

The FP S-OTGuard device series are IIoT Gateways for standard top-hat rails in accordance with EN 50022.

Mobile wireless options

The FP Gateways can be equipped with a mobile wireless module as an option. Suitable SMA antennas are available as an option.

The mobile wireless options are coded via a suffix after the model designation.

| Suffix | Supported mobile wireless networks |
|--------|--|
| NBP * | 2G (GPRS), 4G (LTE Cat.M1, LTE Cat.NB1); GNSS (with 2nd antenna) |
| BB | 2G / 3G / 4G |
| NB | 2G / 3G (discontinued model, minimum order quantity required) |

* NBP option only available as FP S-OTGuard model HN651-P



1 Main functions

| Main functions | |
|----------------------------------|--|
| Alarm and fault indicator | Automatic generation and sending of fault messages from message templates and current values (from PLC or Gateway). Actions can trigger up to 100 definable events depending on the time requirements. Address book with up to 100 addresses. 100 message texts, 100 alarms |
| Acknowledgement | Acknowledgement option for alarms and triggering of alarm chains if the acknowledgement does not arrive within a set time. Acknowledgement via SMS or e-mail possible. |
| Alarm chain | Multiple levels of alarm actions and receivers if alarm messages are not acknowledged in time. Alarm actions can be sent by SMS, e-mail or switching actions. |
| Event | Event, e.g.: Error, PLC communication interrupted, acknowledgement of an alarm. All actions in the Gateway are triggered by events. |
| SMS | Sending and receiving of SMS |
| E-mail | Sending and receiving of e-mail (SMTP) |
| Remote switching | Remote switching of the variable values of the connected controller by sending switching commands as SMS or e-mail to the Gateway. Password protection |
| Remote maintenance | Configuration of the Gateway and the connected PLC via an existing IP connection. |
| Security | Local and remote configuration can be protected using access rights. |
| Web-server | Integrated web-server for local access to web applications (e.g. for commissioning) |
| PLC protocols | More than 30 integrated PLC and field bus protocols; direct access to PLC data points (read/write), e.g. Siemens, ABB, Mitsubishi, Moeller/Eaton, Allen-Bradley, Schneider, Crouzet, VIPA, ... |
| Counter protocols | Many integrated field bus protocols, e.g. Modbus, M-Bus, EN 61107, 1-Wire, Aurora, wMBus via optional FP wMBus adapter, ... |
| EDGE functions | Extensive data handling functions (EGDE computing) integrated by users in a freely programmable way, e.g. logical links, thresholding |
| Data logging | Large integrated log memory (power failure fail-safe due to flash memory) Up to 100 MB of log memory available for user data; up to 100 log files definable |
| Cloud protocols | Cloud protocols integrated from notable Cloud providers incl. Cloud command channel -> Gateway e.g. Deutsche Telekom CoT, Cumulocity, AWS, Juconn, generic MQTT |
| Security Protocols | TLS 1.2, VPN, your own certificates and keys can be configured FTP, SFTP, SMTP, POP3, SMS, MQTT, http, https, telnet, and more |

2 System architecture

| System architecture | |
|-------------------------------|---|
| CPU | 400 MHz, ARM9, ATMEL SAM9-G25 |
| RAM | 128 MB DDR2-RAM |
| FLASH Memory | 128 MB on-board |
| System clock (Battery-backed) | For logging of events, e.g.: <ul style="list-style-type: none"> - Errors - incoming calls, - PLC or Cloud communication interrupted, - acknowledging an alarm All actions in the Gateway are triggered by events. |

