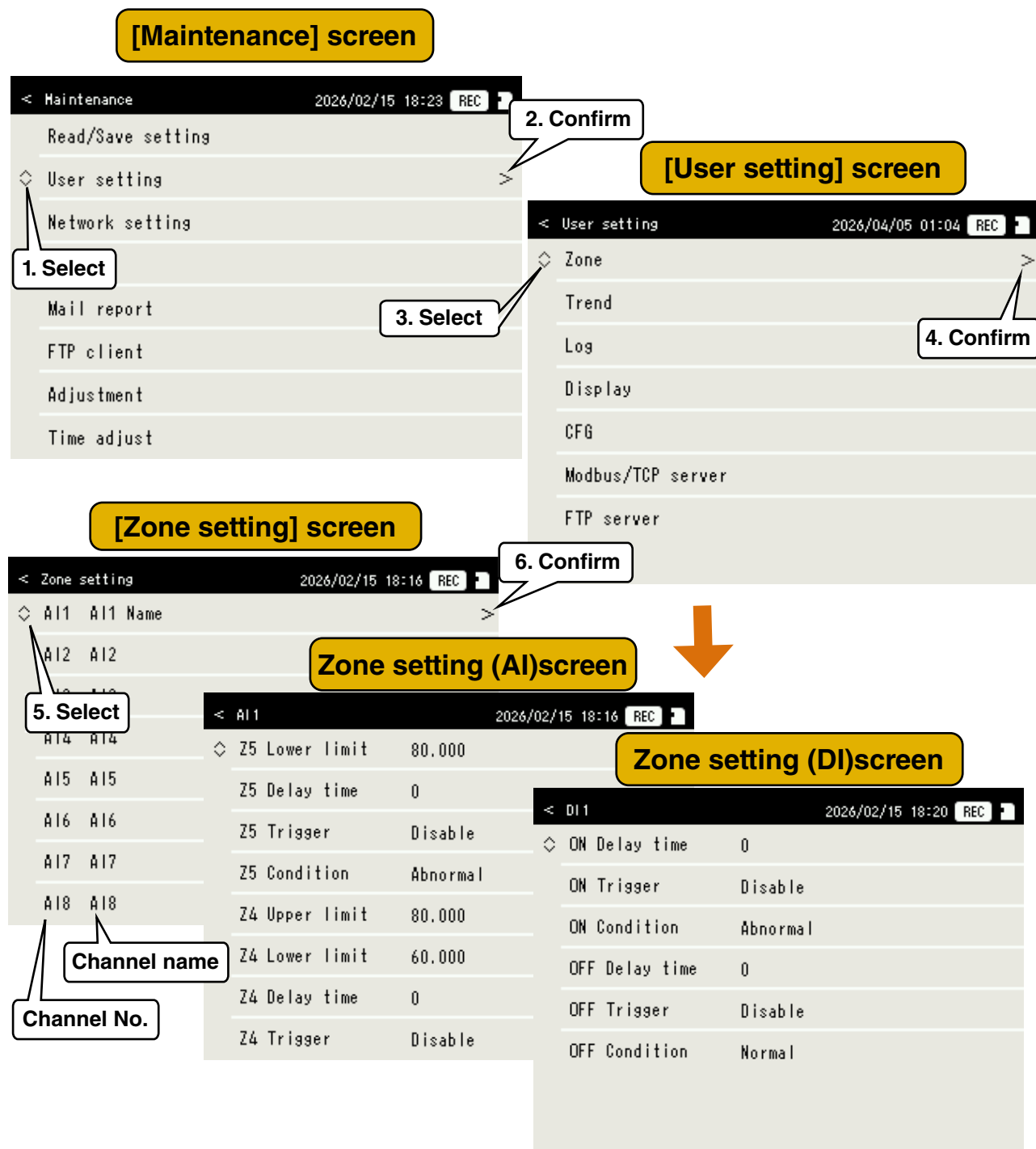
4. The saving setting pop-up appears. Select [OK] to perform reading or writing the setting.
5. If the reading operation is performed but the corresponding file does not exist, or if the writing operation is performed but is failed in writing to the corresponding file, an error message appears.

CAUTION

Do not edit "vr96cfg.json" or "vr96net.json" with a text editor or similar tools.

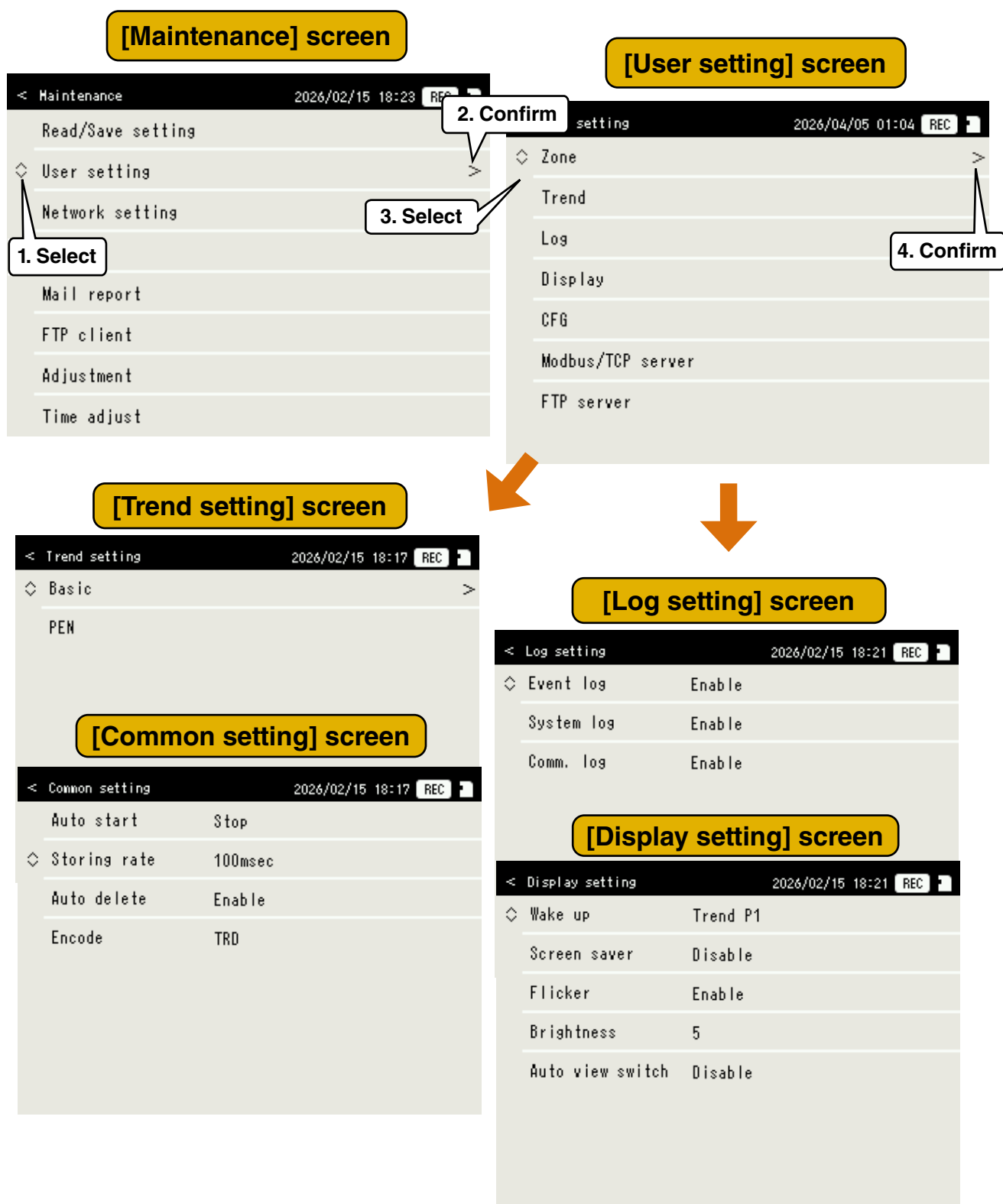
4.3.8.3 User setting

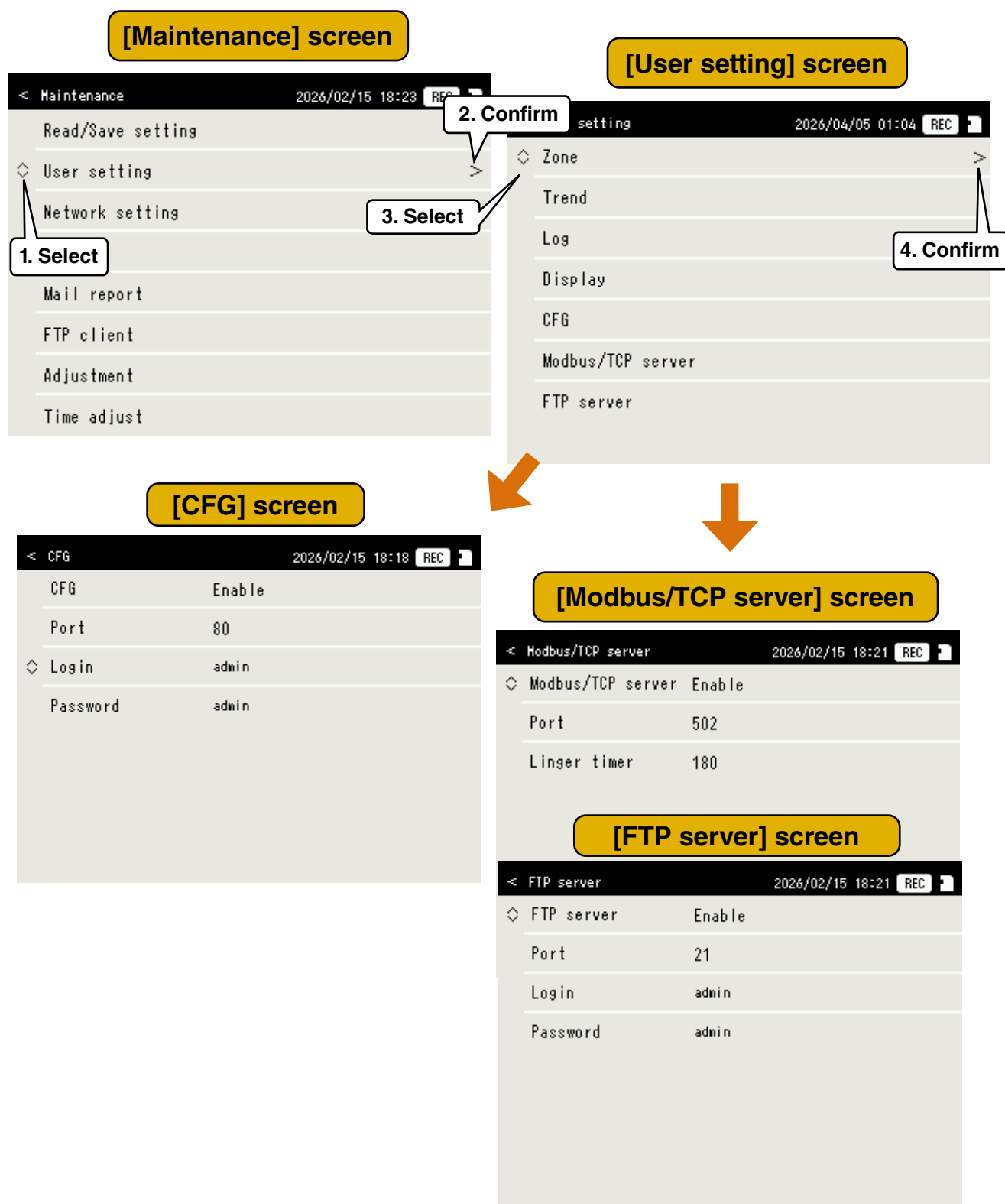
Follow the procedure below in order to configure the settings of zone, trend, log, display, CFG, Modbus/TCP server, and FTP server.



1. Select [User setting] on the maintenance screen.
2. Select the parameter to be set on the user setting screen.
3. Change the settings on each screen. The current values are displayed as the default values.
For setting change procedure, refer to 4.3.8.1 Common.
4. For the parameter and the configurable item, refer to the following table.

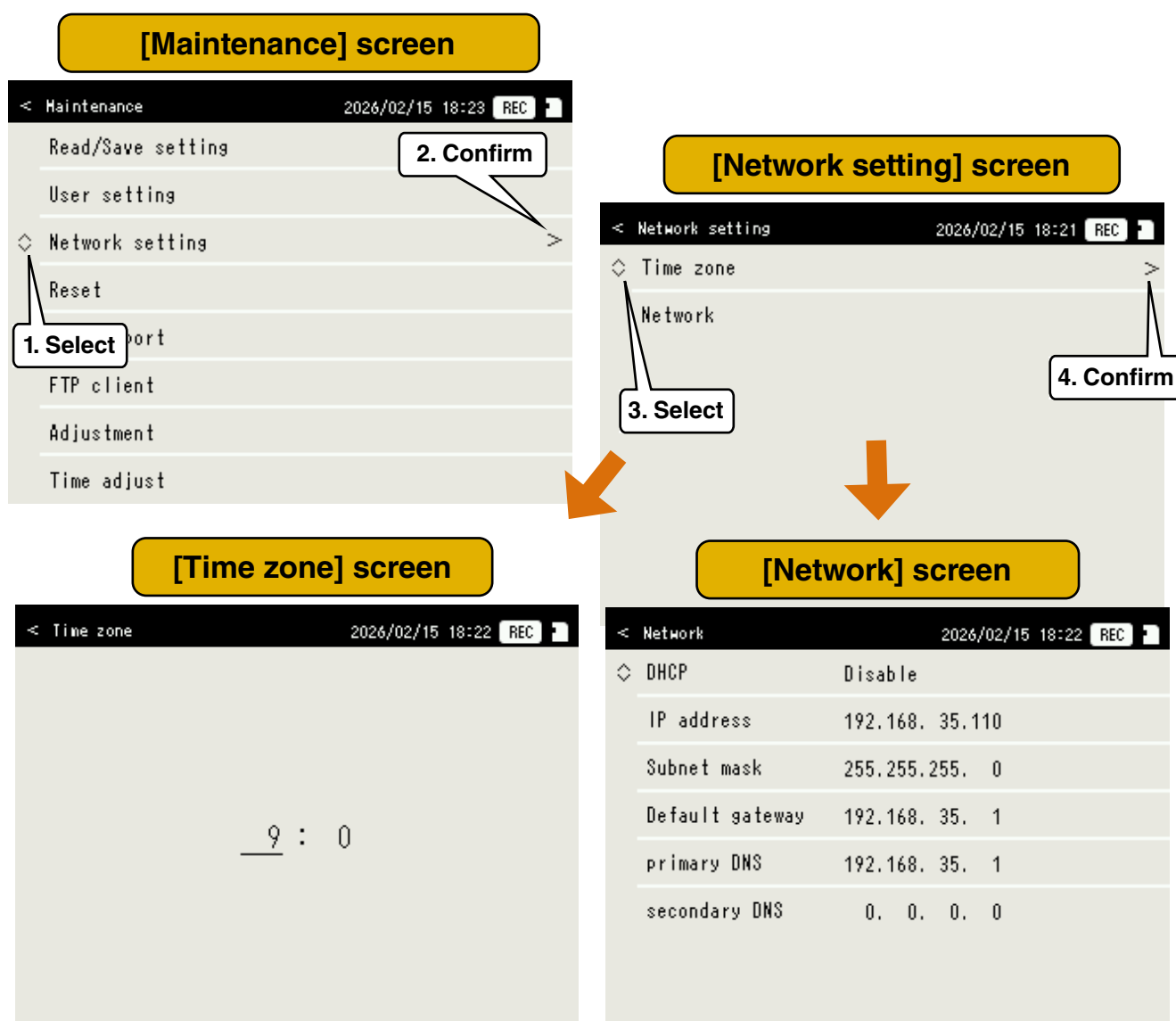
Parameter	Selectable option	Reference
Zone	AI, OI: Z(Zone) 1 to 5 Lower/Upper limit, Delay time, Trigger DI: ON Delay time, OFF Delay time, ON Trigger, OFF Trigger	Set after selecting a channel. The detail is same as the following. AI: 3.4.1.5 Zone setting (AI) 3.4.1.6 Event setting (AI) DI: 3.4.2.4 Basic setting (DI) OI: 3.4.3.2 Zone setting (OI) 3.4.3.3 Event setting (OI)
Trend	Basic: Auto start, Auto delete, Storing rate, Encode PEN: Upper limit, Lower limit	The detail is same as the following. Basic: 3.5.1 Basic setting PEN: Set after selecting PEN1 to 16. 3.5.2 Pen setting
Log	Event log, system log or comm. log.	The detail is same as the following. 3.6 Log setting
Display	Wake up, Screen saver, Flicker, Brightness, Auto view switch	The detail is same as the following. Wake up: 3.7.1 Wake up screen setting Screen saver, Flicker, Brightness: 3.7.3 Other settings Auto view switch: 3.7.2 Auto view switch setting
CFG	Enable/Disable, Port No., Login name, Password	The detail is same as the following. 3.2.1 CFG
Modbus/ TCP server	Enable/Disable, Port No., Linger timer	The detail is same as the following. 3.2.2 Modbus/TCP (server)
FTP server	Enable/Disable, Port No., Login name, Password	The detail is same as the following. 3.2.3 FTP server





4.3.8.4 Network setting

Follow the procedure below in order to configure the network setting for the device.



