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Operating Instructions
FieldGate SWG50

Functional WirelessHART Gateway

Endress+Hauser
People for Process Automation

Revision history

Software version	Operating Instructions	Changes
1.01.xx	BA02235S/04/EN/01.22	Initial version
1.01.xx	BA02235S/04/EN/02.25	▪ Section 4.2: "Nameplates" updated ▪ Section 7.1: "Overview of operating options" revised ▪ Section 8: "System integration" revised ▪ Section 9: "EtherNet/IP converter (optional)" new ▪ Section 11.5: "Resetting the device" revised

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1 About this document

1.1 Document function

These Operating Instructions contain all the information required in the various life cycle phases of the device: from product identification, incoming acceptance and storage, to installation, connection, operation and commissioning, through to troubleshooting, maintenance and disposal.

1.2 Symbols

1.2.1 Safety symbols

⚠ DANGER
This symbol alerts you to a dangerous situation. Failure to avoid this situation will result in serious or fatal injury.

⚠ WARNING
This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in serious or fatal injury.

⚠ CAUTION
This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in minor or medium injury.

NOTICE
This symbol contains information on procedures and other facts which do not result in personal injury.

1.2.2 Symbols for certain types of information

Symbol	Meaning
	**Permitted** Procedures, processes or actions that are permitted.
	**Preferred** Procedures, processes or actions that are preferred.
	**Forbidden** Procedures, processes or actions that are forbidden.
	**Tip** Indicates additional information.
	Reference to documentation
	Reference to page
	Reference to graphic

Symbol	Meaning
▶	Notice or individual step to be observed
1., 2., 3...	Series of steps
→	Result of a step
	Help in the event of a problem
	Visual inspection

1.3 Documentation

FieldGate SWG50 Technical Information TI01677S/04/EN

1.4 Registered trademarks

HART®, WirelessHART® is the registered trademark of the FieldComm Group, Austin, TX 78759, USA.

All other brand and product names are trademarks or registered trademarks of the companies and organizations in question.

2 Basic safety instructions

2.1 Requirements for the personnel

The personnel for installation, commissioning, diagnostics and maintenance must fulfill the following requirements:

- ▶ Trained, qualified specialists must have a relevant qualification for this specific function and task.
- ▶ Are authorized by the plant owner/operator.
- ▶ Are familiar with federal/national regulations.
- ▶ Before starting work, read and understand the instructions in the manual and supplementary documentation as well as the certificates (depending on the application).
- ▶ Follow instructions and comply with basic conditions.

The operating personnel must fulfill the following requirements:

- ▶ Are instructed and authorized according to the requirements of the task by the facility's owner-operator.
- ▶ Follow the instructions in this manual.

2.2 Designated use

FieldGate SWG50 is a gateway for WirelessHART networks. It enables WirelessHART field devices to communicate with each another and manages network security and connectivity. The FieldGate SWG50 converts and stores data from wireless field devices in a format that is

compatible with other systems. It has Ethernet interfaces for connecting to host applications such as SCADA tools.

Incorrect use

Non-designated use can compromise safety. The manufacturer is not liable for damage caused by using the device incorrectly or for purposes for which it was not intended.

2.3 Workplace safety

For work on and with the device:
- ▶ Wear the required personal protective equipment according to federal/national regulations.

If working on and with the device with wet hands:
- ▶ Due to the increased risk of electric shock, gloves must be worn.

2.4 Operational safety

Risk of injury.
- ▶ Operate the device in proper technical condition and fail-safe condition only.
- ▶ The operator is responsible for interference-free operation of the device.

Conversions to the device

Unauthorized modifications to the device are not permitted and can lead to unforeseeable dangers.
- ▶ If, despite this, modifications are required, consult with Endress+Hauser.

Repair

To ensure continued operational safety and reliability,
- ▶ Carry out repairs on the device only if they are expressly permitted.
- ▶ Observe federal/national regulations pertaining to repair of an electrical device.
- ▶ Use original spare parts and accessories from Endress+Hauser only.

2.5 Product safety

This measuring device is designed in accordance with good engineering practice to meet state-of-the-art safety requirements, has been tested, and left the factory in a condition in which it is safe to operate.

It meets general safety standards and legal requirements. It also complies with the EU directives listed in the device-specific EU Declaration of Conformity. The manufacturer confirms this by affixing the CE mark.

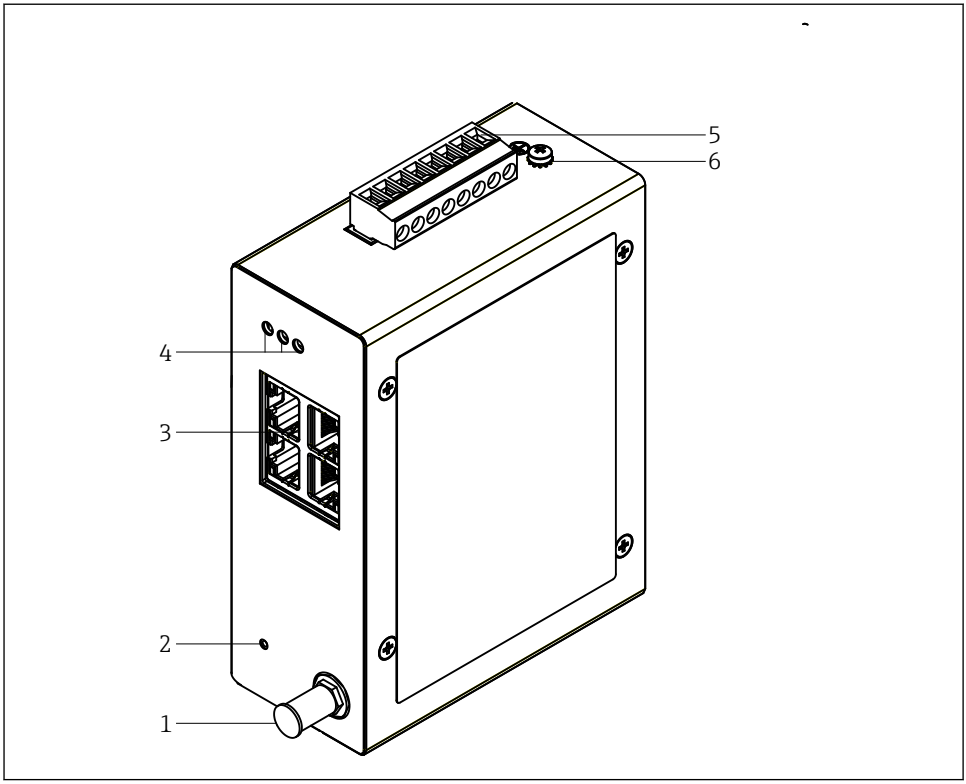
2.6 IT security

Our warranty is valid only if the product is installed and used as described in the Operating Instructions. The product is equipped with security mechanisms to protect it against any inadvertent changes to the settings.

IT security measures, which provide additional protection for the product and associated data transfer, must be implemented by the operators themselves in line with their security standards.

3 Product description

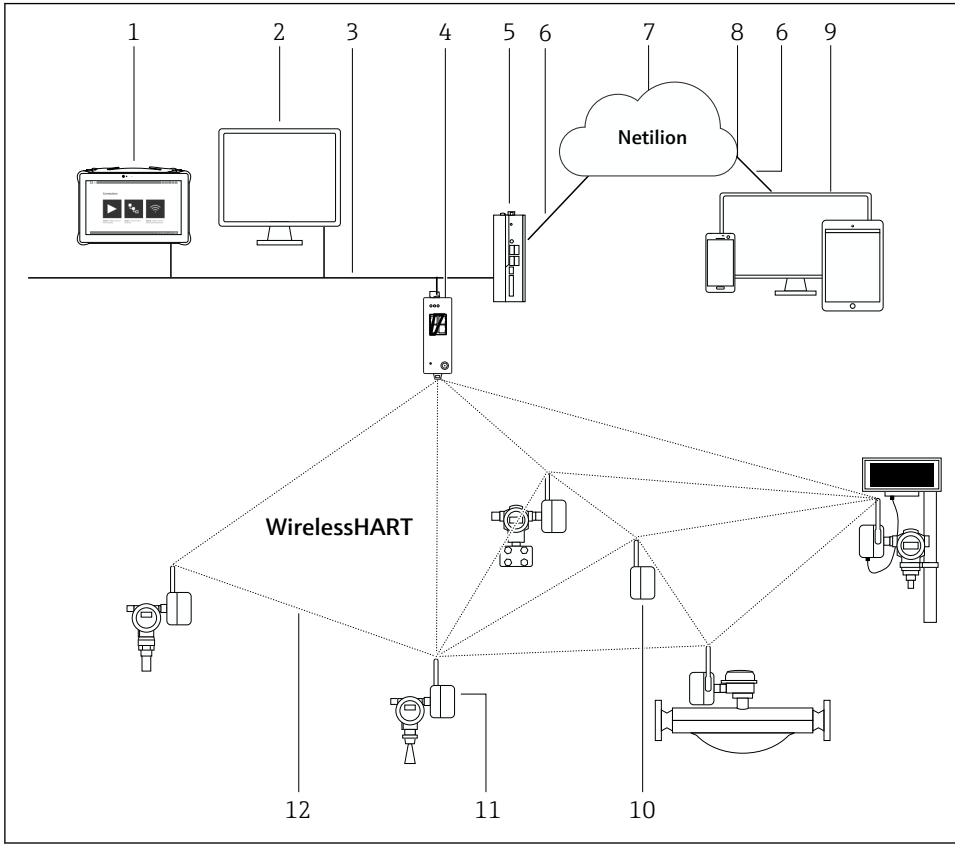
The FieldGate SWG50 is a functional WirelessHART gateway. It comprises a network manager application, a WirelessHART (access point) interface module and a gateway application. Up to 100 wireless or wired devices with WirelesssHART adapter can be connected to the FieldGate SWG50. The application supplies data from the WirelessHART network via Modbus TCP or HART-IP. A CommDTM makes it possible to configure the field devices or adapters connected to the WirelessHART network via their device DTMs.



1 FieldGate SWG50

1 Antenna connection RSMA (f)
2 Reset button, application → 56
3 4-port Ethernet switch (RJ45)
4 LEDs
5 Connector for power supply
6 Ground connection

3.1 Product design



2 *Example of WirelessHART network architecture with FieldGate SWG50*

1 *Endress+Hauser Field Xpert, e.g. SMTxx*
2 *Host application / FieldCare SFE500*
3 *Ethernet communication*
4 *FieldGate SWG50*
5 *FieldEdge SGC500*
6 *https Internet connection*
7 *Netilion Cloud*
8 *Application Programming Interface (API)*
9 *Browser-based Netilion Service app or user application*
10 *WirelessHART adapter SWA70 used as a repeater*
11 *HART field device with WirelessHART adapter SWA70*
12 *Encrypted wireless connection via WirelessHART*

4 Incoming acceptance and product identification

4.1 Incoming acceptance

Visual inspection
- Check the packaging for visible damage arising from transportation
- Open the packaging carefully
- Check the contents for visible damage
- Check that the delivery is complete and nothing is missing
- Retain all the accompanying documents

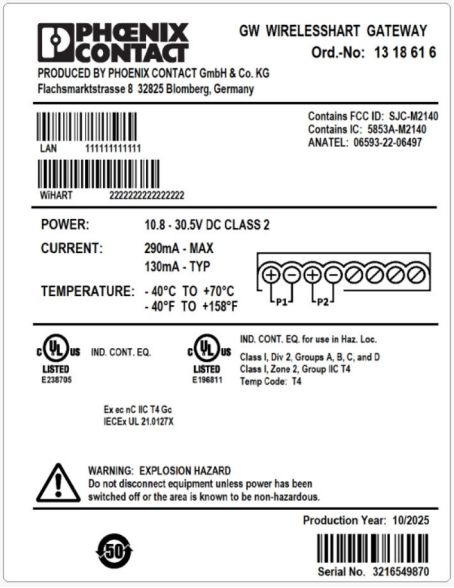
The device may not be put into operation if the contents are found to be damaged beforehand. In this case, please contact your Endress+Hauser Sales Center: www.addresses.endress.com

Return the device to Endress+Hauser in the original packaging where possible.

