

**CHALLENGE.  
SOLUTION.  
SUCCESS.**

**23**

**PRODUCT  
CATALOGUE**



**High-quality radio  
technology for  
real-time wireless  
data communication.**

**SATEL**

**Mission-Critical Connectivity**

# SOLVING YOUR CHALLENGES

**SATEL is a trusted wireless technology expert and innovator who develops and sells high quality connectivity solutions.**

Our solutions are used in a wide range of industrial applications enabling secure, mission-critical connections. All SATEL products are designed and manufactured in Finland.

## **Reliable connections, protected business**

SATEL technology is easy and fast to implement and use with low life cycle costs. Our solutions are expandable, customizable, flexible and secure.

You get added value from our services. We offer network design and technical support, and we have a wide distributor network at your service.



**Expertise**  
**High quality**  
**Operational security**  
**Independence**

**Easy implementation**  
**Low life cycle costs**  
**Service and support**  
**Global distribution network**



# SUSTAINABILITY AS A CORE VALUE

- SATEL is committed to carrying out its business in a sustainable way.
- Our radio technology is designed, manufactured and tested in Finland.
- We have a long tradition of environmentally friendly practices, and we perform highly in ESG (Environmental, Social and Governance) criteria.

SATEL radio technology can be used in various mission-critical applications such as SCADA, machine control, smart farming, ITS, autonomous vehicles, GNSS, offshore, environmental monitoring and Industrial Internet. Mission-critical nature of these applications calls for very tight requirements for connectivity, reliability, accuracy and security. Many of the applications that use radio modems make operations safer and more sustainable.



# APPLICATIONS



## MACHINE CONTROL

Machine control is used to accurately position machinery based on GNSS systems and 3D design models.

Several machine control systems use the Real-Time Kinematic (RTK) to improve positioning accuracy for streamlining the different construction site workflows.

SATEL's radio technology is used worldwide in machine control. Our technology is perfect for mission-critical operations. It is a reliable way to ensure availability even in areas with limited network coverage or no coverage at all.

With machine control operations become more efficient and safe. Environmental impact is manifested in lower fuel consumption and longer machine lifecycle. For example, in precision farming, the use of seeds, fertilizers and pesticides becomes more accurate.

## ENVIRONMENTAL MONITORING

Wireless radio technology is one key aspect in Environmental Monitoring. It brings safety, operability and control. With SATEL's solutions you can monitor weather conditions and get information for example in flood, fire or drought situation. They provide real-time information of environmental conditions without additional costs and with a minimum supervision.



## ITS

Intelligent Transport Systems are improving travel experience everywhere, and operational communication is a major factor in this. Private radio data network ensures the functionality of these applications. SATEL's radio technology is used in in public transport e.g. in traffic light and traffic sign control, real-time passenger information systems and automatic vehicle location.

In ITS radio technology contributes to making transportation more efficient, environmentally friendly and safe. The results can be seen in reduced driving times, less fuel consumption and less CO<sup>2</sup> emissions.

SATEL's technology is used globally in a wide range of industrial applications that require the utmost reliability and security. The application possibilities are numerous.



## UTILITIES

Utility systems require a highly reliable monitoring and controlling network. Malfunctions should be pinpointed quickly and even restored remotely. SATEL offers comprehensive solutions that are easy to implement and expand. SATEL radio technology is currently being used e.g. in power distribution, advanced metering infrastructure, windmills, waterworks, sewer networks, district heating and gas pipelines.

In utility communications, real-time wireless monitoring and remote access add efficiency and support interference-free operation, cut reaction times and minimize the environmental impact, for example water losses.

## OEM

SATEL have produced a range of OEM radio modules for system manufacturers to integrate into customer solutions. They are secure, customizable and flexible in mounting options. SATEL's solutions are widely compatible and also support other manufacturers' radio protocols.



## DEFENCE

Defense forces all around the world use lot of time and money for practicing. To get the most out of the investment and to guarantee the quality and safety, practices are monitored in real-time and the results are analyzed for further development.

SATEL's radio technology is used for example in target practice on land, at sea, and in the air. SATEL products can be used to transmit location and telemetry data from a moving target to the operator reliably, even over long distances.

# SATEL-EASY+

The SATEL-EASy+ product family has an improved LCD display for easy configuration, an improved MCU capacity and variable physical interfaces available. It is compatible with SATELLINE-EASy and -M3-TR4 based radios as well as with SATELLINE-3AS NMS modems. The first product variant is for 400 MHz frequency band and with 1W output power.

