

User Manual

GL-9971, GL-9972, GL-9973, GL-9974, GL-9975 Programmable IO Modules

CODESYS, MODBUS, light version

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1. About This Manual

This manual contains information on the software and hardware features of the Beijer Electronics products listed below. It provides in-depth specifications, guidance on installation, setup, and usage of the products.

1.1. Symbols Used in This Manual

This publication includes Warning, Caution, Note and Important icons where appropriate, to point out safety-related, or other important information. The corresponding symbols should be interpreted as follows:



WARNING

Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury, and major damage to the product.



CAUTION

Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury, and moderate damage to the product.



IMPORTANT

Highlights key information.



NOTE

Points out relevant facts and conditions.



TIP

Provides useful, non-essential information to assist you.

1.2. Modules Covered in This Manual

Module	Type	Other
GL-9971	Programmable IO	CODESYS, MODBUS TCP master/slave, light version max 10 slices
GL-9972	Programmable IO	CODESYS, MODBUS TCP master/slave, MODBUS RTU master, OPC UA, light version max 63 slices
GL-9973	Programmable IO	CODESYS, MODBUS TCP master/slave, MODBUS RTU master, OPC UA, WebVisu, light version max 63 slices

Module	Type	Other
GL-9974	Programmable IO	CODESYS, MODBUS TCP master/slave, OPC UA, light version max 63 slices
GL-9975	Programmable IO	CODESYS, MODBUS TCP master/slave, OPC UA, WebVisu, light version max 63 slices

2. Safety

Before using this product, please read this manual and other relevant manuals carefully. Pay full attention to safety instructions!

In no event will Beijer Electronics be responsible or liable for damages resulting from the use of this product.

The images, examples and diagrams in this manual are included for illustrative purposes. Because of the many variables and requirements associated with any particular installation, Beijer Electronics cannot take responsibility or liability for actual use based on the examples and diagrams.

2.1. Product Certifications

The product has the following product certifications.



2.2. General Safety Requirements



WARNING

- Do not assemble the products and wires with power connected to the system. Doing so cause an "arc flash", which can result in unexpected dangerous events (burns, fire, flying objects, blast pressure, sound blast, heat).
- Do not touch terminal blocks or IO modules when the system is running. Doing so may cause electric shock, short circuit or malfunction of the device.
- Never let external metallic objects touch the product when the system is running. Doing so may cause electric shock, short circuit or malfunction of the device.
- Do not place the product near inflammable material. Doing so may cause a fire.
- All wiring work should be performed by an electrical engineer.
- When handling the modules, ensure that all persons, the workplace and the packing are well grounded. Avoid touching conductive components, the modules contain electronic components that may be destroyed by electrostatic discharge.



CAUTION

- Never use the product in environments with temperature over 60°C. Avoid placing the product in direct sunlight.
- Never use the product in environments with over 90% humidity.
- Always use the product in environments with pollution degree 1 or 2.
- Use standard cables for wiring.

2.3. Additional Safety Requirements

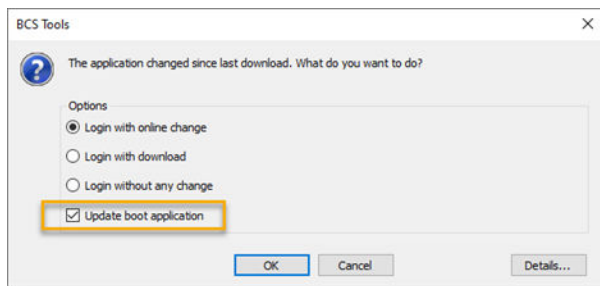
2.3.1. Safety Considerations for Online Change

Due to the characteristics of the product, performing an online change to a **Programmable IO** (models GN-937X, GL-997X, M937X, ML-997X) with the **Update Boot Application** option selected may affect the execution of the PLC logic. This can cause delays while the boot application is being stored in the flash memory.

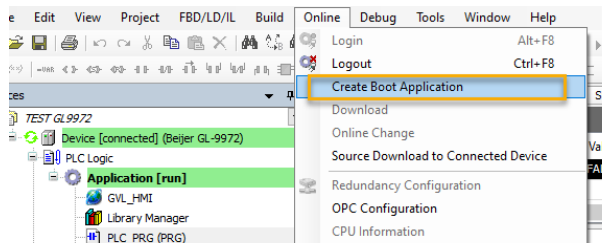


WARNING

This delay can have unwanted consequences for machine control and may cause dangerous situations. Perform an online change with the **Update Boot Application** procedure only when the machine is in **safe state**!



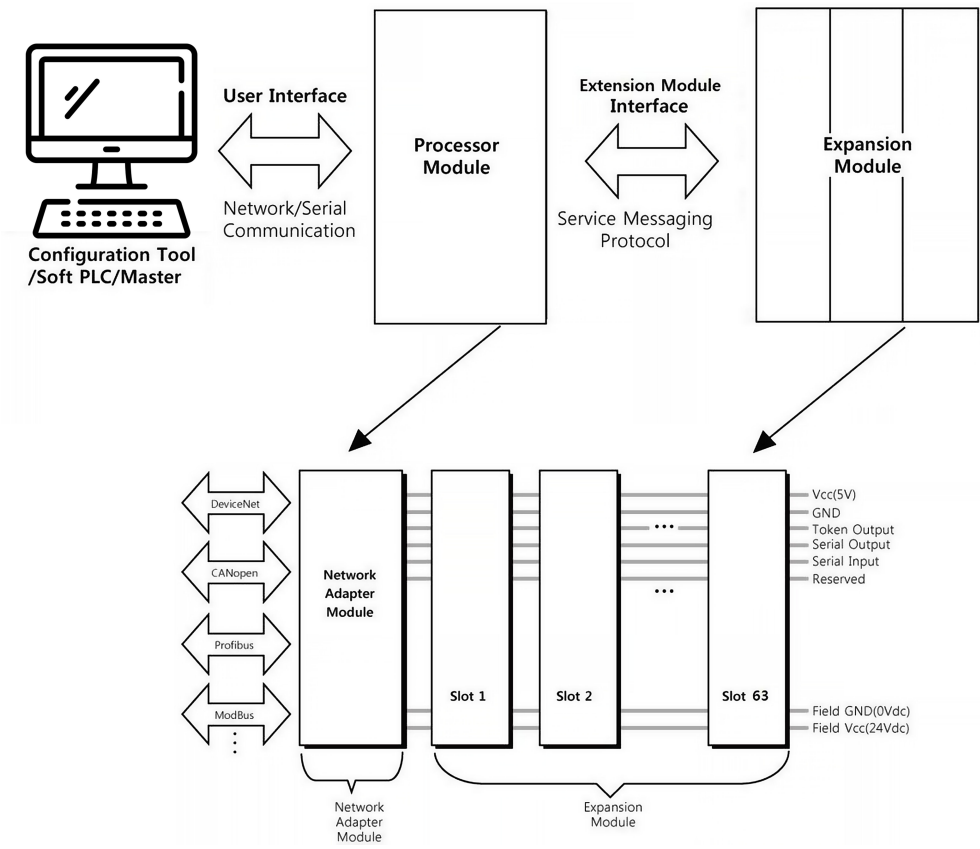
When the **Update Boot Application** is disabled, you can make online changes without any delay. However, you must perform a separate **Create Boot Application**; otherwise, the modified program will not persist after a power cycle.



The **Update Boot Application** setting is typically checked in the **Online > Login** dialog. When enabled, the boot application file is written to the flash memory, which can temporarily disrupt the running PLC task's periodicity. Due to the modules structural characteristics, delays are unavoidable when updating the boot application.

For **Login with download**, program execution is halted, the download is initiated, and the application is written to flash memory and registered as boot application.

3. About the G-series System

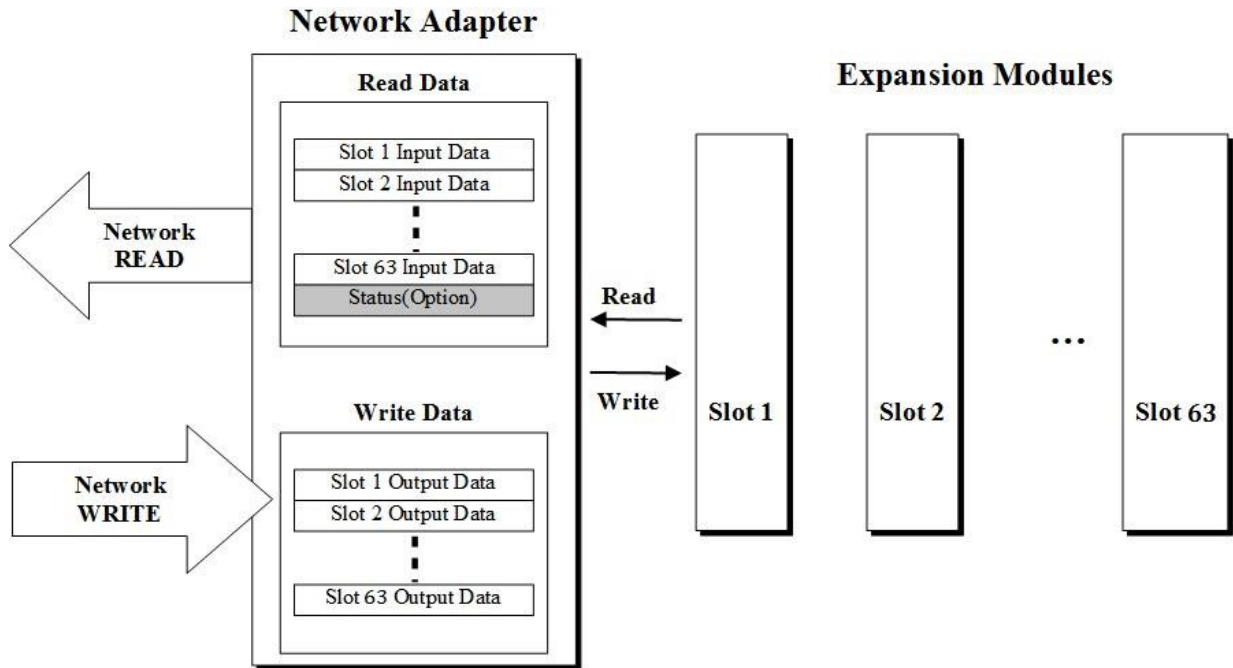


System overview

- **Network Adapter Module** - The network adapter module forms the link between the field bus and the field devices with the expansion modules. The connection to different field bus systems can be established by each of the corresponding network adapter module, e.g., for MODBUS TCP, Ethernet IP, EtherCAT, PROFINET, CC-Link IE Field, PROFIBUS, CANopen, DeviceNet, CC-Link, MODBUS/Serial etc.
- **Expansion Module** - Expansion module types: Digital IO, Analog IO, and Special modules.
- **Messaging** - The system uses two types of messaging: Service messaging and IO messaging.

3.1. IO Process Data Mapping

An expansion module has three types of data: IO data, configuration parameter, and memory register. The data exchange between the network adapter and the expansion modules is made via IO process image data by internal protocol.



Data flow between network adapter (63 slots) and expansion modules

The input and output image data depend on the slot position and the data type of the expansion slot. The ordering of input and output process image data is based on the expansion slot position. Calculations for this arrangement are included in the manuals for network adapter and programmable IO modules.

Valid parameter data depends on the modules in use. For example, analog modules have settings of either 0-20 mA or 4-20 mA, and temperature modules have settings such as PT100, PT200, and PT500. The documentation for each module provides a description of the parameter data.