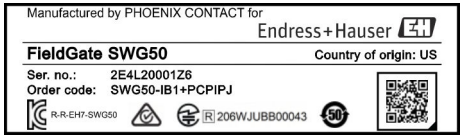
Scope of delivery
- FieldGate SWG50
- Operating Instructions with Safety Instructions

4.2 Product identification

4.2.1 Nameplate



3 *Phoenix Contact nameplate*



4 *Endress+Hauser nameplate*

4.2.2 Manufacturer's address

PHOENIX CONTACT GmbH & Co. KG

Flachsmarktstraße 8

32825 Blomberg

Germany

www.phoenixcontact.com

4.3 Storage and transport

Always use the original packaging when transporting the product.

4.3.1 Storage temperature

–40 to 85 °C

5 Mounting

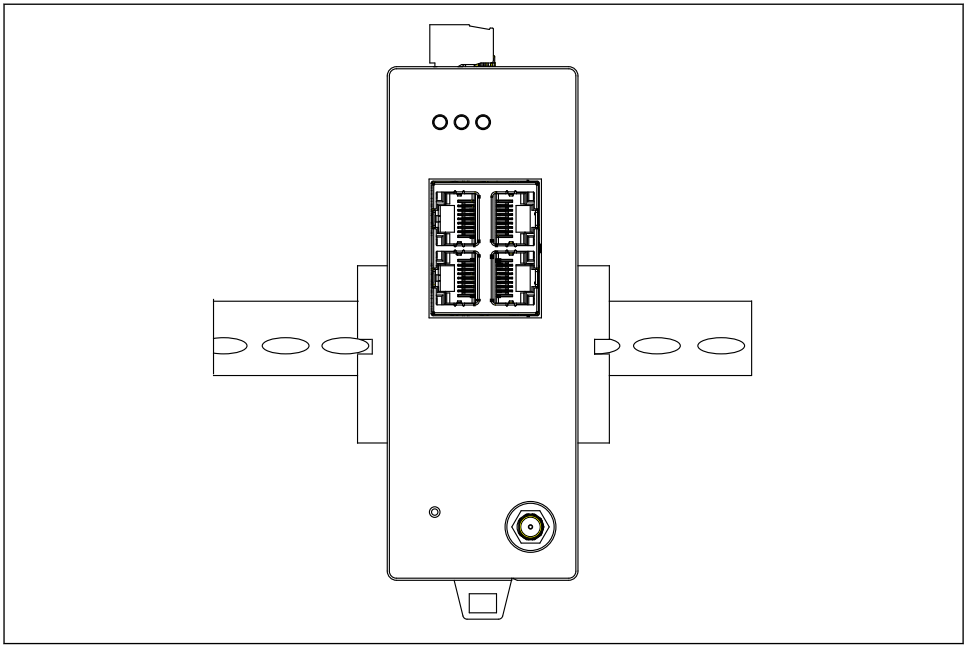
5.1 Mounting requirements

The device must be installed in a housing that has a minimum protection rating of IP54 as per EN/IEC 60079-15. The device must be used only in areas with a maximum pollution degree of 2, as defined in EN/IEC 60664-1. The device can be installed in Zone 2 hazardous areas. Routing and remote installation of the antenna must comply with the relevant site regulations when installed in unclassified Zone 2 or Class I, Division 2 hazardous areas. Otherwise, the antenna must be installed within the end-use housing.

A remote antenna can be mounted outside a cabinet. If there is a risk of lightning, install lightning/EMP protection between the gateway and the remote antenna.

5.2 Mounting the device

The FieldGate SWG50 is mounted on an NS 35 mounting rail. To prevent the device from slipping, end clamps must be mounted on both sides. The device can be mounted either horizontally or vertically. The modules are mounted on the mounting rail from left to right.



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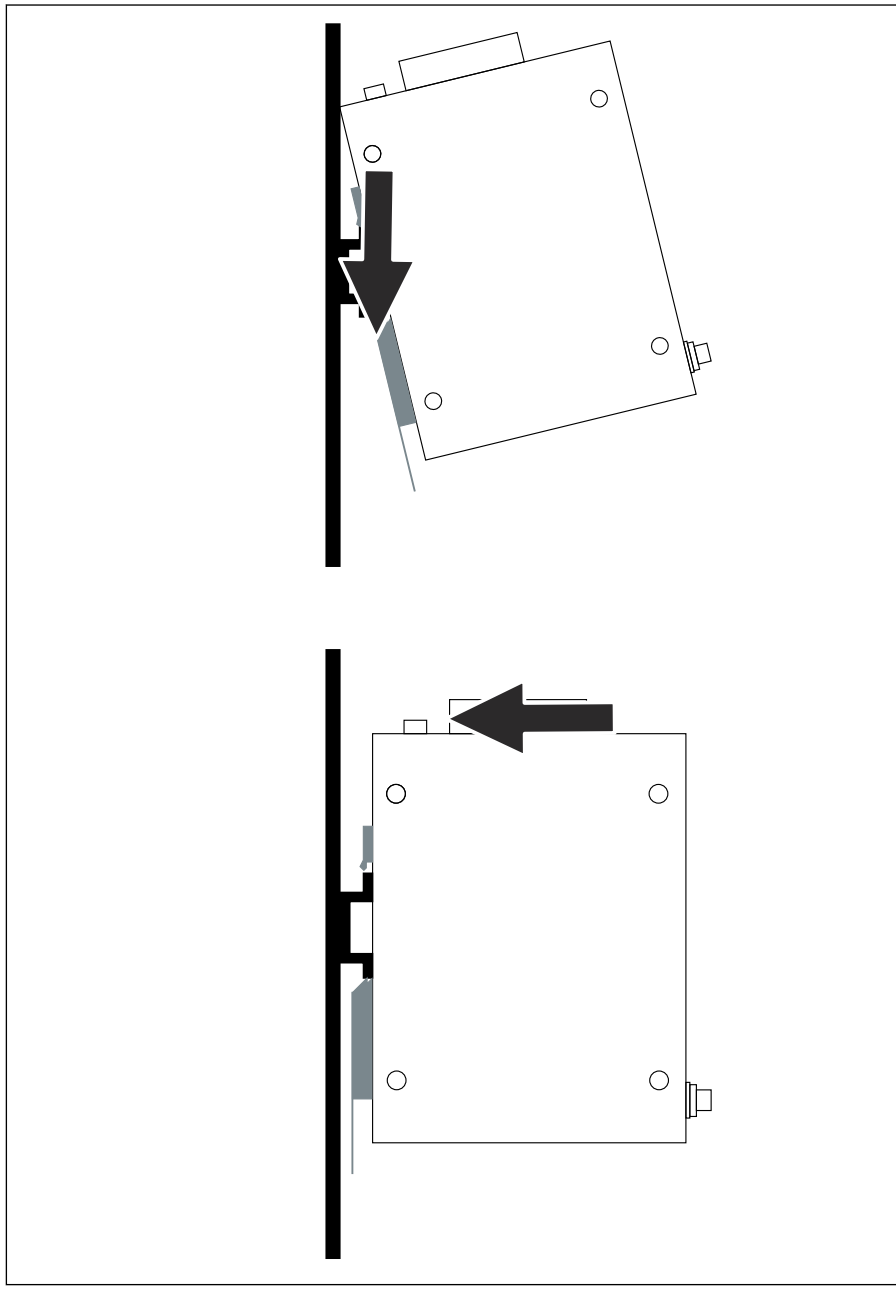
5 Mounting on a standard DIN rail

Mounting the device

1.



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Position the keyway on the mounting rail.

2. Push the device back until it locks into place.
3. Ground the mounting rail.

5.3 Post-mounting check

Is the device properly attached to the mounting rail?

6 Electrical connection

6.1 Connecting requirements

6.1.1 Power supply

Connect a regulated class 2 DC power source to the gateway. The supply voltage can be from 10.8 to 30 V_{DC}, with a recommended nominal voltage of either 12 V_{DC} or 24 V_{DC}. The power supply must be able to supply 290 mA current at 24 V_{DC}. External connecting cables must be used in accordance with NEC, ANSI/NFPA70 (for US applications) and Canadian Electrical Code, Part 1, CSA C22.1 (for Canadian applications) or in accordance with local country codes for all other countries.

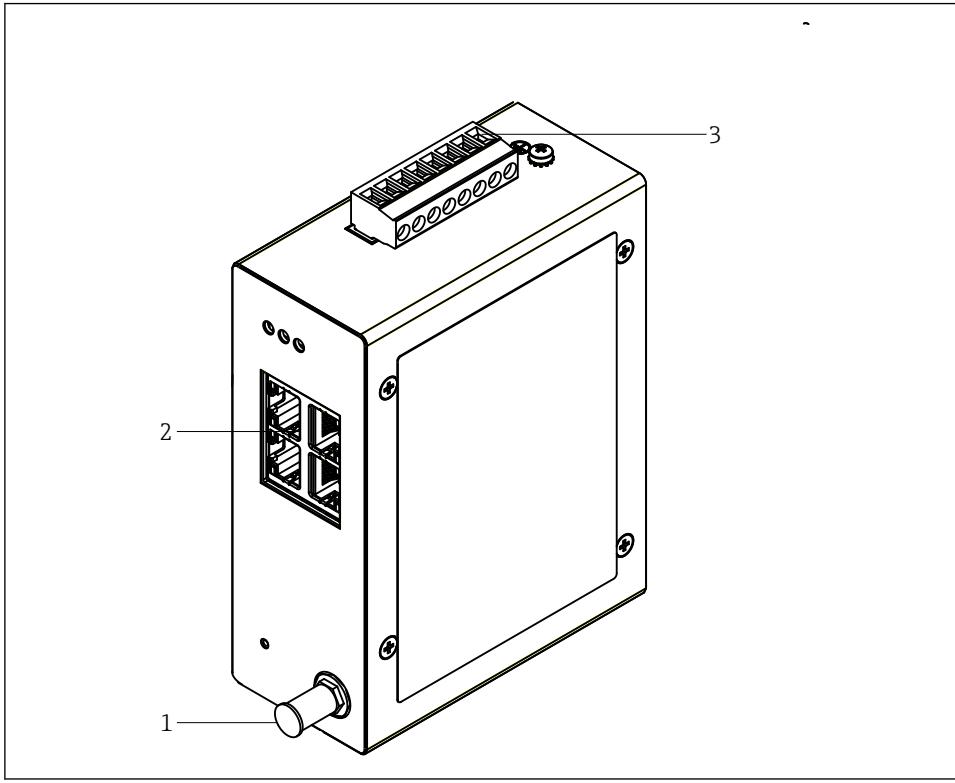
The control cabinet or switch box must meet the specifications of EN 60950-1: 2001 for fire enclosures.

The power supply to the device must meet the following requirements:
- Class 2 circuit in accordance with National Electrical Code, NFPA-70 and Canadian Electrical
- Limited Power Supply (LPS) as per EN/IEC 60950-1 or EN/IEC 62368-1
- Limited-energy circuits EN/IEC 61010-1

6.1.2 Ethernet

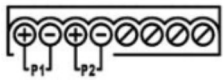
The FieldGate SWG50 has an Ethernet interface (RJ45) on the front for connecting a twisted-pair cable with an impedance of 100 Ω. Data transmission is 10, 100 or 1000 Mbit/s. Slide the Ethernet cable with the RJ45 connector into the device until it locks into place. When two, three or four Ethernet ports are used, the FieldGate SWG50 is classified as a switch. If only one port is used, it is a straightforward end-node device. The maximum number of linked gateways and the maximum distance between the units are based on the Ethernet standards and are determined by the environment and the compliance of the network with the standard.

6.2 Connecting the device



1 Antenna
2 Ethernet
3 Power supply

Power supply



P1 10.8 to 30 V_{DC}
P2 10.8 to 30 V_{DC}

6.3 Special connection instructions

6.3.1 Antenna

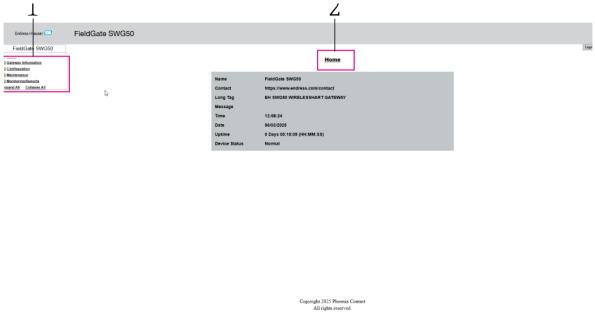
The device is equipped with an RSMA antenna socket for connecting an external antenna. Install the antenna outside the cabinet or building. The maximum permitted HF line as per federal, state and local regulations must be observed. Use antenna and cables that are recommended by the manufacturer.