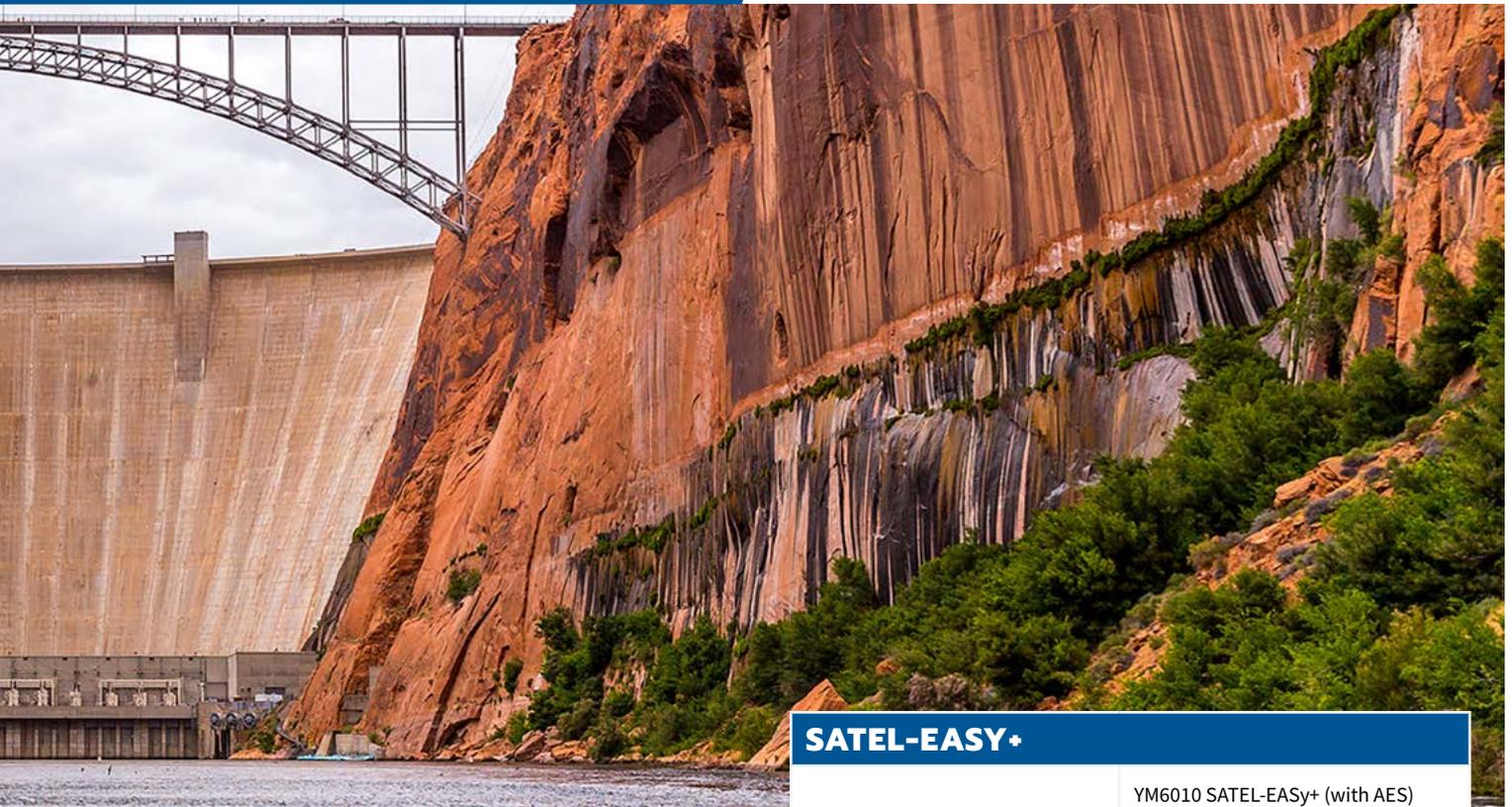
## HW

- New generation mechanics
- Operating voltage +7 ... +27.5 Vdc (-15 % / +20 %)
- Improved LCD display
- Improved MCU capacity
- Variable physical interfaces (D15, RJ45 <sup>\*</sup>, USB <sup>\*</sup>, IO's <sup>\*</sup>)

## FW

- NMS Protocol Compatibility (With routing, diagnostics and packet filters)
- ETH & TCP/IP Connectivity <sup>\*</sup>)
- BT/BLE Connectivity <sup>\*</sup>)
- DRM Feature support (AES256, IP networking <sup>\*</sup>)
- FW Over-The-Air Update <sup>\*</sup>)





## SATEL-EASy+

SATEL order code	YM6010 SATEL-EASy+ (with AES) YM6015 SATEL-EASy+ YM6050 SATEL-EASy+ (with display and AES) YM6055 SATEL-EASy+ (with display)
Frequency	403 ... 473 MHz
Tuning range	70 MHz
Channel width	12.5 / 20 / 25 kHz programmable
RX sensitivity	-116 dBm @ 12.5 kHz (4FSK) / -112 dBm @ 25 kHz (4FSK) -106 dBm @ 25 kHz (16FSK)
TX power ( max. )	1W
Interface	RS-232, -422, -485
Operating voltage range	+7 ... +27.5 Vdc (-15% / +20%)
Power consumption TX / RX	< 5.5 W / < 1.5 W
Data speed ( max. ) radio / serial	28800 bps / 115200 bps

\*) Ask availability from SATEL.

## THE FOLLOWING VARIANTS ARE COMING NEXT:

### Variant for 320 ... 380 MHz frequency band

- With/without LCD user interface, with function buttons and AES encryption support
- Excellent choice for GNSS industry in Asia and utility business in the Middle East

### Variant with USB, ETH and BT interface

- For transmitting and receiving data and modem configuration

# SOLUTIONS FOR THE TOUGHEST PLACES

**SATEL-EASy Pro+ is a new IP67 classified UHF radio modem with a high 35 W power transmitter, wide 70 MHz tuning range (403 ... 473 MHz) in one hardware and selectable channel spacing.**

First version of SATEL-EASy Pro+ is equipped with one antenna port and one data port. Future options include dual serial port capability supporting simultaneous data (RS-232 by default, RS-485/-422 data ports optional) and diagnostics output, as well as lower frequency band 320...380 MHz. Supported AES128 (by default) / AES256 (as an order option) encryption on radio channel increases the data security.

Due to the high transmitting power, connection distances more than 80 kilometres can be covered in favorable conditions.

## SATEL-EASy Pro+

SATEL order code	YM6820 SATEL-EASy Pro+ (with AES, max. 25 W output power) YM6823 SATEL-EASy Pro+ (with AES) YM6825 SATEL-EASy Pro+ (max. 25 W output power) YM6830 SATEL-EASy Pro+ (with AES, max. 25 W output power, for AU) YM6833 SATEL-EASy Pro+ YM6835 SATEL-EASy Pro+ (max. 25 W output power, for AU) YM6840 SATEL-EASy Pro+ (with AES, for BR) YM6843 SATEL-EASy Pro+ (with AES, with RS422/485 interface) YM6845 SATEL-EASy Pro+ (for BR)
Frequency	403 ... 473 MHz
Tuning range	70 MHz
Channel width	12.5 / 20 / 25 kHz
RX sensitivity	-112 dB
TX power ( max. )	35 W
Interface	RS-232 HW model with data port 2: RS-232/-485/-422 (data/NMS)
Operating voltage range	+9 ... +30 Vdc (-15% / +20%)
Power consumption	TX: 9 ... 10 W @ 1W output power TX: 60 ... 72 W @ 25 W output power TX: 84 ... 97 W @ 35 W output power RX: 1.8 ... 2.3 W Sleep mode: 0.9 ... 1.4 W
Data speed ( max. ) radio / serial	28800 bps / 115200 bps



# DEFYING ALL CHALLENGES

SATEL Compact-Proof is particularly well suited for outdoor use (land surveying, for instance) under varying weather conditions.

The lithium-ion battery provides a long-lasting performance and plenty of operating hours. The operating time in +25°C is more than 15 h.



