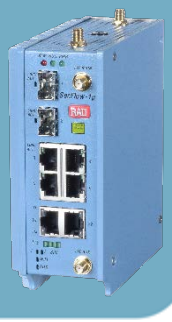
Product page >

Data Sheet

General Availability

# SecFlow-1p

## Industrial IoT Gateway



- Ruggedized IOT gateway, SCADA protocol gateway for IEC-101, IEC-104, Modbus-RTU/TCP*
- Edge computing by hosting 3rd party container software for customized applications
- Zero Touch provisioning
- Terminal server
- One or two embedded cellular modems (optional second cellular modem, Wi-Fi access point and client, or LoRaWAN)
- Two SIM cards for maximum link resiliency
- Serial tunneling to TCP/IP, including DNP3
- Dry contacts
- GPS for location reporting
- Zone-based stateful firewall

SecFlow®-1p, a member of RAD's SecFlow suite of ruggedized Ethernet products, is an industrial IoT gateway. Besides its communication capabilities, it is an open platform for hosting third-party software.

SecFlow®-1p features a security hardened operating system, optimized to provide maximum performance with small SW footprint.

With its maximum configuration, SecFlow-1p features four GbE copper ports and two GbE SFP ports, two serial ports (single RS-232 port or one RS-232 plus one RS-485/2W), a built-in Wi-Fi modem, a GPS receiver for location indication and a cellular modem with two SIM cards or two modems for maximum link resiliency.

SecFlow-1p is equipped with serial interfaces for connectivity to legacy equipment. As a gateway, it converts legacy serial protocols to modern IP-based protocols, enabling seamless communication from IP SCADA to both old and new RTUs. This provides a single-box solution for multi-service applications and smooth migration to all-IP networks.

When equipped with LoRaWAN radio, SecFlow-1p aggregates multiple low-power low-bandwidth sensors/meters deployed over a wide area. This provides an ideal solution for rural and other non-dense areas saving CAPEX and OPEX.

SecFlow

SecFlow-1p features DIN-rail mounting, IP30 protection level, and wide operating temperature range (-40°C to 65°C) without fans. Powering options include an embedded, isolated DC power supply, to meet the harsh environmental requirements.

### MARKET SEGMENTS AND APPLICATIONS

SecFlow-1p addresses the Industrial IoT market, with applications such as:

- Secure and resilient SCADA transport
- IIoT asset management
- Advanced resilient satellite communication
- Smart grid monitoring for power utilities
- Water resources management
- Smart meter concentration

### SINGLE/DUAL LTE MODEMS AND GPS

SecFlow-1p features flexible configuration for one LTE modem with two SIM cards, or two embedded LTE modems, for maximum resiliency. GPS for location reporting is also supported.

5G wireless technology employed by SecFlow-1p is designed to provide higher peak data speeds of multiple Gbps, ultra-low latency, more reliability, massive network capacity, increased availability, higher performance and improved power efficiency.

PulseSupply
pulsesupply.com

** This feature will be released in a future version.*

RAD
Your Network's Edge®

# SecFlow-1p

## Industrial IoT Gateway

Data Sheet

### RESILIENCY

A link redundancy mechanism allows tracking connectivity to specific IP addresses using fault propagation and IP monitoring capabilities.

### ROUTING

SecFlow-1p features static routing, OSPF and BGP.

### VPN SERVICES

The device features a VPN gateway with two operation modes:

- Inter-site connectivity using 30 IPsec tunnels
- Remote user access using SSH

Inter-site VPN-based encrypted link ensures L3 transparent connection of the Ethernet networks sites.

For remote access, the router uses an SSH-encrypted tunnel, with user authentication and specific access authorization.

### CONTAINERS – NEXT LEVEL OF FLEXIBILITY

SecFlow-1p can host containerized edge applications, supporting any 3rd party containers, which extend its original functionality to a new level for Industrial IoT solutions.

Containers can easily be installed and managed via the Docker CLI.

### MANAGEMENT AND SECURITY

#### Management

SecFlow-1p can be managed via Web, CLI, or by NETCONF.

RADview supports fault management, task management and web shortcuts.