1. Select [Network setting] on the maintenance screen.
2. Select an parameter to be set.
3. For the parameters and the selectable items, refer to the table below.

Parameter	Selectable item	Reference
Time zone	—	
Network	DHCP, IP address, Subnet mask, Default gateway, primary DNS, secondary DNS	DHCP: Enable/Disable Setting range other than above (0.0.0.0 to 255.255.255.255)

4. Setting change can be performed with the button operation. Refer to 4.3.8.1 Common for the button operation.

CAUTION

To enable the settings, it is necessary to turn off and then turn on the device or to reboot it.

4.3.8.5 Reset

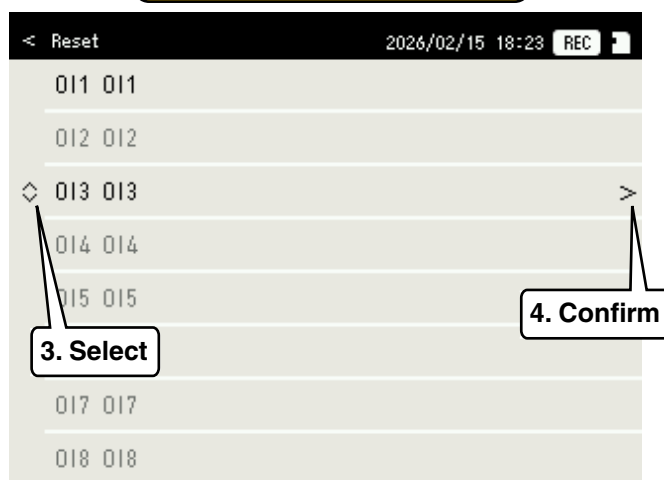
Follow the procedure below in order to reset the operational input (OI).

1. Select [Reset] on the maintenance screen.
2. Select an OI to be reset. For the function type that can be reset, refer to 3.4.3 Operational input (OI).
If the function type cannot be reset, it is not selectable.
3. When a popup appears, tap [OK] to execute.

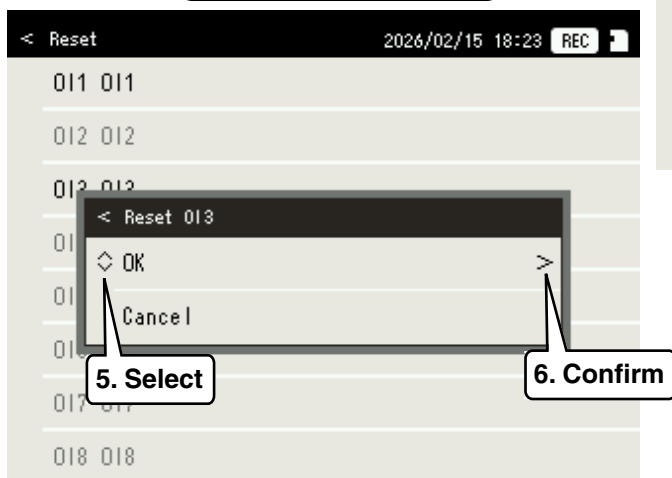
[Maintenance] screen



[Reset] screen

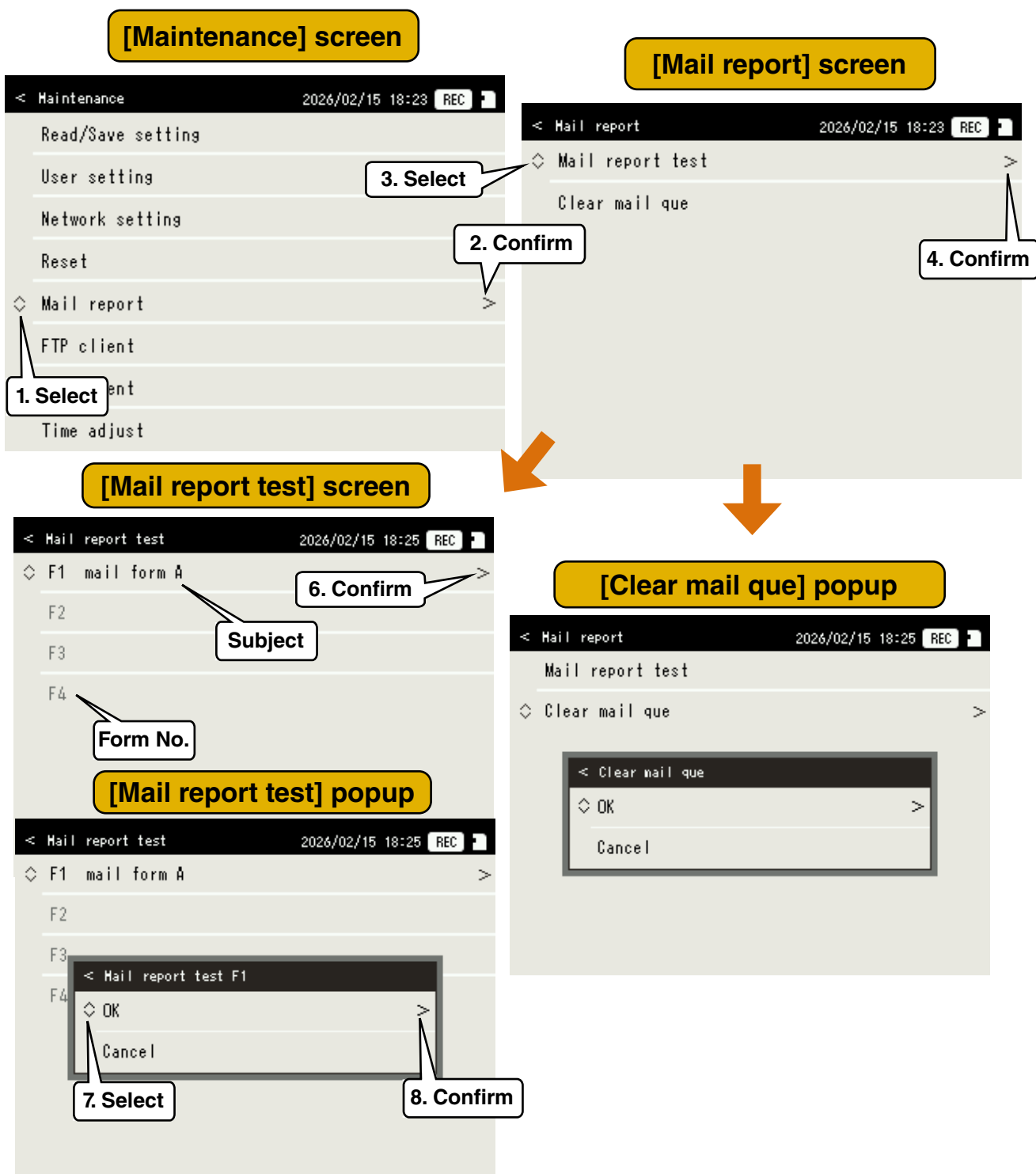


[Reset] popup



4.3.8.6 E-mail report

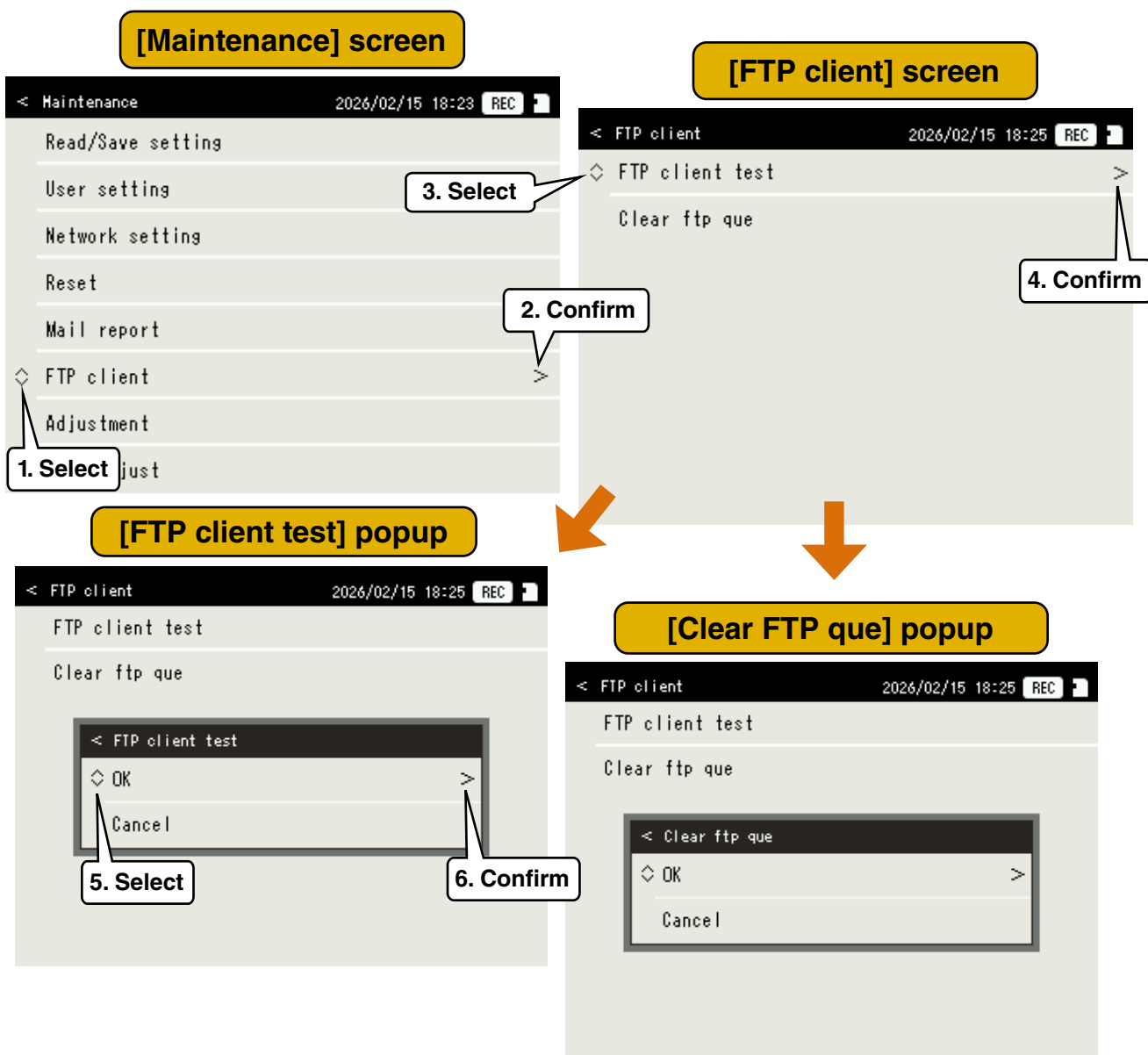
Follow the procedure below in order to perform e-mail reporting test.



1. Select [Mail report] on the maintenance screen.
2. If performing an e-mail reporting test, select [Mail report test].
3. Select a mail form. → 3.8.3 Template setting
4. Select [Clear mail que] when deleting the transmission queue.
5. When a popup appears, tap [OK] to execute.

4.3.8.7 FTP client

Follow the procedure below in order to perform FTP client test.



1. Select [FTP client] on the maintenance screen.
2. If performing an FTP client test, select [FTP client test].
3. Select [Clear ftp que] when clearing the transmission queue.
4. When a popup appears, tap [OK] to execute.

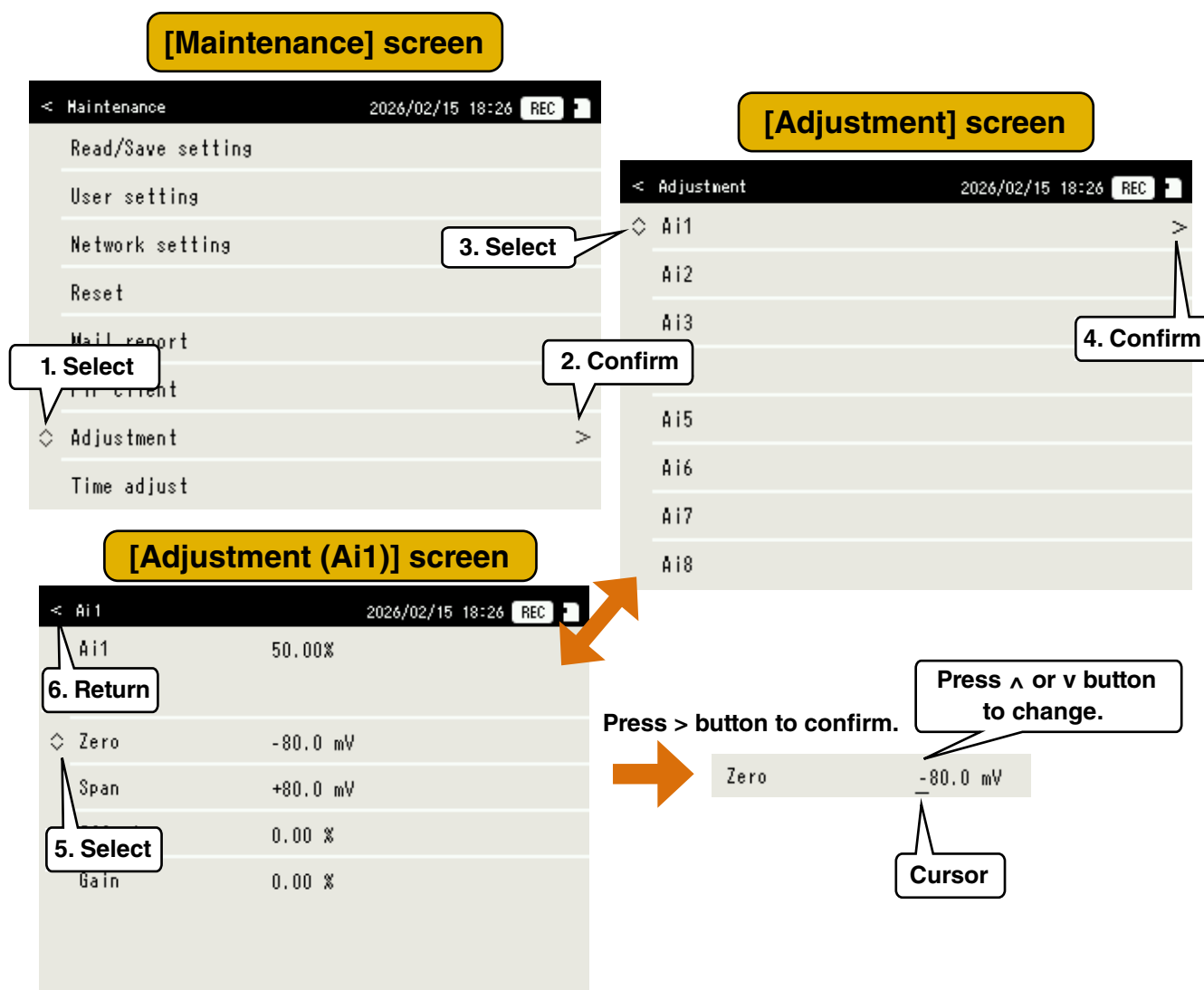
4.3.8.8 Ai adjustment

Follow the procedure below in order to adjust the analog input (Ai).

1. Select [Adjustment] on the maintenance screen.
2. Select a channel to be adjusted. Press < button.
3. The current input value (%) and the current setting value are displayed on [Adjustment] screen corresponding to the channel selected in step 2. Refer to the table below for the parameters. Setting change can be performed with the button operation. Refer to 4.3.8.1 Common for the button operation.
4. Press [<] button to go back to [Adjustment] screen.

Other channels can be adjusted with the same procedure as step 3.

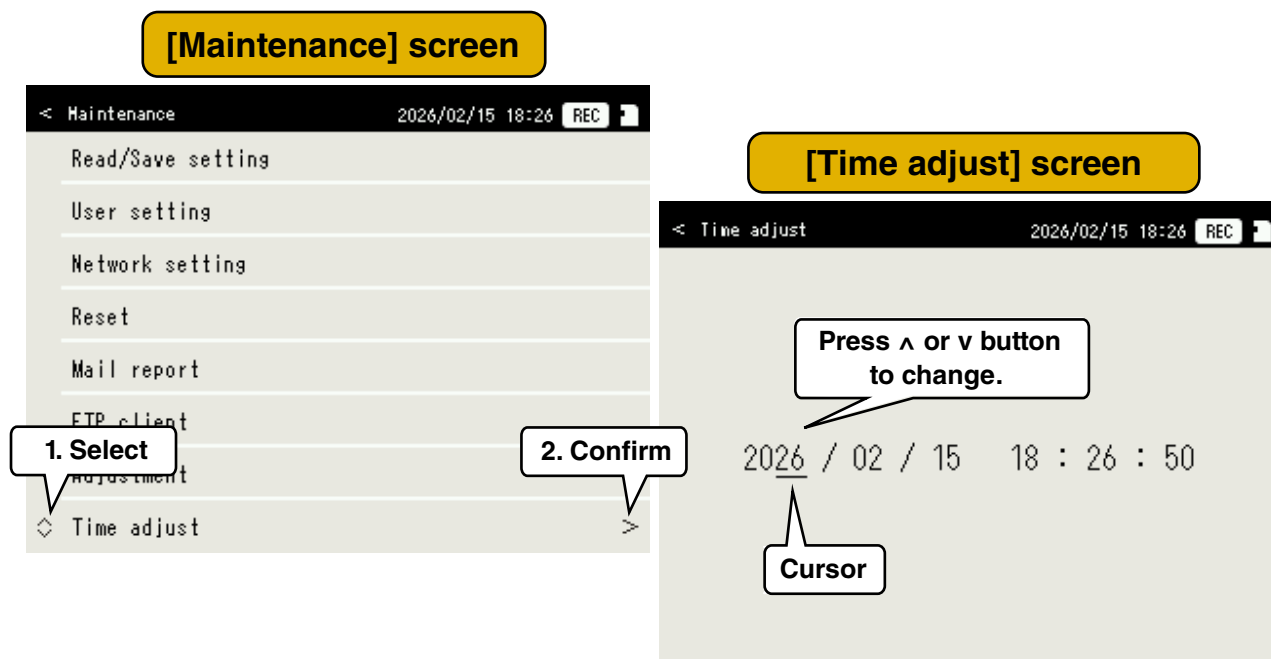
Parameter	Reference
Zero / Span	Depends on the analog input specification. Refer to the code number for the analog input specification. • -10 to +10 V (minimum range 1.6 V) • -800 to +800 mV (minimum range 160 mV) • -80 to +80 mV (minimum range 20 mV)
Offset	Set within the range of -5.00 to +5.00 (%)
Gain	



4.3.8.9 Time adjust

Follow the procedure below in order to set the time for the device.