3 Interfaces

| Built-in interfaces for the top-hat rail models | | | | | | | |
|---|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| Connection type | H651 | H653-M100 | H627 | H632 | H634 | H647 | H671 |
| Ethernet | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| COM1 | RS232 ¹ | RS232 ¹ | RS232 ² | RS232 ² | RS232 ² | RS232 ² | RS232 ² |
| COM2 | RS485 | RS485 | RS232 ¹ | RS232 ¹ | RS232 ¹ | RS485 | Siemens MPI |
| Digital inputs | 1 | 1 | 2 | 8 | 4 | 2 | - |
| Digital outputs | - | - | 2 | 2 | 4 | 2 | - |
| Analogue inputs | - | - | 1 | 1 | 1 | 1 | - |
| USB | 1 | 1 | - | - | - | - | - |
| M-Bus (COM3) | - | 1 (100 loads) | - | - | - | - | - |
| Relay | - | - | 1 | - | - | 1 | - |

¹ DTE ² DCE

| Serial interfaces | |
|-------------------|---|
| COM1 RS232 | D-Sub 9, DCE socket / H651 + H653: D-Sub 9, plug, DTE max. 230,400 bps, ITU-T V.24, V.28, hardware handshake. 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-pin screw connection max 230 kbit/s, not galvanically isolated Termination integrated, can be switched via DIP switch Transmission distance of max. 1200 m (4000 ft) depending on the 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 (counter) short-circuit protection, galvanically isolated 1500 V M-Bus voltage: 36 V, bus length: max. 1000 m (3281 ft) 3 screw terminals, grid dimension 3.81 mm (0.15"), cross-section max. 1.5 mm ² (16 AWG) Data rate: 300 Baud – 19200 Baud Data formats: 8 data bits, 1 start bit, 1 stop bit and 1 parity bit (even parity) |

| USB 2.0 Host | |
|--------------|--|
| 1x USB Host | For USB devices such as USB memory sticks, WiFi sticks, etc. |

| Digital inputs | |
|----------------|--|
| Digital inputs | Can be switched via potential-free contacts or digital signals, not galvanically isolated All models: max. 5 V; H651 / H653: max. 24V |

| Digital outputs | |
|-----------------|----------------------------|
| All models: | Max. voltage: 48 V, 120 mA |

| Relay | |
|-------------|---|
| All models: | Potential free, 230 V AC 3A or 110 V DC 0.3 A |

| Analogue inputs | |
|-----------------|----------------------------------|
| All models: | 0 .. 10 V DC, resolution: 12 Bit |

4 Ethernet connection

| Ethernet connection | |
|---------------------|--|
| Connection | 10/100 Base-T IEEE 802.3, RJ45 connector (8P8C with 2 LEDs), shielded |
| Operating mode | Auto negotiation, Auto MDI-X (crossover cable not required) |
| Status LEDs | Flashing green Data is being transferred Yellow off 10 Base-T Yellow on 100 Base-T |
| Galvanic isolation | 1500 V (V_{rms} min.) |

5 Expansion modules (optional)

| Expansion modules for more I/Os | |
|--|--|
| Up to 8 I/O modules with up to 128 I/Os can be coupled to an FP Gateway via the I/O expansion bus. | |
| Module types | XP84D 8 digital inputs (switchable via potential-free contacts, max. 5 V) 4 digital outputs (potential-free, AC/DC 125 V, max. 130 mA) |
| | XP88D 8 digital inputs (switchable via potential-free contacts, max. 5 V) 8 digital outputs (potential-free, AC/DC 125 V, max. 130 mA) |
| | XP84DR 8 digital inputs (switchable via potential-free contacts, max. 5 V) 4 relays; (potential-free, 230 VAC 3 A, 110 VDC 0.3 A) |
| | XS00 2 free slots for S1 expansion modules (see "S1 expansion modules ..." table) |