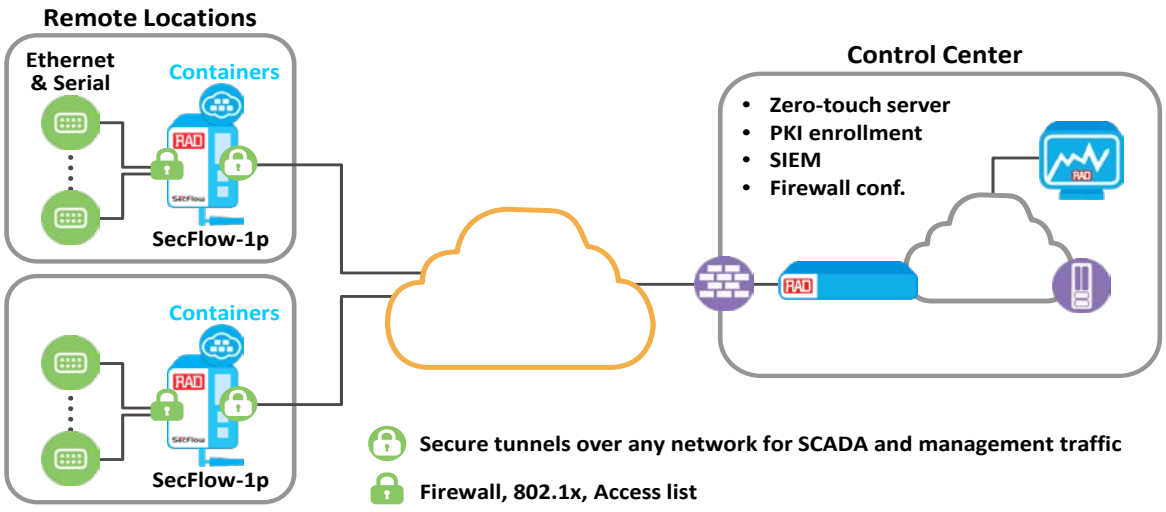
#### Embedded Advanced Security

For meeting the evolving security needs of distributed environments, SecFlow-1p includes embedded security features and options, such as stateful, zone-based firewall, and threat protection.

### ZERO TOUCH PROVISIONING

For easy and safe mass-deployment, RAD offers Zero Touch provisioning thus reducing OPEX and providing a simple way to securely deploy thousands of elements in the network.

SecFlow-1p also supports a variety of access protocols including SFTP.




*Secure Industrial IoT with Edge Computing*

# SecFlow-1p

## Industrial IoT Gateway

## Specifications

### MEMORY AND STORAGE

| | |
|---|---|
| **DRAM** | 1 Gb, 2 Gb |
| **Flash Storage** | 8 Gb, 32 Gb |

### INTERFACES

| | |
|---|---|
| **GNSS** | GPS – American (default) |
| | Galileo – European |
| | Female SMA antenna connector |
| **Ethernet** | 2 x 10/100/1000BASE-T ports |
| | 2 x 1000FX, 4 x 10/100/1000BASE-T ports |
| **Cellular** | 5G, LTE modem with dual SIM |
| | Female SMA antenna connector |
| **SD Card** | Max size: 32 Gb |
| **Serial** | 1 RS-232 interface |
| | 2 RS-232 interfaces (non-isolated or isolated) |
| | 1 RS-232, 1 RS-485 interfaces (non-isolated or isolated) |
| | Connector: RJ-45 |
| **Wi-Fi** | 802.11b/g/n/ac dual band |
| | RP-SMA antenna connector |

### CELLULAR AND GPS

| | |
|---|---|
| **Cellular Authentication** | PAP, CHAP |
| **Firmware Upgrade** | FOTA (Firmware upgrade Over the Air) |
| **GPS** | Location reporting |
| **LTE** | Dual LTE modems |
| | Dual SIM |
| | Single SIM |
| | eSIM support: removable SIM with eUICC |
| | Cellular bands – see Table 1 |
| **Multi APN** | Supported for L450A/L450B |
| **Operation Modes** | PPP, IP |
| **SIM Card** | Mini SIM, 25 mm x 15 mm (0.98 in x 0.59 in) |
| | Form factor: 2 FF |
| **Transmission Modes** | Diversity |
| | MIMO |

### LORAWAN

| | |
|---|---|
| **LoRaWAN Module** | EU868, RU864, US915, AS923 (1-4), AU915, KR920, IN865 bands |
| | SX1303 baseband processor |
| | 8 x 8 channels LoRa packet detectors |
| | 8 x SF5-SF12 LoRa demodulators,<br>8 x SF5-SF10 LoRa demodulators |
| | LoRaWAN Class A, B, C |
| | Packet forwarder |