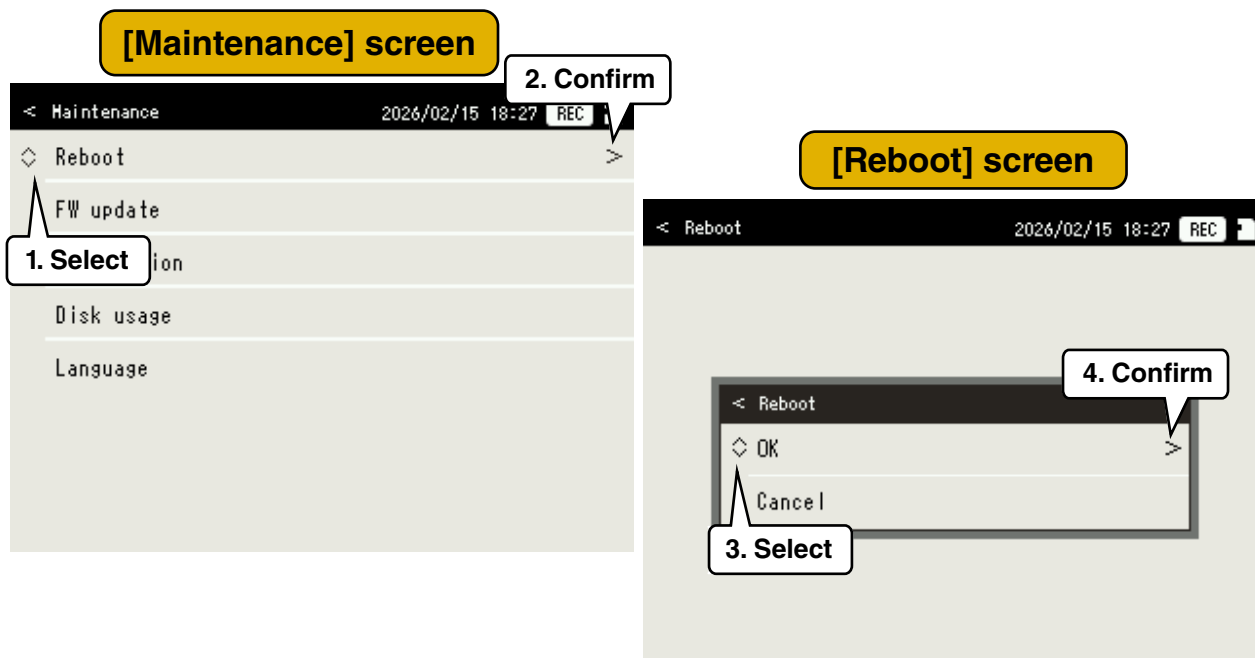
1. Select [Time adjust] on the maintenance screen.
2. Change the time on [Time adjust] screen.
Refer to 4.3.8.1 Common for operation procedure.



4.3.8.10 Reboot

Follow the procedure below in order to reboot the device.

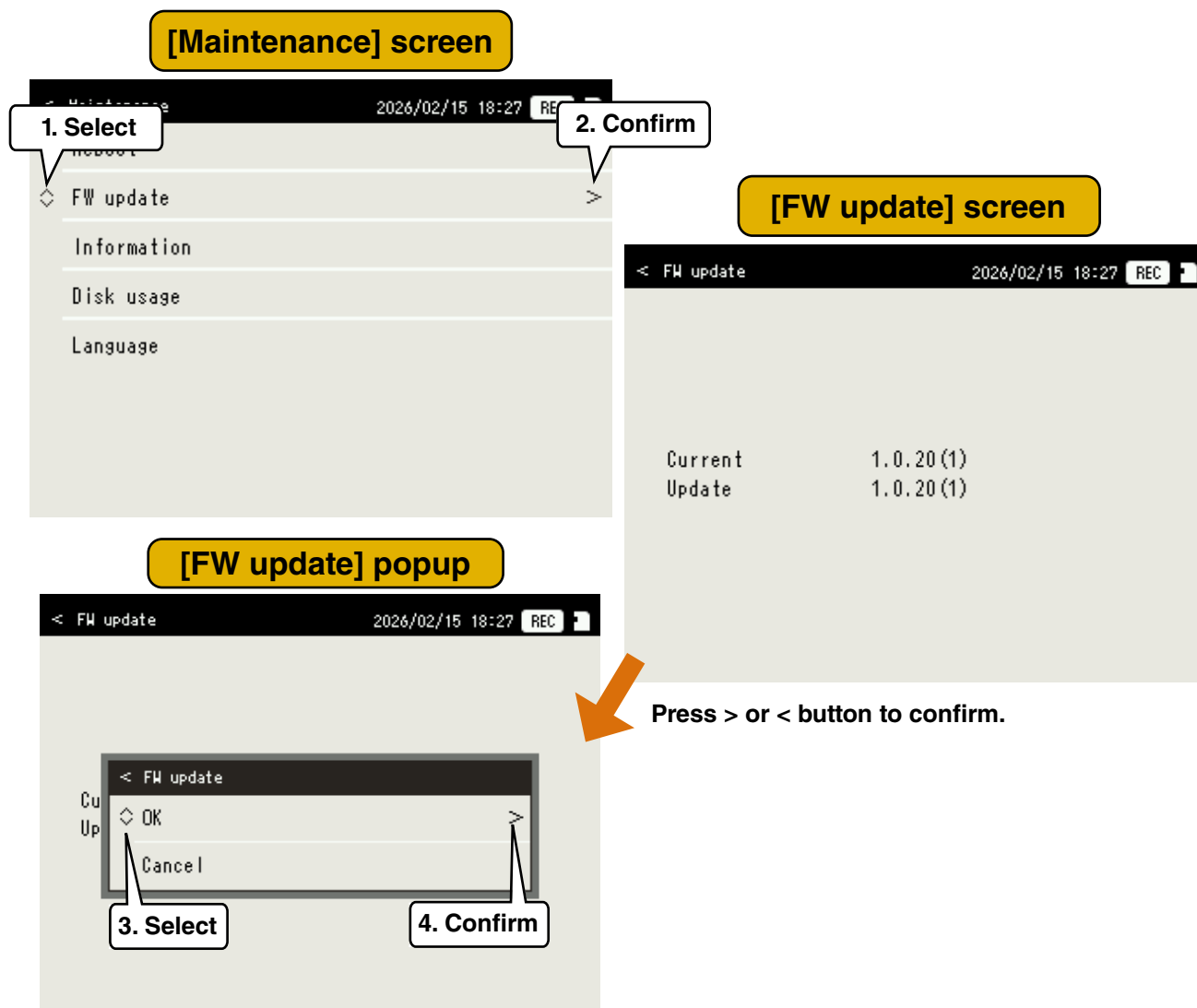
1. Select [Reboot] on the maintenance screen.
2. When a popup appears, select [OK] to reboot the device.



4.3.8.11 FW update

The firmware version is displayed. Refer to our website regarding how to update the firmware.

1. Select [FW update] on the maintenance screen.
2. The current version and the updated version are displayed on [FW update] screen.
3. Press < or > button to display [FW update] popup. Select [OK] to update the firmware.



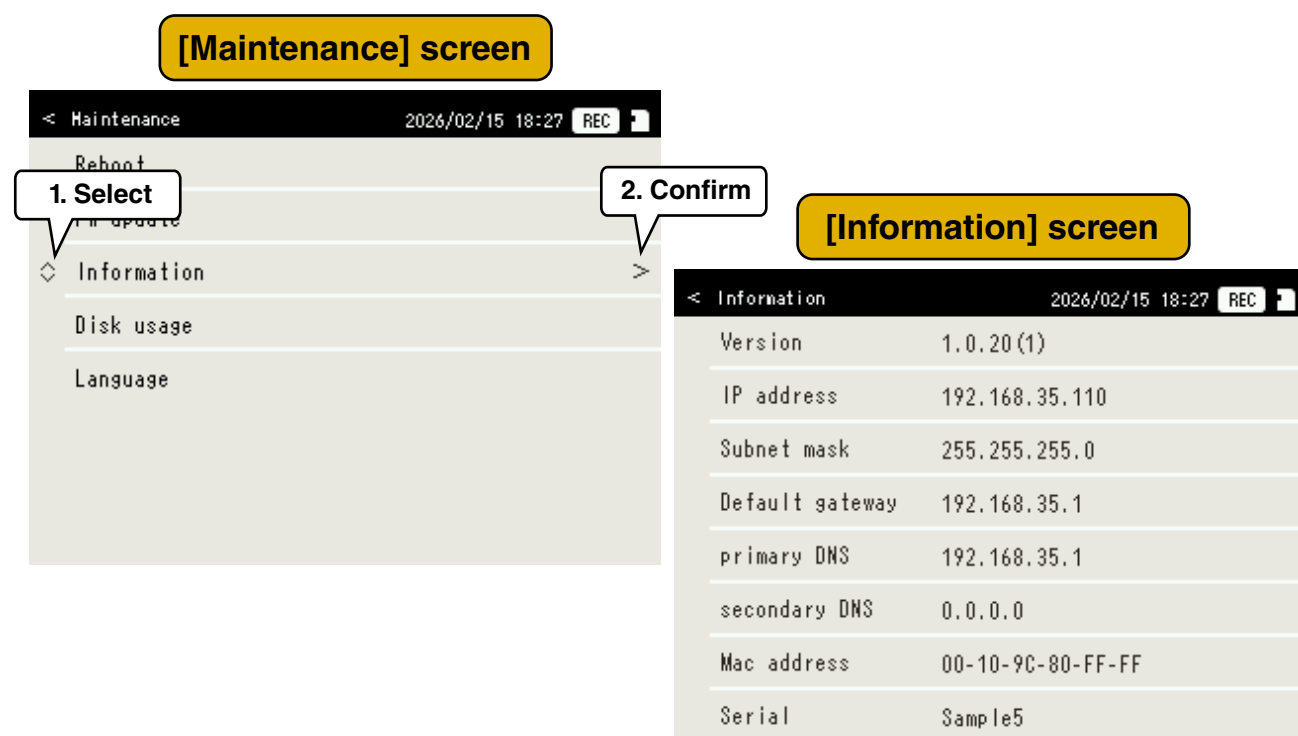
4.3.8.12 Information

Follow the procedure below in order to display the device information.

1. Select [Information] on the maintenance screen.
2. The device information is displayed.

For the displayed items, refer to the table below.

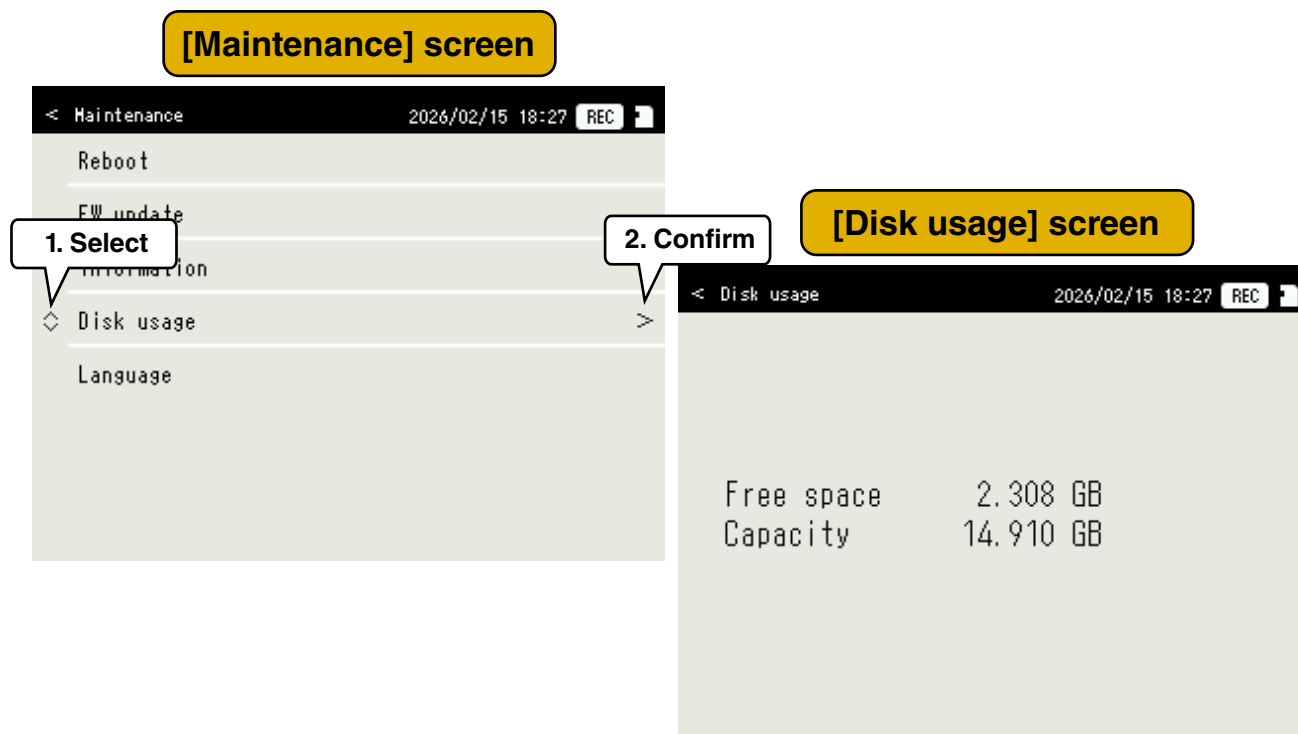
Displayed item	Description	Reference
Version	The firmware version in the VR96E-G8 is displayed.	
IP address Subnet mask Default Gateway primary DNS secondary DNS	IP address, Subnet mask, Default Gateway, primary DNS and secondary DNS are displayed.	Changeable in 4.3.8.4 Network setting.
Mac address	Mac address is displayed.	
Serial	The number to be managed by MG CO., LTD. is displayed.	



4.3.8.13 Disk usage

Follow the procedure below in order to display the usage state of the SD card placed in the device.

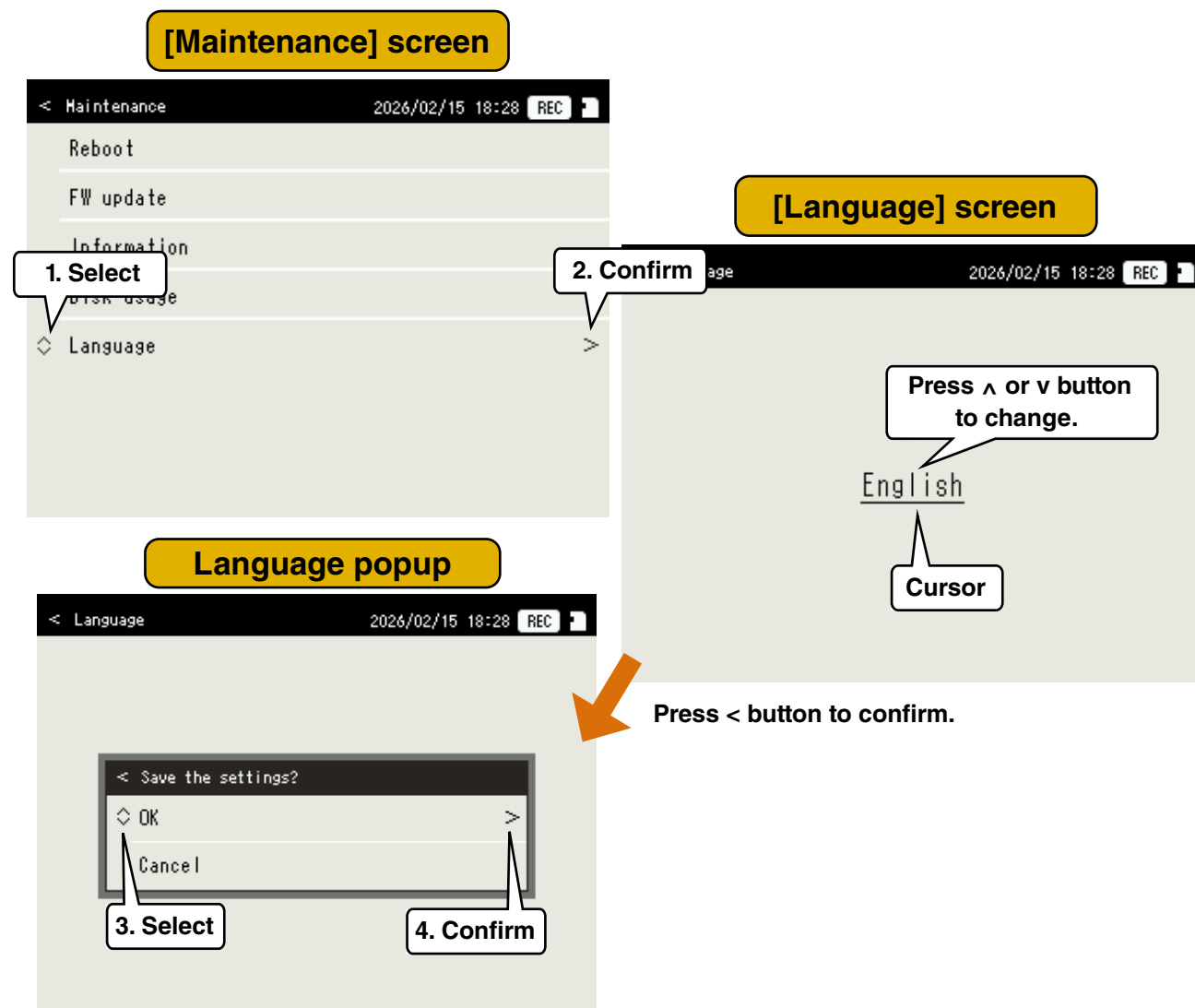
1. Select [Disk usage] on the maintenance screen.
2. The free space and capacity are displayed.