| S1-expansion modules (requires optional Xs00-module expansion) | | | |
|---|---------|---|------------------------|
| Up to 2 S1 plug-in modules can be installed per XS00 module. Several XS00-module expansions are cascadable. | | | |
| Inputs | S1-D50 | 5x digital inputs, max. 24 V | - |
| | S1-D30G | 3x digital inputs, galvanically isolated; (0 .. +/- 60 V; input current 2.2 .. 3.1 mA) | - |
| | S1-AE3 | 3x analogue inputs 0 .. 10 V / 0 .. 20 mA (can be adjusted using jumpers) | 0.2 % +/- 5 mV |
| | S1-PT3 | 3x Pt-1000 inputs; resolution: 0.3 K | +/- 1.2 K (2.16 °F) |
| | S1-PT3C | 3x Pt-100 inputs; resolution: 0.3 K | +/- 1.2 K (2.16 °F) |
| | S1-S03 | 3x pulse inputs S0 for Reed contacts; cable length max. 30 m (98 ft), optional battery backup via button cells | - |
| Outputs | S1-D05 | 5x digital outputs, max. 48 V, 120 mA | - |
| | S1-D03G | 3x digital outputs, galvanically isolated | - |
| | S1-AA2 | 2x analogue outputs 0 .. 10 V / 0 .. 20 mA (can be adjusted using jumpers) A separate 24 V power supply is required on the XS00-module | 1 % +/- 6 mV |
| | S1-WL2 | 2x changeover relay, max. 230 V / 3 A | - |

6 WiFi stick (optional)

| WiFi stick (only for models H651, H653) | |
|---|---|
| WiFi | USB stick model "90.0072.8100.00" |
| Wireless type | IEEE 802.11b/g/n WPS (WiFi Protected Setup) |
| Frequency | 1T1R 2.4 GHz |
| Data rates | IEEE 802.11b: 11 MBit/s max. IEEE 802.11g: 54 MBit/s max. IEEE 802.11n: 150 MBit/s max. |
| Network modes | Ad-hoc, infrastructure |
| Encryption | WEP-64, WEP-128, TKIP, WPA2 |
| Antenna connection | Internal |
| Temperature range | 0 .. 40 °C (32 .. 104 °F) |

7 Operating elements

| Operating elements | |
|------------------------|---|
| Service buttons | Can be freely configured by the user via TiXML programming |
| Signal LED | Can be configured via TiXML (red/green flashing function, 32 patterns), e.g. "red = error" and "green = functioning properly" |
| Speakers | Mini speakers for audio signals; can be controlled using TiXML, e.g. continuous sound for alarm |
| System LEDs | Power, Process/Data out, LAN, Line, Mode, Active |
| Unmount button | For switching the WiFi subsystem on and off or for unloading (unmounting) an SD memory card |

8 SD memory cards

| SD memory cards | |
|--|--|
| All FP top-hat rail gateways have a card reader for SD memory cards with a capacity of up to max. 32 GB. | |
| Active LED | green: SD card active red: read or write process active |
| Unmount button | Before removing the SD card, ALWAYS press the unmount button first for <= 1 second and wait until the "Active LED" goes out |
| Batch mode | A TiXML configuration can be brought into the device via the SD card and system diagnostic data can be saved on the SD card (e.g. configuration, log data, etc.) |
| Memory card type | All SD memory cards up to max. 32 GB (SD and SDHC) |

9 Mobile wireless modem (optional)

| GSM/GPRS/LTE Cat.NB1/LTE Cat.M1: (2G, 4G IoT) NBP model (only available as HN651-P) | |
|--|--|
| Frequencies | 2G: Quad Band 850/900/1800/1900 MHz LTE: B1, B2, B3, B4, B5, B8, B12, B13, B18, B19, B20, B26, B28, B39 |
| EDGE features | Multi-Slot Class 33, Coding Schemes MCS 1-9 |
| GPRS features | Multi-Slot Class 33, Coding Schemes CS 1-4 |
| GSM features | Call Forwarding, Call Barring, Multiparty, Call Waiting, Call Hold, Calling Line Identity, Advice Of Charge, USSD, Closed User Group |
| Antenna | FME socket (male), coaxial, impedance 50 Ω Output: 2 W at 850/900 MHz, 1 W at 1800/1900 MHz |
| Data transmission | GPRS: Downlink: 107 kbps, Uplink: 85.6 kbps EDGE: Downlink: 296 kbps, Uplink: 236.8 kbps Transmission power: max. 2 W |
| GNSS | Positioning. 2nd antenna required. Protocols: GPS, Baidou, GLONASS, Galileo |