# SecFlow-1p

## Industrial IoT Gateway

**Table 1. Integrated Cellular Modems**

| LTE Ordering Code | Modem Category and Frequency Bands |
|---|---|
| L1 | **CAT 4 EMEA/Korea/Thailand**<br>LTE FDD: B1, B3, B5, B7, B8, B20<br>LTE TDD: B38, B40, B41<br>WCDMA: B1, B5, B8<br>GSM: B3, B8 |
| L3 | **CAT 4 Australia/New Zealand/Taiwan/Brazil**<br>LTE FDD: B1, B2, B3, B4, B5, B7, B8, B28<br>LTE TDD: B40<br>WCDMA: B1, B2, B5, B8<br>GSM: B2, B3, B5, B8 |
| L4 | **CAT 4 North America, Verizon wireless + AT&T LTE**<br>LTE FDD: B2, B4, B5, B12, B13, B14, B66, B71<br>WCDMA: B2, B4, B5 |
| L4P | **CAT 4 North American private networks (Anterix & CBRS) + Public networks**<br>LTE TDD: B48<br>LTE FDD: Anterix B8<br>LTE FDD: B2, B4, B5, B12, B13, B14, B26, B66 |
| L4T | **CAT 4 North America TAA (ready for PoC)**<br>LTE: B1, B2, B4, B5, B12, B13, B14, B25, B26, B66, B71 |
| L450A | **CAT 4 450 MHz for private LTE networks**<br>LTE-FDD: B3, B7, B20, B31, B72 |
| L450B | **CAT 4 450 MHz for private LTE networks**<br>LTE-FDD: B3, B20, B87 |
| L5 | **CAT 4 Japan**<br>LTE FDD: B1, B3, B8, B18, B19, B26<br>LTE TDD: B41<br>WCDMA: B1, B6, B8, B19 |
| 5G | **5G NR sub-6 with Global support**<br>FR1 (sub-6GHz): n1, n2, n3, n5, n28, n41, n48, n66, n71, n77, n78, n79<br>LTE: B1, B2, B3, B4, B5, B7, B8, B12, B13, B14, B17, B18, B19, B20, B25, B26, B28, B29, B30, B32, B34, B38, B39, B40, B41, B46, B48, B66, B71 |

## WI-FI

### 2.4/5 GHz

| | |
|---|---|
| **Mode** | Access Point, Client |
| **Radio Mode** | 802.11a/b/g/n/ac |
| **Security** | WPA2-AES |
| **Users** | 8 concurrent |

### HaLow

| | |
|---|---|
| **Radio Mode** | 802.11ah Wi-Fi HaLow |
| **Bands** | 902.0 ~ 928.0 MHz |
| **Bandwidth** | 1/2/4 MHz |
| **Security** | OPEN, WPA2-PSK (AES), WPA3-OWE, WPA3-SAE |
| | OFDM modulation with AES-CCMP encryption |
| **Users** | Max. 22 concurrent |
| **Mode** | Access point |
| | Station mode |
| | Simultaneous GATT server & client |
| **Data Rate** | Up to 4 Mbps |
| **Range** | Up to 1 km |
| **Tx Power Gain** | +23 dBm |
| **Max Input Level** | -10 dBm |

## MANAGEMENT

| | |
|---|---|
| **Console Port** | Ethernet port with the highest port number (4 or 6, according to the device ordered), RJ-45 connector<br>***Note**: Console cable is not included and must be ordered separately (see Optional Accessories)* |
| **Configuration** | Web-based interface using HTTPS |
| | CLI with password-protected access |
| **DHCP Server** | IPv4, IP subnet pools support 256 addresses |
| **Protocols** | NETCONF server (v1.0/v1.1)/ YANG |
| | SNMP v2/v3 |
| | SSH v2, HTTPS server, TFTP/SFTP |
| **Users** | User roles and privileges |

# SecFlow-1p

## Industrial IoT Gateway

### SECURITY

| | |
|---|---|
| **Trusted Platform Module** | Secure boot |
| | TPM2.0 |
| **Access Lists** | Standard and extended |
| **Authentication** | Locally, RADIUS, TACACS+ (also for authorization and accounting) |
| | Port-based: 802.1X on Ethernet and Wi-Fi |
| | Multi-factor authentication (MFA) |
| | One-time password (OTP) |
| **Features** | Login lockout |
| **Firewall** | Zone-based, stateful ACL rules |
| **Public Keys** | Public Key Infrastructure with X.509 certification for Zero Touch |
| | TLS 1.2/1.3 |
| | Certificates with SCEP or EST CA server |
| **Session** | Monitoring and limiting |
| **IoT** | Terminal server |
| | SCADA protocol gateway* |
| | Serial tunneling, IEC 101 to IEC 104* |