4.3.8.14 Language

Follow the procedure below in order to configure the language setting displayed on the device.

1. Select [Language] on the maintenance screen.
2. Select the language to be displayed. Refer to 4.3.8.1 Common for the operation procedure.
3. Press < button to display a popup. Select [OK] to save the setting change.

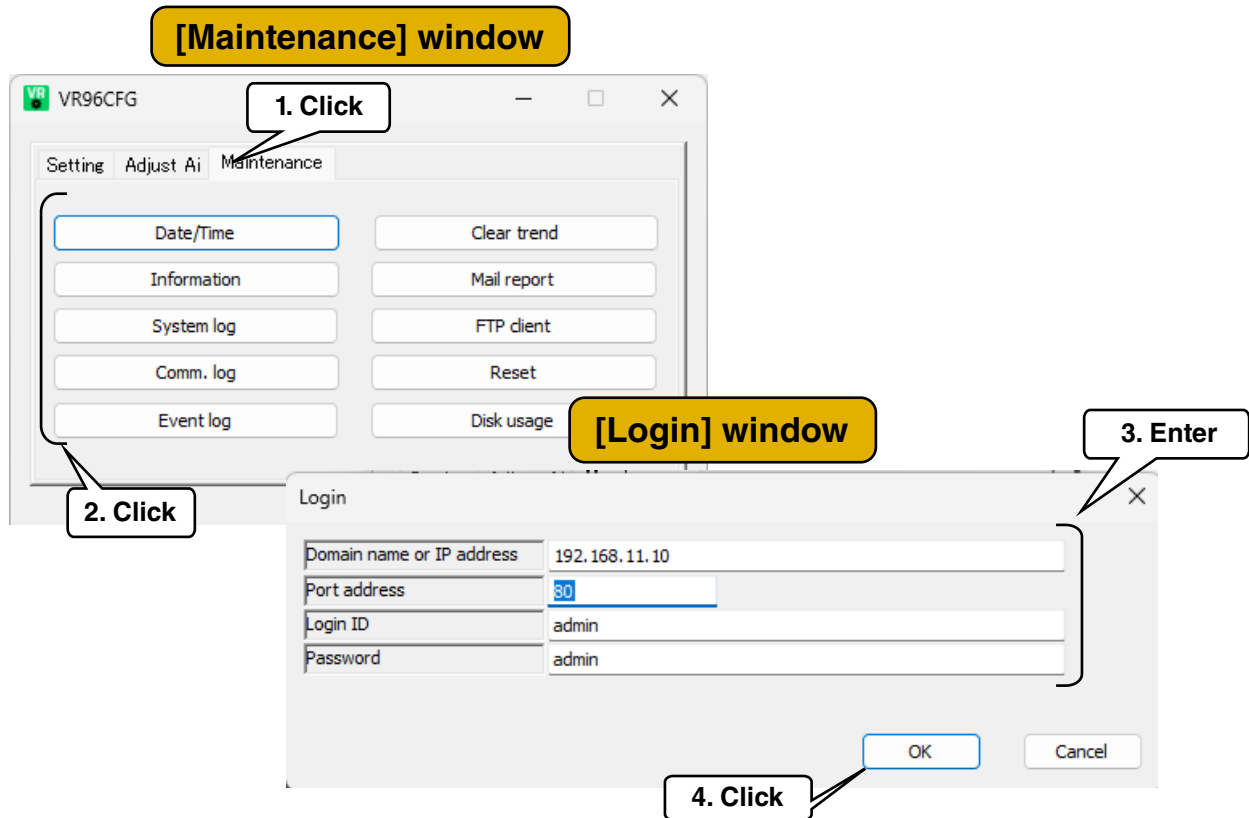


5. Maintenance

5.1 Maintenance from VR96CFG

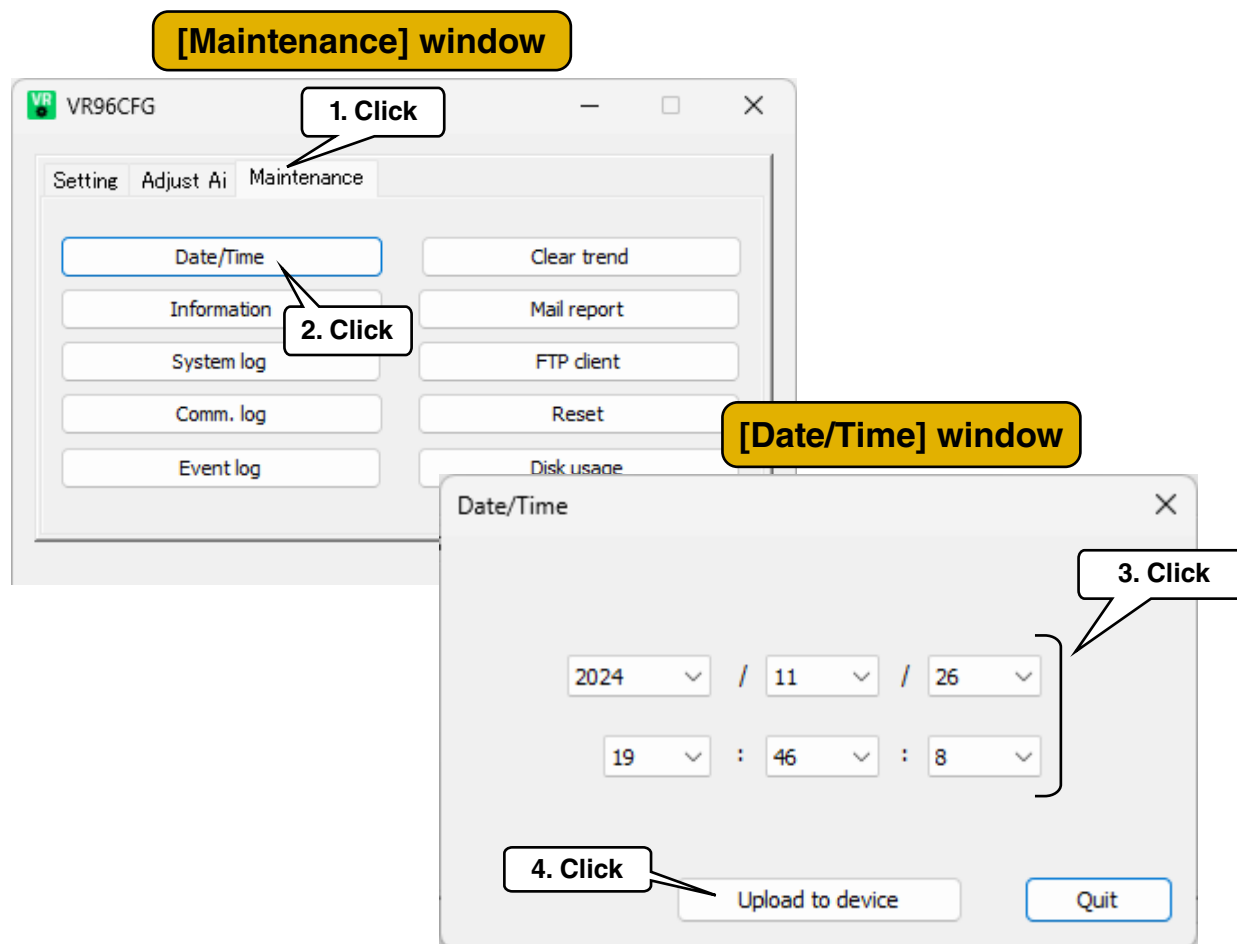
From [Maintenance] window, maintenance on the VR96E-G8 can be performed.

1. After starting up VR96CFG, click [Maintenance] tab to display [Maintenance] window.
2. Click the parameter to be performed to display [Login] window.
3. Enter the login information and click [OK]. The window for the maintenance to be performed appears.



5.1.1 Date/Time

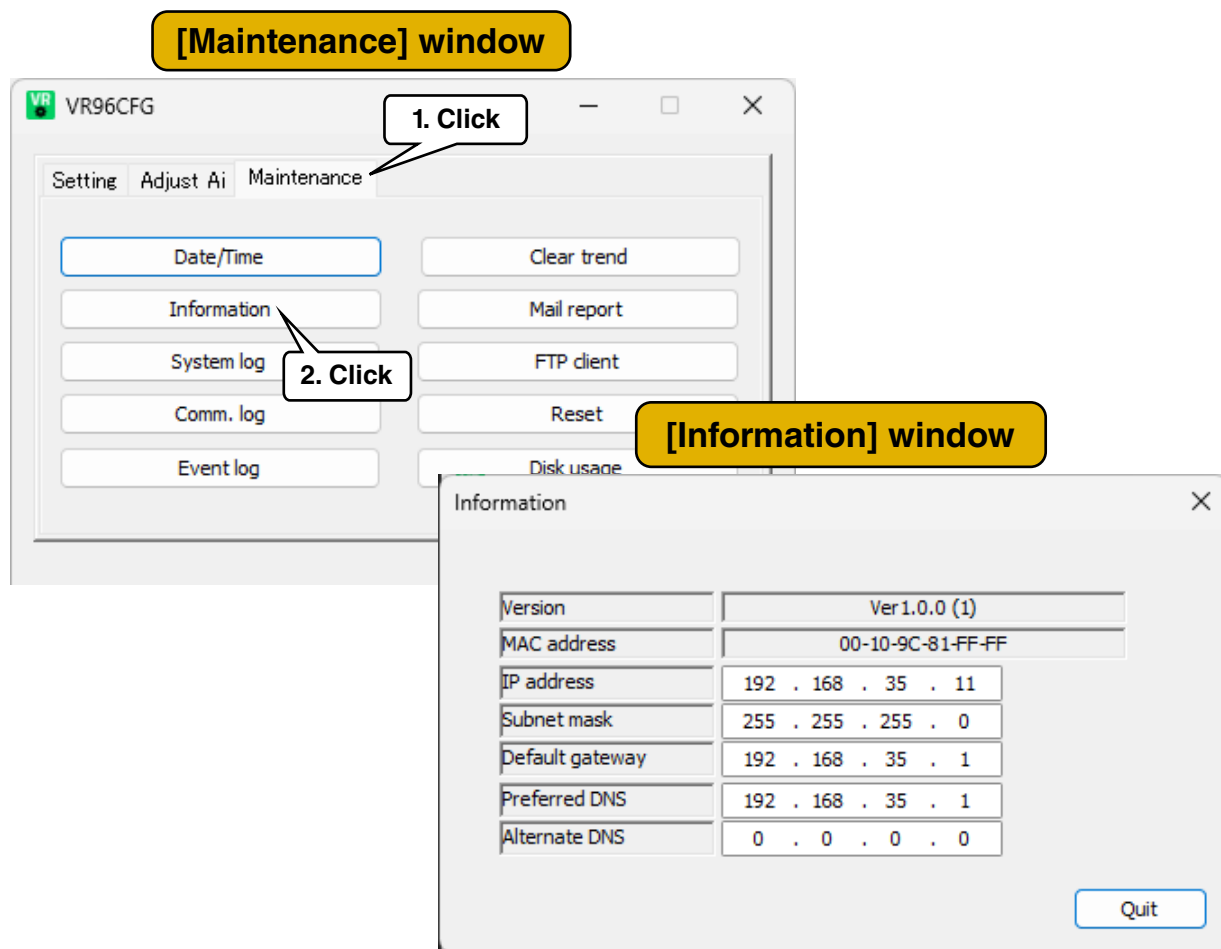
Set the local time used to the trend recording and the system logs.



1. Click [Maintenance] tab.
2. Click [Date/Time] button. After logging in, [Date/Time] window appears.
3. Click the date and time drop-down list to select the date and time, and click [Upload to device] button to apply the settings.

5.1.2 Information

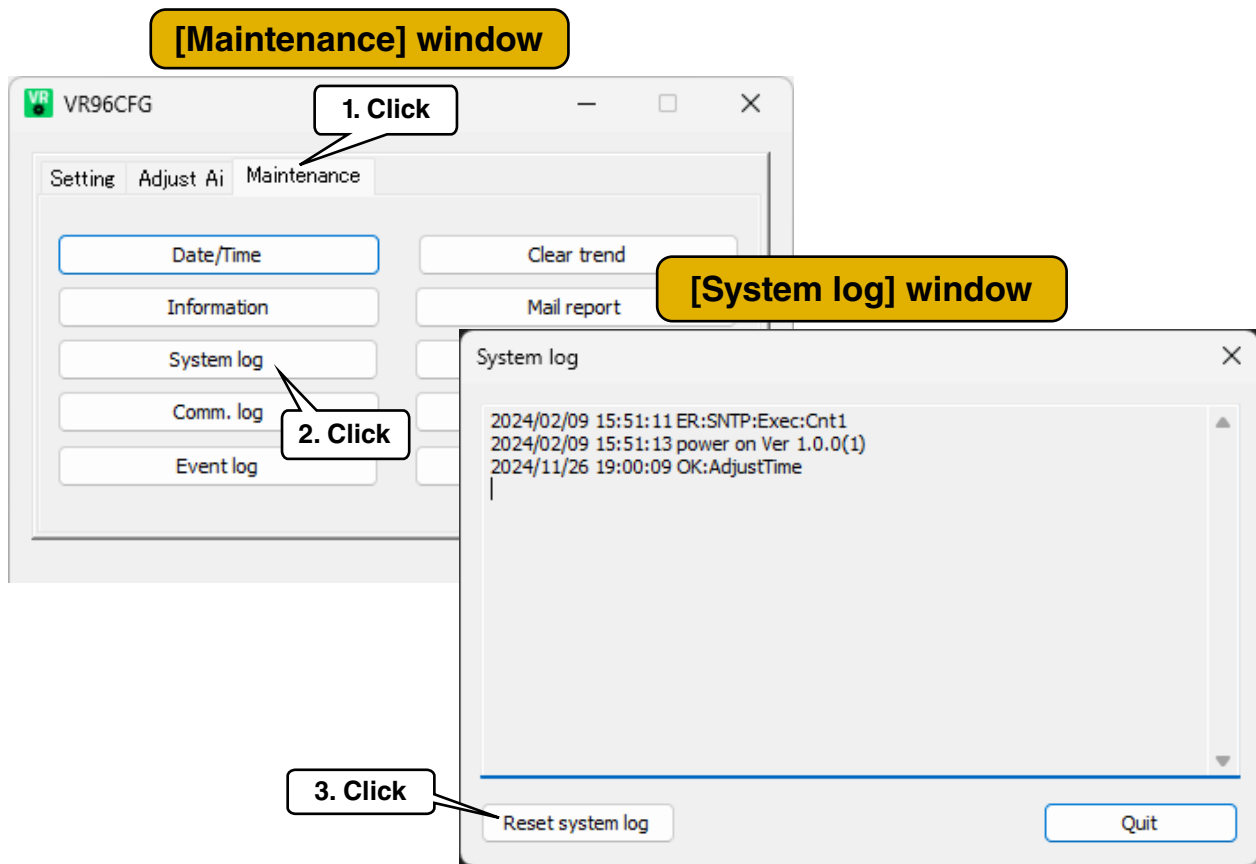
Follow the procedure below in order to display the device information.



1. Click [Maintenance] tab.
2. Click [Information] button. After logging in, [Information] window appears.

5.1.3 System log

Follow the procedure below in order to display the list of system logs.