4. Specifications


4.1. Environmental Specifications

Operating temperature	-20°C - 60°C
UL temperature	-20°C - 60°C
Storage temperature	-40°C - 85°C
Relative humidity	5% - 90% non-condensing
Mounting	DIN rail
Shock operating	IEC 60068-2-27 (15 g)
Vibration resistance	IEC 60068-2-6 (4 g)
Industrial emissions	EN 61000-6-4: 2019
Industrial immunity	EN 61000-6-2: 2019
Installation position	Vertical and horizontal
Product certifications	CE, FCC, UL, cUL

4.2. General Specifications

Power dissipation	GL-9971	60 mA typical @ 24 VDC
	GL-9972/73	50 mA typical @ 24 VDC
	GL-9974/75	70 mA typical @ 24 VDC
UL system power	Supply voltage: 24 VDC nominal, class 2	
System power	Supply voltage: 24 VDC nominal Supply voltage range: 18 - 28.8 VDC Reverse polarity protection	
UL field power	Supply voltage: 24 VDC nominal, class 2	
Field power	Supply voltage: 24 VDC typical (max. 30 VDC)	
Max. current field power contact	Max. DC 8 A	
Wiring	IO cable max. 2.0 mm ² (AWG 14)	
Torque	0.8 Nm (7 lb-in)	
Current for expansion module	1.0 A @ 5 VDC	
Isolation	System power to internal logic: Non-isolation System power IO driver : Isolation	
Weight	GL-9971	76 g
	GL-9972/73	84 g
	GL-9974/75	82 g
Module size	12 mm x 109 mm x 70 mm	

4.3. Programmable Specifications

Items	Specification				
	GL-9971	GL-9972	GL-9973	GL-9974	GL-9975
Programming	CODESYS V3.5 SP17 Patch 3 (build 3.5.17.30), valid from firmware version 3.002.				
Program memory	256 kB	16 MB			
Data memory	40 kB	16 MB			
Non-volatile memory	4 kB Retain: 2 kB Persistent retain: 2 kB	32 kB Retain: 16 kB Persistent retain: 16 kB			
Run-time system	Multiple PLC tasks				
Program languages	IEC 61131-3 (LD, IL, ST, FBD, SFC)				
MQTT *	Yes				
MQTT Sparkplug B	No	Yes			
SSL/TLS	No				
User management **	No	Yes			
IIOT library	No				
SNMP (agent only) ***	Yes				
SNTP	Yes				
OPC DA server	No	Yes			
OPC UA server & client	No	Yes			
Online change	No	Yes			
		<div style="border: 1px solid black; padding: 10px; background-color: #f0f0f0;">  <p>WARNING Before making an online change, see chapter Safety Considerations for Online Change.</p> </div>			
Source upload/download	No	Yes			
File system	No	Yes			
<p>* MQTT does not support TLS.</p> <p>** Provides functionality in a limited form.</p> <p>*** Only the standard format "RFC1213-MIB" is provided.</p> <p>**** WebVisu is not supported in Internet Explorer.</p>					

Items	Specification				
	GL-9971	GL-9972	GL-9973	GL-9974	GL-9975
File transmit	No	Yes			
TFTP	No	Yes			
SQL4CODESYS	No	Yes			
Breakpoint	No	Yes			
WebVisu **	No		Yes	No	Yes
RTC	Retain time: < 15 day/accuracy, < 2 min/month. Status: Fully recharged battery at room temperature. For more specifications, see RTC (Room Temperature) below.				
Max. task	10				
Max. cycle task	10				
Max. status task	10				
Max. data size (Input + Output)	Max. 128 Byte each slot				
Max. expansion module	10 slots	63 slots			
Process time	0.0270 us	0.1440 us			
* MQTT does not support TLS. ** Provides functionality in a limited form. *** Only the standard format "RFC1213-MIB" is provided. **** WebVisu is not supported in Internet Explorer.					

4.3.1. RTC (Room Temperature)

Recommended charging when the battery is discharged: **16 hours**.

Retain time may vary depending on temperature and environment.

Battery charging time	Retain time
4 hours	> 2 days
12 hours	> 12 days
16 hours	> 15 days

RTC warning - Operating problems when the battery is discharged:

- Retain data is not save (only for GN-9971).
- Clock data is not persistent and will be cleared to its initial value.

4.4. Interface Specifications (GL-9971/74/75)

RJ45 ethernet port x 2

Adapter type	Master & slave node (MODBUS TCP)
* WebVisu is not supported in <i>Internet Explorer</i> .	

Ethernet interface		RJ-45 socket, 2 pcs
Baud rate		10/100 Mbps, auto-negotiation, full duplex
Ethernet protocol	GL-9971	MODBUS/TCP, MODBUS/UDP, SNTP, MQTT, HTTP (web server), DHCP/BOOTP
	GL-9974/75	MODBUS/TCP, MODBUS/UDP, SNTP, SNMP, MQTT, DHCP/BOOTP, HTTP (WebVisu *, web server), OPC-server
Max. socket	GL-9971	UDP: 10, TCP: 10
	GL-9974/75	UDP: 16, TCP: 64
Indicators		4 LEDs: MOD - Module status (green/red) NET - Network status (green/red) RUN - PLC run/stop status (green/red) IOS - Expansion IO module status (green/red)
* WebVisu is not supported in <i>Internet Explorer</i> .		

4.5. Interface Specifications (GL-9972/73)

RJ45 Ethernet port x 1

Adapter type	Master & slave node (MODBUS TCP, MODBUS RTU)
Baud rate	10/100 Mbps, auto-negotiation, full duplex
Ethernet interface	RJ-45 socket, 1 pcs
Ethernet protocol	MODBUS/TCP, MODBUS/UDP, SNTP, SNMP, MQTT, DHCP/BOOTP, HTTP (WebVisu, web server), OPC-server
Max. socket	UDP: 16 TCP: 64

RJ45 Serial port x 1

Serial interface	RJ-45 socket, 1 pcs
Serial protocol	MODBUS RTU baud rate: 2400 - 115200 bps (<i>Default: 115200 bps</i>)
Indicator	4 LEDs: MOD - Module status (green/red) NET - Network status (green/red) RUN - PLC run/stop status (green/red) IOS - Expansion IO module status (green/red)

4.6. Ethernet Connection Specifications

Function	Model	Max. number of concurrent communications
WebVisu	GL-9973/75	One for each function are available at the same time
ARTI (OPC-server)	GL-9972/73/74/75	
CODESYS link	GL-9971/72/73/74/75	

Function	Model	Max. number of concurrent communications
Network-variable	GL-9972/73/74/75	
MODBUS/TCP master	GL-9971	1 MODBUS/TCP slaves can be connected
	GL-9972/73/74/75	64 MODBUS/TCP slaves can be connected
MODBUS/TCP slave	GL-9971	10 MODBUS/TCP masters can be connected
	GL-9972/73/74/75	64 MODBUS/TCP masters can be connected
Web server	GL-9971	10 clients can be opened
	GL-9972/73/74/75	64 clients can be opened



IMPORTANT

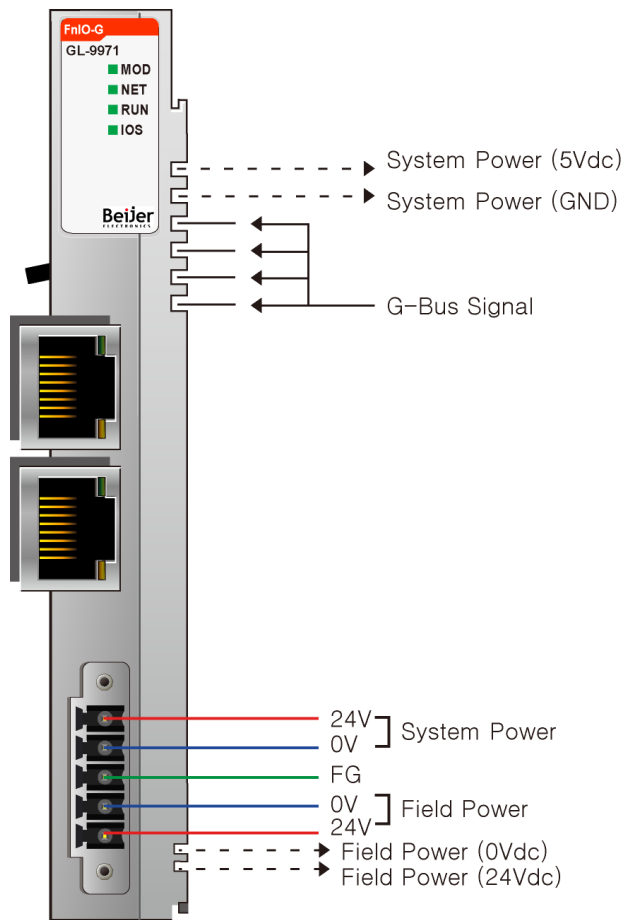
Maximum amount of sockets that can be used at the same time when using the functions in the table above:

- GL-9971: 10 sockets
- GL-9972/73/74/75: 64 sockets

4.7. Serial Connection Specifications (GL-9972/73)

Function	Max. number of concurrent communications
MODBUS RTU master	RS232: 1 slave can be connected RS485: 247 slaves can be connected

5. Wiring Diagram



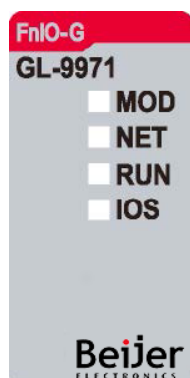
Pin no.	Signal description
0	System power, 24 V
1	System power, ground
2	F.G.
3	Field power, ground
4	Field power, 24 V



WARNING

Never connect system power to field power! Use separate power supplies.

6. LED Indicator



LED	LED function / description	LED color
MOD	Module status	Green/red
NET	Network status	Green/red
RUN	PLC run/stop status	Green/red
IOS	Expansion IO status	Green/red

6.1. MOD (Module Status)

Status	LED is	Indicates
Not powered	OFF	Power is not supplied to the unit
Normal, operational	Green	The unit is operating in normal condition
IAP mode *	Toggleing green & red	Available for firmware download using Firefox
Firmware fault	Red	The unit has occurred unrecoverable fault in self-testing
Recoverable fault	Blinking red	The unit has occurred recoverable fault in self-testing EEPROM checksum fault
Requesting IP	Blinking green MOD and NET LEDs	The module is requesting a new IP address. To modify the IP address, refer to chapter Network settings .

* IP Address to access IAP web server during IAP mode: 192.168.1.51



NOTE

Use a standard web browser, e.g. **Microsoft Edge** or **Google Chrome**.

6.2. NET (Network Status)

Status	LED is	Indicates
Not powered	OFF	Network off-line

Status	LED is	Indicates
Link	Green	The LAN cable is physically connected to the ethernet port
Requesting IP	Blinking green MOD and NET LEDs	The module is requesting a new IP address. To modify the IP address, refer to chapter Network settings .

6.3. RUN (PLC Run/Stop Status LED)

Status	LED is	Indicates
No PLC	OFF	Device has no program
PLC run	Green	PLC program is running
PLC stop	Blinking green	PLC program stop
Firmware fault	Red	The unit has occurred unrecoverable fault in self-testing
Diagnostic	Blinking red	PLC program and expansion IO modules do not match

6.4. IOS (Expansion Module Status LED)

Status	LED is	Indicates
No expansion IO	OFF	The module has no expansion modules or is not powered
Have expansion IO	Green	The module has expansion modules
Configuration fault	Red	<ul style="list-style-type: none"> • Invalid expansion module • Initial protocol failure • Mismatch vendor code between adapter and expansion module • Invalid expansion module configuration
Connection fault	Blinking red	<ul style="list-style-type: none"> • Too many expansion modules • Communication failure • Overflowed IO size

6.5. Exception Indication

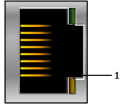
- = Current LED status

Indication	LED			
	MOD	NET	RUN	IOS
Booting *	Green blinking	Green blinking	-	-
IAP mode **	Green/Red toggle	-	Off	
Program reset	-	-	Green/Red toggle (every 0.25 s)	-
Factory reset	Green/Red toggle (every 0.25 s)			
IO watchdog error	Red	-	Red	-
CODESYS license error	-	-	Green/Red toggle (every 2 s)	-
Heap memory over flow	Red	Red	-	-
Hard fault	Red			
<p>* BOOTP/DHCP requests a new IP address. To change the IP setting mode, refer to Modbus Register 0x160B.</p> <p>** IP Address to access IAP web-server during IAP Mode: 192.168.100.10 (use Firefox as web browser).</p>				

7. RJ-45 Socket

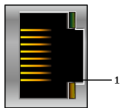
For information on network installation, refer to [Network Installation](#).

7.1. RJ-45 Socket (GL-9971/74/75)

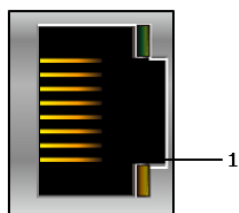


Ethernet socket x 2		
RJ-45	Signal name	Description
1	TD+	Transmit +
2	TD-	Transmit -
3	RD+	Receive +
4	-	
5	-	
6	RD-	Receive -
7	-	
8	-	
Case	Shield	

7.2. RJ-45 Socket (GL-9972/73)



Ethernet socket x 1		
RJ-45	Signal name	Description
1	TD+	Transmit +
2	TD-	Transmit -
3	RD+	Receive +
4	-	
5	-	
6	RD-	Receive -
7	-	
8	-	
Case	Shield	



Serial socket x 1		
RJ-45	Signal name	Description
1	D+	RS485 D+
2	D-	RS485 D-
3	GND	
4	/ISP	/ISP
5	-	
6	GND	
7	TXD	RS232 TXD
8	RXD	RS232 RXD
Case	Shield	

8. Toggle Switch and Push Button

Toggle switch status	Module is	Description
UP	RUN	PLC run
DOWN	STOP	PLC stop

Push button	Module is	Description
Push and detach	Reset	Reset CODESYS PLC program and make the program be in the stop status
Push for 5 sec	PLC reset	Erase CODESYS PLC program and retain memory
Push for 20 sec	Factory reset	Erase CODESYS PLC program and parameter reset
Push hold and power reset	IAP mode	Firmware download via web browser, e.g. Microsoft Edge or Google Chrome.

