PT2E-1582

RIKEN KEIKI

Gas detector head

70D Series Ethernet Model

Communication Function Manual

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Preface

Thank you for choosing our 70D Series Ethernet model (GD-70D-EA/SD-70SC-ET, hereafter GD-70D-EA is described as a representative of both).

This communication function manual explains how to use the Ethernet communication function of GD-70D-EA. Not only the first-time users but also the users who have already used the product must read and understand the operating manual to enhance the knowledge and experience before using the product.

Note that the communication function of GD-70D-EA is part of communication devices forming the network system on the field.
Please be sure to read the operating manuals of related equipment.

Limitation of Responsibilities

We shall not take any responsibilities of the results caused by the program of other devices that communicates with this product.

Notation of numerical number

Decimal number: Numerical value only (1　100　1000, etc.)
Hexadecimal number: With“0x” in front of the value (0x00　0x64　0x3EB, etc.)

Definition of DANGER, WARNING, CAUTION and NOTE

Definition of DANGER, WARNING, CAUTION and NOTE

⚠ DANGER	This message indicates that improper handling may cause serious damage on life, health or assets.
⚠ WARNING	This message indicates that improper handling may cause serious damage on health or assets.
⚠ CAUTION	This message indicates that improper handling may cause minor damage on health or assets.
NOTE	This message indicates advice on handling.

Contents

1

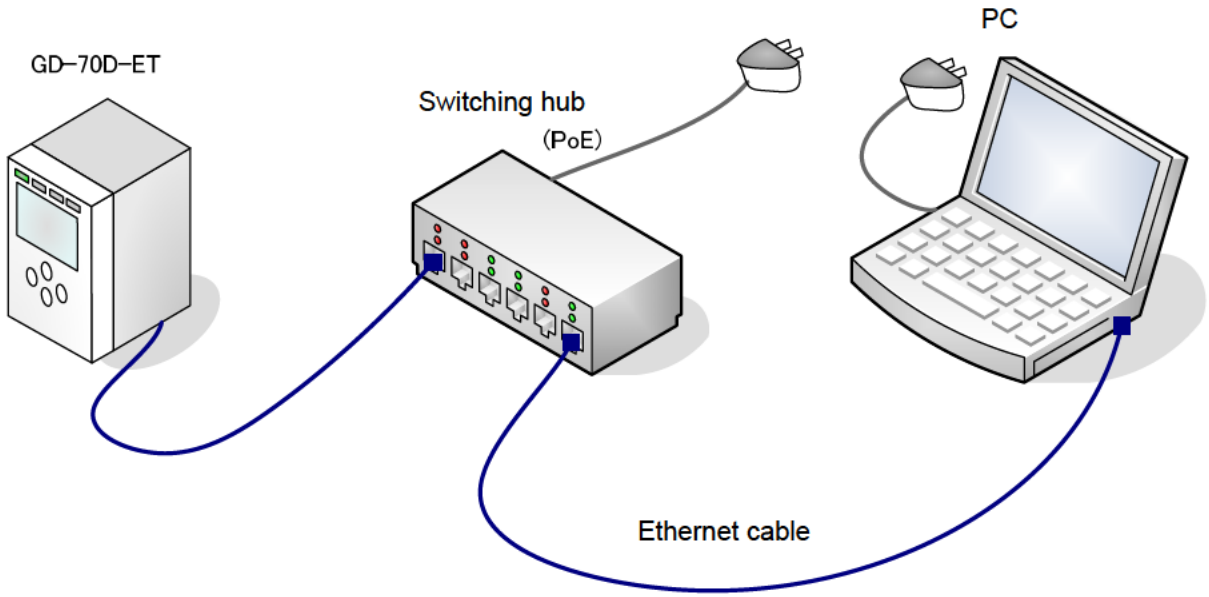
Start-up

This chapter describes the Web screen of GD-70D-EA and the method to communicate with the PLC using specific connection and setting examples.

1-1. Connecting devices

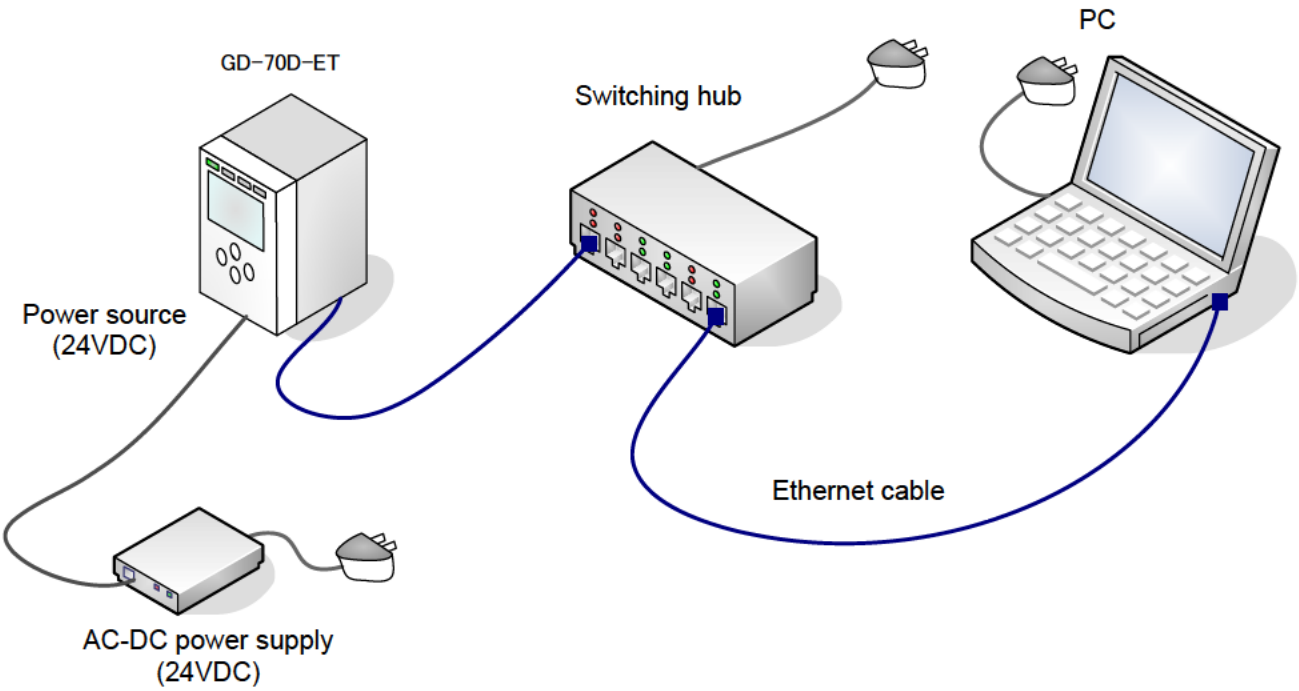
Connect GD-70D-EA and the PC as illustrated in the following figure.

1-1-1. Connection with a PoE switching hub



1-1-2. Connection with a non-PoE switching hub

GD-70D-EA must be supplied with 24 VDC



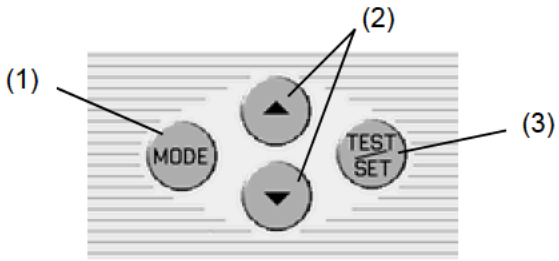
1-2. Setting

1-2-1. Setting the IP address of GD-70D-EA

Turn ON the power switch of GD-70D-EA.

The following describes how to set the IP address to 192.168.1.1 and the Subnet mask to 255.255.255.0 using front panel keys.

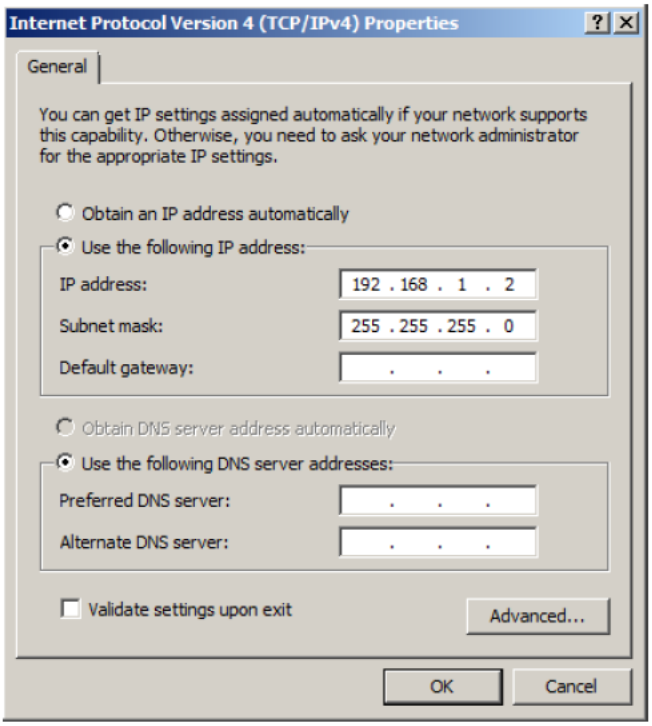
Description of keys
(1) MODE key
(2) ▲▼ keys
(3) SET key



Setting procedure
(1) Press and hold the MODE key to enter the maintenance mode.
(The display indicates [1-1/ZERO].)
(2) Display [1-9/M MODE] using ▲ and ▼ keys. Press the SET key.
(The display indicates [----/M MODE].)
(3) Press and hold the SET key again.
(The display indicates [2-0/GAS TEST].)
(4) Display [2-10/SETTING2] using ▲ and ▼ keys. Press the SET key.
(The display indicates [SET 0/ADDRESS].)
(5) Display [SET 18/ETHERNET] using ▲ and ▼ keys. Press the SET key.
(The display indicates [XX/MAC1].)
(6) Display [XXX/IP1] using ▲ and ▼ keys. Press the SET key.
(The display indicates [XXX/IP1], where XXX (number) blinks.)
(7) Display the IP address of [192/IP1] using ▲ and ▼ keys. Press the SET key.
(The display indicates [192/IP1].)
(8) Set IP2 through IP4 to 168, 1, 1 and set SUB1 through SUB4 to 255, 255, 255, 0 respectively using the same procedures as (6) and (7).
(9) Display [/SAVE] using ▲ and ▼ keys. Press the SET key.
(The display indicates [/SAVE Y/N].)
(10) Press the SET key. The IP address is registered.
(This can take approximately 10 seconds.)
(The display indicates [SET18/ETHERNET].)
(11) Press and hold the MODE key to exit the maintenance mode.

1-2-2. Setting the IP address of the PC

In the [Internet Protocol Version 4 (TCP/IPv4) Properties] window, set the IP address.
The following describes setting the IP address to 192.168.1.2 and the Subnet mask to 255.255.255.0.
(The figure below illustrates an example in Windows 7)



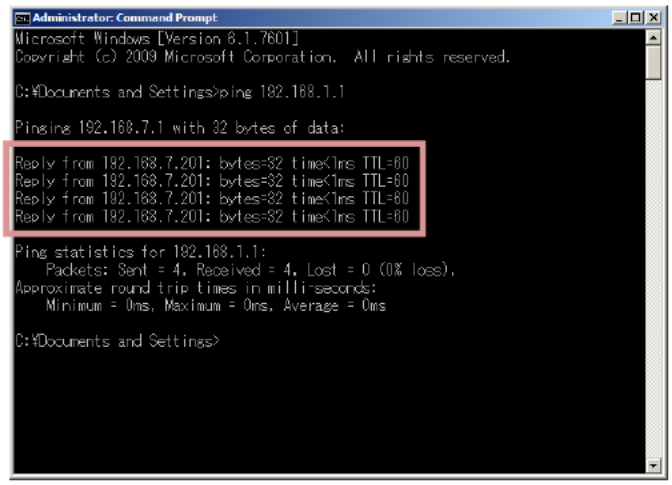
CAUTION

When replacing communication devices, the communication from the PC to the corresponding device may be unavailable for a while (usually 10 minutes or less) following the replacement if the IP address of the device is the same between before and after the replacement.
If it is necessary to immediately make the communication available, select [Repair] in the [Network Connections] window (when using Windows XP). As [Repair] is not available in Windows 7, select [Disable] in the [Network Connections] window and select [Enable] to activate the communication.

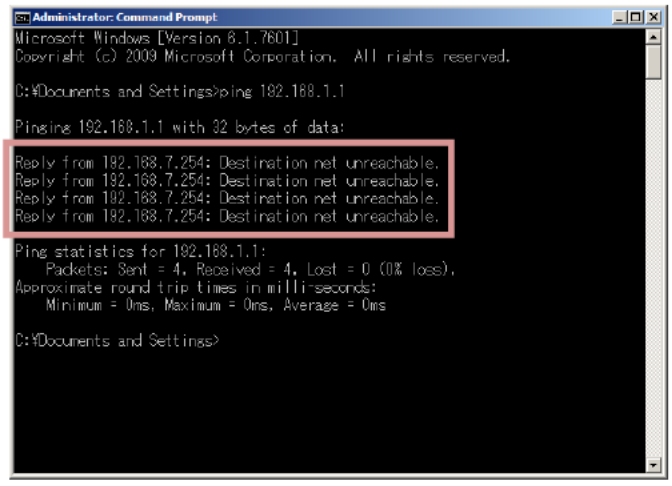
1-2-3. Communication test

Enter the following command in the Windows command prompt.
ping 192.168.1.1 [Enter]

Communication test successful

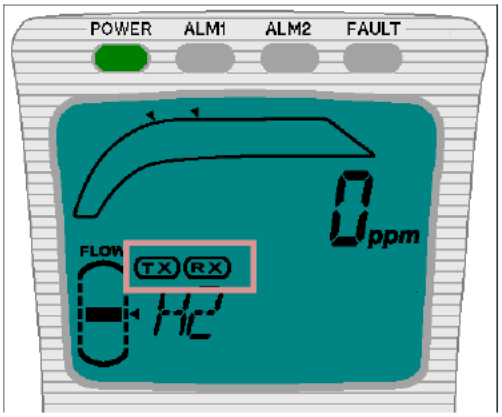


Communication test failed



Verify the connection and settings again if the communication test failed.

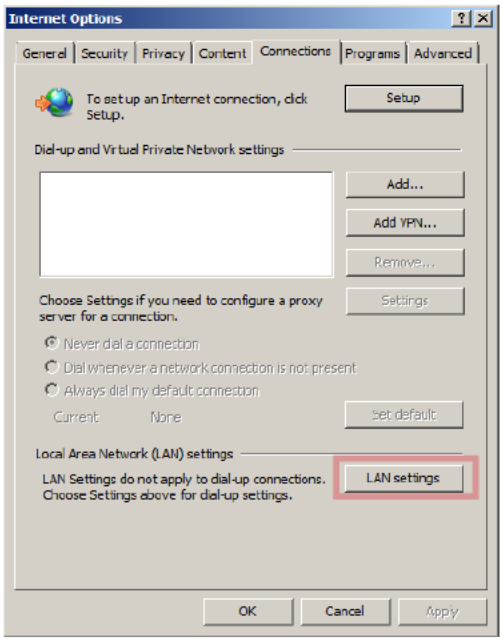
GD-70D-EA displays (TX)/(RX) during data transmission/reception respectively.



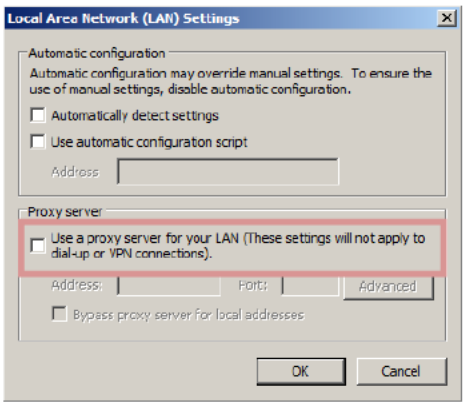
1-3. Web functions

1-3-1. Setting the browser

In the [Internet Options] window, select the [Connections] tab and click [LAN settings].

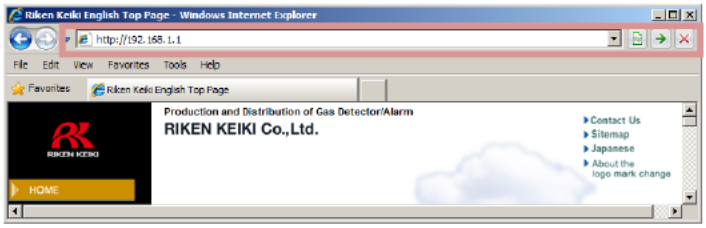


Uncheck the [Use a proxy server for your LAN] option if it is checked.

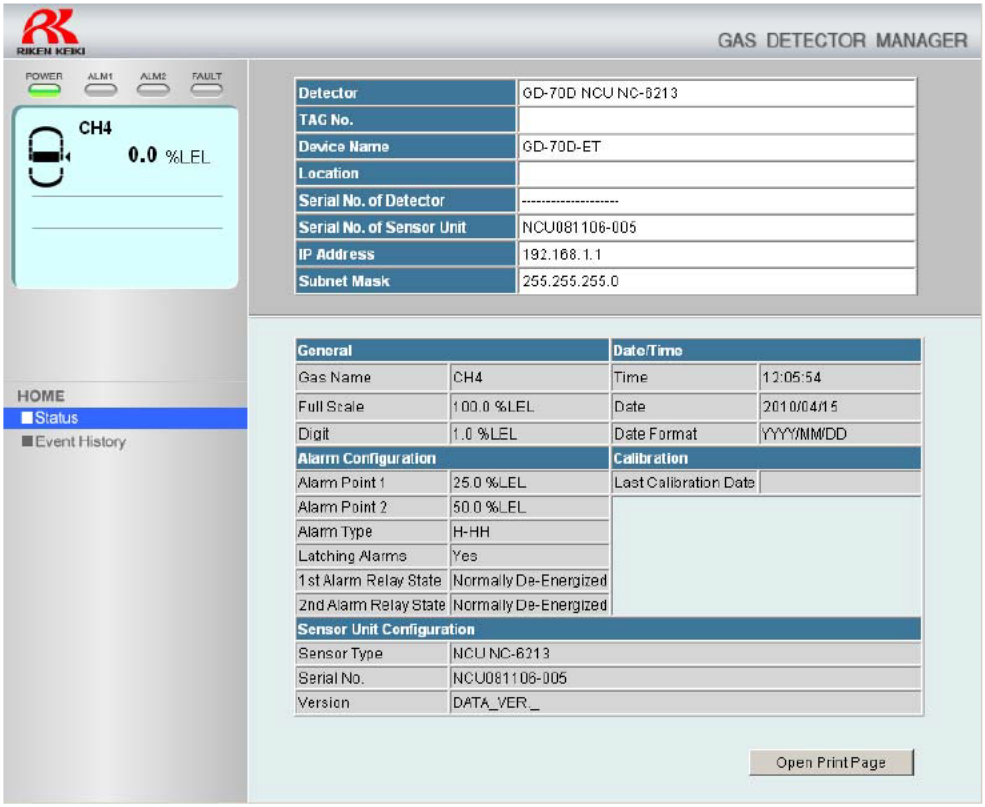


1-3-2. Logging in to the user mode

Enter the following address in the Internet Explorer address bar and click the move button.
http://192.168.1.1



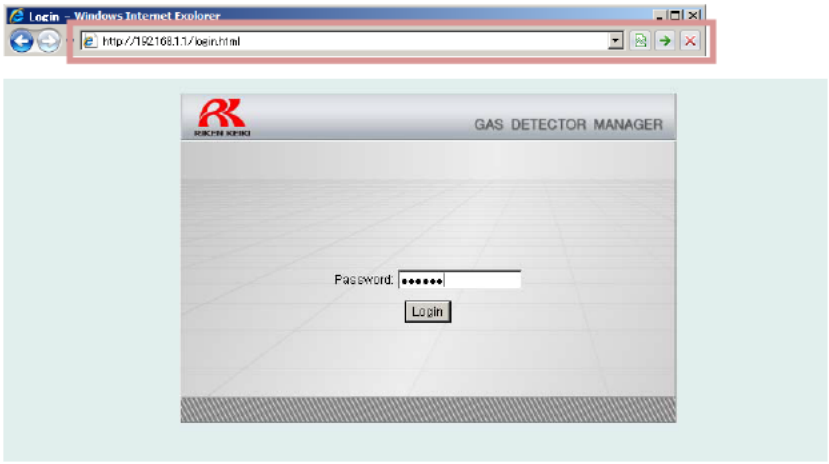
In the user mode, basic information (gas name, alarm setpoint, etc.) is only indicated.



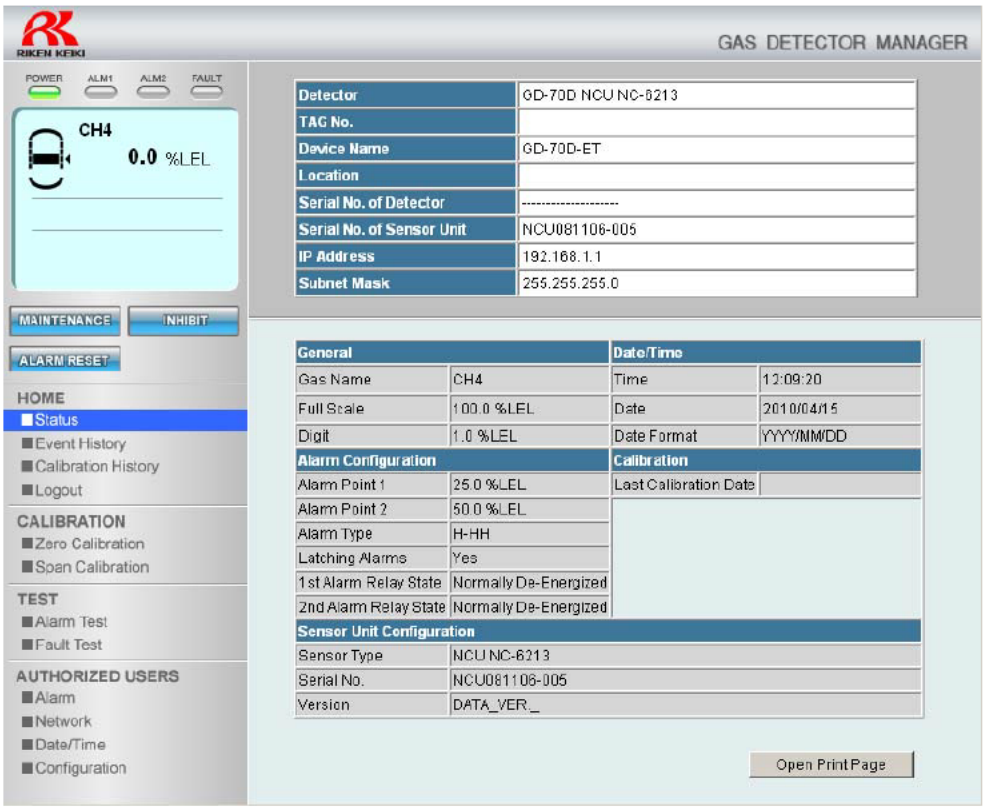
(The content of the screen may vary depending on the version and settings of Internet Explorer.)
See Chapter 2, “Web Functions” for the detailed content.