6.4 Post-connection check

- Are the device and cable undamaged (visual check)?
- Do the cables used comply with the requirements?
- Is the terminal assignment correct?
- Have the cables been connected in such a way that no wires, insulation and / or cable shields are jammed?
- Is the supply voltage correct?
- Is the FieldPort SWG50 grounded, if necessary?

7 Operating options

The FieldGate SWG50 has an integrated web server with which the WirelessHART network is configured.



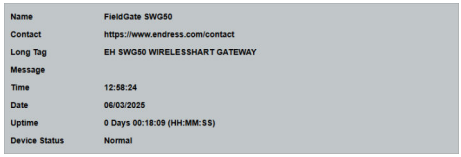
6 Initial screen

1 Navigation tree
2 Page name

7.1 Overview of operating options

7.1.1 Overview of start screen

After login, the start screen appears with basic information about the FieldGate SWG50.

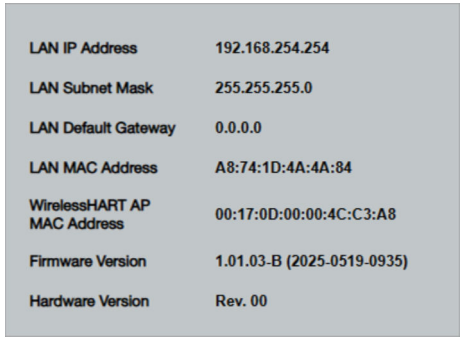


7 *Gateway information*

Field	Description
Name	Information about the gateway and location.
Contact	Person responsible for operating the device.
Long Tag	Identification of device in the WirelessHART network, can be identical to the **Name** field.
Message	Notification about the device or network.
Time	Internal device time.
Data	Internal device date.
Uptime	Length of time device is in operation since last power-up.
Device Status	Current operating status of device and error messages.

7.1.2 Overview of general information

- In the Navigation menu, click **Gateway Standardinformationen -> General**.
  - The **General Information** dialog box appears.



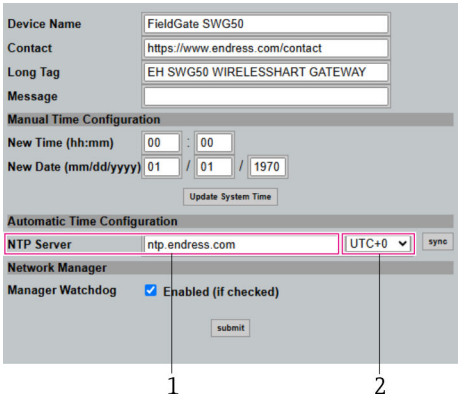
Field	Description	Default
LAN IP Address	IP address uniquely identifies this device with the LAN.	192.168.254.254
LAN Subnet Mask	IP subnet mask for this device in the LAN.	255.255.255.0
LAN Default Gateway	IP address of default gateway.	0.0.0.0

Field	Description	Default
LAN MAC Adresse	Media Access Control (MAC) address of LAN network card.	A8:74:1D:4A:4A:84
WirelessHART AP MAC-Address	Media Access Control (MAC) address of WirelessHART interface module.	XX:XX:XX:XX:XX:XX:XX:XX
Firmware Version	Software version in device	
Hardware Version	Device version	

7.1.3 Overview of basic configuration

Changing the data displayed on the home screen

1. In the Navigation menu, click **Configuration -> General**.
   ↳ The **General Configuration** dialog box appears.



1 NTP server: Address of the Network Time Protocol (NTP) server
2 UTC offset: Time zones defined by their offset from UTC. For example: UTC + 1: Central European Time (CET), which includes cities like Paris, Berlin, Rome.

2. Make any necessary changes.
3. Click the **Submit** button.

The changes are accepted.

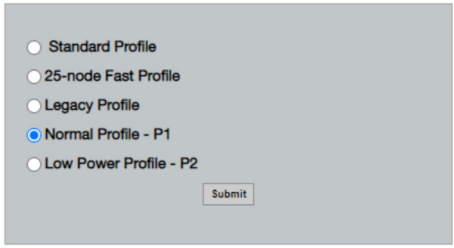
- Long Tag: maximum 32 characters (excess characters will be truncated following restart).
- Message: maximum 32, only capital letters, numbers and certain special characters
- Automatic Time Configuration: The NTP server synchronizes the gateway clocks via the network using the Network Time Protocol (NTP). Click the **sync** button to update the gateway's internal clock immediately. Synchronization is performed automatically once per day, provided an Internet connection is available. Daylight saving time changes are applied automatically. After each device restart, synchronization is performed automatically, provided an Internet connection is available. Synchronization does not affect network performance.

Configuring the time manually

1. Make any necessary changes.
2. Click the **Update System Time** button.

7.1.4 Configuring the WirelessHART profile

1. In the Navigation menu, click **Configuration -> WirelessHART -> Gateway Profil**.
   ↳ The **WirelessHART Gateway Profile Configuration** dialog box appears.

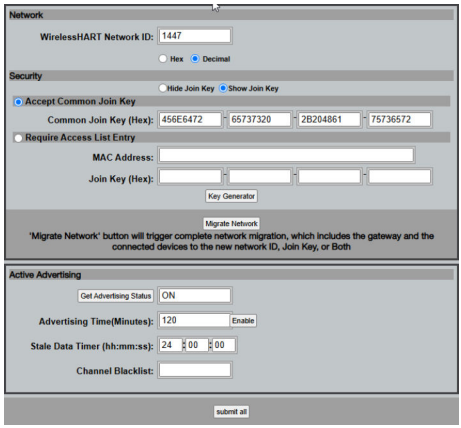


2. Make changes and click **Submit**.
   ↳ The changes are accepted automatically.

Profile	API Profile Type	minServicesPkPeriod	Upstream frame size	Downstream frame size
Standard		400	1024	256
25-Node Fast	Manual	100	128	128
Legacy	Manual	400	1024	256
P1	P1	400	1024	256
P2	P2	400	1024	2048

7.1.5 Configuring the WirelessHART network

- In the Navigation menu, click **Configuration -> WirelessHART -> Network Configuration**.
  - The **Network Configuration** dialog box appears.



Section	Parameter	Description
Network	WirelessHART Network ID	In hexadecimal or decimal format, depending on setting. Default network ID: 1447
Security	Hide/Show Join Key	Displays or hides the password.
	Accept Common Join Key Common Join Key (Hex)	Activates general network password. General network password in hexadecimal format (32 characters). Default Join Key: 456E6472- 65737320- 2B204861- 75736572
	Required Access List Entry MAC Address Join Key (Hex) For use by trained personnel only.	Enables access via an external join list in addition to a network password. List of MAC addresses of all permitted devices. Key in hexadecimal format (32 characters). Connects each device individually with the network by specifying the MAC address of the desired WirelessHART device, e.g. "00:1B:1E:11:F0:C9:23:29", and the required network join key. The process is completed once the **submit all** button is clicked. The gateway is restarted. After the restart, the selected device connects to the gateway. If the process is repeated to add another device, the connection remains active as long as the network join key remains unchanged.
	Key generator	Automatically generates a random network password.

Section	Parameter	Description
	Migrate Network	Migration of entire device network. The network ID and/or network password of all connected WirelessHART network devices is migrated. To perform a network migration, enter the new network ID/the new join key in the corresponding field and click "Migrate Network". The network migration then starts (this may take some time) without requiring a gateway restart. To perform a network migration, enter the new network ID/the new join key in the "WirelessHART Network ID" field and click **Migrate Network**. The network migration starts (this may take some time). A gateway restart is not required.
Active Advertising	Get Advertising Status	Status indicating whether Active Advertising is enabled. Active Advertising can increase the probability of a field device joining the network quickly. The Advertising is transmitted periodically by the gateway on random WirelessHART channels. The joining device must be set to the correct frequency at the right time to receive the Advertising. Joining the network may therefore take some time while the device waits for the Advertising. The probability of network detection (and thus the time required to join the network) can be improved by increasing the frequency of the advertising transmissions.
	Advertising Time	The time period for which Active Advertising is to be enabled. Enabled via the **Enable** key. For a defined period (Advertising Time) the gateway transmits advertising messsages more frequently. After the **enable** button is pressed, this mode is activated for the specified duration. Once this period has elapsed, the SWG50 returns to normal operating mode.
	Stale Data Timer	Data from WirelessHart field devices is cached in the gateway. This allows the gateway to respond quickly to host requests without having to constantly query new device data. To ensure the validity of the cached data, each data point is time-stamped. If the cached data is not updated within the **Stale Data Timer** interval, a request is sent to the relevant field device (HART IP request) or a Modbus exception is generated and the saved data is deleted (Modbus). → 22 The recommended setting for **Stale Data Timer** is equal to or greater than three times the burst rate of the field devices. If no bursts are active, it is advisable to set it to three times the desired update time.
	Channel Blacklist	A maximum of 3 managed WirelessHART channels can be blocked.

Channel blacklist

The blacklist can be used to limit the number of channels used in a network. Any channels included in the blacklist are not used. The respective frequency of the channel must be entered in the blacklist. The channels must be blacklisted in pairs.

Channel	Frequency
1	2405
2	2410
3	2415
4	2420
5	2425
6	2430
7	2435
8	2440
9	2445
10	2450
11	2455
12	2460
13	2465
14	2470
15	2475

7.1.6 Caching commands

The FieldGate SWG50 stores a number of commands in the cache. The validity of the stored data depends on the **Stale Data Timer**. → 20

Command	Description
3, 778	These commands (Expert User Parameter)are used to populate the **Devices** page in the web server and the Modbus registers. It is expected that most field devices will burst these commands. The gateway generates a request to update this cached data if it is older than 1/3 of the **Stale Data Timer** interval. For this reason, the "Stale Data Timer" interval should be set to three times the burst rate of the field devices. If the burst rate of the field devices is one minute, the "Stale Data Timer" interval should be set to 3 minutes or more. The recommended setting for **Stale Data Timer** is equal to or greater than three times the burst rate of the field devices.
1, 2, 9, 42, 48, 76, 89, 93, 95, 512, 769, 779, 781, 796, 798, 804, 808, 810, 817, 822, 833, 1793, 1794	These commands are cached by the gateway. If this data is older than the **Stale Data Timer** interval, the gateway forwards a request to the field device and renews the cached data.

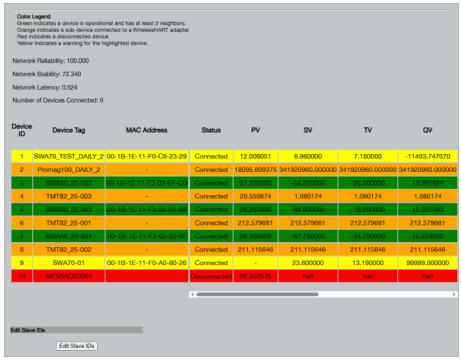
Command	Description
0, 7, 8, 11, 12, 13, 14, 15, 16, 20, 21, 35, 74, 75, 84, 101, 105, 774, 776, 778	These commands are cached by the gateway and regarded as "static". They are updated only if an update is triggered by a HART command. The receipt of a CMD 22 (Write Long Tag) response generates a CMD 20 (Read Long Tag) request.
0, 48	If these commands are sent from a HART IP client to a field device, the cached value is bypassed and a request is sent directly to the field device.

7.1.7 Device view

The device information page displays all data and the status of the devices in the WirelessHART network and is constantly updated.

Color	Description
Green	The WirelessHART device is functioning correctly, is connected to the network and has at least three neighbors.
Yellow	The WirelessHART device is functioning correctly, is connected to the network and has less than three neighbors. At least two neighbors are required for a stable WirelessHART network; three neighbors marked in green provide the best solution.
Orange	The HART device is connected to the WirelessHART adapter shown above it.
Red	The device is no longer communicating with the WirelessHART network.

- ▶ In the Navigation menu, click **Configuration -> WirelessHART -> Devices**.
  - ↳ The **Device Information** dialog box appears.



For improved performance, web page caching must be disabled in the browser. The following description applies to Internet Explorer 11.

Disabling web page caching

1. In the Internet Explorer, click the **Settings** symbol.
2. In the menu, click **Internet options**.
3. Under **Browsing history** in the **General** tab, click **Settings**.
4. In the **Temporary Internet Files** tab, select **Every time I visit the webpage**.
5. In the **Caches and databases** tab, do not enable **Allow website caches and databases**.
6. Click **OK**.

