Panasonic®

FP Industry 4.0 Communicator

FP-I4C Unit

User Manual

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Important symbols

One or more of the following symbols may be used in this documentation.

The following symbols are used to indicate the type of hazard.

⚠ DANGER

Indicates a hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING

Indicates a hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION

Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

Notice

Indicates a property damage message.

Safety precautions

Observe the following notices to ensure personal safety or to prevent accidents. To ensure that you use this product correctly, read this User's Manual thoroughly before use. Make sure that you fully understand the product and information on safety.

⚠ WARNING

- Always take precautions to ensure the overall safety of your system, so that the whole system remains safe in the event of failure of this product or other external factor.
- Do not use this product in areas with inflammable gas. It could lead to an explosion.
- Exposing this product to excessive heat or open flames could cause damage to electronic parts.

⚠ CAUTION

- To prevent abnormal exothermic heat or smoke generation, do not use this product continuously at the maximum performance values listed in the specifications.
- Do not disassemble or modify the product. It could lead to abnormal exothermic heat or smoke generation.
- Do not touch the terminals while the electricity is turned on. It could lead to an electric shock.
- Use external devices to ensure safety related functions such as the emergency stop and interlock circuit.
- Connect the wires and connectors securely. A loose connection might pose an electrical hazard, which could result in a short-circuit, exothermic heat or smoke generation.
- Do not allow foreign matter such as liquid, flammable materials, metals to enter the product. It could cause excessive exothermic heat or smoke generation.
- Do not undertake construction (such as connection and disconnection) while the power supply is on. It could lead to an electric shock.

Network security

Implementing measures to protect your network is crucial to keep your network and its traffic secured.

As you will use this product connected to a network, your attention is called to the following security risks.

- Leakage or theft of information through this product
- Use of this product for illegal operations by persons with malicious intent
- Interference with or stoppage of this unit by persons with malicious intent

It is your responsibility to take precautions such as those described below to protect yourself against the above network security risks.

- Use this product in a secure network by using protection tools such as a firewall.
- If this product is connected to a network that includes PCs, make sure that the system is not infected by computer viruses or other malicious entities (using a regularly updated antivirus program, anti-spyware program, etc.).
- Use this product in an environment that has LAN, VPN (virtual private network) or leased line network.
- Use this product in an environment where only limited people concerned can enter.
- Use this product and connected devices such as a PC and tablet securing safety.
- Do not install this product in locations where the product or the cables can be destroyed or damaged by persons with malicious intent.

Note that incorrect setting of the connection to the existing LAN might cause malfunction in the devices on the network. Consult your network administrator before connecting.

Table of contents

1 Product overview

1.1 Product package

The FP-I4C product package contains the following items.

- 1 x FP-Industry 4.0 Communicator (FP-I4C unit)
  Product number: AFP4C
- 1 x 24V DC power supply cable
  Product number: AFPG805
- 1 x leaflet providing installation instructions
- 1 x 16-pin spring force plug (Phoenix Contact Co. MC0.5/8-ST-2,54)

1.2 System requirements

To configure your applications and to access FP series PLCs via Ethernet, you only need a standard browser. For HMWIN Studio, your PC must meet some basic requirements.

Supported browsers:

- Microsoft Edge
- Mozilla Firefox
- Google Chrome
- Safari
- Opera

HMWIN Studio has the following system requirements:

- Microsoft Windows® 7, Windows® 8.x or Windows® 10
- Hard disk with at least 500MB free disk space, 512MB RAM, Ethernet connection

HMWIN Studio can be downloaded free of charge from the Panasonic Download Center.

1.3 Features

The FP-I4C unit connects PLCs and other devices securely with databases, cloud servers, and remote control systems.

The unit works as an interface between a LAN or WAN (Internet/Intranet) and all PLCs of the FP series. It comes in a compact housing with multiple interfaces and offers various services for data exchange.

Interfaces:

- RS232C interface
- Switchable RS232C/RS485 interface
- 2 Ethernet interfaces
- 2 USB 2.0 host ports
- 2 digital function inputs
- Redirection from Ethernet to any other interface

Modbus TCP/RTU support:

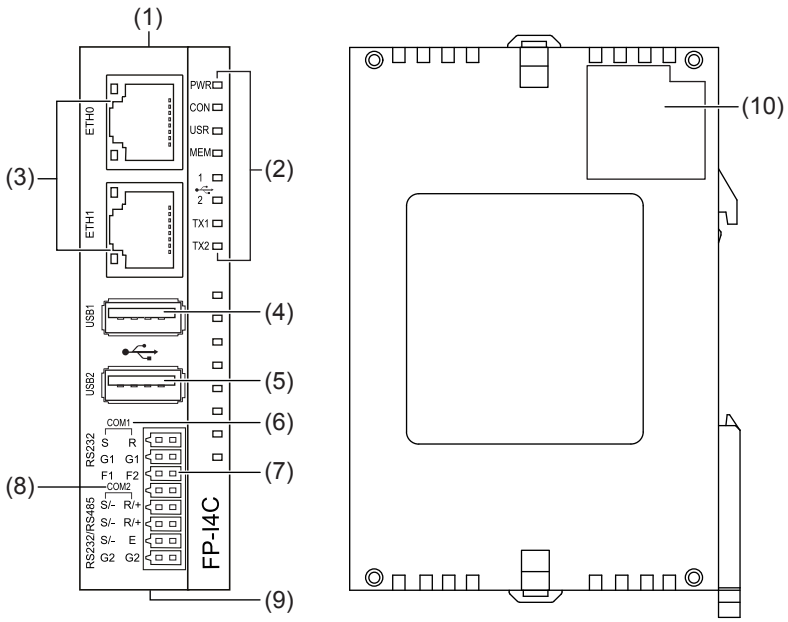
- Modbus RTU master functionality
- Modbus TCP client/server functionality
- Modbus TCP gateway

Other features:

- Configuration via Web interface in any standard browser
- Secure data transmission and authentication
- Web server
- Data logger
- FTP client
- SMTP/POP3 (email) client
- MQTT protocol
- HTTP client
- SQL client
- Script function
- REST API
- IEC60870 protocol

1.4 Part names

The FP-I4C unit is equipped with multiple communication interfaces, status LEDs, function inputs, a reset tact switch, and an expansion connector.



(1) Reset tact switch
(2) Status LEDs
(3) ETH0, ETH1, Ethernet connectors
(4) USB1, USB 2.0 host port (500mA)
(5) USB2, USB 2.0 host port (100mA)
(6) COM1 RS232 (non-insulated)
(7) F1, F2, function inputs (pull-up design)
(8) COM2 RS232/RS485 (insulated, switchable)
(9) 24V DC power supply connector
(10) Expansion connector for FP0/FP0R expansion units (16 pins)

Related topics

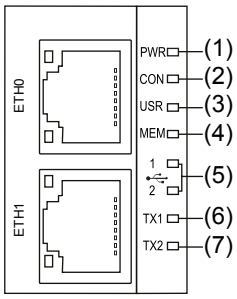
Reset tact switch (page 14)

Wire the power supply (page 25)

Status LEDs (page 13)

1.5 Status LEDs

The LEDs on the FP-I4C unit display the operation and communication status.



(1) PWR
(2) CON
(3) USR
(4) MEM
(5) USB 1, USB 2
(6) TX1
(7) TX2

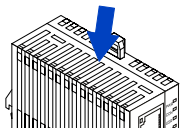
LED	Color	LED status	Description
PWR	Green	On	Power supply is on and self-test is completed.
CON	Yellow	User-defined	User-defined, controlled by script function
USR	Yellow	User-defined	User-defined, controlled by script function
		Flashes (heartbeat 1/s)	A system reset initiated by the reset tact switch is active.
MEM	Orange	On	Data is written to the USB flash drive.
USB 1	Green	On	A device is connected to USB port 1.
USB 2	Green	On	A device is connected to USB port 2.
TX1	Green	Flashes (rate depending on data traffic)	Communication via COM1 RS232 is active.
TX2	Green	Flashes (rate depending on data traffic)	Communication via COM2 RS232/RS485 is active.

Related topics

Reset tact switch (page 14)

1.6 Reset tact switch

A small tact switch within the housing on the top side can be used to restart or to reset the FP-I4C unit.



To restart or to reset the unit to the factory settings, use a paperclip or similar and press the tact switch 3 times within 3s. The yellow USR LED starts flashing (heartbeat 1/s).

- To restart the unit, press the tact switch again for 3 to 6s.
- To reset the unit, press the tact switch for at least 6s after the LED began to flash. The unit will be restarted and all user data are removed.

1.7 Devices supported by USB host ports

The USB host ports support the FP series PLCs and GT series HMIs listed in the following targeted peripheral list.

Commercial USB flash drives and hard disks (max. 500mA on upper USB connector) can also be connected.

- Panasonic GT USB driver ver. 1.0

  Model: GT series, manufacturer: Panasonic Electric Works, Ltd.,
  vendor ID: 0x0986, product ID: 0x0310
- Panasonic FP series USB driver

  Model: PLC FP0H, FP7, FP0R, manufacturer: Panasonic Electric Works, Ltd.,
  vendor ID: 0x0986, product ID: 0x0320
- Panasonic Eco-POWER METER

  Model: Eco-POWER METER, manufacturer: Panasonic Electric Works, Ltd.,
  vendor ID: 0x04da, product ID: 0x4201
- Panasonic FP-X series USB driver

  Model: CP210x UART Bridge, e.g. FP-X, manufacturer: Cygnal Integrated Products,
  vendor ID: 0x10C4, product ID: 0xEA60

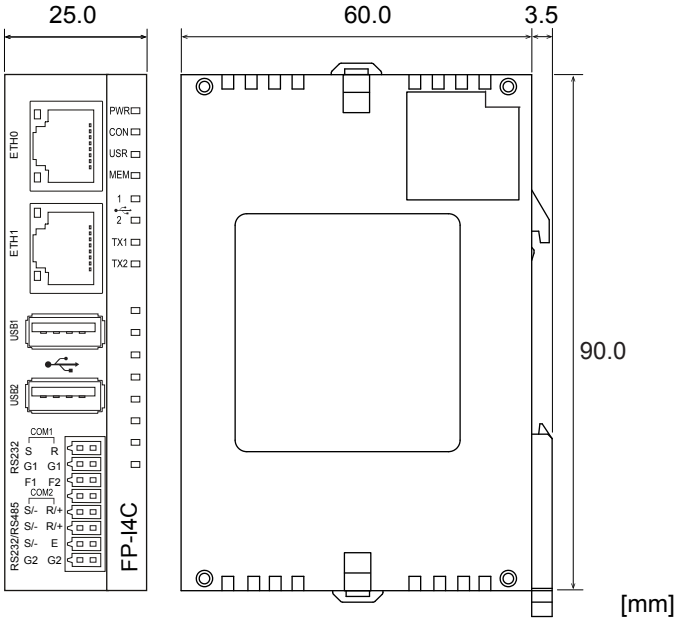
1.8 Specifications

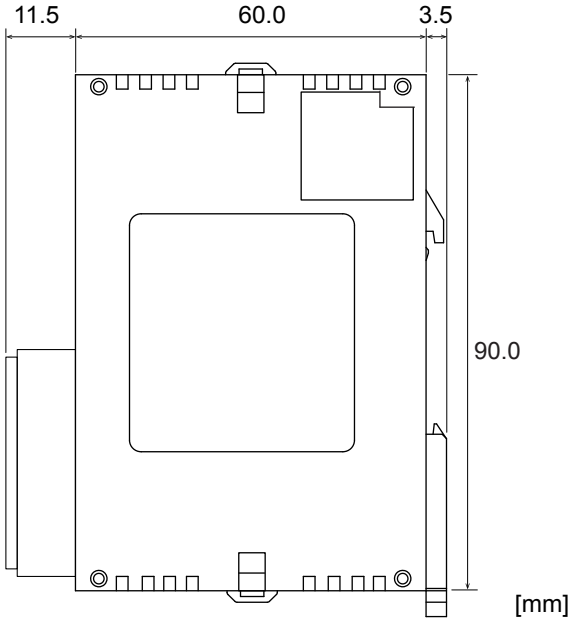
The FP-I4C unit has the following characteristics and technical specifications.

Item	Description
Product number	AFP4C
Rated input voltage	24V DC, use the power supply cable (AFPG805) supplied with the unit
Operating voltage range	21.6–26.4V DC, supplied by class 2 circuit only
Serial interfaces	COM1 RS232 (non-insulated), COM2 RS232/RS485 (insulated, switchable) 16-pin spring force plug by Phoenix Contact Co. (MC0.5/8-ST-2,54)
Ethernet	2 Ethernet connectors, 10BASE-T/100BASE-TX auto-negotiation via RJ45 female connector
USB	2 USB connectors, USB 2.0 full speed, max. 500mA (USB1), max. 100mA (USB2)
Function inputs	2 binary inputs (pull-up design) for optional functions
Operation status LEDs	7
Protocols and standards	TCP/IP, UDP/IP, DHCP, FTP, FTPS, SSH, HTTP, HTTPS, SMTP, ESMTP-Auth, POP3, NTP, Modbus, DNS, SNMP, VPN, VNC, MQTT, SQL, OPC UA
Flash memory	2.4GB user/configuration data
RAM	496MB
Current consumption	≈75mA at 24V DC (without expansion unit, USB flash memory, etc.)
Degree of protection	IP20
Operating temperature	0°C to +55°C
Storage temperature	-20°C to +70°C
Operating humidity	10%–95% RH (at 25°C, non-condensing)
Storage humidity	10%–95% RH (at 25°C, non-condensing)
Vibration resistance	10Hz to 55Hz, 1 cycle per minute with a double amplitude of 0.75mm; 10min on 3 axes
Shock resistance	≥10g, 4 times on 3 axes
Unit dimensions	Height: 90mm, width: 25mm, depth: 64mm
Weight	≈110g
Operation conditions	Free from corrosive gases and excessive dust
Conformity to EU directives and standards	2011/65/EU RoHS, 2014/30/EU EMC, EN IEC 63000:2018, EN 61326-1:2013
UL approval	UL number "2LD7" (file E232530)

1.9 Dimensions

The dimensions of the FP-I4C unit are indicated in the technical drawings.





Right side view of the unit with the 16-pin connector installed

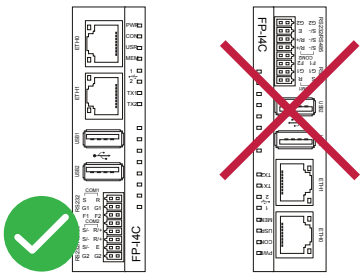
2 Installation

2.1 Installation environment

To prevent failure or malfunctions, the installation environment must comply with the specifications of the FP-I4C unit.

After installing the unit, make sure to use it within the range of the general specifications:

- Operating temperature: 0°C to +55°C
- Operating humidity: 30% to 85% RH (at 25°C, non-condensing)
- Pollution degree: 2
- Do not use the unit in the following environments:
  - Direct sunlight
  - Sudden temperature changes causing condensation
  - Flammable or corrosive gases
  - Excessive airborne dust, metal particles or salts
  - Benzine, paint thinner, alcohol or other organic solvents, or strong alkaline solutions such as ammonia or caustic soda
  - Vibration, shock, or direct drop of water
- Avoid noise interference from the following items:
  - Influence from power transmission lines, high voltage equipment, power cables, power equipment, radio transmitters, or any other equipment that would generate high switching surges. Maintain at least 100mm of space between these devices and the unit.
  - If noise occurs in the power supply line even after the above countermeasures are taken, it is recommended to supply power through an isolated transformer, noise filter, or the like.
- Take measures regarding heat discharge:
  - Always install the unit orientated with the Ethernet ports facing outward on the top in order to prevent the generation of heat.

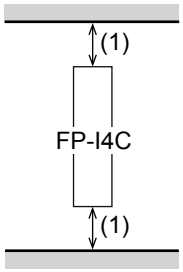


  - Do not install the unit above devices which generate heat, such as heaters, transformers or large-scale resistors.