1-3-3. Logging in to the authorized user mode

Enter the following address in the Internet Explorer address bar and click the move button.
http://192.168.1.1/login.html
The screen similar to below is displayed. Enter the default password “GD-70D” and click the [Login] button.



In the authorized user mode, detailed information of the gas detector can be viewed. Also settings (alarm setpoint, etc.) can be modified.



1-4. PLC communication functions (OMRON CJ/CS Series)

Configure the PLC communication settings of GD-70D-EA.
The settings can be configured by the following methods:

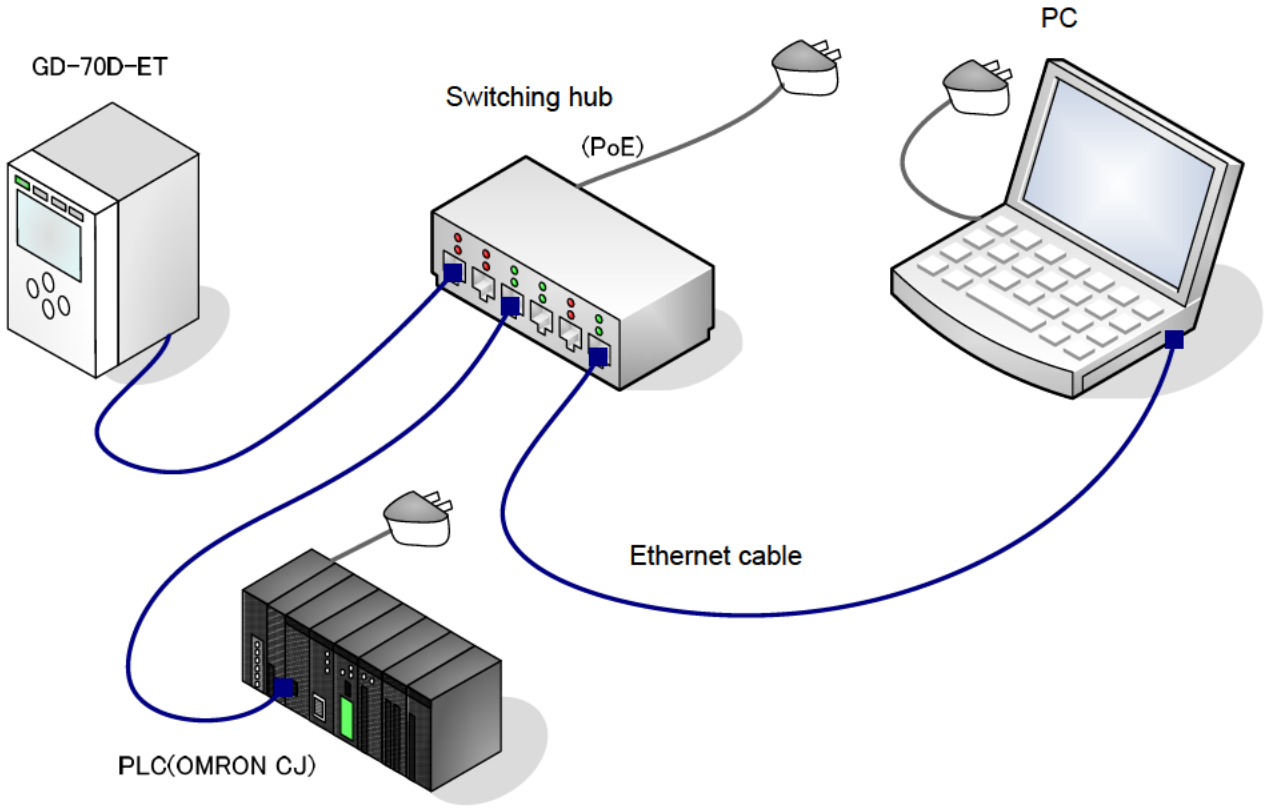
- To flexibly set the small number of devices:
  ⇨ Use the Web screen of the authorized user mode.
  Multiple items can flexibly be set through the Network screen of the Web function.
  If not [PLC MODE] = 1, it is not possible to change all the items.
  See 1-4-2, “Setting the communication with PLC through the Web function” for details of the setting method.

- To quickly set a large number of devices through the operation on the gas detector:
  ⇨ Use the GD-70D-EA front panel.
  The setting can be easily configured using front panel keys in the following two items: [PLC MODE] and [PLC AREA].
  PLC IP address XXX. XXX. XXX.251 and NODE251 are fixed.
  ([xxx] is the same as the IP address of GD-70D-EA.)
  See 1-4-3, “Setting the communication with PLC through the GD-70D-EA main unit” for details of the setting method.

OMRON CJ/CS Series

1-4-1. Connection with the PLC

Connect the PLC as illustrated in the following figure.
(The following figure illustrates the connection with the PoE switching hub.)

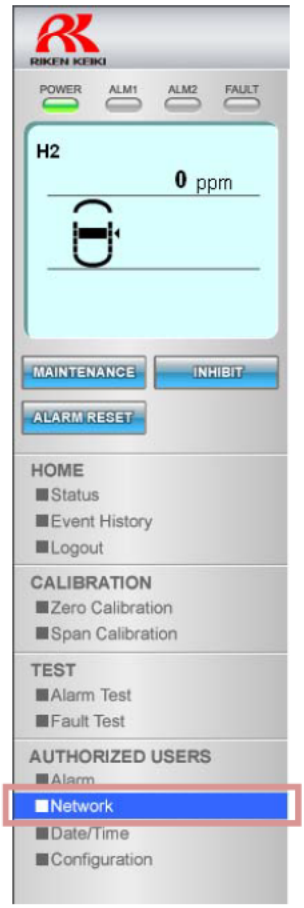


With the PLC, set the IP address and FINS/UDP port to 192.168.1.251 and 9600 respectively.

OMRON CJ/CS Series

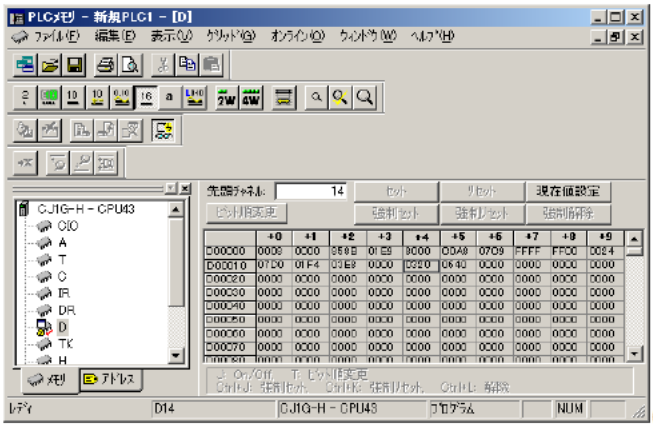
1-4-2. Setting the communication with PLC through the Web function

Click [Network] located in the left side of Authorized User Web screen.
Set the right side of Authorized User Web screen as illustrated below.
Settings when writing basic data (Small) to 0 address in D memory of the PLC (with IP address 192.168.1.251, NODE251, FINS/UDP port 9600 configured):



PLC		
PLC Type		Not Use / FINS / MC
Type of Basic Data		Small / Large
Use Optional Data		Yes / No
Interval	Min	1000 msec
	Max	1000 msec
Timeout		10 sec
FINS		
IP Address		192 168 1 10
Port		9600
Detector	Network Address	0
	Node Address	1
	Unit Number	0
PLC	Network Address	0
	Node Address	10
	Unit Number	0
Detector Write	Memory Address	0
	Area Type	DM 130
Detector Read	Memory Address	10000
	Area Type	DM 130

See Chapter 4, “PLC Communication Function” for details of the configuration.
The screen below illustrates how data is written to D memory (D2 counter is incremented).



(CX-Programmer PLC memory screen)

See the PLC operation manual for how to set the PLC and to use tools.

OMRON CJ/CS Series

CAUTION

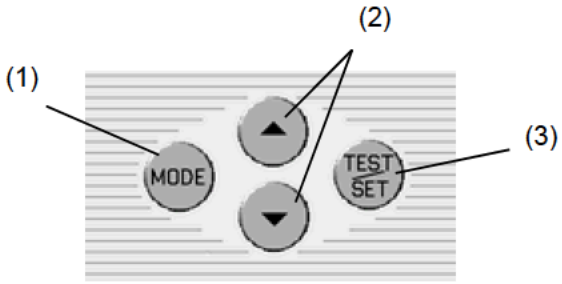
The PLC may act in an unexpected way if incorrectly configuring settings to rewrite data in the PLC memory. Check that settings are correct before confirming them.

1-4-3. Setting the communication with PLC through the GD-70D-EA main unit operation

Turn ON the power switch of GD-70D-EA.

Establish the setting of [PLC MODE] = 2, [PLC AREA] = 2 through the front panel keys.
Settings when writing Basic Data: Small to 0 address in E2 memory of the PLC (with IP address 192.168.1.251, NODE251, FINS/UDP port 9600 configured):
(PLC IP address XXX. XXX. XXX.251 and NODE251 are fixed.
([xxx] is the same as the IP address of GD-70D-EA.))

Description of keys
(1) MODE key
(2) ▲▼ keys
(3) SET key



Setting procedure
(1) Press and hold the MODE key to enter the maintenance mode.
(The display indicates [1-1/ZERO].)
(2) Display [1-9/M MODE] using ▲ and ▼ keys. Press the SET key.
(The display indicates [----/M MODE].)
(3) Press and hold the SET key again.
(The display indicates [2-0/GAS TEST].)
(4) Display [2-10/SETTING2] using ▲ and ▼ keys. Press the SET key.
(The display indicates [SET 0/ADDRESS].)
(5) Display [SET 18/ETHERNET] using ▲ and ▼ keys. Press the SET key.
(The display indicates [XX/MAC1].)
(6) Display [X/PLC MODE] using ▲ and ▼ keys. Press the SET key.
(The display indicates [X/PLC MODE], where X (number) blinks.)
(7) Indicate [2/PLC MODE] in the PLC MODE display using ▲ and ▼ keys. Press the SET key.
(The display indicates [2/PLC MODE].)
(8) Display [XX/PLC AREA] using ▲ and ▼ keys. Press the SET key.
(The display indicates [XX/PLC AREA], where XX (number) blinks.)
(9) Indicate [2/PLC AREA] in the PLC AREA display using ▲ and ▼ keys. Press the SET key.
(The display indicates [2/PLC AREA].)
(10) Display [/SAVE] using ▲ and ▼ keys. Press the SET key.
(The display indicates [/SAVE Y/N].)
(11) Press the SET key. The setting is registered.
(This can take approximately 10 seconds.)
(The display indicates [SET18/ETHERNET].)
(12) Press and hold the MODE key to exit the maintenance mode.

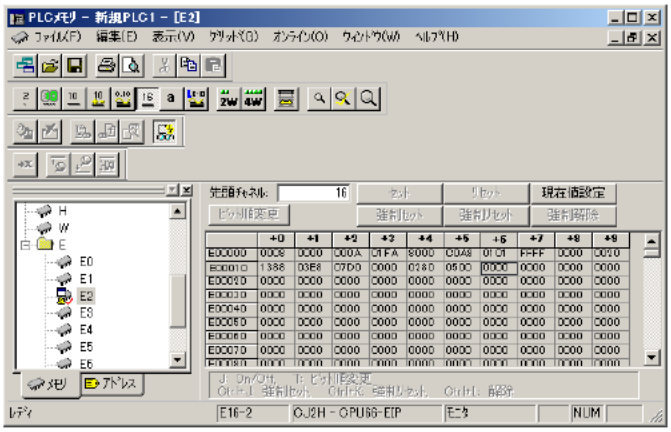
OMRON CJ/CS Series

Items and their settings
(* if the GD-70D-EA main unit IP address is 192.168.1.1)

Item	Details			
PLC MODE	PLC Type	Type of Basic Data	Memory Address	
			Detector write	Detector read
2	FINS	Small	0 *	-
PLC AREA	Area Type(FINS)			
2	E2			

See 4-6, “Specifications for communication setting through GD-70D-EA main unit operation” for setting specifications of [PLC MODE] [PLC AREA] items.
See Chapter 4, “PLC Communication Function” for details of the configuration.

The screen below illustrates how data is written to E2 memory (E2 counter is incremented).



(CX-Programmer PLC memory screen)

See the PLC operation manual for how to set the PLC and to use tools.

CAUTION

The PLC may act in an unexpected way if incorrectly configuring settings to rewrite data in the PLC memory. Check that settings are correct before confirming them.

MELSEC Q Series

1-5. PLC communication functions (MELSEC Q Series)

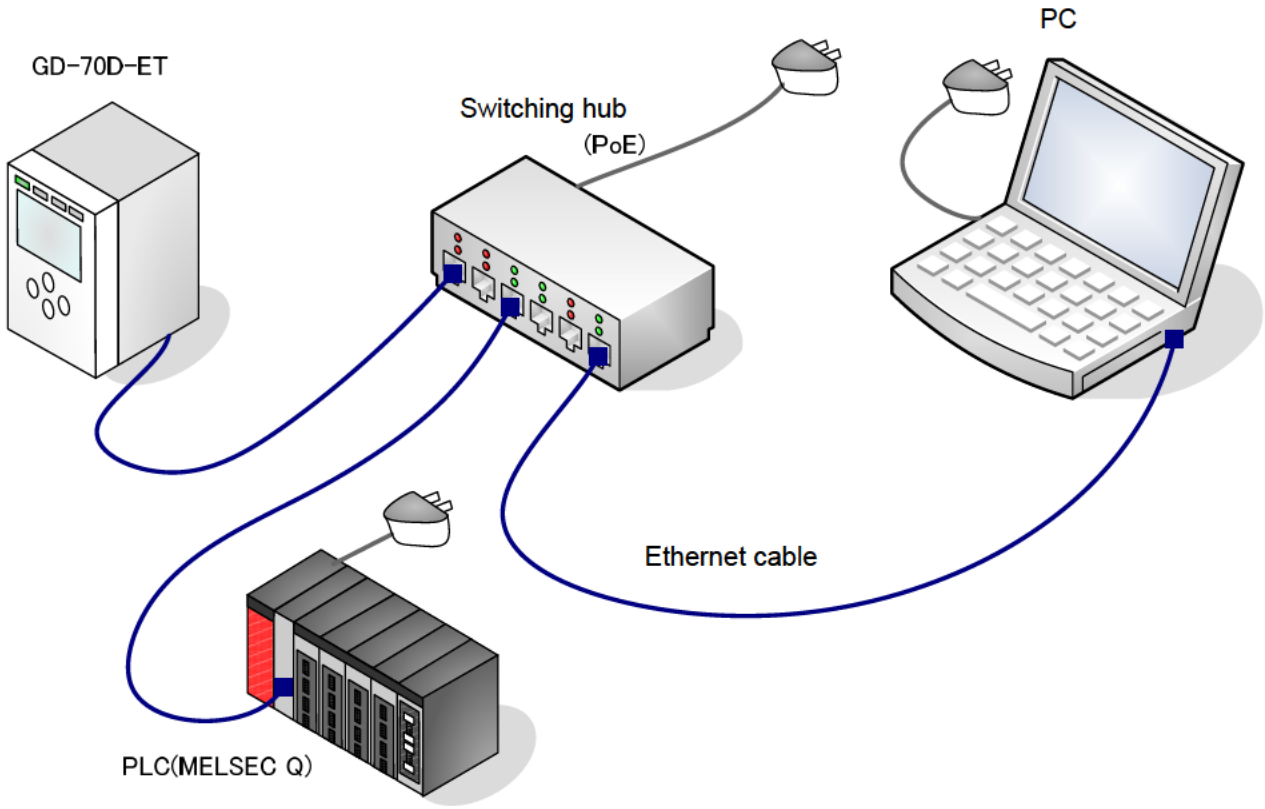
Configure the PLC communication settings of GD-70D-EA.
The settings can be configured by the following methods:

- To flexibly set the small number of devices:
  ⇨ Use the Web screen of the authorized user mode.
  Multiple items can flexibly be set through the Network screen of the Web function.
  If not [PLC MODE] = 1, it is not possible to change all the items.
  See 1-5-2, “Setting the communication with PLC through the Web function” for details of the setting method.

- To quickly set a large number of devices through the operation on the gas detector:
  ⇨ Use the GD-70D-EA front panel.
  The setting can be easily configured using front panel keys in the following two items: [PLC MODE] and [PLC AREA].
  PLC IP address XXX. XXX. XXX.251 is fixed.
  ([xxx] is the same as the IP address of GD-70D-EA.)
  See 1-5-3, “Setting the communication with PLC through the GD-70D-EA main unit” for details of the setting method.

1-5-1. Connection with the PLC

Connect the PLC as illustrated in the following figure.
(The following figure illustrates the connection with the PoE switching hub.)

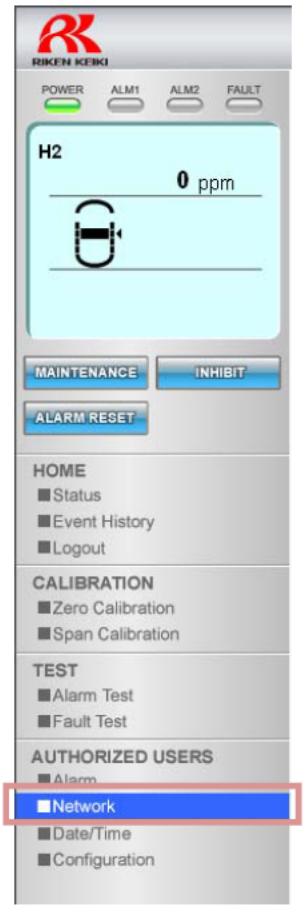


With the PLC (MELSEC Q), set the IP address and UDP own station port number to 192.168.1.251 and 2000 respectively.

MELSEC Q Series

1-5-2. Setting the communication with PLC through the Web function

Click [Network] located in the left side of Authorized User Web screen.
Set the right side of Authorized User Web screen as illustrated below.
Settings when writing basic data (Small) to 0 address in D memory of the PLC (with IP address 192.168.1.251 and UDP own station port number 2000 configured):



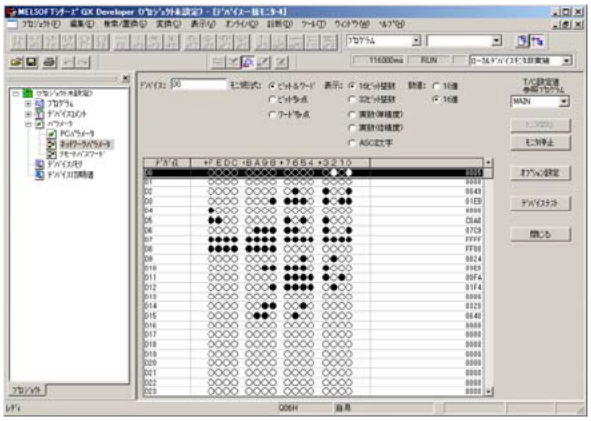
PLC

PLC Type		Not Use / FINS / MC (MC)
Type of Basic Data		Small (Small) / Large
Use Optional Data		Yes / No (No)
Interval	Min	1000 msec
	Max	1000 msec
Timeout		10 sec

MC

IP Address		192.168.1.11
Port		5000
PLC	Network Address	0
	Node Number	255
Detector Write	Memory Address	0
	Device Code	D* 168
Detector Read	Memory Address	10000
	Device Code	D* 168

See Chapter 4, “PLC Communication Function” for details of the configuration.
The screen below illustrates how data is written to D memory (D2 counter is incremented).



(GX-Developer memory device listing screen)

See the PLC operation manual for how to set the PLC and to use tools.

MELSEC Q Series

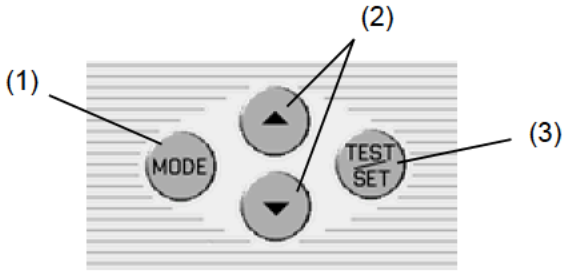
CAUTION

The PLC may act in an unexpected way if incorrectly configuring settings to rewrite data in the PLC memory. Check that settings are correct before confirming them.

1-5-3. Setting the communication with PLC through the GD-70D-EA main unit operation

Turn ON the power switch of GD-70D-EA.
Establish the setting of [PLC MODE] = 4, [PLC AREA] = 2 through the front panel keys.
Settings when writing basic data (Small) to 65536 address in ZR memory of the PLC (with IP address 192.168.1.251 and UDP own station port number 2000 configured):
(PLC IP address XXX. XXX. XXX.251 and NODE251 are fixed.
([xxx] is the same as the IP address of GD-70D-EA.))