1. Click [Maintenance] tab.
2. Click [System log] button. After logging in, [System log] window appears.
3. Click [Reset system log] button to clear the system logs.
4. For system log messages, refer to the table below. (Partial list)

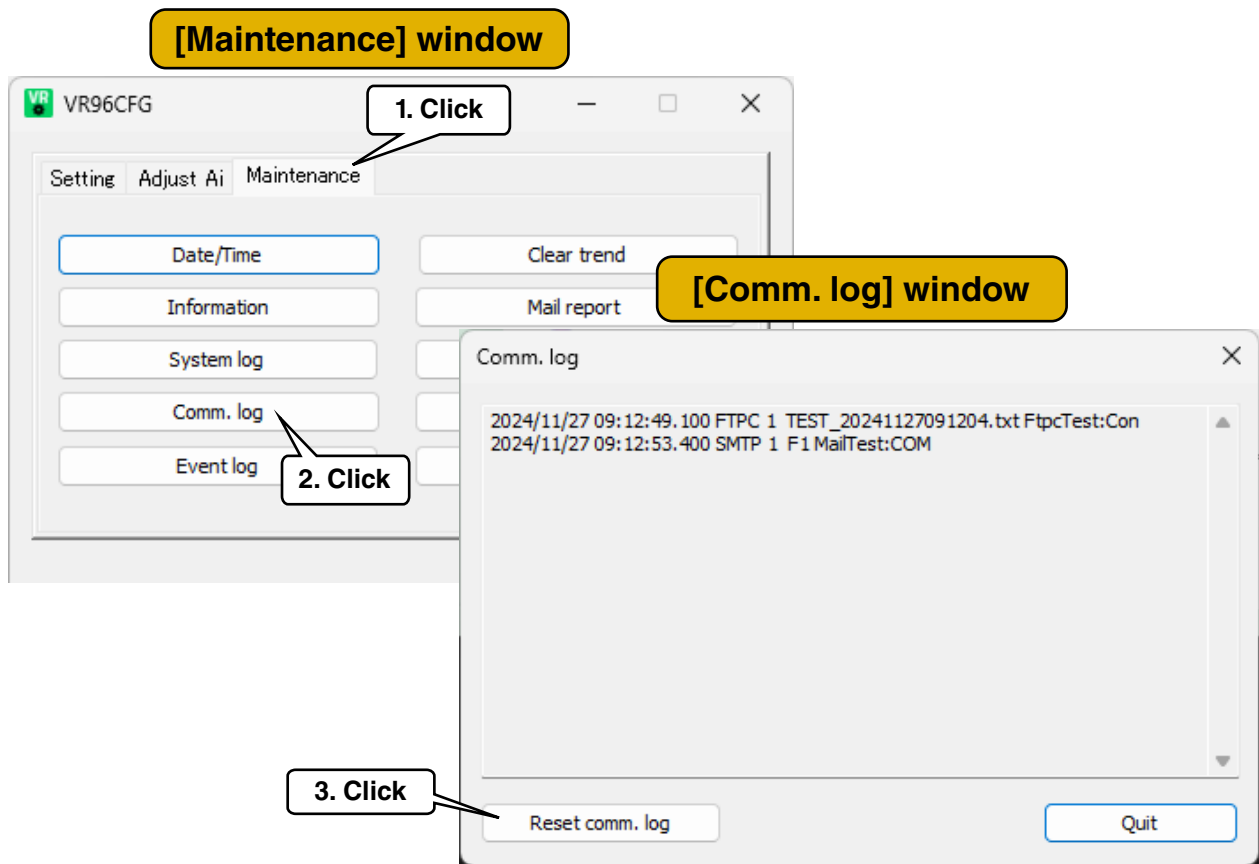
Message	Meaning
power on Verxx	Power supply ON (xxx: version)
OK:SNTP	Succeeded in time synchronization of SNTP.
OK:AdjustTime	Time is adjusted.
OK:Save Config	Setting is updated.
OK:Save Net	Network setting is updated (Rebooting is required).

CAUTION

- In case of trouble, our service personnel may review the system log contents for analysis.
- The system log messages contain many proprietary internal processes, so individual log details are not provided.

5.1.4 Communication log

Follow the procedure below in order to display the list of communication logs.



1. Click [Maintenance] tab.
2. Click [Comm. log] button. After logging in, [Comm. log] window appears.
3. Click [Reset comm. log] button to clear the communication logs.
4. For communication log messages, refer to the table below. (Partial list)

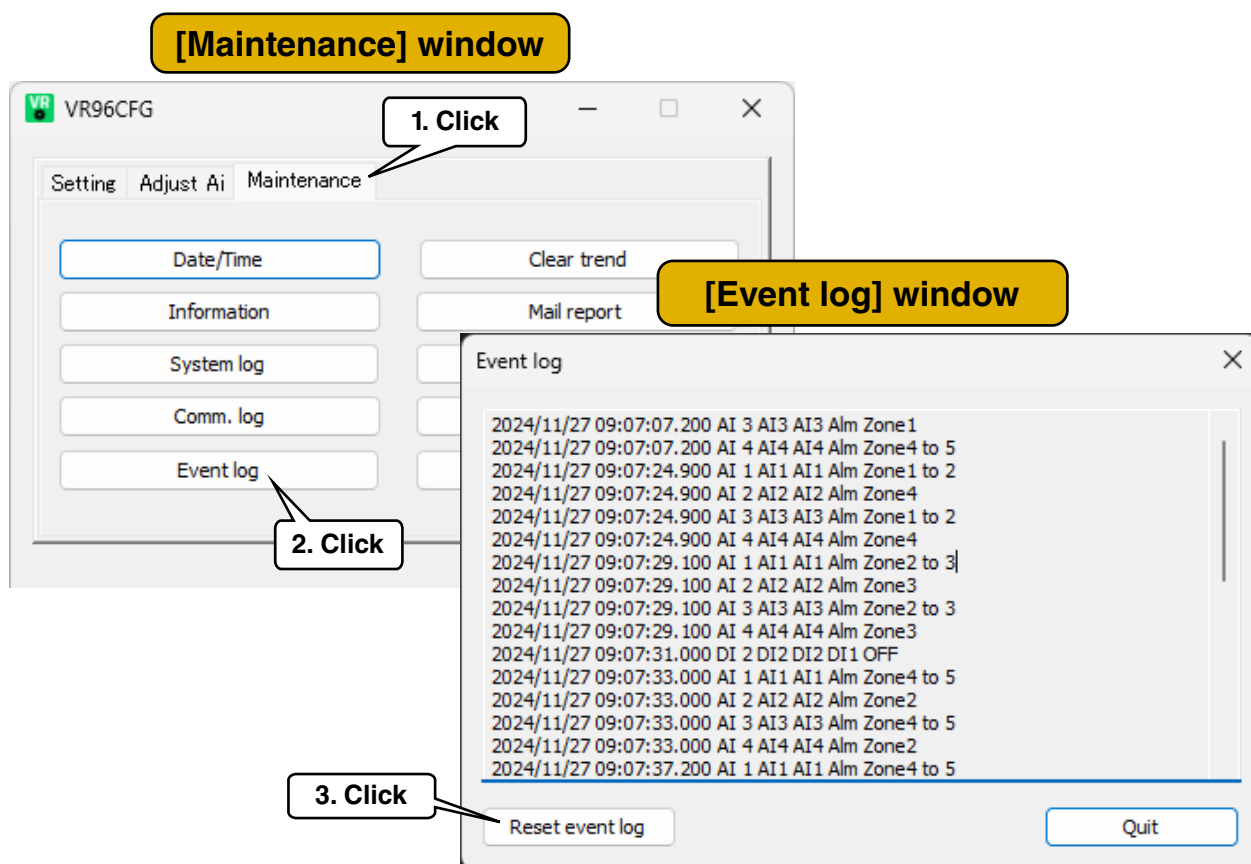
Message	Meaning
FTPC,1,CLOG.txt,Success	Succeeded in the transfer of CLOG.txt.
SMTP,1,F1,Regular	Succeeded in the regular reporting of Form1.

CAUTION

- The communication log contains proprietary content related to internal processing and various messages from different companies providing mail services, so individual log details are not provided.

5.1.5 Event log

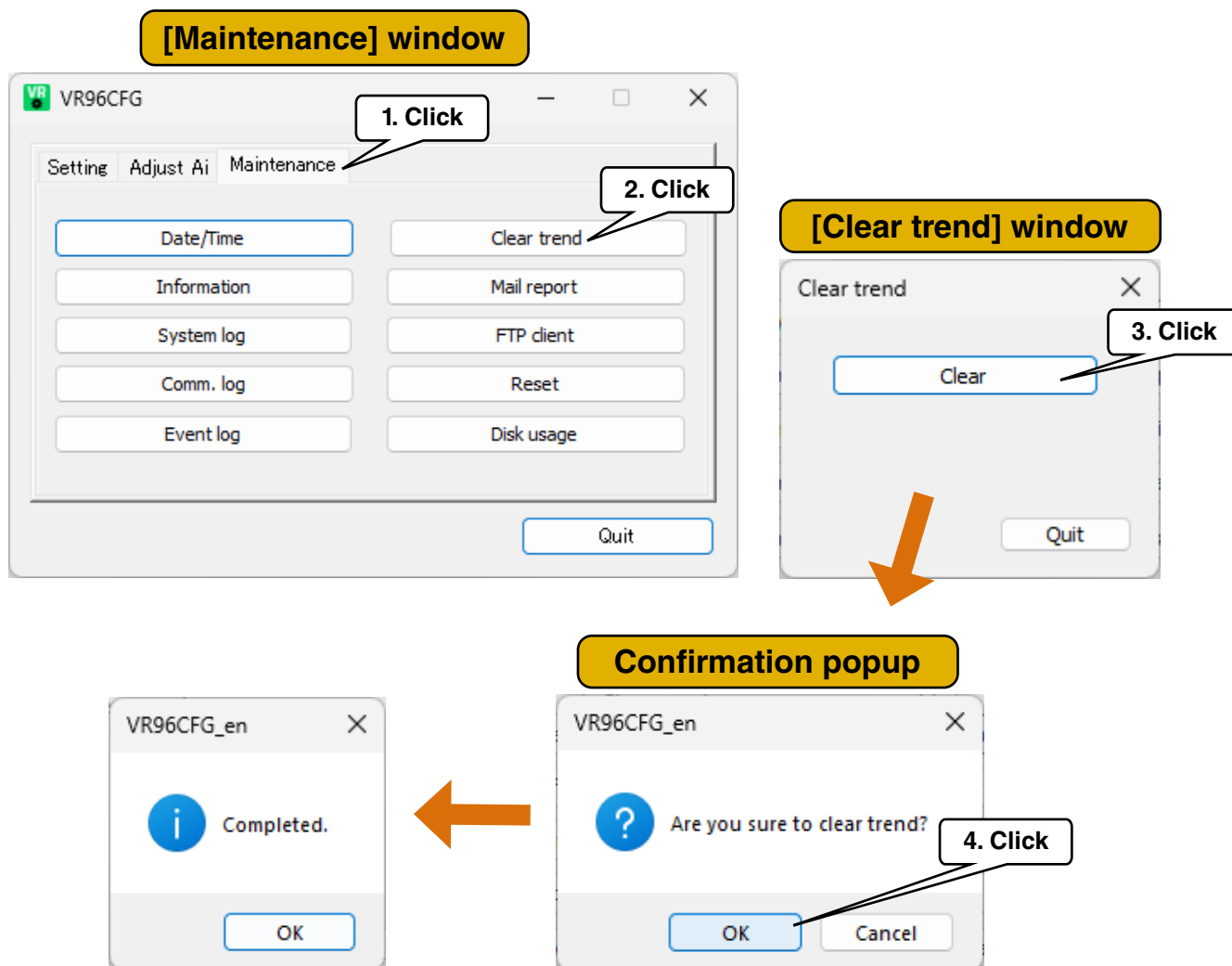
Follow the procedure below in order to display the list of event logs.



1. Click [Maintenance] tab.
2. Click [Event. log] button. After logging in, [Event log] window appears.
3. Click [Reset event log] button to clear the event logs.

5.1.6 Clear trend

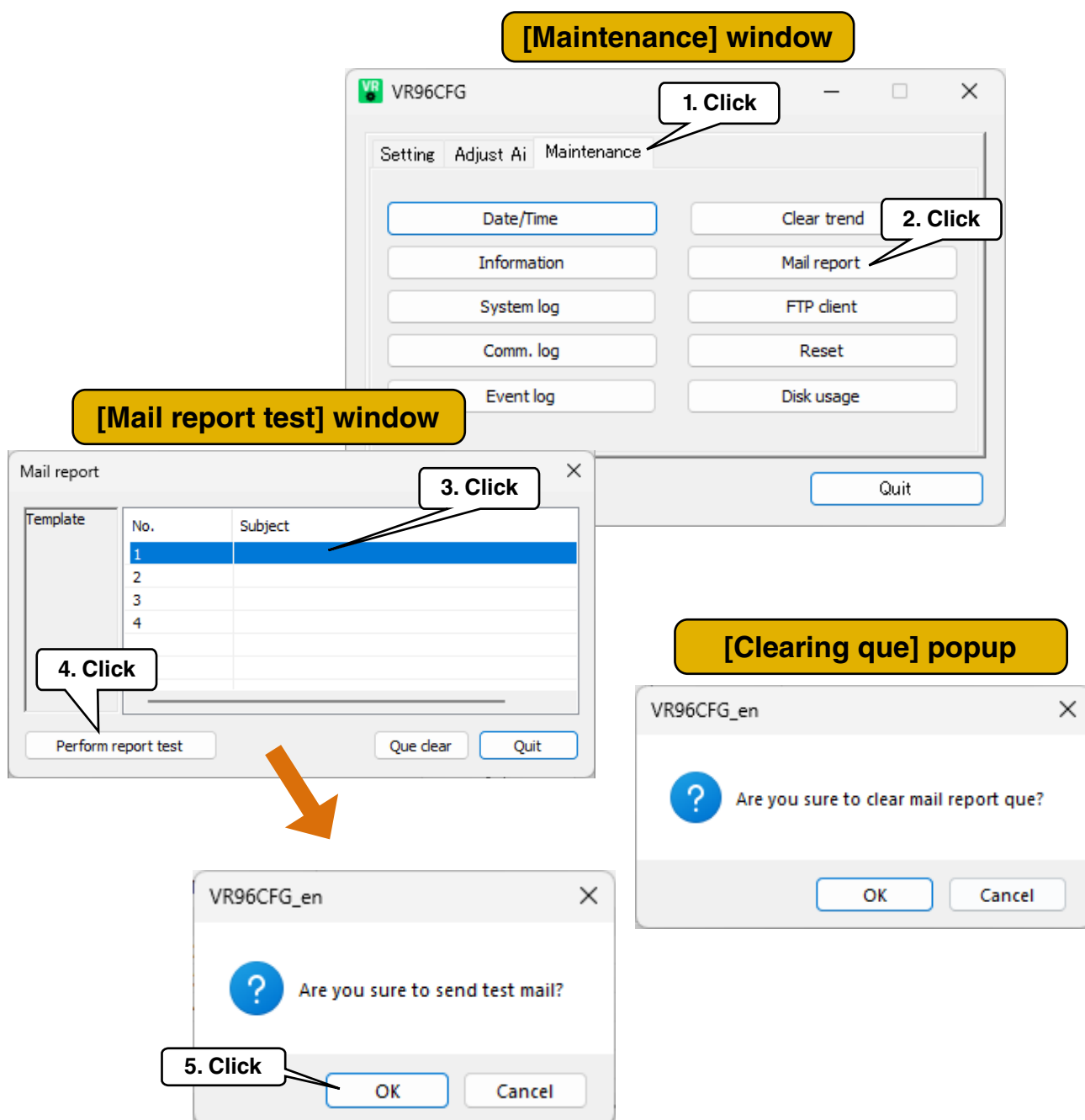
Follow the procedure below in order to clear the trend.



1. Click [Maintenance] tab.
2. Click [Clear] button on [Clear trend] window. The confirmation popup appears.
3. Click [OK] button. The result of performing clearing trend appears in the popup.