2.2 Installation space

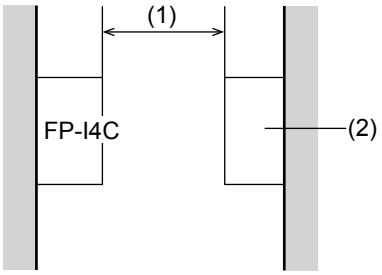
Make sure to keep a minimum distance to other devices to avoid effects from noise or heat and to permit unit replacement.

- Leave at least 50mm of space between the wiring ducts of the unit and other devices to allow heat radiation and unit replacement.



(1) 50mm or more

- Maintain a minimum of 100mm between devices to avoid adverse effects from noise and heat when installing a device or panel door to the front of the unit.



(1) 100mm or more
(2) Other device or panel door

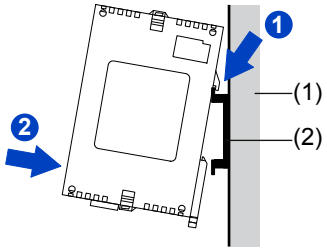
- Keep the first 100mm from the front surface of the unit open in order to allow room for wiring.

2.3 Attach the unit to a DIN rail

The unit is designed for easy installation on DIN rails.

1. Fit the upper hook of the unit onto the DIN rail.

2. Without moving the upper hook, press on the lower hook to fit the unit into position.

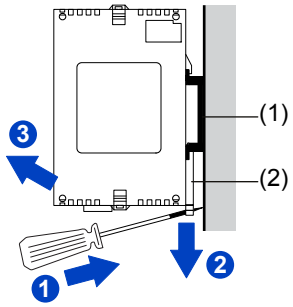


(1) Mounting panel
(2) DIN rail

2.4 Remove the unit from a DIN rail

You can easily remove the unit from a DIN rail with a slotted screwdriver.

1. Insert a slotted screwdriver into the DIN rail attachment lever.
2. Pull the attachment lever downwards.
3. Lift the unit and remove it from the rail.

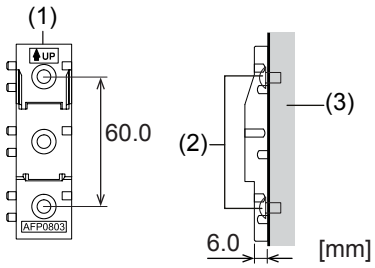


(1) DIN rail
(2) DIN rail attachment lever

2.5 Install the unit on a slim mounting plate (AFP0803)

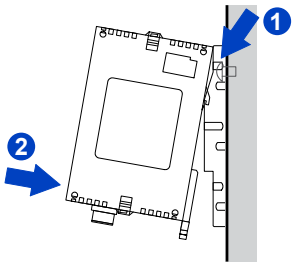
To attach the unit directly to the wall, you can use a slim type mounting plate, which can be ordered separately.

Use M4 size pan-head screws to attach the mounting plate to the mounting panel.



(1) FP0 slim type mounting plate AFP0803
(2) Screw
(3) Mounting panel

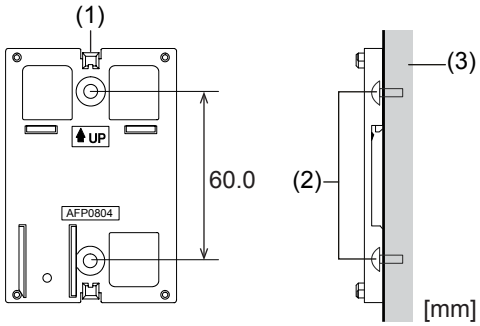
1. Fit the upper hook of the unit onto the mounting plate.
2. Without moving the upper hook, press on the lower hook to fit the unit into position.



2.6 Install the unit on a flat mounting plate (AFP0804)

To attach the unit sideways, you can use a flat type mounting plate, which can be ordered separately.

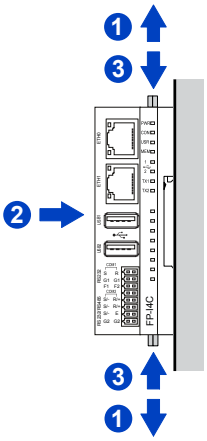
Use M4 size pan-head screws to attach the mounting plate to the mounting panel.



(1) FP0 flat type mounting plate AFP0804
(2) Screw
(3) Mounting panel

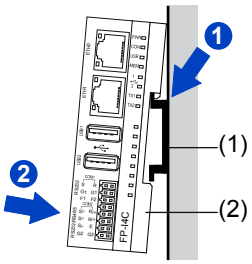
1. Raise the expansion hooks on the top and bottom of the unit.
2. Install the unit on the mounting plate.

3. Align the expansion hooks with the plate and press the hooks back down.



Note

A unit with an attached flat type mounting plate can also be installed sideways on a DIN rail.

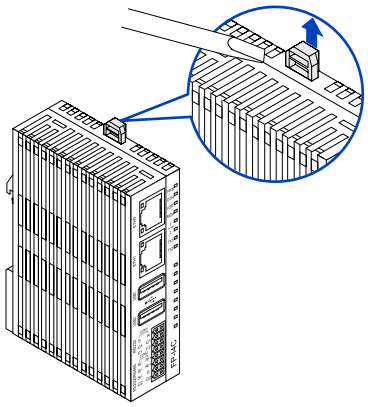


(1) DIN rail
(2) FP0 flat type mounting plate AFP0804

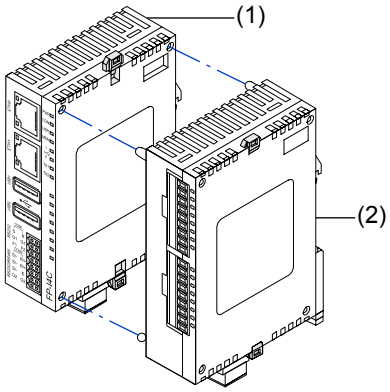
2.7 Add FP0/FP0R expansion units to the FP-I4C unit

The FP0/FP0R expansion units are connected on the right side of the FP-I4C unit.

1. Raise the expansion hooks on the top and bottom sides of the FP-I4C unit with a screwdriver.

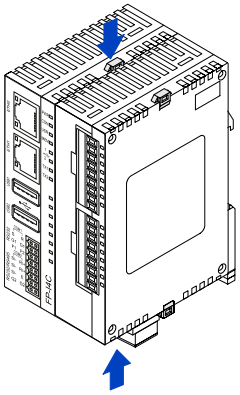


2. Align the pins and holes in the four corners of the units and press the two units together.



(1) FP-I4C unit
(2) FP0/FP0R expansion unit

3. Press down the expansion hooks raised in step 1 to secure the unit.



3 Wiring

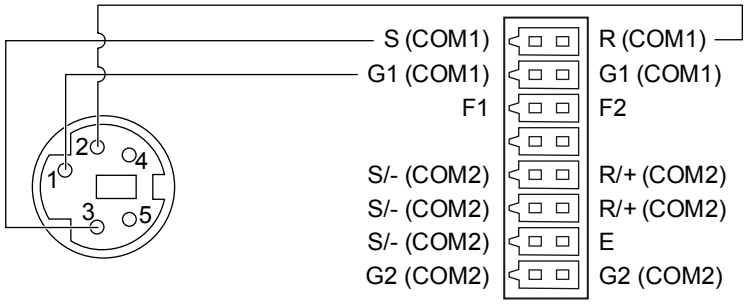
3.1 Connection to PLC TOOL port using cable AIGT8192

Use the cable AIGT8192 to connect the FP-I4C unit to the 5-pin mini DIN male TOOL port of an FP0R, FPΣ, FP-X, or FP2SH type PLC.

Use either COM1 or COM2 depending on your setting for “Service control interface” in the FP-I4C Web interface.

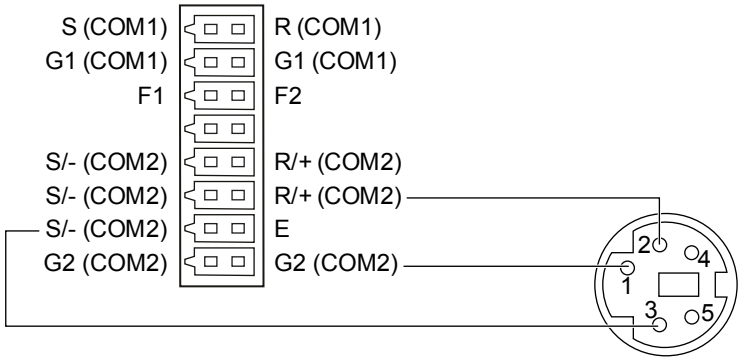
The cable AIGT8192 can be ordered as an accessory. Remove the ferrules of the cable before inserting the wires into the connector.

Using COM1:



AIGT8192, 5-pin mini DIN male (left) and FP-I4C unit, 16-pin connector (right)

Using COM2:



FP-I4C unit, 16-pin connector (left) and AIGT8192, 5-pin mini DIN male (right)

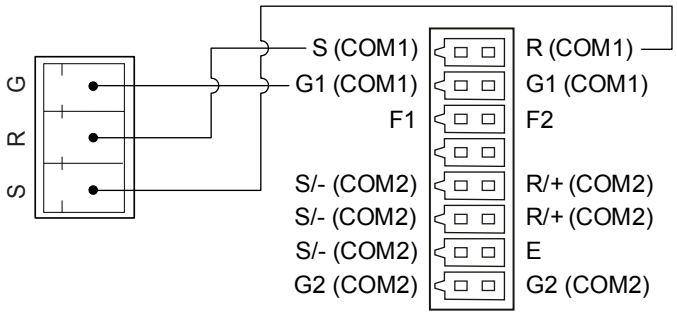
3.2 Connection to PLC COM port

Wire the 16-pin connector of the FP-I4C unit directly to the COM port of an FP0R, FP-X, FPΣ, FP0H, or FP7 type PLC.

Use either COM1 or COM2 depending on your setting for “Service control interface” in the FP-I4C Web interface.

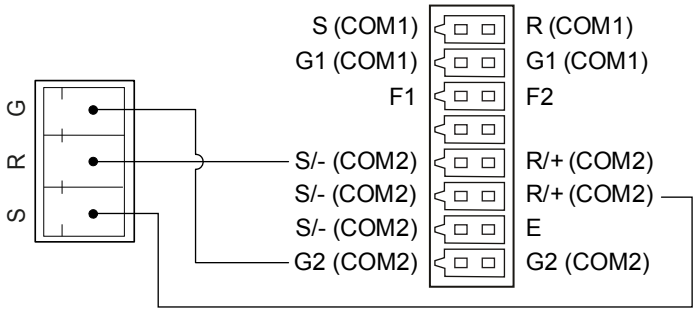
Suitable wire: AWG26-24

Using COM1:



PLC COM port, 3-pin screw terminal (left) and FP-I4C unit, 16-pin connector (right)

Using COM2:

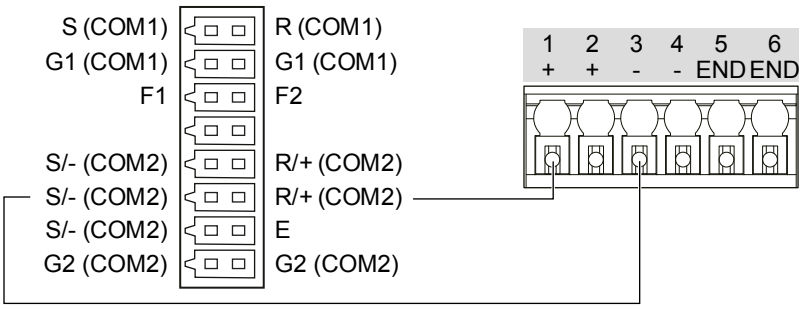


PLC COM port, 3-pin screw terminal (left) and FP-I4C unit, 16-pin connector (right)

3.3 RS485 connection to Eco-POWER METER

Use COM2 RS485 to connect the FP-I4C unit to an Eco-POWER METER.

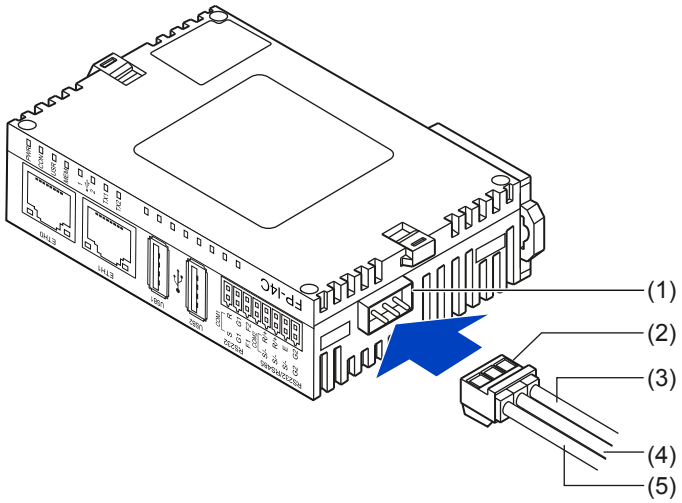
Suitable wire: AWG26-24



FP-I4C unit, 16-pin connector (left) and Eco-POWER METER terminal block (right)

3.4 Wire the power supply

Use the power supply cable (AFPG805) that comes with the unit to connect the power supply.



(1) Power supply connector
(2) Power supply cable (AFPG805)
(3) Brown: 24V DC
(4) Blue: 0V
(5) Green: must be connected to frame ground

The FP-I4C unit will turn on as soon as the power supply has been connected. The green LED PWR will turn on after self-test.

When connecting the power supply (class 2 circuit), make sure the polarity (+/-) is correct.

If you connect an FP0/FP0R expansion unit, both units must be supplied by the same power supply.

3.5 Pre-startup checklist

Check the following items prior to applying power to the system.

⚠ CAUTION

Perform the pre-startup checks with the power turned off.

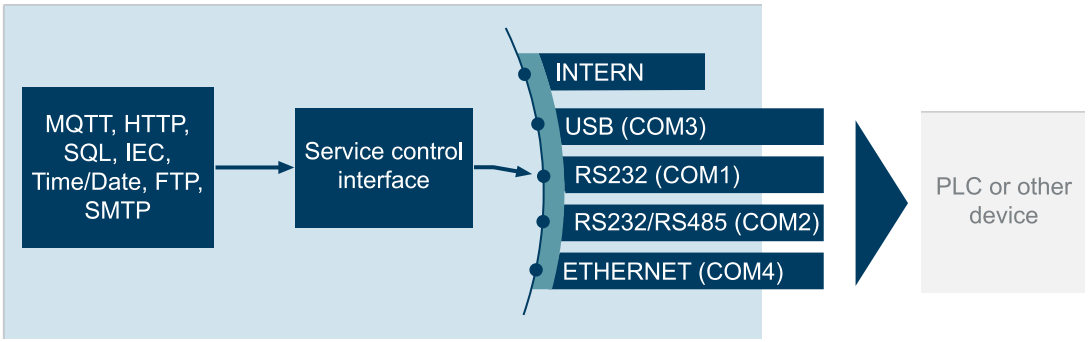
1. Is the unit securely fixed to the control panel?
2. Are all wires firmly secured to the terminals?
3. Are the connectors properly wired with respect to voltage and polarity?
4. Is the green wire connected to frame ground?

4 Getting started

4.1 Basic communication processes

The FP-I4C unit is equipped with multiple interfaces and supports a variety of protocols and services.

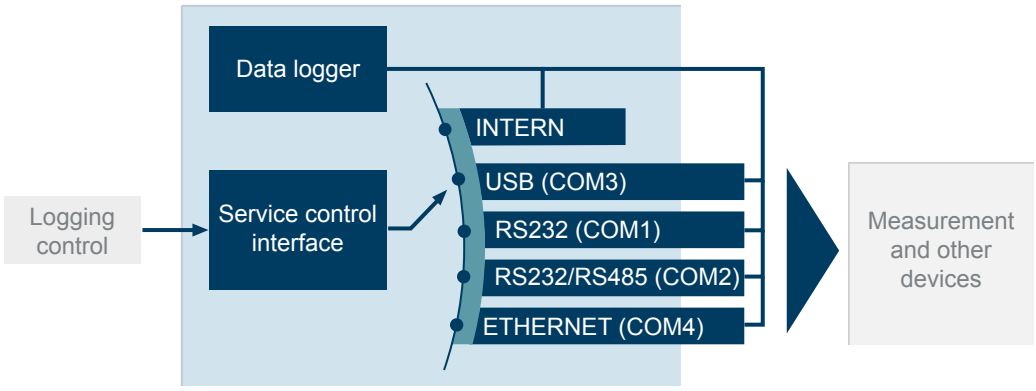
All services (FTPC, MQTT, data logger, etc.) use a so-called service control interface to poll the control and status flags/registers of connected devices. This service control interface is configured using the FP-I4C unit's Web interface.