When using Chrome or Firefox browsers, disable the web page cache here too.
It advisable to use Chrome or Firefox browsers with the web page cache disabled.

Field	Description
Device ID	Identification number of the WirelessHART device
Device Tag	Long tag of HART device. Long tags are supported only from HART 6. Older devices, such as HART 5 devices, must be labeled via the **Message** field. For a HART 5 device connected in a WirelessHART network, the WirelessHART gateway emulates the long tag with the **Message** field.
MAC Address	MAC address of WirelessHART device or adapter.
Status	Device status
PV/SV/TV/QV	Displays the process variables of the HART device.
Battery Life	Displays the expected remaining life of the battery that powers the devices. 65535 indicates that the device is receiving power from a mains supply or is waiting for the device to provide information regarding the battery life.
Neighbours	Number of neighbors with which a WirelessHART device can communicate in the mesh.
Timestamp	Time at which data was last updated. Format: hh:mm
Latency	Time required to respond to all data requests or to update the data (measured in seconds).
Bandwidth	Available bandwidth for the device in question.
Joins	The frequency with which a device was connected to the gateway (since the gateway was restarted)
Active Pipe	Indicates the status of the pipe for a device
Fast Pipe Control	This function can be used to enable or disable the fast pipe function for a device. The **Fast Pipe** button in the device list of the web server causes the gateway manager to activate a high-speed connection (pipe) between the gateway and a connected device. A pipe is a high-speed frame that enables faster data transmission between the gateway and the connected device.

Deleting the device

Only devices that are not connected can be removed from the list of devices. To delete an active device, switch off the device and wait until the status column indicates that the device is no longer connected.

1. Click the device with the right mouse button.
2. Confirm the delete option.

Editing the Slave ID

1. Click the **Edit Slave IDs** button.
2. Enter the new ID number.
3. Click **OK**.
   ↳ Changes are saved; this may take several minutes.

7.1.8 Adding a device

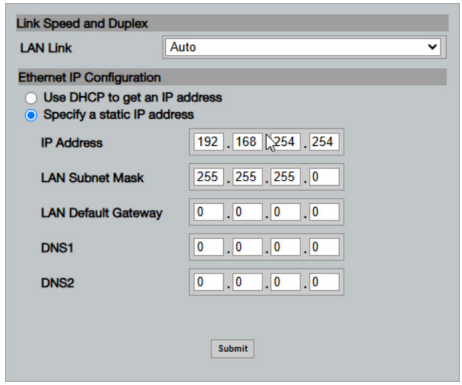
If a device is added to the network, the FieldGate SWG50 issues several commands.

The HART commands are executed in the following order:
- Command 0
- Command 74
- Command 84
- Command 20
- Command 27
- Command 7
- Command 13
- Command 105

While the commands are executed, the web server reports the device as "Handshaking". Once command 105 has been executed, the device switches to the "connected" status. The device is updated once per second.

7.1.9 IP configuration

▶ In the Navigation menu, click **Configuration -> Network Interface -> LAN IP Configuration**.
   ↳ The **LAN IP Configuration** dialog box appears.



Field	Description
Link Speed and Duplex	Determines the speed of the communication channel. If the connection speed is not known, leave the setting as **AUTO**. If a manual option is selected, the connected device must be set to the same speed.
Ethernet IP Configuration	Indicates the method by which the network retrieves IP addresses. If static IP addresses are used, the IP address assigned to the device must be entered. Each device in the network must have a different IP address.

There is a DHCP server present in the network that assigns the IP addresses.

► Select **Use DHCP to get an IP address**.
  ↳ The option field for the IP address is grayed out.

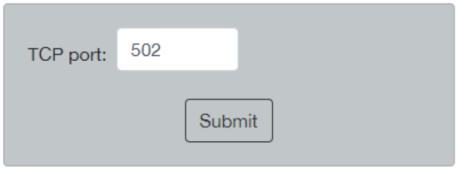
Changing the IP address

1. Select **Specify a static IP address**.
2. Enter the desired IP address and subnet mask.
3. Enter the LAN default gateway and DNS1 and DNS2 if necessary.
4. Click the **Submit** button.
   ↳ The amended IP address will be applied following an automatic restart.

If the IP address has been amended, it must be noted down so that it can be used when reconnecting to the web server.

7.1.10 Modbus configuration

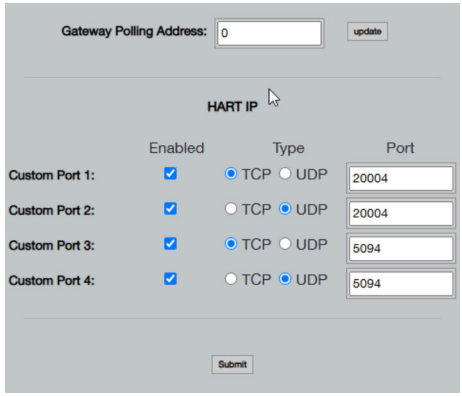
1. In the Navigation menu, click **Configuration -> MODBUS -> MODBUS Configuration**.
   ↳ The **MODBUS Configuration** dialog box appears.



2. In the **TCP port** field, enter the Ethernet port number (default is "502").
3. Click the **Submit** button.
   ↳ The changes are applied following a restart.
4. Click the **Reboot** button.
   ↳ The device restarts.

7.1.11 HART IP configuration

▶ In the Navigation menu, click **Configuration -> HART-IP -> Port Configuration**.
↳ The **Protocol Configuration** dialog box appears.



Gateway polling address

1. Make the changes (default is "0").
2. Click the **Update** button.

HART IP

1. Make any necessary changes.
2. Click the **Submit** button.

A restart notification appears. The changes are applied following a restart.

8 System integration

8.1 Modbus TCP

8.1.1 Condensed Modbus mapping

Condensed Modbus mapping is available when using Modbus device ID 254 in conjunction with the IP address of the FieldGate SWG50. The device ID displayed in the gateway device list

is the same ID used when reading the Modbus registers. The condensed and expanded mappings can be accessed simultaneously and combined.

Data relating to gateway statistics				
Modbus address (based on 1)	**Variable name**	**Register number**	**Register data type**	**Register type Read/ Write**
49996	Gateway status register [1)]	1	Integer	Read
49997	WirelessHART device count (includes any disconnected)	1	Integer	Read
49998	Total Device Count (includes wired sub-devices)	1	Integer	Read
49999	Live WirelessHART device count	1	Integer	Read

1) A value of 0 indicates a "good" status

Data relating to device ID 1 in the web server device list				
Modbus address (based on 1)	**Variable name**	**Register number**	**Register data type**	**Register type Read/ Write**
40011	PV for device ID 1 (MSW)	2	Float	Read
40012	PV for device ID 1 (LSW)	2	Float	Read
40013	SV for a device ID 1 (MSW)	2	Float	Read
40014	SV for device ID 1 (LSW)	2	Float	Read
40015	TV for device ID 1 (MSW)	2	Float	Read
40016	TV for device ID 1 (LSW)	2	Float	Read
40017	QV for device ID 1 (MSW)	2	Float	Read
40018	QV for device ID 1 (LSW)	2	Float	Read
40019	Battery life for device ID 1	1	Integer	Read
40020	Number of WirelessHART neighbors	1	Integer	Read

Data relating to device ID 2 in the web server device list				
Modbus address (based on 1)	**Variable name**	**Register number**	**Register data type**	**Register type Read/ Write**
40021	PV for device ID 2 (MSW)	2	Float	Read
40022	PV for device ID 2 (LSW)	2	Float	Read
40023	SV for a device ID 2 (MSW)	2	Float	Read
40024	SV for device ID 2 (LSW)	2	Float	Read
40025	TV for device ID 2 (MSW)	2	Float	Read
40026	TV for device ID 2 (LSW)	2	Float	Read
40027	QV for device ID 2 (MSW)	2	Float	Read
40028	QV for device ID 2 (LSW)	2	Float	Read
40029	Battery life for device ID 2	1	Integer	Read
40030	Number of WirelessHART neighbors	1	Integer	Read

Data relating to device ID xxx in the web server device list				
Modbus address (based on 1)	**Variable name**	**Register number**	**Register data type**	**Register type Read/ Write**
4xxx1	PV for device ID xxx (MSW)	2	Float	Read
4xxx2	PV for device ID xxx (LSW)	2	Float	Read
4xxx3	PV for device ID xxx (MSW)	2	Float	Read
4xxx4	PV for device ID xxx (LSW)	2	Float	Read
4xxx5	PV for device ID xxx (MSW)	2	Float	Read
4xxx6	PV for device ID xxx (LSW)	2	Float	Read
4xxx7	PV for device ID xxx (MSW)	2	Float	Read

Data relating to device ID xxx in the web server device list				
Modbus address (based on 1)	**Variable name**	**Register number**	**Register data type**	**Register type Read/ Write**
4xxx8	PV for device ID xxx (LSW)	2	Float	Read
4xxx9	Battery life for Device ID xxx	1	Integer	Read
4xxx0	Number of WirelessHART neighbors	1	Integer	Read

A total of 12 devices can be read sequentially using the condensed Modbus mapping.

8.1.2 Expanded Modbus mapping

To access the expanded Modbus mapping for a specific device, select the device ID corresponding to the device ID in the gateway web server device list. Multiple devices can be queried simultaneously. For example, device ID 1 and device ID 2 can be queried simultaneously.

Data relating to device ID in the web server device list					
Modbus address (based on 1)	**Variable name**	**Register number**	**Register data type**	**Register type Read/Write**	**Information received when the following HART command is executed: (the command does not need to be repeated to access the data)**
40001 (2 bytes)	Expanded device type code	1	Enum-16	Read	HART command 0
40002	Number of preambles required for request message from client to device	1	Unsigned-8	Read	
40003	HART protocol major revision number	1	Unsigned-8	Read	
40004	Device revision level	1	Unsigned-8	Read	
40005	Software revision level	1	Unsigned-8	Read	

Data relating to device ID in the web server device list					
Modbus address (based on 1)	**Variable name**	**Register number**	**Register data type**	**Register type Read/Write**	**Information received when the following HART command is executed: (the command does not need to be repeated to access the data)**
40006	Hardware revision level	1	Unsigned-5	Read	
40007	Physical signaling code	1	Enum-3	Read	
40008	Flags	1	Bits	Read	
40009-40010 (3 bytes	Device ID	2	Unsigned-24	Read	
40011	Minimum number of preambles to be sent with response message from device to client	1	Unsigned-8	Read	
40012	Maximum number of device variables	1	Unsigned-8	Read	
40013 (2 bytes)	Configuration change counter	1	Unsigned-16	Read	
40014	Extended field device status	1	Bits	Read	
40015 (2 bytes)	Manufacturing identity code	1	Enum-16	Read	
40016 (2 bytes)	Private label distributor code	1	Enum-16	Read	
40017 (bytes)	Device profile	1	Enum-8	Read	
40018	Primary variable units	1	Enum-8	Read	HART command 1
40019-40020	Primary variable	2	Float	Read	
40021-40022	Primary variable loop current	2	Float	Read	HART command 2
40023-40024	Primary variable percent of range	2	Float	Read	
40025	Secondary variable unit code	1	Enum-8	Read	HART command 3

Data relating to device ID in the web server device list					
Modbus address (based on 1)	**Variable name**	**Register number**	**Register data type**	**Register type Read/Write**	**Information received when the following HART command is executed: (the command does not need to be repeated to access the data)**
40026-40027	Secondary variable	2	Float	Read	
40028	Tertiary variable unit code	1	Enum-8	Read	
40029-40030	Tertiary variable	2	Float	Read	
40031	Quaternary variable unit code	1	Enum-8	Read	
40032-40033	Quaternary variable	2	Float	Read	
40037	Polling address	1	Unsigned-8	Write	HART command 6
40038	Loop current mode	1	Enum-8	Write	
40039	Primary variable classification	1	Enum-8	Read	HART command 8
40040	Secondary variable classification	1	Enum-8	Read	
40041	Tertiary variable classification	1	Enum-8	Read	
40042	Quaternary variable classification	1	Enum-8	Read	
40043-40044	Primary variable damping value	2	Float	Write	HART command 34
40013 (2 bytes)	Configuration change counter	2	Unsigned-16	Write	HART command 38
40027	Damping value of the primary variables	1	Enum	Write	HART command 44
40045	Lock code	1	Enum	Write	HART command 71
40046	Read lock device state	1	Bits		HART command 76