## SATEL Compact-Proof

SATEL order code	YM6570 (with battery) YM6571 (w/o battery)
Frequency	330... 420 / 403...473 MHz
Tuning range	90 / 70 MHz
Channel width	12.5 / 20 / 25 kHz programmable
RX sensitivity	-114 dBm
TX power ( max. )	1 W
Interface	RS-232
Operating voltage range	+10.6 ... +13.3 Vdc (-15% / +20%)
Power consumption TX / RX When idle ( no charging and modem off )	7 W / 1.2 W 6 mW
Data speed ( max. ) radio / serial	19200 bps / 38400 bps

## LICENCE FREE RADIO MODEM

### SATEL Compact-Proof (869 MHz)

SATEL order code	YM6575 with battery YM6576 w/o battery
Frequency	869.4125 ... 869.6375 MHz (865 ... 867 MHz for India)
Channel width	25 kHz
RX sensitivity	-111 dBm
TX power ( max. )	500 mW (1 W for India)
Interface	RS-232
Operating voltage range	+10.6 ... +13.3 Vdc (-15% / +20%)
Power consumption TX / RX	TX 3.8 W (869 MHz) / 7 W (865 MHz) / RX 1.2 W
Data speed ( max. ) radio / serial	19200 bps / 38400 bps



### BATTERY for SATEL Compact-Proof

Capacity and type	7.2 V, 8700 mAh, Li-Ion	
Charging current ( max. )	1.6 A	
Charging time ( empty to full )	5.5 hrs (+20 °C)	
Charging voltage	+10.6 ... +13.3 Vdc (-15% / +20%)	
Max. time of operation	+60 °C (1 W, TX 100%)	13 h
	+60 °C (1 W, TX 50%)	22 h
	-20 °C (1 W, TX 100%)	10 h
	-20 °C (1 W, TX 50%) )	15 h
	-20 Co (RX only)	44 h

\*) In -20 °C operational times can decrease 40 %.

\*\*) Due to the Li-Ion battery technology capacity will slightly decrease after each cycle affecting directly to the operation times.

## IP67 RADIO MODEMS

### SATELLINE-EASy Pro

SATEL order code	YM6803
Frequency MHz	403 ... 473 MHz
Tuning range	70 MHz
Channel width kHz	12.5 / 20 / 25 kHz programmable
RX sensitivity	-114 dBm
TX power ( max. )	35 W ( 25 W as an order option )
Interface	RS-232
Operating voltage range	+10.6 ... +13.3 Vdc (-15% / +20%)
Power consumption TX / RX	120 W / 1.8 W
Data speed ( max. ) radio / serial	19200 bps / 38400 bps

## IP69K RADIO MODEMS

### SATEL Proof-TR4+ / -TR9

SATEL order code	YM6577 SATEL Proof-TR4+ (with AES) YM6578 SATEL Proof-TR4+ YM6410 SATEL Proof-TR9 YM6411 SATEL Proof-TR9 for US, CA YM6412 SATEL Proof-TR9 for AU,NZ, BR
Frequency	403 ... 473 / 902 ... 928 MHz
Channel width	12.5 / 20 / 25 kHz @ TR4
Spreading method	Frequency hopping @ TR9
RX sensitivity	-118 ... -105 dBm
TX power ( max. )	1 W
Interface	RS-232 (TD, RD lines)
Operating voltage range	+7 ... +27.5 Vdc (-15% / +20%)
Power consumption TX / RX	7 / 1.2 W (typical)
Data speed ( max. ) radio / serial	28800 bps / 115200 bps @ TR4 115200 bps / 115200 bps @ TR9

### SATEL Proof-TR489

SATEL order code	TBD
Frequency	403 ... 473 / 869.4 ... 869.65 / 902 ... 928
Tuning range	70 MHz / 0.25 MHz / frequency hopping spread spectrum
Channel width	12.5, 20, 25 kHz / 25, 50 kHz / 7 user selectable hopping bands
RX sensitivity	-113 dBm / -108 dBm / -106 dBm
TX power ( max. )	1 W / 0.5 W / 1 W
Interface	RS-232 (TD, RD lines)
Operating voltage range	+7 ... +27.5 Vdc (-15% / +20%)
Power consumption TX / RX	7 / 1.3 W (typical)
Data speed ( max. ) radio / serial	28800 bps / 115200 bps @ 400 MHz 38400 bps / 115200 bps @ 869 MHz 115200 bps @ 915 MHz



**SATELLINE-EASy Pro**



**SATEL Proof-TR4+ / -TR9**  
**SATEL Proof-TR489**



# LONG DISTANCES MADE SHORT

## \*NETWORK MANAGEMENT SYSTEM

SATEL NMS software can be used to set up a new radio modem network or modify an existing one. It is also an excellent tool for monitoring the condition of the radio network, and by setting different alarm levels it enables immediate reactions.

- Graphical tool for designing a radio network
- Enhanced reliability through advance indication of anticipated faults and failures
- Reduced configuration and maintenance costs through remote configuration
- Flexibility in adapting to customer protocols and applications

### SATELLINE-3AS VHF

SATEL order code	YM5000
SATELLINE-3AS VHF	YM5010 ( with display )
SATELLINE-3ASd VHF	YM5020 ( with cooling part )
SATELLINE-3AS VHF C	YM5030 ( with display and cooling part )
SATELLINE-3ASd VHF C	
Frequency	135...174 MHz
Tuning range	135...155, 138...160, 155...174 MHz
Channel width	12.5 / 25 fixed kHz
RX sensitivity	-115 dBm
TX power ( max. )	5 W
Interface	RS-232, -422, -485
Operating voltage range	+10.6 ... +25 Vdc (-15% / +20%)
Power consumption TX / RX	6.6 W @ 1 W, 22 W @ 5 W / 1.7 W
Data speed ( max. ) radio / serial	19200 bps / 38400 bps