Via TCP listening ports and port redirections, all interfaces are also available to external clients, such as Control FPWIN Pro7 or SCADA systems. Port redirections can be configured in the Web interface.

“INTERN” refers to the addressable internal memory areas of the FP-I4C unit which is accessible via Modbus/TCP or the script function. If the unit is used as a stand-alone FTP or SMTP client (no PLC connected), select “INTERN” as service control interface.

The data logger can collect data from all interfaces, allowing you to connect multiple sensors. The log function can be controlled by time trigger or by PLC via the service control interface.



Related topics

Port redirection (page 31)

Configure a port redirection (page 32)

4.2 Getting connected to the FP-I4C unit

The FP-I4C unit is configured using any standard Web browser.

To perform an initial function test and to configure the FP-I4C unit, connect a PC and the unit in the same Ethernet network and connect the 24V DC power supply.

You can connect the unit and the PC directly via LAN cable. In this case, use the ETH1 connector, which has a fixed IP address, and set the IP address in your PC (see "Related topics").

In larger networks where IP addresses area usually assigned by a DHCP server, you first need to find out the IP address of your FP-I4C unit. This can easily be done with the HMWIN Studio software. Use the ETH0 connector in networks with a DHCP server.

With the IP address of your device and the proper URL, you can open the FP-I4C Web interface in your browser. You can now activate and configure the required services and functions.

The Web interface is divided in application settings and system settings. Use the corresponding menu commands to switch between these areas. Or enter the URL to access each area directly:

- “Application Settings”: `https://[IP address]/fp_config`
- “System Settings”: `https://[IP address]/machine_config`

Replace `[IP address]` with the IP address of your FP-I4C unit (e.g. `https://192.168.0.10/machine_config`).

In the “System Settings”, you can change the user interface language and password (see "Related topics").

You can find detailed operating instructions for the FP-I4C Web interface if you click on the help button in the status bar of the “Application Settings”.

Related topics

Connect the FP-I4C unit directly to a PC (page 29)

Connect the FP-I4C unit to a PC via DHCP server (page 30)

Change the user interface language (page 33)

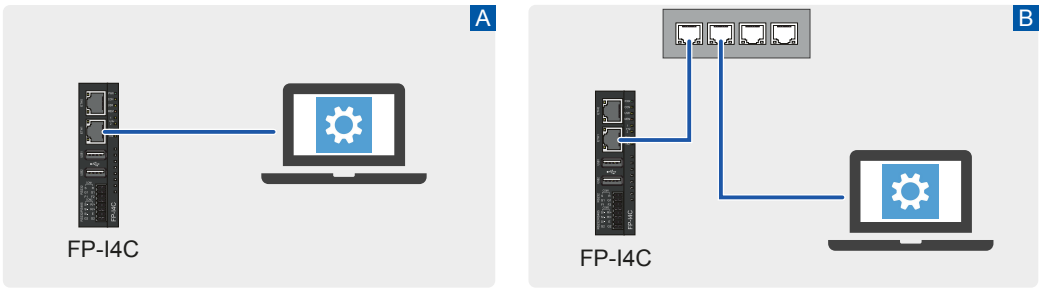
Change passwords (page 34)

4.3 Connect the FP-I4C unit directly to a PC

For a direct connection, use a standard LAN cable and the unit's ETH1 connector.

The factory default IP address of the ETH1 connector is 192.168.0.1. This address is printed on a label attached to the unit's housing. The PC must be on the same subnet as the FP-I4C unit.

1. Connect a LAN cable between your PC and the ETH1 connector.



A: Direct connection, B: Connection using a network switch

2. Set the IP address in your PC.
   In Windows, go to “Network Connections” > “Change adapter options”. Select “Ethernet” > “Properties”. On the “Network” tab, select “Internet protocol, Version 4 (TCP/IPv4)” > “Properties”. Select “Use the following IP address” and set the IP address.
   Example:
   IP address: 192.168.0.10
   Subnet mask: 255.255.255.0
   (Settings for default gateway and preferred DNS server not required.)
3. Open your browser and enter the URL `https://192.168.0.1/machine_config`.
   Depending on your browser, an insecure connection warning may be displayed. Follow the instructions in your browser to accept the connection. You will then be forwarded to the Web interface of the FP-I4C unit.
4. Log in with the user name "admin" and the default password "admin".
   You are now in the system settings area where you can make general network and service settings, change the user interface language and password (see "Related topics"). We recommend that you change the default password as soon as possible.
5. Select “Application Settings” to go to the application settings area.

You are now ready to configure the services required for your application.

Related topics

Change the user interface language (page 33)

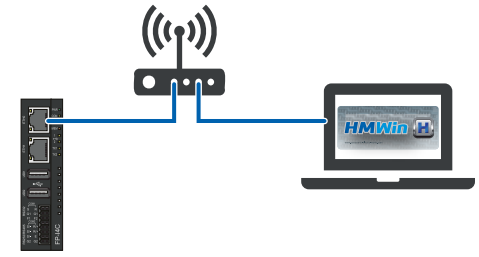
Change passwords (page 34)

4.4 Connect the FP-I4C unit to a PC via DHCP server

If you connect the FP-I4C unit and the PC in an Ethernet network with a DHCP server, you need to know which IP address was assigned to the unit.

You can easily find out the IP address of your unit with the HMWIN Studio software. The software is available free of charge in our Panasonic Download Center.

1. Connect a LAN cable between the ETH0 connector of the FP-I4C unit and your Ethernet network.
   For Ethernet connections using a DHCP server it is important that you use the top Ethernet connector ETH0.



FP-I4C

2. Start HMWIN Studio to find out the IP address of the FP-I4C unit.
3. Go to “Run” > “Manage Target” and select the “Board” tab.
   In the device list of your DHCP network you can find the IP address of theFP-I4C unit. If there are multiple devices in the list, compare the MAC address to the MAC address of the ETH0 connector to find the right device. The MAC address is printed on a label that can be found on the unit's housing.
4. Open your browser and enter the URL `https://[IP address]/machine_config`. Replace `[IP address]` with the IP address of your FP-I4C unit (e.g. `https://192.168.0.10/machine_config`).
   Depending on your browser, an insecure connection warning may be displayed. Follow the instructions in your browser to accept the connection. You will then be forwarded to the Web interface of the FP-I4C unit.
5. Log in with the user name "admin" and the default password "admin".
   You are now in the system settings area where you can make general network and service settings, change the user interface language and password (see "Related topics"). We recommend that you change the default password as soon as possible.
   We also recommend setting a static IP address:
   a. Select “Network” > “Network Interface”.
   b. Select “EDIT” and then “DHCP disabled” for “eth0” so that DHCP is disabled for both Ethernet connectors.
      Make settings for “Address” (e.g. 192.168.100.10), “Netmask” (e.g. 255.255.255.0), and “Gateway” (e.g. 192.168.100.1).
6. Select “Application Settings” to go to the application settings area.

You are now ready to configure the services required for your application.

Related topics

Change the user interface language (page 33)

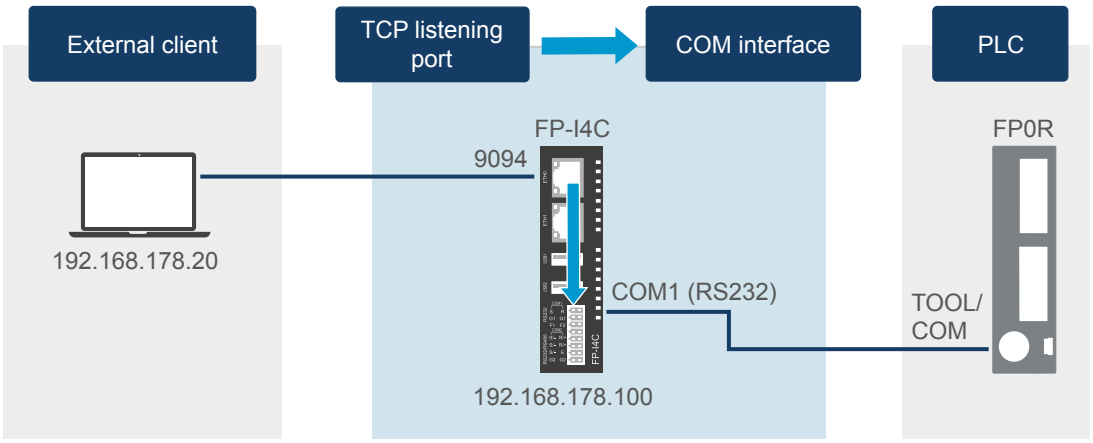
Change passwords (page 34)

4.5 Port redirection

For some applications, port redirections need to be configured to forward data packages from the TCP listening port to another FP-I4C interface.

General principle

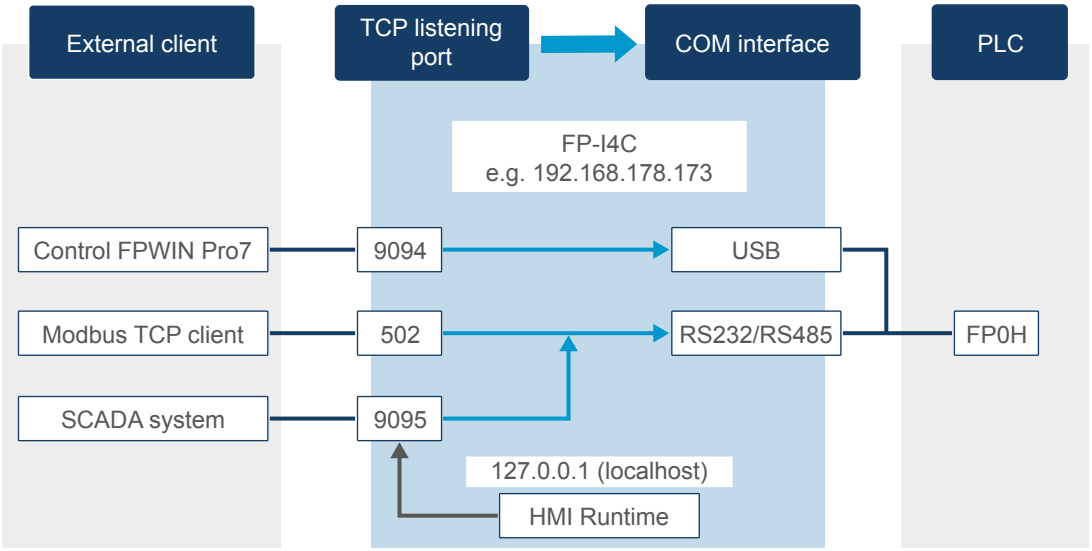
An open TCP listening port is redirected to a serial COM interface (blue arrows). This allows external clients to communicate via TCP with a device connected to the COM interface.



Example

Three TCP listening ports are opened on the FP-I4C unit (9094, 502, and 9095) and redirected to two serial COM interfaces connected to an FP0H PLC:

- Port 9094 handles requests from the PLC programming software Control FPWIN Pro7 to the PLC. The port is redirected to the USB interface.
- Port 502 is used as a Modbus TCP gateway to handle data requests from a Modbus TCP client.
- Port 9095 is used as a MEWTOCOL server to handle MEWTOCOL data requests from a SCADA system.



In addition, a Web server (HMI Runtime) is installed in the FP-I4C unit to show PLC data on an HTML page. The Web server connects to the PLC using the localhost IP address 127.0.0.1. In the example, HMI Runtime collects data from the PLC via MEWTOCOL and port 9095.

The data from port 502 and 9095 is redirected to the RS485/RS232 interface and then transmitted to the PLC FP0H. The SCADA system with polling rates in the millisecond range causes high loads on the serial interface. It is therefore advisable to use a different serial interface (in this example USB) for remote programming of the PLC.

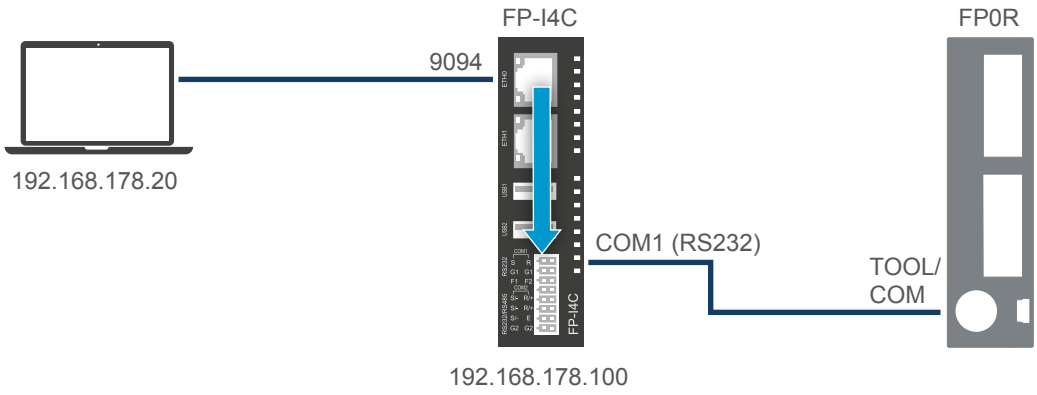
Related topics

Configure a port redirection (page 32)

4.6 Configure a port redirection

With the PLC connection wizard, you can set a port redirection very quickly. Alternatively, you can also configure the redirection manually.

In the following example, the TOOL or COM port of the FP0R PLC is connected to COM1 RS232 of the FP-I4C unit. A PC is connected to one of the Ethernet interfaces of the unit. To establish a connection between the PC and the PLC via the FP-I4C unit, open port 9094 for COM1 RS232, and make the communication settings.



Using the wizard

1. Go to “COM Interface” and select “Start wizard” to start the PLC connection wizard.
2. Select “Simple mode” and “Continue”.
3. Select the interface used to communicate with the PLC (“COM1 RS232”) and then “Continue”.
4. Set baud rate and parity (or IP address and port if the interface is COM4 Ethernet).
5. Enter the TCP listening port number (9094).
6. Select “Finish” and save your configuration.

Manual configuration

1. Go to “COM Interface” and enable the interface “COM1 RS232” to communicate with the PLC.
2. Make the desired communication settings.
3. Go to “Service control interface” and select “RS232” as “COM interface to control device (PLC)” and the station number.
4. Go to “Port” > “Ports and restrictions” and select “Add new”.
5. Specify the TCP listening port number 9094 and the COM interface “RS232” to which the data packets should be forwarded, and make all other desired communication settings.
6. Save your configuration.

4.7 Change the user interface language

The language of the user interface can be changed in the system settings.

Go to “System Settings” > “Language” and select the desired language.

Note that the application settings and the online help are not yet available in all of the languages.

4.8 Change passwords

For security reasons, we recommend that you change the default passwords in the FP-I4C Web interface.

You can set different passwords for the administrator and standard users. There are certain access restrictions for standard users.

If you forget your password, you must reset the FP-I4C unit to the default settings with the reset tact switch.

The following default passwords have been set:

Service	User name	Password
Configuration/SSH (if enabled)	admin	admin
SSH (if enabled) standard user	user	user
FTP server (if enabled) for logged data	log	log

1. Go to “System Settings” > “Authentication”.
2. Select “EDIT” to change the passwords.
   Allowed characters for passwords: all letters, numbers and special characters (e.g. #!$).
   Spaces are not allowed.

Related topics

Reset tact switch (page 14)

User rights (page 34)

4.9 User rights

Access to certain functions and settings is restricted to administrators. The functions accessible to users have a check mark.