Data relating to device ID in the web server device list					
Modbus address (based on 1)	**Variable name**	**Register number**	**Register data type**	**Register type Read/Write**	**Information received when the following HART command is executed: (the command does not need to be repeated to access the data)**
40047 (2 bytes)	Count of STX messages received	1	Unsigned-16	Read	HART command 95
40048 (2 bytes)	Count of ACK messages received	1	Unsigned-16	Read	
40049 (2 bytes)	Count of BACK messages received	1	Unsigned-16	Read	
40050	Burst message number	1	Unsigned-8	Write	HART command 103
40051-40052	Update period (time value in 1/32 ms format)	2	Time format	Write	
40053-40054	Maximum update period (time value in 1/32 ms format)	2	Time format	Write	
40059	Burst message number	1	Unsigned-8	Write	HART command 104
40060	Burst trigger mode selection code	1	Enum-8	Write	
40061	Device variable classification for trigger level	1	Enum-8	Write	
40062	Units code	1	Enum-8	Write	
40063-40064	Trigger level	2	Float	Write	
40065	Device variable code assigned to slot 0	1	Unsigned-8	Write	HART command 107
40066	Device variable code assigned to slot 1	1	Unsigned-8	Write	
40067	Device variable code assigned to slot 2	1	Unsigned-8	Write	

Data relating to device ID in the web server device list					
Modbus address (based on 1)	**Variable name**	**Register number**	**Register data type**	**Register type Read/Write**	**Information received when the following HART command is executed: (the command does not need to be repeated to access the data)**
40068	Device variable code assigned to slot 3	1	Unsigned-8	Write	
40069	Device variable code assigned to slot 4	1	Unsigned-8	Write	
40070	Device variable code assigned to slot 5	1	Unsigned-8	Write	
40071	Device variable code assigned to slot 6	1	Unsigned-8	Write	
40072	Device variable code assigned to slot 7	1	Unsigned-8	Write	
40073	Burst message number	1	Unsigned-8	Write	
40074	Command number of response message to be initiated	1	Unsigned-16	Write	HART command 108
40075	Burst message number	1	Unsigned-8	Write	
40076	Burst mode control code	1	Unsigned-8	Write	HART command 109
40077	Burst message number	1	Unsigned-8	Write	
40078 (2 bytes)	Country code	1	Latin-1	Read/Write	HART command 512
40079	SI unit	1	Enum-8	Read/Write	HART command 513
40135-40142 (15 bytes)	Join key value	9	Unsigned-128	Write	HART command 768
40143	Wireless mode	1	Enum-4	Read	HART command 769
40144 (2 bytes)	Join status	1	Bits-16	Read	

Data relating to device ID in the web server device list					
Modbus address (based on 1)	**Variable name**	**Register number**	**Register data type**	**Register type Read/Write**	**Information received when the following HART command is executed: (the command does not need to be repeated to access the data)**
40145	Number of available neighbor	1	Unsigned-8	Read	
40146	Number of advertising packet received	1	Unsigned-8	Read	
40147	Number of join attempts	1	Unsigned-8	Read	
40148-40149	Join retry timer	2	Time	Read	
40150-40151	Network search time	2	Time	Read	
40156 (2 bytes)	Network ID	1	Unsigned-16	Read/Write	HART command 773/774
40157 (2 bytes	Battery life	1	Unsigned-16	Read	HART command 778
40158 (2 bytes)	Number of packets generated by this device since last report	1	Unsigned-16	Read	HART command 779
40159 (2 bytes)	Number of packets terminated since last report	1	Unsigned-16	Read	
40160	Number of MAC MIC failures	1	Unsigned-8	Read	
40161	Number of network MIC failures	1	Unsigned-8	Read	
40162	Power status	1	Enum-8	Read	
40195	Nickname	1	Unsigned-16	Read	HART command 781
40163	Timer type	1	Enum-8	Read/Write	HART command 795/796
40164-40165 (4 bytes)	Timer interval	2	Unsigned-32	Read/Write	
40166	Output power in dbm	1	Signed-8	Read/Write	HART command 797/798

Data relating to device ID in the web server device list					
Modbus address (based on 1)	**Variable name**	**Register number**	**Register data type**	**Register type Read/Write**	**Information received when the following HART command is executed: (the command does not need to be repeated to access the data)**
40167	CCA mode	1	Enum-8	Read/Write	HART command 804/805
40168	Currently configured time-to-live	1	Unsigned-8	Read/Write	HART command 808/809
40169	Join priority	1	Unsigned-8	Read/Write	HART command 810/811
40170	Number of bits in the current channel mapping array	1	Unsigned-8	Read/Write	HART command 817
40171	Current channel map array	1	Bits	Read/Write	
40172	Pending channel mapping array Each bit corresponds to one channel.	1	Bits	Read	
40173	Number of bits in the new channel mapping array	1	Unsigned-8	Write	HART command 818
40174	Pending channel mapping array	1	Bits	Write	
40175	Code for network access mode	1	Enum	Read/Write	HART command 821/822
40391-40393 (5 bytes)	Unique ID of device	4	Unsigned-40	Read	HART command 840
40394 (2 bytes)	Number of graphics active	1	Unsigned-16	Read	
40395 (2 bytes)	Number of frames active	1	Unsigned-16	Read	
40396 (2 bytes)	Number of links active	1	Unsigned-16	Read	
40397	Number of neighbors	1	Unsigned-8	Read	

Data relating to device ID in the web server device list					
Modbus address (based on 1)	**Variable name**	**Register number**	**Register data type**	**Register type Read/Write**	**Information received when the following HART command is executed: (the command does not need to be repeated to access the data)**
40398-40399	Average communication latency	2	Time	Read	
40400 (2 bytes)	Number of joins	1	Unsigned-16	Read	
40401-40402	Date of most recent join	2	date	Read	
40403-40404	Time of date when the device most recently join	2	Time	Read	
40405-40406	Number of packets generated by this device	2	Unsigned-32	Read	
40407-40408	Number of packets terminated by this device	2	Unsigned-32	Read	
40409-40410	Number of data-link layer MIC failures detected	2	Unsigned-32	Read	
40411-40412	Number of network layer (session) MIC failures detected	2	Unsigned-32	Read	
40413-40414	Number of CRC errors detected	2	Unsigned-32	Read	
40415-40416	Number of nonce counter values not received by this device	2	Unsigned-32	Read	
40417-40418	Number of nonce counter values not received from the device	2	Unsigned-32	Read	
40419-40420	Standard deviation of latency	2	Time	Read	

Data relating to device ID in the web server device list					
Modbus address (based on 1)	**Variable name**	**Register number**	**Register data type**	**Register type Read/Write**	**Information received when the following HART command is executed: (the command does not need to be repeated to access the data)**
40194	Reason	1	Unsigned-8	Write	HART command 960
40195	Nickname	1	Unsigned-16	Write	HART command 962
40196-40198	Time at which to suspend network	3	Unsigned-40 (unsigned integer 40 bits long)	Write	HART command 972
40199-40201	Time at which to resume network	3	Unsigned-40 (unsigned integer 40 bits long)	Write	
40202-40217	Long tag	16	Latin-1	Read	HART command 20
40218-40229	Message	12	Packed	Read	HART command 12
40230	Resetting the device	1	None	Read	HART command 42
40231-40233 (6 bytes)	Device specific status	3	Bits or enum only	Read	HART command 48
40234	Extended device status	1	Bits	Read	
40235	Device operating mode	1	Enum-8	Read	
40236	Standardized status 0	1	Bits	Read	
40237	Standardized status 1	1	Bits	Read	
40238	Analog channel saturated	1	Bits	Read	
40239	Standardized status 2	1	Bits	Read	
40240	Standardized status 3	1	Bits	Read	
40241	Analog channel fixed	1	Bits	Read	

Data relating to device ID in the web server device list					
Modbus address (based on 1)	**Variable name**	**Register number**	**Register data type**	**Register type Read/Write**	**Information received when the following HART command is executed: (the command does not need to be repeated to access the data)**
40242-40247 (11 bytes)	Device specific status	6	Bits or enum only	Read	
40310	Maximum no. of I/O cards	1	Unsigned-8	Read	HART command 74
40311	Maximum no. of channels per I/O cards	1	Unsigned-8	Read	
40312	Maximum no. of sub-devices per channel	1	Unsigned-8	Read	
40313	Number of devices detected	1	Unsigned-16	Read	
40314	Maximum number of delayed responses	1	Unsigned-8	Read	
40315	Master mode for communication on channels	1	Enum-8	Read	
40316	Retry count to use when sending commands to a sub-device	1	Unsigned-8	Read	
40318-40329 (24 bytes)	Message string	12	Packed	Write	HART command 17
40331-40346 (32 bytes)	Long tag	16	Latin-1	Write	HART command 22
40345 -40361 (subdevice only)	Same as command 0	17	Enum-16	Read	HART command 75 (subdevice only)
40360	Burst message number	1	Unsigned-8	Write	HART command 105
40362	Burst mode control code	1	Unsigned-8	Read	
40363	Command number expansion flag	1	Unsigned-8	Read	

Data relating to device ID in the web server device list					
Modbus address (based on 1)	**Variable name**	**Register number**	**Register data type**	**Register type Read/Write**	**Information received when the following HART command is executed: (the command does not need to be repeated to access the data)**
40364	Device variable code assigned to slot 0	1	Unsigned-8	Read	
40365	Device variable code assigned to slot 1	1	Unsigned-8	Read	
40366	Device variable code assigned to slot 2	1	Unsigned-8	Read	
40367	Device variable code assigned to slot 3	1	Unsigned-8	Read	
40368	Device variable code assigned to slot 4	1	Unsigned-8	Read	
40369	Device variable code assigned to slot 5	1	Unsigned-8	Read	
40370	Device variable code assigned to slot 6	1	Unsigned-8	Read	
40371	Device variable code assigned to slot 7	1	Unsigned-8	Read	
40372	Burst message number	1	Unsigned-8	Read	
40373	Maximum number of burst messages supported by the device	1	Unsigned-8	Read	
40374 (2 bytes)	Extended command number	1	Unsigned-16	Read	
40375-40376	Update time in 1/32 of a millisecond	2	Time format	Read	

Data relating to device ID in the web server device list					
Modbus address (based on 1)	**Variable name**	**Register number**	**Register data type**	**Register type Read/Write**	**Information received when the following HART command is executed: (the command does not need to be repeated to access the data)**
40377-40378	Maximum update time in 1/32 of a millisecond	2	Time format	Read	
40379	Burst trigger mode code	1	Enum-8	Read	
40380	Device variable classification for trigger value	1	Enum-8	Read	
40381	Units code	1	Enum-8	Read	
40382-40383	Trigger value	2	Float	Read	

The SWG50 Modbus mapping uses PLC-based Modbus addressing with 1-based addressing; numbering starts at 1. For example, the first register is labeled 0001. Standard Modbus addresses, on the other hand, are 0-based, i.e. numbering starts at 0. For example, the first register is labeled 0000. When the Modbus mapping is used, the register offset must be taken into account depending on the addressing type used.

The SWG50 device ID can be found on the device web server. To do so, enter the correct IP address in your web browser and select the **WirelessHART/Devices** menu. The device ID to be used for the mapping is 254 (for the condensed mapping) or the required device ID from the web server device list (for the expanded mapping).

An important feature of the expanded mapping registers is that the device long tag can be obtained by reading registers 40202–40217 (16 registers) and converting the result from hexadecimal to Latin-1:

Example:

Modbus address (based on 1)	Value (hex)
0x40202	0x5357
0x40203	0x4137
0x40204	0x302D
0x40205	0x3031
0x40206	0x5F4E
0x40207	0x4557

Modbus address (based on 1)	Value (hex)
0x40208	0x0000
0x40209	0x0000
0x40210	0x0000
0x40211	0x0000
0x40212	0x0000
0x40213	0x0000
0x40214	0x0000
0x40215	0x0000
0x40216	0x0000
0x40217	0x0000

53574137302D30315F4E4557 = SWA70_01_NEW

Another important feature of the expanded mapping is the ability to write to Modbus registers and actively modify device parameters, such as the update period in write burst mode:

Modbus address (based on 1)	Value (hex)
0X40050	0x0000
0x40051	0x0003
0x40052	0xE800
0x40053	0x0003
0x40054	0xE800

40050 - Burst message (0-9 for SWA70 and 0-4 for SWA50)

40051-40052 - Update period (1/32 ms, hexadecimal format)

40053-40054 - Maximum update period (1/32 ms, hexadecimal format)

Example: 8 seconds burst period, 8 x 1000 (conversion of seconds to milliseconds) x 32 (time format multiplier) = 256000 decimal or 0x0003 E800.