Description of keys
(1) MODE key
(2) ▲▼ keys
(3) SET key



Setting procedure
(1) Press and hold the MODE key to enter the maintenance mode.
(The display indicates [1-1/ZERO].)
(2) Display [1-9/M MODE] using ▲ and ▼ keys. Press the SET key.
(The display indicates [----/M MODE].)
(3) Press and hold the SET key again.
(The display indicates [2-0/GAS TEST].)
(4) Display [2-10/SETTING2] using ▲ and ▼ keys. Press the SET key.
(The display indicates [SET 0/ADDRESS].)
(5) Display [SET 18/ETHERNET] using ▲ and ▼ keys. Press the SET key.
(The display indicates [XX/MAC1].)
(6) Display [X/PLC MODE] using ▲ and ▼ keys. Press the SET key.
(The display indicates [X/PLC MODE], where X (number) blinks.)
(7) Indicate [4/PLC MODE] in the PLC MODE display using ▲ and ▼ keys. Press the SET key.
(The display indicates [4/PLC MODE].)
(8) Display [XX/PLC AREA] using ▲ and ▼ keys. Press the SET key.
(The display indicates [XX/PLC AREA], where XX (number) blinks.)
(9) Indicate [2/PLC AREA] in the PLC AREA display using ▲ and ▼ keys. Press the SET key.
(The display indicates [2/PLC AREA].)
(10) Display [/SAVE] using ▲ and ▼ keys. Press the SET key.
(The display indicates [/SAVE Y/N].)
(11) Press the SET key. The setting is registered.
(This can take approximately 10 seconds.)
(The display indicates [SET18/ETHERNET].)
(12) Press and hold the MODE key to exit the maintenance mode.

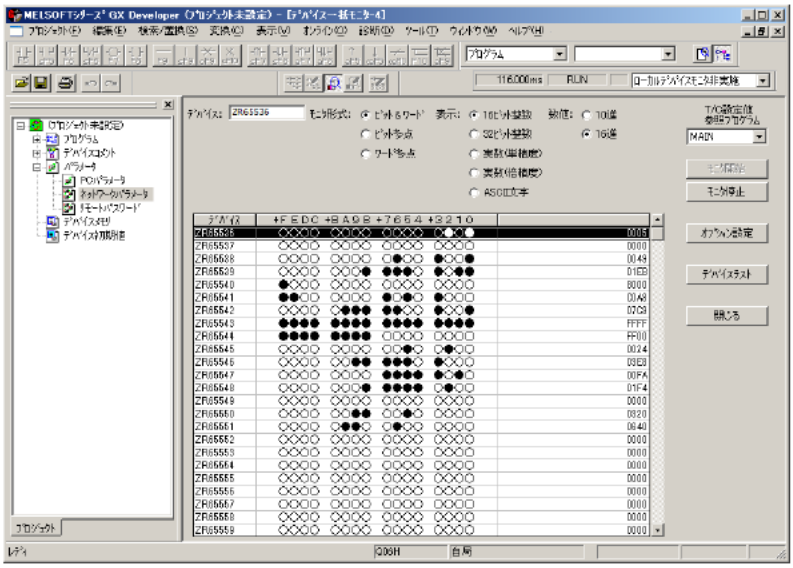
MELSEC Q Series

Items and their settings
(* if the GD-70D-EA main unit IP address is 192.168.1.1)

Item	Details			
PLC MODE	PLC Type	Type of Basic Data	Memory Address	
			Detector write	Detector read
4	MC	Small	0 *	-
PLC AREA	Area Type(MC)			
2	ZR(65536)			

See 4-6, “Specifications for communication setting through GD-70D-EA main unit operation” for setting specifications of [PLC MODE] [PLC AREA] items.
See Chapter 4, “PLC Communication Function” for details of the configuration.

The screen below illustrates how data is written to ZR memory
(ZR65538 live counter is incremented).



(GX-Developer memory device listing screen)

See the PLC operation manual for how to set the PLC and to use tools.

CAUTION

The PLC may act in an unexpected way if incorrectly configuring settings to rewrite data in the PLC memory. Check that settings are correct before confirming them.

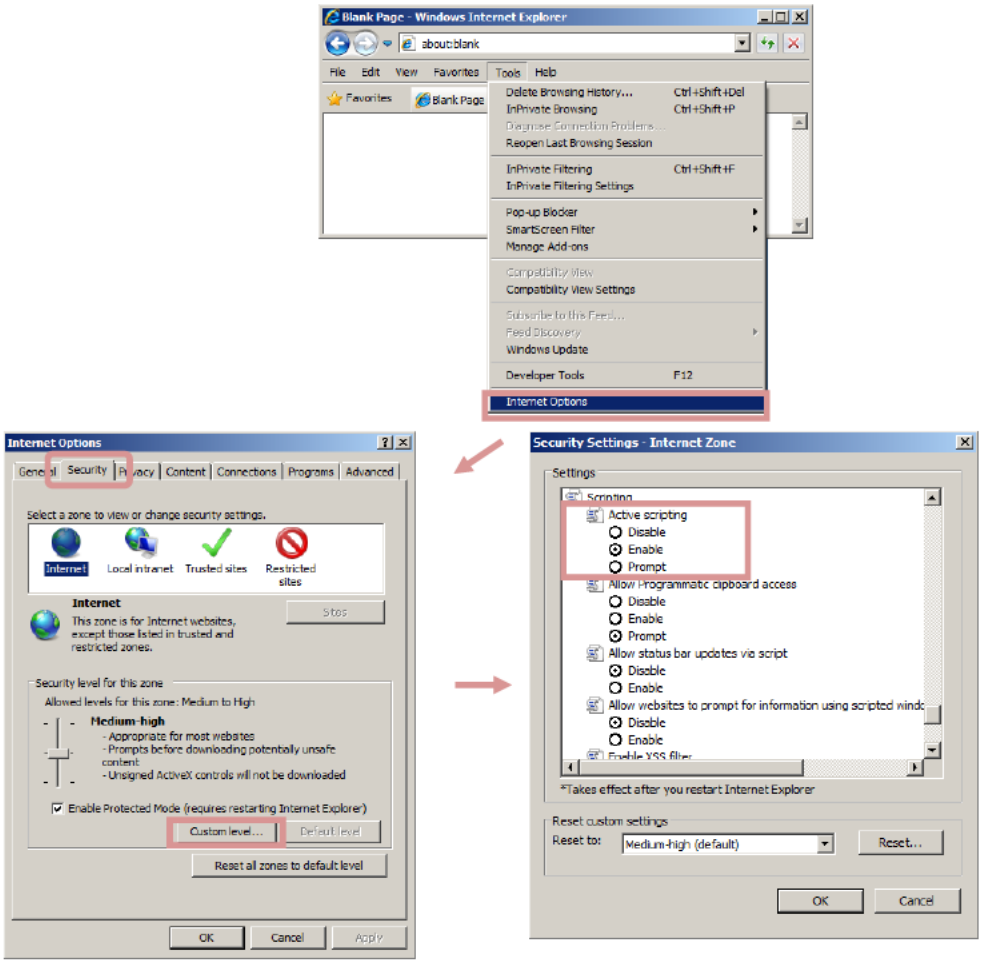
2

Web Functions

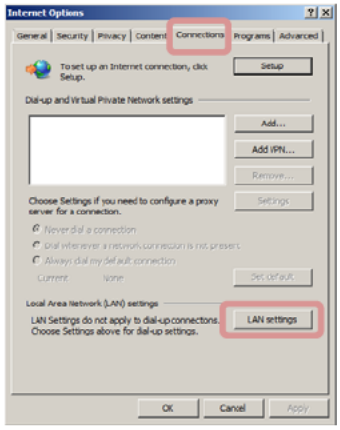
2-1. Precautions on operating environment

The Web functions have been verified that they run with Microsoft Internet Explorer 6 to 8.
Running with other browsers may cause faulty operation.

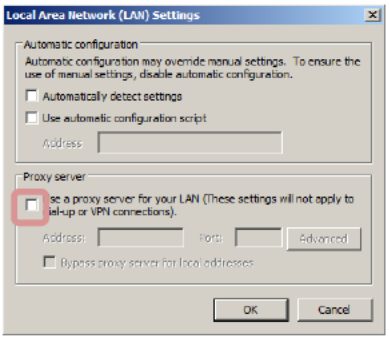
As the Web functions use browser scripts, set [Active scripting] to [Enable]. (Usually it is set to [Enable].)

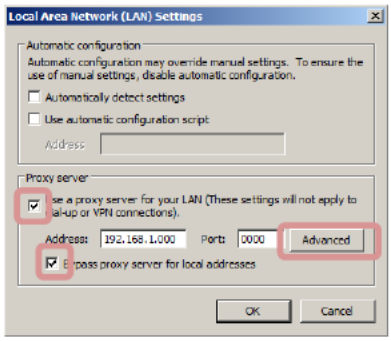


Confirm proxy server settings (Windows 7 Internet Explorer 8).



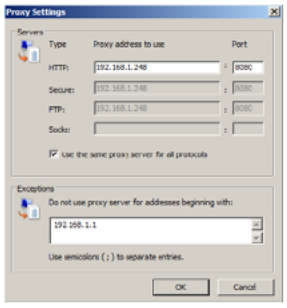
In the [Connections] tab of [Internet Options], select [LAN settings] to open the [Local Area Network (LAN) Settings] window.





If the proxy server is not used ([Use a proxy server for your LAN] is unchecked), the Web functions can be used without any alterations.

If the proxy server is used ([Use a proxy server for your LAN] is checked), check the [Bypass proxy server for local addresses] option.
Click [Advanced] to open the [Proxy Settings] window.



Enter the IP address of GD-70D-EA to the [Do not use proxy server for addresses beginning with:] field in the [Exceptions] pane.

CAUTION

Above settings are for GD-70D-EA used with the local address. Web functions cannot be used via the proxy server.

If settings are altered through the GD-70D-EA main unit operation, [Data is updated] is displayed at the end of the maintenance mode and the screen is displayed again.
GD-70D-EA records login information whenever logging in as an authorized user. Turning off the power supply of GD-70D-EA erases this information. Thus, if turning the power off and on cyclically with the browser opened, an error screen appears when trying to open the screen that is not displayed. Close the browser and do logging in again.

Do not alter settings via the Web functions and via the GD-70D-EA main unit operation at the same time.

2-2. List of functions

○: Displayed ×: Non-Displayed

		HOME	Authorized Users	Descriptions
		User screen	Authorized User screen	
HOME	Status	○	○	Indicates information about GD-70D-EA settings
	Event History	○	○	Lists up to 100 records and indicates a trend graph
	Calibration History	×	○	Lists up to 100 records
	Logout	×	○	Logout menu for authorized users
CALIBREATION	Zero Calibration	×	○	Zero calibration
	Span Calibration	×	○	Span calibration
TEST	Alarm Test	×	○	Alarm test function
	Fault Test	×	○	Fault alarm test function
AUTHORIZED USERS	Alarm	×	○	Alarm settings can be viewed and configured
	Network	×	○	Communication/mail/network settings can be viewed and configured
	Date/Time	×	○	Date and time can be viewed and configured
	Configuration	×	○	Detailed information of GD-70D-EA and sensors can be viewed and configured
MAINTENANCE		×	○	Enters the maintenance mode
INHIBIT		×	○	Enters the inhibit condition
ALARM RESET		×	○	Resets the alarm

2-3. Web screen components

Start up Microsoft Internet Explorer and specify the address.
([xxx] corresponds to the IP address of GD-70D-EA)

User screen (User)

http://xxx.xxx.xxx.xxx Password is not required.

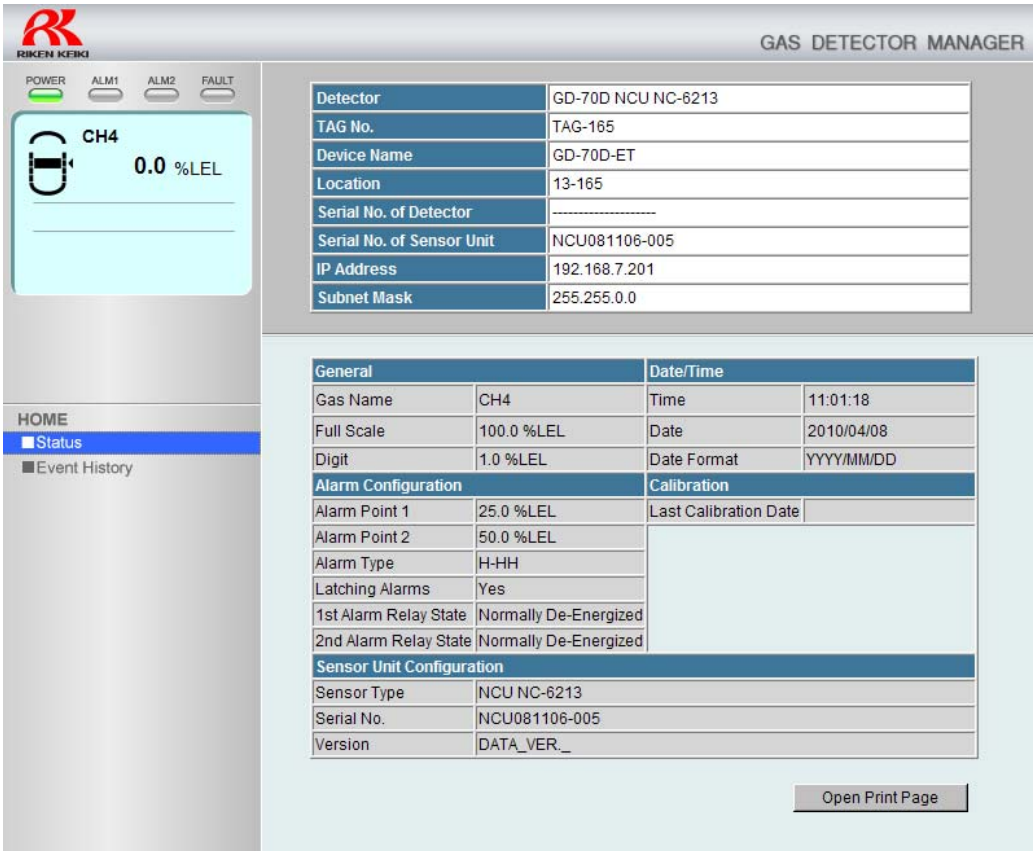
Authorized user screen (Authorized Users)

http://xxx.xxx.xxx.xxx/login.html Password is required.

Password setting: Default password “GD-70D”

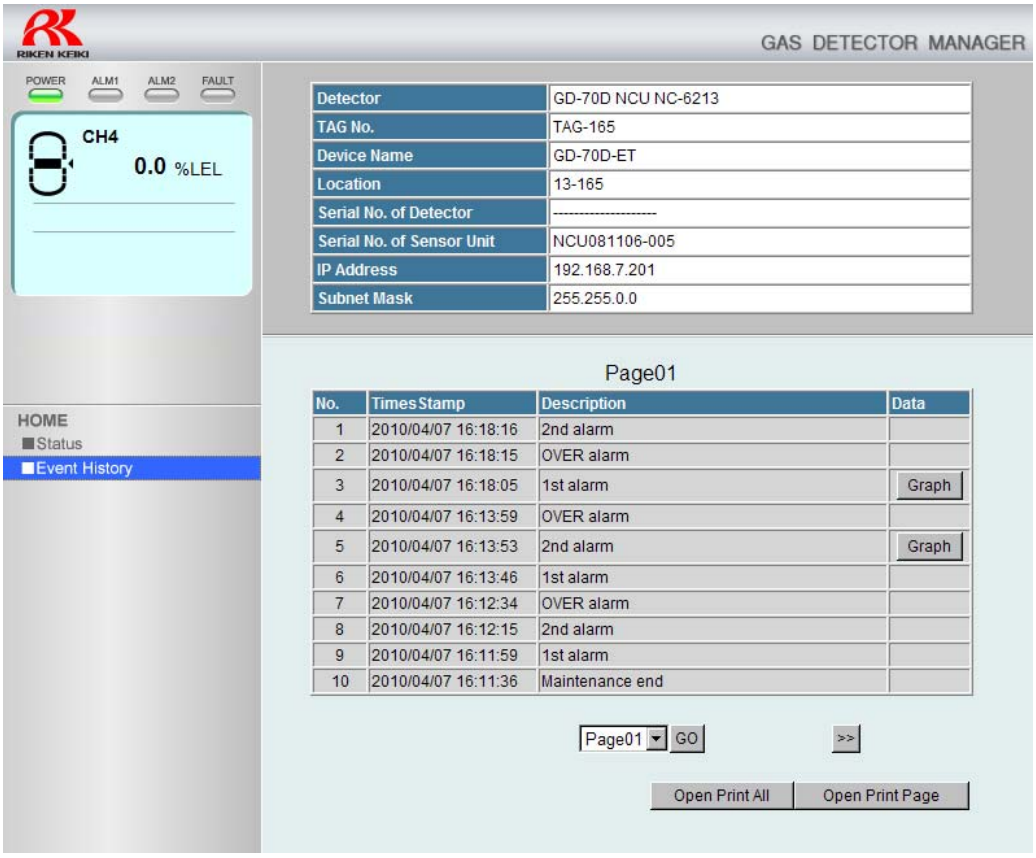
2-3-1. User screen (User)

HOME
Status screen (User)



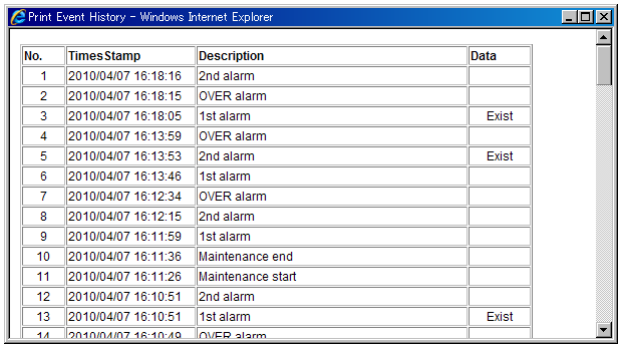
The status, including alarms, of GD-70D-EA is displayed in real time.
Information on alarm settings and sensors is displayed.
Clicking the [Open Print Page] button opens a screen for printing the page currently viewed.

Event History screen (User)
event history

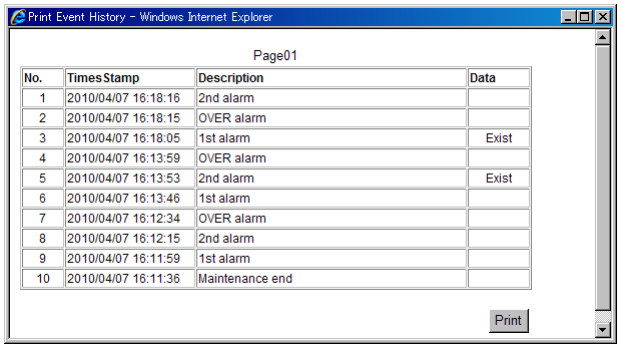


The event history (alarm history) can be viewed with ten records per page (maximum 100 records through 10 pages).
A record consists of the time stamp, event description and the [Graph] button if it contains trend graphs.
Clicking the [Graph] button displays a trend graph for 3 minutes before and after the occurrence of the alarm.
Clicking the [Open Print All] button opens a screen for printing all events including pages not viewed.
Clicking the [Open Print Page] button opens a screen for printing the page currently viewed.