System settings

Function	Admin	User
Change language	✓	✓
View system status	✓	✓
Save log file	✓	✓
Change date and time	✓	✓
Change network settings	✓	✓

Function	Admin	User
View data, settings, and main OS partitions	✓	✓
Change, clear, and update partitions	✓	×
Restart system	✓	✓
Change user password	✓	✓
Change admin password	✓	×

Application settings

Function	Admin	User
Change COM settings	✓	×
Change port settings	✓	×
PLC connection test	✓	✓
Start PLC connection wizard	✓	×
Change data logging settings	✓	×
Download log files	✓	✓
Delete log files	✓	×
Change MQTT settings	✓	×
Save or download MQTT library or example	✓	✓
Change date and time settings	✓	×
Change FTP client settings	✓	×
Save or download FTP library or example	✓	✓
Change script settings	✓	×
Change SQL client settings	✓	×
Save or download SQL library or example	✓	✓
Change email client settings	✓	×
Save or download email library or example	✓	✓
Change HTTP client settings	✓	×
Save or download HTTP library or example	✓	✓
Change REST API settings	✓	×
Change IEC60870 settings	✓	×
Save configuration changes	✓	×
Reset configuration to default	✓	×
Backup application settings	✓	✓
Restore application settings	✓	×

Related topics

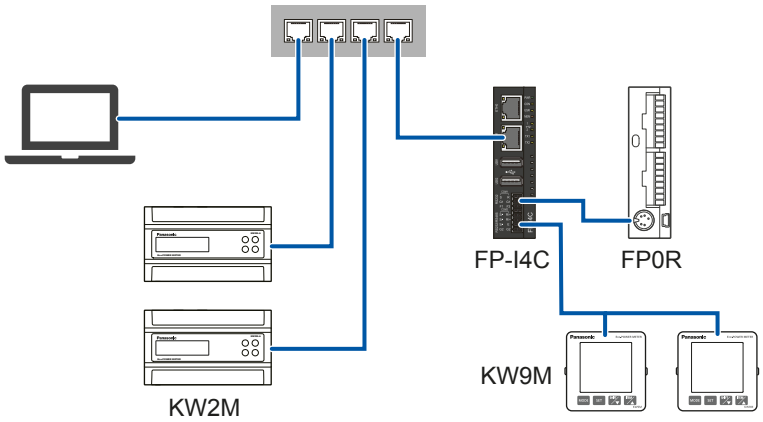
Change passwords (page 34)

5 Example: Data logging from different devices

5.1 Functional overview

During data logging, the FP-I4C unit collects and saves the data from all connected devices. The log files can then be downloaded or transmitted to a server.

This sample application is the basic configuration of a PLC-based monitoring and control system that collects and evaluates process data. In the figure, an FP0R PLC and four power meters of the Panasonic Eco-POWER METER series are connected to the FP-I4C unit. The measurement values from temperature sensors connected to the PLC will be logged in the FP-I4C unit. The energy consumption values supplied by the power meters will also be logged and can be transmitted to the PLC using the script function. Logging is performed at a fixed time interval set in the FP-I4C unit.



Configuration

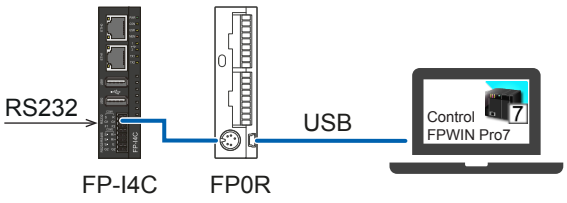
- The FP-I4C unit has the fixed IP address 192.168.0.1. It is connected to the Ethernet devices via a network switch. The PC must be on the same subnet as the FP-I4C unit.
- The KW2M power meters have the IP addresses 192.168.0.70 and 192.168.0.71.
- The KW9M power meters have the station numbers 1 and 2 and are connected via RS485 (19200 baud, odd parity, MEWTOCOL-COM protocol).
- The FP0R PLC is connected to the FP-I4C unit with its TOOL port (115200 baud, odd parity, MEWTOCOL-COM protocol).

Step-by-step instructions

1. Connect the FP0R PLC to the FP-I4C unit (page 38)
   Connect the FP0R and FP-I4C units and make the TOOL port settings for the PLC.
2. Connect the power meters (page 39)
   Connect two KW2M power meters via Ethernet and two KW9M power meters via RS485.
3. Connect the FP-I4C unit to the network (page 40)
   Make the physical network connection, set a static IP address, enable the router function, and configure the RS232 COM1 interface to the FP0R PLC.
4. Configure data logging (page 41)
   Make the settings to log the temperature data and the measured energy consumption.
5. Import variables from CSV files (page 44)
   Instead of adding single data points, you can import CSV files.
6. List and download log files (page 45)
   Use this function to generate a list of all log files and to download individual log files.

5.2 Connect the FP0R PLC to the FP-I4C unit

Connect the FP0R and FP-I4C units and make the TOOL port settings for the PLC.



1. Connect the TOOL port of the FP0R PLC to the COM1 RS232 interface of the FP-I4C unit, e.g. using cable AIGT8192 (see "Related topics").
2. Connect your PC to the PLC, e.g. with a USB cable, and turn on the power of the PLC.
3. Start the Control FPWIN Pro7 programming software to configure the TOOL port of the PLC.
4. Open or create a Control FPWIN Pro7 project and make sure the set PLC type is an FP0R PLC.
5. Go to “System registers” > “Serial ports” > “TOOL”.
   Make the following settings:
   Communication mode: “MEWTOCOL-COM slave”, “Station number”: “1”, “Baud rate”: “115200”, “Data length”: “8 bits”, “Parity”: “Odd”, “Stop bits”: “1 bit”
6. When you have completed your settings, transfer the configuration to the PLC.

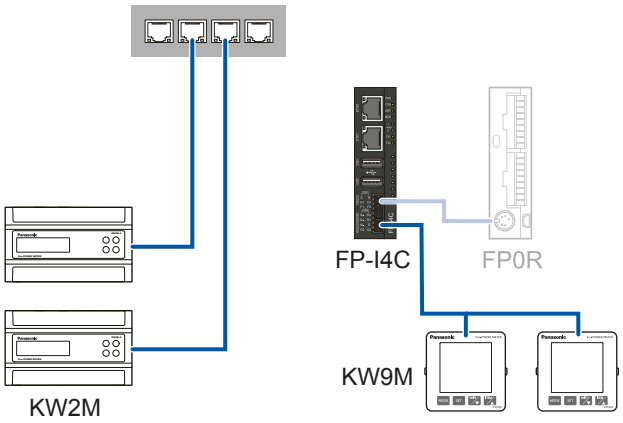
For details on wiring and configuring the FP0R PLC, refer to the PLC's documentation.

Related topics

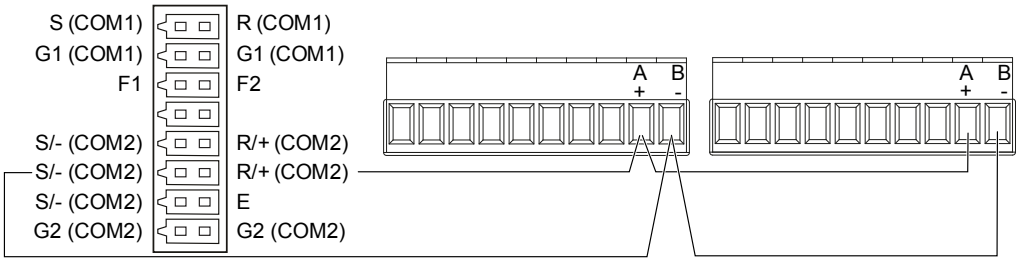
Connection to PLC TOOL port using cable AIGT8192 (page 23)

5.3 Connect the power meters

Connect two KW2M power meters via Ethernet and two KW9M power meters via RS485.



1. Use a LAN cable to connect the KW2M power meters to the network switch.
2. Connect the KW9M power meters to the RS485 interface in a daisy chain:



Suitable wire: AWG26-24

We recommend that you install a terminating resistor on both ends of the RS485 connection. On the FP-I4C side, place a 100Ω resistor between E and R/+. On the second KW9M power meter, place a 120Ω resistor between A+ and B-.

3. Make the power meter settings:

   KW2M:

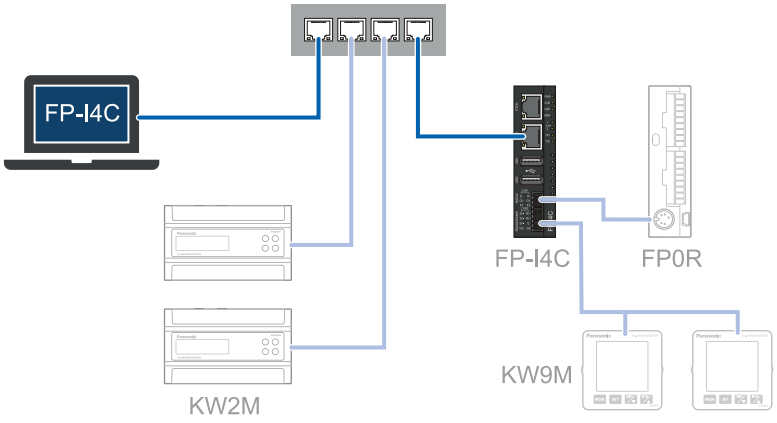
   Set the IP address to 192.168.0.70 and 192.168.0.71 and the subnet mask to 255.255.255.0.

   KW9M:

   Protocol: MEWTOCOL, baud rate: 19200, parity: Odd (8b - o), station numbers: 1 and 2

5.4 Connect the FP-I4C unit to the network

Use a standard browser to make the communication settings for the FP-I4C unit.



This task includes the following steps:

1. Make the physical connection
2. Configure the FP-I4C unit's RS232 COM1 interface to the FP0R PLC
3. Enable COM2 RS485/RS232 for communication with the KW9M power meters
4. Enable COM4 ETHERNET for communication with the KW2M power meters

Make the physical connection

Connect your PC to the FP-I4C unit and set the IP address of the PC, e.g. 192.168.0.10 (see "Related topics"). The PC must be on the same subnet as the FP-I4C unit.

Because we are using static IP addresses, connect the LAN cable to the ETH1 connector of the FP-I4C unit.

Configure the RS232 COM1 interface to the FP0R PLC

1. Open your browser and enter the URL `https://192.168.0.1/fp_config`.

   Depending on your browser, an insecure connection warning may be displayed. Follow the instructions in your browser to accept the connection. You will then be forwarded to the Web interface of the FP-I4C unit.

2. Go to “COM Interface” > “COM settings - FP-I4C” and enable “COM1 RS232”.

   Keep the default settings (“Protocol”: “MEWTOCOL”, “Autobaud”: Enabled, “Baud rate”: “115200”, “Parity”: “Odd”, “Timeout”: “2000”).

Enable COM2 RS485/RS232

1. Enable “COM2 RS485/RS232”.

2. Make the following settings (keep the default settings for all other parameters):
   “Protocol”: “MEWTOCOL”
   “Autobaud”: Disabled (only PLCs can respond to status requests)
   “Baud rate”: “19200”

Enable COM4 ETHERNET

1. Enable “COM4 ETHERNET”.
2. Make the following settings:
   “Protocol”: “MODBUS”
   “Timeout”: “2000”
   “IP address”: “192.168.0.0”
   “Port”: “502”
   “Address offset”: Enabled and set to 0
3. Save your configuration.

Related topics

Connect the FP-I4C unit directly to a PC (page 29)

5.5 Configure data logging

Make the settings to log the temperature data and the measured energy consumption.

A log file must be configured for each device.

In this example, the two power meters log the total energy consumption. Please refer to the power meter documentation for details on register addresses and data format.

This task includes the following steps:

1. Make general log settings
   This includes the data storage location and CSV file settings. If you add more than one log file, you need to make the general log settings only once.
2. Configure the log files and data points for each device
   Specify the COM interface to receive the log data, the station number of the connected device, the trigger that starts data logging, and the data points (in this example temperature and energy consumption values).
   If you need to configure many data points, we recommend importing the variables from a CSV file.

Make general log settings

Go to “Data Logger” > “General log settings” and turn on “Use data logger”.

Make the following settings:

“Data storage location”: “Internal memory”
“Show advanced settings”: Enabled
“Enable PLC memory area, start address”: Disabled

Keep the default settings for all other parameters.

Configure data logging for the FP0R PLC

1. Go to “Log file settings”, select “Add new”, and open the new configuration.
   Make the following settings (keep the default settings for all other parameters):
   “File name”: FP0R_RS232
   “COM interface/station number”: RS232, 0
   “Trigger cycle time”: 300 (a new value is logged every 5min)
2. Go to “Data point settings”, select “Add new”, and select the new data point from the list.
   Make the following settings:
   “Data point name”: Temperature
   “Unit”: C
   “COM interface”: RS232, “Station number”: 0
   “Register type”: “Momentary value”, “Memory area”: DT
   “Register address”: 100
   “Data format”: “INT (16 bits, signed)”
   “Decimal”: 2
3. Save your configuration.

Configure data logging for KW2M

1. Go to “Log file settings”, select “Add new”, and open the new configuration.
   Make the following settings (keep the default settings for all other parameters):
   “File name”: KW2M_ETHERNET_70
   “COM interface/station number”: ETHERNET, 70 (station number 70 corresponds to the last octet of the target IP address)
   “Trigger cycle time”: 300 (a new value is logged every 5min)
2. Go to “Data point settings”, select “Add new”, and select the new data point from the list.
   Make the following settings:
   “Data point name”: Energy
   “Unit”: kWh
   “COM interface”: ETHERNET, “Station number”: 70
   “Register type”: “Momentary value”, “Memory area”: DT
   “Register address”: 112
   “Data format”: “UINT64 (64 bits, unsigned)”
   “Decimal”: 3
3. Go to “Log file settings”, select “Add new”, and open the new configuration.

Make the following settings (keep the default settings for all other parameters):
“File name”: KW2M_ETHERNET_71
“COM interface/station number”: ETHERNET, 71 (station number 71 corresponds to the last octet of the target IP address)
“Trigger cycle time”: 300 (a new value is logged every 5min)

4. Go to “Data point settings”, select “Add new”, and select the new data point from the list.
   Make the following settings:
   “Data point name”: Energy
   “Unit”: kWh
   “COM interface”: ETHERNET, “Station number”: 71
   “Register type”: “Momentary value”, “Memory area”: DT
   “Register address”: 112
   “Data format”: “UINT64 (64 bits, unsigned)”
   “Decimal”: 3
5. Save your configuration.

Configure data logging for KW9M

1. Go to “Log file settings”, select “Add new”, and open the new configuration.
   Make the following settings (keep the default settings for all other parameters):
   “File name”: KW9M_RS485_1
   “COM interface/station number”: RS485/232, 1
   “Trigger cycle time”: 300 (a new value is logged every 5min)
2. Go to “Data point settings”, select “Add new”, and select the new data point from the list.
   Make the following settings:
   “Data point name”: Energy
   “Unit”: kWh
   “COM interface”: RS485/232, “Station number”: 1
   “Register type”: “Momentary value”, “Memory area”: DT
   “Register address”: 106
   “Data format”: “UDINT (32 bits, unsigned)”
   “Decimal”: 2
3. Go to “Log file settings”, select “Add new”, and open the new configuration.
   Make the following settings (keep the default settings for all other parameters):
   “File name”: KW9M_RS485_2
   “COM interface/station number”: RS485/232, 2
   “Trigger cycle time”: 300 (a new value is logged every 5min)
4. Go to “Data point settings”, select “Add new”, and select the new data point from the list.
   Make the following settings:
   “Data point name”: Energy
   “Unit”: kWh

“COM interface”: RS485/232, “Station number”: 2

“Register type”: “Momentary value”, “Memory area”: DT

“Register address”: 106

“Data format”: “UDINT (32 bits, unsigned)”

“Decimal”: 2

5. Save your configuration.

Related topics

Import variables from CSV files (page 44)

5.6 Import variables from CSV files

Instead of adding single data points, you can import CSV files.

