

1 For your safety

Before you start working on FP S-OTGuard

Please read the enclosed leaflet "For your safety" carefully before installing and operating a device. Make sure that you have understood all instructions.

This document describes in short form the installation and start-up of FP S-OTGuard devices. For further information, please read the hardware manual (Download at <https://www.inovolabs.com/infobereich/downloads/handbuecher-datenblatter>).

Target group

This document is intended exclusively for qualified electricians who are familiar with the safety standards of electrical and automation engineering. Project planning, installation, start-up, maintenance and testing of the FP S-OTGuard devices may only be carried out by a recognised qualified electrician.

WARNING **Danger from electrical voltage and incalculable behaviour!**
Any interventions in the hardware and software, unless they are described in these installation instructions or in the hardware manual, may only be carried out by qualified personnel provided by the manufacturer.

2 Installation

Installation site

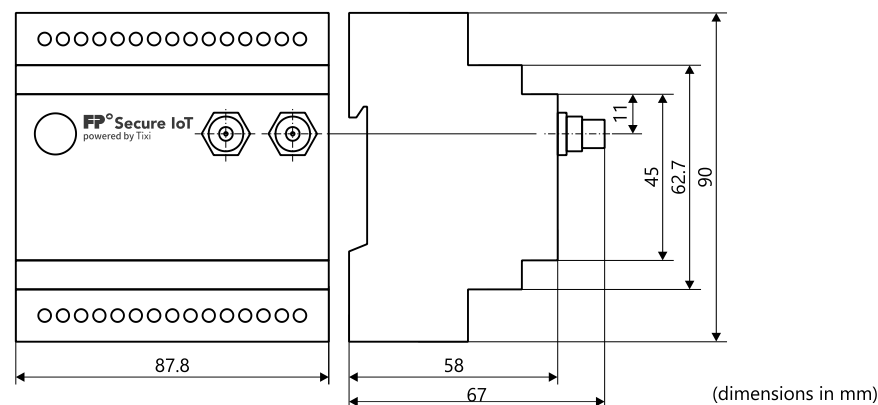
DANGER **Danger to life from explosion!** Sparks can cause explosion and fire! Do not use the device in a potentially explosive environment or in the vicinity of flammable gases, vapours, dust or conductive dusts.

ATTENTION **Possible damage to the device by external influences!**

Only use the device in dry and clean spaces.

Protect the device from moisture, water spray, heat and direct sunlight.

Do not expose the device to strong shocks or vibrations.



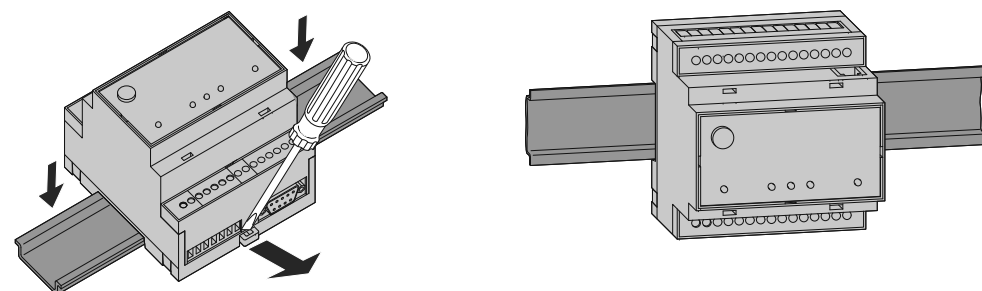
Warning: In a residential environment this equipment may cause radio interference.

Installation on a DIN rail

CAUTION **Danger from electrical voltage!**
Make sure that the lines to which the device is connected are voltage-free. Before starting assembly and installation tasks, disconnect the cables from the power supply and secure them against being switched on again.

Mount the device by sliding or snapping it onto a DIN rail (35 mm × 7.5 mm | 1.4" × 0.3", according to EN 50022).

Vertical or horizontal installation is possible.