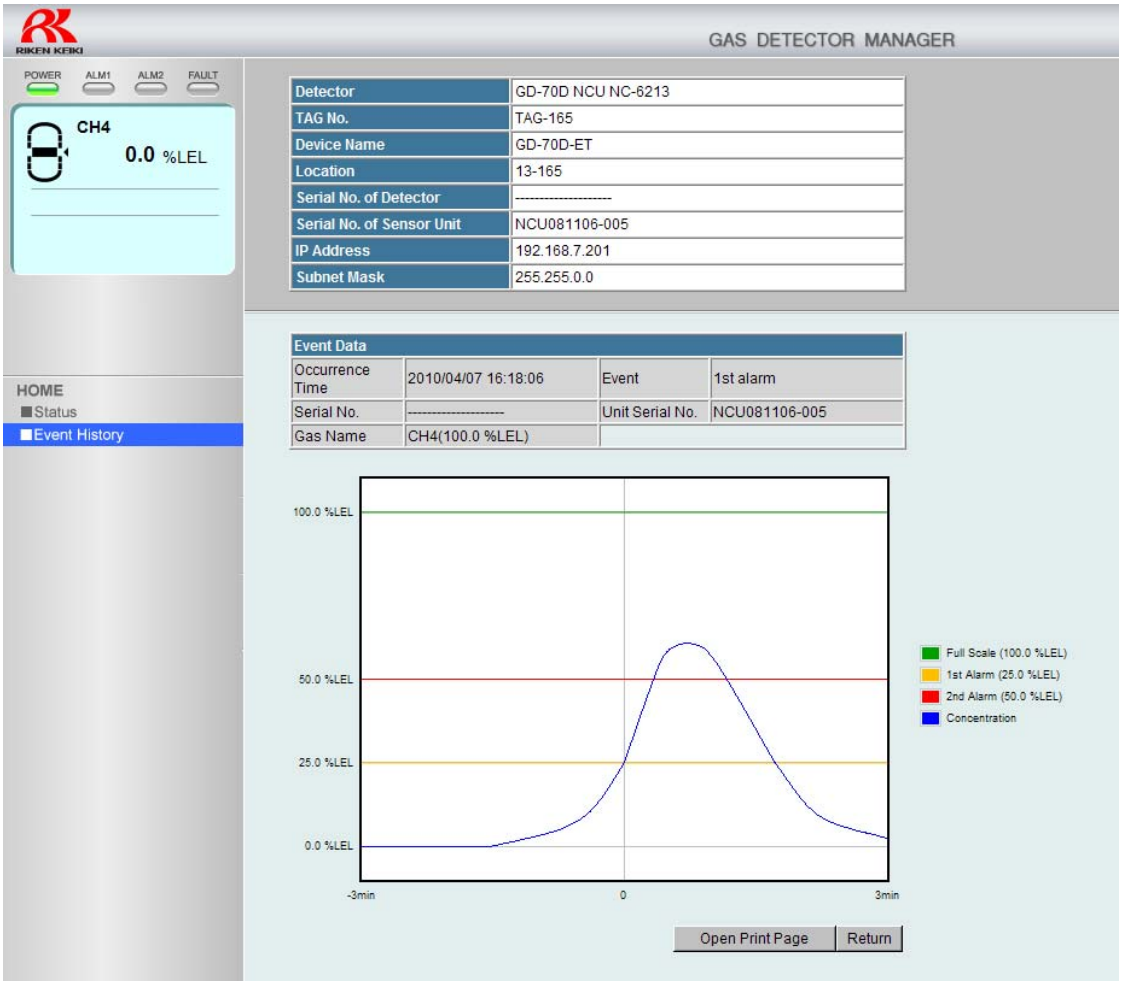
Print Event History opened via [Open Print All]



via [Open Print Page]



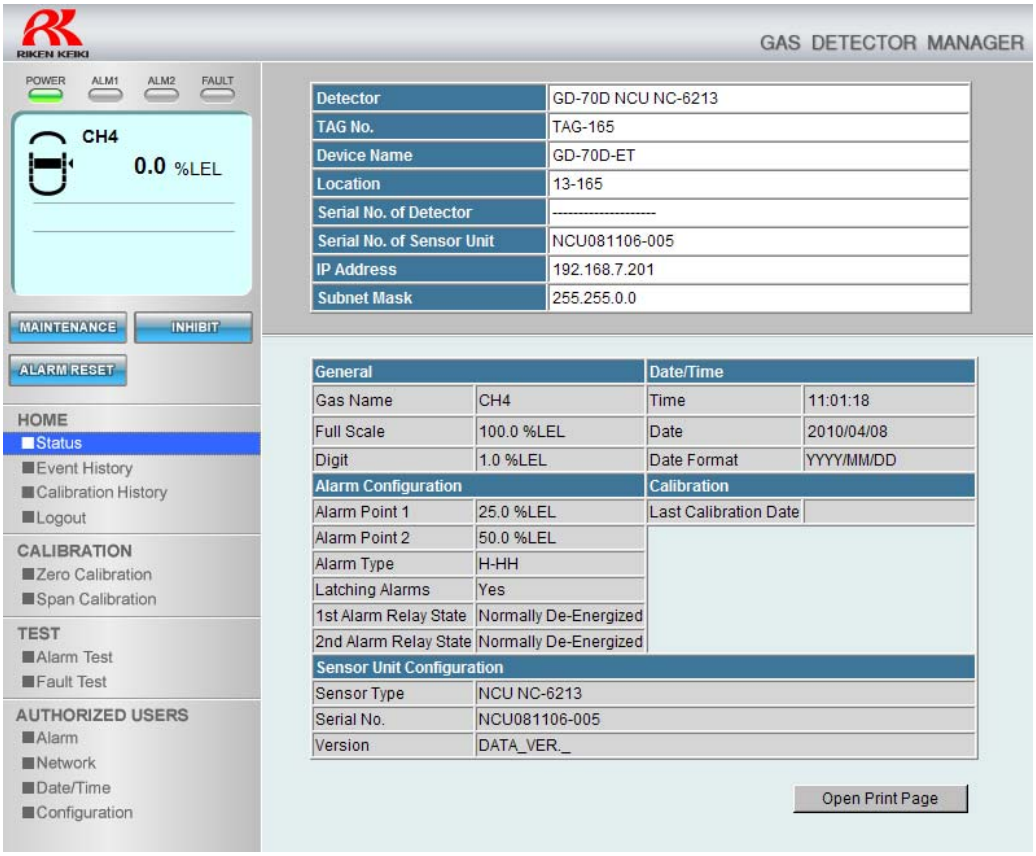
Event History screen (User)
Trend graph



Clicking the [Graph] button in the Event History (alarm history) screen displays a trend graph for 3 minutes before and after the occurrence of the alarm.
Clicking the [Open Print Page] button opens a screen for printing the page currently viewed.
To return to the Event History screen, click the [Return] button.

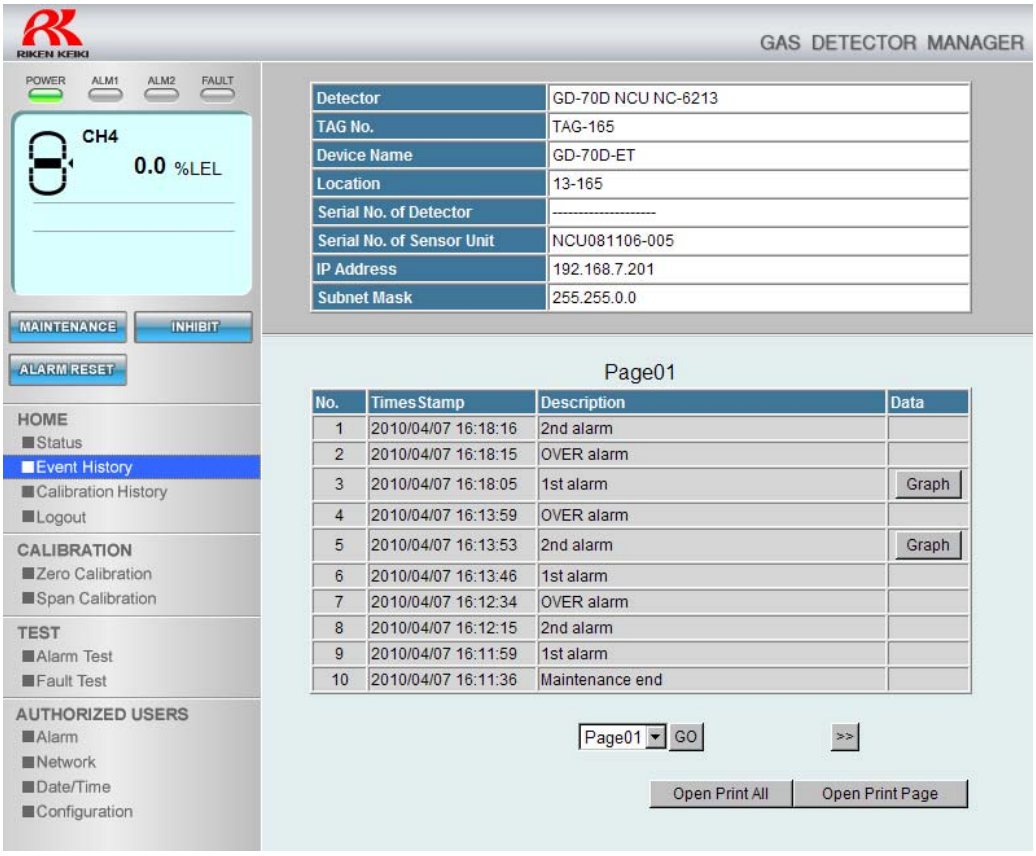
2-3-2. Authorized user screen (Authorized Users)

HOME
Status screen (Authorized User)



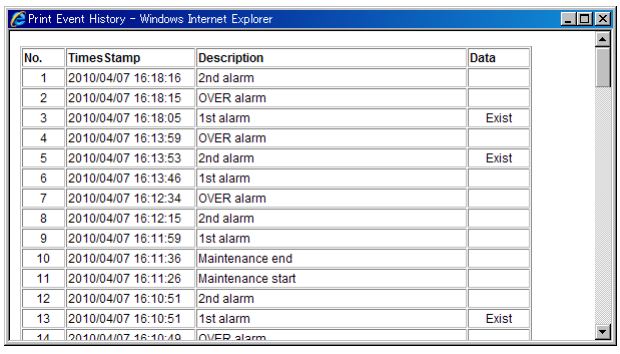
The status, including alarms, of GD-70D-EA is displayed in real time.
Information on alarm settings and sensors is displayed.
The status in which an alarm is activated can be reset by clicking the [ALARM RESET] button.
Clicking the [Open Print Page] button opens a screen for printing the page currently viewed.

Event History screen (Authorized User)
event history

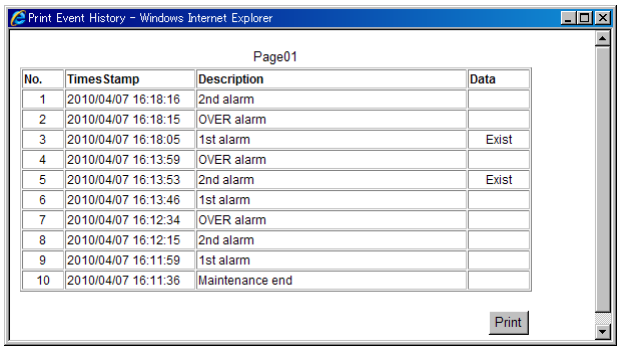


The event history (alarm history) can be viewed with ten records per page (maximum 100 records through 10 pages).
A record consists of the time stamp, event description and the [Graph] button if it contains trend graphs.
Clicking the [Graph] button displays a trend graph for 3 minutes before and after the occurrence of the alarm.
Clicking the [Open Print All] button opens a screen for printing all events including pages not viewed.
Clicking the [Open Print Page] button opens a screen for printing the page currently viewed.

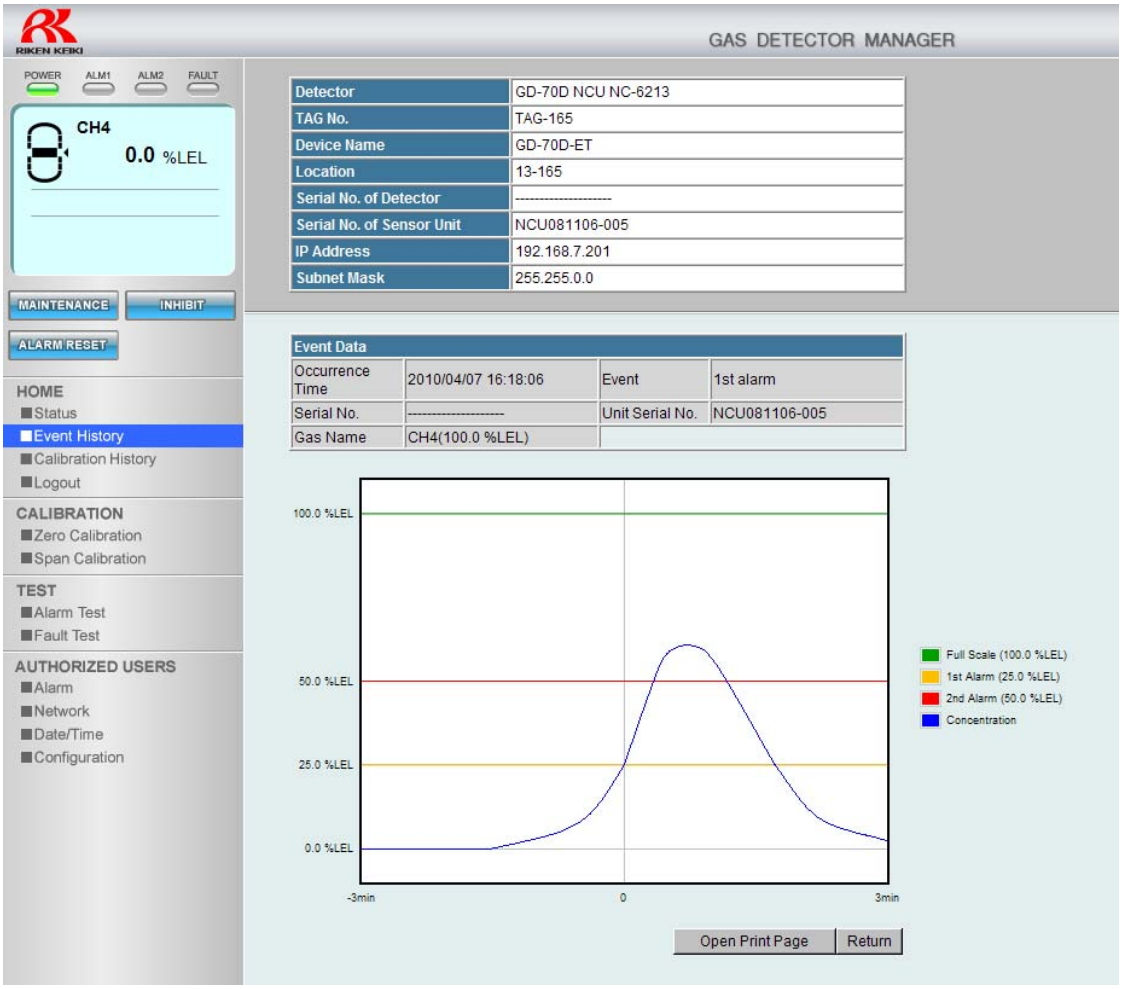
Print Event History opened via [Open Print All]



via [Open Print Page]

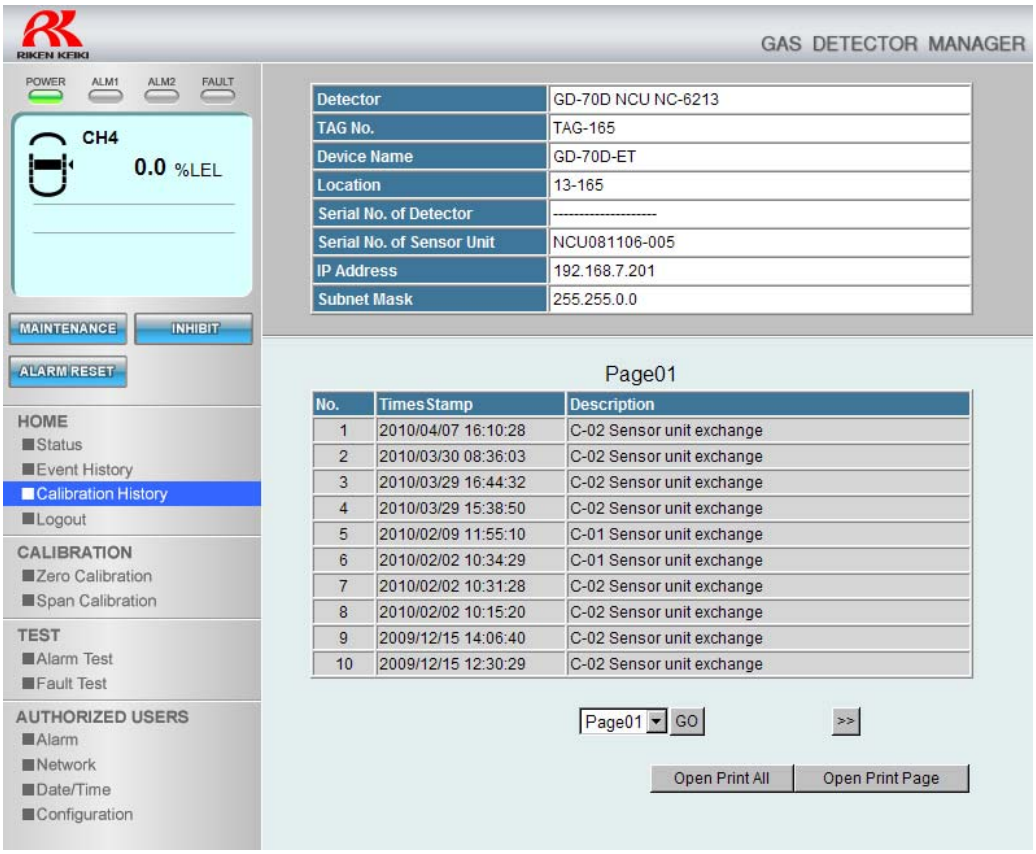


Event History screen (Authorized User)
Trend graph



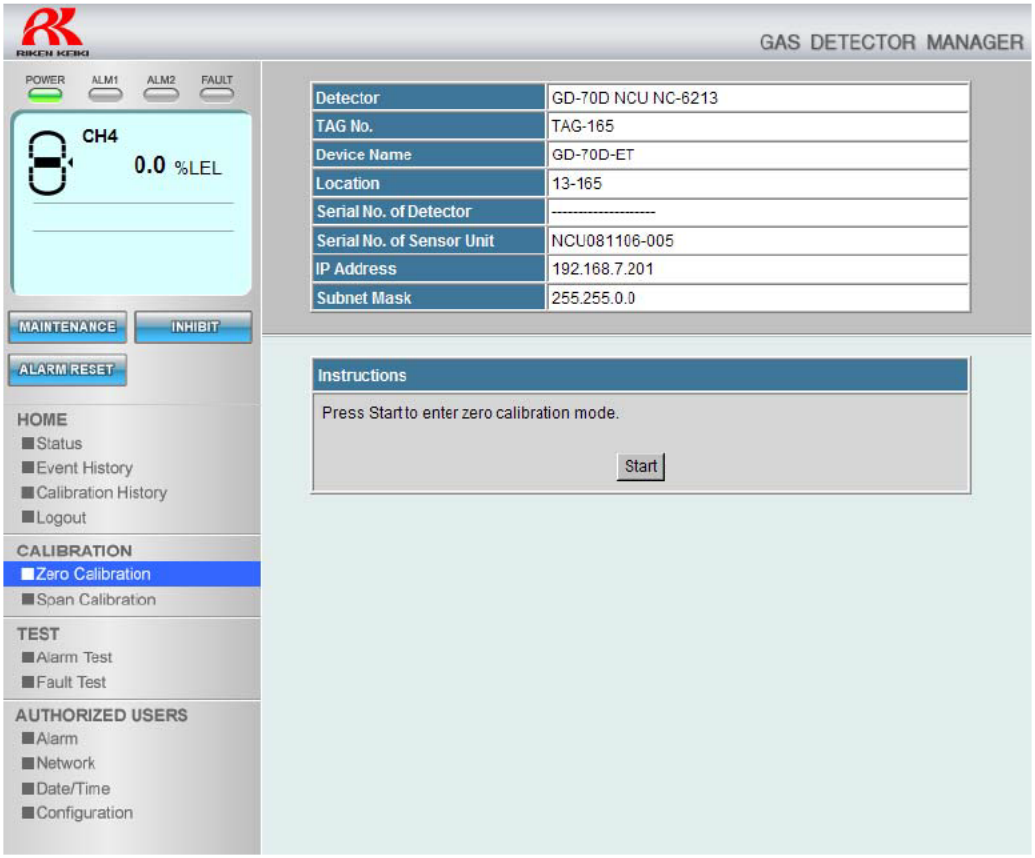
Clicking the [Graph] button in the Event History (alarm history) screen displays a trend graph for 3 minutes before and after the occurrence of the alarm.
Clicking the [Open Print Page] button opens a screen for printing the page currently viewed.
To return to the Event History screen, click the [Return] button.

Calibration History screen (Authorized User)



The calibration history can be viewed with ten records per page (maximum 100 records through 10 pages).
Clicking the [Open Print All] button opens a screen for printing all records including pages not viewed.
Clicking the [Open Print Page] button opens a screen for printing the page currently viewed.

CALIBRATION
Zero Calibration screen (Authorized User)

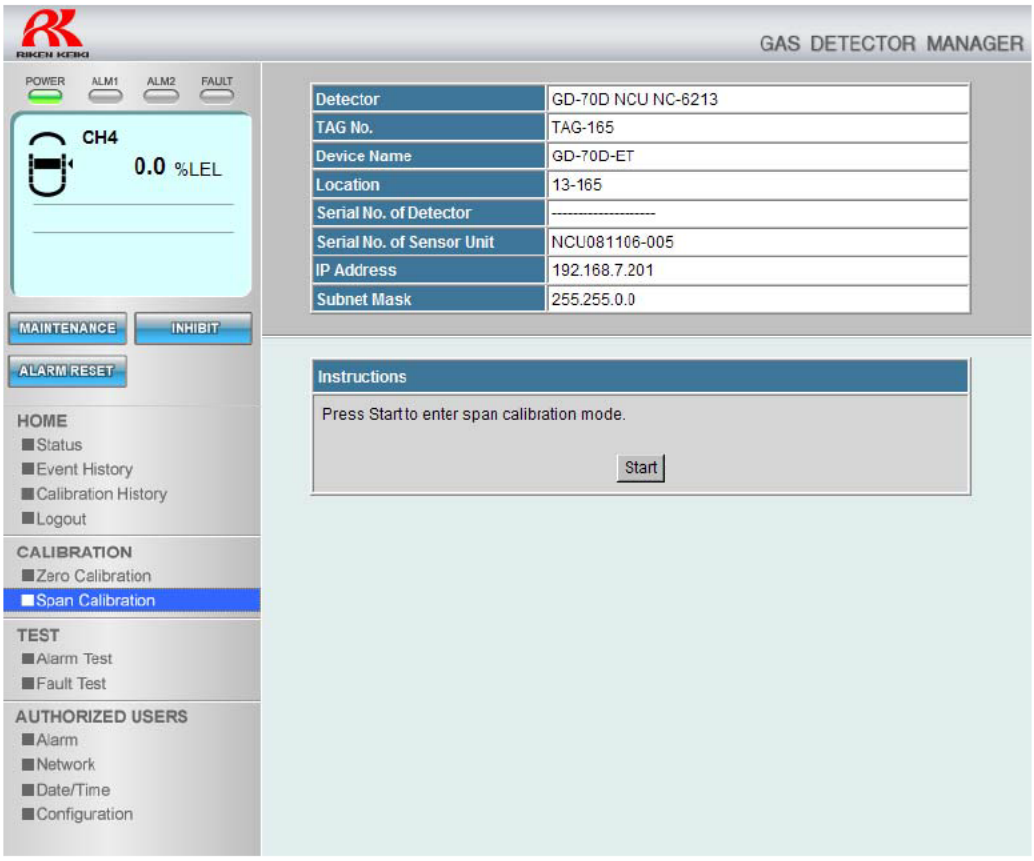


This screen is used to execute the zero calibration.

CAUTION

To perform the Gas Calibration adequately, read the GD-70D series operating manual and follow the appropriate procedures.
We provide services on regular maintenance including span adjustment, other adjustments and maintenance, etc. To make the calibration gas, dedicated tools, such as a gas cylinder of the specified concentration and gas sampling bag must be used. Our qualified service engineers have expertise, knowledge and other information on the dedicated tools used for services, along with other products. To maintain the safety operation of the unit, please use our maintenance service.