The following restrictions apply:

- A maximum of 700 variables can be imported. Entries beyond this number will be ignored.
- Data point names that are longer than 30 characters will be cut during import.
- The data types DT, LD, FL, R, Y, and X can be imported. Other data types (e.g. WR, WL, WX, WY) are skipped and an error message is displayed when the import is finished.

Use the default import settings to import variables that have been exported in Control FPWIN Pro7 with the default settings.

1. Make general log settings and configure the log file.
2. Go to “Import variables from CSV”.
   If you want to change the default settings, select “Show import settings”.
   - Select a separator from the “Separator” list box.
   - Select “Header rows” if your CSV file contains header rows.
     Specify the number of header rows in the CSV file. By default, CSV files have one header row in Control FPWIN Pro7.
     If the header settings do not match your file's header, header rows will not be imported correctly.
3. Specify the number of the column containing the data point name, the FP address, the data type, and a comment.
   - “Data point name”
     Specify the number of the column containing the data point name. The default column number in Control FPWIN Pro7 is 2 (starting with column 1).
   - “FP address”
     Specify the number of the column containing the FP address (e.g. DT100, R10). The default column number in Control FPWIN Pro7 is 4 (starting with column 1).
   - “Data type”

Specify the number of the column containing the data type (e.g. INT, BOOL). The default column number in Control FPWIN Pro7 is 5 (starting with column 1).

- “Comment”

  Specify the number of the column containing the comment. The default column number in Control FPWIN Pro7 is 7 (starting with column 1). The comment may contain data point settings (type, decimal, endian, unit, enable_scal, scale_plc_min, scale_plc_max, scale_log_min, scale_log_max) in a JSON format. Export a file for an example.

4. Drag a file onto the drag and drop area or select a CSV file with the “+” icon.
   A new table view appears when the CSV file has been successfully read.
5. To filter entries in the CSV file, enter any text string in the “Filter” text box (visible after a CSV file has been loaded).
   The text is searched in all columns of the selected CSV file.
6. Select a log file with “Import to configuration”.
   The variables from the CSV file are imported into this log configuration.
7. Select the desired entries and click “Import selection”, or click “Import all” to import all entries from the CSV file.

Related topics

Configure data logging (page 41)

5.7 List and download log files

Use this function to generate a list of all log files and to download individual log files.

1. Go to “Data Logger” > “List and download log files”.
2. Select the file storage area of the log files, and click “List files” to list all files available.
3. To download a single file, click on the file name. To download all files, select “Download all files”.
   This button is disabled if no log file is available.
   With “Download all files”, all log files will be saved in a zipped file.
4. To delete one or more entries from the list, select the desired check boxes and click “Delete selection”. To delete all entries, select “Delete all”.
   These buttons are disabled if no files are listed.

6 Example: HTTP connection to a cloud server

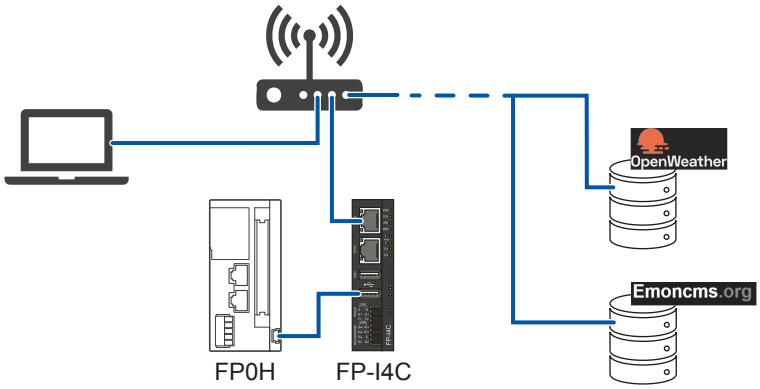
6.1 Functional overview

When you use the FP-I4C unit as an HTTP client, you can use the HTTP GET and HTTP POST methods to exchange data with a cloud server. A PLC is needed to control the send and receive operations.

In this sample application, weather data is collected from the online service OpenWeather and forwarded to a dashboard provided by Emoncms.org (both offer free access). The FP-I4C unit receives the commands via USB/MEWTOCOL from the PLC. The FP-I4C library for Control FPWIN Pro7 offers ready-made function blocks that support the HTTP client service.

OpenWeather content and data are licensed under https://creativecommons.org/licenses/by-sa/4.0/.

Emoncms.org content and data are licensed under https://www.gnu.org/licenses/agpl-3.0.html.



Configuration

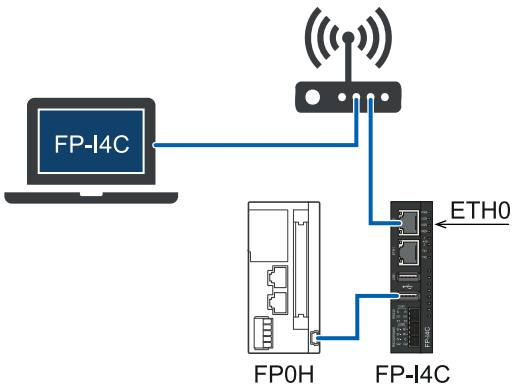
- The FP-I4C unit and a PC are connected to the Internet. They obtain their IP addresses from a DHCP server.
- An FP0H PLC is connected to the FP-I4C unit via USB.

Step-by-step instructions

1. Connect the devices (page 47)
   Connect an FP0H PLC to the USB port of the FP-I4C unit, and connect a PC and the FP-I4C unit to the Internet.
2. Make FP-I4C settings (page 48)
   Make the communication settings for the FP-I4C unit, configure the HTTP client, and download the sample files for Control FPWIN Pro7.
3. Set up the programming examples (page 50)
   The programming examples use ready-made function blocks for the HTTP client service to collect data from a weather server and forward it to a dashboard server.
4. Get weather data from a cloud server (page 51)
   Use the sample program to collect data from a weather server.
5. Forward weather data to a dashboard (page 52)
   Use the sample program to collect data from a weather server and transmit the data to a dashboard server.
6. Minimize security risks (page 53)
   To minimize security risks, you should take a few precautionary measures.

6.2 Connect the devices

Connect an FP0H PLC to the USB port of the FP-I4C unit, and connect a PC and the FP-I4C unit to the Internet.



- Connect the USB port of the FP0H PLC to the USB port of the FP-I4C unit.
- Connect the FP-I4C unit and your PC to the network, and set the IP address of the FP-I4C unit.

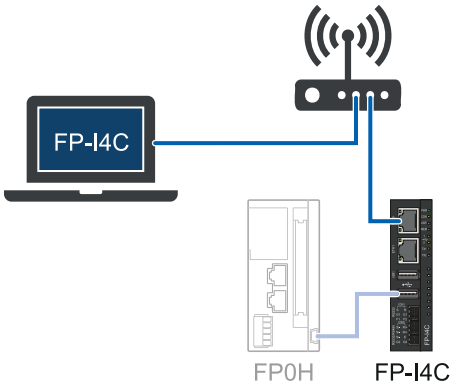
  Because we use a DHCP server, connect the LAN cable to the ETH0 connector of the FP-I4C unit.

Related topics

Connect the FP-I4C unit to a PC via DHCP server (page 30)

6.3 Make FP-I4C settings

Make the communication settings for the FP-I4C unit, configure the HTTP client, and download the sample files for Control FPWIN Pro7.



This task includes the following steps:

1. Make the FP-I4C communication settings
   Use the PLC connection wizard to enable the COM3 USB interface for communication with the FP0H PLC and to configure a redirect from the TCP port to the USB interface.
2. Configure the HTTP client
   To set up the FP-I4C unit to function as an HTTP client, you need to enable the function and specify a memory area in the PLC for the DUT that handles the data exchange.
3. Download the sample files

Make the FP-I4C communication settings

1. Start HMWIN Studio to find out the IP address of the FP-I4C unit.
2. Go to “Run” > “Manage Target” and select the “Board” tab.
   In the device list of your DHCP network you can find the IP address of theFP-I4C unit. If there are multiple devices in the list, compare the MAC address to the MAC address of the ETH0 connector to find the right device. The MAC address is printed on a label that can be found on the unit's housing.
3. Open your browser and enter the URL `https://[IP address]/machine_config`. Replace `[IP address]` with the IP address of your FP-I4C unit (e.g. `https://192.168.100.10/machine_config`).

Depending on your browser, an insecure connection warning may be displayed. Follow the instructions in your browser to accept the connection. You will then be forwarded to the Web interface of the FP-I4C unit.

4. Log in with the default or your modified administrator credentials.
5. Select “Application Settings” to go to the application settings area.
6. Go to “COM Interface” and select “Start wizard”.
7. Select “Simple mode” and “Continue”.
8. Select “COM3 USB” and “Continue”.
9. Enter port number 9096 (or any other port between 1025 and 65535).
10. Select “Finish”.

    All packages received on the specified port are now forwarded to the PLC via the serial interface.
11. Save your configuration.

Configure the HTTP client

1. Go to the “HTTP Client” page and enable the HTTP client function.
2. Specify free DT registers in the user area of the PLC that can be used to control data transmission.

   The same address must be set in the corresponding DUT of the programming example.

   The server IP address and the login parameters are set in the PLC. Do not enter any data in these fields in this example.

   Do not enable “Use HTTPS” for now. If you want to establish a secure connection later, specify at least a list of CA root certificates. For more information, please refer to your HTTP server provider.
3. Save your configuration.

Download the sample files

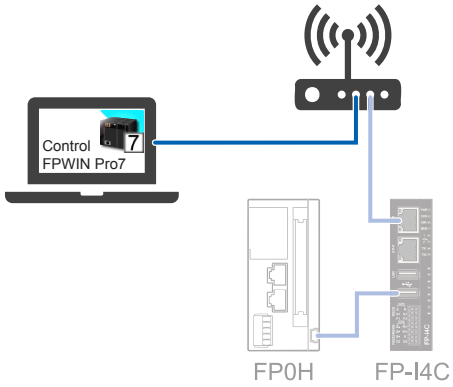
Download the FP-I4C library for Control FPWIN Pro7 and the HTTP client example by clicking on the two “Save to PC” buttons.

Related topics

Connect the FP-I4C unit to a PC via DHCP server (page 30)

6.4 Set up the programming examples

The programming examples use ready-made function blocks for the HTTP client service to collect data from a weather server and forward it to a dashboard server.



Download the FP-I4C library and the programming example for Control FPWIN Pro7 on the “HTTP Client” page.

1. Unzip the downloaded library and sample files.
2. Double-click the file `HTTPC_example.pce` to open the sample project in Control FPWIN Pro7.

   The library is automatically installed when the project is opened.

   The project contains different sample POUs. These POUs contain all settings required to establish a connection with a weather server.
3. Go to “Online” > “Communication settings... ”.

   Make the following settings:

   “Connection type”: “Ethernet”

   “Configuration name”: Enter a name for your Ethernet connection.

   “Use ET-LAN unit”: Disabled

   “PC settings”:

   - “IP address”: 0.0.0.0
   - “Port number”: 0

   “Destination settings”:

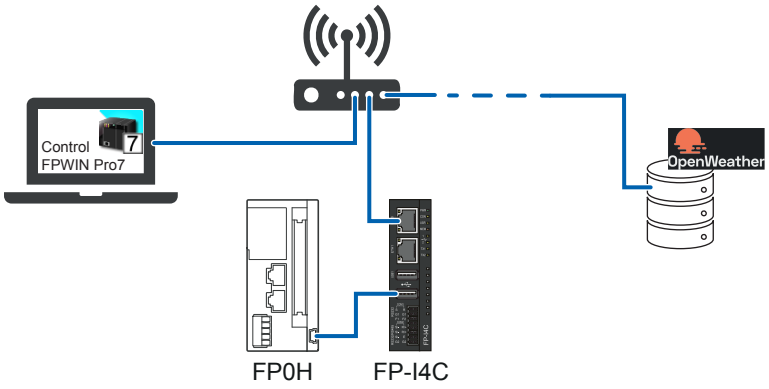
   - “IP address”: Enter the IP address of the FP-I4C unit.
   - “Port number”: Enter the port number of the FP-I4C unit (in this example 9096).

   “Communication timeout (s)”: 15s

   “Connection timeout (s)”: 60s

6.5 Get weather data from a cloud server

Use the sample program to collect data from a weather server.



In this example, we will use the POU "Easy_HTTP_Client". This POU contains all settings required to establish a connection with a weather server.

Prepare and compile the PLC program:

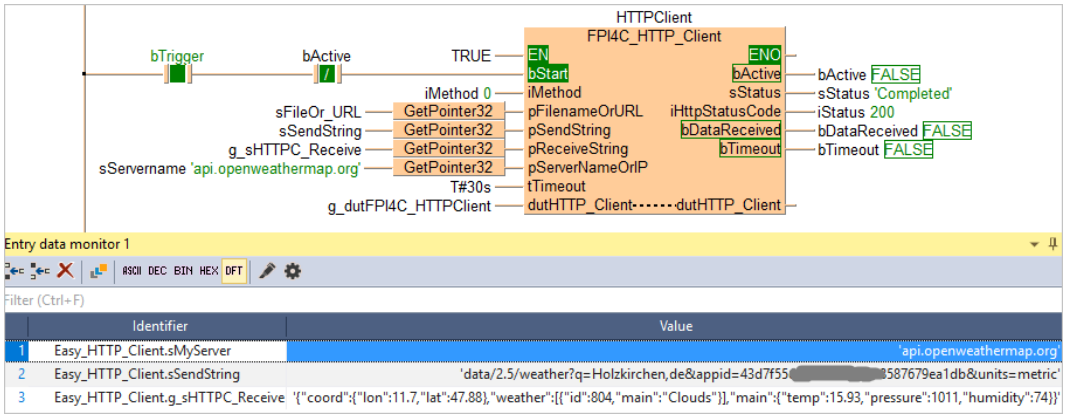
- Make sure that the POU "Easy_HTTP_Client" is the only POU assigned to the program task.
- Replace the value for the parameter **appid** in the variable **sMyCommandToSend** with your API key.

  You must register on the home page of the provider (api.openweathermap.org) to get your own API key.
- Specify the start address of the **g_dutFPI4C_HTTPClient** DUT in the global variable list. The default setting is DT240. (If you kept the default value DT240 on the "HTTP client" page, you do not need to change the address.)

  The project is now ready to be compiled and transmitted to the PLC.
- Select “Online” > “Online mode”, then “Compile all...” and “Download program code and PLC configuration to PLC” to transmit the program to the PLC.

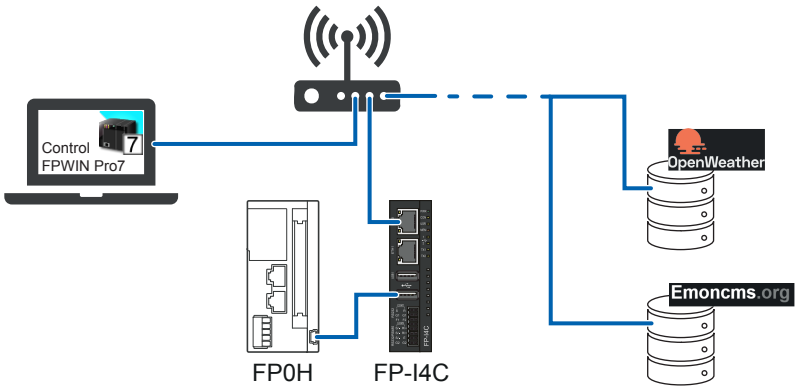
Start communication with the weather server and monitor your POU:

- Double-click on the variable **bTrigger** to turn the value of the Boolean variable to TRUE. Communication with the weather server starts and weather data is received.
- Select “Monitor” > “Entry data monitor” to monitor your POU.
  If the communication is working properly, you can read the weather data in the string variable **g_sHTTPC_Receive**.



6.6 Forward weather data to a dashboard

Use the sample program to collect data from a weather server and transmit the data to a dashboard server.



In this example, we will use the POU "Weather_Power_Values_EMONCMS_GET_Method". This POU contains all settings required to establish a connection with a weather server. (Depending on the HTTP server you choose, you can also use the POU "Weather_Power_Values_EMONCMS_POST_Method". Emoncms.org supports both methods.)