8.1.3 Modbus exception codes

Code	Meaning
0x01	No request bytes present (expanded mapping only). Invalid read request for "Number of neighbors" register from sub-device (condensed mapping only).
0x02	Starting address does not exist in mapping.
0x03	Starting register valid, but length of requests spans at least one unmapped register WirelessHART device disconnected (condensed mapping only).

Code	Meaning
0x06	WirelessHART field device is engaged in processing another command. Retry later.
0x0b	Indicates that no response was obtained from the target device.

To avoid Modbus exception notifications, read each individual device data independently. In case of device disconnection, reading data from multiple devices in one block read will result in complete Modbus block read error.

8.2 HART IP

8.2.1 Gateway terminated commands

The FieldGate SWG50 provides information on the following HART commands:

Command	Function
Universal commands	
0	Read Unique Identifier
12	Read Message
13	Read Tag, Descriptor, Date
17	Write Message
18	Write Tag, Descriptor, Date
20	Read Long Tag
22	Write Long Tag
38	Reset Configuration Changed Flag
Common practice commands	
74	Read I/O system capabilities
77	Send command to sub-device
84	Read sub-device identity summary
89	Set real-time clock
106	Flushed delayed responses
Wireless commands	
773	Read Network ID
774	Write Network ID
836	Flush cached response for a device

8.2.2 Special commands

The FieldGate SWG50 supports the activation of Fast Pipes for block data transfer using the following commands:

CMD 146 (Write Device Fast Pipe Status)	Byte(s) Value
Request	0-4 5-byte Device Unique ID

5 Pipe Status (OFF, ON_BI, ON_UP, ON_DOWN)	Byte(s) Value
Response	0-4 5-byte Device Unique ID 5 Pipe Status (OFF, ON_BI, ON_UP, ON_DOWN)

CMD 147 (Get Device ID of Active Pipe)	Byte(s) Value
Request None Response	0-4 5-byte Device Unique ID

CMD 147 (Get Device ID of Active Pipe)	Byte(s) Value
Request None Response	0-4 5-byte Device Unique ID

CMD 148 (Write Device Routing Status)	Byte(s) Value
Request	0-4 5-byte Device Unique ID 5 Routing Status (Enable/Disable) Response
	0-4 5-byte Device Unique ID 5 Routing Status (Enable/Disable)

9 EtherNet/IP converter (optional)

The EtherNet/IP converter (GW EIP/MODBUS 1E/1DB9) enables bidirectional communication between EtherNet/IP TM and Modbus protocols. It has an RJ45 port and a D-SUB-9 port.

The EtherNet/IP converter is an accessory that can be ordered for the FieldGate SWG50: https://www.endress.com/swg50

9.1 Configuration and commissioning

Prerequisites

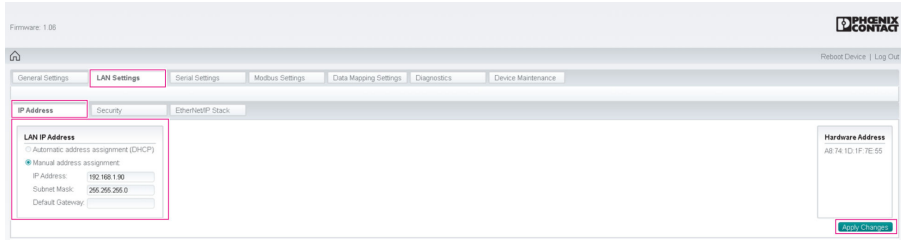
- EtherNet/IP converter (GW EIP/MODBUS 1E/1DB9) has been commissioned in accordance with the supplied user manual of the manufacturer.
- EtherNet/IP converter is connected to the FieldGate SWG50 via an Ethernet cable.

The web-based management interface of the EtherNet/IP converter allows configuration means of a standard browser.

Logging on to the web server

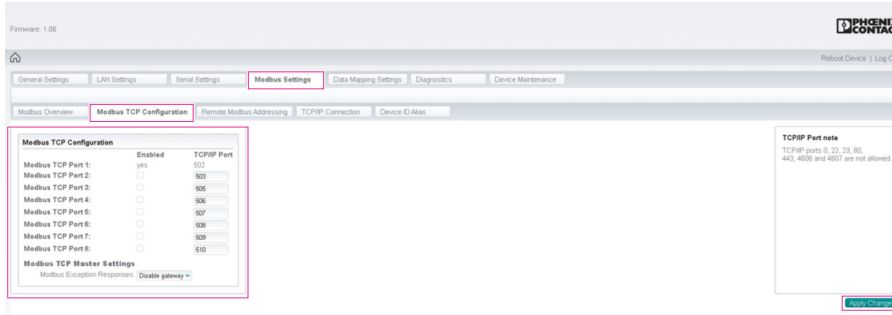
1. Set the IP address of the connected PC to the subnet of the gateway (EIP/MODBUS): example: IP = 192.168.254.10, subnet = 255.255.255.0.
2. Open a web browser and enter the IP address of the gateway (EIP/MODBUS) in the address bar (standard: 192.168.254.254).
3. Enter the access data for the web server configuration. The default access data are: user name: admin, default password: admin
   ↳ A connection to the EtherNet/IP converter is established.

Setting the IP address of the FieldGate SWG50

1. 

   On the **LAN Settings** page, select the **IP Address** tab.
   ↳ The "LAN IP Address" input screen appears.
2. Enter the IP address of the SWG50.
3. Confirm entry with **Apply Changes**.
   ↳ The IP address of the FieldGate SWG50 has been set.

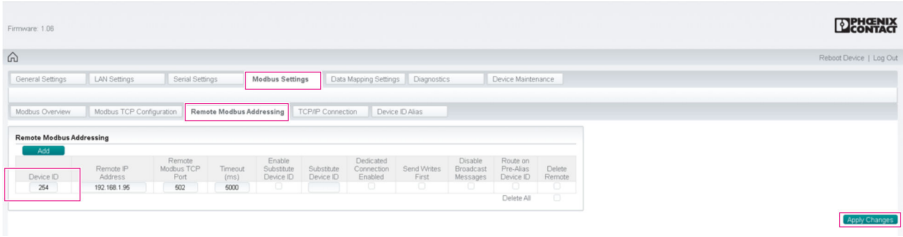
Setting the Modbus TCP port in the web server of the EtherNet/IP converter

1. 

   On the **Modbus Settings** page, select the **Modbus TCP Configuration** tab.
   ↳ The "Modbus TCP Configuration" input screen appears.

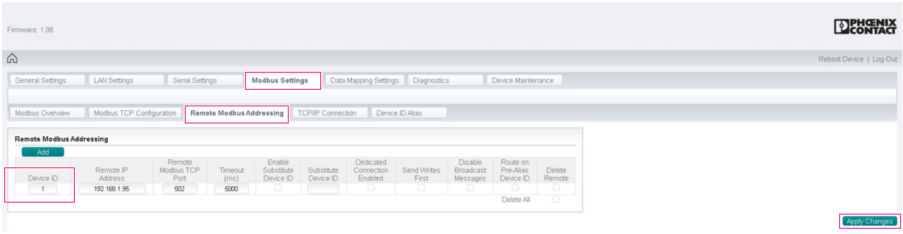
2. Select the Modbus TCP port (default value 502).
3. Confirm your choice with **Apply Changes**.
   ↳ The Modbus TCP port is set.

Setting the Modbus remote address (for condensed Modbus mapping)

1. 

   On the **Modbus Settings** page, select the **Remote Modbus Addressing** tab.
   ↳ The "Remote Modbus Addressing" input screen appears.
2. Enter Device ID 254 in the Device ID field.
3. Confirm your choice with **Apply Changes**.
   ↳ The device ID for condensed Modbus mapping is set.

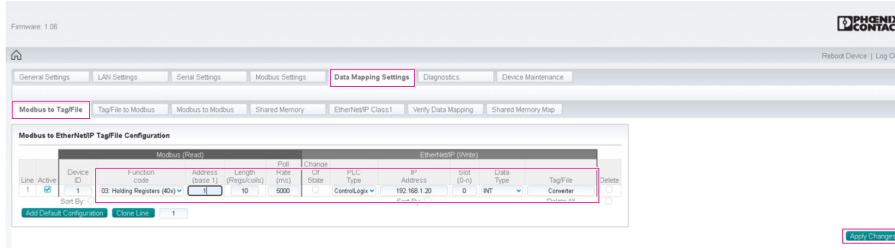
Setting the Modbus remote address (for expanded Modbus mapping)

1. 

   On the **Modbus Settings** page, select the **Remote Modbus Addressing** tab.
   ↳ The "Remote Modbus Addressing" input screen appears.
2. Enter Device ID 1-250 in the Device ID field.
3. Confirm your choice with **Apply Changes**.
   ↳ The device ID for expanded Modbus mapping is set.

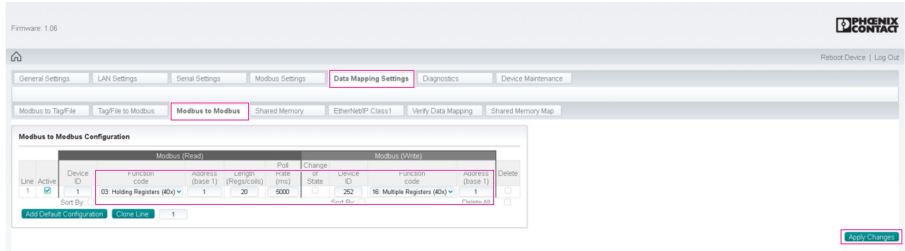
Depending on the Modbus mapping type used, either Device ID XXX (XXX = 1-250 corresponds to the Device ID from the device list in the FieldGate SWG50 web server) for expanded Modbus mapping → 🖹 30 or the device ID 254 for condensed Modbus mapping → 🖹 27 is used.

Setting expanded Modbus mapping

1. 

   On the **Data Mapping Settings** page, select the **Modbus to Tag/File** tab.

   ↳ The "Modbus to EtherNet/IP Tag/File Configuration" input screen appears.

2. Complete the fields under **Modbus (Read)** and **EtherNet/IP (Write)** .
3. Confirm entry with **Apply Changes**.
4. 

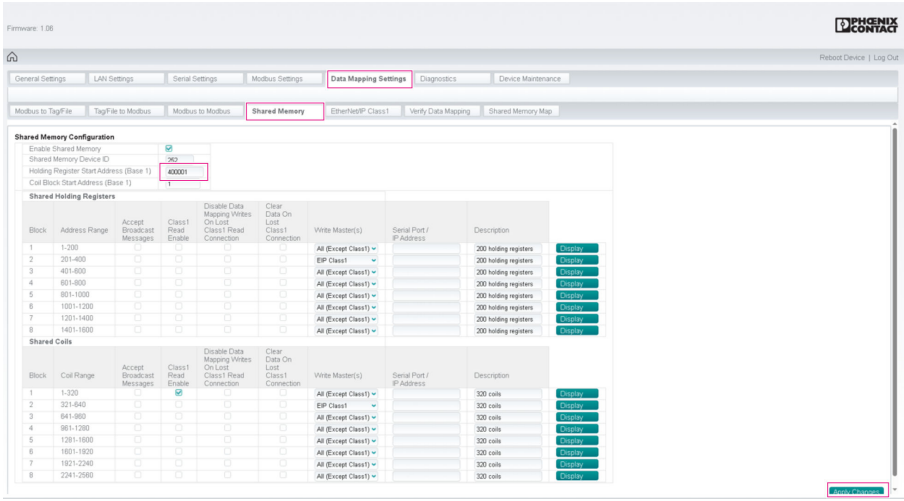
   On the **Data Mapping Settings** page, select the **Modbus to Modbus** tab.

   ↳ The "Modbus to Modbus Configuration" input screen appears.

5. Complete the fields under **Modbus (Read)** and **EtherNet/IP (Write)** .
6. Confirm entry with **Apply Changes**.

   ↳ Expanded Modbus mapping is set.

7.