Span Calibration screen (Authorized User)

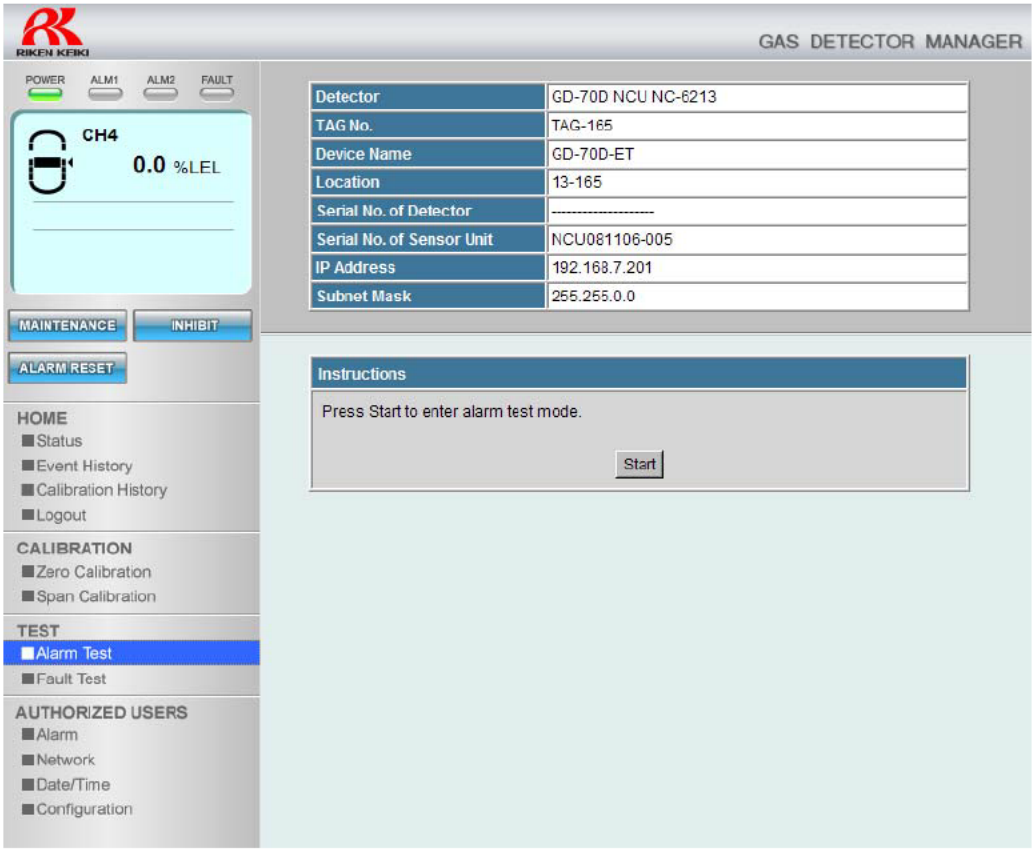


This screen is used to execute the span calibration.

CAUTION

To perform the Gas Calibration adequately, read the GD-70D series operating manual and follow the appropriate procedures.
We provide services on regular maintenance including span adjustment, other adjustments and maintenance, etc. To make the calibration gas, dedicated tools, such as a gas cylinder of the specified concentration and gas sampling bag must be used. Our qualified service engineers have expertise, knowledge and other information on the dedicated tools used for services, along with other products. To maintain the safety operation of the unit, please use our maintenance service.

TEST
Alarm Test screen (Authorized User)

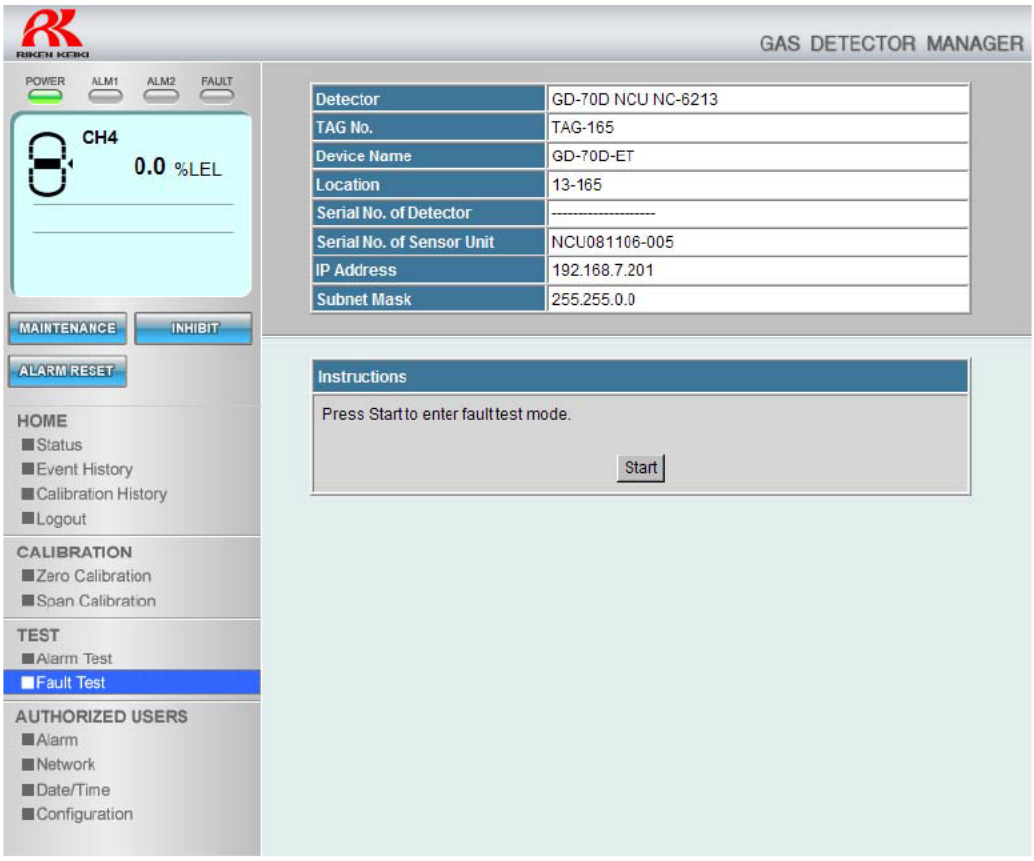


The alarm test can be executed using this screen.

CAUTION

Execution of the alarm test activates the GD-70D-EA gas alarm contact output.
(If the contact operation is turned on while the alarm test.)

Fault Test screen (Authorized User)

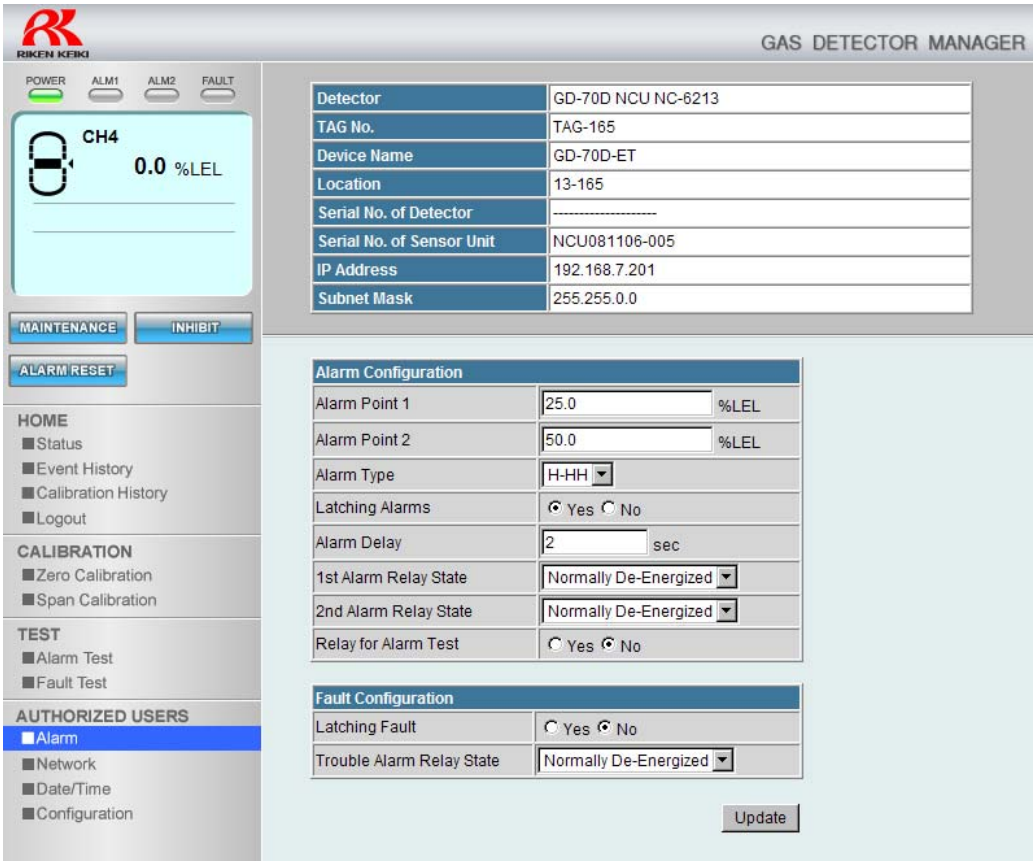


The fault alarm test can be executed using this screen.

CAUTION

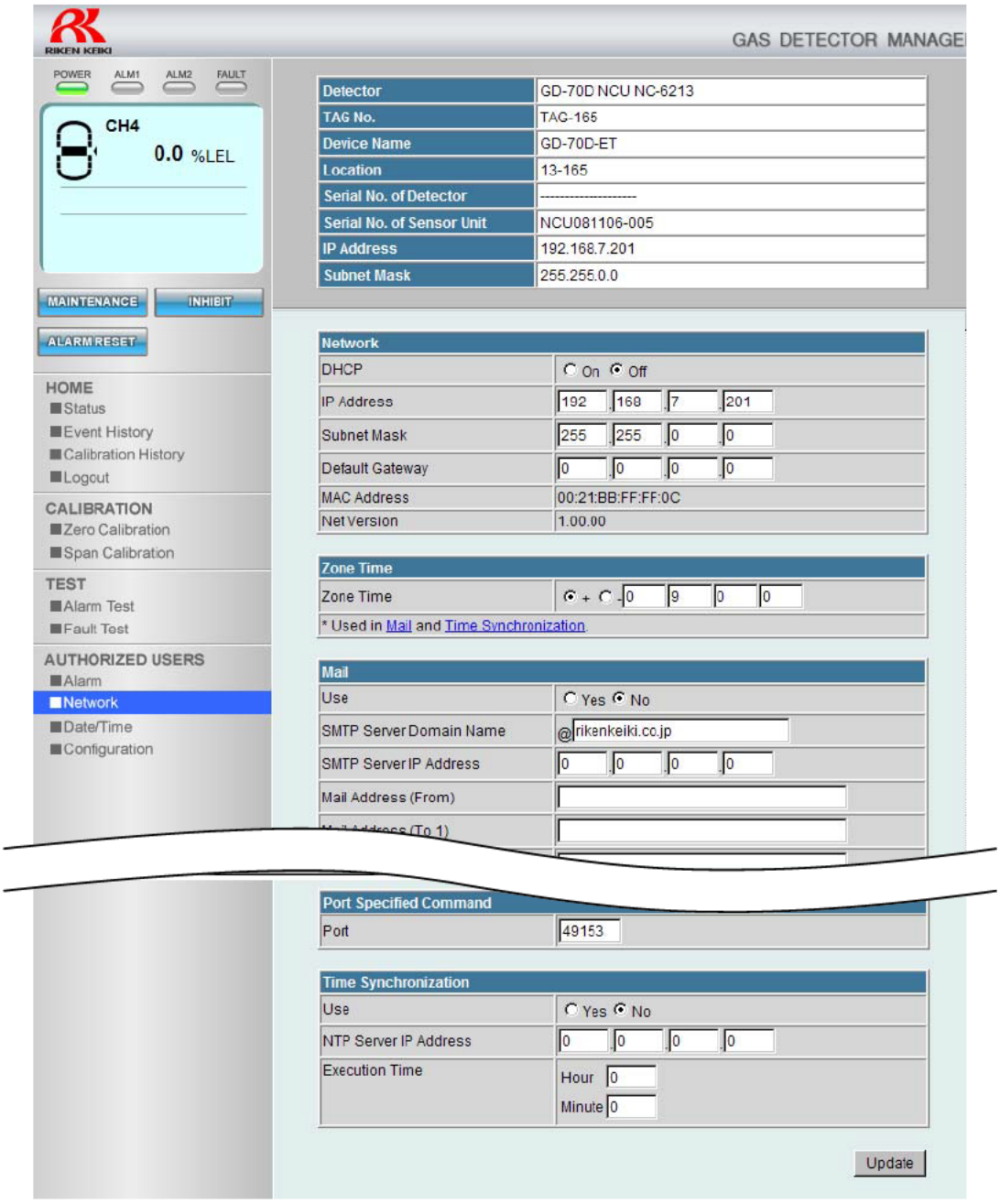
Execution of the fault alarm test activates the GD-70D-EA fault alarm contact output.

AUTHORIZED USERS
Alarm screen (Authorized User)



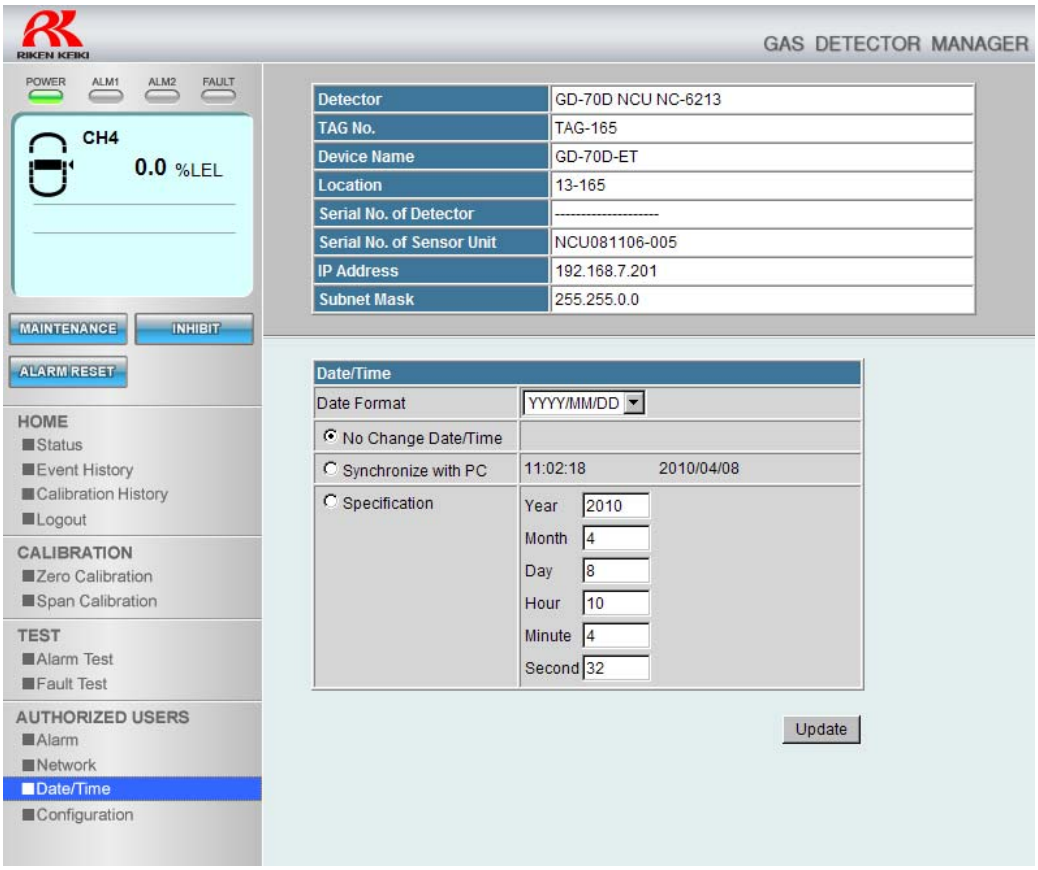
Alarm settings can be viewed and configured.
Clicking the [Update] button updates the configuration of GD-70D-EA using settings entered.

Network screen (Authorized User)



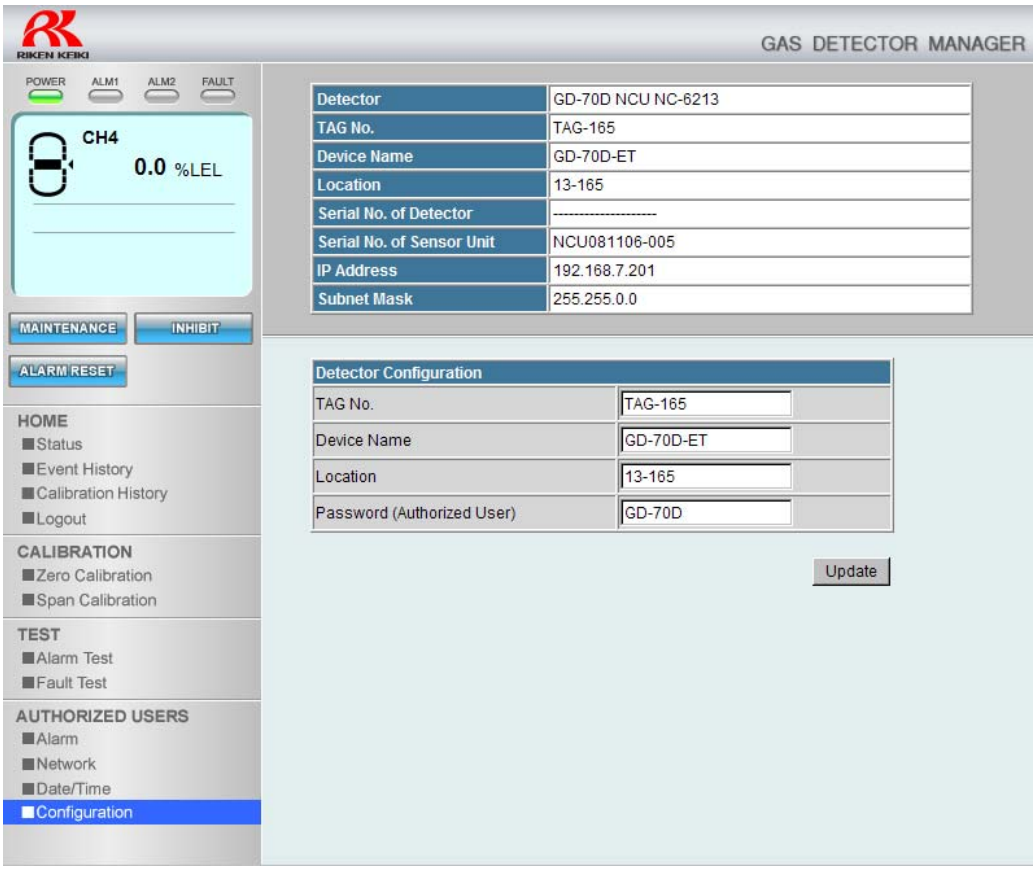
Communication/mail/network settings can be viewed and configured.
If the time synchronization function is enabled, the date and time information is obtained from the NTP server to set the clock at the specified time (Execution Time). (The time delay caused by communicating with NTP server is not corrected.)
Clicking the [Update] button updates the configuration of GD-70D-EA using settings entered.
See 2-4, “Auto mailing function” for the mailing function.

Date/Time screen (Authorized User)



The date and time information can be viewed and configured.

Configuration screen (Authorized User)

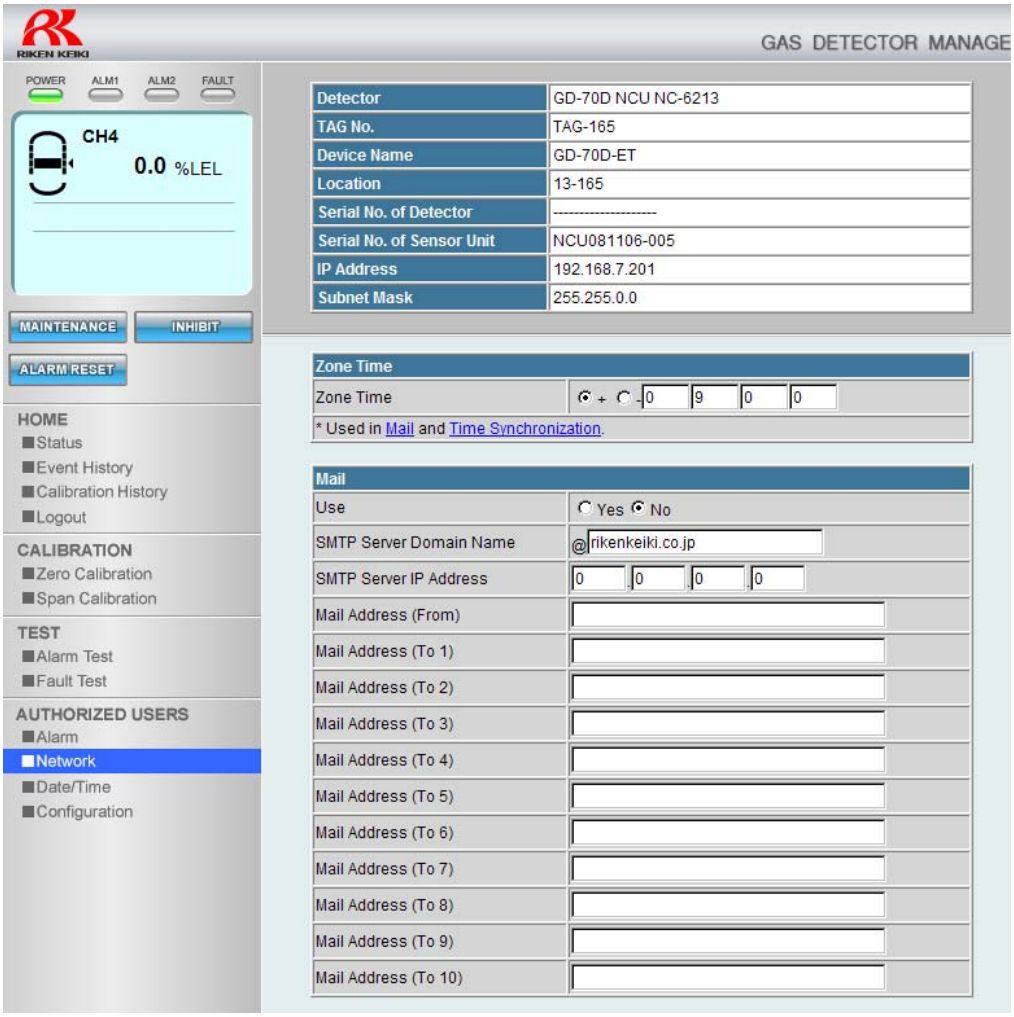


Settings for GD-70D-EA (the tag number, name of the unit, location, etc.) can be viewed and configured. Clicking the [Update] button updates the configuration of the detector head using settings entered.