YM5000



YM5010



YM5020



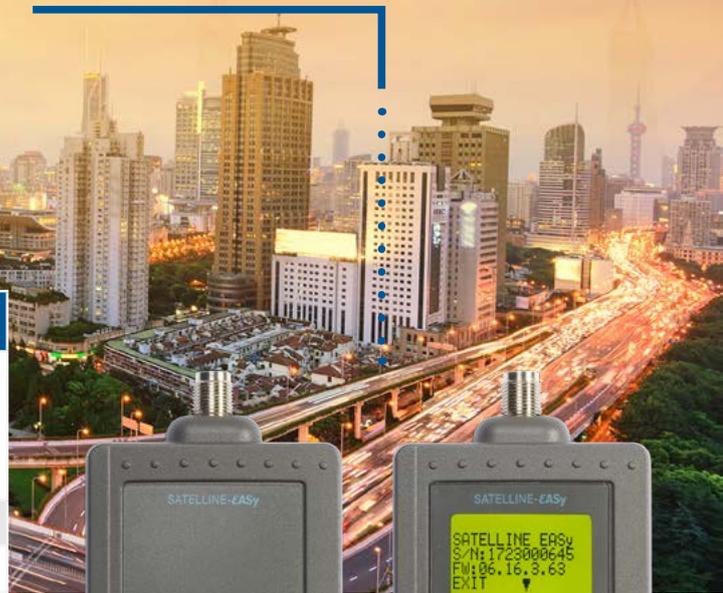
YM5030

# THE WORLD IS OPEN

## UHF RADIO MODEM

### SATELLINE-EASy

SATEL order code	YM6500 SATELLINE-EASy YM6510 SATELLINE-EASy (with AES) YM6550 SATELLINE-EASy (with display) YM6560 SATELLINE-EASy (with display and AES)
Frequency	330 ... 420 / 403 ... 473 MHz
Tuning range	90 / 70 MHz
Channel width	12.5 / 20 / 25 kHz programmable
RX sensitivity	-114 dBm
TX power ( max. )	1 W
Interface	Port1: RS-232 fixed Port2: RS-232 / -422
Operating voltage range	+3.5 ... +7.5 / +7 ... +25 Vdc (-15% / +20%)
Power consumption TX / RX	7 W / 1.2 W
Data speed ( max. ) radio / serial	19200 bps / 38400 bps



**YM6500/YM6510**

**YM6550/YM6560**

## LICENCE FREE RADIO MODEM

### SATELLINE-EASy 869

SATEL order code	YM6501
SATELLINE-EASy 869	YM6551 ( with display )
SATELLINE-EASy 869	
Frequency	869.4000 ... 870.0000 MHz (865 ... 867 MHz for India)
Channel width	25 kHz
RX sensitivity	-111 dBm
TX power ( max. )	500 mW (1 W for India)
Interface	RS-232, -422
Operating voltage range	+7 ... +25 Vdc (-15% / +20%)
Power consumption TX / RX	TX 3.8 W (869 MHz)/7 W (865 MHz)/RX 1.2 W
Data speed ( max. ) radio / serial	19200 bps / 38400 bps



**YM6501**

**YM6551**

## SATEL EASy-Proof

SATEL order code	YM6580 YM6585 (with AES)
Frequency	330 ... 420 / 403 ... 473 MHz
Tuning range	90 / 70 MHz
Channel width	12.5 / 20 / 25 kHz programmable
RX sensitivity	-114 dBm
TX power ( max. )	1 W
Interface	RS-232
Operating voltage range	+7 ... +25 Vdc (-15% / +20%)
Power consumption TX / RX	7 W / 1.2 W
Data speed ( max. ) radio / serial	19200 bps / 38400 bps
Note	Interface connector: Deutsch DT04-6P-CL09

EOL product, limited availability



**SATEL EASy-Proof**

## ADDITIONAL EQUIPMENT

SATEL BT-RS232 is an IP66-rated robust and waterproof Bluetooth to RS-232 serial port adapter. It offers a compact and easily integrable solution for devices that needs to communicate without a cable connection.

SATEL BT-RS232 is equipped with long range Bluetooth 2.1, that offers connection distances upto 400 meters.

## SATEL BT-RS232

SATEL order code	YI0232 SATEL BT-RS232 adapter
Electrical interface	RS232
Data speed serial	115200 bps
TX power	+12 dBm with Bluetooth BR/EDR
RX sensitivity	-96 dBm
Operation mode	Slave mode
Operating voltage	+9 ... +27.5 Vdc (-15% / +20%)



**SATEL BT-RS232**

# THE HEART OF THE SATEL XPRS SOLUTION

SATEL XPRS IP radio router is an excellent choice for data transfer for mission-critical applications requiring long range and the benefits of the privately owned networks.

The IP radio router provides high availability connections with device and routing protection. The SATEL XPRS solution utilizes the interoperability of the radio routers with other communications technologies, as well as technology switchovers.

## IP RADIO ROUTER



SATEL XPRS IP radio router is suitable for both serial and IP data networking in UHF frequencies. It provides a reliable data connectivity for applications that require stability, high availability and long range. It supports low latency networking and has easy remote management with intuitive user interface.

The product consists of two separate modules, a radio unit and central unit. The radio unit alone can be used as a serial data radio router and as a repeater in packet routing networks. When central unit is added to the radio unit, full TCP/IP functionality is obtained. Advanced features, such as adaptive modulation and radio parameters, cyber security features, monitoring and management, protocol routing and conversion functionality provide a complete digital solution that takes into account all data transfer scenarios.



Radio and central unit w display  
YF0220



Radio and central unit w/o display  
YF0210



Radio unit only  
YF0200

	XT 5R		XT 5RC	
Model / Type identification	SATELLAR RU-Q / TA-26		SATELLAR RU-Q / TA-26	
SATEL order code with display	YF0200		YF0210 YF0220	
Frequency MHz	400-445			
Channel width	12.5 kHz / 25 kHz			
Data speed radio ( max. )	60.5 kbps @ 12.5 kHz (64QAM) 121 kbps @ 25 kHz (64QAM) Max. coded			
RX sensitivity (BER 10E-6)	Air speed	Channel width	Modulation	Sensitivity (10E-6)
	121 kbps	25 kHz	64QAM	-98 dBm
	60.5 kbps	12.5 kHz	64QAM	-100 dBm
	80.6 kbps	25 kHz	16QAM	-105 dBm
	40.3 kbps	12.5 kHz	16QAM	-106 dBm
	40.3 kbps	25 kHz	4QAM	-111 dBm
	20.2 kbps	12.5 kHz	4QAM	-113 dBm
Tx power (nominal)	37 dBm (5 W) mean: average 30 dBm (1 W), max 32 dBm (1.5 W) PEP: average 37 dBm (5 W), max 38 dBm (6.6 W)			
Interface	RS-232, -422 / -485		RS-232, -422 / -485, USB, Ethernet	
Operating voltage range	12.5 ... +25 Vdc (-15% / +20%)			
Power consumption without display TX / RX	14.4 W / 3.8 W		15.8W/5.2W 16.4W/5.8W	

Long range	VLAN	Unicast Broadcast	Bridge mode	NETCO	Cyber security
Redundant routing	SNMP monitoring	Radio data up to ~121 kbps	Interoperability	UHF	
Firewall	Protocol conversions	IEC-104/101, DNP3, Modbus TCP/RTU	Serial over IP	0.1-5 W TX-power	



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**Complete your  
SATEL XPRS  
solution** .....

