The FP S-OTGuard and FP S-ENGuard H653 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.: - 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	-

All specified models are of type “FP S-OTGuard”, except *: H653-M100 = FP S-ENGuard

[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 end devices (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 Yellow off Yellow on	Data is being transferred 10 Base-T 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	**T**ixi **E**mbedded **Com**munication 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

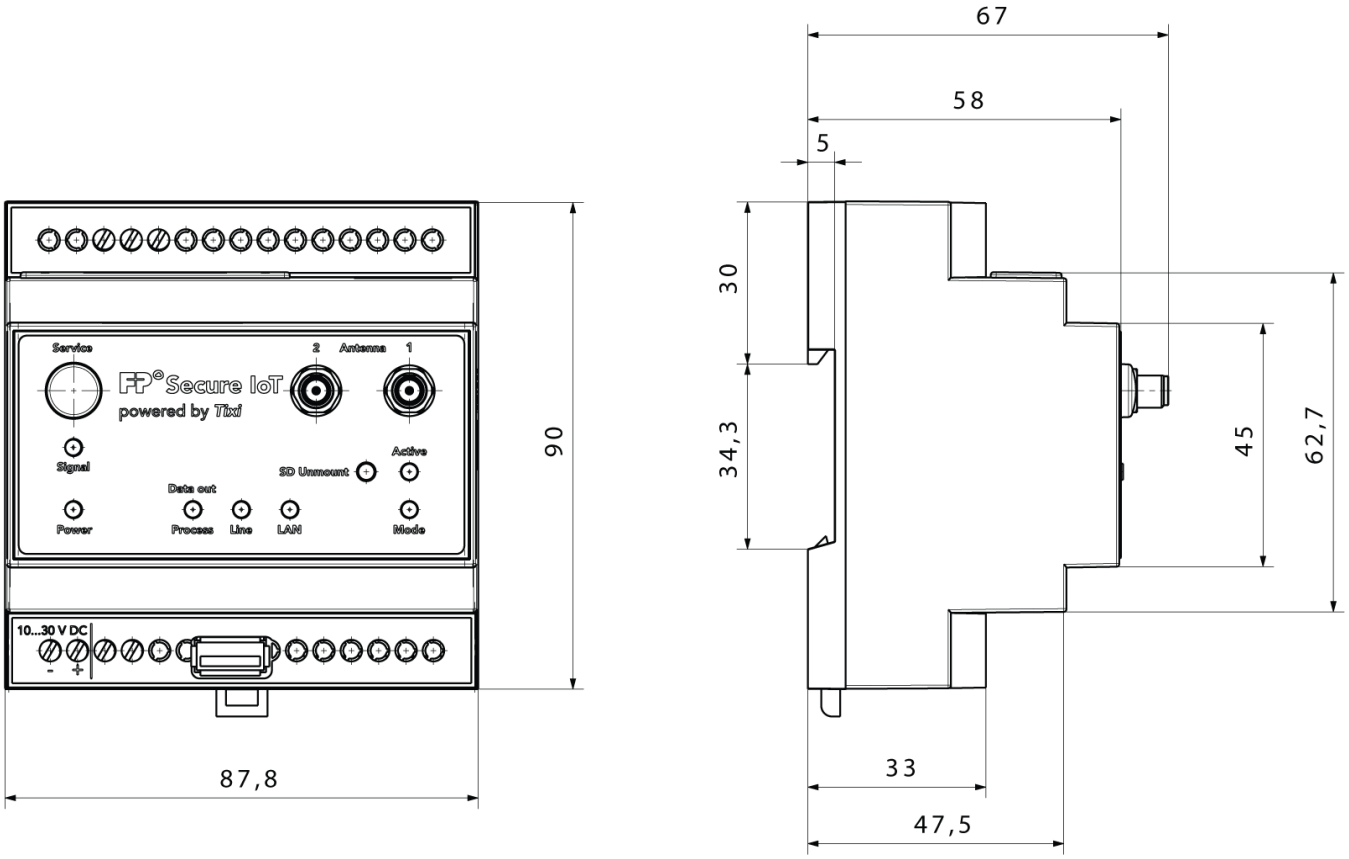
Housing	
Installation	On standard 35 mm x 7.5 mm (1.4" x 0.3") top-hat rails in accordance with EN 50022, horizontal or vertical
Type	FP H5-top-hat rail housing
OEM housing	Standard OEM H5-top-hat rail housing
Dimensions HxWxD	90 mm x 87.8 mm x 58 mm (3.54" x 3.46" x 2.28")
Weight	approx. 225 g (0.5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

