Technical Information
Fieldgate SFG500

Smart Ethernet/PROFIBUS gateway

Parallel access to PROFIBUS networks
Monitoring of PROFIBUS and HART device status

Application

Fieldgate SFG500 is a system component that provides independent access to a PROFIBUS network. It can be used in a variety of applications that are supported by specific operating modes. The suitable operating mode is determined by an optional memory card (Fieldgate module SFM500). Without a memory card, Fieldgate SFG500 acts as a plant access point. In this case, it functions as an Ethernet gateway with adaptive PROFIBUS Master Class 2 capabilities and supports FDT-based plant asset management applications, such as FieldCare for example. When a memory card is used, device diagnostics information such as the NAMUR NE107 status, with the reason for failure and remedial measures, as well as process values from PROFIBUS and HART devices are displayed in the integrated Web browser.

Your benefits

- PROFIBUS listener and Master Class 2: integrates automatically into a PROFIBUS network and finds all PROFIBUS devices
- HART support via PROFIBUS: HART device support and device diagnostics
- PROFIBUS observer: monitors network traffic and process values with device diagnostics
- Web server: provides a clear overview of the network and diagnostic information via the Web browser or FDT/DTM frame application
- SFGNetwork DTM: finds all the Fieldgate SFG500 devices in an Ethernet domain and displays their PROFIBUS connections
- Fieldgate module SFM500: enables the functions for displaying process values and diagnostics information

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Function and system design

Function	**Access point**

The simplest application is to use the Fieldgate SFG500 as an access point together with FieldCare, Endress+Hauser's plant asset management system. In this scenario, FieldCare accesses all the devices in the PROFIBUS DP segment via the SFGNetwork DTM. Apart from setting the IP address, and the PROFIBUS bus parameters in some cases, no additional configuration is required.

Fieldgate module SFM500

Fieldgate SFG500 can be used for other applications with the Fieldgate module SFM500. The SFM500 activates the appropriate operating mode and enables the necessary outputs (Modbus RS485 interface, relay output).

System design

The control network comprises, for example, a PLC or DCS system and one or more PROFIBUS DP segments. Depending on the actual scenario, it is possible that additional Class 1 Masters are connected to the network. In addition, PROFIBUS DP slaves, remote I/Os and segment couplers or PA links are also connected to the PROFIBUS DP segment. With remote I/Os, for example, it is possible to integrate HART devices into the PROFIBUS DP network. Segment couplers or PA links establish a connection to PROFIBUS PA slaves and also provide them with power.

Via its Ethernet port, Fieldgate SFG500 allows host applications to access data from the PROFIBUS DP segment independently of the control system. The local area network (LAN) in which the host applications operate can be a separate network or an integral part of the control network. Fieldgate SFG500 only connects to one PROFIBUS DP segment. If there is more than one segment in a PROFIBUS DP network, a separate SFG500 module is required for every segment.