Prepare and compile the PLC program:

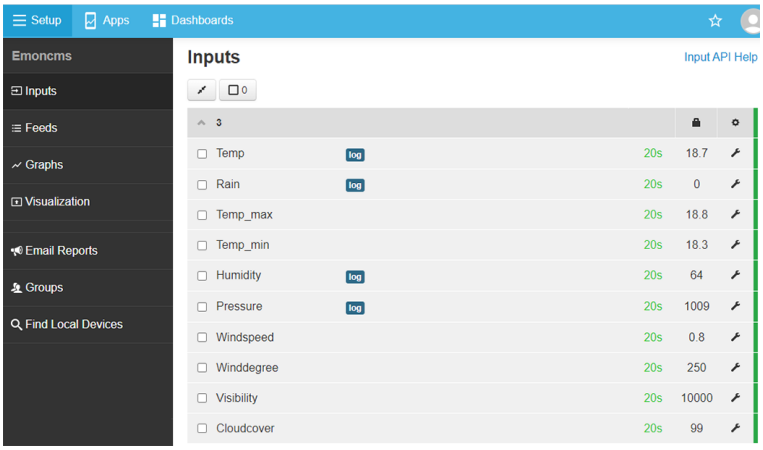
- Make sure that the POU "Weather_Power_Values_EMONCMS_GET_Method" is the only POU assigned to the program task.
- Replace the value for the parameter **appid** in the variable **sFileOr_URL** with your API key of the weather data server (registration on api.openweathermap.org required).
- Replace the value of the variable **sEmoncmsAPIKey** of this POU with your API key of the dashboard server (registration on emoncms.org required).

  The project is now ready to be compiled and transmitted to the PLC.
- Select “Online” > “Online mode”, then “Compile all...” and “Download program code and PLC configuration to PLC” to transmit the program to the PLC.

Start communication with the weather server and the dashboard server:

- Double-click on the variable **bTrigger** to turn the value of the Boolean variable to TRUE. First, communication with the weather server starts and weather data is received. Then the HTTP client transmits weather information to the dashboard server.

  If the communication is working properly, the weather data is displayed in your Emoncms profile and workspace. Please refer to the tutorials on the Emoncms Web site for details on how to configure your workspace.



6.7 Minimize security risks

To minimize security risks, you should take a few precautionary measures.

- Change the default passwords of the FP-I4C unit to new and more complex passwords.
- Be sure that only those FP-I4C services are enabled that are actually used by your application.
- Use encrypted transmission methods for your communication. A root CA certificate list or self-signed certificates help to ensure that you are communicating with the correct server. Please be aware that public root CA certificate lists expire after a certain time.

7 Example: Web-based data visualization

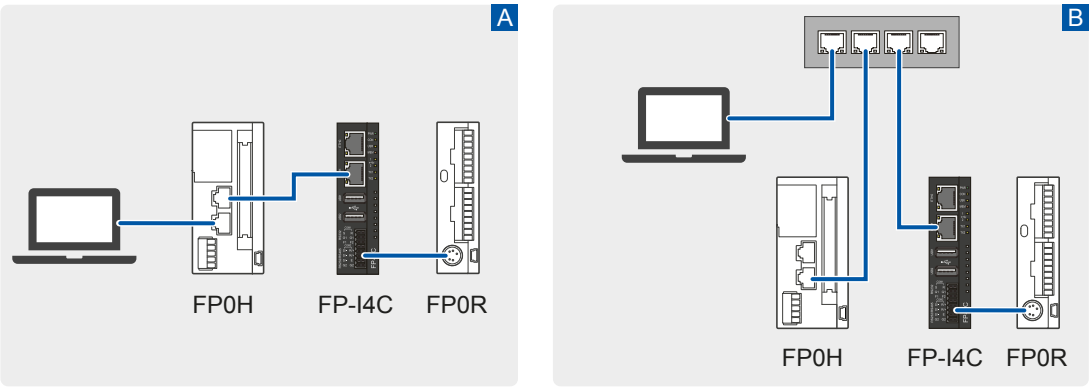
7.1 Functional overview

The FP-I4C unit can be used as a Web server to visualize data from different sources.

In this sample application, two Panasonic PLCs are connected to the FP-I4C unit. You will learn how to create a simple Web page that displays data from these PLCs in a browser.

An FP0R PLC is connected via RS232C and MEWTOCOL, and an FP0H PLC is connected via Ethernet and Modbus TCP.

To create the Web pages and store them in the FP-I4C unit, use HMWIN Studio version 4.0 or newer. The software is available free of charge in our Panasonic Download Center.



A: Direct connection of the devices, B: Connection using a network switch

Configuration

- The FP-I4C unit has the fixed IP address 192.168.0.1.
- The FP0H PLC has the IP address 192.168.0.21. Two server connections have been enabled for Modbus TCP, one for data communication via port 502 and another one to control the PLC via port 9094.
- The FP0R PLC is connected to the FP-I4C unit with its TOOL port (115200 baud, odd parity, MEWTOCOL-COM protocol).
- The PC has the static IP address 192.168.0.10.

Step-by-step instructions

1. Configure the FP0H PLC (page 55)
   Make the communication settings for the PLC in Control FPWIN Pro7.
2. Connect the FP0R PLC to the FP-I4C unit (page 56)
   Connect the FP0R and FP-I4C units and make the TOOL port settings for the PLC.

3. Connect the PC and the FP0H PLC to the FP-I4C unit (page 57)
   Use a LAN cable to connect your PC, the FP0H PLC, and the FP-I4C unit, either directly or via a network switch.

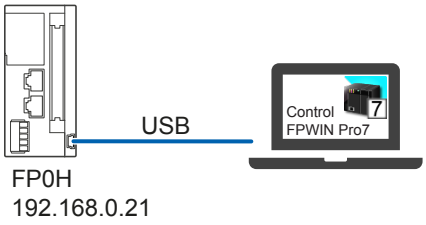
4. Make FP-I4C settings (page 57)
   Make the communication settings for the COM1 RS232 interface and configure a redirection from the TCP port to the COM1 RS232 interface.

5. Create a Web page (page 59)
   Use HMWIN Studio to configure the PLC connections and to create a Web page that shows the status of four PLC variables.

6. Import variables in HMWIN Studio (page 62)
   If you do not want to enter the variables manually, you can import them from a Control FPWIN Pro7 export file.

7.2 Configure the FP0H PLC

Make the communication settings for the PLC in Control FPWIN Pro7.



(Replace the IP addresses in this example with the addresses that match your network configuration.)

1. Connect your PC to the PLC, e.g. with a USB cable, and turn on the power of the PLC.
2. Start the Control FPWIN Pro7 programming software to set the IP address in the FP0H PLC and configure the Ethernet connection.
3. Open or create a Control FPWIN Pro7 project and make sure the set PLC type is an FP0H PLC.
4. Go to “PLC” > “System registers” > “Ethernet” > “IP addresses”.
   Make the following settings:
   “Automatically obtain IPv4 address”: “No” (we need a static IP address)
   “IPv4 address”: “192.168.0.21” (must be on the same subnet as the FP-I4C unit)
   “IPv4 subnet mask”: “255.255.255.0”
5. Go to “PLC” > “System registers” > “Ethernet” > “User connections”.
   Make the following settings:
   “User connection 1”: “Enabled”
   “Communication mode”: “Modbus TCP master/slave”

“Communication method”: “TCP/IP”

“Open method”: “Server connection (unspecified partner)”

“Source port number”: “502”

TCP port 502 will be used for data communication.

6. Go to “PLC” > “System registers” > “Ethernet” > “System connections”.

   Make the following settings:

   “System connection 1”: “Enabled” (there is just one system connection for the FP0H PLC)

   “Communication mode”: “MEWTOCOL-COM slave”

   “Communication method”: “TCP/IP”

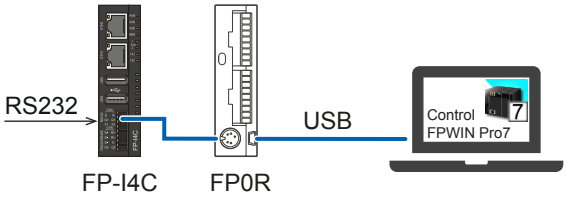
   “Open method”: “Server connection (unspecified partner)”

   “Source port number”: “9094”

   TCP port 9094 will be used to control the PLC from a remote PC.

7.3 Connect the FP0R PLC to the FP-I4C unit

Connect the FP0R and FP-I4C units and make the TOOL port settings for the PLC.



1. Connect the TOOL port of the FP0R PLC to the COM1 RS232 interface of the FP-I4C unit, e.g. using cable AIGT8192 (see "Related topics").
2. Connect your PC to the PLC, e.g. with a USB cable, and turn on the power of the PLC.
3. Start the Control FPWIN Pro7 programming software to configure the TOOL port of the PLC.
4. Open or create a Control FPWIN Pro7 project and make sure the set PLC type is an FP0R PLC.
5. Go to “System registers” > “Serial ports” > “TOOL”.

   Make the following settings:

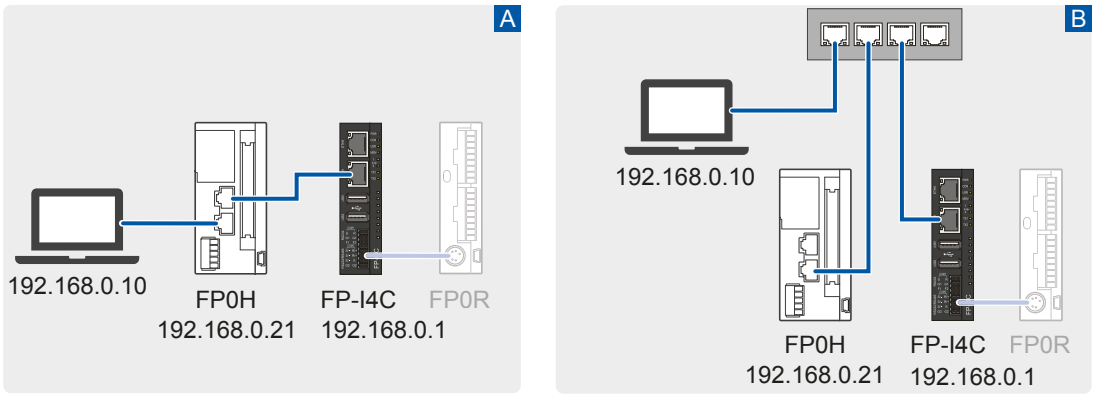
   “Communication mode”: “MEWTOCOL-COM slave”, “Station number”: “1”, “Baud rate”: “115200”, “Data length”: “8 bits”, “Parity”: “Odd”, “Stop bits”: “1 bit”
6. When you have completed your settings, transfer the configuration to the PLC.

Related topics

Connection to PLC TOOL port using cable AIGT8192 (page 23)

7.4 Connect the PC and the FP0H PLC to the FP-I4C unit

Use a LAN cable to connect your PC, the FP0H PLC, and the FP-I4C unit, either directly or via a network switch.



Direct connection of the devices (A)

1. Connect the PC with either one of the two Ethernet ports of the FP0H PLC.
2. Connect the other Ethernet port of the FP0H PLC with ETH1 of the FP-I4C unit.
3. Set the IP address of the PC to 192.168.0.10 (see "Related topics"). The PC must be on the same subnet as the FP-I4C unit.

Connection using a network switch (B)

1. Connect the PC with the network switch.
2. Connect one of the two Ethernet ports of the FP0H PLC with the network switch.
3. Connect ETH1 of the FP-I4C unit with the network switch.
4. Set the IP address of the PC to 192.168.0.10 (see "Related topics"). The PC must be on the same subnet as the FP-I4C unit.

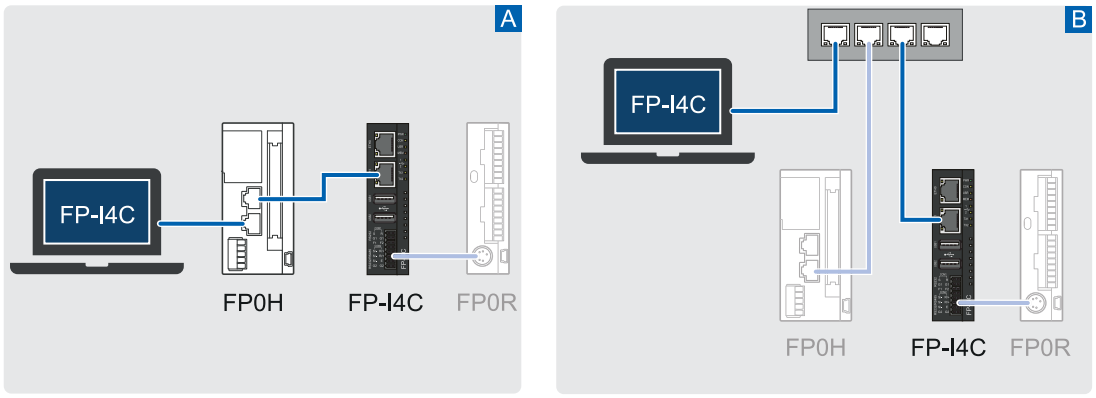
Related topics

Connect the FP-I4C unit directly to a PC (page 29)

7.5 Make FP-I4C settings

Make the communication settings for the COM1 RS232 interface and configure a redirection from the TCP port to the COM1 RS232 interface.

Connect your PC to the FP0H PLC or to the network switch to configure the FP-I4C unit.



A: Direct connection of the devices, B: Connection using a network switch

1. Open your browser and enter the URL `https://192.168.0.1/fp_config`.

   Depending on your browser, an insecure connection warning may be displayed. Follow the instructions in your browser to accept the connection. You will then be forwarded to the Web interface of the FP-I4C unit.

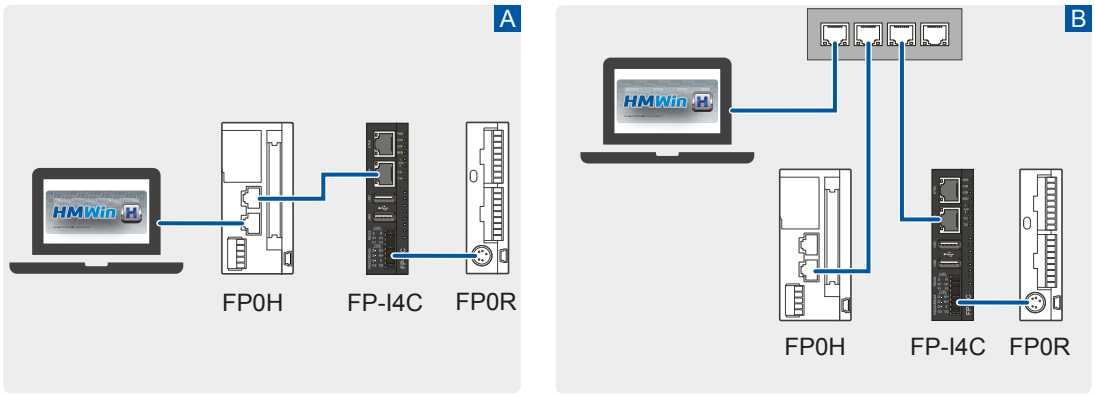
2. Log in with the default or your modified administrator credentials.
3. Select “Application Settings” to go to the application settings area.
4. Go to “COM Interface” and select “Start wizard”.
5. Select “Simple mode” and “Continue”.
6. Select “COM1 RS232” and “Continue”.
7. Select a baud rate of 115200 and “Odd” parity.
8. Enter port number 9094.
9. Select “Finish”.

   All packages received on the specified port are now forwarded to the PLC via the serial interface.

10. Save your configuration.

7.6 Create a Web page

Use HMWIN Studio to configure the PLC connections and to create a Web page that shows the status of four PLC variables.



A: Direct connection of the devices, B: Connection using a network switch

HMWIN Studio uses tags to display PLC variables. Tags contain information about the memory location and data type of the variables.

In this example, we define two tags for each PLC:

- For the FP0R PLC, we define a Boolean tag for a 1s clock pulse and an integer tag for the current value of a ring counter that is increased by one every 2.5ms.
- For the FP0H, we define a Boolean tag for the digital output Y0 and an integer tag for the current value of the memory area DT0.