3 Connecting the mobile radio antenna (model dependent)

The mobile radio antenna is not included. You can order these as accessories from FP InovoLabs. A list of available antennas can be found in the hardware manual.

Signal strength

First find a suitable location for the antenna outside the electrical cabinet. To find a suitable location with good reception, the operating software can be used to display the reception quality.

For reliable data connections (for remote parametrisation, Internet dial-up) the signal strength should be at least -77 to -53 dBm.

In the range from -95 to -79 dBm, SMS still works in most cases, but the connections often break down. No operation is possible below -97 dBm.

Use an antenna with high antenna gain if the signal strength at the receiving location is too low.

Connection to FP S-OTGuard

Screw the antenna or antenna cable into the corresponding antenna socket on the FP S-OTGuard housing.

4 Inserting the SIM card (model dependent)

ATTENTION **Damage to the device due to incorrect handling of the SIM card!**

Only insert the SIM card when the device is in a voltage-free state.

Make sure that no SMS messages are stored on the SIM card by inserting the card into a mobile phone.

ATTENTION **Possible damage to the SIM card due to improper handling!**

Do not touch the contacts on the SIM card.

ATTENTION **Blocking of the SIM card if another SIM card was previously used in the device!** First load a project with the PIN of the new SIM card into the device to avoid blocking the new SIM card.

Unlock the drawer for the SIM card: To do this, press the small button to the right of the drawer using a pen or a pointed object.

Pull out the drawer carefully. Insert your SIM card.

Slide the drawer back into the device until it clicks into place.

5 Connecting peripherals

Please read the hardware manual to connect the periphery intended for the application.

6 Connecting to the power supply

CAUTION **Danger from electrical voltage!**

Make sure that the lines to which the device is connected are voltage-free. Before starting assembly and installation tasks, disconnect the cables from the power supply and secure them against being switched on again.

After completing all other installation work, connect FP S-OTGuard to the power supply.

ATTENTION **Damage to the device due to incorrect voltage connection!**

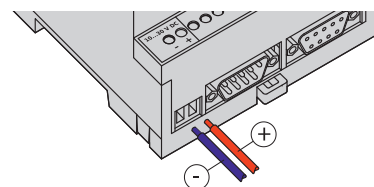
Ensure the correct polarity of the voltage connections and adherence to the characteristic values $U = 10 - 30 \text{ V DC}$ /models with M-Bus: $U = 18 - 30 \text{ V DC}$.

ATTENTION **Inadequate power supply due to insufficient conductor cross-section!**

Only use cables with sufficient conductor cross-section for connection.

ATTENTION **Damage to the connection terminals due to excessive torque!**

Use a torque screwdriver. Tighten the clamping screws to a torque of 0.5 Nm (0.37 ft lb).



Connect the connection cables to the screw terminals. Tighten the clamping screws to a torque of 0.5 Nm (0.37 ft lb).

Note: To avoid interference from power supply units or other sources of interference, do not lay the DC cables in the immediate vicinity of AC cables.

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FP^oSecure IoT



FP S-OTGuard
Installation instructions

7 Start-up

When all installation steps are completed, the device can be put into operation. Switch on the supply voltage.

Self-test

After applying the operating voltage, the device carries out an extensive self-test. All LEDs are switched on once for checking and the memories are checked.

Power	Data out/Process	Line	LAN	Mode	Remarks
Yellow	Red		Yellow		Load firmware, check checksum
Yellow	Red + Green (flashes)				Unpacking of the firmware
Yellow	Red				Launching the kernel
Yellow	Green				Launching the Linux application
White	White	White	White	White	All LEDs off for approx. 5 s
Yellow	Green (flashes)	Green (flashes)	Yellow (flashes)		Multiple simultaneous flashing of Data Out/Line/LAN

As soon as the device is ready for operation, an acoustic signal is emitted. The yellow Power LED lights up.

FP S-OTGuard must still be configured for operation. Software tools for this can be purchased from FP InovoLabs.