Fieldgate SFG500 can be configured from any computer in the LAN via a Web browser (e.g. Internet Explorer). LAN2 has a DHCP server which assigns an address to a connected computer.
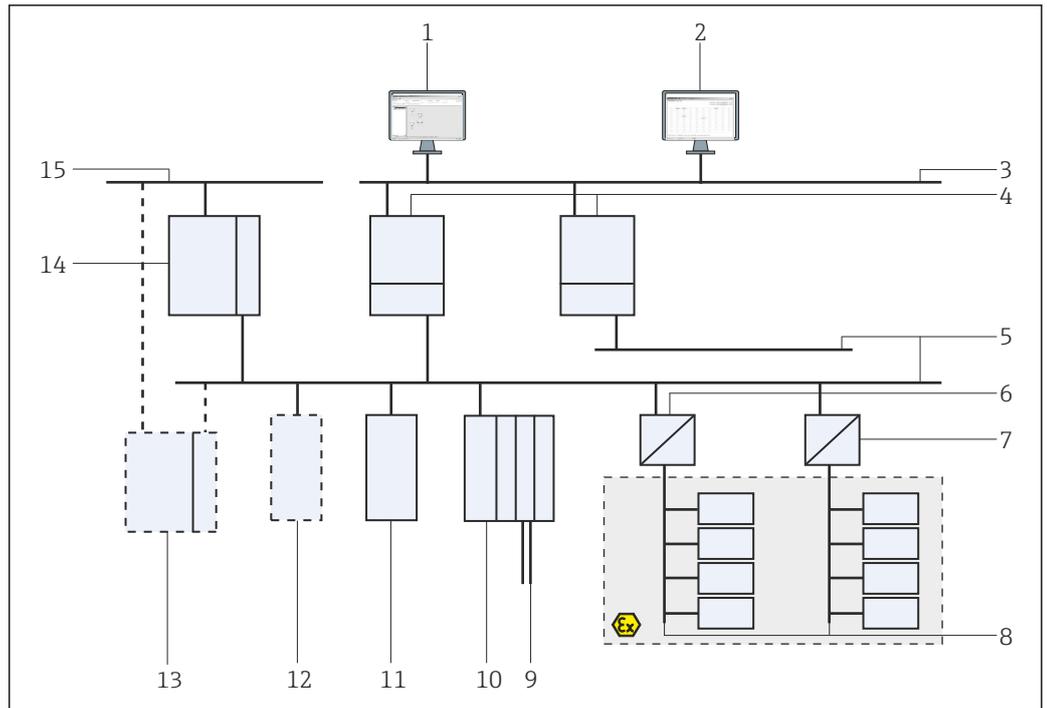
⊠ *1* *System architecture of a Fieldgate SFG500 acting as an access point*

1 FieldCare
2 Web browser
3 LAN 1 (Ethernet)
4 SFG500 Listener PB MS2
5 PROFIBUS DP
6 DP/PA coupler (transparent)
7 DP/PA coupler (non-transparent)
8 PROFIBUS PA with PA slave
9 HART devices downstream from remote I/O
10 DP remote I/O (HART connectivity)
11 DP slave (PA profile)
12 PB Master Class 2 (visitor)
13 PLC/DCS (additional PB Master Class 1, optional)
14 PLC/DCS with PB Master Class 1
15 Control network

IT security

We only provide a warranty if the device is installed and used as described in the Operating Instructions. The device is equipped with security mechanisms to protect it against any inadvertent changes to the device settings.

IT security measures in line with operators' security standards and designed to provide additional protection for the device and device data transfer must be implemented by the operators themselves.

Output

Output type	Relay
Activation	Via Fieldgate module SFM500 and relevant operating mode (disabled for access point)
Arrangement	Single changeover contact
Supply voltage	18 V DC to 36 V DC: the relay circuit must be powered by a SELV power unit
Load current	1 mA < IL < 0.5 A
Max. switching capacity	18 W
Dielectric strength	Coil to contact: min. 1 500 V AC for 1 minute
Type of protection	None

Galvanic isolation	Fully isolated from all other circuits
Connections	• Terminal block with 3 terminals • Screw terminals: 0.2 mm^2 to 4 mm^2 for solid wire, 0.2 mm^2 to 2.5 mm^2 for stranded wire

Digital communication interface

PROFIBUS DP

Protocol	PROFIBUS DP
Physical layer	RS485
Transmission rate	• Automatic detection and matching of system baudrate • Can also be configured via Web server or FDT/DTM
Type of protection	None
Galvanic isolation	Fully isolated from all other circuits
Maximum bus length	1 200 m depending on cable and transmission rate
Input variables	• All variables of connected PROFIBUS DP devices • All variables of PROFIBUS PA devices connected via a DP/PA coupler or link • All variables of HART devices connected to selected remote I/Os
Additional functions	Mapping of process values in Modbus registers for interrogation by Modbus OPC client
Connections	9-pin D-sub female connector