### OAM

| | |
|---|---|
| **SLA Monitoring** | ICMP echo, UDP echo |
| **ZTP** | On-net |
| | Off-net (over unsecured network) performs secure “call home” using Public Key Infrastructure (X.509) |

### ZONE-BASED FIREWALL

| | |
|---|---|
| **Type** | Stateless |
| | Stateful |
| **IPv4 and IPv6 NAT** | SNAT, DNAT<br>REDIRECT<br>NAPT/NAT |
| **Configuration** | via Web GUI, SSH and SNMP |
| **Rules** | Interfaces are assigned to zones, for which a set of rules is configured |
| | IPv4 and IPv6 |
| | Limit maximum number of simultaneous connections |
| | Limit rules by traffic (kilobyte per second/packet per second) |
| | Rule hits reported to local LINUX Syslog* |
| **DoS Prevention** | Blocklist |
| | Defend from IP sweep |

### IP ADDRESSING AND ROUTING

| | |
|---|---|
| **Addressing** | IPv4 and IPv6 |
| **DHCP** | Client, server, relay |
| | IP helper addresses |
| **DNS** | Server |
| **NAT** | Static/dynamic |
| | NAPT/NAT |
| **Routing Protocols** | OSPF v2, BGP v4 |
| | VRRP |
| | IP-BFD for fast route propagation* |
| **Routing Technologies** | Static |
| | Policy-based |
| | VRF (10), router Interfaces (32) |

### RESILIENCY

| | |
|---|---|
| **Link Redundancy** | Tracking connectivity to specific IP addresses using fault propagation and IP monitoring |
| **ERPS** | Ethernet Ring Protection Switching |

### DIAGNOSTICS

| | |
|---|---|
| **Features** | Traceroute, ping |
| | Syslog |
| | Port mirroring |
| | Alarm and event logs |
| **IoT** | Setting dry contacts based on pre-defined events, generating syslog and device log event |
| | SNMP traps on events |
| **Dry Contacts** | 2 In, 2 Out (default) |
| | 3 In, 1 Out (special ordering option) |
| **LEDs** | Including alarm indication and cellular RSSI level |

### TIMING

| | |
|---|---|
| **Date and Time** | Local time setting |
| **Protocol** | SNTPv4 |

** This feature will be released in a future version.*

# SecFlow-1p

## Industrial IoT Gateway

### IP QUALITY OF SERVICE

| | |
|---|---|
| **Classification** | Port-based, IP-based, DSCP |
| **Egress Queues** | 8 queues per port |
| **Queuing** | Class-based, SPQ, WFQ |
| **Scheduling** | Strict Priority/WRR |
| **Traffic Class Actions** | CoS mapping (queues) |
| | Marking, remarking (DSCP) |
| **Traffic Processing** | Shaping |

### IP VPNS

| | |
|---|---|
| **IPsec** | Up to 30 tunnels |
| **DH Groups** | 1 (768-bit modulus)<br>2 (1024-bit modulus)<br>5 (1536-bit modulus)<br>14 (2048-bit modulus)<br>19 (256-bit elliptic curve)<br>20 (384-bit elliptic curve) |
| **ESP Algorithms** | AES CTR 128, 256 and 192, AES GCM 128 and 256, ChaCha20-Poly1305 |
| **IKE Algorithms** | ECDH-SHA2 NISTP 521, 384 and 256, Curve25519-SHA256, DH-Group18-SHA512, DH-Group17-SHA512, DH-Group16-SHA512, DH-Group15-SHA512, DH-Group14-SHA256, DH-GEX-SHA256 |
| **IKE Hashing Algorithms** | SHA2-256-128-HMAC, SHA2-512-256-HMAC |
| **Protocols** | Policy- and route-based IPsec, GRE |
| | GREoIPsec |
| | IKEv1, IKEv2 |
| | DMVPN client, DMVPN phase 3 |
| | L3 IPsec VPN |
| | PPPoE supporting Broadband or LTE access |
| **Technologies** | NAT traversal |
| | Interoperability with SCEP server 2012 and higher |