Operation with SD card (model dependent)

Only use an SD or MMC card with a maximum of 32 GB memory for FP S-OTGuard. Format the card under Windows (FAT or FAT32).

Inserting the SD card

Insert the formatted card into the slot marked "SD Card" (printed side visible and contacts first). If FP S-OTGuard is ready for operation, the card is automatically activated after insertion.

Removing the SD card

Press the "SD Unmount" button for max. 1 second.

Wait until the "Active" LED goes out. All read and write operations are then completed.

Push the SD card a little further into the card slot and let go. The card is released. You can remove the card.

Communication with an PLC

FP S-OTGuard supports communication with a number of programmable logic controllers (PLC) as standard. The list of supported controllers and important notes on connection to FP S-OTGuard can be found in the hardware manual.

The Modbus fieldbus system (RTU, ASCII and TCP) is also available.

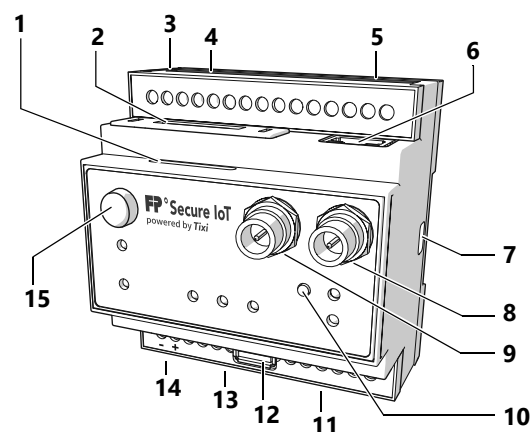
For further information, please visit us online at www.inovolabs.com.

Models

All FP S-OTGuard models are identical in basic functions but differ in the type and number of interfaces as well as inputs and outputs. As standard, all models are equipped with 128 MB RAM, 128 MB flash memory and an SD card reader.

Models and material numbers	Remote communication, interfaces, inputs and outputs												
	LAN	GSM	UMTS	Cat M1 NB/GPRS	GNS5	RS232	RS485	MPI	I/O	SD	USB	LTE	M-Bus
FP S-OTGuard H651 LAN (HE651) 50.0071.0001.00	●					●	●		1x	●	●		
FP S-OTGuard H651 NB (HG651) 50.0071.0002.00		●				●	●		●	●	●		
FP S-OTGuard H651 NB (HU651) 50.0071.0003.00			●			●	●		●	●	●		
FP S-OTGuard H627 NB (HG627) 50.0071.0004.00		●				2x			6x	●			
FP S-OTGuard H627 NB (HU627) 50.0071.0005.00			●			2x			6x	●			
FP S-OTGuard H671 NB (HG671) 50.0071.0006.00		●						●		●			
FP S-OTGuard H651 NB (HN651-P) 50.0071.0007.00				●	●	●	●		●	●	●		
FP S-OTGuard H651 BB (HT651) 50.0071.0008.00						●	●		1x	●	●	●	
FP S-OTGuard H653 BB (HT653-M100) 50.0071.0009.00						●	●		1x	●	●	●	●
FP S-OTGuard H653 LAN (HE653-M100) 50.0071.0010.00	●					●	●		1x	●	●		●
FP S-OTGuard H671 BB (HT671) 50.0071.0011.00						●		●		●		●	
FP S-OTGuard H671 LAN (HE671) 50.0071.0012.00	●					●		●		●			
FP S-OTGuard H671 NB (HU671) 50.0071.0013.00			●			●		●		●			