5.1.7 E-mail reporting test

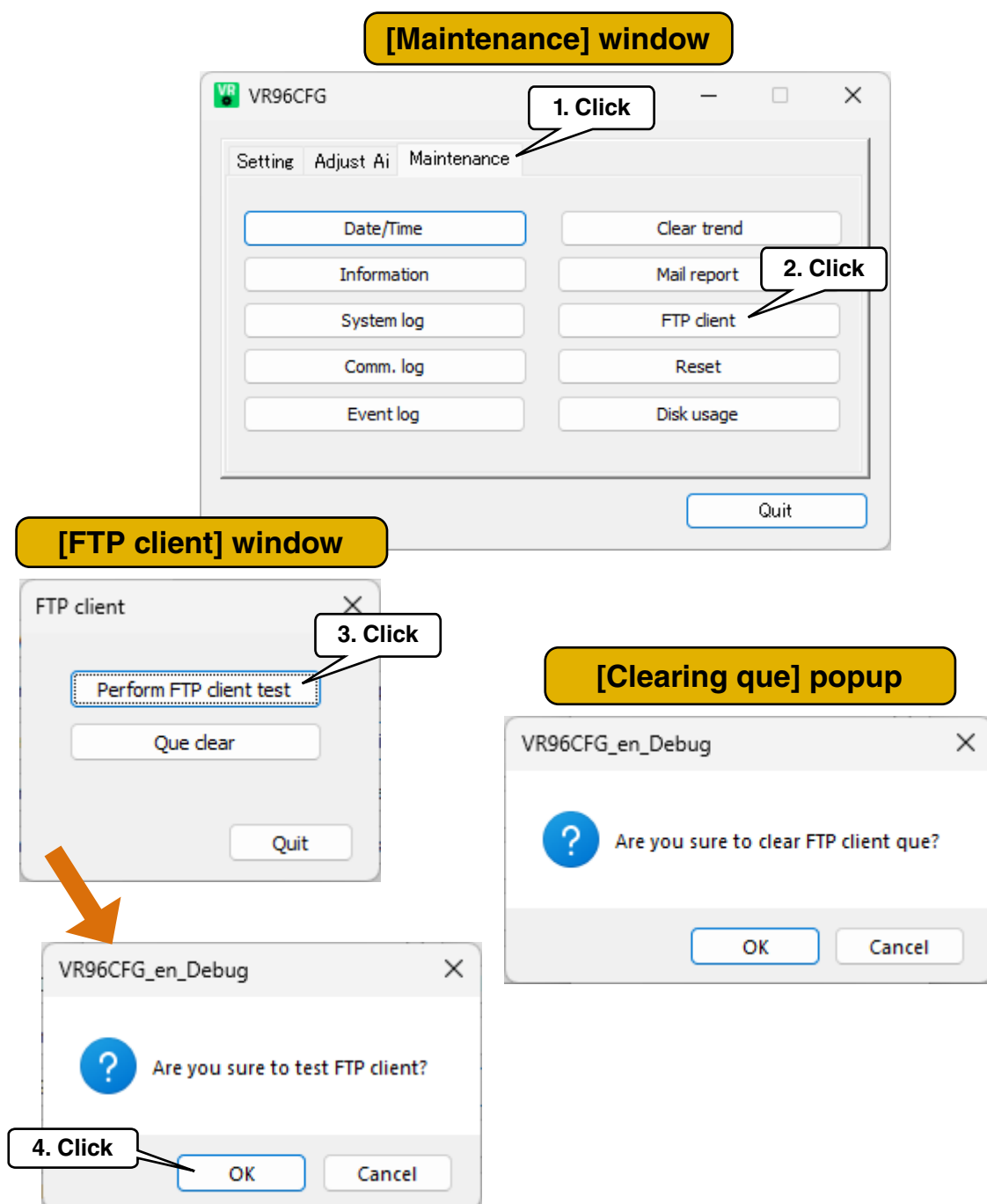
Perform e-mail reporting test.



1. Click [Maintenance] tab.
2. Click [Mail report test] button. After logging in, [Mail report test] window appears.
3. Click the template to perform the e-mail reporting test. → 3.8.3 Template setting
4. Click [Perform report test] button. Then, the confirmation popup appears.
5. Click [OK] button to perform the e-mail reporting test.
6. Click [Que clear] button to display [Clearing que] popup.
Click [OK] button to clear the que after login.

5.1.8 FTP client test

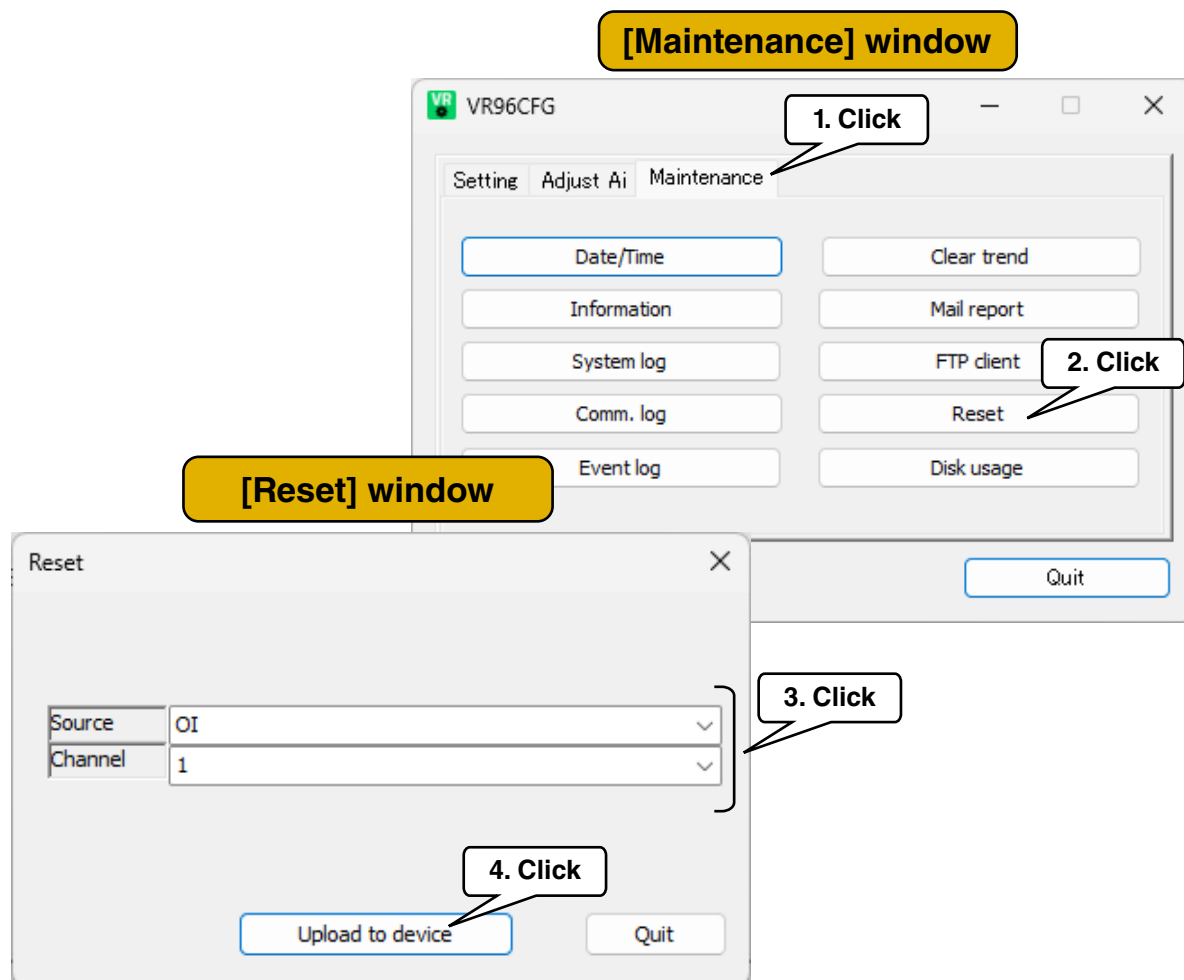
Perform FTP client test.



1. Click [Maintenance] tab.
2. Click [FTP client] button. [FTP client] window appears after login.
3. Click [Perform FTP client test] button to display the confirmation popup.
Click [OK] button to perform the FTP client test.
4. Click [Que clear] button to display [Clearing que] popup.
Click [OK] button to clear the que after login.

5.1.9 Reset

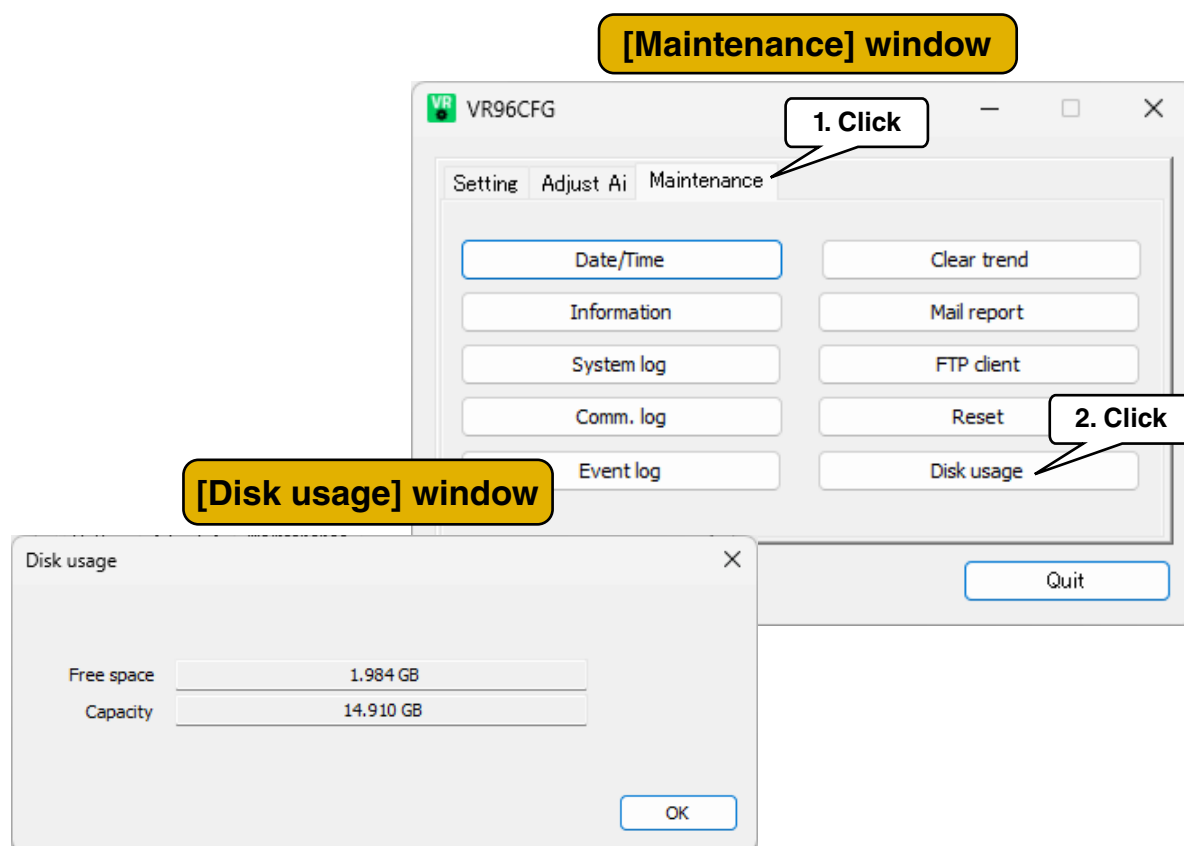
Follow the procedure below in order to reset the operational input (OI) value.



1. Click [Maintenance] tab.
2. Click [Reset] button to display [Reset] window.
3. Select the source and channel to be reset and click [Upload to device] button.
4. Resetting is performed after login.

5.1.10 Disk usage

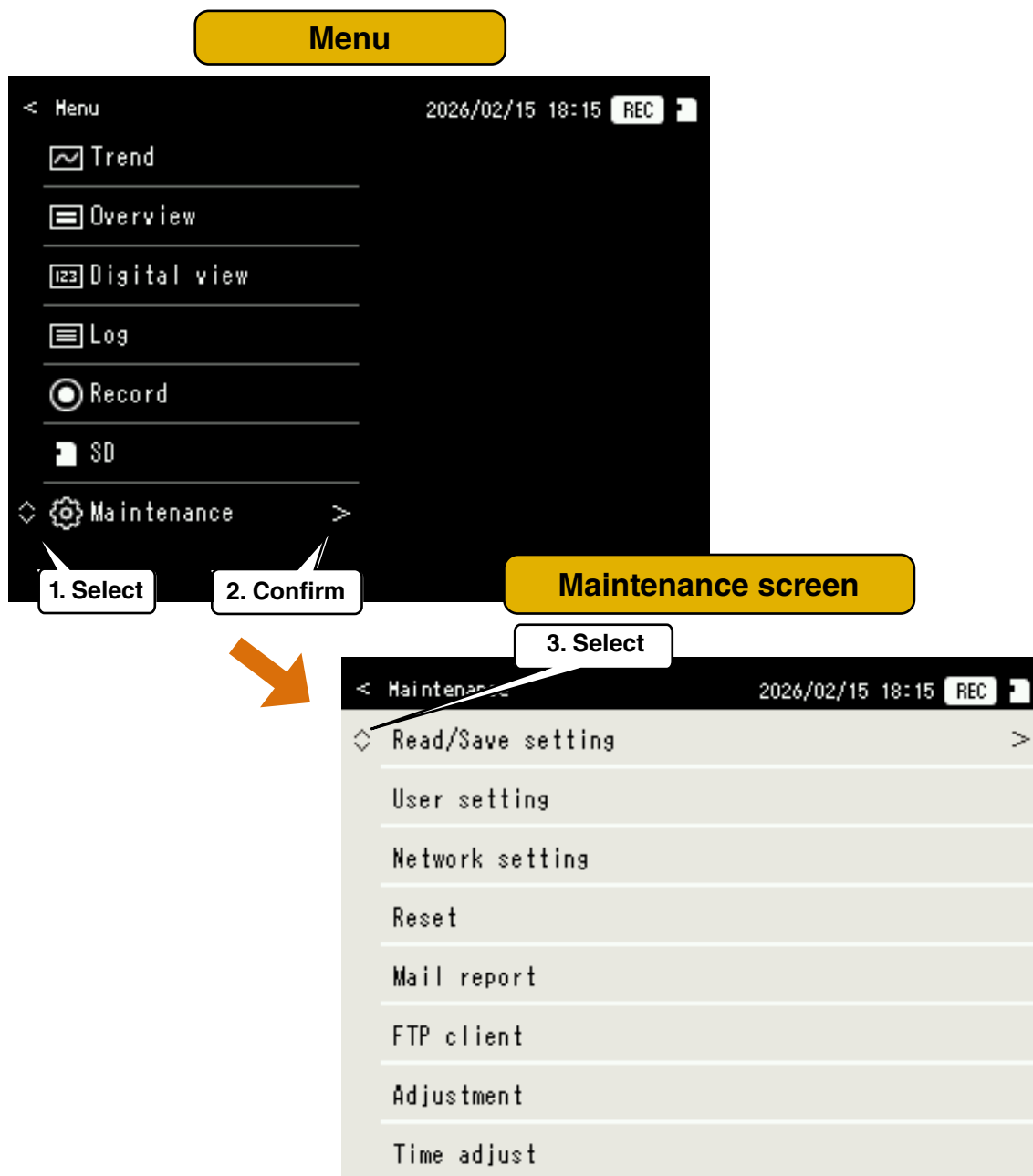
Follow the procedure below in order to display the disk usage.



1. Click [Maintenance] tab.
2. Click [Disk usage] button. After logging in, [Disk usage] window appears.

5.2 Maintenance from VR96E-G8

Maintenance can be performed on the device screen.
For details, refer to 4.3.8 Maintenance screen.



6. Recorded data

Depending on the settings, system logs, event logs and communication logs are stored in the SD card in the specified file format.

The trend data is written to the internal memory. The internal memory is composed of divided memory blocks and functions as a ring buffer. Recorded data is written to a memory block, and when it reaches a specified time or number of samplings, the writing operation transitions to the next memory block.

Simultaneously, the recorded data in the memory block is transferred to an SD card and saved in the specified file format.

6.1 General specification

The working directory is "MG\VR96" under the SD card. The pre-confirmation data (intermediate data of each recorded data) is saved there.

The updating cycle of the pre-confirmation data is as follows.

Item	Description
Trend data	Up to 50 000 samples are recorded in the internal memory block and updated at the following timing. The updating rate depends on the storing rate. → 3.5.1 Basic setting 100 ms: 5 sec. 500 ms: 10 sec. 1 s, 2 s, 5 s, 10 s: the timing of 00 sec. 1 m, 2 m, 5 m, 10 m, 30 m, 1 h: at the storing timing
System log	Updated sequentially.
Event log	
Communication log	

The conditions for finalizing the pre-confirmation data are as shown in the table below.

Finalized files are registered in the FTP client's queue. → 3.2.5 FTP client

It is also possible to download from the FTP server. → 3.2.3 FTP server

Item	Description
Trend data	When the conditions set in the normal recording or the trigger recording are met. → 3.5.1.2 Normal recording, 3.5.1.3 Trigger recording At the time of the device startup. When the SD card is inserted. When the setting is changed.
System log	When the pre-confirmation data size exceeds 128KBytes. At the time of the device startup.
Event log	
Communication log	

Refer to the following for operations during inserting or removing SD card, during power failure retention and during power startup.

Item	Description
Inserting or removing SD card	No SD card: Not saved. SD card removal process: Recording stops. When inserting SD card: Same operation as at the time of power startup. In case of storing failure due to removing SD card: Storing failure is registered in the system log. Trend recording stops. In case of storing failure during inserting SD card: Storing failure is registered in the system log. Trend recording stops.
Power failure retention	None
At the time of power startup	The pre-confirmation data before power startup is finalized and saved in the designated folders. The designated folder and file name are determined by the date information when the recorded data is finalized.

6.2 Trend data

The trend data is recorded according to the settings in the configurator software or in the device.

→ 3.5 Trend setting, 4.3.8.3 User setting

Either binary format (extension: TRD) or CSV file can be selected for the recording file format of the trend data.

Refer to the table below for the specifications of the trend data recording file.

Item	Description
Recorded content	- Binary format (extension: TRD): Setting information, trend data - CSV file: Trend data, event data, comment data
Storing rate	100 msec., 500 msec., 1 sec., 2 sec., 5 sec., 10 sec., 1 min., 2 min., 5 min., 10 min., 30 min., 1 hour
Data size (per file)	Max. 50,000 samples (per memory block)
Data size (total)	Depending on the capacity of the SD card
Timing of finalizing data	The data is finalized when the trend is finalized or when the power is turned on. When there is the data recorded before the power is removed and it is not finalized, the data is handled as the finalized data.
Data error	The previous value (initial value: 0) is recorded. Data errors occur in the following cases: - When a communication error occurs with I/O - When I/O is out of the input range - During I/O communication errors
Recording capacity (per file)	- Trend data: 50,000 samples × the number of pens - Event data: 3,000 events - Comment data: 1,000 comments

When recording trends, note the following limitations.