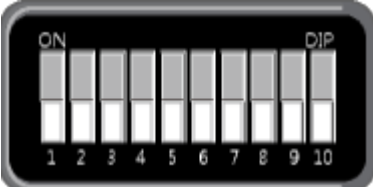
9. Dip Switch

9.1. 2 poles (GL-9972/73)



Dip switch status		Description
1	2	
ON	ON	RS485 terminating resistor enabled (1 kΩ)
OFF	OFF	RS485 terminating resistor disabled

9.2. 10 poles



Description
No function (reserved)

10. Hardware Setup



CAUTION

- Always read this section before installing the module!
- **Hot surface!** The surface of the housing can become hot during operation. If the module is used in high ambient temperatures, always let it cool down before touching it.
- Working on energized devices can damage the equipment! Always turn off the power supply before working on the module.

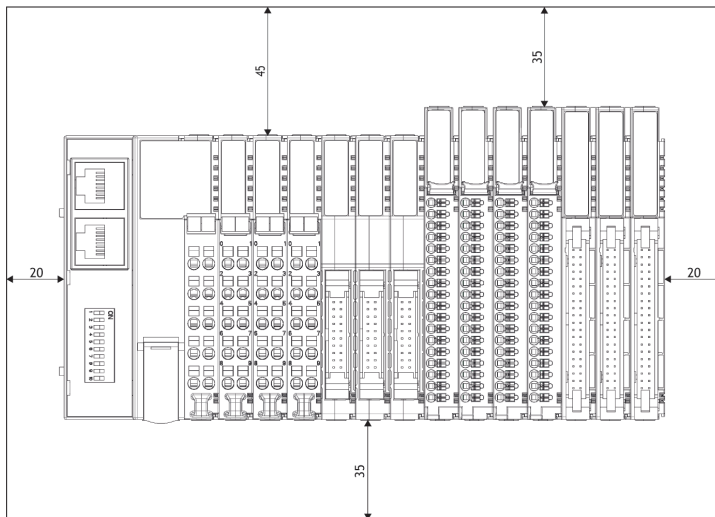
10.1. Space Requirements

The following drawings show the space requirements when installing the G-series modules. The spacing creates space for ventilation, and prevents conducted electromagnetic interference from influencing the operation. Installation position is valid vertical and horizontal. The drawings are illustrative and may be out of proportion.

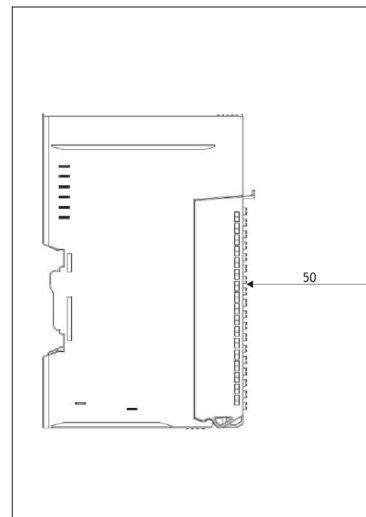


CAUTION

Not following the space requirements may result in damaging the product.



Vertical and horizontal space requirements



Required distance to door

10.2. Mount Module to DIN Rail

The following chapters describe how to mount the module to the DIN rail.



CAUTION

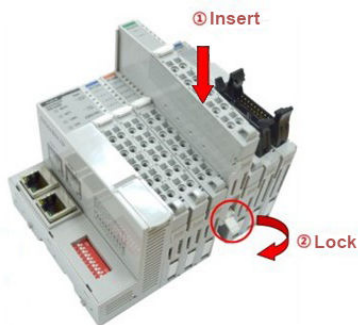
The module must be fixed to the DIN rail with the locking levers.

10.2.1. Mount GL-9XXX or GT-XXXX Module

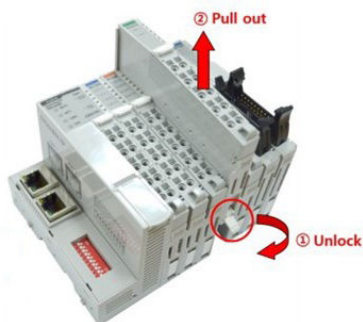
The following instructions apply to these module types:

- GL-9XXX
- GT-1XXX
- GT-2XXX
- GT-3XXX
- GT-4XXX
- GT-5XXX
- GT-7XXX

GN-9XXX modules have three locking levers, one at the bottom and two on the side. For mounting instructions, refer to [Mount GN-9XXX Module](#).



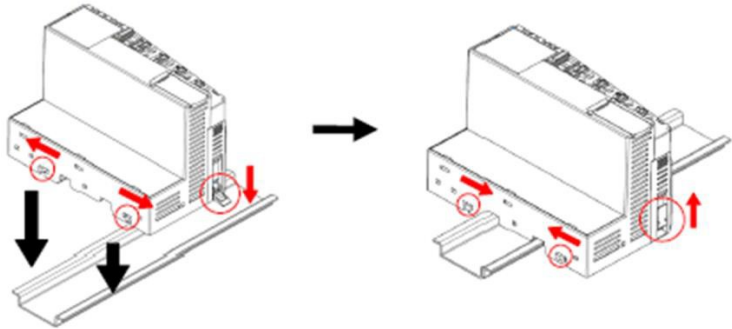
Mount to DIN rail



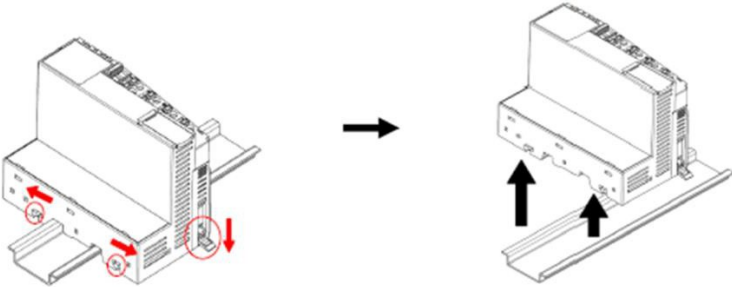
Dismount from DIN rail

10.2.2. Mount GN-9XXX Module

To mount or dismount a network adapter or programmable IO module with the product name GN-9XXX, for example GN-9251 or GN-9371, see the following instructions:



Mount to DIN rail



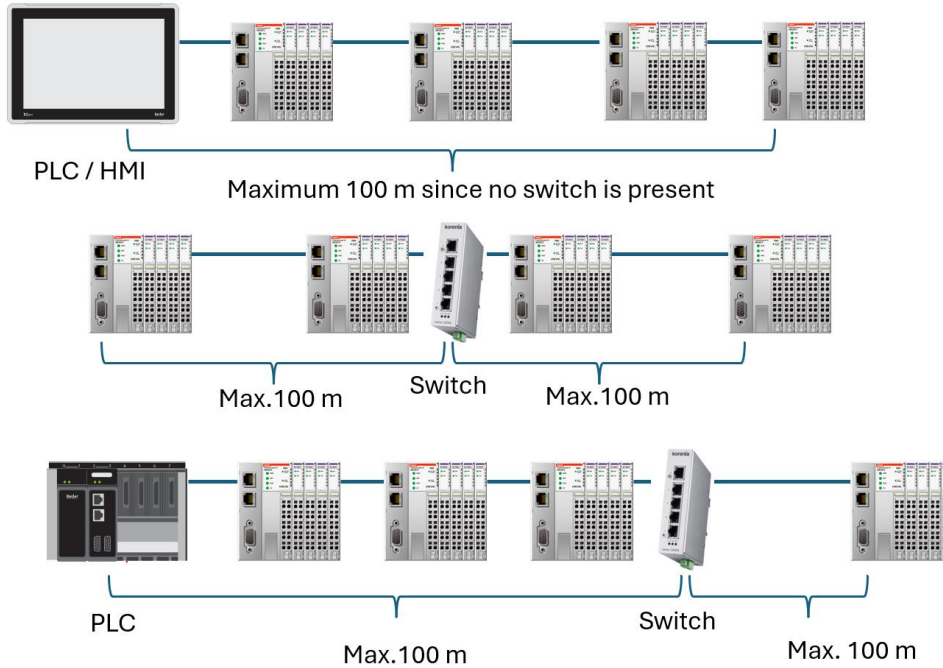
Dismount from DIN rail

10.3. Network Installation

Use twisted pair cables (CAT5/CAT6) for the installation. Refer to the image below for cable setup.

10.3.1. Network Distance > 100 m

The RJ-45 ethernet ports on network adapter and programmable IO modules are passive ports. The maximum allowable distance from one RJ-45 ethernet connection to an ethernet switch is 100 meters. If the total network distance exceeds 100 meters, it is necessary to incorporate at least one unmanaged switch to extend the network length. This remains applicable even when ethernet network cables are connected sequentially from one adapter to the next.



11. Web Server

Web server address: <http://IP/setup.htm>

Example

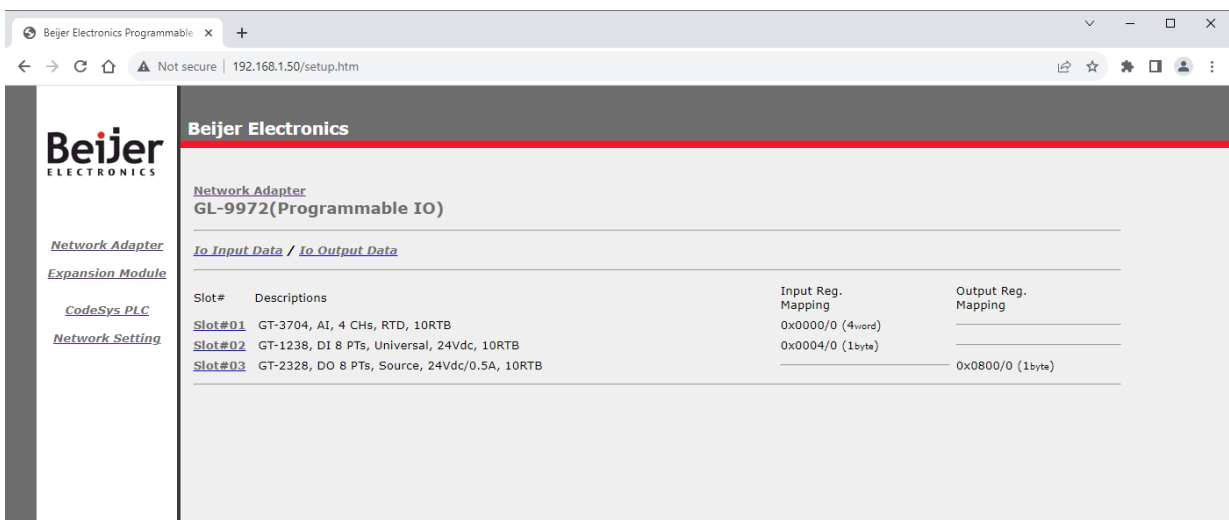
<http://192.168.1.50/setup.htm>

11.1. Network Adapter (Main Page)



11.2. Expansion Module

This page displays the expansion data modules attached to the network adapter.



11.3. CODESYS PLC

This page contains CODESYS PLC information and RTC time settings.

The screenshot shows a web browser window with the URL `192.168.1.50/setup.htm`. The page title is "Beijer Electronics". On the left, there is a navigation menu with links for "Network Adapter", "Expansion Module", "CodeSys PLC", and "Network Setting". The main content area displays the following information:

Network Adapter
GL-9972(Programmable IO)

[Io Input Data / Io Output Data](#)

- Vendor Name : "Beijer Electronics"
- Vendor ID : 0x10AD
- Device ID : 0x3071
- Device Type : 0x1000

PLC Logic : "Application"
 - Project Name : "TEST GL9972"
 - Author : ""
 - Version : ""
 - Description : ""
 - Profile : "BCS Tools"
 - Last Updated Time : Aug 2, 2023 06:54:01(GMT+00)

- Switch(Run/Stop) : Run
- PLC Status : Run
- Last Battery Status : Charged
- Retain Working Count : 10

- Current RTC Date : 2014-05-08 Time : 04:23:29

Enter RTC: (Please follow the date and time format)
 - Date: Time:

Click Button if you want to get Current time from PC

11.4. Network Settings

This page contains the modules IP settings.

The screenshot shows the same web browser window as in 11.3, but the "Network Setting" page is displayed. The main content area displays the following information:

Network Adapter
GL-9972(Programmable IO)

[Io Input Data / Io Output Data](#)

Current IP Configuration

- IP Address : 192.168.1.50
- Subnet Mask : 255.255.255.0
- Gateway : 0.0.0.0
- MAC Address : 00:50:6C:15:59:80

Change IP Parameter

- IP address:
- Subnet mask:
- Gateway:

" DO NOT FORGET the new IP configuration before power reset! "
 " Please write down the addresses before you forget it! "

Click Button if you want to reset power & use new IP parameters

12. IP Address Configuration Guide

This chapter provides two methods for configuring the IP address:

Method 1 (known IP address): Using a standard web browser.

Method 2 (unknown IP address): Using **BCS Tools**, available from [Beijer Electronics SmartStore](#).

Method 1 (known IP address)

1. Connect the module to your computer using an Ethernet cable and power it on.
2. Open a web browser (for example Microsoft Edge or Google Chrome) on your computer. In the address bar, enter the module's IP address followed by `/setup.htm` (for example `192.168.1.10/setup.htm`).
3. In the left-hand menu, click **Network Setting**.
4. Under the **Change IP Parameter** section, adjust the settings as needed. Click **Set IP** to apply the changes.
5. Reboot the module.