| UMTS/HSPA+: (2G, 3G) NB model | |
|--------------------------------------|---|
| Frequencies | Dual-mode UMTS (WCDMA) / HSDPA / EDGE / GPRS operation Dual Band 900 / 1800 MHz; UMTS Band 1 (2100 MHz), Band 8 (900 MHz) |
| EDGE features | Multi-Slot Class 12, E-GPRS Mobile Station Class B, Coding Schemes MCS 1-9; up to 236.8 kbps DL |
| GPRS features | Multi-Slot Class 12, GPRS Mobile Station Class B, Coding Schemes CS 1-4; up to 85.6 kbps DL/UL |
| UMTS features | UMTS Terrestrial Radio Access (UTRA) HSDPA category 8 |
| GSM features | Call Forwarding, Call Barring, Multiparty, Call Waiting, Call Hold, Calling Line Identity Advice Of Charge, USSD, Closed User Group |
| Antenna | FME socket (male), coaxial, impedance 50 Ω |
| 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 Transmission power: 2 W GPRS/GSM/E-GSM @ 900 MHz 1 W GPRS/GSM/E-GSM @ 1800 MHz 0.5 W EDGE/GSM/E-GSM @ 900 MHz 0.4 W EDGE/GSM/E-GSM @ 900 MHz 0.25 W WCDMA/HSDPA/HSUPA @ 800/850/1900/2100 MHz |

| LTE: (4G) BB model | |
|---------------------------|---|
| Frequencies | 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) |
| Antenna | FME socket (male), coaxial, impedance 50 Ω |
| Data transmission | WCDMA CS: Downlink: 64 kbps, Uplink: 64 kbps GPRS: Downlink: 85.6 kbps, Uplink: 85.6 kbps EDGE: Downlink: 236.8 kbps, Uplink: 236.8 kbps WCDMA PS: Downlink: 384 kbps, Uplink: 384 kbps HSPA+: Downlink: 21.6 Mbps, Uplink: 5.76 Mbps DC-HSPA+: Downlink: 43.2 Mbps, Uplink: 5.76 Mbps LTE FDD: Downlink: 150 Mbps, Uplink: 50 Mbps @ 20M BW cat4 Transmission power: 2 W GSM-GPRS @ 850/900 MHz 1 W GSM-GPRS @ 1800/1900 MHz 0.5 W EGPRS @ 850/900 MHz 0.4 W EGPRS @ 1800/1900 MHz 0.25 W UMTS @ 850/900/1900/1950 MHz 0.2 W LTE @ 800/850/900/1700/1800/1900/1950/2100 MHz |

10 Firmware


| Firmware | |
|-------------------------|---|
| TECom | Tixi Embedded Communication System TECom TECom provides all basic functions which are required for close communication with controllers and remote communication in telephone networks, mobile wireless networks, LAN, Wi-Fi and IP based networks. |
| Operating system | Embedded Linux |
| File system | UBIFS: Log data and process variables (in RAM) remain in flash memory in the event of a power failure |
| OEM functions | The firmware can be expanded for OEM customers, e.g. for: New control protocols, calculating or processing functions or web server functions. |
| Data security | Use of the industry standard libraries Open SSL (TLS 1.2) and OpenVPN |

11 General data

| Power supply | |
|------------------------|---|
| Standard device | All devices: 10 .. 30 V DC; max. 0.7 A H653 model: 18 .. 30 V DC; max. 0.7 A 2 screw terminals; conductor cross section max. 2.5 mm ² (14 AWG) |
| Backup battery | CR2032 backup battery for RTC (real time clock), service life >= 10 years, replacement by the user not intended |