Connections and controls



- 1 SD card Slot for SD card (max. 32 GB)
- 2 SIM card Slot for SIM card
- 3 I/O ports (model dependent)
- 4 COM2 (RS485) 3/5 screw terminals, configurable via DIP switches (model dependent)
- 5 M-Bus Master for up to 100 M-Bus loads, 3 screw-type terminals (model dependent)
- 6 LAN Ethernet port (RJ45) with LEDs
- 7 I/O-Bus 6-pin precision port for expansion modules
- 8 Antenna 1 Main connection for mobile communications antenna
- 9 Antenna 2 Connection for GPS antenna or 2nd mobile communications antenna (LTE, optional)
- 10 SD Unmount Press the button briefly to log off the SD card, Press and hold button to turn Wi-Fi on/off (requires Wi-Fi stick)
- 11 COM1 (RS232) 9-pin D-Sub port or plug
- 12 USB USB port for Wi-Fi stick, for wireless configuration (model dependent)
- 13 COM2 (RS232) 9-pin D-Sub plug (model dependent)
COM2 (RS485) 5 screw terminals, configurable via DIP switches (model dependent)
COM2 (S7-MPI) 9-pin D-Sub socket (model dependent)
- 14 10-30 V DC Power supply, 2 screw terminals
18-30 V DC Power supply for models with M-Bus, 2 screw terminals
- 15 Service Button (application specific, user programmable)

Meaning of the LEDs

LEDs indicate the operating states of the FP S-OTGuard. The following overview shows and explains these for all FP S-OTGuard models. The number of LEDs is model dependent.

LED	Status	Meaning
Power	○ (off)	No power supply
	● (yellow)	Device ready for operation
	○	No process, no messages in the outbox
Data out/ Process	● (red)	Process execution
	● (yellow)	Messages for sending in the device
	○	Modem is not logged into the GSM network
Line	● (green)	GSM connection established
	● (green) (flashes)	Connection setup (incoming or outgoing call)
	● (green) (flashes 1x per second)	Modem is logged into the GSM network
	● (green) (flashes 2x per second)	Modem is logged into the GPRS network
LAN	○ (off)	no connection
	● (green)	Ethernet active
	● (green) (flashes)	IP address conflict or no IP address received via DHCP
Signal	○ (off)	application-specific, user programmable, 27 different colour and flash combinations
	● (red) / ● (red)	
	● (green) / ● (green)	
	● (green) / ● (green)	
Mode	○	Transparent mode switched off
	● (red)	Transparent mode (device has switched through transparent connection to a serial interface)
Active	○ (off)	Wi-Fi not active / no USB memory stick loaded
	● (green) (flashes briefly)	Wi-Fi mode is active
	● (green) (flashes for an extended period)	USB memory stick detected and loaded, Wi-Fi active
	● (green)	USB memory stick detected and loaded
Ethernet port RJ45	■ (green)	Connection established
	□ (green off)	No connection
	■ (green) (flashes)	Data transmission
	■ (yellow)	100 MBit connection
	□ (yellow off)	10 MBit connection
FP S-OTGuard H671 NB (HG671):		
Connect Data	● (green)	MPI connection to PLC established
	● (green) (flashes)	MPI data transfer from/to PLC
Active Param.	● (green)	is correctly parametrised and registered on the MPI net
FP S-OTGuard H627 NB (HG627) and FP S-OTGuard H627 NB (HU627):		
Data	○ (off)	No communication to COM2
	● (red)	PLC or transmode data traffic from COM1 to COM2
	● (green)	PLC or transmode data traffic from COM2 to COM1

Technical data (selection)

The detailed technical specification can be found on the datasheet.