The tag number is used as a mail sender for using the mail function.

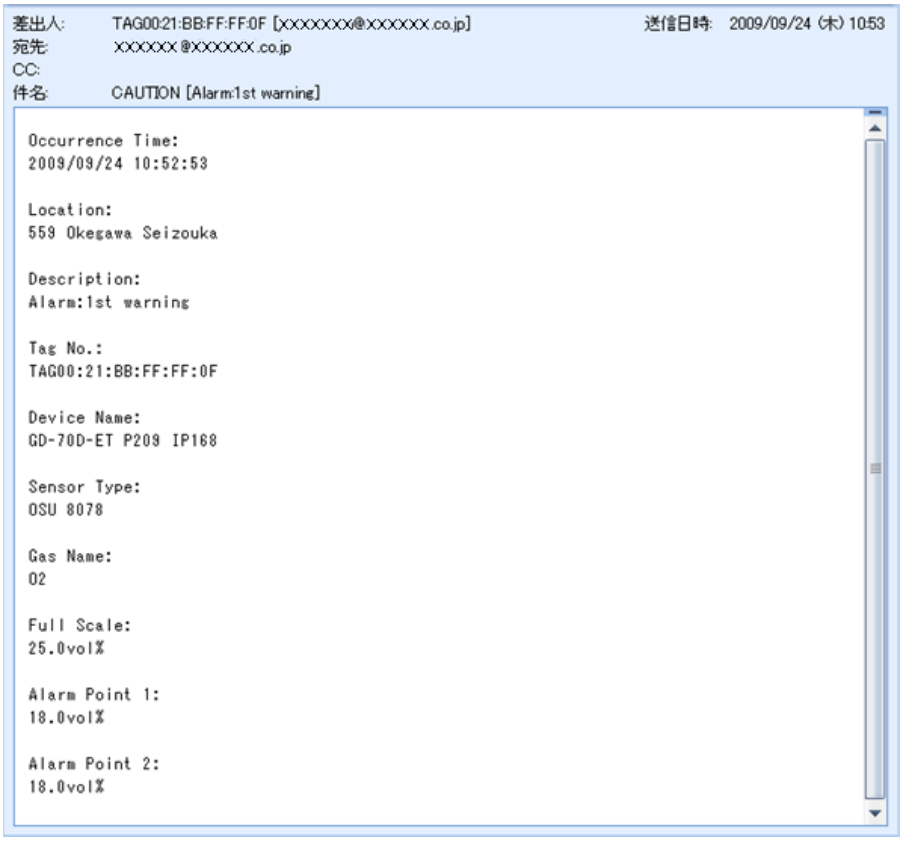
2-4. Auto mailing function (gas alarm/fault alarm)

AUTHORIZED USERS
Network screen (Authorized User)



In response to alarm/fault events, this sends Email notification of the event from GD-70D-EA to predefined Email addresses.
Register a mail address of the sender. The maximum number of destinations is ten. The mail is sent simultaneously to all the predefined addresses.

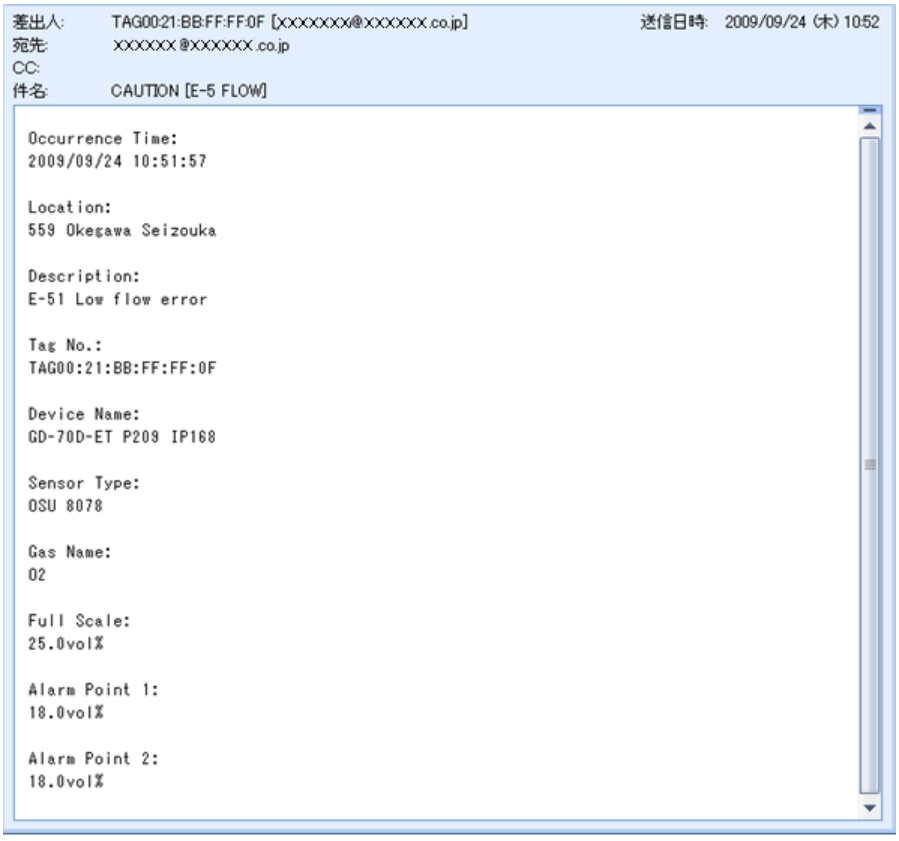
Sent Email (sample)
First alarm triggered



差出人: TAG00:21:BB:FF:FF:0F [xxxxxxx@xxxxxx.co.jp] 送信日時: 2009/09/24 (木) 10:53
宛先: xxxxxx@xxxxxx.co.jp
CC:
件名: CAUTION [Alarm:1st warning]

```
Occurrence Time:
2009/09/24 10:52:53

Location:
559 Okegawa Seizouka

Description:
Alarm:1st warning

Tag No.:
TAG00:21:BB:FF:FF:0F

Device Name:
GD-70D-ET P209 IP168

Sensor Type:
OSU 8078

Gas Name:
O2

Full Scale:
25.0vol%

Alarm Point 1:
18.0vol%

Alarm Point 2:
18.0vol%
```

Flow rate abnormality alarm



差出人: TAG00:21:BB:FF:FF:0F [xxxxxxx@xxxxxx.co.jp] 送信日時: 2009/09/24 (木) 10:52
宛先: xxxxxx@xxxxxx.co.jp
CC:
件名: CAUTION [E-5 FLOW]

```
Occurrence Time:
2009/09/24 10:51:57

Location:
559 Okegawa Seizouka

Description:
E-51 Low flow error

Tag No.:
TAG00:21:BB:FF:FF:0F

Device Name:
GD-70D-ET P209 IP168

Sensor Type:
OSU 8078

Gas Name:
O2

Full Scale:
25.0vol%

Alarm Point 1:
18.0vol%

Alarm Point 2:
18.0vol%
```

3

Modbus/TCP Communication Functions

3-1. Communication specifications

Protocol	Modbus/TCP
Communication mode	RTU
Port No.	502 port
Corresponding function	Read Holding Register (0x03) Preset Multiple Registers (0x10)
Number of simultaneous connections	8

General specifications for Modbus/TCP are not included in the scope of this manual. See the specifications for Modbus/TCP. (http://www.modbus.org/)

3-2. Register map

The register map of GD-70D-EA Modbus/TCP is described below.

Address	Writability ○: Yes ×: No	Item	Description
40001	×	Status	bit0-3: Mode (0: Initial 1: Measuring mode 3: Inhibit 5: Test mode) bit5: Fault flag bit6: Alarm: 1st flag bit7: Alarm: 2nd flag bit8: Alarm: 1st alarm relay contact flag bit9: Alarm: 2nd alarm relay contact flag bit10: Fault relay contact flag bit11: Repeat 0 and 1 every two seconds
40002	×	(Reserved)	
40003	×	Concentration value	Floating decimal point Address 40003: Lower 16 bits Address 40004: Upper 16 bits
40004	×		
40005	×	Concentration value	Signed integer Value obtained by rounding off the concentration value to the nearest whole number
40006	×	(Reserved)	
40007	×	Concentration unit	bit0-2: Decimal point code (000:1/1 001:1/10 010:1/100 011:1/1000) bit8-11: Unit code (0001: ppm 0010: ppb 0100: vol% 1000: %LEL)

Address	Writability ○: Yes ×: No	Item	Description
40008	×	Temperature	Unsigned integer Indicates the temperature if the value is within the operation temperature range (0 to 40°C) of GD-70D-EA. Indicates that the temperature is above 40°C or below 0°C if the value is out of the operation temperature range. • 0 to 40°C: Temperature (0 to 40°C) • 41 to 3276: Above 40°C • Others: Below 0°C
40009	×	(Reserved)	
40010	×	Heartbeat	bit0: Heartbeat (repeat 0 and 1 every second)
40011	×	(Reserved)	
40012	×	(Reserved)	
40013	×	Alarm setpoint 1	Floating decimal point Address 40013: Lower 16 bits Address 40014: Upper 16 bits
40014	×		
40015	×	Alarm setpoint 2	Floating decimal point Address 40015: Lower 16 bits Address 40016: Upper 16 bits
40016	×		
40017	×	Alarm status	bit0: Alarm: 1st bit1: Alarm: 2nd
40018	×	Fault status	bit1: Fault
40019	×	(Reserved)	
40020	×	(Reserved)	
40021	○	(Reserved)	
40022	○	(Reserved)	
40023	×	Status	bit15: Maintenance bit14: Test bit13: Inh bit bit12: Initial bit11: Alarm: RANGE OVER bit10: Smoke detection bit9: Alarm: 2nd bit8: Alarm: 1st bit7: Abnormalities: Sensor bit6: Abnormalities: Communication bit5: Abnormalities: Flow rate bit4: Caution: Flow rate bit2-3: Concentration unit code (00: vol% 01: %LEL 10: ppm 11: ppb) bit0-1: Decimal point code (00: 1/1 01: 1/10 10: 1/100 11: 1/1000)
40024	×	Concentration value	Signed integer Value obtained by turning the valid number of concentration value into an integer. Actual concentration value is obtained by multiplying the integer by the decimal point code of Status.
40026	×	(Reserved)	
40025	×	(Reserved)	
40027	○	Year/month	Upper byte: Year (the last 2 digits) Lower byte: Month
40028	○	Day/hour	Upper byte: Day Lower byte: Hour
40029	○	Minute/second	Upper byte: Minute Lower byte: Second
40030	×	Heartbeat	bit0: Heartbeat (repeat 0 and 1 every second) (Identical to address 40010)
40031	×	(Reserved)	
40032	×	(Reserved)	
40033	×	Temperature	Signed integer Value that is ten times of the temperature (unit: °C)
40034	×	(Reserved)	
40035	×	(Reserved)	
40036	×	(Reserved)	
40037	×	(Reserved)	
40038	×	(Reserved)	
40039	×	(Reserved)	
40040	×	Lifetime prediction rate	Change rate based on 100% at shipping adjustment. 0 to 100 (unit: %)

Address	Writability ○: Yes ×: No	Item	Description
40041	×	Full scale	Signed integer Value obtained by turning the valid number of full scale into an integer. Actual full scale is obtained by multiplying the integer by the decimal point code of Status.
40042	×	Digit	Signed integer Value obtained by turning the valid number of digit into an integer. Actual digit is obtained by multiplying the integer by the decimal point code of Status.
40043	×	Magnification	0: Same magnification, 1: One-tenth, 2: One-hundredth, 3: One-thousandth
40044	×	Unit	0: vol%, 1: %LEL, 2: ppm, 3: ppb
40045	○	Alarm setpoint 1	Signed integer Value obtained by turning the valid number of Alarm setpoint 1 into an integer. Actual Alarm setpoint 1 is obtained by multiplying the integer by the decimal point code of Status.
40046	○	Alarm setpoint 2	Signed integer Value obtained by turning the valid number of Alarm setpoint 2 into an integer. Actual Alarm setpoint 2 is obtained by multiplying the integer by the decimal point code of Status.
40047	○	(Reserved)	
40048	○	Alarm delay time	Unit: 10 msec
40049	○	Fault activation	0: Non latching (Auto-reset) 1: Fault alarm pattern
40051	○	Alarm type	0: H-HH 1: L-LL 2: L-H
40052	○	Alarm activation	0: Non latching (Auto-reset) 1: Fault alarm pattern
40053	○	Contact activation at test	0: OFF 1: ON
40054	○	(Reserved)	
40055	○	Energized/De-energized	bit0: Alarm: 1st (0: De-energized, 1: Energized) bit1: Alarm: 2nd (0: De-energized, 1: Energized) bit2: Fault (0: De-energized, 1: Energized)
40056	○	(Reserved)	
40057	○	(Reserved)	
40058	○	(Reserved)	
40059	○	(Reserved)	
40060	○	(Reserved)	
40061	○	(Reserved)	
40062	×	(Reserved)	
40063	×		
40064	×		
40065	×		
40066	×		
40067	×		
40068	×		
40069	×	Serial number	ASCII character string Left-align, blank is space (0x20)
40070	×		
40071	×		
40072	×		
40073	×		
40074	×		
40075	×		
40076	×		
40077	×		
40078	×		
40079	×	Gas name	ASCII character string Left-align, blank is space (0x20)
40080	×		
40081	×		
40082	×		
40083	×		

Address	Writability ○: Yes ×: No	Item	Description
40084	○	Tag number	ASCII character string Left-align, blank is space (0x20)
40085	○		
40086	○		
40087	○		
40088	○		
40089	○		
40090	○		
40091	○		
40092	○		
40093	○		
40094	○	Apparatus name	ASCII character string Left-align, blank is space (0x20)
40095	○		
40096	○		
40097	○		
40098	○		
40099	○		
40100	○		
40101	○		
40102	○		
40103	○		
40104	○	Measurement location	ASCII character string Left-align, blank is space (0x20)
40105	○		
40106	○		
40107	○		
40108	○		
40109	○		
40110	○		
40111	○		
40112	○		
40113	○		
40114	○	Customer code	ASCII character string Left-align, blank is space (0x20)
40115	○		
40116	○		
40117	○		
40118	○		
40119	×	Sensor serial number	ASCII character string Left-align, blank is space (0x20)
40120	×		
40121	×		
40122	×		
40123	×		
40124	×		
40125	×		
40126	×		
40127	×		
40128	×		
40129	×	Sensor model	ASCII character string Left-align, blank is space (0x20)
40130	×		
40131	×		
40132	×		
40133	×		
40134	×	Sensor unit type	1: ESU 2: SGU 3: NCU 4: SSU 5: SSU (smoke) 6: OSU (25%) 7: OSU (5%) 8: OSU (50%) 9: SCU
40135	×	(Reserved)	
40136	×		
40137	×		
40138	×		
40139	×		
40140	×		
40141	×		
40142	×		
40143	×	Alarm/Fault new flags	bit0: Alarm new flag bit1: Fault flag

Address	Writability ○: Yes ×: No	Item	Description
40144	×	Fault flag	bit0: E-1 (sensor unit abnormalities) bit1-3: Reserved bit4: E-5 (flow rate abnormalities) bit5: E-6 (detector inner communication abnormalities) bit6: E-7 (PLU abnormalities) bit7: Reserved bit8: E-9 (system/clock abnormalities) bit9: Flow rate caution alarm (FLOW) bit10: Clock abnormalities (bit8 is concurrently ON) bit11-14: Reserved bit15: Concentration display flag (ON when the GD-70D-EA LCD display is indicating the concentration and error code (E-9, etc.) alternately)
40145 - 40147	×	MAC address	Upper byte of address 40145 = First octet - Lower byte of address 40147 = Sixth octet
40148 40149	○	IP address	Upper byte of address 40148 = First octet - Lower byte of address 40149 = Fourth octet
40150 40151	○	Subnet mask	Upper byte of address 40150 = First octet - Lower byte of address 40151 = Fourth octet
40152 40153	○	Default gateway	Upper byte of address 40152 = First octet - Lower byte of address 40153 = Fourth octet
40154	○	DHCP	0: OFF 1: ON
40155	×	Lifetime determination flag	Upper byte: Lifetime predictability flag (0: Lifetime predictable 1: Lifetime unpredictable) Lower byte: Lifetime determination flag (0: Before expiration of lifetime 1: Lifetime expired) (Display: E-1)
40156	×	Expiration date flag	0: Before expiration of duration of use 1: Duration of use expired (Duration: Three years) (Display: E-8)
40157 - 40250	○	(Reserved)	
40251	○	Command	See 3-3, “Command”
40252	○	Sub command	
40253	○	Parameter 1	
40254	○	Parameter 2	
40255	○	Parameter 3	
40256	○	Parameter 4	

CAUTION

Interval of five seconds or less between each action of data writing causes the delay in response. Set the timeout value taking this into consideration, or ensure interval of five seconds or more when writing data successively.

Writing into (Reserved) portions in the table above may cause unexpected operation.
Never write into the (Reserved) portions.

For concentration values in address 40003, 40004, 40005 and 40024, concentration values could become negative values during maintenance.
When processing numbers based on concentration values, design carefully taking into consideration negative values as well.

3-3. Command

Following functions are executed by writing commands into registers for addresses 40251 to 40256.

40251	40252	40253	40254	40255	40256	Functions
Command	Sub command	Parameter 1	Parameter 2	Parameter 3	Parameter 4	
MM (0x4D4D)	S (0x0053)	—	—	—	—	Enter the maintenance mode
	E (0x0045)	—	—	—	—	Exit maintenance mode
GS (0x4753)	W (0x0057)	0x0000	—	—	—	Inhibit off
		0x0001	—	—	—	Inhibit on
RA (0x5241)	S (0x0053)	—	—	—	—	Alarm test start
	E (0x0045)	—	—	—	—	Alarm test finish
	W (0x0057)	Concentration value	—	—	—	Apply alarm test concentration value
SB (0x5342)	W (0x0057)	—	—	—	—	Reset the alarm

Execution of the function is triggered by writing the command to address 40251.
Command, subcommand and parameter (if needed) are usually executed by one-time query.
If only the command is written, the function is executed using the subcommand and parameter that are already written.

CAUTION

If wrong commands other than those above are written, exceptional response is not returned.
If the result of command execution is failure, exceptional response is not returned.
Modbus TCP response is against success or failure of writing. Success/failure of the command execution processing itself should be determined as the result of verification of the status and concentration values.

3-4. Exceptional response

3-4-1. When non-supported function is specified

Examples of data:

Query	000000000006010400000001	Function code = 0x04
Response	000000000003018401	Exceptional responses 01 (incorrect function)

Description
Supported functions in GD-70D-EA are Read Holding Register (0x03), Preset Multiple Registers (0x10).

3-4-2. When the specified address is out of the range

Examples of data:

Query	000000000006010301000001	Address = 40257
Response	000000000003018302	Exceptional response 02 (incorrect data address)

Description
The address of GD-70D-EA ranges from 40001 to 40256.

3-4-3. When access to the address not within the range is specified

Examples of data:

Query	000000000006010300FF0002	Read two registers from address 40256
Response	000000000003018303	Exceptional response 03 (incorrect data)

Description
When the address specification is within the range while specification of the number of data exceeds the last address (40256)

3-4-4. When writing to the unwritable address is specified

Examples of data:

Query	00000000000D0110002E000306000503E80000	
	Write three registers from address 40047 (address 40049 is unwritable)	
Response	000000000003019003	Exceptional response 03 (incorrect data)

Description
If any address within the specified range of writing is unwritable, overall function causes an error resulting in a state where writable addresses not to be written.