Ethernet (100 BASE-T/100 BASE TX)

Ports	LAN1 for operation, LAN2 for service
Protocol	LAN1 configurable for Ethernet TCP/IP and MODBUS TCP communication
Transmission rate	Choice of $^{10}/_{100}$ Mbits/s (maximum cable length 100 m at 25 °C ambient temperature)
Type of protection	None
Galvanic isolation	Fully isolated from all other circuits
Maximum bus length	100 m depending on cable
Connections	RJ-45 socket

RS485 serial interface

| Protocol	MODBUS RTU
Activation	Via Fieldgate module SFM500 and relevant operating mode (disabled for asset point)
Transmission rate	Can be configured between 1 200 Bit/s and 115 200 Bit/s via Web server or DTM
Type of protection	None
Galvanic isolation	Fully isolated from all other circuits
Maximum bus length	1 200 m depending on cable and transmission rate
Terminating resistor	Integrated, can be set by hardware (DIP switch)
Connections	• Terminal block with 3 terminals • Screw terminals: 0.2 mm^2 to 4 mm^2 for solid wire, 0.2 mm^2 to 2.5 mm^2 for stranded wire

Power supply

Supply voltage	18 to 36 V$_{DC}$: supply voltage must be via a SELV power unit
Current	0.35 to 0.20 A
Capacity	7.2 W

Connections	• Terminal block with 3 terminals • Screw terminals: 0.2 to 4 mm² for solid wire, 0.2 to 2.5 mm² for stranded wire
Battery (for memory)	3 V lithium manganese dioxide battery, type CR2450: • Operating temperature range: −20 to +85 ℃ (−4 to +178 ℉) • Nominal voltage: 3 V • Nominal capacity: 610 mAh • Max. current:15 mA • UL recognition: e.g. MH12568

Environment   **Installation**

Location	• Fieldgate SFG500 has been designed for use at a permanent and weather-protected location in a non-Ex area • The installation environment should be a metal cabinet or an installation frame with a well-grounded mounting plate
Installation instructions	• Vertical installation on a top-hat rail, the rail clip can be fitted at two height positions • Fieldgate SFG500 requires lateral clearance from other modules and can therefore not be mounted directly beside every other non-Ex module • To ensure adequate ventilation and prevent overheating, the vertical and lateral clearance between the modules and the cabinet duct or cabinet wall must be at least 50 mm
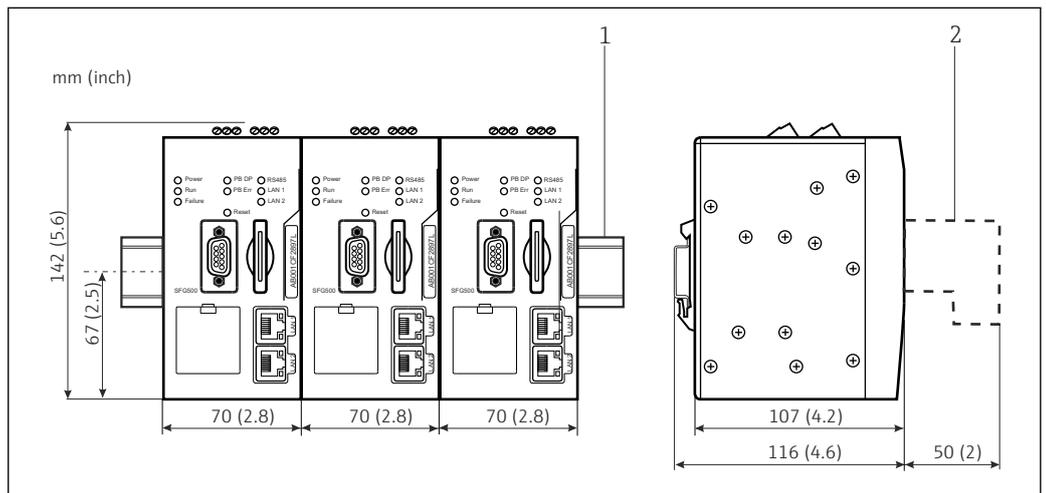
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🖾 *2   Installation of Fieldgate SFG500*