Dimensions	Width × height × depth, without antenna connection: 87.8 mm × 90 mm × 58 mm (approx. 3.46" × 3.54" × 2.28")
Weight	approx. 225 g (0.5 lb)
Power supply	10 - 30 V DC / models with M-Bus: 18 - 30 V DC, max. 0.7 A, 2 screw terminals, conductor cross-section max 2.5 mm ² (AWG 14)
CPU	400 MHz, ARM9, ATMEL SAM9-G25
RAM	128 MB DDR2-RAM, optional: 256 MB, 32 MB, 64 MB
FLASH Memory	128 MB on-board, optional: 256 MB – 8 GB SD card reader, optional: max. 32 GB
Temperature range	-25 °C to +65 °C (-13 °F to 149 °F) Except H653: -25 °C to +60 °C (-13 °F to 140 °F)
Permitted humidity	5 % to 95 % relative humidity, non-condensing
Protection class	IP20
Degree of contamination	2
Mechanical strength	Vibration (sine wave) in accordance with IEC 60068-2-6 Vibration (broadband) in accordance with IEC 60068-2-64 Shock in accordance with IEC 60068-2-27
Remote communication (model dependent, for equipment see overview in "Models" section)	
Ethernet connection	10/100 Base-T IEEE 802.3, RJ45 port (8P8C with 2 LEDs), shielded
Antenna connection	FME socket (male), coaxial, impedance 50 Ω
Frequencies	GSM models: Quad Band 2G 850/900/1800/1900 MHz UMTS models: Dual-mode UMTS (WCDMA) / HSDPA / EDGE / GPRS operation Dual Band 900/1800 MHz; UMTS Band 1 (2100 MHz), Band 8 (900 MHz) LTE models: 8-Band LTE (B1, B2, B3, B5, B7, B8, B20; all bands with diversity) Quad Band 3G (850, 900 1800, 1900 MHz) Quad Band 2G (850, 900 1800, 1900 MHz)
EDGE features	Multi-Slot Class 12, E-GPRS Mobile Station Class B, Coding Schemes MCS 1-9
GPRS features	Multi-Slot Class 12, GPRS Mobile Station Class B, Coding Schemes CS 1-4
UMTS features	UMTS Terrestrial Radio Access (UTRA) HSDPA category 8
Data transmission	GSM CSD up to 9.6 kbps DL/UL GPRS max. downlink 85.6 kbps, max. uplink 85.6 kbps EDGE max. downlink 236.8 kbps, max. uplink 70.4 kbps UMTS max. downlink 384 kbps, max. uplink 384 kbps HSDPA category 8: max. 7.2 Mbps DL (peak rate) HSUPA category 6: 5.76 Mbps UL

Interfaces (model dependent, for equipment see overview in "Models" section)

COM1 (RS232)	D-Sub 9, port, DCE or plug, DTE, max. 230,400 bps, ITU-T V.24, V.28, hardware handshake, all signals: DTR, DSR, RTS, CTS, DCD, GND, RI, RxD, TxD, transmission distance 12 m (39 ft)
COM2 (RS232)	D-Sub 9, plug, DTE, FIFO 16550, otherwise like COM1
COM2 (RS485)	In accordance with EIA/TIA-485, 3- or 5-pole screw connection max. 230 kbit/s, not electrically isolated, integrated termination, switchable via DIP switches, transmission distance max. 1200 m (4000 ft) depending on transmission rate, bus and cable type
COM3 (M-Bus)	Conformity: DIN EN 13757-2, DIN EN 13757-3, M-Bus Master for up to 100 M-Bus loads, short-circuit proof, electrically insulated 1500 V, M-Bus voltage: 36 V, bus length: max. 1 000 m (3 281 ft), 3 screw terminals, grid dimension 3.81 mm (0.15"), cross-section max. 1.5 mm ² (AWG 16), data rate: 300 Baud - 19200 Baud, data formats: 8 data bits, 1 start bit, 1 stop bit and 1 parity bit (even parity)

Inputs / outputs (model dependent, for equipment see overview in "Models" section)

Connections	Screw terminal, grid dimension: 5.08 mm (0.2"), cross-section max. 2.5 mm ² (AWG 14)
Inputs	Digital Can be switched via potential-free contacts <u>or</u> digital signals All models: max. 5 V; H651 / H653: max. 24 V Analogue 0 - 10 V DC, resolution: 12 Bit
Outputs	Digital Potential free, AC/DC max. 48 V, 120 mA Relay Potential free, 230 V AC 3 A <u>or</u> 110 V DC, 0.3 A