**BENEFIT FROM  
THE USE OF  
MULTIPLE  
TECHNOLOGIES**

The SATEL XPRS solution takes your mission-critical communications to the next level. Varying system requirements such as different investment profiles and increasing redundancy and performance are met by the SATEL XPRS solution with wireless cellular routers.

Co-operation of adjacent technologies adds even more reliability, predictability and security to your mission-critical connectivity.



EOL product, limited availability.

## SATEL-GW600

SATEL order code	YG0600
Cellular technologies	LTE, HSPA+, HSPA, UMTS, EDGE, GPRS, GSM
Interfaces	Dual SIM, Quad Ethernet ports, RS-232 and RS-485 serial ports, Digital inputs for event detection
Cyber security	For example IPsec and OpenVPN
Special features	Protocol conversions, Relay contact options, Interface connectivity monitoring

The versatile 2G/3G/LTE wireless router is suitable for a variety of industrial deployments. The compact structure makes it excellent for M2M applications like SCADA, telemetry and intelligent traffic systems. The router supports the following radio access technologies: LTE, HSPA+, HSPA, UMTS, EDGE, GPRS and GSM.

- Dual SIM
- Quad Ethernet ports
- SMS commands
- RS-232 and RS-485 serial ports
- Digital inputs for event detection
- Relay contact options
- Extended list of routing protocols
- Security features
- Protocol conversions
- Centralised management and monitoring

## SATEL-GW120

SATEL order code SATEL-GW100 without WiFi SATEL-GW120 with WiFi	YG0100 YG0120
Cellular technologies	LTE, HSPA+, HSPA, UMTS, EDGE, GPRS, GSM
Interfaces	Dual SIM, 2.4 GHz WiFi, Dual Ethernet ports
Cyber security	For example IPsec and OpenVPN

The small and robust 2G/3G/LTE router with WiFi option is perfect for M2M applications like remote monitoring and control. It offers a new entry point for 2G/3G/LTE data applications and supports the following radio access technologies: LTE, HSPA+, HSPA, UMTS, EDGE, GPRS and GSM.

- Dual SIM
- 2.4GHz WiFi
- Dual Ethernet
- Extended list of routing protocols
- Security features
- GPS receiver
- SMS management
- Active power conditioning
- Centralised management and monitoring

In case WiFi is not needed, a good choice is SATEL-GW100. It has all the same functions than SATEL-GW120 except WiFi.

Contact us for other cellular router options!



# COMPACT AND COMPATIBLE

SATEL has a wide range of OEM radio modules for system manufacturers to integrate into customer solutions. They are secure, customizable and flexible in mounting options. SATEL's solutions are widely compatible and also support other manufacturers' radio protocols.

The latest addition to SATEL radio modules is the SATEL GO radio module family. SATEL GO modules introduce new revolutionary features: one to three frequencies in the same small module and more practical interfaces. The design is compact and the integration easy.

## SATELGO

### SATEL-TR49 SnapOn

SATEL-TR49 SnapOn fits to a standard PCIe bus. This makes it compatible with millions of equipment already in the market, and the integration is easy. If there is Mini PCIe bus, it can replace other technologies such as cellular and LoRa. Ideal for real-time IoT applications!

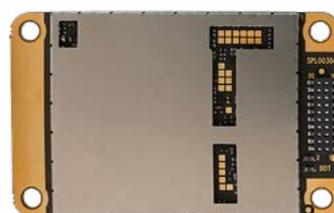
- Ultra-compact design
- Easy integration and deployment
- Possibility of power over USB (max 500 mW, more with extra input)
- Robust mounting and interfaces



SATEL order code	YM8600 region all, with AES YM8605 region all, w/o AES YM8610 region US/CA, with AES YM8615 region US/CA, w/o AES YM8630 region AU/BR, with AES YM8635 region AU/BR, w/o AES
Frequency	410 ... 475 / 902 ... 928 MHz
Channel width	12.5 / 25 kHz @ 400 MHz
Spreading method	Frequency hopping @ 900 MHz
RX sensitivity	-120 dBm @ 400 MHz -109 dBm @ 900 MHz
TX power ( max. )	1 W
Interface	CMOS / UART
Operating voltage	+3.3 Vdc +/-9%
Power consumption TX / RX	4.5 – 4.8 W / 400 mW @ 400 MHz 4.0 W / 400 mW @ 900 MHz
Data speed ( max. ) radio / serial	19200 bps (115200 bps @ 900 MHz) / 115200 bps

### SATEL-TR49

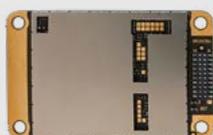
SATEL order code	YM8490 region all, with AES YM8495 region all, w/o AES YM8500 region US/CA, with AES YM8505 region US/CA, w/o AES YM8510 region AU/BR, with AES YM8515 region AU/BR, w/o AES YM8520 region NZ, with AES YM8525 region NZ, w/o AES
Frequency	410 ... 475 / 902 ... 928 MHz
Channel width	12.5 / 20 / 25 kHz @ 400 MHz
Spreading method	Frequency hopping @ 900 MHz
RX sensitivity	-120 dBm @ 400 MHz -109 dBm @ 900 MHz
TX power ( max. )	1 W
Interface	CMOS / UART
Operating voltage range	+3.7 ... +5.5 Vdc
Power consumption TX / RX	4.8 W (TX 1 W) / 440 mW (RX) @ 400 MHz 4.1 W (TX 1 W) / 440 mW (RX) @ 900 MHz
Data speed ( max. ) radio / serial	19200 bps (115200 bps @ 900 MHz) / 115200 bps



Ask availability from SATEL for the modules with region limitations.