The Web page will contain two lamps to visualize the Boolean values and two numeric fields to display the integer values.

Special flags and special data registers cannot be accessed directly by Modbus TCP but must be moved to an accessible memory area first. Refer to the Control FPWIN Pro7 online help for system variables and the corresponding address offsets.

This task includes the following steps:

1. Configure the PLC connections
2. Create tags for PLC variables
3. Create a simple Web page

Configure the PLC connections

1. Start HMWIN Studio and select “File” > “New project” to start the project wizard.
2. Enter a project name and click “Next”.
3. Select the FP-I4C device and click “Next”.

4. Select “Unified” and click “Finish” to complete the creation of the new project.
5. Go to “ProjectView” > “Configuration” and double-click “Protocols”.
6. Make settings for the protocol used by the FP0R PLC:
   a. Click the “+” icon and select “Panasonic FP/FP7”.
      Make the following settings:
      “PLC network”: Deactivated
      “Alias”: “FP0R”
      “Node ID”: “1”
      “Media”: “Ethernet”
      “Request delay (ms)”: “0”
      “IP address”: “127.0.0.1” (localhost)
      “Port”: “9094” (must match the specified port redirection in the FP-I4C unit)
      “Timeout (ms)”: “500”
      “PLC models”: “FP”
   b. Select “OK”.
7. Make settings for the protocol used by the FP0H PLC:
   a. Click the “+” icon and select “Modbus TCP”.
      Make the following settings:
      “PLC Network”: Deactivated
      “Alias”: “FP0H”
      “IP address”: “192.168.0.21” (must match the IP address setting in Control FPWIN Pro7)
      “Port”: “502”
      “Use UDP/IP”: Deactivated
      “Encapsulated RTU”: Deactivated
      “Timeout (ms)”: “2000”
      “Server busy timeout”: “0”
      “Busy retry time (ms)”: “20”
      “Modbus ID”: “1”
      “Max. read bit block”: “2000”
      “Write holding registers”: “16”
      “Write coils”: “15”
      “PLC models”: “Generic Modbus (0 based)”
   b. Select “OK”.

Create tags for PLC variables

1. Go to “ProjectView” and double-click “Tags”.
2. Create tags for the protocol used by the FP0R PLC:
   a. Select the FP0R protocol and click the “+” icon to add a new tag.
      Make the following settings:

“Memory type”: “R - Internal rel”

“Offset”: “901”

“Data type”: “Boolean”

“SubIndex”: “0x0C”

b. Select “OK” and rename the tag to **Pulse1s**.

c. Click the “+” icon to add another tag.

Make the following settings:

“Memory type”: “DT - Data reg”

“Offset”: “90019”

“Data type”: “short” (corresponds to INT in the PLC)

d. Select “OK” and rename the tag to **RingCounter_2ms5**.

3. Create tags for the protocol used by the FP0H PLC:

a. Select the FP0H protocol and click the “+” icon to add a new tag.

Make the following settings:

“Memory type”: “Coil status”

“Offset”: “1” (corresponds to Y0 of the PLC)

“Data type”: “Boolean”

b. Select “OK” and rename the tag to **DigitalOutput_Y0**.

c. Click the “+” icon to add another tag.

Make the following settings:

“Memory type”: “Holding registers” (corresponds to DT in the PLC)

“Offset”: “400000” (corresponds to DT0 in the PLC, 400001 is DT1 etc.)

“Data type”: “short” (corresponds to INT in the PLC)

d. Select “OK” and rename the tag to **DataRegister_DT0**.

Create a simple Web page

1. Go to “ProjectView” > “Unified” > “Normal” and double-click “1 : Page1”.

2. Go to “View” > “Toolbars and Docking Windows” > “Widget Gallery” to open a collection of HMI objects.

The widget gallery is divided into several categories. Simply drag a widget on the page of your project.

3. Add two numeric fields:

a. Go to the “Basic” > “Text/Numeric” category in the widget gallery.

b. Drag the “99999” widget on the page.

c. Go to the “Properties” panel and select the “+” icon in the “Value” field to add a tag to the widget.

d. Select the **RingCounter_2ms5** tag and click “OK”.

e. To add a label to your widget, drag the “[Label]” widget next to the “99999” widget and enter "FP0R RingCounter_2ms5" in the “Text” field of the “Properties” panel.

f. Repeat the procedure for the **DataRegister_DT0** tag and add the label "FP0H DataRegister_DT0".

4. Add two lamps:
   a. Go to the “Symkeys” > “HM Symkeys real elements” category in the widget gallery.
   b. Drag a lamp widget on the page.
   c. Go to the “Properties” panel and select the “+” icon in the “Value” field.
   d. Select the **Pulse1s** tag and click “OK”.
   e. Add the label "FP0R Pulse1s".
   f. Repeat the procedure for the **DigitalOutput_Y0** tag and add the label "FP0H DigitalOutput_Y0".
5. Select “Run” > “Download to Target” to transfer the page to the FP-I4C unit.

   HMWIN Studio searches for all units on the same subnet. Select your device and click “Download”.

   The first time you perform a download, HMWIN Studio will ask you to install the HMI Runtime on your FP-I4C unit. The installation takes approximately 2 minutes. Then the unit will automatically reboot.
6. Display the Web page by entering the IP address of your FP-I4C unit (192.168.0.1) in your browser.

7.7 Import variables in HMWIN Studio

If you do not want to enter the variables manually, you can import them from a Control FPWIN Pro7 export file.

1. To export the variables from Control FPWIN Pro7, go to “Project” > “Export” > “Variables as CSV file” > “Global variables”.
2. To import the variables in HMWIN Studio, go to “Configuration” and double-click on “Tags”.
3. Select the desired protocol and click the Import Dictionary icon to start the import.

4. Select the Control FPWIN Pro7 import type and the CSV file to be imported.

   The available variables are listed in gray color.
5. Select the variables you want to import and click the Import Tags icon.

   All imported tags are now listed in black color.

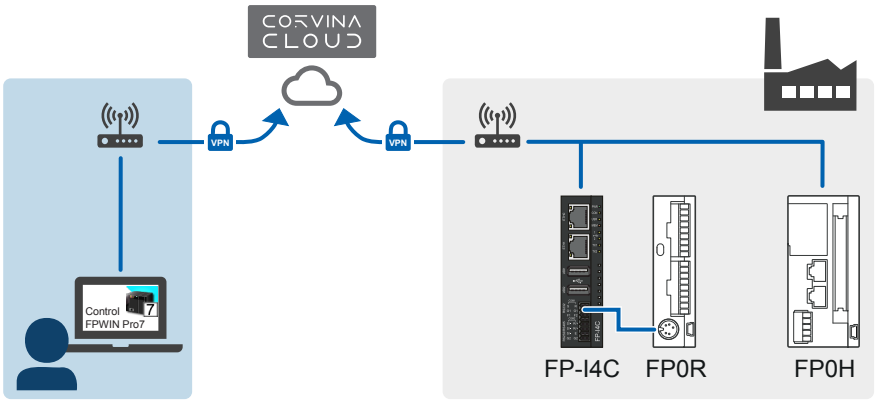
8 Example: Remote control with Corvina Cloud

8.1 Functional overview

Corvina Cloud is a software platform that allows to remotely manage different devices via a secured VPN connection from anywhere in the world.

In this sample application, the FP-I4C unit serves as gateway to communicate with two PLCs from a remote PC. An FP0R PLC is connected using its RS232C interface, and an FP0H PLC is connected to the same network via Ethernet.

To purchase a license for Corvina Cloud and obtain administrator credentials, please contact one of our sales offices.



Configuration

- The FP-I4C unit has the static IP address 192.168.100.10.
- The FP0H PLC has the IP address 192.168.100.11. A server connection has been enabled to allow remote control of the PLC.
- The FP0R PLC is connected to the FP-I4C unit with its TOOL port (115200 baud, odd parity, MEWTOCOL-COM protocol).
- The PC is on the control side (e.g. office, home). The Corvina Cloud Connect app is installed on the computer.
- The PC is running in a network without proxy server or blocking of outbound ports.

Step-by-step instructions

1. Connect the FP0H PLC to the network (page 64)
   Connect the LAN cable and make the Ethernet settings for the PLC.
2. Connect the FP0R PLC to the FP-I4C unit (page 65)
   Connect the FP0R and FP-I4C units and make the TOOL port settings for the PLC.

3. Connect the FP-I4C unit to the network (page 66)
   Make the physical network connection, set a static IP address, enable the router function, and configure the RS232 COM1 interface to the FP0R PLC.

4. Configure the Corvina Cloud (page 68)
   Go to the Corvina Cloud Web Portal to configure the Corvina Cloud.

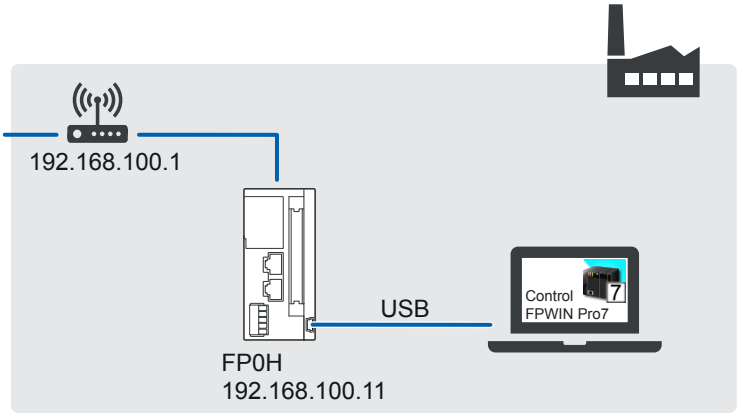
5. Connect the FP-I4C unit to the Corvina Cloud (page 70)
   Make the server settings required to connect to the Corvina Cloud.

6. Connect the PC to the Corvina Cloud (page 71)
   This step requires that you install the Corvina Cloud Connect app on the PC that makes the remote connection to the PLCs.

7. Connect the PLCs with the cloud (page 72)
   Establish an online connection between Control FPWIN Pro7 and the PLCs.

8.2 Connect the FP0H PLC to the network

Connect the LAN cable and make the Ethernet settings for the PLC.



(Replace the IP addresses in this example with the addresses that match your network configuration.)

1. Use a LAN cable to connect either one of the two Ethernet ports of the FP0H PLC with the router.
   The router has the default gateway IP address 192.168.100.1.
2. Connect your PC to the PLC, e.g. with a USB cable, and turn on the power of the PLC.
3. Start the Control FPWIN Pro7 programming software to set the IP address in the FP0H PLC and configure the Ethernet connection.
4. Open or create a Control FPWIN Pro7 project and make sure the set PLC type is an FP0H PLC.
5. Go to “PLC” > “System registers” > “Ethernet” > “IP addresses”.
   Make the following settings:
   “Automatically obtain IPv4 address”: “No” (we need a static IP address)

“IPv4 address”: “192.168.100.11”

“IPv4 subnet mask”: “255.255.255.0”

“ IPv4 default gateway”: “192.168.100.1”

“Preferred DNS server IPv4 address”: “192.168.100.1”

6. Go to “PLC” > “System registers” > “Ethernet” > “System connections”.

   Make the following settings:

   “System connection 1”: “Enabled” (there is just one system connection for the FP0H PLC)

   “Communication mode”: “MEWTOCOL-COM slave”

   “Communication method”: “TCP/IP”

   “Open method”: “Server connection (unspecified partner)”

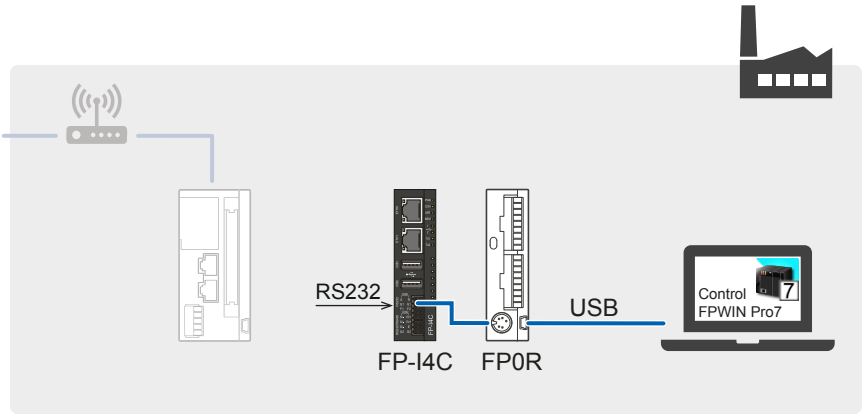
   “Source port number”: “9094”

   TCP port 9094 will be used to control the PLC from a remote PC.

7. When you have completed your settings, transfer the configuration to the PLC.

8.3 Connect the FP0R PLC to the FP-I4C unit

Connect the FP0R and FP-I4C units and make the TOOL port settings for the PLC.



1. Connect the TOOL port of the FP0R PLC to the COM1 RS232 interface of the FP-I4C unit, e.g. using cable AIGT8192 (see "Related topics").
2. Connect your PC to the PLC, e.g. with a USB cable, and turn on the power of the PLC.
3. Start the Control FPWIN Pro7 programming software to configure the TOOL port of the PLC.
4. Open or create a Control FPWIN Pro7 project and make sure the set PLC type is an FP0R PLC.
5. Go to “System registers” > “Serial ports” > “TOOL”.

   Make the following settings:

   Communication mode: “MEWTOCOL-COM slave”, “Station number”: “1”, “Baud rate”: “115200”, “Data length”: “8 bits”, “Parity”: “Odd”, “Stop bits”: “1 bit”

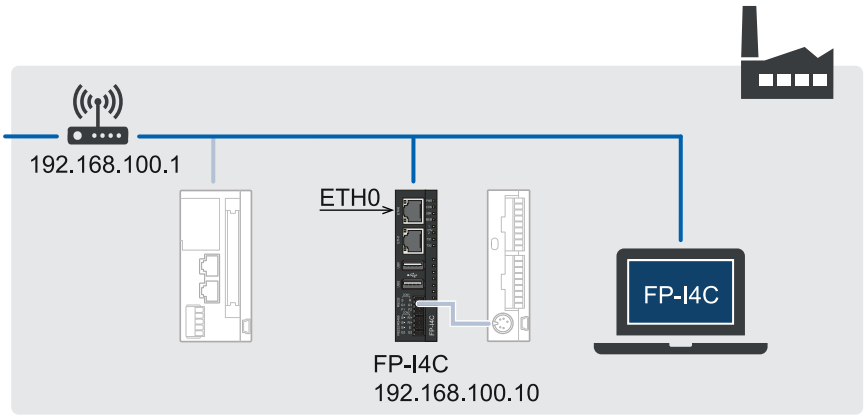
6. When you have completed your settings, transfer the configuration to the PLC.

Related topics

Connection to PLC TOOL port using cable AIGT8192 (page 23)

8.4 Connect the FP-I4C unit to the network

Make the physical network connection, set a static IP address, enable the router function, and configure the RS232 COM1 interface to the FP0R PLC.



This task includes the following steps:

1. Make the physical connection
2. Set a static IP address
   In a network with a DHCP server, the IP address may change over time. For our application, we need a static IP address.
3. Enable the router function
   The router function is needed to forward incoming packages to the FP0H PLC.
4. Configure the FP-I4C unit's RS232 COM1 interface to the FP0R PLC

(Replace the IP addresses in this example with the addresses that match your network configuration.)

Make the physical connection

1. Connect a LAN cable from the router to the FP-I4C unit. Use the top ETH0 connector, which is set to DHCP by default.
2. Connect your PC to the same router to find out the IP address of the FP-I4C unit and to configure the unit.

   Follow the instructions on how to connect the FP-I4C unit via DHCP server (see "Related topics").

Set a static IP address

1. Open your browser and enter the URL `https://[IP address]/machine_config`. Replace `[IP address]` with the IP address of your FP-I4C unit (e.g. `https://192.168.100.10/machine_config`).
2. Log in with the default or your modified administrator credentials.