### EDGE COMPUTING (CONTAINERS)

| | |
|---|---|
| **Containers** | Docker |

### INTEGRATED ROUTING AND BRIDGING (IRB)

| | |
|---|---|
| **Bridges** | Max 4 |
| **Bridge Ports** | Max 32 |
| **MAC Addresses per Bridge** | Max 512 |
| **Operation Mode** | VLAN-aware VLAN-unaware |
| | Static or dynamic MAC addresses |

### GENERAL

| | |
|---|---|
| **Compliance** | EMC: EN 55032, EN 55035, EN 50121-4*, ETSI EN 301 489-1, ETSI EN 301 908-1, CFR 47 FCC, VCCI-CISPR 32, AS/NZS CISPR 32 |
| | EU: CE |
| | FCC and TUV for North America |
| | Safety: UL 62368-1, IEC/EN 62368-1 |
| | Industry standards: IEC 61850-3, IEEE 1613** |
| | Hazardous locations (Hazloc) standards: UL 121201, CSA C22.2 (Class I & II – Div 2) & (Class III - Div 1 & 2) For use in Class I, Division 2 Groups A, B, C, D) Temp. Class T4** |
| | US Carrier: PTCRB, AT&T, Verizon*, T-Mobile |

** Please contact the PLM for a certified platform

#### Environment

| | |
|---|---|
| **Storage Temperature** | -40 to 85°C (-40 to 185°F) |
| **Operating Temperature** | DIN rail: -40 to 65°C (-40 to 149°F) |
| **Humidity** | Up to 90% |

#### Physical

| | |
|---|---|
| **Height** mm (in) | 138 (5.43) |
| **Width** | 53.3 (2.1) |
| **Depth** | 123.3 (4.85) |
| **Weight** | 0.88 kg (1.94 lb) |

#### Power

| | |
|---|---|
| **DC** | 12-48 VDC (10-60 VDC) |
| | Non-isolated |
| **WDC** | 24-48 VDC (20-60 VDC) |
| | 12-24-48 VDC (10-60 VDC)* |
| | Isolated |
| **12V** | 12- 24 VDC (11-30 VDC) |
| | Isolated |
| **EXT AC Power Supply** | 90–240VAC |
| **Power Consumption** | < **5W** |
| | Idle: 3.0W** |
| | Typical: 3.6W** |
| | Maximum: 4.5W** |
| | **On a platform with one LTE modem |

** This feature will be released in a future version.*

## Ordering

The information below represents examples of supported configurations. For additional configuration options, please contact your local RAD partner.

**SF-1P/E1/DC/4U2S/2RS/L450A/2R**
**SF-1P/E1/DC/4U2S/2RS/2R**
**SF-1P/E1/DC/4U2S/2RS/L1/G/2R**
**SF-1P/E1/DC/4U2S/2RS/L1/G/L1/2R**
**SF-1P/E1/DC/4U2S/2RS/L3/G/2R**
**SF-1P/E1/DC/4U2S/2RS/LRA/2R**
**SF-1P/E1/DC/4U2S/2RSM/5G/2R**
**SF-1P/E1/DC/4U2S/2RSM/5G/G/LRB/2R**
**SF-1P/E1/DC/4U2S/2RSM/5G/LRA/2R**
**SF-1P/E1/DC/4U2S/2RSM/L1/G/LRA/2**
**SF-1P/E1/DC/4U2S/2RSM/L1/G/WF/2R**
**SF-1P/E1/DC/4U2S/2RSM/L3/G/2R**
**SF-1P/E1/DC/4U2S/2RSM/L3/G/L3/2R**
**SF-1P/E1/DC/4U2S/2RSM/L4/G/LRA/2R**
**SF-1P/E1/WDC/4U2S/2RMI/L4/RG/2R**

### ORDERING OPTIONS

Some options are not supported by all models. Some option combinations are invalid or may require a minimum order. To determine the BOM for your application, please contact your local RAD partner.

| | | |
|---|---|---|
| **Cellular Ports** | L1 | LTE modem for Europe |
| | L3 | LTE modem for Oceania and Latin America |
| | L4 | LTE modem for North America, Verizon wireless + AT&T |
| | L5 | LTE modem for Japan |
| | L450A | LTE modem 450MHz for private LTE networks, LTE-FDD: B3/7/20/31/72 |
| | L450B | LTE modem 450MHz for private LTE networks, LTE-FDD: B3/20/87 |
| | L4P | LTE modem for North American private networks (Anterix & CBRS) + Public networks |
| | 5G | 5G modem with SA and NSA global support with fallback to LTE or 3G<br>L4T (Ready for PoC) |