**SATEL-R4+**

SATEL order code	YM7490 with AES YM7495 w/o AES YM7491 DTE connector at TOP YM7496 w/o AES, DTE connector on TOP
Frequency	403 ... 473 MHz
Tuning range	70 MHz
Channel width	12.5 / 20 / 25 kHz programmable
RX sensitivity	-115 dBm
Interface	CMOS-UART
Operating voltage range	+3.8 ... +5.5 Vdc
Power consumption RX	0.86 W
Data speed ( max. ) radio / serial	28800 bps / 115200 bps

**SATEL-R4+****RECEIVER ONLY****SATEL-TR4+**

SATEL order code	YM7470 with AES YM7475 w/o AES YM7480 DTE connector at TOP YM7485 w/o AES, DTE connector on TOP
Frequency	403 ... 473 MHz
Tuning range	70 MHz
Channel width	12.5 / 20 / 25 kHz programmable
RX sensitivity / TX power (max)	-115 dBm / 1 W
Interface	CMOS-UART
Operating voltage range	+3.8 ... +5.5 Vdc
Power consumption TX / RX	4.8 W / 0.89 W
Data speed ( max. ) radio / serial	28800 bps / 115200 bps

**SATEL-TR4+****TRANSCIVER WITH  
16FSK MODULATION****SATEL-TR489**

SATEL order code	YM8810 region all YM8815 w/o AES, region all YM8816 SATEL-TR489 w/o AES, region all, DTE connector on TOP YM8820 region US/CA YM8825 w/o AES, region US/ CA
Frequency	403 ... 473 MHz / 856 ... 876 MHz / 902 ... 928 MHz
Tuning range	70 MHz / 20 MHz / frequency hopping spread spectrum
Channel width	12.5, 20, 25, 50*) kHz / 25, 50*) kHz / 7 user selectable hopping bands
RX sensitivity / TX power (max.)	-115 dBm / -110 dBm / -108 dBm 1 W / 0.5 W / 1 W
Interface	CMOS-UART
Operating voltage range	+3.8 ... +5.5 Vdc
Power consumption TX / RX/	TX / RX 4.7 W / 0.73 W
Data speed ( max. ) radio / serial	28800 bps / 115200 bps @ 400 MHz 38400 bps / 115200 bps @ 800 MHz 115200 bps / 115200 bps @ 900 MHz

\*) Ask availability from SATEL.

**SATEL-TR300**

SATEL order code	YM7300 with AES YM7305 w/o AES YM7315 w/o AES, DTE connector on TOP
Frequency	320 ... 380 MHz
Tuning range	60 MHz
Channel width	6.25 / 12.5 / 20 / 25 kHz programmable
RX sensitivity / TX power (max.)	-113 dBm / 1 W
Interface	CMOS-UART
Operating voltage range	+3.8 ... +5.5 Vdc
Data speed ( max. ) radio / serial	28800 bps / 115200 bps

**SATEL-TR489****LICENCE FREE****SATEL-TR300****LICENCED**

## SATEL-B2 MOTHERBOARD ASSEMBLIES

SATEL-B2 motherboard is designed to house following SATEL radio modules:

- SATEL-TR4+
- SATEL-TR49
- SATEL-TR489
- SATEL-TR300
- SATELLINE-M3-TR9

SATEL-B2 motherboard and SATEL radio module combinations are available either as enclosed assemblies or as a board level OEM variant. The combination of a radio module on a SATEL-B2 motherboard is easy to integrate into the host device and due to the modular structure, user can select the optimum radio solution fitting to their application.

SATEL-B2 motherboard regulates the supply voltage (+7...+27.5 VDC) for the radio module, and provides the electrical connections by which the radio module and the user system communicate:

- RS232 Port1
- GPIN
- GPOUT



Contact your local SATEL distributor for various options.

## RADIO MODULES

### SATELLINE-M3-TR9

SATEL order code	YM7900 region all YM7920 DTE TOP/U.FL same side YM7910 region US/CA YM7915 region AU
Frequency	902 ... 928 MHz
Spreading method	Frequency hopping
RX sensitivity / TX power ( max. )	-109 dBm / 1 W
Interface	CMOS-UART
Operating voltage range	+3.5 ... +5.5 Vdc
Power consumption TX / RX	3.2 W / 0.3 W
Data speed ( max. ) radio / serial	115200 bps

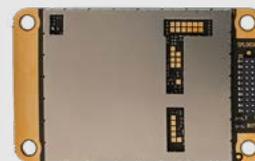
### SATELLINE-M3-R9

SATEL order code	YM7950
Frequency	902 ... 928 MHz
Spreading method	Frequency hopping
RX sensitivity / TX power ( max. )	-109 dBm
Interface	CMOS-UART
Operating voltage range	+3.5 ... +5.5 Vdc
Power consumption TX / RX	0.3 W
Data speed ( max. ) radio / serial	115200 bps



**SATELLINE-M3-TR9**

**FREQUENCY HOPPING  
TRANSCIVER MODULE**



**SATELLINE-M3-R9**

**FREQUENCY HOPPING  
RECEIVER MODULE**

## SATELLINE-M3 VHF

SATEL order code	YM6000
Frequency	135...174 MHz
Tuning range	135...155, 138...160, 155...174 MHz
Channel width	12.5 / 25 fixed kHz
RX sensitivity / TX power ( max. )	-115 dBm / 1 W
Interface	RS-232, -422, -485
Operating voltage range	+10.6 ... +25 Vdc (-15% / +20%)
Power consumption TX / RX	6.6 W / 1.7 W
Data speed ( max. ) radio / serial	19200 / 38400 bps



## SATELLINE-M3-TR1 869

SATEL order code	YM6301
Frequency	869.4000 ... 870.0000 MHz (865 ... 867 MHz for India)
Tuning range	0.25 MHz (2 MHz India)
Channel width	25 fixed kHz
RX sensitivity / TX power ( max. )	-111 dBm / 0.5 W (1 W for India)
Interface	RS-232, -422, LVTTTL, TTL
Operating voltage range	+7 ... +25 Vdc (-15% / +20%)
Power consumption TX / RX	3.8 W / 1.2 W
Data speed ( max. ) radio / serial	19200 bps / 38400 bps



## SATELLINE-M3-TR1

SATEL order code	YM6300 YM6310 with AES
Frequency	330 ... 420 / 403...473 MHz
Tuning range	90 / 70 MHz
Channel width	12.5 / 20 / 25 kHz programmable
RX sensitivity / TX power ( max. )	-114 dBm / 1 W
Interface	RS-232, -422, LVTTTL, TTL
Operating voltage range	+3.5 ... +7.5 / +7 ... +25 Vdc (-15% / +20%)
Power consumption TX / RX	3 W @ 0.5 W, 7 W @ 1 W / 1.2 W
Data speed ( max. ) radio / serial	19200 / 38400 bps



Examples of the customized radio modems.  
Ask your local SATEL distributor about the various options.

## SATELLINK I/O CONVERTERS



**SATEL I-LINK 100**



**SATEL I-LINK 300**

\*Extension module for I-LINK 100 and I-LINK 100 MB. Note: EOL product, limited availability.