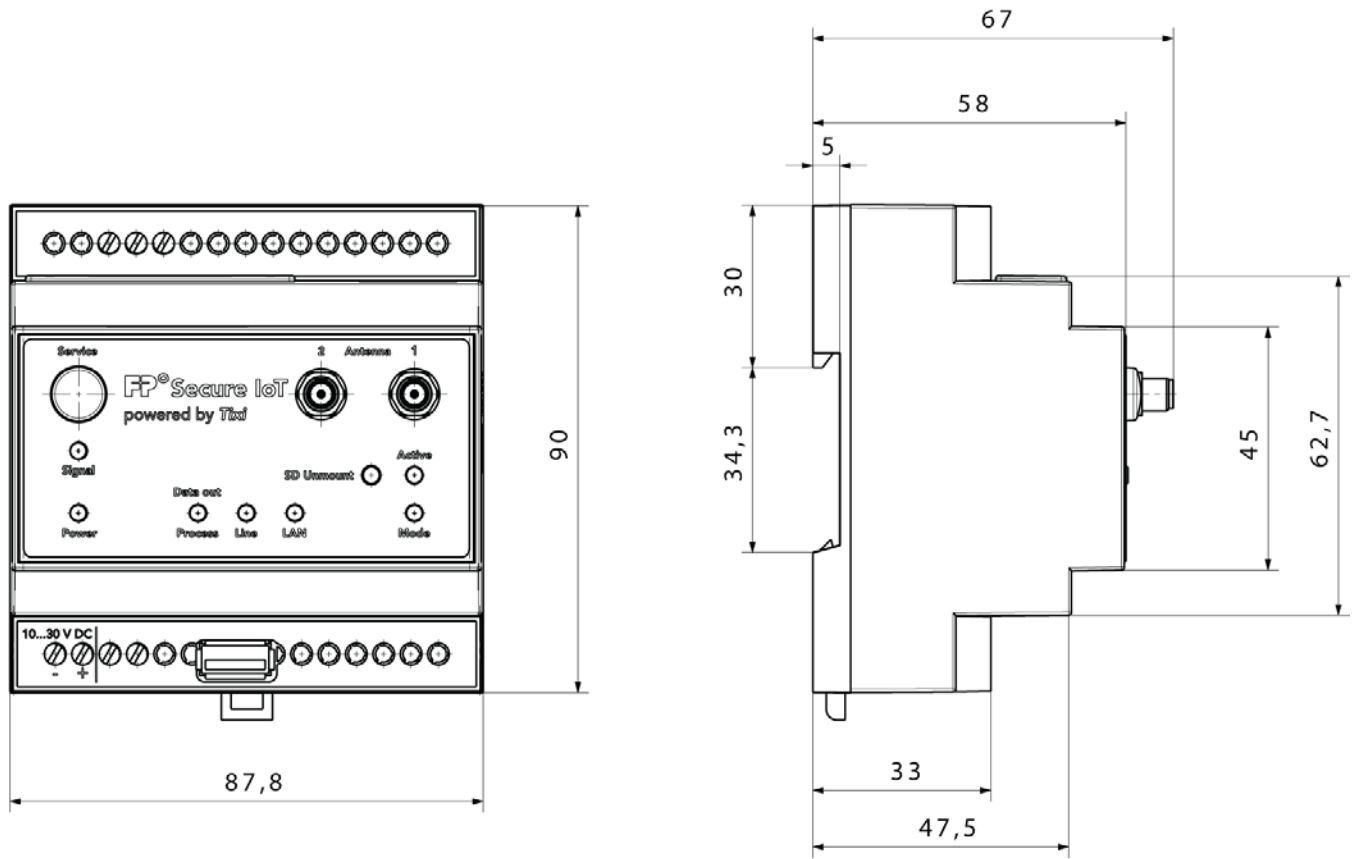
| Housing | |
|-------------------------|--|
| Installation | On standard 35 mm x 7.5 mm (1.4" x 0.3") top-hat rails in accordance with EN 50022, horizontal or vertical |
| Type | FP H5-top-hat rail housing |
| OEM housing | Standard OEM H5-top-hat rail housing |
| Dimensions HxWxD | 90 mm x 87.8 mm x 58 mm (3.54" x 3.46" x 2.28") |
| Weight | approx. 225 g (0.5 lb) |