The modules IP settings is now updated.

Method 2 (unknown IP address)

1. Connect the module to your computer using an Ethernet cable, but **do not** power it on yet.
2. On the computer, open the **Control Panel** and go to the network setting.
3. Set a **fixed IP** on the computer.
4. Disable all other Ethernet ports, including the WiFi connection.
5. Launch **BCS Tools**.
6. Go to **Tools > BootP Server**.
7. Click **Add New Device**. Enter the module's **MAC address** and the desired IP settings, then click **OK**.
8. Click **Start BootP** to begin assigning the new IP to the module.
9. Power on the module. It will receive the new IP settings from the BootP server. You can see the status in the **Request History** section.
10. Click **Stop BootP** once the module has received the new IP.
11. Reboot the module.

The modules IP settings is now updated.



NOTE

- BootP functionality can be affected by antivirus software, such as **Windows Defender**. Temporarily disable your antivirus if you experience issues.
- If the module does not receive the IP settings, ensure that **0x160B(5643)** in **Adapter Setting Special Register (0x1600, 5632)** is set to **BOOTP: 0x8000** (default setting).
- If the module's IP address is on a different subnet than your computer, change your computer's network settings to match the module's subnet.

13. Firmware Update

13.1. Firmware Update using IAP over Ethernet

The IAP mode is part of the preparation for a firmware update. There are two ways to update the firmware on a programmable IO module in IAP mode:

- [PIO Firmware Update Tool \(recommended\)](#)
- [IAP Mode Web Portal](#)

13.2. PIO Firmware Update Tool (Recommended)

The **PIO Firmware Update Tool** is included in the **GN-937X PIO F/W** package, which is available in the [Beijer Electronics SmartStore](#).

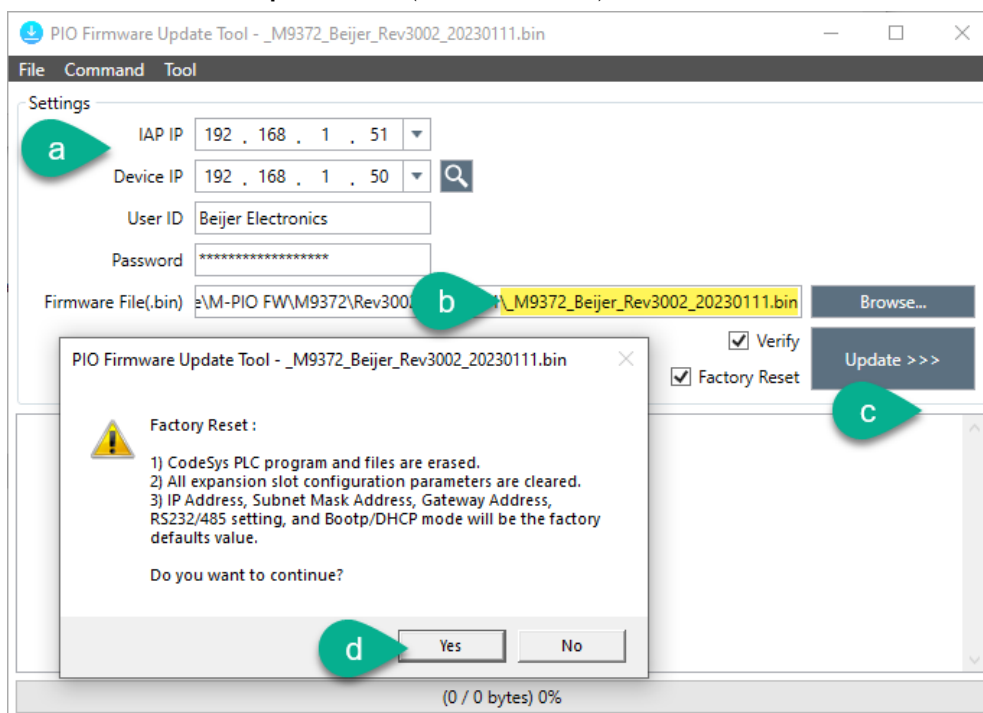
1. Connect a PC via ethernet (LAN cable) to the module (e.g., M9372, GN-9372 or GL-9972).



NOTE

The module has the default IP **192.168.1.50**, make sure the PC is on the same subnet. Ping the module or access the web server at: <http://192.168.1.50/setup.htm>.

2. Power off the module. Press and hold the reset button and apply power at the same time. Now the module will enter IAP mode (MOD LED will blink green/red). Access the module via IAP web server address: **192.168.1.51**.
3. Start **PIO Firmware Update Tool** (version 1.0.0.3)



- a. Enter the following IAP Web server settings:

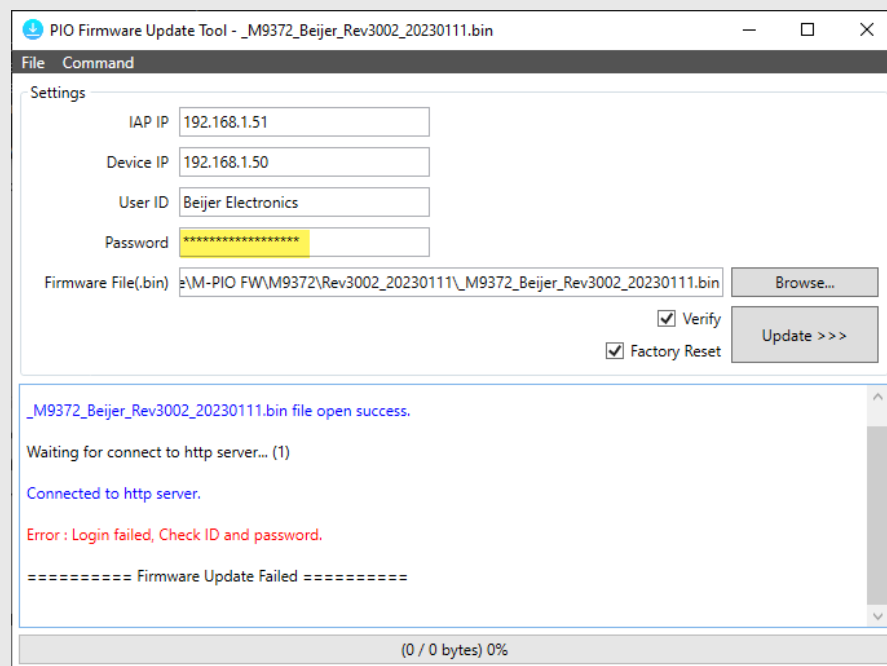
IAP IP	192.168.1.51
Device IP	192.168.1.50
User ID	Beijer Electronics
User password	Beijer Electronics

- b. Click **Browse** and select the firmware file (Bin file).
- c. Tick the **Verify** and **Factory Reset** check boxes.
Verify - To check PIO information after firmware update (Ex: Vendor code, Product code, Product name, Firmware version, Firmware release date)
Factory Reset - It's always recommended to proceed with a factory reset after a firmware update. When checked, a factory reset is carried out after a successful verified procedure.
- d. Click **Update**, and click **OK**.

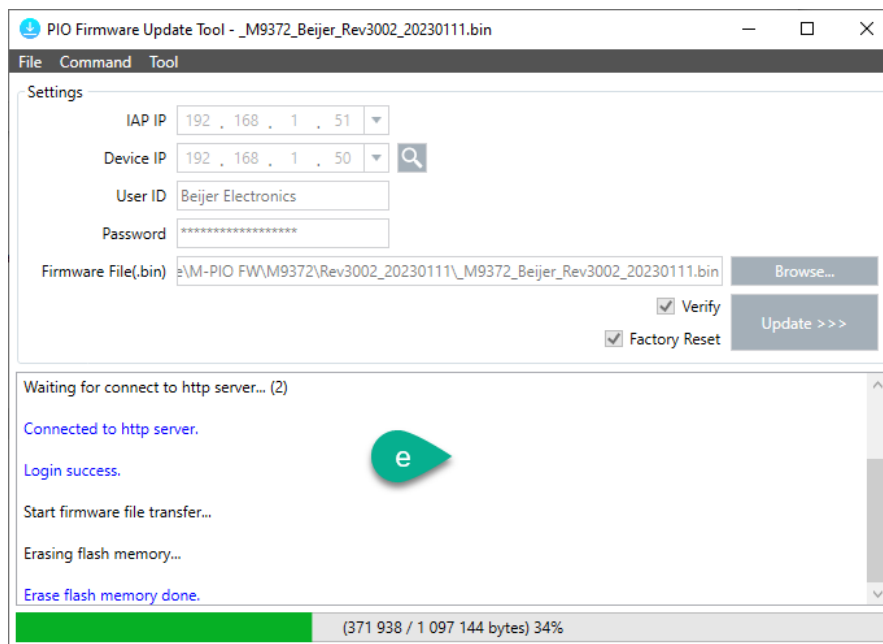


NOTE

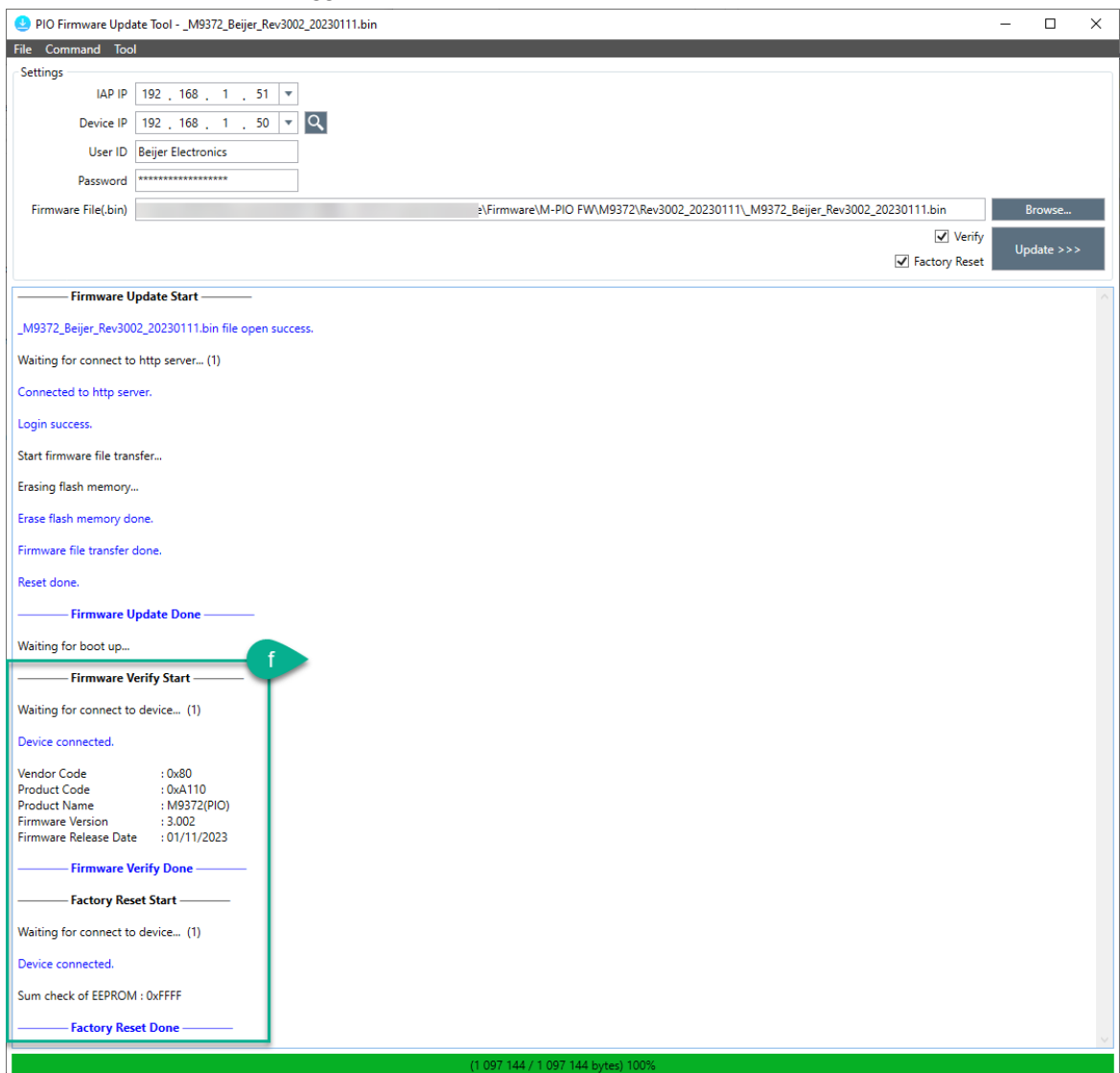
The following warning will appear if the wrong user ID or password has been entered.



- e. After the correct user ID and password has been entered, the PIO Firmware Update Tool connects to the module, transfers the firmware and erases the flash.