12 Conformity

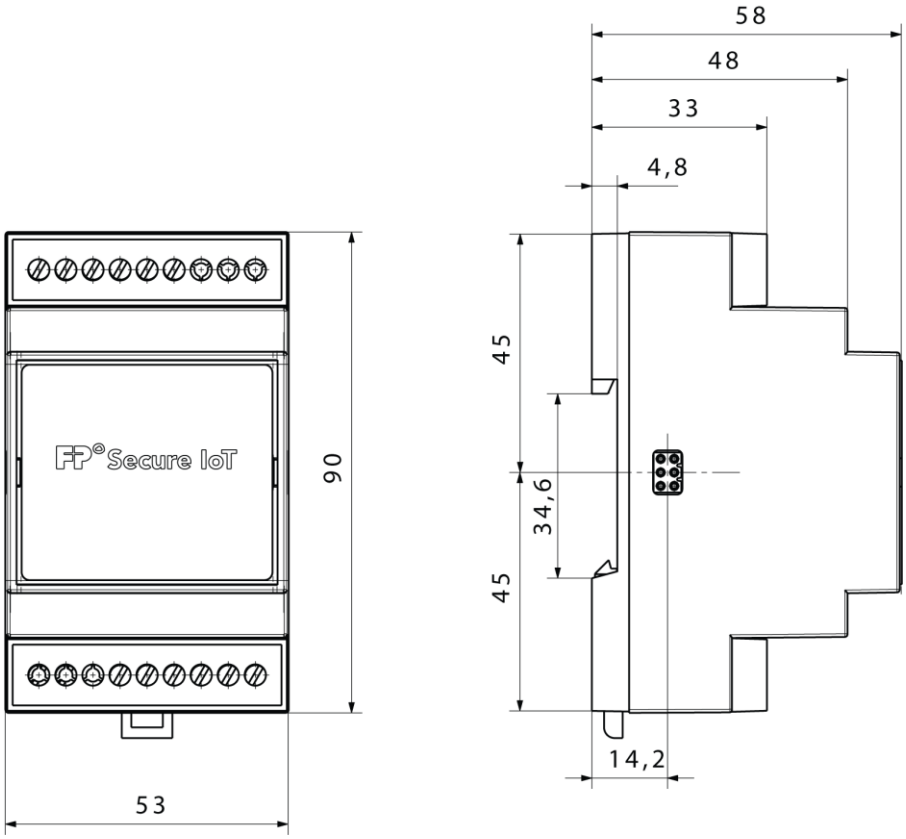
Conformity and use	
Conformity	CE 2014/53/EU Radio Equipment Directive RED 2011/65/EU RoHS 2012/19/EU WEEE
Temperature range	Operation: -25 °C .. +65 °C / -13 °F .. 149 °F (except H653: -25 °C .. +60 °C / -13 °F .. 140 °F) Storage: -25 °C .. +85 °C / -13 °F .. 185 °F
Permitted humidity	5 .. 95 % relative 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")



Contact

FP NeoMonitor GmbH
Prenzlauer Promenade 28
D - 13089 Berlin

Tel.: +49 - 30 – 220 660 601
Email: info@neomonitor.de
Web: www.neomonitor.de