12 Conformity

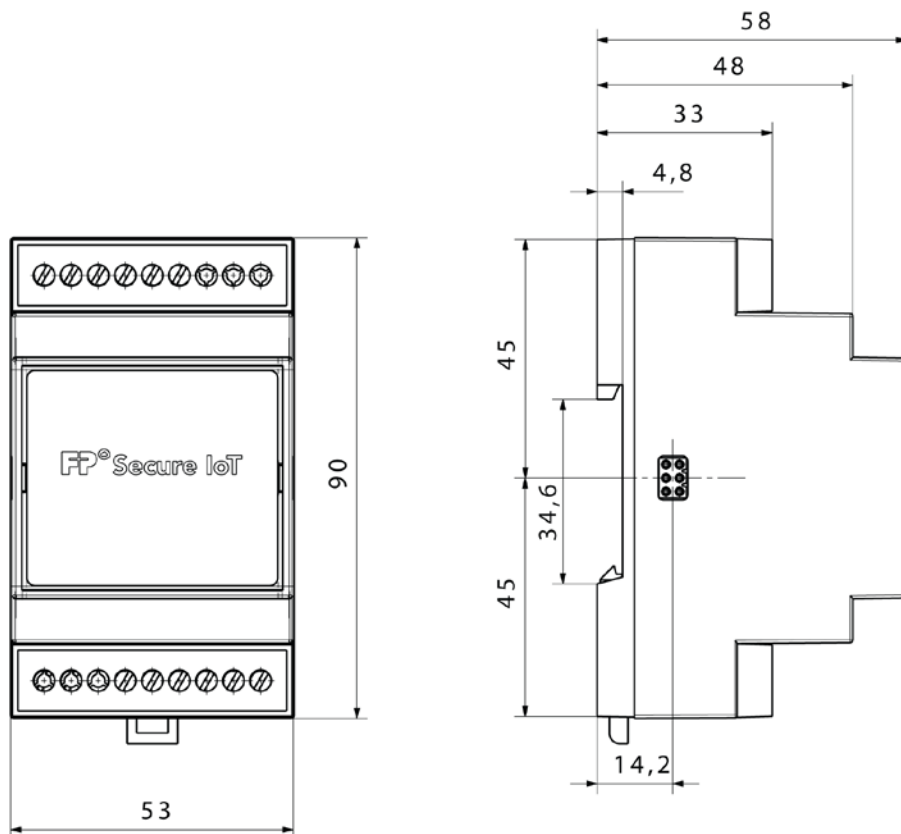
| Conformity and use | |
|--------------------------------------|--|
| Conformity |  2014/53/EU Radio Equipment Directive RED 2011/65/EU RoHS 2012/19/EU WEEE |
| Temperature range | Operation: -25 °C .. +65 °C / -13 °F .. 149 °F (except H653: -25 °C .. +60 °C / -13 °F .. 140 °F) Storage: -25 °C .. +85 °C / -13 °F .. 185 °F |
| Permitted humidity | 5 .. 95 % relative humidity, non-condensing |
| Protection class | IP20 |
| Degree of contamination | 2 |
| Mechanical strength | Vibration (Sinus) in accordance with IEC 60068-2-6, vibration (broadband) in accordance with IEC 60068-2-64 Shock in accordance with IEC 60068-2-27 |
| Electromagnetic compatibility | Class A Warning: In a residential environment this equipment may cause radio interference. |

13 Dimensions

Dimensions of basic device HxWxD (without antenna): 90 mm x 87.8 mm x 58 mm (3.54" x 3.46" x 2.28")



Dimensions of expansion modules WxHxD: 53 mm x 58 mm x 90 mm (2.09" x 2.28" x 3.54")



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