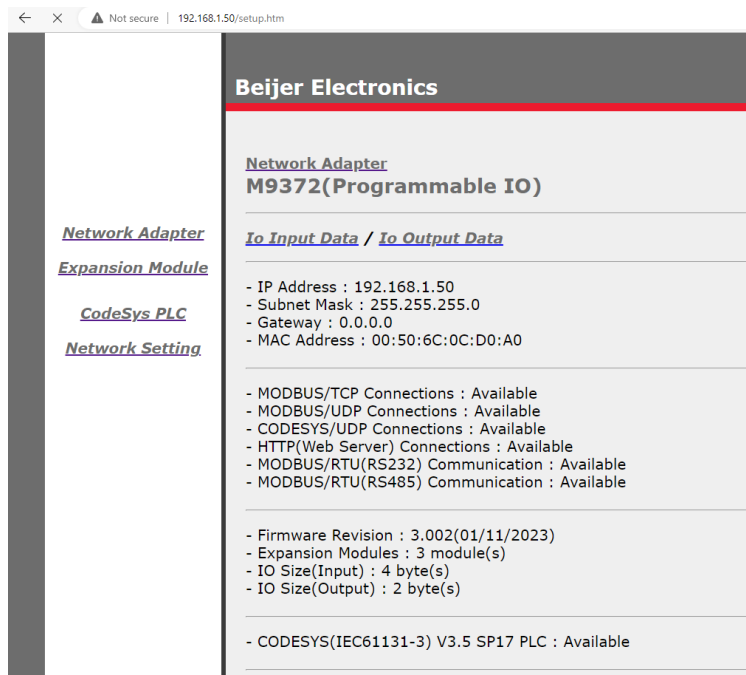


- f. Then the tool initiates the firmware verification and the automatic factory reset. Expand the window to show the logged status.



- g. When the update process is completed, recycle the power.

- h. Connect to the web server <http://192.168.1.50/setup.htm> and verify the firmware version and the CODESYS version.



- i. Download the application program.

13.3. IAP Mode Web Portal

1. Connect a PC via Ethernet (LAN cable) to the module (e.g. M9372, GN-9372 or GL-9972).



NOTE

The Programmable IO device has the default IP **192.168.1.50**, make sure the PC is on the same subnet. Ping the device or access the web server at: <http://192.168.1.50/setup.htm>.

2. Power off the module. Press and hold the reset button and apply power at the same time. Now the module will enter IAP mode (MOD LED will blink green/red). Access the module via IAP web server address: **192.168.1.51**
3. Start the web browser and connect to IP: **192.168.1.51**.



NOTE

Use a standard web browser, e.g. **Microsoft Edge** or **Google Chrome**.



4. Login with:

User ID	Beijer Electronics
Password	Beijer Electronics



5. Click **Choose File** to specify a firmware binary file (*.bin).



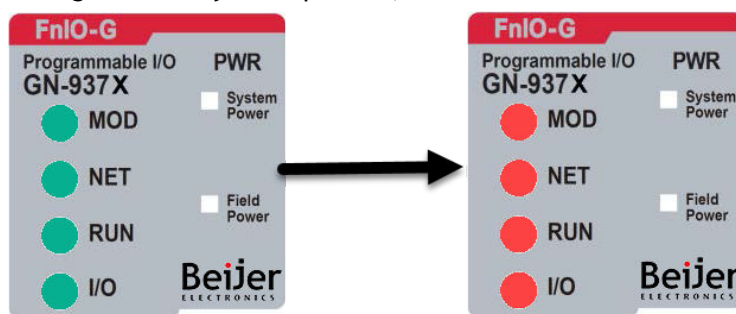
6. Click **Update Firmware**.



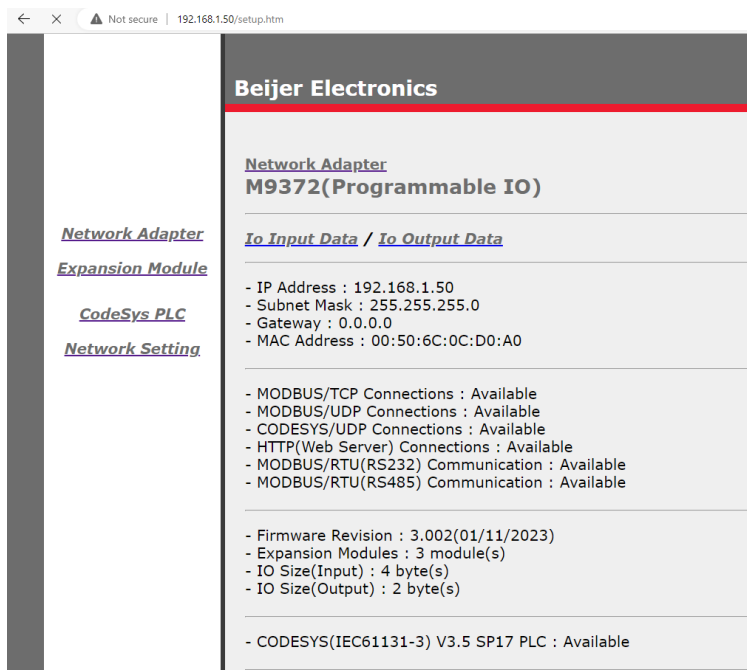
7. When finished click **Reset Adapter**.



8. It's recommended to always do a factory reset after a firmware update, for example when transitioning from CODESYS version SP11 to SP17 or the contrary. See the following instructions for making a factory reset:
 - a. Update to the latest firmware, see steps 1 - 7 above.
 - b. Press and hold the reset button for 20 seconds.
 - c. During the factory reset process, all LED indicators will switch from green to red.



- d. Recycle the power.
 - e. Download your PLC project.
9. After the update process is completed, recycle the power.
10. Connect to the web server <http://192.168.1.50/setup.htm> and verify firmware version and CODESYS version.



11. Download the application program.

14. MODBUS Interface

14.1. Supported MODBUS Function Codes

Function code	Function	Description
1(0x01)	Read coils	Read output bit
2(0x02)	Read discrete inputs	Read input bit
3(0x03)	Read holding registers	Read output word
4(0x04)	Read input registers	Read input word
5(0x05)	Write single coil	Write one bit output
6(0x06)	Write single register	Write one word output
8(0x08)	Diagnostics	Read diagnostic register
15(0x0F)	Write multiple coils	Write a number of output bits
16(0x10)	Write multiple registers	Write a number of output words
23(0x17)	Read / Write multiple registers	Read a number of input words / Write a number of output words



NOTE

Refer to MODBUS APPLICATION PROTOCOL SPECIFICATION V1.1a.

14.1.1. 1 (0x01) Read Coils

This function code is used to read from 1 to 2000 contiguous status of coils in a remote device. The Request PDU specifies the starting address, i.e., the address of the first coil specified, and the number of coils. In the PDU Coils are addressed starting at zero. Therefore, coils numbered 1-16 are addressed as 0-15. The coils in the response message are packed as one coil per bit of the data field. Status is indicated as 1= ON and 0= OFF.

Request

Field name	Example
Function code	0x01
Starting address Hi	0x10
Starting address Lo	0x00
Quantity of outputs Hi	0x00
Quantity of outputs Lo	0x0A

Response

Field name	Example
Function code	0x01
Byte count	0x02
Output status	0x55

Field name	Example
Output status	0x02

**NOTE**

If address is 0x1015 - 0x1000, output bit value is 10101010_01010101.

14.1.2. 2 (0x02) Read Discrete Inputs

This function code is used to read from 1 to 2000 contiguous status of discrete inputs in a remote device. The Request PDU specifies the starting address, i.e., the address of the first input specified, and the number of inputs. In the PDU discrete inputs are addressed starting at zero. Therefore, discrete inputs numbered 1-16 are addressed as 0-15. The discrete inputs in the response message are packed as one input per bit of the data field. Status is indicated as 1= ON; 0= OFF.

Request

Field name	Example
Function code	0x02
Starting address Hi	0x00
Starting address Lo	0x00
Quantity of inputs Hi	0x00
Quantity of inputs Lo	0x0A

Response

Field name	Example
Function code	0x02
Byte count	0x02
Input status	0x80
Input status	0x00

**NOTE**

If address is 0x0015 - 0x0000, input bit value is 00000000_10000000.

14.1.3. 3 (0x03) Read Holding Registers

This function code is used to read the contents of a contiguous block of holding registers in a remote device. The Request PDU specifies the starting register address and the number of registers. The register data in the response message are packed as two bytes per register, with the binary contents right justified within each byte. For each register, the first byte contains the high order bits and the second contains the low order bits.

Request

Field name	Example
Function code	0x03
Starting address Hi	0x08
Starting address Lo	0x00
Quantity of register Hi	0x00
Quantity of register Lo	0x02

Response

Field name	Example
Function code	0x03
Byte count	0x04
Output register#0 Hi	0x11
Output register#0 Lo	0x22
Output register#1 Hi	0x33
Output register#1 Lo	0x44



NOTE

If address is 0x0800/0x0801, output register value is 0x1122/0x3344.

14.1.4. 4 (0x04) Read Input Registers

This function code is used to read from 1 to approx. 125 contiguous input registers in a remote device. The Request PDU specifies the starting register address and the number of registers. The register data in the response message are packed as two bytes per register, with the binary contents right justified within each byte. For each register, the first byte contains the high order bits and the second contains the low order bits. This function code is used to read from 1 to approx. 125 contiguous input registers in a remote device. The Request PDU specifies the starting register address and the number of registers. The register data in the response message are packed as two bytes per register, with the binary contents right justified within each byte. For each register, the first byte contains the high order bits and the second contains the low order bits.

Request

Field name	Example
Function code	0x04
Starting address Hi	0x00
Starting address Lo	0x00
Quantity of register Hi	0x00
Quantity of register Lo	0x02

Response

Field name	Example
Function code	0x03
Byte count	0x04
Input register#0 Hi	0x00
Input register#0 Lo	0x80
Input register#1 Hi	0x00
Input register#1 Lo	0x00



NOTE

If address is 0x0000/0x0001, input register value is 0x0080/0x0000.

14.1.5. 5 (0x05) Write Single Coil

This function code is used to write a single output to either ON or OFF in a remote device. The requested ON/OFF state is specified by a constant in the request data field. A value of FF 00 hex requests the output to be ON. A value of 00 00 requests it to be OFF. All other values are illegal and will not affect the output.

Request

Field name	Example
Function code	0x05
Output address Hi	0x10
Output address Lo	0x01
Output value Hi	0xFF
Output value Lo	0x00

Response

Field name	Example
Function code	0x05
Output address Hi	0x10
Output address Lo	0x01
Output value Hi	0xFF
Output value Lo	0x00



NOTE

Output bit of address 0x1001 turns ON.

14.1.6. 6 (0x06) Write Single Register

This function code is used to write a single holding register in a remote device. Therefore, register numbered 1 is addressed as 0. The normal response is an echo of the request, returned after the register contents have been written.

Request

Field name	Example
Function code	0x06
Register address Hi	0x08
Register address Lo	0x00
Register value Hi	0x11
Register value Lo	0x22

Response

Field name	Example
Function code	0x06
Register address Hi	0x08
Register address Lo	0x00
Register value Hi	0x11
Register value Lo	0x22



NOTE

If address is 0x0800, output register value 0x0000 changes to 0x1122.

14.1.7. 8 (0x08) Diagnostics

MODBUS function code 08 provides a series of tests for checking the communication system between a client (Master) device and a server (Slave), or for checking various internal error conditions within a server. The function uses a two-byte sub-function code field in the query to define the type of test to be performed. The server echoes both the function code and sub-function code in a normal response. Some of the diagnostics cause data to be returned from the remote device in the data field of a normal response.

Request

Field name	Example
Function code	0x08
Sub-function Hi	0x00
Sub-function Lo	0x00
Data Hi	0x11
Data Lo	0x22

Response

Field name	Example
Function code	0x08
Sub-function Hi	0x00
Sub-function Lo	0x00
Data Hi	0x11
Data Lo	0x22

Sub-Function 0x0000(0) Return Query Data

The data passed in the request data field is to be returned (looped back) in the response. The entire response message should be identical to the request.

Sub-function	Data field (request)	Data field (response)	Description
0x0000(0)	Any	Echo request data	

Sub-Function 0x0001(1) Restart Communications Option

The remote device could be initialized and restarted, and all its communications event counters are cleared.

Especially, data field 0x55AA make the remote device to restart with factory default setup of EEPROM.

Sub-function	Data field (request)	Data field (response)	Description
0x0001(1)	0x0000 or 0xFF00	Echo request data	Reset
0x0001(1)	0x55AA+Checksum	Echo request data	Reset with default setting ¹⁾
0x0001(1)	0x55AA+0xAB7B+Checksum ³⁾	Echo request data	Reset with factory default ^{1) 2)}

¹⁾ Delete PLC program.

²⁾ IP Address, subnet mask address, gateway address, RS232/485 settings, and Bootp/DHCP mode will be the factory defaults value.

³⁾ See [Adapter Identification Special Register \(0x1000, 4096\)](#) for checksum (0x1006).

Sub-Function 0x000A(10) Clear Counters and Diagnostic Register

The goal is to clear all counters and the diagnostic register. Counters are also cleared upon power-up.