***Notes:***

- *In options with dual modems, both modems are of the same type (L1, L3, L4, L4P, L450A or L450B).*
- *The cellular modem is supplied with two matching antennas (see Supplied Accessories).*

| | | |
|---|---|---|
| **Certification** | RG | IEC 61850-3 and IEEE-1613 compliant |
| **Dry Contacts** | Default | 2 input + 2 output |
| | 3DI | 3 input + 1 output |
| **Ethernet Ports** | 2U | 2 x UTP ports |
| | 4U2S | 4 x 10/100/1000BASE-T and 2 x SFP ports |
| **GNSS** | G | Integrated GPS |

***Note:*** *The GPS modem is supplied with one antenna (see* Supplied Accessories*).*

| | | |
|---|---|---|
| **LoRaWAN Modem** | LRA | LoRaWAN modem with 8 channels and frequency scheme selectable for US915, AU915, AS923-(1-4), or KR920 |
| | LRB | LoRaWAN modem with 8 channels and frequency scheme selectable for EU868, IN865, or RU864 |

***Note*:** *The LoRaWAN modem is supplied with one antenna matching the frequency ordered.*

| | | |
|---|---|---|
| **Power Supply** | DC | 12/24/48V input voltage (10–60 VDC), non-isolated |
| | WDC | 24/48 input voltage (20–60 VDC), isolated |
| | 12V | 12/24 input voltage (11–30 VDC), isolated |
| **RAM** | Default | 1G RAM |
| | 2R | 2G RAM |
| **Serial Ports** | 1RS | 1 RS-232 interface |
| | 2RS | 2 RS-232 interfaces |
| | 2RSM | 1 RS-232, 1 RS-485 interfaces |
| | 2RSI | 2 RS-232 interfaces, isolated |
| | 2RMI | 1 RS-232, 1 RS-485 interfaces, isolated |
| **Wi-Fi Interface** | WF | Wi-Fi 2.4 GHz/5 GHz |
| | WH | Wi-Fi 900 MHz HaLow |

***Note:*** *The WiFi modem is supplied with two matching antennas (see Supplied Accessories).*

# SecFlow-1p

## Industrial IoT Gateway

Data Sheet

### SUPPLIED ACCESSORIES

**SF-ANT-GPS-PAS-3DBI-MAG/3M**
GPS passive antenna, 3m, for options with integrated GPS

**SF-ANT-LTE699-4DBI-SMA**
LTE antenna, 4dBi, for options with LTEx modems

**SF-ANT-WIFI-DUALBAND-3DBI-SMA**
WiFi dual band antenna, 3 dBi, for options with WiFi modem

**SF-ANT-LoRA-3DBI-SMA**
LoRaWAN antenna, 3 dBi, for options with LoRaWAN modem

***Note***: *The LoRaWAN modem is supplied with one antenna matching the frequency ordered: EU868, AU915, US915, AS923 (1-4), RU864, KR920, IN865*

**SF-1P-CONN/TB**
TB connectors for the DC power and dry contacts

### OPTIONAL ACCESSORIES

For an AC power supply, order a DC option +one of the two power supplies below.

**SF-AC-12VDC-20W-EX**

External AC to 12 VDC 20W power supply

**SF-AC-12VDC-16W-JP**

External AC power supply for Japanese market

**SF-AC-12VDC-20W**

External DIN Rail AC to 12 VDC 20W power supply

**CBL-ETH/STP/STR/1M**
Console port cable

**CBL-RJ45/D9/F/6FT**
Serial RS-232 data port cable

**CBL-SF-RJ45-RS485**
Serial RS-485 data port cable

**RM-DIN-SINGLE**
Adaptor for mounting a single device in a 19-inch/23-inch DIN rail

**RM-DIN-19**
Adaptor for mounting a single/multiple devices in a 19-inch DIN rail

**SF-ANT-LTE700-7DBI-MGNT**

Outdoor magnetic base antenna for SecFlow-1p LTE options and for LoRaWAN 868 and 915 MHz, 7 dBi

**SF-ANT4G-2M**
LTE screw antenna, 2m (6.5 ft) cable, 3 dBi, 699-960 MHz/ 1710-2170 MHz/2500-2690 MHz

**SF-ANT4G-5M**
LTE screw antenna, 5m (16.4 ft) cable, 3 dBi, 699-960 MHz /1710-2170 MHz/2500-2690 MHz

**SF-ANT-GPS-PAS-3DBI-MAG/3M**
GPS passive antenna, 3m

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