1   Top-hat rail (not supplied)
2   Necessary clearance (type-dependent) for DP or Ethernet connection (not supplied)

ℹ️ Allow a clearance of 50mm to all cabinet walls to ensure adequate ventilation.

Environment

Ambient temperature range	0 to 60 ℃ (32 to 140 ℉)
Storage temperature	• With lithium battery inserted: −20 to 60 ℃ (−4 to 140 ℉) • Without lithium battery inserted: −25 to 70 ℃ (−13 to 158 ℉)
Relative humidity	110 to 90 %, no condensate; applies for operation and storage
Altitude	Max. 2 000 m (6 500 ft) above sea level
Vibration resistance	EN/IEC 61131-2:2007: • 5 to 8.4 Hz: 3.5 mm • 8.4 to 150 Hz: 10 ms^{-2}
Shock resistance	EN/IEC 61131-2:2007: 15 g, 11 ms

| Electromagnetic compatibility	Meets EU Directive 2004/108/EC on **Electromagnetic compatibility** Electromagnetic compatibility according to EN/IEC 61131-2: 2007 (programmable logic controllers) – Interference immunity: EN 61000-6-2:2006, industrial environment – Interference emission: EN 61000-6-4:2007
Mean time between failure	• 15 years at an ambient temperature of 25 °C (77 °F) • The relay contact depends on the number of switching events • All connectors are designed for a minimum of 100 plugging cycles

Mechanical construction

Dimensions
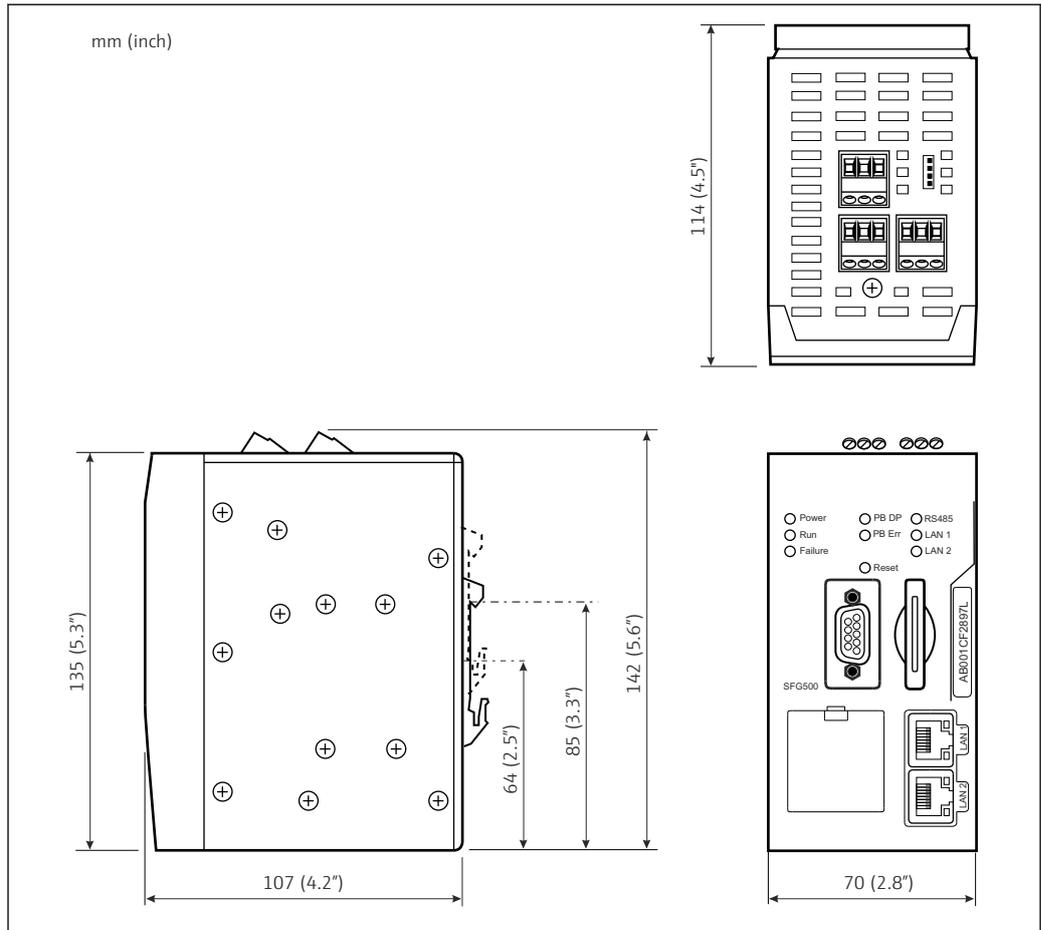
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Weight	Approx. 0.7 kg
Material	• Body: aluminum (EN AW 5754) with transparent passivated surface • Front panel: ABS
Degree of protection	IP 20; NEMA Type 1 (general purpose)
Explosion protection	None
Operational safety	IEC 61010-1: Class III equipment