4

PLC Communication Functions

4-1. Communication specifications

Protocol FINS/UDP (for OMRON PLC), MC/UDP (for MELSEC PLC)
Supported PLC OMRON CJ/CS Series, MELSEC Q Series
Data type Basic Data (Small)
Basic Data (Large)
Basic Data (Small) + Optional Data
Basic Data (Large) + Optional Data

PLC configuration (recommended) and the maximum connectable number of GD-70D-EA units
Communication setting: Interval: min = 1000 msec

PLC configuration (recommended)		Maximum connectable number of GD-70D-EA units	
CPU model	Ethernet unit model	Data type Basic Data: Small	Data type Basic Data: Large Basic Data: Small+Optional Data Basic Data: Large+Optional Data
OMRON CJ1H-CPU6□H	CJ1W-ETN21(CJ1W-EIP21)	32	8
OMRON CJ1G-CPU4□H	CJ1W-ETN21(CJ1W-EIP21)	32	8
OMRON CJ2H-CPU6□	CJ1W-ETN21(CJ1W-EIP21)	64	8
OMRON CJ2H-CPU6□-EIP	- (CPU integrated)	64	32
MELSEC Q□□HCPU	QJ71E71-100	8	8
MELSEC Q□□UDHCPU	QJ71E71-100	64	8
MELSEC Q□□UDEHCPU	- (CPU integrated)	64	8

Communication setting: Interval: min = 3000 msec

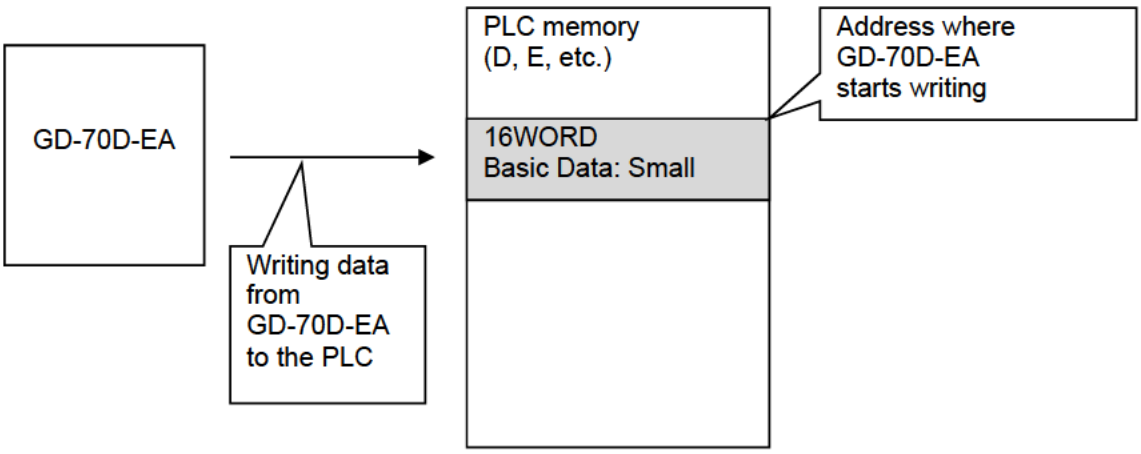
PLC configuration		Maximum connectable number of GD-70D-EA units	
CPU model	Ethernet unit model	Data type Basic Data: Small	Data type Basic Data: Large Basic Data: Small+Optional Data Basic Data: Large+Optional Data
OMRON CJ1H-CPU6□H	CJ1W-ETN21(CJ1W-EIP21)	64	32
OMRON CJ1G-CPU4□H	CJ1W-ETN21(CJ1W-EIP21)	64	32
OMRON CJ2H-CPU6□	CJ1W-ETN21(CJ1W-EIP21)	128	64
OMRON CJ2H-CPU6□-EIP	- (CPU integrated)	128	64
MELSEC Q□□HCPU	QJ71E71-100	64	32
MELSEC Q□□UDHCPU	QJ71E71-100	128	64
MELSEC Q□□UDEHCPU	- (CPU integrated)	128	64

Operation and specifications of the PLC are not included in the scope of this manual. See the operation manual of the PLC used.

4-2. Data type

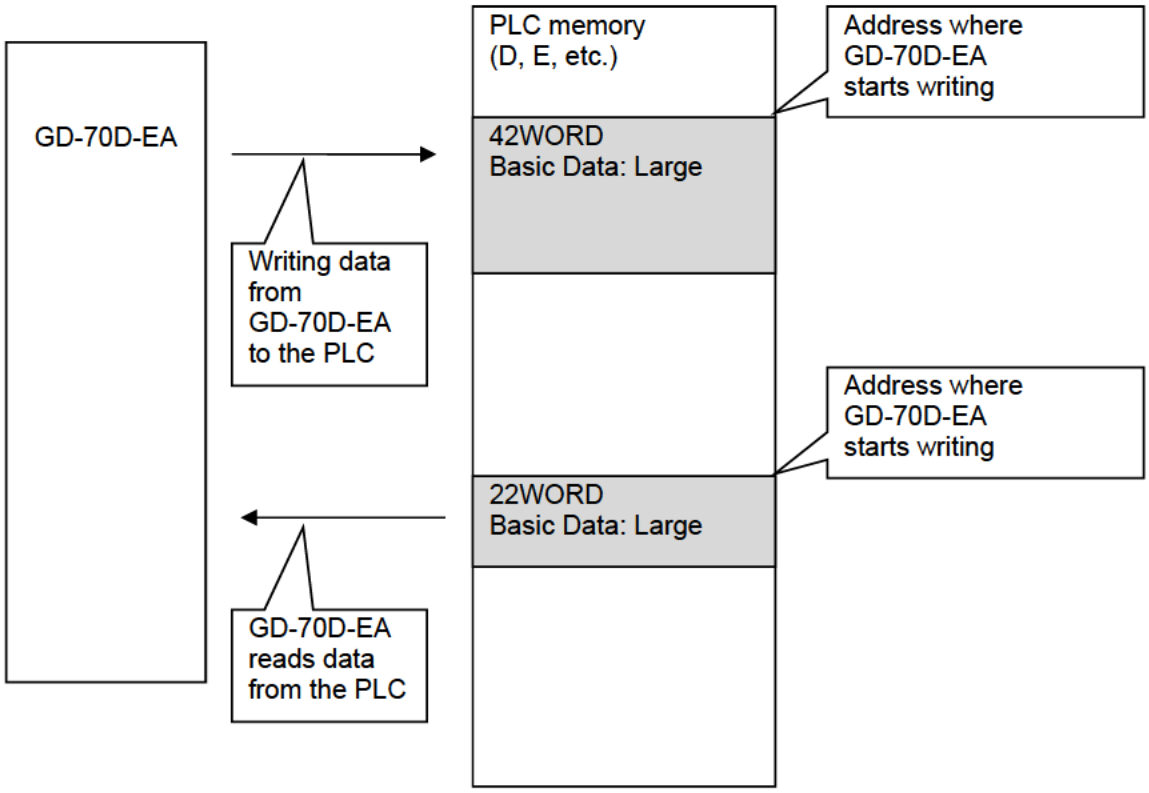
4-2-1. Basic Data: Small

Basic Data: Small
Writing basic information, including alarm status, concentration values, alarm setpoints, etc.



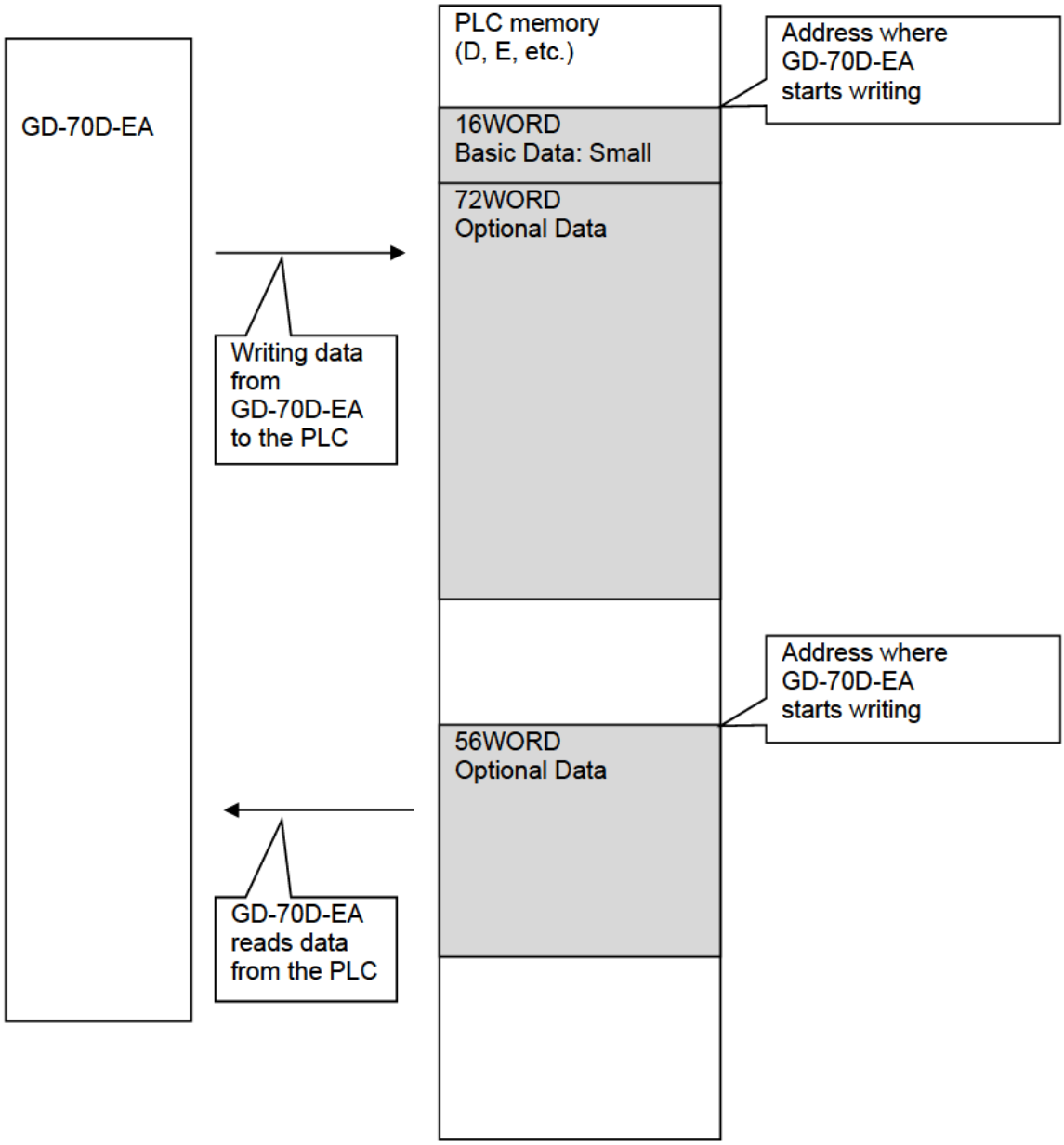
4-2-2. Basic Data: Large

Basic Data: Large
Writing basic information, including alarm status, concentration values, alarm setpoints, etc. and other information such as date and time, gas name, etc.
Reading data for altering alarm pattern settings, alarm setpoints, etc.



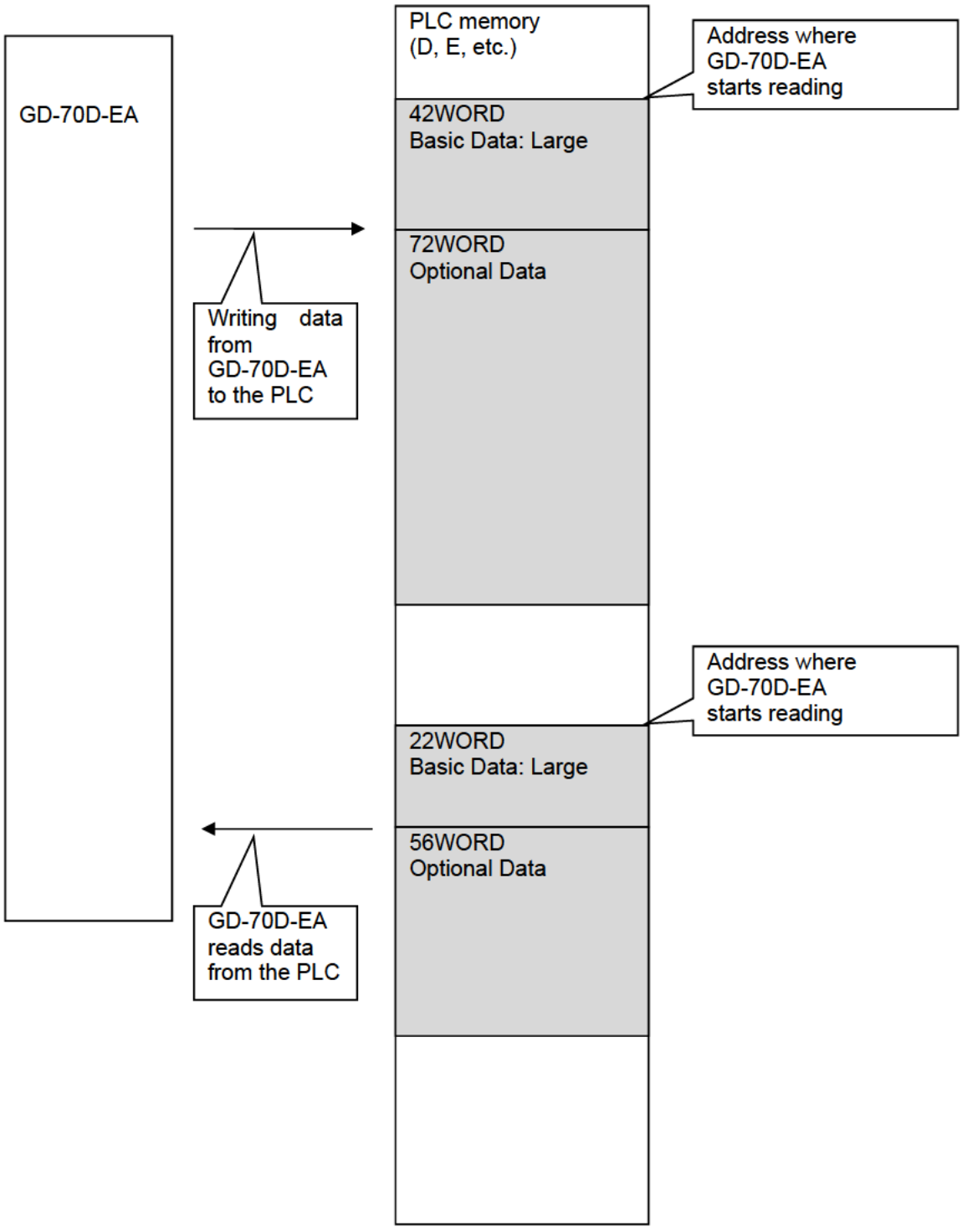
4-2-3. Basic Data: Small + Optional Data

Basic Data: Small + Optional Data
Writing basic information, including alarm status, concentration values, alarm setpoints, etc.
Reading extended data, including various names, sensor models, sensor serial numbers, etc.
Reading data for altering various names, etc.



4-2-4. Basic Data: Large + Optional Data

Basic Data: Large + Optional Data
Writing basic information, including alarm status, concentration values, alarm setpoints, etc. and other information such as date and time, gas name, etc.
Reading data for altering alarm pattern settings, alarm setpoints, etc.
Reading extended data, including various names, sensor models, sensor serial numbers, etc.
Reading data for altering various names, etc.



4-3. Communication settings

GD-70D-EA Settings can be configured through the Network screen displayed by logging in as an authorized user using the Web function, or through the front panel keys. Note that when using the front panel the configuration is restricted.
See Chapter 2, “Web Functions” for details of Web functions. See 4-6, “Specifications for communication setting through GD-70D-EA main unit operation” for details of specifications for communication setting through the front panel.

Item			Description	Remarks
PLC	PLC Type		Choose the communication type of the PLC. FINS settings in this table are used if FINS is selected, or MC settings in this table are used if MC is selected.	Not Used: PLC is not used (default) FINS: OMRON CJ/CS Series MC: MELSEC Q Series
	Type of Basic Data		Type of Basic Data	Small: Small Large: Large
	Use Optional Data		With or without use optional data	Yes: With use No: Without use (default)
	Interval	Min	Minimum transmission interval. Transmission interval in abnormal measuring condition (in alarm or maintenance state) with data changing.	250 to 10000 msec Minimum time default: 1000 msec (With variation in concentration) Maximum time default: 3000 msec (Without variation in concentration)
		Max	Maximum transmission interval. Transmission interval in normal measuring condition without change in data.	
	Timeout		Timeout period of receiving reply from the PLC. Stops waiting for a reply from the PLC following transmission to the PLC if no reply has been received when predefined waiting time elapsed. Transmission occurs again when the length of time set in Interval elapsed.	1 to 10 sec Default: 5 sec
FINS	IP Address		IP address of the PLC	
	Port		UDP port number	Default: 9600
	Detector	Network Address	Network address of GD-70D-EA (Setting value for FINS specification)	
		Node Address	Node address of GD-70D-EA (Setting value for FINS specification)	
		Unit Number	Unit number of GD-70D-EA (Setting value for FINS specification)	
	PLC	Network Address	Network address of the PLC (Setting value for FINS specification)	
		Node Address	Node address of the PLC (Setting value for FINS specification)	
		Unit Number	Unit number of the PLC (Setting value for FINS specification)	
	Detector Write	Memory Address	Memory address used when writing to PLC	
		Area Type	Memory area used when writing to PLC	
	Detector Read	Memory Address	Memory address used when reading from PLC	
		Area Type	Memory area used when reading from PLC	

Item			Description	Remarks
MC	IP Address		IP address of the PLC	
	Port		UDP port number	Default: 5000
	PLC	Network Address	Network address of the PLC (Setting value for MC specification)	
		Node Address	Node address of the PLC (Setting value for MC specification)	
	Detector Write	Memory Address	Memory address where writing to PLC starts	
		Area Type	Memory area used when writing to PLC	
	Detector Read	Memory Address	Memory address where reading from PLC starts	
		Area Type	Memory area used when reading from PLC	

4-4. Data map

4-4-1. Basic Data: Small

Writing data map

		Address	Item	Description
GD-70D-EA Writing area	GD-70D-EA Data	0	Status	bit15: Maintenance bit14: Test bit13: Inhibit bit12: Initial bit11: Alarm: RANGE OVER bit10: Smoke detection bit9: Alarm: 2nd bit8: Alarm: 1st bit7: Abnormalities: Sensor bit6: Abnormalities: Communication bit5: Abnormalities: Flow rate bit4: Caution: Flow rate bit2-3: Concentration unit code (00: vol% 01: %LEL 10: ppm 11: ppb) bit0-1: Decimal point code (00: 1/1 01: 1/10 10: 1/100 11: 1/1000)
		1	Concentration value	Signed integer Value obtained by turning the valid number of concentration value into an integer. Actual concentration value is obtained by multiplying the integer by the decimal point code of Status.
		2	Counter for checking existence	Value increasing in each transmission. Return to 0 when count value overflows.
		3	Flow	Unit: mL/min
		4	Pyrolyzer heater temperature	Unit: °C (0x8000 if no pyrolyzer heater provided)
		5	IP address (Upper 16 bits)	First half of IP address. Ex.) 0xC0A8 if IP address is 192.168.0.1
		6	IP address (Lower 16 bits)	Second half of IP address. Ex.) 0x0001 if IP address is 192.168.0.1
		7	Subnet mask (Upper 16 bits)	First half of subnet mask. Ex.) 0xFFFF if subnet mask is 255.225.225.0
		8	Subnet mask (Lower 16 bits)	Second half of subnet mask. Ex.) 0xFF00 if subnet mask is 255.225.225.0
		9	Flag	bit6: Sensitivity correction (0: OFF 1: ON) bit5: Zero follower (0: OFF 1: ON) bit4: Suppression type (0: Cut off 1: Slope) bit3: Fault alarm pattern (0: Non latching (Auto-reset) 1: Fault alarm pattern) bit2: Gas alarm pattern (0: Non latching (Auto-reset) 1: Fault alarm pattern) bit0-1: Alarm type (0: H-HH 1: L-LL 2: L-H)
		10	Full scale	Signed integer Actual full scale is obtained by multiplying the integer by the decimal point code of Status.
		11	First alarm setpoint	Signed integer Actual first alarm setpoint is obtained by multiplying the integer by the decimal point code of Status.
		12	Second alarm setpoint	Signed integer Actual second alarm setpoint is obtained by multiplying the integer by the decimal point code of Status.

		Address	Item	Description
GD-70D-EA Writing area	GD-70D-EA Data	13	3200 portioned concentration value	Relative value when full scale is assumed to be 3200.
		14	3200 portioned first alarm setpoint	Relative value when full scale is assumed to be 3200.
		15	3200 portioned second alarm setpoint	Relative value when full scale is assumed to be 3200.

CAUTION

For the concentration value in address 1, the concentration value could become a negative value during maintenance.
When processing numbers based on concentration values, design carefully taking into consideration negative values as well.

4-4-2. Basic Data: Large

Writing data map

		Address	Item	Description
GD-70D-EA Writing area	GD-70D-EA Data	0 - 15	Concentration, alarm status, etc.	Identical to Basic Data(Small) (See 4-1-1, "Basic Data: Small")
		16	Date and time (year/month)	Upper byte: Year (the last 2 digits) Lower byte: Month
		17	Date and time (day/hour)	Upper byte: Day Lower byte: Hour
		18	Date and time (minute/second)	Upper byte: Minute Lower byte: Second
		19	Alarm delay time	Unit: 10 msec
		20	Digit	Signed integer Actual digit is obtained by multiplying the integer by the decimal point code of Status.
		21	Zero suppression value	Signed integer Actual zero suppression value is obtained by multiplying the integer by the decimal point code of Status.
		22 - 27	Gas name	ASCII character string Left-align, blank is space (0x20)
		28 - 34	(Reserved)	
		35	(Reserved)	
		36	Lifetime data	bit0-7: Lifetime prediction rate bit8-12: Reserved bit13: Determination whether used or not bit14: Lifetime determination bit15: Availability of lifetime function
		37 - 39	(Reserved)	
	Command Data	40	Command execution status (GD-70D-EA)	0: Normal state 1: Processing in progress
		41	Command execution result	For Command 1 (setting alteration), (Successful: bit ON Failed: bit OFF) bit12: Sensitivity correction bit11: Date and time bit10: Zero follower bit9: Zero suppression type bit8: Zero suppression value bit7: Alarm delay time bit6: Fault alarm pattern bit5: Gas alarm pattern bit4: Second alarm setpoint bit3: First alarm setpoint bit2: Alarm type bit1: Subnet mask bit0: IP address For Command 2 and so on 0: Fail 1: Success

CAUTION

For the concentration value in address 1, the concentration value could become a negative value during maintenance.
When processing numbers based on concentration values, design carefully taking into consideration negative values as well.