Sub-function	Data field (request)	Data field (response)	Description
0x000A(10)	0x0000	Echo request data	

Sub-Function 0x000B(11) Return Bus Message Count

The response data field returns the quantity of messages that the remote device has detected on the communications system since its last restart, clear counters operation, or power-up.

Sub-function	Data field (request)	Data field (response)	Description
0x000B(11)	0x0000	Total message count	

Sub-Function 0x000D(13) Return Bus Exception Error Count

The response data field returns the quantity of MODBUS exception responses returned by the remote device since its last restart, clear counters operation, or power-up.

Exception responses are described and listed in chapter Error Response.

Sub-function	Data field (request)	Data field (response)	Description
0x000D(13)	0x0000	Exception error count	

Sub-Function 0x000E(14) Return Slave Message Count

The response data field returns the quantity of messages addressed to the remote device, or broadcast, that the remote device has processed since its last restart, clear counters operation, or power-up.

Sub-function	Data field (request)	Data field (response)	Description
0x000E(14)	0x0000	Slave message count	

Sub-Function 0x000F(15) Return Slave no Response Count

The response data field returns the quantity of messages addressed to the remote device for which it has returned no response (neither a normal response nor an exception response), since its last restart, clear counters operation, or power-up.

Sub-function	Data field (request)	Data field (response)	Description
0x000F(15)	0x0000	Slave no response count	

Sub-Function 0x0064(100) Return Slave MODBUS, Expansion Status

The response data field returns the status of MODBUS and expansion addressed to the remote device. This status values are identical with status 1word of input process image.

Sub-function	Data field (request)	Data field (response)	Description
0x0064(100)	0x0000	MODBUS, G-Bus status	Same as status 1word

14.1.8. 15 (0x0F) Write Multiple Coils

This function code is used to force each coil in a sequence of coils to either ON or OFF in a remote device. The Request PDU specifies the coil references to be forced. Coils are addressed starting at zero. A logical "1" in a bit position of the field requests the corresponding output to be ON. A logical "0" requests it to be OFF. The normal response returns the function code, starting address, and quantity of coils forced.

Request

Field name	Example
Function code	0x0F
Starting address Hi	0x10

Field name	Example
Starting address Lo	0x00
Quantity of outputs Hi	0x00
Quantity of outputs Lo	0x0A
Byte count	0x02
Output value#0	0x55
Output value#1	0x01

Response

Field name	Example
Function code	0x0F
Starting address Hi	0x10
Starting address Lo	0x00
Quantity of outputs Hi	0x00
Quantity of outputs Lo	0x0A



NOTE

If address is 0x1015 - 0x1000, output bit value 00000000_00000000 changes to 00000001_01010101.

14.1.9. 16 (0x10) Write Multiple Registers

This function code is used to write a block of contiguous registers (1 to approx. 120 registers) in a remote device. The requested written values are specified in the request data field. Data is packed as two bytes per register. The normal response returns the function code, starting address, and quantity of registers written.

Request

Field name	Example
Function code	0x0F
Starting address Hi	0x10
Starting address Lo	0x08
Quantity of registers Hi	0x00
Quantity of registers Lo	0x02
Byte count	0x04
Register value#0 Hi	0x11
Register value#0 Lo	0x22
Register value#1 Hi	0x33
Register value#1 Lo	0x44

Response

Field name	Example
Function code	0x0F
Starting address Hi	0x10
Starting address Lo	0x08
Quantity of registers Hi	0x00
Quantity of registers Lo	0x02



NOTE

If address is 0x0800/0x0801, output register value 0x0000/0x0000 changes to 0x1122/0x3344.

14.1.10. 23 (0x17) Read/Write Multiple Registers

This function code performs a combination of one read operation, and one write operation in a single MODBUS transaction. The write operation is performed before the read. The request specifies the starting address and number of holding registers to be read as well as the starting address, number of holding registers, and the data to be written. The byte count specifies the number of bytes to follow in the write data field.

The normal response contains the data from the group of registers that were read. The byte count field specifies the quantity of bytes to follow in the read data field.

Request

Field name	Example
Function code	0x17
Read starting address Hi	0x08
Read starting address Lo	0x00
Quantity of read Hi	0x00
Quantity of read Lo	0x02
Write starting address Hi	0x08
Write starting address Lo	0x00
Quantity of write Hi	0x00
Quantity of write Lo	0x02
Byte count	0x04
Write reg. value#0 Hi	0x11
Write reg. value#0 Lo	0x22
Write reg. value#1 Hi	0x33
Write reg. value#1 Lo	0x44

Response

Field name	Example
Function code	0x17

Field name	Example
Byte count	0x04
Read reg. value#0 Hi	0x11
Read reg. value#0 Lo	0x22
Read reg. value#1 Hi	0x33
Read reg. value#1 Lo	0x44

**NOTE**

If address is 0x0800/0x0801, output register value 0x0000/0x0000 changes to 0x1122/0x3344.

14.1.11. Error Response

In an exception response, the server sets the MSB of the function code to 1. This makes the function code value in an exception response exactly 80 hexadecimal higher than the value would be for a normal response.

Exception Response Example

Field name	Example
Function code	0x81
Exception code	0x02

Exception Codes

Exception code	Name	Description
01	Illegal function	The function code received in the query is not an allowable action for the server (or slave).
02	Illegal data address	The data address received in the query is not an allowable address for the server (or slave).
03	Illegal data value	A value contained in the query data field is not an allowable value for server (or slave).
04	Slave device failure	An unrecoverable error occurred while the server (or slave) was attempting to perform the requested action.
06	Slave device busy	Specialized use in conjunction with programming commands. The server (or slave) is engaged in processing a long-duration program command. The client (or master) should retransmit the message later when the server (or slave) is free.

14.2. MODBUS Special Register Map

The special register map can be accessed by function code 3, 4, 6 and 16. Also the special register map must be accessed by read/write of each address (one address).

14.2.1. Adapter Register Mapping (GL-9971)

Address	IEC Address	Contents
0x0000-0x07FF	%IW0-%IW2047	2048 words input and internal memory (area is write-protected)
0x0800-0x0FFF	%QW0-%QW2047	2048 words output and internal memory (area is write-enabled)
0x1000-0x1FFF	-	Special function register (PIO information)
0x2000-0x2FFF	-	Special function register (slot information)
0x4000-0x4FFF	%MW0-%MW4095	4096 words internal memory (area is write-enabled)

14.2.2. Adapter Register Mapping (GL-9972, GL-9973, GL-9974, GL-9975)

Address	IEC Address	Contents
0x0000-0x07FF	%IW0-%IW2047	2048 words input and internal memory (area is write-protected)
0x0800-0x0FFF	%QW0-%QW2047	2048 words output and internal memory (area is write-enabled)
0x1000-0x1FFF	-	Special function register (PIO information)
0x2000-0x2FFF	-	Special function register (slot information)
0x4000-0x5FFF	%MW0-%MW8191	8192 words internal memory (area is write-enabled)

14.2.3. Adapter Identification Special Register (0x1000, 4096)

Address	Access	Type, size	Description
0x1000(4096)	Read	1 word	Vendor ID = 0x02E5(741), Crevis. Co., Ltd.
0x1001(4097)	Read	1 word	Device type = 0x000C, Network Adapter
0x1002(4098)	Read	1 word	Product code = 0x9160(GL-9971) / 0x91E0(GL-9972) / 0x91F0(GL-9973) 0x9200(GL-9974) / 0x9210(GL-9975)
0x1003(4099)	Read	1 word	Firmware revision, if 0x0101, revision 1.001
0x1005(4101)	Read	String Up to 34 bytes	Product name string First 1 word is length of valid character string Example: Response as following "00 0C 47 4C 2D 39 39 37 31 28 50 49 4F 29 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00" Valid character size = 0x000C = 12 characters "GL-9971(PIO)"
0x1006(4102)	Read	1 word	Checksum of EEPROM
0x1010(4112)	Read	2 words	Firmware release date
0x1013(4115)	Read	1 word	Module ID = 0x9971(GL-9971)

Address	Access	Type, size	Description
0x101E(4126)	Read	15 words	Composite ID of following address: 0xA8C0(Lo_IP Addr),0x3264(Hi_IP Addr),0xFFFF(Lo_NetMask), 0x00FF(Hi_NetMask),0xA8C0(GateWay),0xFE64(GateWay), 0x1400(MacAddr),0x00F7(MacAddr),0xBA83(MacAddr), 0x02E5(VendorCode),0x000C(DeviceType),0x91F0(ProductCode), 0x0203(FW_Rev),0x0510(FW_ReleasData),0x2021(FW_ReleasYear)

**NOTE**

String Type consists of valid string length (first 1 word) and array of characters.

14.2.4. Adapter Information Special Register (0x1100, 4352)

Address	Access	Type, size	Description
0x1102(4354)	Read	1 word	Start address of input image word register = 0x0000
0x1103(4355)	Read	1 word	Start address of output image word register = 0x0800
0x1104(4356)	Read	1 word	Size of input image word register.
0x1105(4357)	Read	1 word	Size of output image word register.
0x1106(4358)	Read	1 word	Start address of input image bit = 0x0000
0x1107(4359)	Read	1 word	Start address of output image bit = 0x1000
0x1108(4360)	Read	1 word	Size of input image bit.
0x1109(4361)	Read	1 word	Size of output image bit.
0x110D(4365)	Read	1 word	Switch State (Dip Switch, Run, Stop, Reset) For specifications, see table below.
0x110E(4366)	Read	up to 63 words	Expansion slot's GT-number If the PIO is connected with GT-222F and GT-123F, then 0x222F 0x123F
0x1110(4368)	Read	1 word	Number of expansion slot.
0x1113(4371)	Read	GL-9971	Expansion slot module id.
		up to 11 words	First 1 word is product code = 0x9160(GL-9971).
		GL-9972/73	Expansion slot module id.
0x1113(4371)	Read	up to 63 words	First 1 word is product code = 0x91E0(GL-9972), 0x91F0(GL-9973).
		GL-9974/75	Expansion slot module id.
0x1113(4371)	Read	up to 63 words	First 1 word is product code = 0x9200(GL-9974), 0x9210(GL-9975).
		1 word	Reserved. Adapter IO identification vendor code.

0x110D(4365)

15	14	13	12	11	10	9	8	7	6	5	4	3	2
-	-	-	-	DIP10	DIP9	DIP8	DIP7	DIP6	DIP5	DIP4	DIP3	DIP2	DIP1

14.2.5. Adapter Setting Special Register (0x1600, 5632)



NOTE

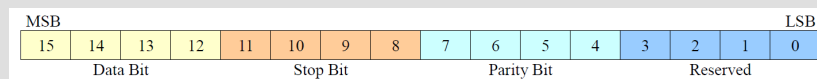
Registers 0x1606 - 0x160A are available only for GL-9972 and GL-9973 devices.

Address	Access	Type, size	Description
0x1600(5632)	Read	2 words	IP address (ex: C0A8 0132 = 192.168.1.50)
0x1602(5634)	Read	2 words	Subnet mask (ex: FFFF 0000 = 255.255.0.0)
0x1604(5636)	Read	2 words	Gateway (ex: A8C0 0100 = 192.168.0.1)
0x1606(5638)*	Read/Write	1 word	RS-232C baud rate (2400 - 115200 bps) • 0 : 115200 (default)

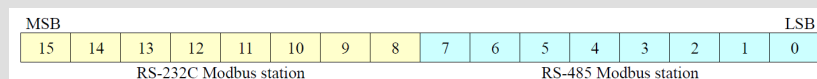
*** RS-232C/485 Baud rate setting**

Value	Baud rate
0	115200 (default)
1	2400
2	4800
3	9600
4	19200
5	38400
6	57600
7	115200

**** RS-232C/485 setting (registers with addresses 0x1607 and 0x1609)**



***** MODBUS station (registers with addresses 0x160A)**



****** Ethernet Port 1 control**

GL-9971 / GL-9974 / GL-9975: Only one of the two ports can be disabled. If the second port is disabled, the first port cannot be disabled.

GL-9972 / GL-9973: Since the device is equipped with a single Ethernet port, the port status must be changed from Disabled to Enabled using one of the following methods:

- Access the designated address via a serial connection and enable the port.
- Perform a factory reset.

******* Ethernet Port 2 control**

GL-9971 / GL-9974 / GL-9975: Only one of the two ports can be disabled. If the second port is disabled, the first port cannot be disabled.

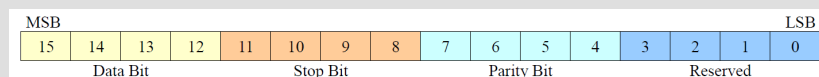
GL-9972 / GL-9973: Not supported.