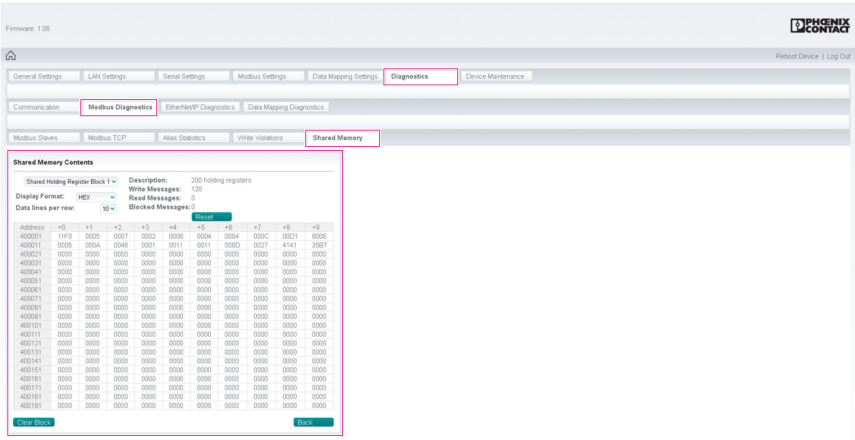
On the **Data Mapping Settings** page, select the **Shared Memory** tab.

↳ "Shared Memory Configuration" appears.

8. Enter the Modbus address in the **Holding Register Start Adress (Base 1)** field.

9. Confirm entry with **Apply Changes**.

↳



The values of the measuring instrument are displayed on the **Diagnostic** page in the **Modbus Diagnostics/Shared Memory** tab.

To display the measured values of the measuring instrument in the condensed Modbus mapping, repeat steps 1 to 8. The only difference is that the correct Modbus address must be entered in step 8.

9.2 1. Integration into a Rockwell PLC (example)

Prerequisites

- Module drivers have been downloaded, extracted and installed.
- Rockwell Studio 5000 is installed.

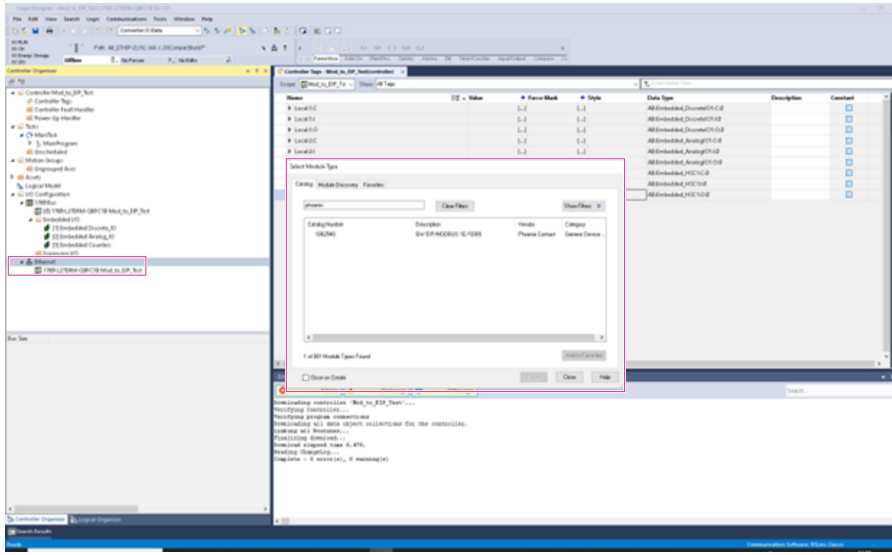
Module drivers can be downloaded from the official Phoenix Contact website.

File	Description	Language	Version
EDS_GW-EIP-MODBUS_1_02_20190805.zip (12.7 kB)	EDS file for project planning	Multilingual	1.02

8 Module driver for GW EIP/MODBUS 1E/1DB9

Opening Rockwell Studio 5000

▶



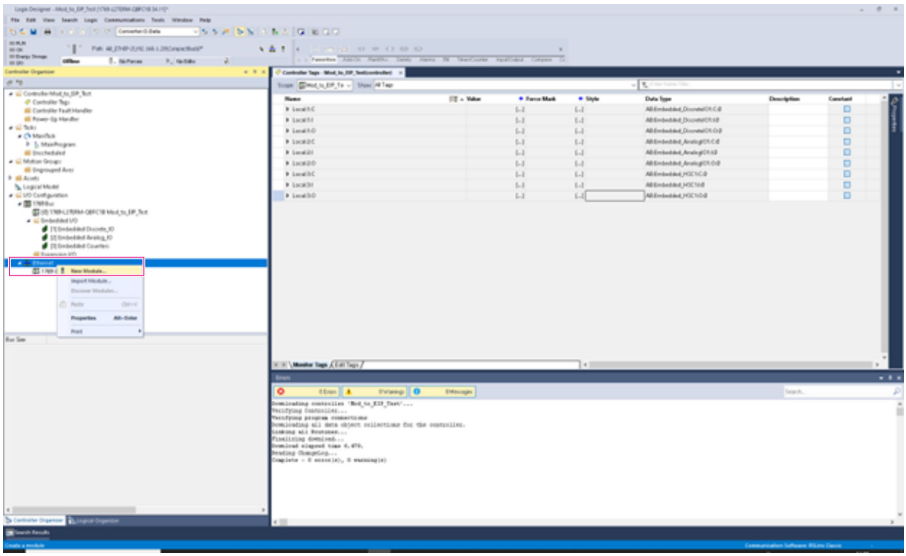
In the left-hand pane of the window, click **Ethernet**.

↳ The device catalog is opened.

The tag name must be identical to the name in the web server of the converter. If the entries do not match, contact your local service organisation.

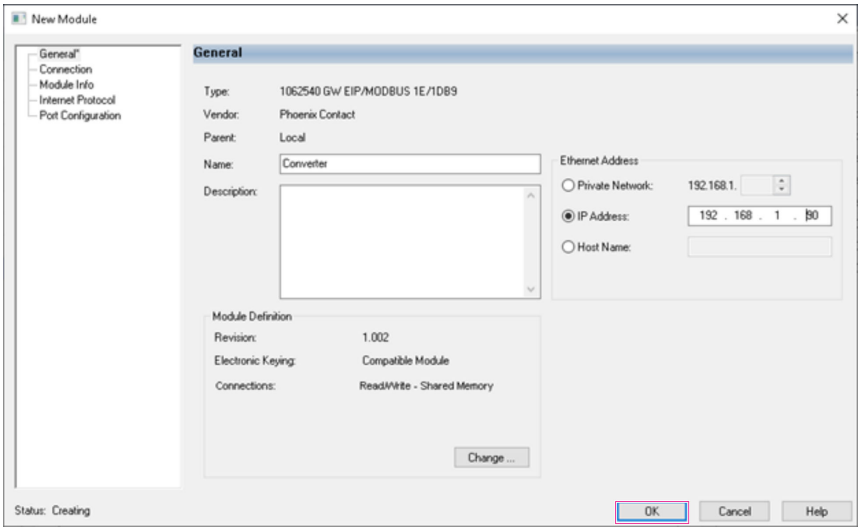
Creating a new module

1.

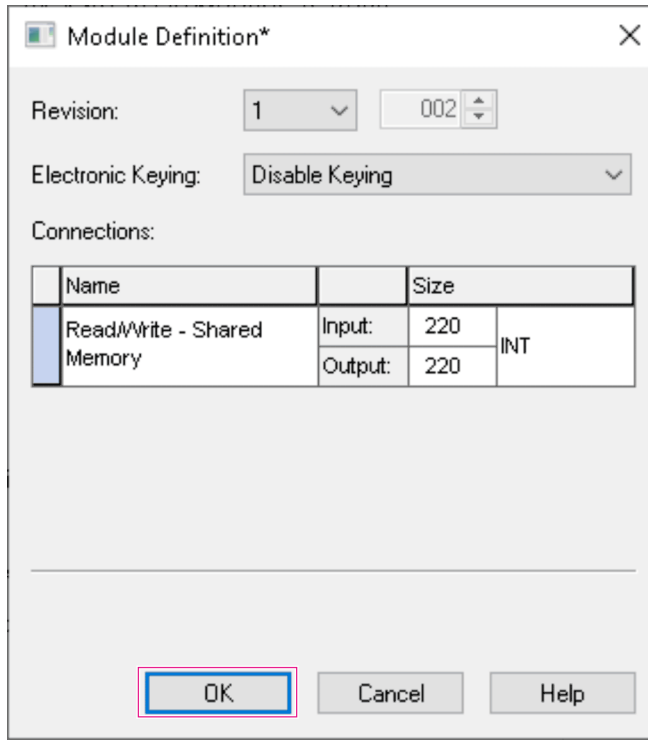


In the left-hand pane of the window, right-click **Ethernet** and select **New Module...**.

↳ The "New Module" dialog box is opened.

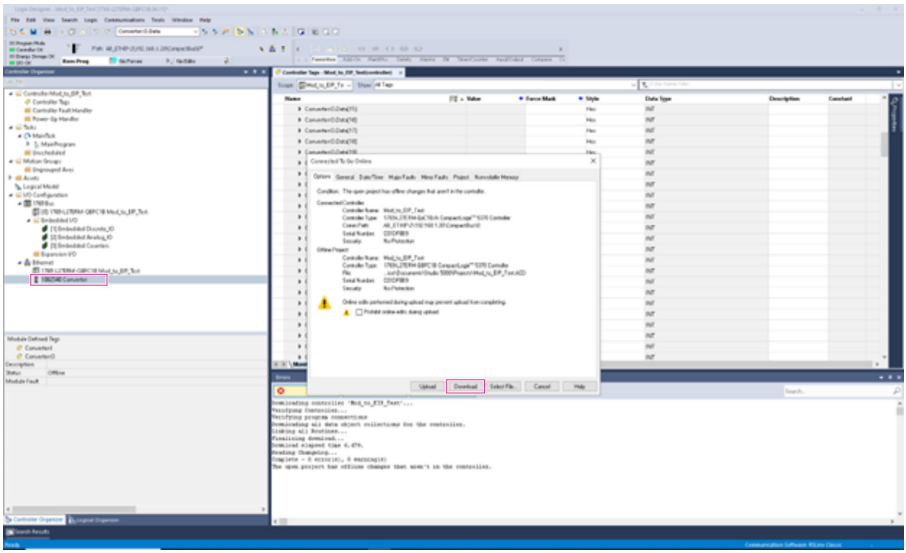


2. Click **OK**.
   ↳ The "Module Definition" dialog box is opened.



3. Press **OK** to confirm.

Switching to online operating mode

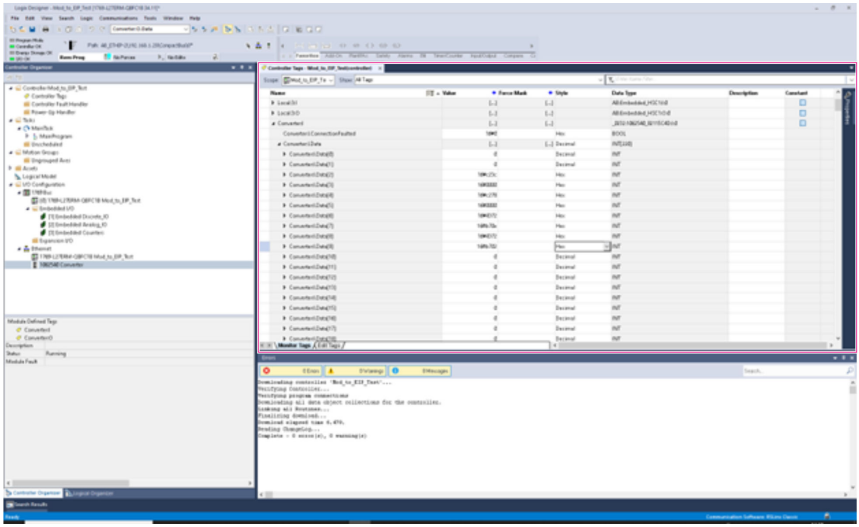
1. 

In the left-hand pane of the window, double-click **Converter.**

↳ The "Conected to Go online" dialog box is opened.

2. Click the **Download** button.

↳ HEX data are displayed.