Item	Description
Number of events	Up to 32 events can be recorded per sample. Up to 8 events can be recorded per 100 msec. Up to 256 events can be recorded per file update. (Up to 256 events can be recorded during pre-trigger.) If the maximum number of the internal memory is exceeded, a new event is written starting from the beginning.
Number of comments	Up to 16 comments can be recorded per file update. (Up to 16 comments can be recorded during pre-trigger.) If the maximum number of the internal memory is exceeded, a new comment is written starting from the beginning.

If the time is corrected during trend data recording, the time is corrected at regular intervals for a fixed period of time to ensure time continuity.

Corrected range	Process
Within 0 to -10 sec.	The storing rate is extended until the corrected current time catches up with the time in the process of trend data recording. After catching up, the storing rate is restored.
Within 0 to 10 sec.	The data for missing storing rate is complemented. In addition, the storing rate is shortened until the time in the process of trend data recording catches up with the corrected current time. After catching up, the storing rate is restored.
Other than those above	The time change is applied immediately and is not equalized.

6.2.1 Trend data (TRD)

Refer to the table below for the detail of the trend file. Refer to 6.6 Folder structure for the folder structure.

Item	Description
Data format	TRD Binary Format (Extension: TRD)
Encode	UTF-8
Recording folder	Determined by the confirmed time of the recorded data. Saved in the "TREND\YYYY\MM\DD" folder. YYYY: 4-digit year, e.g., 2025 MM: 2-digit month, e.g., 12 DD: 2-digit day, e.g., 24
File name	Files are named with the confirmed year, month, day, hour, minute, second, and millisecond of the recorded data (YYYYMMDDhhmmss//) and saved to the SD card. (Example: For December 24, 2025, at 10:30:10.500, the file would be named 20251224103010500.TRD.)
Data view	- The trend data being recorded can be viewed on the device screen. → 4.2.3 Trend screen - Any data in the recording folder can be selected and displayed on the device screen. It is possible to jump to the target trend position from the event summary screen or comment summary screen. (If there are no events, only the latest will be displayed) → 4.3.7 SD screen - Data can be viewed with the waveform viewer software for TR30 (model: TRViewer). TRViewer can be downloaded from our website.

6.2.2 Trend data (CSV)

Refer to the table below for the detail of the trend file.

6.2.2.1 Saving format

Refer to 6.6 Folder structure for the folder structure.

Item	Description
Data format	CSV Format (Extension: CSV)
Encode	Shift-JIS / UTF-8
Recording folder	Determined by the confirmed time of the recorded data. Saved in the "TREND\YYYY\MM\DD" folder. YYYY: 4-digit year, e.g., 2025 MM: 2-digit month, e.g., 08 DD: 2-digit day, e.g., 20
File name	Files are named with the confirmed year, month, day, hour, minute, second_file type of the recorded data and saved to the SD card. Trend: YYYYMMDDhhmmss_T.CSV Event: YYYYMMDDhhmmss_E.CSV Comment: YYYYMMDDhhmmss_C.CSV (Example: For August 20, 2025, at 10:30:10.500, the file would be named 20250820103010_T.CSV, 20250820103010_E.CSV, 20250820103010_C.CSV)
Data view	Trend data being recorded can be viewed on the device screen. → 4.2.3 Trend screen

6.2.2.2 Recording format

(1) Trend data

	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8	Column 9	Column 10	Column 11	Column 12	Column 13
Row 1													
Row 2													
Row 3													
Row 4	Number of pens	4											
Row 5	Storing rate	100ms											
Row 6													
Row 7													
Row 8		PEN	Display color	I/O type	CH	CH name	Displayed comment (ON)	Displayed comment (OFF)	Scaling (0%)	Scaling (100%)	Scaling	Number of decimal places when a value is displayed	Engineering unit
Row 9		1	0xFF0000	AI	1	AI1			-10	10		2	V
Row 10		2	0x0000FF	AI	2	AI2			4	20		2	mA
Row 11		3	0x00FF00	DI	1	DI1	OFF	ON					
Row 12		4	0x00FFFF	DI	2	Contact 2	OFF	ON					
Row 13													
Row 14		Date	Time	Mili-second	AI1	AI2	DI1	Contact 2					
Row 15					AI1	AI2	DI1	Auxiliary power					
Row 16		2025/8/21	16:02:20	500	6.45	6.84	OFF	OFF					
Row 17		2025/8/21	16:02:20	600	6.53	6.77	OFF	OFF					
Row 18		2025/8/21	16:02:20	700	6.61	6.71	OFF	OFF					
Row 19		2025/8/21	16:02:20	800	6.69	6.65	OFF	OFF					
...	...	...	...	...	...	...	...	...	...	...	...	...	...

(2) Event data

	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6	Column 7	Column 8	Column 9
Row 1									
Row 2									
Row 3									
Row 4									
Row 5									
Row 6		Date	Time	Milisecond	CH name	CH comment	Event	Event no.	Status
Row 7		2025/8/21	16:02:22	700	AI1	AI1	Zone 1	0	0xFF0000
Row 8		2025/8/21	16:02:43	900	Contact 2	Auxiliary power	OFF	0	0xFF00FF
Row 9		2025/8/21	16:02:52	700	AI1	AI1	Zone 5	0	0x0000FF
Row 10		2025/8/21	16:03:13	800	Contact 2	Auxiliary power	ON	0	0xFF0000
Row 11		2025/8/21	16:03:22	700	AI1	Ai2	Zone 3	0	0x00FF00
...	...	...	...	...	...	...	...	...	...

(3) Comment data

	Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
Row 1						
Row 2						
Row 3						
Row 4						
Row 5						
Row 6		Date	Time	Milisecond	Comment	Display color
Row 7		2025/9/2	13:27:31	0	Comment 1	0xFF00FF
Row 8		2025/9/2	13:27:41	0	Comment 2	0xFF8000
Row 9		2025/9/2	13:27:47	0	Comment 2	0xFF8000
Row 10		2025/9/2	13:27:52	0	Comment 2	0xFF8000
Row 11		2025/9/2	13:27:56	0	Comment 1	0xFF00FF
...	...	...	...	...	...	...

6.3 System log

Refer to the table below for the specifications of the system log recording files.

When system log recording is disabled, system logs are not saved. → 3.6 Log setting, 4.3.8.3 User setting

Item	Description
Data format	Text format (Extension: txt)
Encode	ASCII
Recording folder	Determined by the confirmed time of the recorded data. Saved in the "LOG\YYYY\MM\DD" folder. YYYY: 4-digit year, e.g., 2025 MM: 2-digit month, e.g., 08 DD: 2-digit day, e.g., 20
Recorded content	Each row is recorded as "YYYY/MM/DD hh:mm:ss Message". Refer to 5.1.3 System log for the details on the messages.
File name	Files are named with the confirmed year, month, day, hour, minute, second, and S of the recorded data (YYYYMMDDhhmmssS.txt) and stored to the SD card. (Example: For August 20, 2025, at 10:30:10, the file would be named 20250820103010S.txt.)
Data view	Regardless of whether system logs are recorded or not, the latest 32 system logs can be viewed on the device.

6.4 Event log

Refer to the table below for the specifications of the event log recording files.

When event log recording is disabled, event logs are not saved. → 3.6 Log setting, 4.3.8.3 User setting

Item	Description
Data format	Text format (Extension: txt)
Encode	UTF-8 / Shift-JIS
Recording folder	Determined by the confirmed time of the recorded data. Saved in the "EVENT\YYYY\MM\DD" folder. YYYY: 4-digit year, e.g., 2025 MM: 2-digit month, e.g., 08 DD: 2-digit day, e.g., 20
Recorded content	Each row is recorded as "YYYY/MM/DD hh:mm:ss CH,Name,Comment,Msg". CH: Channel information (AI1 - AI16, DI1 - DI8, OI1 - OI16, DO1 - DO8) Name: The name set in the I/O setting Comment: The comment set in the I/O setting (AI: 3.4.1.4 Basic setting (AI), DI: 3.4.2.4 Basic setting (DI), OI: 3.4.3.1 Basic setting (OI), DO: 3.4.4.4 Basic setting (DO)) Message: The message set in the I/O setting (AI: 3.4.1.5 Zone setting (AI), DI: 3.4.2.4 Basic setting (DI), OI: 3.4.3.2 Zone setting (OI), DO: 3.4.4.4 Basic setting (DO))
File name	Files are named with the confirmed year, month, day, hour, minute, second, and E of the recorded data (YYYYMMDDhhmmssE.txt) and stored to the SD card. (Example: For August 20, 2025, at 10:30:10, the file would be named 20250820103010E.txt.)
Data view	Regardless of whether event logs are recorded or not, the latest 32 event logs can be viewed on the device.

6.5 Communication log

Refer to the table below for the specifications of the communication log recording files.

When communication log recording is disabled, communication logs are not saved.

→ 3.6 Log setting, 4.3.8.3 User setting

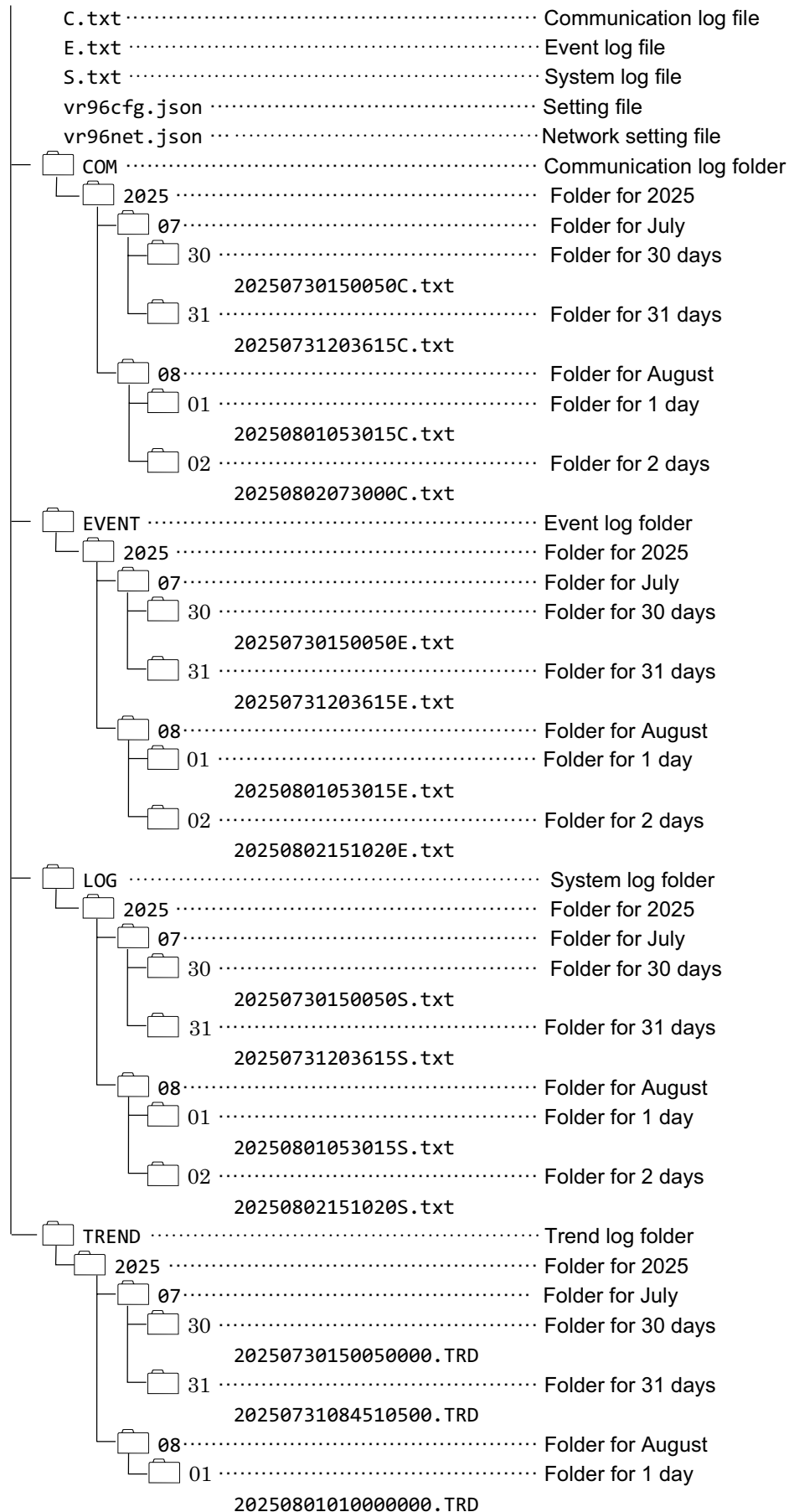
Item	Description
Data format	Text format (Extension: txt)
Encode	ASCII
Recording folder	Determined by the confirmed time of the recorded data. Saved in the "COM\YYYY\MM\DD" folder. YYYY: 4-digit year, e.g., 2025 MM: 2-digit month, e.g., 08 DD: 2-digit day, e.g., 20
Recorded content	Each row is recorded as "YYYY/MM/DD hh:mm:ss Type, Count,Form/File,Msg". Type: SMTP/FTPC Count: Number of transmission trials 1 to 3 Form/File: Forms or files to be sent Msg: Success or failure factors Example: FTPC,1,CLOG.txt,Success → Succeeded in transferring CLOG.txt SMTP,1,F1,Regular → Succeeded in regular reporting of Form1
File name	Files are named with the confirmed year, month, day, hour, minute, second, and C of the recorded data (YYYYMMDDhhmmssC.txt) and stored to the SD card. (Example: For August 20, 2025, at 10:30:10, the file would be named 20250820103010C.txt.)
Data view	Regardless of whether communication logs are recorded or not, the latest 32 communication logs can be viewed on the device.

6.6 Folder structure

Each file is stored in the base folder "MG¥VR96" in the SD card.

The folder structure is as shown on the next page. Year, month, and day folders are automatically created as the number of saved files increases.

Base folder (MGVR96)



7. Appendix

7.1 Troubleshooting

Also refer to the “Frequently Asked Questions (FAQ)” from our website.

7.1.1 SD card

Problem faced	Checks to be done	Method of handling
Unable to record log data in the SD card.	Has the SD card been inserted? (Is the SD card mounted?) → 4.2.2 Common area for each screen	Insert an SD card specified by us. → 7.2.6 SD card
	Is the RECORD lamp ON? → 4.2.2 Common area for each screen	Hold down > button on the device.
	Is there space available for storage on the SD card?	Check for space availability, and delete unnecessary data in the SD card. → 4.3.8.13 Disk usage, 5.1.10 Disk usage

7.1.2 VR96CFG

Problem faced	Checks to be done	Method of handling
Unable to communicate between VR96E-G8 and VR96CFG.	Is the IP address correct?	Check the IP address on the screen of the VR96E-G8. → 4.3.8.4 Network setting
	Has the LAN cable come out of the HUB?	Connect the LAN cable securely.
	Is the IP address overlapping with another device?	Check the IP address.
	Has the same network address been specified in the VR96E-G8 and in the PC?	Check the IP address. Issue the ping command from the PC and check whether there is a response. [Example] VR96E-G8 : 192.168.0.1 PC : 192.168.0.2 Subnet mask: 255.255.255.0
	Have firewall or proxy server setting been configured on the PC?	Check the contents of the firewall and proxy server setting with the network administrator.
	Is there a problem in the terminal or PC being used?	Use a different terminal or PC.
	Is the login name and the password correct?	Check the login name and password on the screen of the VR96E-G8. → 4.3.8.4 Network setting

7.1.3 E-mail reporting

Problem faced	Checks to be done	Method of handling
Unable to send e-mails from the VR96E-G8.	Have you connected to the Internet?	Check that it is possible to connect to the Internet from the PC.
	Have the IP address and default gateway of the VR96E-G8 been correctly set?	Check the settings of the IP address and default gateway of the VR96E-G8. → 4.3.8.4 Network setting
	Is the recipient's e-mail address correct?	Check the recipient's e-mail address. Pay attention to differences such as between "_" and "-".
	Are the mail-related settings correct? - E-mail account - SMTP server IP address or domain name - POP3 server IP address or domain name - E-mail password	Check the mail-related settings sent by the provider. Also, confirm that it is possible to send e-mails to the recipient's address from e-mail software of your PC.
	Is the e-mail address correctly registered in the template?	Check the template settings.
	Does the e-mail server of the provider require authentication when sending e-mails? (e.g., SMTP authentication, SSL)	Verify the authentication method required by the provider and configure the e-mail settings accordingly. → 3.8 E-mail reporting setting
	If case of POP before SMTP authentication, have you opened the specified router port number?	Manually set the number specified in the router's NAT settings. (refer to the instruction manual of the router)
	Does the provider's e-mail service have a spam prevention function?	Are the mail-related settings correct? - E-mail account - SMTP server IP address or domain name - POP3 server IP address or domain name - E-mail password

7.1.4 Modbus/TCP (client)

Problem faced	Checks to be done	Method of handling
Unable to connect from the Modbus client to the VR96E-G8.	Has the Modbus/TCP server function enabled?	Enable the Modbus/TCP server function. → 3.2.2 Modbus/TCP (server)
Unable to read the data.	Are the channel register type and address correct?	Check the register type and address. → 7.2.4 Modbus/TCP server
Unable to connect via the router.	Has the port number 502 used by Modbus/TCP on the router opened?	Manually set the IP address and port number 502 of the VR96E-G8 in the router's NAT settings. (refer to the instruction manual of the router)

7.1.5 Modbus/TCP (server)

Problem faced	Checks to be done	Method of handling
Unable to connect to the Modbus server device from the VR96E-G8.	Is the LAN cable disconnected or has it come out from the HUB?	Connect the LAN cable securely. Check the connection lamp on the HUB.
	Is the IP address of the VR96E-G8 correct?	Check the IP address. → 4.3.8.4 Network setting
	Has the same network address been specified in the VR96E-G8 and in Modbus server device?	Check the network address. [Example] VR96E-G8: 192.168.0.1 Slave: 192.168.0.2 Subnet mask: 255.255.255.0
	Is the IP address of the server device same as the one registered in VR96CFG?	Check the IP address. → 3.3.1 Connection setting
	Has the IP address been set for the server device?	Set the IP address for the server device. And, when using a remote I/O provided by us, disconnect and restart the power supply after setting the IP address. (refer to Users Manual of the respective remote I/O for how to set the IP address)
	Is the server function enabled on the SLMP-compatible device?	Enable the server function on the SLMP-compatible device.