Address	Access	Type, size	Description
0x1607(5639)**	Read/Write	1 word	RS-232C setting <ul style="list-style-type: none"> • 1 nibble: Data bit (0: 8 bit (default), 1: 9 bit, 2: 7 bit) • 2 nibble: Stop bit (0: 1 bit (default), 1: 2 bit) • 3 nibble: Parity bit (0: none (default), 1: odd, 2: even) • 4 nibble: Reserve
0x1608(5640)*	Read/Write	1 word	RS-485 baud rate (2400 - 115200 bps) <ul style="list-style-type: none"> • 0: 115200 (default)

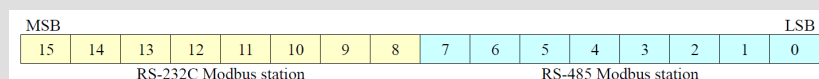
*** RS-232C/485 Baud rate setting**

Value	Baud rate
0	115200 (default)
1	2400
2	4800
3	9600
4	19200
5	38400
6	57600
7	115200

**** RS-232C/485 setting (registers with addresses 0x1607 and 0x1609)**



***** MODBUS station (registers with addresses 0x160A)**



****** Ethernet Port 1 control**

GL-9971 / GL-9974 / GL-9975: Only one of the two ports can be disabled. If the second port is disabled, the first port cannot be disabled.

GL-9972 / GL-9973: Since the device is equipped with a single Ethernet port, the port status must be changed from Disabled to Enabled using one of the following methods:

- Access the designated address via a serial connection and enable the port.
- Perform a factory reset.

******* Ethernet Port 2 control**

GL-9971 / GL-9974 / GL-9975: Only one of the two ports can be disabled. If the second port is disabled, the first port cannot be disabled.

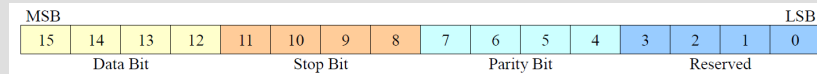
GL-9972 / GL-9973: Not supported.

Address	Access	Type, size	Description
0x1609(5641)**	Read/Write	1 word	RS-485 setting <ul style="list-style-type: none"> • 1 nibble: Data bit (0: 8 bit (default), 1: 9 bit, 2: 7 bit) • 2 nibble: Stop bit (0: 1 bit (default), 1: 2 bit) • 3 nibble: Parity bit (0: none (default), 1: odd, 2: even) • 4 nibble: Reserve

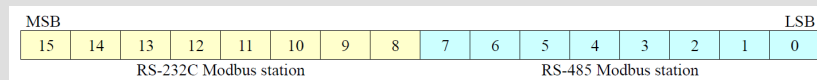
*** RS-232C/485 Baud rate setting**

Value	Baud rate
0	115200 (default)
1	2400
2	4800
3	9600
4	19200
5	38400
6	57600
7	115200

**** RS-232C/485 setting (registers with addresses 0x1607 and 0x1609)**



***** MODBUS station (registers with addresses 0x160A)**



****** Ethernet Port 1 control**

GL-9971 / GL-9974 / GL-9975: Only one of the two ports can be disabled. If the second port is disabled, the first port cannot be disabled.

GL-9972 / GL-9973: Since the device is equipped with a single Ethernet port, the port status must be changed from Disabled to Enabled using one of the following methods:

- Access the designated address via a serial connection and enable the port.
- Perform a factory reset.

******* Ethernet Port 2 control**

GL-9971 / GL-9974 / GL-9975: Only one of the two ports can be disabled. If the second port is disabled, the first port cannot be disabled.

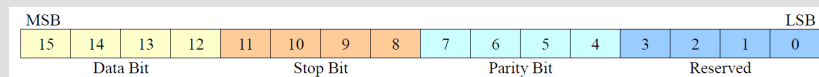
GL-9972 / GL-9973: Not supported.

Address	Access	Type, size	Description
0x160A(5642) ^{***}	Read/Write	1 word	MODBUS station <ul style="list-style-type: none"> • High 1 byte / Station No. of RS-232C (default: 1) • Low 1 byte / Station No. of RS-485 (default: 1)
0x160B(5643)	Read/Write	1 word	IP setting method <ul style="list-style-type: none"> • BootP/DHCP disable: 0x0000 • BootP: 0x8000 (default) • DHCP: 0x8001
0x1610(5648)	Read	3 words	MAC Address (ex: 1400 00F7 0101 = 00.14.F7.00.01.01)

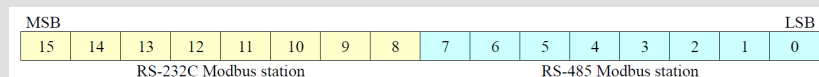
*** RS-232C/485 Baud rate setting**

Value	Baud rate
0	115200 (default)
1	2400
2	4800
3	9600
4	19200
5	38400
6	57600
7	115200

**** RS-232C/485 setting (registers with addresses 0x1607 and 0x1609)**



***** MODBUS station (registers with addresses 0x160A)**



****** Ethernet Port 1 control**

GL-9971 / GL-9974 / GL-9975: Only one of the two ports can be disabled. If the second port is disabled, the first port cannot be disabled.

GL-9972 / GL-9973: Since the device is equipped with a single Ethernet port, the port status must be changed from Disabled to Enabled using one of the following methods:

- Access the designated address via a serial connection and enable the port.
- Perform a factory reset.

******* Ethernet Port 2 control**

GL-9971 / GL-9974 / GL-9975: Only one of the two ports can be disabled. If the second port is disabled, the first port cannot be disabled.

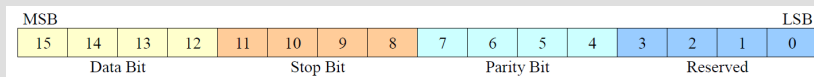
GL-9972 / GL-9973: Not supported.

Address	Access	Type, size	Description
0x1614(5652)	Read	1 word	Serial connection method <ul style="list-style-type: none"> • 0x0000: Crevis MODBUS/RTU (default) • 0x8000: RS232 Enable for CODESYS Function block / RTU Master CODESYS Serial Port Configuration Setting: COM Port 1 • 0x8001: RS485 Enable for CODESYS Function block / RTU Master CODESYS Serial Port Configuration Setting: COM Port 2

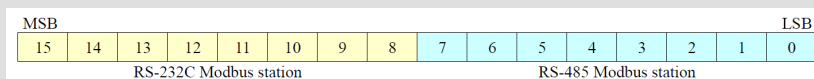
*** RS-232C/485 Baud rate setting**

Value	Baud rate
0	115200 (default)
1	2400
2	4800
3	9600
4	19200
5	38400
6	57600
7	115200

**** RS-232C/485 setting (registers with addresses 0x1607 and 0x1609)**



***** MODBUS station (registers with addresses 0x160A)**



****** Ethernet Port 1 control**

GL-9971 / GL-9974 / GL-9975: Only one of the two ports can be disabled. If the second port is disabled, the first port cannot be disabled.

GL-9972 / GL-9973: Since the device is equipped with a single Ethernet port, the port status must be changed from Disabled to Enabled using one of the following methods:

- Access the designated address via a serial connection and enable the port.
- Perform a factory reset.

******* Ethernet Port 2 control**

GL-9971 / GL-9974 / GL-9975: Only one of the two ports can be disabled. If the second port is disabled, the first port cannot be disabled.

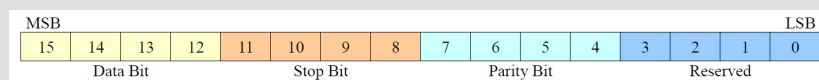
GL-9972 / GL-9973: Not supported.

Address	Access	Type, size	Description
0x1620(5664)	Read/Write	4 words	RTC <ul style="list-style-type: none"> • 1 word: 00ss (ss : sec) • 2 words: hhmm (hh : hour, mm : min) • 3 words: mmdd (mm : month, dd : day) • 4 words: yyyy (yyyy : year) (Ex: 0010 0F28 0317 07E0 = 2016 - 03.23 - 15:40 - 16)

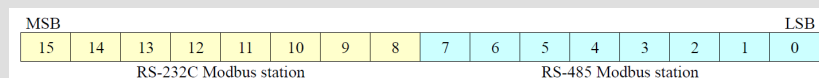
*** RS-232C/485 Baud rate setting**

Value	Baud rate
0	115200 (default)
1	2400
2	4800
3	9600
4	19200
5	38400
6	57600
7	115200

**** RS-232C/485 setting (registers with addresses 0x1607 and 0x1609)**



***** MODBUS station (registers with addresses 0x160A)**



****** Ethernet Port 1 control**

GL-9971 / GL-9974 / GL-9975: Only one of the two ports can be disabled. If the second port is disabled, the first port cannot be disabled.

GL-9972 / GL-9973: Since the device is equipped with a single Ethernet port, the port status must be changed from Disabled to Enabled using one of the following methods:

- Access the designated address via a serial connection and enable the port.
- Perform a factory reset.

******* Ethernet Port 2 control**

GL-9971 / GL-9974 / GL-9975: Only one of the two ports can be disabled. If the second port is disabled, the first port cannot be disabled.

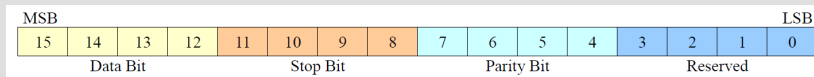
GL-9972 / GL-9973: Not supported.

Address	Access	Type, size	Description
0x1634(5684)	Read/Write	1 word	WebServer setting <ul style="list-style-type: none"> • 0: Disable • 1: Enable (default) The settings will be applied after restarting the system.

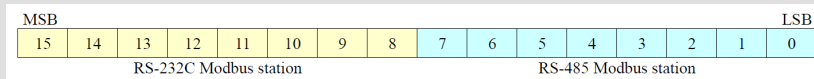
*** RS-232C/485 Baud rate setting**

Value	Baud rate
0	115200 (default)
1	2400
2	4800
3	9600
4	19200
5	38400
6	57600
7	115200

**** RS-232C/485 setting (registers with addresses 0x1607 and 0x1609)**



***** MODBUS station (registers with addresses 0x160A)**



****** Ethernet Port 1 control**

GL-9971 / GL-9974 / GL-9975: Only one of the two ports can be disabled. If the second port is disabled, the first port cannot be disabled.

GL-9972 / GL-9973: Since the device is equipped with a single Ethernet port, the port status must be changed from Disabled to Enabled using one of the following methods:

- Access the designated address via a serial connection and enable the port.
- Perform a factory reset.

******* Ethernet Port 2 control**

GL-9971 / GL-9974 / GL-9975: Only one of the two ports can be disabled. If the second port is disabled, the first port cannot be disabled.

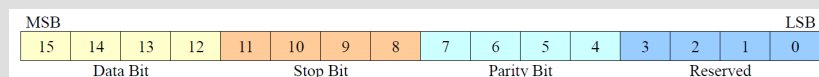
GL-9972 / GL-9973: Not supported.

Address	Access	Type, size	Description
0x1635(5685)****	Read/Write	1 word	Ethernet Port 1 setting <ul style="list-style-type: none"> • 0: Disable • 1: Enable (default) Read <ul style="list-style-type: none"> • High 1byte: User-defined Values • Low 1byte: Current Port Status Write <ul style="list-style-type: none"> • 0: Disable • 1: Enable (default)

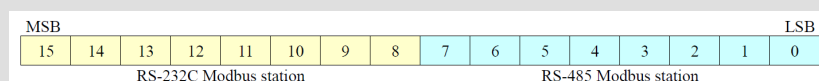
*** RS-232C/485 Baud rate setting**

Value	Baud rate
0	115200 (default)
1	2400
2	4800
3	9600
4	19200
5	38400
6	57600
7	115200

**** RS-232C/485 setting (registers with addresses 0x1607 and 0x1609)**



***** MODBUS station (registers with addresses 0x160A)**



****** Ethernet Port 1 control**

GL-9971 / GL-9974 / GL-9975: Only one of the two ports can be disabled. If the second port is disabled, the first port cannot be disabled.

GL-9972 / GL-9973: Since the device is equipped with a single Ethernet port, the port status must be changed from Disabled to Enabled using one of the following methods:

- Access the designated address via a serial connection and enable the port.
- Perform a factory reset.

******* Ethernet Port 2 control**

GL-9971 / GL-9974 / GL-9975: Only one of the two ports can be disabled. If the second port is disabled, the first port cannot be disabled.

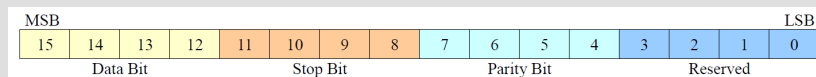
GL-9972 / GL-9973: Not supported.

Address	Access	Type, size	Description
0x1636(5686)*****	Read/Write	1 word	Ethernet Port 2 setting <ul style="list-style-type: none"> • 0: Disable • 1: Enable (default) Read <ul style="list-style-type: none"> • High 1byte: User-defined Values • Low 1byte: Current Port Status Write <ul style="list-style-type: none"> • 0: Disable • 1: Enable (default)

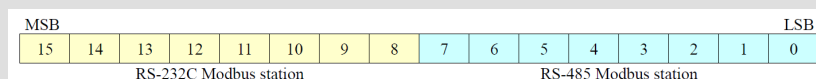
*** RS-232C/485 Baud rate setting**

Value	Baud rate
0	115200 (default)
1	2400
2	4800
3	9600
4	19200
5	38400
6	57600
7	115200

**** RS-232C/485 setting (registers with addresses 0x1607 and 0x1609)**



***** MODBUS station (registers with addresses 0x160A)**



****** Ethernet Port 1 control**

GL-9971 / GL-9974 / GL-9975: Only one of the two ports can be disabled. If the second port is disabled, the first port cannot be disabled.