   The user name is "admin", the default password is also "admin".
3. Select “Network” > “Network Interface”.
4. Select “EDIT” and then “DHCP disabled” for “eth0” so that DHCP is disabled for both Ethernet connectors.

   Make the following settings:

   “Address”: “192.168.100.10”

   “Netmask”: “255.255.255.0”

   “Gateway”: “192.168.100.1”

Enable the router function

1. Select “Services” > “Router / NAT / Port forwarding”.
2. Select “EDIT” and turn on the “Enabled” switch.
3. Select “SAVE” to save your settings.

Configure the RS232 COM1 interface to the FP0R PLC

1. Select “Application Settings” to go to the application settings area.
2. Go to “COM Interface” and select “Start wizard” to start the PLC connection wizard.
3. Select “Simple mode” and “Continue”.
4. Select “COM1 RS232” and “Continue”.
5. Select a baud rate of 115200 and “Odd” parity.
6. Enter port number 9094 (must match the application port setting in the Corvina Cloud).
7. Select “Finish”.

   All packages received on the specified port are now forwarded to the PLC via the serial interface.
8. Save your configuration.

   After about 10s you can test your connection.
9. Select “Test RS232”.

   You should receive a message that the FP0R PLC has been successfully connected to the RS232 interface. If the connection fails, refer to the troubleshooting section for advice.

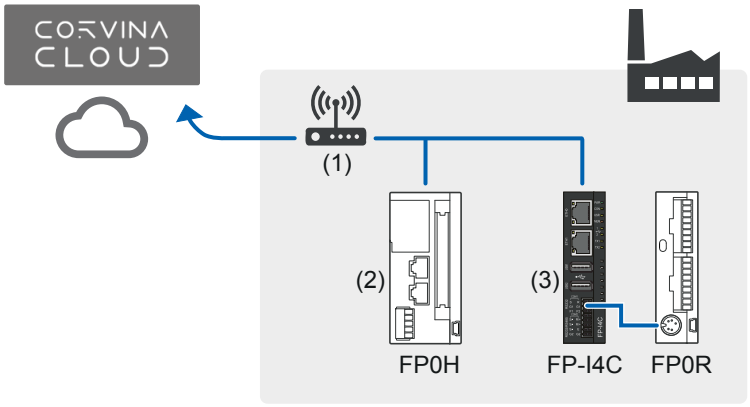
Related topics

Connect the FP-I4C unit to a PC via DHCP server (page 30)

The connection test for RS232, RS485, or USB fails (page 73)

8.5 Configure the Corvina Cloud

Go to the Corvina Cloud Web Portal to configure the Corvina Cloud.



(1) Router
(2) Endpoint
(3) Gateway

This task includes the following steps:

1. Create a device to define the FP-I4C unit as a gateway
2. Create an application to give Control FPWIN Pro7 access to the PLCs
3. Create a profile to group your applications (there is only one in this example)
4. Add the profile to the device

Create a device

1. Go to https://corvinacloud.com/ and log in with your credentials.
2. Go to “DEVICES” and select “Add gateway”.

   A gateway can be any device that can connect to the Corvina Cloud, e.g. FP-I4C, HMe, HMX.

   Make the following settings:

   “Name”: Enter a unique name that can be used to identify the FP-I4C gateway when you connect your devices to the Corvina Cloud, e.g. “FPI4C_Gateway”.

   “Organization”: Select your organization from the list.

   “Description”: Enter an optional description, e.g. “Gateway to the Corvina Cloud”.

“Serial number”: Enter the code you received after purchasing the license.

“Password”: Enter a password (must contain at least 8 characters and one non-alphanumeric character).

“Confirm password”: Confirm your password by retyping it.

“Enabled”: Activated

3. Select “Add” to save your settings.

Create an application

1. Go to “APPLICATIONS” and select “Add application”.
   Make the following settings:
   “Name”: Enter a unique name, e.g. “RemoteControlPLC”.
   “Organization”: Select your organization from the list.
   “Description”: Enter an optional description, e.g. “Remote control of PLCs”.
   “Application type”: “Custom”
   “Protocol”: “TCP”
   “Port”: “9094” (must match the port setting for COM1 RS232 of the FP-I4C unit).
   Keep the default settings under “Environments”.
2. Select “Add” to save your settings.

Create a profile

1. Go to “APPLICATIONS” > “PROFILES” and select “Add profile”.
   Make the following settings:
   “Name”: Enter a unique name, e.g. “RemoteControl”
   “Organization”: Select your organization from the list.
   “Description”: “Remote control for endpoints” (optional)
2. Under “Applications”, select “RemoteControlPLC” and click on “>>”.
   The application is moved under “Selected”.
3. Select “Add” to save your settings.

Add the profile to the device

1. Go to “DEVICES”.
2. Select the pencil icon for the device “FPI4C_Gateway”.
3. Select the “Endpoints” tab.
   Make the following settings:
   “Maximum number of endpoints”: “2” (FP0H PLC is the only endpoint in this example)
   “Local network”: Empty
   “Do not translate real IPs into virtual IPs (1:1 NAT)”: Deactivated
4. In the endpoint list, go to the gateway with IP address 127.0.0.1, double-click under “Application profile”, and select the profile “RemoteControl”.

5. Select “Add row”.

   Make the following settings:

   “Name”: “FP0H”

   “IP address”: “192.168.100.11” (must match the setting for “IPv4 address” in the FP0H PLC)

   “Description”: “Endpoint FP0H” (optional)

   “Application profile”: Select “RemoteControl”.

   “Enabled”: “yes”

   “Source NAT”: “no”

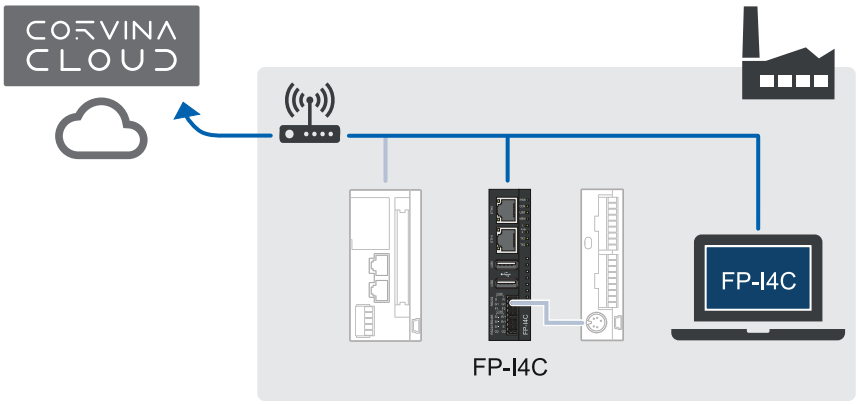
   “Custom”: Empty

6. Select “Change” to save your settings.

The device “FPI4C_Gateway” is now displayed on the “Dashboard”. The status is still “offline”.

8.6 Connect the FP-I4C unit to the Corvina Cloud

Make the server settings required to connect to the Corvina Cloud.



1. Open your browser and enter the URL `https://[IP address]/machine_config`. Replace `[IP address]` with the IP address of your FP-I4C unit (e.g. `https://192.168.100.10/machine_config`).
2. Log in with the default or your modified administrator credentials.

   The default user name is "admin", the default password is "admin".
3. Select “Services” > “Cloud Service”.
4. Select “EDIT” and turn on the “Enabled” switch.

   Make the following settings:

   “Autostart”: Activate this setting to reconnect the unit automatically to the Corvina Cloud after a reboot.

   “Server type”: “Cloud Server”

   “Server”: Empty

“Username”: Enter the device name (“FPI4C_Gateway”) and organization name (as shown in Corvina Cloud) in the format device_name@organization_name.

“Password”: Enter the password you created for your device.

5. Select “SAVE” to save your settings.

Once the connection to the Corvina Cloud has been established, your device will be displayed on the “DASHBOARD” of the Corvina Cloud.

If the connection fails, refer to the troubleshooting section for advice.

Related topics

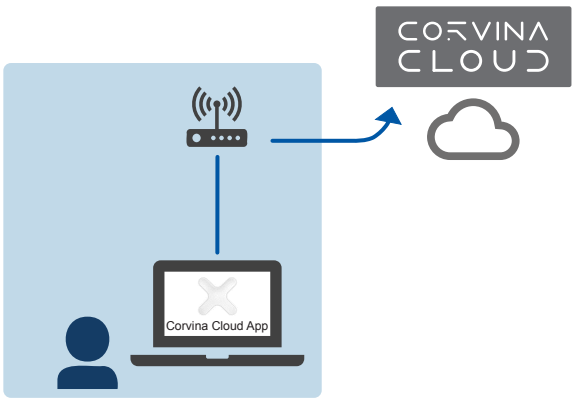
Troubleshooting (page 73)

8.7 Connect the PC to the Corvina Cloud

This step requires that you install the Corvina Cloud Connect app on the PC that makes the remote connection to the PLCs.

The software is available free of charge in our Panasonic Download Center.

Make sure no proxy server is used in your network and no outbound ports are blocked. (Port 1194 is needed to connect to Corvina Cloud.)



1. Install Corvina Cloud Connect on your PC.
2. On the start page, select the gear icon to enter your connection profile.
   Make the following settings:
   “Profile name”: “Remote control” (or any other name)
   “Server type”: “Cloud Server”
   “Username”: Use the format username@organization_name.
   “Organization”: Leave empty.
   “Password”: Password
3. Select “OK” to save your settings.

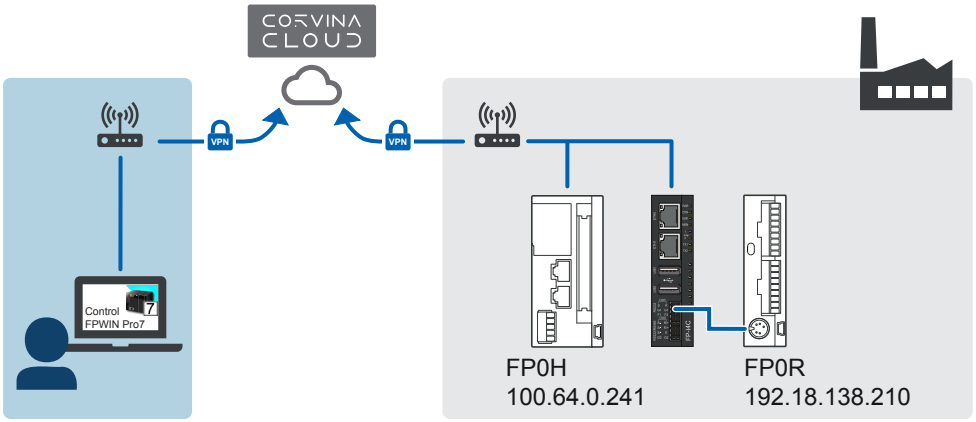
4. Select your profile and click on “SIGN IN” to log in to the Corvina Cloud.
5. On the Corvina Cloud “DASHBOARD”, the status of the device “FPI4C_Gateway” should now be "online".
6. Click on the device “FPI4C_Gateway” and select “Connect to all endpoints” in the gateway window.

   Write down the “VPN IP address” of the gateway because you will need to enter it in Control FPWIN Pro7.
7. Close the gateway window.
8. Click on the arrow next to the device “FPI4C_Gateway” to display the list of endpoints.
9. Select the FP0H PLC.

   Write down the “VPN IP address” of the endpoint because you will need to enter it in Control FPWIN Pro7.

8.8 Connect the PLCs with the cloud

Establish an online connection between Control FPWIN Pro7 and the PLCs.



Perform this task for each PLC type.

1. Start Control FPWIN Pro7.
2. Open your project.
3. Go to “Online” > “Communication settings... ”.

   Make the following settings:

   “Connection type”: “Ethernet”

   “Configuration name”: Enter a title for your Ethernet connection.

   “Use ET-LAN unit”: Disabled

   “PC settings”:

   - “IP address”: 0.0.0.0 (The appropriate network card is selected automatically.)
   - “Port number”: 0 (The next available port is selected automatically.)

   “Destination settings”:

- “IP address”: Enter the virtual IP address displayed in the Corvina Cloud for the gateway and for the endpoint, e.g. 192.18.138.210 for FP0R and 100.64.0.241 for FP0H.
- “Port number”: 9094 (must match the port setting for COM1 RS232 of the FP-I4C unit)

4. Select “OK” to save your settings.
5. Select “Online” > “Online mode” to establish the VPN connection to both PLCs.

   If the connection fails, refer to the troubleshooting section for advice.
6. Transfer the configuration to the PLC.

Related topics

Troubleshooting (page 73)

8.9 Troubleshooting

If the connection to the Corvina Cloud cannot be established, check the list of possible causes.

The connection test for RS232, RS485, or USB fails

- Make sure the communication settings for the RS232 or RS485 interface in the PLC and in the FP-I4C unit are identical in both devices.
- Check the wiring. For RS232, there are three wires (R, S, and G). Make sure G is connected to G, R to S, and S to R.
- The system was not ready yet. Wait a few seconds, then test the connection again.
- The PLC is not ready (powered off).
- If you are using HMWIN Studio, make sure COM1 is not used by your HMWIN Studio project.

The connection of the FP-I4C unit to the Corvina Cloud fails

- Open your browser and enter the URL `https://[IP address]/machine_config`. Replace `[IP address]` with the IP address of your FP-I4C unit (e.g. `https://192.168.100.10/machine_config`). Check your settings under “Services” > “Cloud Services”. Substitute "xxx.xx" with the last digits of the unit's IP address (e.g. `https://192.168.100.10/machine_config`).

  Make sure the settings match your device configuration in the Corvina Cloud (user name, password, organization name, etc.).
- Check the Internet connection of the FP-I4C unit.
- Check if there are any port restrictions in your network. The FP-I4C unit uses port 1194 to connect to the Corvina Cloud. Make sure this port is not blocked.

- Make sure the time and date in the FP-I4C unit are correct. Otherwise, the certificate is not accepted by the Corvina Cloud. Go to the “Time/Date” page in the FP-I4C Web interface and set the correct time and date.
- Make sure the DNS is set correctly. Open your browser and enter the URL `https://[IP address]/machine_config`. Replace `[IP address]` with the IP address of your FP-I4C unit (e.g. `https://192.168.100.10/machine_config`). Check your settings under “Network” > “Network Interface ”.

The cloud connection to a PLC fails

- Open the Corvina Cloud Connection app and make sure all endpoints are connected. See Connect the PC to the Corvina Cloud (page 71).
- If you have more than one network configuration on your PC, make sure you are connected to the right network. We recommend that you disable the other networks (e.g. Wifi). Otherwise, you need to determine the interface for your Corvina Cloud connection and enter the corresponding IP address in Control FPWIN Pro7 with “Online” > “Communication parameters... ” > “Computer” > “IP address”.
- Check the LAN cable connection between the router and the Ethernet port of the FP0H PLC, and make sure the PLC is powered on.
- Make sure a system or user connection with source port 9094 is enabled in the project downloaded to the FP0H PLC. See Connect the FP0H PLC to the network (page 64).

9 Record of changes

ACGM0162V4EN, 2022.07

Added application example for Corvina Cloud

Added pre-startup checklist

Updated list of features

Corrected list of applicable EU directives and standards

Added description of basic communication processes and port redirections

Corrected instructions for changing passwords

Updated software user interface descriptions

Added new graphics in section "Getting started" and in application examples

ACGM0162V3EN, 2021.01

Updated list of features

Added unit dimensions with Phoenix Contact connector installed

Added information on changing access credentials and restrictions

Added application example for data logging from different devices

Added application example for the HTTP client function

Added application example for Web-based data visualization

ACGM0162V2EN, 2020.06

Cover page: changed manual title, corrected product name

Frontmatter: added software legal notes, safety precautions, network security notes

Corrected list of features

Deleted section on hardware version information

Updated description of LEDs

Specifications: corrected product number and list of supported protocols, corrected operating voltage range, corrected operating and storage humidity

Added dimensional drawing

Devices supported by USB host ports: added FP0R

Revised installation instructions for FP0R expansion units

Corrected wiring diagram for "Connecting the TOOL port" with COM1

Revised section "Getting started"

ACGM0162V1EN, 2019.07

First edition