7.1.6 FTP server

Problem faced	Checks to be done	Method of handling
Unable to make an FTP connection to the VR96E-G8.	Have the setting of the FTP server function for the VR96E-G8 been enabled?	Set the mode in the FTP server setting in VR96CFG as [Enable]. → 3.2.3 FTP server 4.3.8.4 Network setting
	Are the IP address, Login ID and the password for the VR96E-G8 correct?	Check the IP address.
		Check the Login ID and password set in VR96CFG. → 3.2.3 FTP server
	Is it possible to login to the VR96E-G8 from an FTP client such as a PC?	Check whether a DOS command can be used to login to the VR96E-G8.
Unable to perform maintenance of files in the VR96E-G8 from the FTP client.	Is the FTP client software being used specified in this User Manual?	Use an FTP client whose working has been confirmed. → 7.2.1 FTP server

7.1.7 FTP client

Problem faced	Checks to be done	Method of handling
Unable to connect to the FTP server.	Are the FTP server settings correct?	Check the settings on the FTP server.
	Is it possible to login to the FTP server set to the VR96E-G8 as transfer destination from FTP client such as a PC?	Verify if it is possible to log in to the FTP server using DOS commands, etc.
Unable to transfer trend data and each log files from the VR96E-G8.	Are the FTP server address, login, password, and destination folder name correct?	Check the login name and password for the FTP server. → 3.2.5 FTP client
	Is the subfolder to transfer specified?	Check the subfolder name on the FTP server. → 3.2.5 FTP client
	Does VR96E-G8 regularly transmit to the FTP server?	Check the transmission status. → 4.2.10 Communication log screen 5.1.4 Communication log

7.2 Reference documents

7.2.1 FTP server

Item	Description
FTP client	OS: Windows 10, Windows 11 Application (Verified operation environment): FFFTP
Maximum number of connections	1
Port address	For FTP connection: can be changed (initial value: 21) For passive: 45967 to 45970
Connection	PASV only
Access limitation	Login ID and password only
Operation	- Display of the list of directories and files - File download (only 1 file) - File download (Multiple files) - File deletion (1 file/multiple files) - Directory deletion (Including the files stored in the directory)

7.2.2 FTP client

FTP client function is performed as follows.

Item	Description
Port address	Variable (default: 21)
Connection	PASV only (port mode is not available)
Target	Finalized files (trend, logs)
File name	Same as the files saved in an SD card
Sub folder	Sub folder can be set.
Queuing	Up to 8 files Files are recorded in the system logs when the queue is full.
PASV	PASV port: 45967 to 45970 It is possible to set whether the address returned by the PASV command is ignored or not. (mandatory if a port number other than 21 is specified).
Power failure retention	None
Retransmission	3 times (including the initial attempt) The first retry will continue 10 seconds later, and the second retry will continue 20 seconds later.
Test transmission	A test file is created in the working directory and transmitted. It is deleted after the test transmission. Test transmission is not a target of retransmission.
Transmission failure	When transmission fails, the transmission failure output is turned ON. When transmission is successful or when FTP client-related settings are changed, the transmission failure output is turned OFF. The same applies during test transmissions.
Time stamp	Local time
Log	Recorded in the communication log including retransmissions.

7.2.3 SLMP client

7.2.3.1 Request message

Header	Subheader	Request destination station network number	Request destination station number	Request destination unit I/O number	Request destination multidrop station number	Request data length	Monitoring timer	Request data	Footer
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Parameter	Description
Header	Automatically added
Subheader	Fixed at 0x5000
Request destination station network number	Network No. specified in the VR96CFG I/O connection setting
Request destination station number	Station No. specified in the VR96CFG I/O connection setting
Request destination unit I/O number	Processor No. specified in the VR96CFG I/O connection setting
Request destination multidrop station number	Fixed at 0
Request data length	Automatically added
Monitoring timer	SLMP Timeout specified in the VR96CFG connection setting
Request data	Automatically generated by the device specified by the VR96CFG
Footer	Automatically added

7.2.3.2 SLMP command list

The commands and subcommands used to read the data from an SLMP device are as follows.

AI

Type	Device	Device code	Command	Subcommand
16bits	Data register (D)	00A8H	0403H	0000H
	Special register (SD)	00A9H	0403H	0000H
	File register (R) -- Block switching method	00AFH	0403H	0000H
	File register (ZR) -- Serial number access methos	00B0H	0403H	0000H
	Link register (W)	00B4H	0403H	0000H
	Link special register (SW)	00B5H	0403H	0000H
	Timer, Current value (TN)	00C2H	0403H	0000H
	Counter, Current value (CN)	00C5H	0403H	0000H
	Retentive timer, Current value (STN)	00C8H	0403H	0000H
	Index register (Z)	00CCH	0403H	0000H
	Module refresh register (RD)	002CH	0403H	0000H
32bits	Data register (D)	00A8H	0403H	0002H
	Special register (SD)	00A9H	0403H	0002H
	File register (R) -- Block switching method	00AFH	0403H	0002H
	File register (ZR) -- Serial number access methos	00B0H	0403H	0002H
	Link register (W)	00B4H	0403H	0002H
	Link special register (SW)	00B5H	0403H	0002H
	Timer, Current value (TN)	00C2H	0403H	0002H
	Counter, Current value (CN)	00C5H	0403H	0002H
	Retentive timer, Current value (STN)	00C8H	0403H	0002H
	Index register (Z)	00CCH	0403H	0002H
	Module refresh register (RD)	002CH	0403H	0002H

DI (1/2)

Type	Device	Device code	Command	Subcommand
16bits	Internal relay (M)	0090H	0403H	0000H
	Special relay (SM)	0091H	0403H	0000H
	Latch relay (L)	0092H	0403H	0000H
	Annunciator (F)	0093H	0403H	0000H
	Edge relay (V)	0094H	0403H	0000H
	Step relay (S)	0098H	0403H	0000H
	Input (X)	009CH	0403H	0000H
	Output (Y)	009DH	0403H	0000H
	Link relay (B)	00A0H	0403H	0000H
	Link special relay (SB)	00A1H	0403H	0000H
	Timer, Coil (TC)	00C0H	0401H	0001H
	Timer, Contact (TS)	00C1H	0401H	0001H
	Counter, Coil (CC)	00C3H	0401H	0001H
	Counter, Contact (CS)	00C4H	0401H	0001H
	Retentive timer, Coil (STC)	00C6H	0401H	0001H
	Retentive timer, Contact (STS)	00C7H	0401H	0001H
	Long timer, Coil (LTC)	0050H	0403H	0000H
	Long timer, Contact (LTS)	0051H	0403H	0000H
	Long counter, Coil (LCC)	0054H	0403H	0000H
	Long counter, Contact (LCS)	0055H	0403H	0000H
	Long retentive timer, Coil (LSTC)	0058H	0403H	0000H
	Long retentive timer, Contact (LSTS)	0059H	0403H	0000H

DI (2/2)

Type	Device	Device code	Command	Subcommand
32bits	Internal relay (M)	0090H	0403H	0002H
	Special relay (SM)	0091H	0403H	0002H
	Latch relay (L)	0092H	0403H	0002H
	Annunciator (F)	0093H	0403H	0002H
	Edge relay (V)	0094H	0403H	0002H
	Step relay (S)	0098H	0403H	0002H
	Input (X)	009CH	0403H	0002H
	Output (Y)	009DH	0403H	0002H
	Link relay (B)	00A0H	0403H	0002H
	Link special relay (SB)	00A1H	0403H	0002H
	Timer, Coil (TC)	00C0H	0401H	0003H
	Timer, Contact (TS)	00C1H	0401H	0003H
	Counter, Coil (CC)	00C3H	0401H	0003H
	Counter, Contact (CS)	00C4H	0401H	0003H
	Retentive timer, Coil (STC)	00C6H	0401H	0003H
	Retentive timer, Contact (STS)	00C7H	0401H	0003H
	Long timer, Coil (LTC)	0050H	0401H	0002H
	Long timer, Contact (LTS)	0051H	0401H	0002H
	Long counter, Coil (LCC)	0054H	0401H	0003H
	Long counter, Contact (LCS)	0055H	0401H	0003H
	Long retentive timer, Coil (LSTC)	0058H	0401H	0002H
	Long retentive timer, Contact (LSTS)	0059H	0401H	0002H

DO (1/2)

Type	Device	Device code	Command	Subcommand
16bits	Internal relay (M)	0090H	1402H	0001H
	Special relay (SM)	0091H	1402H	0001H
	Latch relay (L)	0092H	1402H	0001H
	Annunciator (F)	0093H	1402H	0001H
	Edge relay (V)	0094H	1402H	0001H
	Step relay (S)	0098H	1402H	0001H
	Input (X)	009CH	1402H	0001H
	Output (Y)	009DH	1402H	0001H
	Link relay (B)	00A0H	1402H	0001H
	Link special relay (SB)	00A1H	1402H	0001H
	Timer, Coil (TC)	00C0H	1402H	0001H
	Timer, Contact (TS)	00C1H	1402H	0001H
	Counter, Coil (CC)	00C3H	1402H	0001H
	Counter, Contact (CS)	00C4H	1402H	0001H
	Retentive timer, Coil (STC)	00C6H	1402H	0001H
	Retentive timer, Contact (STS)	00C7H	1402H	0001H
	Long timer, Coil (LTC)	0050H	1402H	0001H
	Long timer, Contact (LTS)	0051H	1402H	0001H
	Long counter, Coil (LCC)	0054H	1402H	0001H
	Long counter, Contact (LCS)	0055H	1402H	0001H
	Long retentive timer, Coil (LSTC)	0058H	1402H	0001H
	Long retentive timer, Contact (LSTS)	0059H	1402H	0001H

DO (2/2)

Type	Device	Device code	Command	Subcommand
16bits	Internal relay (M)	0090H	1402H	0003H
	Special relay (SM)	0091H	1402H	0003H
	Latch relay (L)	0092H	1402H	0003H
	Annunciator (F)	0093H	1402H	0003H
	Edge relay (V)	0094H	1402H	0003H
	Step relay (S)	0098H	1402H	0003H
	Input (X)	009CH	1402H	0003H
	Output (Y)	009DH	1402H	0003H
	Link relay (B)	00A0H	1402H	0003H
	Link special relay (SB)	00A1H	1402H	0003H
	Timer, Coil (TC)	00C0H	1402H	0003H
	Timer, Contact (TS)	00C1H	1402H	0003H
	Counter, Coil (CC)	00C3H	1402H	0003H
	Counter, Contact (CS)	00C4H	1402H	0003H
	Retentive timer, Coil (STC)	00C6H	1402H	0003H
	Retentive timer, Contact (STS)	00C7H	1402H	0003H
	Long timer, Coil (LTC)	0050H	1402H	0003H
	Long timer, Contact (LTS)	0051H	1402H	0003H
	Long counter, Coil (LCC)	0054H	1402H	0003H
	Long counter, Contact (LCS)	0055H	1402H	0003H
	Long retentive timer, Coil (LSTC)	0058H	1402H	0003H
	Long retentive timer, Contact (LSTS)	0059H	1402H	0003H

7.2.4 Modbus/TCP server

7.2.4.1 General specification

Item	Description
Protocol	Modbus/TCP
Port address	Variable (Initial value: 502)
Number of simultaneous connections	Up to 2
Connectable device	SCADALINXpro / DL30 series / TR30 series / DL8 series / JC-IO / VR series / GM30 / RGP30

7.2.4.2 Register map

0X

Register	Channel
1 to 8	DO1 to 8

1X

Register	Channel
1 to 8	DI1 to 8

3X

Register	Channel
0001 to 0016	AI1 to 16
1001 to 1032	OI1 to 16 Addresses with smaller numbers are low.

7.2.4.3 Modbus commands

■ Data and control functions

CODE	NAME		
01	Read Coil Status	Yes	Digital Output from the slave
02	Read Input Status	Yes	Status of digital Inputs to the slave
03	Read Holding Registers		General purpose register within the slave
04	Read Input Registers	Yes	Collected data from the field by the slave
05	Force Single Coil		Digital output from the slave
06	Preset Single Register		General purpose register within the slave
07	Read Exception Status		
08	Diagnostics		
09	Program 484		
10	Poll 484		
11	Fetch Comm. Event Counter		
12	Fetch Comm. Event Log		
13	Program Controller		
14	Poll Controller		
15	Force Multiple Coils		Digital output from the slave
16	Preset Multiple Registers		General purpose register within the slave
17	Report Slave ID		
18	Program 884/M84		
19	Reset Comm. Link		
20	Read General Reference		
21	Write General Reference		
22	Mask Write 4X Register		
23	Read/Write 4X Registers		
24	Read FIFO Queue		

■ Exception code

CODE	NAME		
01	Illegal Function	Yes	Function code is not allowable for the slave
02	Illegal Data Address	Yes	Address is not available within the slave
03	Illegal Value		
04	Slave Device Failure		
05	Acknowledge		
06	Slave Device Busy		
07	Negative Acknowledge		
08	Memory Parity Error		

■ Diagnostic subfunctions

CODE	NAME		
00	Return Query Data		
01	Restart Comm. Option		
02	Return Diagnostic Register		
03	Change Input Delimiter Character		
04	Force Slave to Listen Only Mode		

7.2.4.4 Data range

When the VR96E-G8 is used as a Modbus/TCP slave, the data range that respond to the Modbus master and data written from the Modbus master is as follows.

Item	Description
AI	- When the data type is [%] (0 to 10000; voltage/current data of remote I/O): -500 to 10500 - When the data type is [Int] (signed integer): Signed 16 bit integer (-32768 to 32767) - When the data type is [Uint]: Unsigned 16 bit integer (0 to 65535)
DI	0: OFF, 1: ON
OI	32 bit single precision floating point
DO	0: OFF, 1: ON

7.2.5 E-mail reporting

Event reporting and regular reporting are sent as follows.

Item	Description
Port address	Variable (default: 465)
Reported contents	- Subject: up to 32 characters - Body text: up to 128 characters - Reporting source: attached at the end of the body text Abnormality reporting: [Report Factor: message] Regular reporting: [Report Factor: Regular] Test reporting: [Report Factor: Test] - Channel information: attached at the end of the body text AI, DI, OI or DO can be selected. (abnormality reporting and regular reporting only)
Address	8 (only "To:")
Template	4
Encryption communication	TLS1.2
Queuing	Up to 8 files Files are recorded in the system logs when the queue is full.
Power failure retention	None
Retransmission	3 times (including the initial attempt) The first retry will continue 10 seconds later, and the second retry will continue 20 seconds later.
Test transmission	Test transmission is not a target of retransmission.
Transmission failure	When transmission fails, the transmission failure output is turned ON. When transmission is successful or when SMTP-related settings are changed, the transmission failure output is turned OFF. The same applies during test transmissions.

7.2.6 SD card

7.2.6.1 SD card basic specifications

Item	Description
Type	microSD
Format	FAT32

7.2.6.2 Specified SD card type

Manufacturer	Model	Capacity
Hagiwara Solutions	MSDB-016GS(V01SLS	16 GB

Available for purchase from us. Consult us.

7.2.6.3 SD card formatter

When formatting SD card, use a dedicated software “SD Card Formatter”.

“SD Card Formatter” is downloadable at SD Association’s web site.

<https://www.sdcard.org>

CAUTION

Do not use a formatter other than the one provided by the SD Association for the SD card.

7.2.6.4 Auto deleting function

The oldest files can be automatically deleted by enabling the auto deleting function when the remaining space of the SD card is less than 100 MB. → 3.5.1 Basic setting

The conditions for deletion are as follows.

- The data older than 2 days are deleted.
- An SD card error is triggered if the files cannot be deleted.
- The oldest files are deleted when the remaining space of the SD card is less than 100 MB.
The oldest day, month, year folder(s) are deleted until the SD card recovers more than 100 MB of free space.
An SD card error is triggered if the free space is still less than 100 MB after deletion.
The SD card recovers from error when the free space exceeds 100 MB after deleting the files.
Regarding system log, event log and communication log, the oldest files are deleted when the files are exported after memory blocks are finalized.

7.3 Version history

7.3.1 VR96E-G8

7.3.1.1 Ver1.0

- Initial issue

8. License

Below are the licenses for the functions used in VR96E-G8 and VR96CFG.

8.1 License

This software incorporates Jansson (<https://github.com/akheron/jansson>).
This Jansson is distributed under the MIT License.

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