GL-9972 / GL-9973: Since the device is equipped with a single Ethernet port, the port status must be changed from Disabled to Enabled using one of the following methods:

- Access the designated address via a serial connection and enable the port.
- Perform a factory reset.

******* Ethernet Port 2 control**

GL-9971 / GL-9974 / GL-9975: Only one of the two ports can be disabled. If the second port is disabled, the first port cannot be disabled.

GL-9972 / GL-9973: Not supported.

14.2.6. Expansion Slot Information Special Register (0x2000, 8192)

(GL-9971)

Each expansion slot has 0x20(32) address offset and same information structure.

Address offset	Expansion slot#1	Expansion slot#2	Expansion slot#3	Expansion slot#4	.....	Expansion slot#10
+ 0x00(+0)	0x2000(8192)	0x2020(8224)	0x2040(8256)	0x2060(8288)	.....	0x2120(8480)
+ 0x01(+1)	0x2001(8193)	0x2021(8225)	0x2041(8257)	0x2061(8289)	.....	0x2121(8481)
+ 0x02(+2)	0x2002(8194)	0x2022(8226)	0x2042(8258)	0x2062(8290)	.....	0x2122(8482)
+ 0x03(+3)	0x2003(8195)	0x2023(8227)	0x2043(8259)	0x2063(8291)	.....	0x2123(8483)
+ 0x04(+4)	0x2004(8196)	0x2024(8228)	0x2044(8260)	0x2064(8292)	.....	0x2124(8484)
+ 0x05(+5)	0x2005(8197)	0x2025(8229)	0x2045(8261)	0x2065(8293)	.....	0x2125(8485)
+ 0x06(+6)	0x2006(8198)	0x2026(8230)	0x2046(8262)	0x2066(8294)	.....	0x2126(8486)
+ 0x07(+7)	0x2007(8199)	0x2027(8231)	0x2047(8263)	0x2067(8295)	.....	0x2127(8487)
+ 0x08(+8)	0x2008(8200)	0x2028(8232)	0x2048(8264)	0x2068(8296)	.....	0x2128(8488)
+ 0x09(+9)	0x2009(8201)	0x2029(8233)	0x2049(8265)	0x2069(8297)	.....	0x2129(8489)
+ 0x0A(+10)	0x200A(8202)	0x202A(8234)	0x204A(8266)	0x206A(8298)	.....	0x212A(8490)
+ 0x0B(+11)	0x200B(8203)	0x202B(8235)	0x204B(8267)	0x206B(8299)	.....	0x212B(8491)
+ 0x0C(+12)	0x200C(8204)	0x202C(8236)	0x204C(8268)	0x206C(8300)	.....	0x212C(8492)
+ 0x0D(+13)	0x200D(8205)	0x202D(8237)	0x204D(8269)	0x206D(8301)	.....	0x212D(8493)
+ 0x0E(+14)	0x200E(8206)	0x202E(8238)	0x204E(8270)	0x206E(8302)	.....	0x212E(8494)
+ 0x0F(+15)	0x200F(8207)	0x202F(8239)	0x204F(8271)	0x206F(8303)	.....	0x212F(8495)
+ 0x10(+16)	0x2010(8208)	0x2030(8240)	0x2050(8272)	0x2070(8304)	.....	0x2130(8496)
+ 0x11(+17)	0x2011(8209)	0x2031(8241)	0x2051(8273)	0x2071(8305)	.....	0x2131(8497)
+ 0x12(+18)	0x2012(8210)	0x2032(8242)	0x2052(8274)	0x2072(8306)	.....	0x2132(8498)
+ 0x13(+19)	0x2013(8211)	0x2033(8243)	0x2053(8275)	0x2073(8307)	.....	0x2133(8499)
+ 0x14(+20)	0x2014(8212)	0x2034(8244)	0x2054(8276)	0x2074(8308)	.....	0x2134(8500)
+ 0x15(+21)	0x2015(8213)	0x2035(8245)	0x2055(8277)	0x2075(8309)	.....	0x2135(8501)
+ 0x16(+22)	0x2016(8214)	0x2036(8246)	0x2056(8278)	0x2076(8310)	.....	0x2136(8502)
+ 0x17(+23)	0x2017(8215)	0x2037(8247)	0x2057(8279)	0x2077(8311)	.....	0x2137(8503)
+ 0x18(+24)	0x2018(8216)	0x2038(8248)	0x2058(8280)	0x2078(8312)	.....	0x2138(8504)
+ 0x19(+25)	0x2018(8217)	0x2038(8249)	0x2058(8281)	0x2078(8313)	.....	0x2139(8505)
+ 0x1A(+26)	0x201A(8218)	0x203A(8250)	0x205A(8282)	0x207A(8314)	.....	0x213A(8506)
+ 0x1B(+27)	0x201B(8219)	0x203B(8251)	0x205B(8283)	0x207B(8315)	.....	0x213B(8507)
+ 0x1C(+28)	0x201C(8220)	0x203C(8252)	0x205C(8284)	0x207C(8316)	.....	0x213C(8508)
+ 0x1D(+29)	0x201D(8221)	0x203D(8253)	0x205D(8285)	0x207D(8317)	.....	0x213D(8509)
+ 0x1E(+30)	0x201E(8222)	0x203E(8254)	0x205E(8286)	0x207E(8318)	.....	0x213E(8510)
+ 0x1F(+31)	0x201F(8223)	0x203F(8255)	0x205F(8287)	0x207F(8319)	.....	0x213F(8511)

(GL-9972/73/74/75)

Each expansion slot has 0x40(64) address offset and same information structure.

Address offset	Expansion slot#1	Expansion slot#2	Expansion slot#3	Expansion slot#4	.....	Expansion slot#63
+ 0x00(+0)	0x2000(8192)	0x2020(8224)	0x2040(8256)	0x2060(8288)	.....	0x27C0(10176)
+ 0x01(+1)	0x2001(8193)	0x2021(8225)	0x2041(8257)	0x2061(8289)	.....	0x27C1(10177)
+ 0x02(+2)	0x2002(8194)	0x2022(8226)	0x2042(8258)	0x2062(8290)	.....	0x27C2(10178)

Address offset	Expansion slot#1	Expansion slot#2	Expansion slot#3	Expansion slot#4	.....	Expansion slot#63
+ 0x03(+3)	0x2003(8195)	0x2023(8227)	0x2043(8259)	0x2063(8291)	.....	0x27C3(10179)
+ 0x04(+4)	0x2004(8196)	0x2024(8228)	0x2044(8260)	0x2064(8292)	.....	0x27C4(10180)
+ 0x05(+5)	0x2005(8197)	0x2025(8229)	0x2045(8261)	0x2065(8293)	.....	0x27C5(10181)
+ 0x06(+6)	0x2006(8198)	0x2026(8230)	0x2046(8262)	0x2066(8294)	.....	0x27C6(10182)
+ 0x07(+7)	0x2007(8199)	0x2027(8231)	0x2047(8263)	0x2067(8295)	.....	0x27C7(10183)
+ 0x08(+8)	0x2008(8200)	0x2028(8232)	0x2048(8264)	0x2068(8296)	.....	0x27C8(10184)
+ 0x09(+9)	0x2009(8201)	0x2029(8233)	0x2049(8265)	0x2069(8297)	.....	0x27C9(10185)
+ 0x0A(+10)	0x200A(8202)	0x202A(8234)	0x204A(8266)	0x206A(8298)	.....	0x27CA(10186)
+ 0x0B(+11)	0x200B(8203)	0x202B(8235)	0x204B(8267)	0x206B(8299)	.....	0x27CB(10187)
+ 0x0C(+12)	0x200C(8204)	0x202C(8236)	0x204C(8268)	0x206C(8300)	.....	0x27CC(10188)
+ 0x0D(+13)	0x200D(8205)	0x202D(8237)	0x204D(8269)	0x206D(8301)	.....	0x27CD(10189)
+ 0x0E(+14)	0x200E(8206)	0x202E(8238)	0x204E(8270)	0x206E(8302)	.....	0x27CE(10190)
+ 0x0F(+15)	0x200F(8207)	0x202F(8239)	0x204F(8271)	0x206F(8303)	.....	0x27CF(10191)
+ 0x10(+16)	0x2010(8208)	0x2030(8240)	0x2050(8272)	0x2070(8304)	.....	0x27D0(10192)
+ 0x11(+17)	0x2011(8209)	0x2031(8241)	0x2051(8273)	0x2071(8305)	.....	0x27D1(10193)
+ 0x12(+18)	0x2012(8210)	0x2032(8242)	0x2052(8274)	0x2072(8306)	.....	0x27D2(10194)
+ 0x13(+19)	0x2013(8211)	0x2033(8243)	0x2053(8275)	0x2073(8307)	.....	0x27D3(10195)
+ 0x14(+20)	0x2014(8212)	0x2034(8244)	0x2054(8276)	0x2074(8308)	.....	0x27D4(10196)
+ 0x15(+21)	0x2015(8213)	0x2035(8245)	0x2055(8277)	0x2075(8309)	.....	0x27D5(10197)
+ 0x16(+22)	0x2016(8214)	0x2036(8246)	0x2056(8278)	0x2076(8310)	.....	0x27D6(10198)
+ 0x17(+23)	0x2017(8215)	0x2037(8247)	0x2057(8279)	0x2077(8311)	.....	0x27D7(10199)
+ 0x18(+24)	0x2018(8216)	0x2038(8248)	0x2058(8280)	0x2078(8312)	.....	0x27D8(10200)
+ 0x19(+25)	0x2018(8217)	0x2038(8249)	0x2058(8281)	0x2078(8313)	.....	0x27D9(10201)
+ 0x1A(+26)	0x201A(8218)	0x203A(8250)	0x205A(8282)	0x207A(8314)	.....	0x27DA(10202)
+ 0x1B(+27)	0x201B(8219)	0x203B(8251)	0x205B(8283)	0x207B(8315)	.....	0x27DB(10203)
+ 0x1C(+28)	0x201C(8220)	0x203C(8252)	0x205C(8284)	0x207C(8316)	.....	0x27DC(10204)
+ 0x1D(+29)	0x201D(8221)	0x203D(8253)	0x205D(8285)	0x207D(8317)	.....	0x27DD(10205)
+ 0x1E(+30)	0x201E(8222)	0x203E(8254)	0x205E(8286)	0x207E(8318)	.....	0x27DE(10206)
+ 0x1F(+31)	0x201F(8223)	0x203F(8255)	0x205F(8287)	0x207F(8319)	.....	0x27DF(10207)

Address offset	Access	Type, size	Description
+ 0x02(+2) *	Read	1 word	Input start register address of input image word this slot.
+ 0x03(+3) *	Read	1 word	Input word's bit offset of input image word this slot.
+ 0x04(+4) *	Read	1 word	Output start register address of output image word this slot.
+ 0x05(+5) *	Read	1 word	Output word's bit offset of output image word this slot.
+ 0x06(+6) *	Read	1 word	Input bit start address of input image bit this slot.

* Nothing of output, input, memory, or configuration parameter corresponding slot returns Exception 02.

** Word amount depends on the configured module.

Address offset	Access	Type, size	Description
+ 0x07(+7) *	Read	1 word	Output bit start address of output image bit this slot.
+ 0x08(+8) *	Read	1 word	Size of input bit this slot
+ 0x09(+9) *	Read	1 word	Size of output bit this slot
+ 0x0A(+10)*	Read	x word**	Read input data this slot
+ 0x0B(+11)*	Read/Write	x word**	Read/write output data this slot
+ 0x0E(+14)	Read	1 word	GT-number, if GT-22CA, returns 0x22CA
+ 0x0F(+15)	Read	String Up to 72 bytes	First 1 word is length of valid character string. If GT-1238 returns “00 1E 52 54 2D 31 32 33 38 2C 20 38 44 49 2C 20 32 34 56 64 63 2C 20 55 6E 69 76 65 72 73 61 6C 00 00” Valid character size = 0x001E = 30 characters, “GT-1238, 8 DI, 24 VDC, Universal”
+ 0x10(+16)	Read	1 word	Size of configuration parameter byte
+ 0x11(+17)*	Read/Write	x words**	Read/write configuration parameter data, Refer to each IO parameter Specification.
+ 0x17(+23)	Read	2 words	Firmware Revision Example: 0x00010010 (Major revision 1 / Minor revision 2, Rev 1.02)
+ 0x19(+25)	Read	2 words	Firmware release data.
* Nothing of output, input, memory, or configuration parameter corresponding slot returns Exception 02.			
** Word amount depends on the configured module.			



NOTE

After the system is reset, the new **Set Value** action is applied.

14.3. MODBUS Reference Documents

<http://www.modbus.org>

14.4. MODBUS Tools

<http://www.modbustools.com> - modbus poll

<http://www.win-tech.com> - modscan32