Operation

Mode of operation	• Basic mode: access point • A Fieldgate module is required for other operating modes
Configuration	Web browser via Ethernet or SFGNetwork DTM

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Operating elements	• 1x reset button for interrupting operation or resetting the hardware • 8x LEDs for indicating the current operating mode and fault conditions • 4x LEDs at Ethernet ports for indicating the communication status
IP address	• LAN1: can be configured via the Web browser or FDT/DTM, default: 192.168.253.2 • LAN2: fixed, 192.168.253.1 • LAN2 has a DHCP server which assigns an address to a connected computer
Web server	• Device information page • Ethernet settings (IP address) and firmware download • PROFIBUS settings and PROFIBUS live list
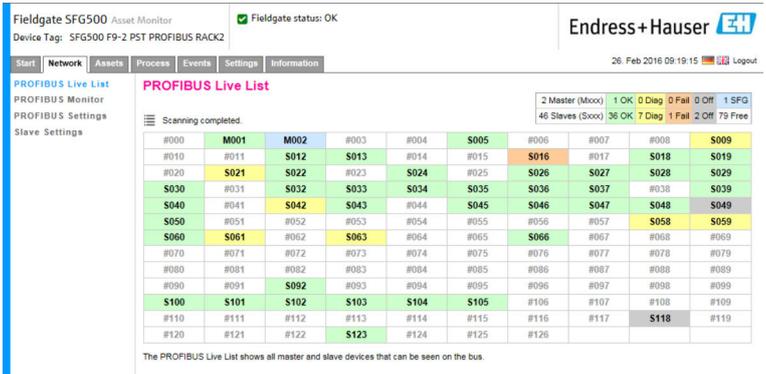
Certificates and approvals

CE mark	CE in accordance with EN/IEC 61131-2: 2007
Safety approval	TÜV NRTL in accordance with EN/IEC/UL/CAN/CSA C22.2-No 61010-1

Ordering Information

Fieldgate SFG500	Order code: 71116672
Fieldgate module SFM500	SFM500A1

Documentation

Fieldgate SFG500

• Innovation Brochure IN00015S/04/EN
• Installation and Commissioning Operating Instructions BA00070S/04/EN
• Access Point, Asset Monitor, Process Monitor Operating Instructions BA01579S/04/EN
• Getting Started Guide BA00073S/04/A2

FieldCare

Competence Brochure CP00001S/04/EN

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