Reading data map

		Address	Item	Description
GD-70D-EA Reading area	GD-70D-EA Setting data	0	IP address (Upper 16 bits)	First half of IP address.
		1	IP address (Lower 16 bits)	Second half of IP address.
		2	Subnet mask (Upper 16 bits)	First half of subnet mask.
		3	Subnet mask (Lower 16 bits)	Second half of subnet mask.
		4	Flag	bit3: Fault alarm pattern (0: Non latching (Auto-reset), 1: Fault alarm pattern) bit2: Gas alarm pattern (0: Non latching (Auto-reset), 1: Fault alarm pattern) bit0-1: Alarm type (0: H-HH, 1: L-LL, 2: L-H)
		5	First alarm setpoint	Signed integer Actual first alarm setpoint is obtained by multiplying the integer by the decimal point code of Status.
		6	Second alarm setpoint	Signed integer Actual second alarm setpoint is obtained by multiplying the integer by the decimal point code of Status.
		7	Date and time (year/month)	Upper byte: Year (the last 2 digits) Lower byte: Month
		8	Date and time (day/hour)	Upper byte: Day Lower byte: Hour
		9	Date and time (minute/second)	Upper byte: Minute Lower byte: Second
		10	Alarm delay time	Unit: 10 msec
		11	Zero suppression value	Signed integer Actual zero suppression value is obtained by multiplying the integer by the decimal point code of Status.
		12 - 15	(Reserved)	
	Command Data	16	Command execution status (PLC)	0: Normal state 1: Processing executed
		17	Command code	(See 4-5, “Command”)
		18	Parameter	
		19 - 21	(Reserved)	

4-4-3. Optional Data

Writing data map

		For address Basic Data (Small)	For address Basic Data (Large)	Item	Description
GD-70D-EA Writing area	GD-70D-EA Data	16 - 25	42 - 51	TAG number	ASCII character string Left-align, blank is space (0x20)
		26 - 35	52 - 61	Apparatus name	ASCII character string Left-align, blank is space (0x20)
		36 - 45	62 - 71	Measurement location	ASCII character string Left-align, blank is space (0x20)
		46 - 50	72 - 76	Customer code	ASCII character string Left-align, blank is space (0x20)
		51 - 55	77 - 81	Sensor model	ASCII character string Left-align, blank is space (0x20)
		56 - 65	82 - 91	Sensor serial number	ASCII character string Left-align, blank is space (0x20)
		66 - 67	92 - 93	Sensor unit type setting	ASCII character string Left-align three characters
		68 - 85	94 - 111	(Reserved)	
	Command data	86	112	Command execution status (GD-70D-EA)	0: Normal state 1: Processing completed
		87	113	Command execution result	For Command 1 (setting alteration), (Successful: bit ON Failed: bit OFF) bit3: Customer code bit2: Location of measurement bit1: Unit name bit0: TAG number For Command 2 and so on (reserved) 0: Fail 1: Success

Reading data map

		For address Basic Data (Small)	For address Basic Data (Large)	Item	Description
GD-70D-EA Reading area	GD-70D-EA Setting data	0 - 9	22 - 31	TAG number	ASCII character string Left-align, blank is space (0x20)
		10 - 19	32 - 41	Apparatus name	ASCII character string Left-align, blank is space (0x20)
		20 - 29	42 - 51	Measurement location	ASCII character string Left-align, blank is space (0x20)
		30 - 34	52 - 56	Customer code	ASCII character string Left-align, blank is space (0x20)
		35 - 49	57 - 71	(Reserved)	
	Command data	50	72	Command execution status (PLC)	0: Normal state 1: Processing executed
		51	73	Command code	(See 4-5, “Command”)
		52	74	Parameter	
		53 - 55	75 - 77	(Reserved)	

4-5. Command

Various functions are executed by writing Basic Data: Large, GD-70D-EA setting data for Optional Data, command execute status (PLC), command codes and parameters.

4-5-1. Issuing Command 1 (setting alteration)

Verify [Command execution status (PLC)] = 0 (normal state).
↓
[GD-70D-EA setting data] ← Set data to the item to be altered. (multiple settings allowed)
[Command code] ← Set "1" (setting alteration).
[Parameter] ← Set the value with the bit of the item to be altered set to "ON".
(Set multiple bits to "ON" if altering multiple values.)
↓
[Command execution status (PLC)] ← Set "1" (processing executed).
↓
Verify [Command execution status (GD-70D-EA)] = 1 (processing completed).
↓
[Command execution status (PLC)] ← Set "0" (normal state).

If setting alteration is successful, [Command execution result] = The bit of altered item is ON.
If setting alteration fails, [Command execution result] = The bit of altered item is OFF.

CAUTION

Do not alter values of [GD-70D-EA setting data], [Command code], [Parameter] after issuing the command until completion of processing.

4-5-2. Issuing Commands 2 to 9 (Basic Data: Large only)

Verify [Command execution status (PLC)] = 0 (normal state).
↓
[GD-70D-EA setting data] ← Set data to the item to be altered. (multiple settings allowed)
[Command code] ← Set "2 to 9".
[Parameter] ← Set "0". (Unused) (Commands 2 to 9)
↓
[Command execution status (PLC)] ← Set "1" (processing executed).
↓
Verify [Command execution status (GD-70D-EA)] = 1 (processing completed).
↓
[Command execution status (PLC)] ← Set "0" (normal state).

If setting alteration is successful, [Command execution result] = 1
If setting alteration fails, [Command execution result] = 0

CAUTION

Do not alter values of [GD-70D-EA setting data], [Command code], [Parameter] after issuing the command until completion of processing.

4-5-3. Issuing Command 10 (alarm test concentration setting) (Basic Data: Large only)

Verify [Command execution status (PLC)] = 0 (normal state).
↓
[GD-70D-EA setting data] ← Set data to the item to be altered. (multiple settings allowed)
[Command code] ← Set “10” (alarm test concentration setting).
[Parameter] ← Set the alarm test concentration value.
↓
[Command execution status (PLC)] ← Set “1” (processing executed).
↓
Verify [Command execution status (GD-70D-EA)] = 1 (processing completed).
↓
[Command execution status (PLC)] ← Set “0” (normal state).

If setting alteration is successful, [Command execution result] = 1
If setting alteration fails, [Command execution result] = 0

CAUTION

Do not alter values of [GD-70D-EA setting data], [Command code], [Parameter] after issuing the command until completion of processing.

4-5-4. Data relative to Basic Data: Large commands

	Address	Item	Description
GD-70D-EA Writing area	40	Command execution status (GD-70D-EA)	0: Normal state 1: Processing in progress
	41	Command execution result	For Command 1 (setting alteration), (Successful: bit ON Failed: bit OFF) bit12: Sensitivity correction bit11: Date and time bit10: Zero follower bit9: Zero suppression type bit8: Zero suppression value bit7: Alarm delay time bit6: Fault alarm pattern bit5: Gas alarm pattern bit4: Second alarm setpoint bit3: First alarm setpoint bit2: Alarm type bit1: Subnet mask bit0: IP address For Command 2 and so on 0: Failure 1: Success

	Address	Item	Description
GD-70D-EA Reading area	0 - 15	Various setting data	
	16	Command execution status (PLC)	0: Normal state 1: Processing executed
	17	Command	Set command code.
	18	Parameter	Depending on command (See the command code table below)

Command codes for Basic Data: Large

Command code	Details	Parameter
1	Setting alteration	Setting flag (see below)
2	Buzzer stop	Unassigned
3	Inhibit on	Unassigned
4	Inhibit off	Unassigned
5	Enter the maintenance mode	Unassigned
6	Exit maintenance mode	Unassigned
7	Zero calibration executed	Unassigned
8	Enter the alarm test mode	Unassigned
9	Exit the alarm test mode	Unassigned
10	Alarm test concentration setting	Test concentration value

Parameter (setting flag) for Command code 1 (setting alteration)
Concurrent alteration of multiple items is allowed. To do so, set multiple bits to ON at the same time.

Parameter (bit)	Details
bit15	(Reserved)
Bit14	(Reserved)
Bit13	(Reserved)
Bit12	Sensitivity correction
bit11	Date and time
bit10	Zero follower
bit9	Zero suppression type
bit8	Zero suppression value
bit7	Alarm delay time
bit6	Fault alarm pattern
bit5	Gas alarm pattern
bit4	Second alarm setpoint
Bit3	First alarm setpoint
Bit2	Alarm type
Bit1	Subnet mask
Bit0	IP address

4-5-5. Data relative to Optional Data commands

	Address Basic Data (Small) For	Address Basic Data (Large) For	Item	Description
GD-70D-EA Writing area	86	102	Command execution status (GD-70D-EA)	0: Normal state 1: Processing in progress
	87	103	Command execution result	For Command 1 (setting alteration), (Successful: bit ON Failed: bit OFF) bit3: Customer code bit2: Location of measurement bit1: Unit name bit0: TAG number For Command 2 and so on (reserved) 0: NG 1: OK

	Address For Basic Data (Small)	Address For Basic Data (Large)	Item	Description
GD-70D-EA Reading area	0 - 49	22 - 71	Various setting data	
	50	72	Command execution status (PLC)	0: Normal state 1: Processing in progress
	17	73	Command	Set command code.
	18	74	Parameter	Depending on command (See the command code table below)

Command code for Optional Data

Command code	Details	Parameter
1	Setting alteration	Setting flag (see below)

Parameter (setting flag) for Command code 1 (setting alteration)

Parameter (bit)	Details
bit15	(Reserved)
Bit14	(Reserved)
Bit13	(Reserved)
Bit12	(Reserved)
bit11	(Reserved)
bit10	(Reserved)
bit9	(Reserved)
bit8	(Reserved)
bit7	(Reserved)
bit6	(Reserved)
bit5	(Reserved)
bit4	(Reserved)
Bit3	Customer code
Bit2	Measurement location
Bit1	Apparatus name
Bit0	TAG number

4-5-6. Altering alarm setpoint setting

To set the first alarm setpoint to 500, the second alarm setpoint to 1000:
Address
[GD-70D-EA setting data (1st alarm point)] : Basic Data: Large GD-70D-EA reading area address 5
[Command execution status (PLC)] : Basic Data: Large GD-70D-EA reading area address 16
[Command code] : Basic Data: Large GD-70D-EA reading area address 17
[Parameter] : Basic Data: Large GD-70D-EA reading area address 18
[Command execution status (GD-70D-EA)] : Basic Data: Large GD-70D-EA writing area address 40
[Command execution status] : Basic Data: Large GD-70D-EA writing area address 41

Verify [Command execution status (PLC)] = 0 (normal state).
↓
[GD-70D-EA setting data] ← 500
[Command code] ← Set “1” (setting alteration).
[Parameter] ← 0x0018

The value with setting flags of first and second alarm setpoints (bit3 and bit4) set to ON.
↓
[Command execution status (PLC)] ← Set “1” (processing executed).
↓
Verify [Command execution status (GD-70D-EA)] = 1 (processing completed).
↓
[Command execution status (PLC)] ← Set “0” (normal state).

If setting alteration is successful, [Command execution result] = 0018
With first and second alarm setpoints (bit3 and bit4) set to ON
If setting alteration fails, [Command execution result] = 0000
With first and second alarm setpoints (bit3 and bit4) set to OFF

4-5-7. Inhibit operation

Address

[Command execution status (PLC)]	: Basic Data: Large GD-70D-EA reading area address 16
[Command code]	: Basic Data: Large GD-70D-EA reading area address 17
[Parameter]	: Basic Data: Large GD-70D-EA reading area address 18
[Command execution status (GD-70D-EA)]	: Basic Data: Large GD-70D-EA writing area address 40
[Command execution status]	: Basic Data: Large GD-70D-EA writing area address 41

Verify [Command execution status (PLC)] = 0 (normal state).

↓

[Command code] ← Set “3” (Inhibit ON).

(If Inhibit OFF, set “4”.)

[Parameter] ← 0 (Parameter unused)

↓

[Command execution status (PLC)] ← Set “1” (processing executed).

↓

Verify [Command execution status (GD-70D-EA)] = 1 (processing completed).

↓

[Command execution status (PLC)] ← Set “0” (normal state).

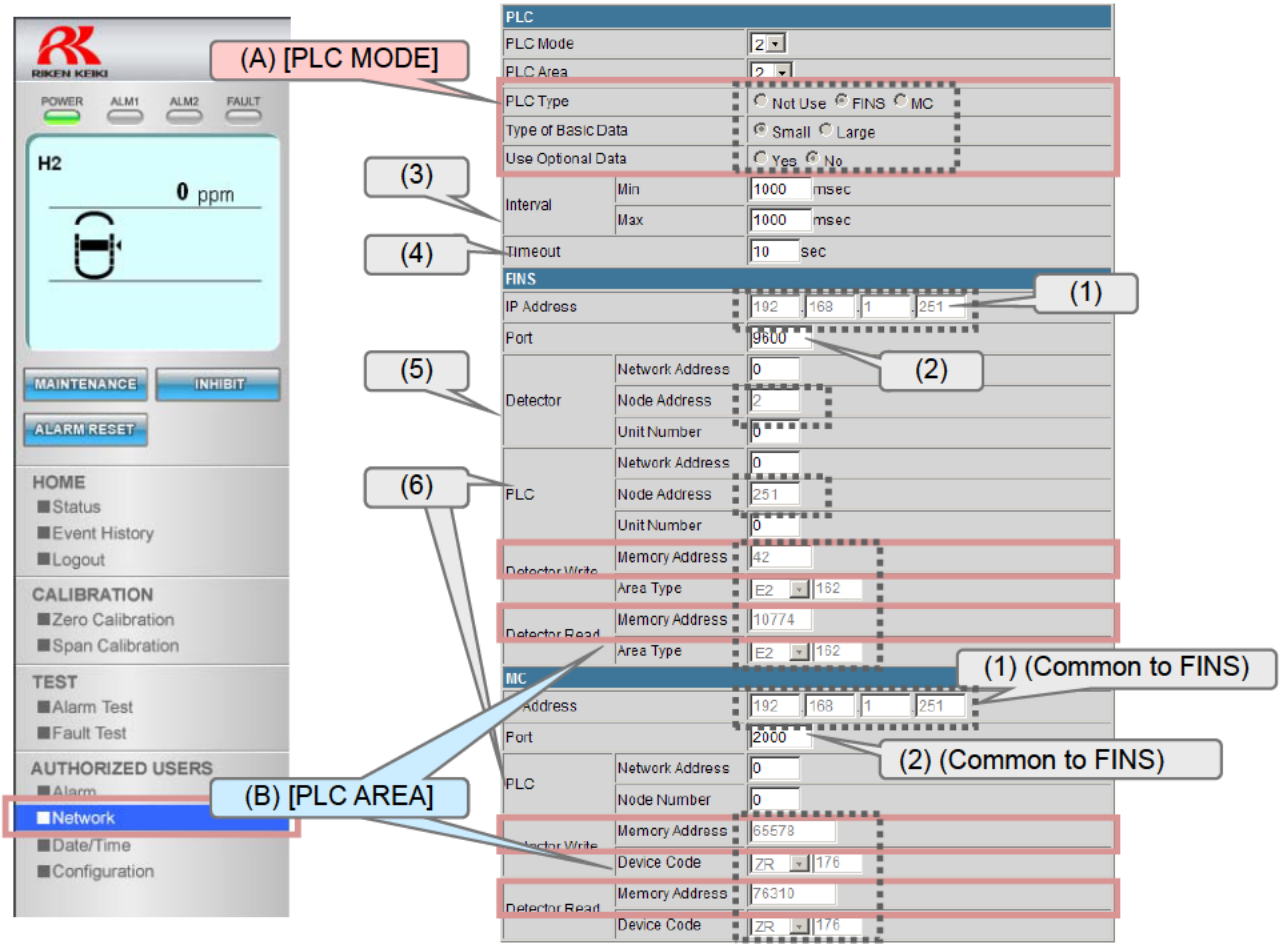
If setting alteration is successful, [Command execution result] = 1

If setting alteration fails, [Command execution result] = 0

4-6. Specifications for communication setting through GD-70D-EA main unit operation

Item	Description	Remarks
PLC Mode	Communication mode	1 - 5
PLC Area	PLC memory area	0 - 15

The following figure illustrates the authorized user Web screen with the [Network] item selected and [PLC MODE]/[PLC AREA] set to 2 to 5/0 to 15 respectively, Predefined items are displayed in gray and not editable.



IP address of GD-70D-EA	IP1.IP2.IP3.IP4

	Item		Remarks	For [PLC MODE 2 to 5]	
(1)	IP Address(PLC)		0 - 254	IP1.IP2.IP3.251 (fixed)	Fixed : 251
(2)	Port		0-655535		default : 9600(FINS) default : 5000(MC)
(3)	Interval	Min	250-10000		default : 1000msec
		Max	250-10000		default : 3000msec
(4)	TimeOut		1-10		default : 5 sec
(5)	Detector	Network Address	0-255		default : 0
		(Node Address)	0-255	IP4	
		Unit Number	0-255		default : 0

	Item		Remarks	For [PLC MODE 2 to 5]	
(6)	PLC	Network Address	0-255		default : 0
		(Node Address)	0-255	251 (fixed)	
		Unit Number	0-255		default : 0

See 4-3, “Communication settings” for detailed settings of items.

Configuring [PLC MODE] = 1 to 5 sets each IP address of GD-70D-EA as described in the table below.
[xxx] corresponds to the IP address of GD-70D-EA.
IP address of PLC: XXX. XXX. XXX.251 (fixed)

(A)	Communication mode [PLC MODE]	1	2		3		4		5	
	default : 1									
	PLC Type Type of Basic Data	Not use	FINS Small		FINS Large		MC Small		MC Large	
	Memory Address IP address		Detector write	Detector read	Detector write	Detector read	Detector write	Detector read	Detector write	Detector read
	xxx.xxx.xxx.1		0	-	0	10752	0	-	0	10752
	xxx.xxx.xxx.2		42	-	42	10774	42	-	42	10774
	xxx.xxx.xxx.3		84	-	84	10796	84	-	84	10796
	xxx.xxx.xxx.4		126	-	126	10818	126	-	126	10818
	xxx.xxx.xxx.5		168	-	168	10840	168	-	168	10840
	xxx.xxx.xxx.6		210	-	210	10862	210	-	210	10862
	xxx.xxx.xxx.7		252	-	252	10884	252	-	252	10884
	xxx.xxx.xxx.8		294	-	294	10906	294	-	294	10906
	xxx.xxx.xxx.9		336	-	336	10928	336	-	336	10928
	xxx.xxx.xxx.10		378	-	378	10950	378	-	378	10950
	xxx.xxx.xxx.11		420	-	420	10972	420	-	420	10972
	xxx.xxx.xxx.12		462	-	462	10994	462	-	462	10994
	xxx.xxx.xxx.13		504	-	504	11016	504	-	504	11016
	xxx.xxx.xxx.14		546	-	546	11038	546	-	546	11038
	xxx.xxx.xxx.15		588	-	588	11060	588	-	588	11060
	xxx.xxx.xxx.16		630	-	630	11082	630	-	630	11082
	xxx.xxx.xxx.164		6846	-	6846	14338	6846	-	6846	14338
	xxx.xxx.xxx.165		6888	-	6888	14360	6888	-	6888	14360
	xxx.xxx.xxx.166		6930	-	6930	14382	6930	-	6930	14382
	xxx.xxx.xxx.167		6972	-	6972	14404	6972	-	6972	14404
	xxx.xxx.xxx.168		7014	-	7014	14426	7014	-	7014	14426
	xxx.xxx.xxx.169		7056	-	7056	14448	7056	-	7056	14448
	xxx.xxx.xxx.170		7098	-	7098	14470	7098	-	7098	14470
	xxx.xxx.xxx.171		7140	-	7140	14492	7140	-	7140	14492
	xxx.xxx.xxx.172		7182	-	7182	14514	7182	-	7182	14514
	xxx.xxx.xxx.173		7224	-	7224	14536	7224	-	7224	14536
	xxx.xxx.xxx.174		7266	-	7266	14558	7266	-	7266	14558
	xxx.xxx.xxx.175		7308	-	7308	14580	7308	-	7308	14580
	xxx.xxx.xxx.176		7350	-	7350	14602	7350	-	7350	14602
	xxx.xxx.xxx.177		7392	-	7392	14624	7392	-	7392	14624
	xxx.xxx.xxx.178		7434	-	7434	14646	7434	-	7434	14646
	xxx.xxx.xxx.179		7476	-	7476	14668	7476	-	7476	14668
	xxx.xxx.xxx.180		7518	-	7518	14690	7518	-	7518	14690
	xxx.xxx.xxx.249		10416	-	10416	16208	10416	-	10416	16208
	xxx.xxx.xxx.250		10458	-	10458	16230	10458	-	10458	16230
PLC fixed	xxx.xxx.xxx.251									

If flexible configuration is required, set [PLC MODE] = 1, then configure settings through Web functions. See 1-4, “PLC communication functions (OMRON CJ/CS Series)” or 1-5, “PLC communication functions (MELSEC Q Series)” for details of setting methods.

CAUTION

Design carefully as XXX. XXX. XXX.252 and subsequent IP addresses will be unavailable.

Each of [PLC AREA] = 0 to 15 corresponds to individual settings described in the table below.

(B)	PLC memory area [PLC AREA]		FINS	MC*
	default : 3	0	E0	ZR(0)
		1	E1	ZR(32768)
		2	E2	ZR(65536)
		3	E3	ZR(98304)
		4	E4	ZR(131072)
		5	E5	ZR(163840)
		6	E6	ZR(196608)
		7	E7	ZR(229376)
		8	E8	ZR(262144)
		9	E9	ZR(294912)
		10	E10	ZR(327680)
		11	E11	ZR(360448)
		12	E12	ZR(393216)
		13	E13	ZR(425984)
		14	E14	ZR(458752)
		15	E15	ZR(458753)

* When MC is used, the values indicated in parentheses “()” represent offset values of MemoryAddress.

320CE17059

Declaration of Conformity

We, RIKEN KEIKI CO., LTD.

2-7-6, Azusawa, Itabashi-ku,
Tokyo 174-8744 Japan

declare in our sole responsibility that the following product conforms to all the relevant provisions.

Product Name	:	Gas Detector Head		
Model Name	:	GD-70D-EA		
Council Directives	:	EMC	:	2014/30/EU
		RoHS	:	2011/65/EU
Applicable Standards	:	EMC	:	EN 50270:2015(Type 2)
		RoHS	:	EN50581(2012)

Year to begin affixing CE Marking : 2017

Place: TOKYO, Japan

Signature: Tetsuya Kawabe
Full name: Tetsuya Kawabe

Date: Oct. 6, 2017

Title: Director,Quality control center