	SATEL order code	Digital I/Os	Analog I/Os 4-20 mA	Connectors, switches
SATEL I-LINK 100	YI0007	4	2	Screw conn. / D15m / D15f / DIP
SATEL I-LINK 100 MB	YI0017	4	2	Screw conn. / D15m / D15f / DIP
SATEL I-LINK 300*	YI0010	6	-	Screw conn. / D15m / D15f / DIP

# Software – Ready, steady, go!

## SOFTWARE

SATEL product	SATEL software							
	SATEL NETCO DEVICE	SATEL NETCO DESIGN	SATEL Configuration Manager	SATELLINE SaTerm	SATEL NMS PC	SATEL NETCO Mobile	SATEL NETCO NMS**	Free Channel Scan Monitor
SATEL MCCU-20				*				
SATEL-EASy+				*				
SATEL-EASy Pro+		**			**		**	
SATEL Proof-TR4+				*				
SATEL Proof-TR9				*				
SATELLINE-EASy								
SATEL EASy-Proof								
SATEL Compact-Proof								
SATEL Compact-Proof 869								
SATELLINE-EASy Pro								
SATEL Compact-4BT	**			*				
SATELLINE-EASy 869								
SATELLINE-3AS VHF								
SATEL XPRS IP Radio								
SATEL XPRS Radio								
SATEL-TR4+				*				
SATEL-R4+				*				
SATEL-TR300				*				
SATEL-TR49				*				
SATEL-TR489				*				
SATEL-TR49 SnapOn				*				
SATELLINE-M3-TR9				*				
SATELLINE-M3-R9				*				
SATELLINE-M3-TR1								
SATELLINE-M3-TR1 869								
SATELLINE-M3 VHF								

\*) SL Command support only

\*\*) Ask for availability

## SATEL NETCO DEVICE

SATEL NETCO DEVICE is a software for configuring and updating a device. The configuration parameters can be read and written from/to the locally connected, powered device. The device configuration can be also created/saved/explored from/to a file without device connection.

The most common use case for which the SATEL NETCO DEVICE is optimized for is editing existing parameters in a SATEL radio product using local connection, such as serial interface.

## SATEL NETCO DESIGN

SATEL NETCO DESIGN is an intuitive and user-friendly network configuration software for network design and management. The software supports configuration of the Routing Setup and NMS Routing Setup modes for SATEL-EASy+ product family and configuration of the XPRS radio family.

The user interface of the product is browser-based and can therefore be used both locally and remotely. Design with graphical user interface for easy optimizing network design and deployment in a few simple steps, with local and remote connection to SATEL radios.

## SATEL NETCO NMS

SATEL NETCO NMS is an intuitive and user-friendly network configuration software for network design and management with radio network monitoring option. The software supports configuration of the Routing Setup and NMS Routing Setup modes for SATEL-EASy+ product family and configuration of the XPRS radio family.

The user interface of the product is browser-based and can therefore be used both locally and remotely. Design with graphical user interface for easy optimizing network design and deployment in a few simple steps, with local and remote connection to SATEL radios.

## SATELLINE SaTerm

SATELLINE SaTerm is a terminal software for configuring the Routing Setup mode and for configuring and testing the radios. Routing Setup refers to Message Routing feature for SATEL-EASy+ and SATELLINE-EASy family radio modems, where messages can be automatically routed over the radio network to correct recipient terminal. This SW can assist in tests procedures and configuration for the radios via terminal interface with SL command support.

## SATEL NMS PC

SATEL NMS PC is a software for creating and managing SATEL-EASy+ and SATELLINE-3AS VHF product families for NMS Routing networks with radio network monitoring option. NMS Routing refers to NMS Message Routing feature, where messages can be automatically routed over the radio network to correct recipient terminal, monitoring and diagnostics included for the radio network. Graphical design of topology for NMS Message Routing, remote modification of settings, online storing and trending of field data with programmable alarm triggers.

## SATEL Configuration Manager

SATEL Configuration Manager is a software for SATEL radio device configuration and reprogramming. The parameters can be read and written from/to the connected, powered device. The program file can be saved into a separate file to be used to other devices.

The most common use case for which the SATEL Configuration Manager is optimized for is editing existing parameters in a SATEL radio product using locally connected product over a serial interface.

## SATEL NETCO Mobile

SATEL NETCO Mobile allows easy-to-use configuring of the SATEL Compact-4BT radio modem via Bluetooth connection. RSSI (Received Signal Strength Indicator) monitor and battery status and charging monitor of SATEL Compact-4BT radio modem included.

## FCS Monitor

Free Channel Scan Monitor program can be used for setting the FCS parameters and for loading them to modems and for monitoring the channels for noise or interference. FCS feature supported in SATELLINE-EASy radio modem family.

Additional information can be found: [www.satel.com/products/software/](http://www.satel.com/products/software/)

For more information, please contact SATEL or local distributor: [www.satel.com/where-to-buy/](http://www.satel.com/where-to-buy/)

# Antennas & cables

## Antennas

- Half Wave Antennas for frequencies 400 ... 470 MHz for short distances.
- Quarter Wave Antennas for frequencies 400 ... 470 MHz and 869 MHz for short distances.
- Helix Antennas for frequencies 400 ... 470 MHz for short distances.
- Directional Antennas for frequencies 330 ... 470 MHz, 869 MHz and 135 ... 174 MHz for long distances.
- Omnidirectional Antennas for frequencies 330 ... 470 MHz, 869 MHz and 135 ... 174 MHz for long distances.



## Cables

- CRF-1 RG58 length 1 meter with TNC male / TNC female -connectors.
- CRF-5F RG58 length 5 meter with TNC male / TNC female -connectors or CRF-5M TNC male / TNC male -connectors.
- ECOFLEX10 low loss (0.9 dB / 10 m) cable for cable lengths up to 20 meter with N or TNC -connectors.
- ECOFLEX15 low loss (0.6 dB / 10 m) cable for cable lengths over 20 meter with N -connectors.

### We can also offer a wide range of interface and power cables, for example:

- CRS-2M length 2 meter, includes power supply wires, with D15 / D9 male or CRS-2F female -connectors.
- CRS-PB length 2 meter, includes power supply wires, with D15 / D9 male -connectors for RS-485 interface.
- CRS-35W 8-pin 2 m cable ODU 8-pin male / D9 female.
- C-P-35W 2m Power cable 2 m, ODU 4-pin male / 4 mm lab plugs.