10 Commissioning

10.1 Function check

- Post-mounting check → 14
- Post-connection check

10.2 Configuring the device

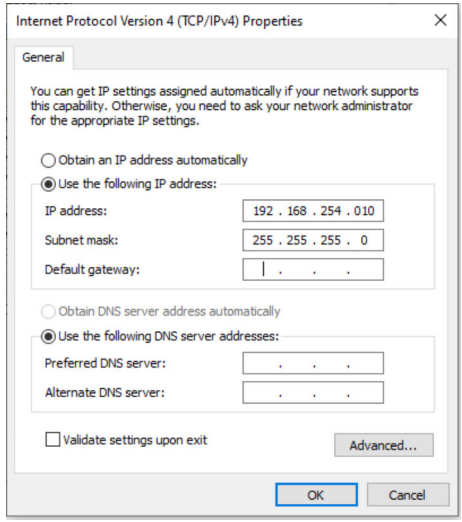
1. Connect the device to the network.
2. Adjust the IP address of the connected PC to the IP range of the SWG50 as follows.

Default IP of FieldGate SWG50:

IP address: 192.168.254.254

Subnet mask 255.255.255.0

3. Open network connections.
4. Select **Properties** by clicking the right mouse button.
   ↳ The **General** dialog box opens.



5. Click **Use the following IP address** and enter IP address.
6. Enter "255.255.255.0" in the **Subnet mask** field and click **OK**.

The IP address assigned to the PC must be different to that of the FieldGate SWG50.

10.3 Login

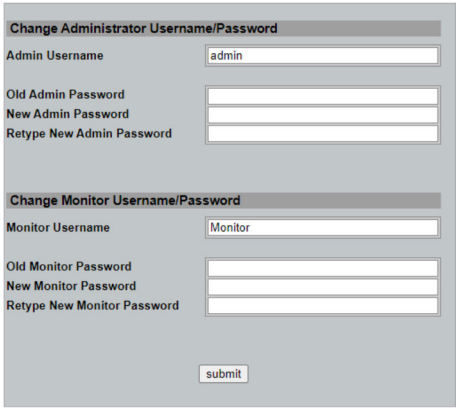
1. Ensure that the connected PC is in the IP range of the FieldGate SWG50.
2. Open the web browser and enter the IP address of the FieldGate SWG50.
   ↳ The web server with the login window opens.
3. Enter the login credentials: username "admin" , password "admin".
   ↳ The web server opens.

Change the default password when logging in for the first time. → 54

Operating multiple devices with factory-preset IP addresses will cause a network conflict, and incorrect parameters may be configured in the FieldGate SWG50 modules. When programming modules for the first time, it is important to switch on only one at a time and to change the IP address of each module to a unique IP address. Once all devices have a unique IP address, they can be switched on together in the same network.

10.3.1 Changing the username and password

1. In the Navigation menu, click **Configuration -> Usernames/Passwords**.
   ↳ The **Configuration - Usernames/Passwords Modification** dialog box appears.



2. Make changes and click **Submit**.

The changes are accepted.

11 Diagnostics and troubleshooting

11.1 General troubleshooting

Problem	Solution
Access to web server is not possible.	Check power supply to device (ST-LED on ERR-LED off). Check cable connection between PC and device. Check network settings of PC and device. Check IP addresses and subnet mask.
Connection to WirelessHART devices is taking too long or they are not communicating with each other.	"Active Advertising" must be enabled. Check wiring of the devices. Check power supply. Check network ID and network password. Check correct hexadecimal representation of network ID and network password. Check communication range of the device and the WirelessHART devices in the same network.
Error LED is lit	Check status notifications Configuration file is corrupted or missing: problem reading/parsing the XML configuration file of the device One or more systems could not start properly or an application could not be initialized: If the errors are not deleted after a few minutes, the device must be restarted. Important system components could not be initialized correctly: Check applications and tools. Network manager queue full: Reduce scan rate. Up to 100 notifications can be stored.
Modbus	Check Modbus addresses. Check support for commands from WirelessHART device, adapter and HART device.
WirelessHART device connects and disconnects	Check stability and number of joins. If joins increase, add repeater.
No connection from new device	Check network ID and connection key. Check access control list. Ensure that the new device is switched on.
Low battery life	Replace battery.
Wireless signal too weak	Make sure the antenna is not blocked.
Weak network	Check communication. Each device must be able to communicate with at least three devices.

11.2 Diagnostic information via light emitting diodes

ST	flashing green	Voltage applied, device is active
	flashing red	Device is initializing
	off	Device off
MESH	lit green	WirelessHART device connected
	off	No WirelessHART device connected

ERR	lit red	Internal error
	off	Normal operation

11.3 Diagnostic information in web browser

Advanced diagnostics are possible via the integrated web server.

11.4 Event logbook

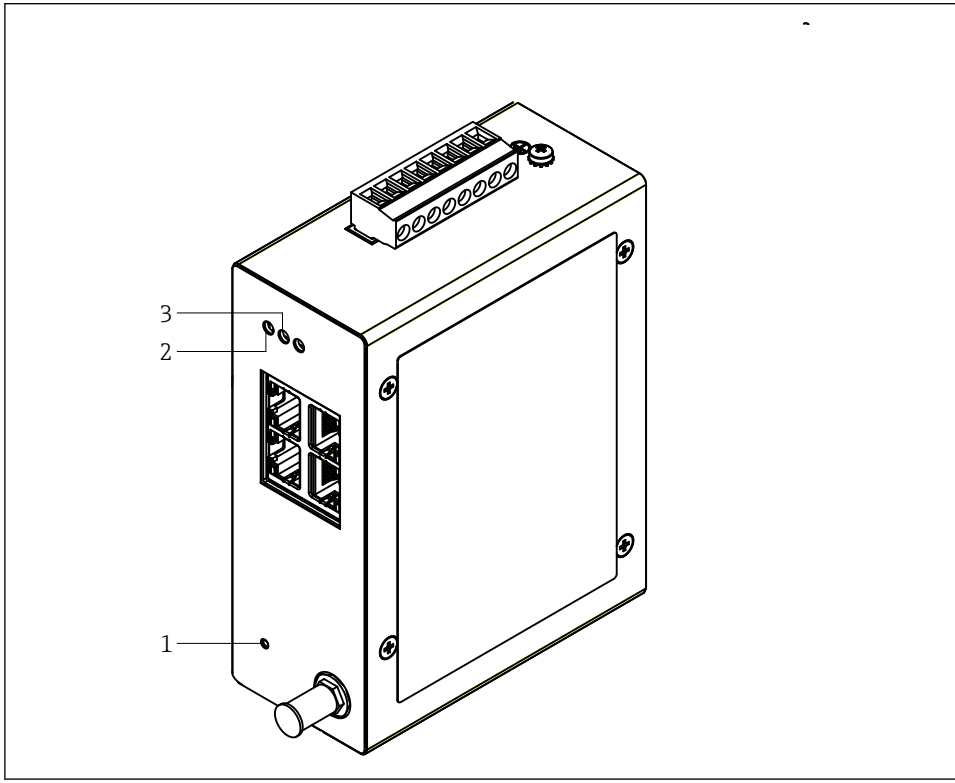
This page shows the system protocol. It may take several seconds for the page to load.

- In the Navigation menu, click **Monitoring/Reports -> System Log**.
  - The **Monitoring - System Log** dialog box appears.

11.5 Resetting the device

The device can be reset using either the reset button or the web server.

Resetting the device using the reset button

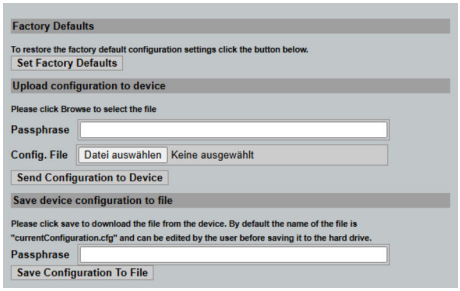


1 Reset button
2 "ST" LED
3 "MESH" LED

▶ Press and hold the reset button for 10 seconds.
↳ If active, the "ST" and "MESH" LEDs switch off after 10 seconds.
After 20 seconds, the "ST" and "RED" LEDs flash for 30 seconds.
The device has been successfully reset when the "ST" LED lights up green continuously.

Resetting the device via the web server

▶ In the Navigation menu, click **Configuration -> Store Retrieve Settings**.
↳ The **Configuration - Store Retrieve Settings** dialog box appears.



▶ Click the **Set Factory Defaults** button.
↳ All settings, including the IP address, are reset to the factory settings.

Uploading the configuration to the device:

1. Click the **Select file** button.
2. Navigate to the desired file. The **Passphrase** field must be completed.
3. Click the **Send Configuration to Device** button.
   ↳ The upload starts.

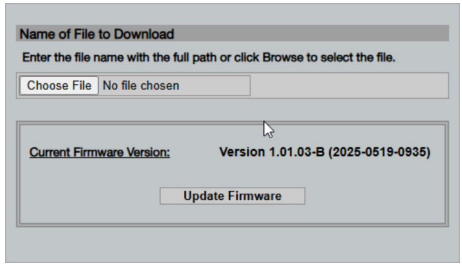
The FieldGate SWG50 can export an existing configuration to the hard drive of a PC. Please note that a passphrase is required. A 10-digit passphrase is necessary to protect and then validate the file before it is saved or can be retrieved from a PC. It prevents unauthorized users from applying the system configuration file to an unauthorized access point to gain access to the network. Make a note of this passphrase whenever you save a configuration file. It must be re-entered each time the configuration file is uploaded to the gateway.

12 Maintenance

12.1 Firmware update

On this page the current firmware can be displayed or a version installed.

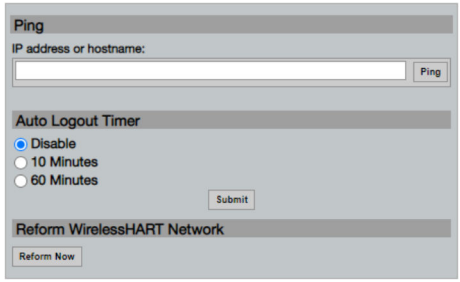
1. In the Navigation menu, click **Maintenance -> Firmware Update**.
   ↳ The **Software Updates** dialog box appears.



2. Click the **Select file** button and navigate to the required file.
3. Click Update Firmware.
   ↳ The new firmware version is installed.

12.2 Utilities

▶ In the Navigation menu, click **Maintenance -> Utilities**.
   ↳ The **Utilities** dialog box appears.



Ping

1. Enter the **IP address** or **host name**.
2. Click the **Ping** button.

The display indicates if the device is connected and operational.

Auto Logout Timer

1. Select the relevant option.
2. Click the **Submit** button.

The changes are accepted. Access to the web server is terminated after the selected period has elapsed.

Reform WirelessHART Network

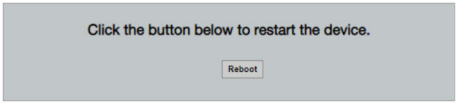
▶ Click the **Reform Now** button.

The WirelessHART network is reorganized.

12.3 Reboot

The FieldGate SWG50 can be restarted on this page.

1. In the Navigation menu, click **Maintenance -> Reboot**.
   ↳ The **Reboot Device** dialog box appears.



2. Click the **Reboot** button.
3. Confirm **Reboot**.
   ↳ The FieldGate SWG50 restarts.

13 Repair

13.1 General information

Repairs may only be performed by Endress+Hauser staff or by individuals authorized and trained by Endress+Hauser.

13.2 Spare parts

Accessories currently available for the product can be selected via the Product Configurator at www.endress.com:

1. Select the product using the filters and search field.
2. Open the product page.
3. Select **Spare parts & Accessories**.

13.3 Return

The requirements for safe device return can vary depending on the device type and national legislation.

1. Refer to the web page for information:
   http://www.endress.com/support/return-material
   ↳ Select the region.
2. Return the device if repairs or a factory calibration are required, or if the wrong device was ordered or delivered.

13.4 Disposal

If required by the Directive 2012/19/EU on waste electrical and electronic equipment (WEEE), the product is marked with the depicted symbol in order to minimize the disposal of WEEE as unsorted municipal waste. Do not dispose of products bearing this marking as unsorted municipal waste. Instead, return them to the manufacturer for disposal under the applicable conditions.

14 Accessories

Accessories currently available for the product can be selected via the Product Configurator at www.endress.com:

1. Select the product using the filters and search field.
2. Open the product page.
3. Select **Spare parts & Accessories**.

15 Technical data

For detailed information on the "technical data", see the Technical Information.

www.addresses.endress.com

Endress+Hauser
People for Process Automation