**Please contact your local distributor to get more information regarding cable types.**

# Selection guide

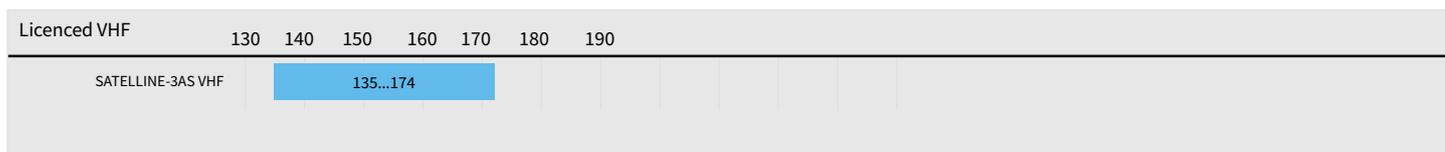
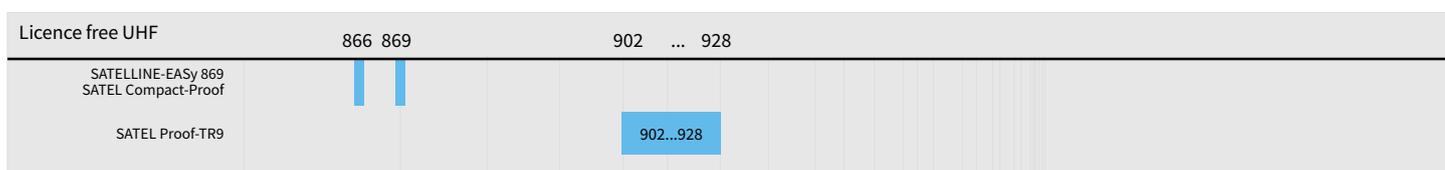
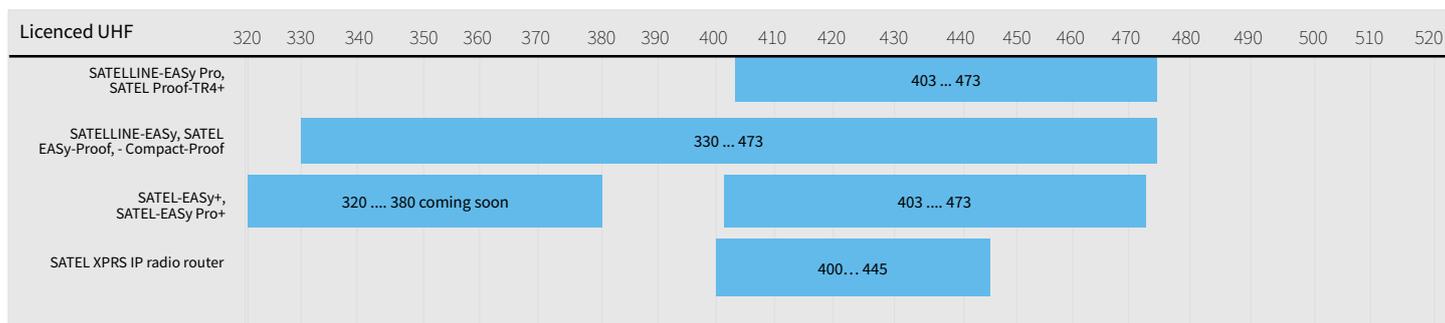
- 1) SATEL XPRS IP radio  
2) Check product details

	SATEL XPRS radio	SATELLINE-3AS VHF	SATELLINE-M3 VHF	SATELLINE-EASy	SATEL-EASy+	SATEL-EASy Pro+	SATELLINE-EASy Pro	SATEL Compact-Proof	SATEL EASy-Proof	SATELLINE-M3-TR1	SATEL-R4+	SATEL-TR4+	SATEL-TR489	SATEL-TR49	SATEL-TR300	SATEL-TR49 SnapOn	SATEL Proof-TR4+, -TR9	SATELLINE-M3-TR9	SATELLINE-M3-R9	SATELLINE-EASy 869	SATELLINE-M3-TR1 869	SATEL I-LINK
<b>Frequency range</b>																						
UHF	•			•	•	•	•		•	•	•	•			•							
VHF		•	•																			
UHF & Licence free								2)					•	•		•	•	•	•	•	•	•
<b>Interfaces</b>																						
RS-232	•	•	•	•	•	•	•	•	•	•							•				•	•
RS-422	•	•	•	•	•	•	•			•											•	•
RS-485	•	•	•	•	•	•															•	•
TTL / LV-TTL										•												•
CMOS-UART											•	•	•	•	•	•		•	•			
Ethernet	1)				2)																	
USB	1)				2)																	
Digital / Analog I/O																						•
Bluetooth					2)																	
<b>Tuning range</b>																						
≤ 2 MHz																					2)	2)
20 MHz		2)	2)										•									
45 MHz	•																					
65 MHz														•	2)	•						
70 / 90 MHz				•	2)	2)	2)	2)	•	•	2)	2)	2)				•					
FHSS													•	•		•	•	•	•			
<b>Channel width kHz</b>																						
Fixed (12.5 or 20 or 25)		•	•																		2)	2)
Programmable (12.5 / 20 / 25)				•	•	•	•	•	•	•	•	•					•					
Programmable (12.5 / 25)	•														2)	•						
Programmable (12.5 / 20 / 25 / 50)													•									
FHSS													•	•			•	•	•			
<b>Max. TX power</b>																						
500 mW													•								•	•
1 W			•	•	•			•	•	•		•	•	•	•	•	•	•	•			
5 W	•	•																				
35 W						•	•															
<b>Operating voltage range</b>																						
+3.3 Vdc +/- 9%																	•					
+3.5 ... +5.5 Vdc																		•	•			
+3.7 ... +5.5 Vdc														•								
+3.8 ... +5.5 Vdc													•	•	•							
+3.5 ... +7.5 / +7 ... +25 Vdc (-15% / +20%)				•						•											•	•
+7 ... +25 Vdc (-15% / +20%)										•												
+7 ... +27.5 Vdc (-15% / +20%)					•													•				
+9 ... +30 Vdc (-15% / +20%)						•															•	•
+10.6 ... +13.3 Vdc (-15% / +20%)							•	•														
+10.6 ... +25 Vdc (-15% / +20%)		•	•																			
+12.5 ... +25 Vdc (-15% / +20%)	•																					
Battery								•														
<b>Housing</b>																						
Aluminium IP44		•		•	•																•	
Aluminium IP52	•																					
Aluminium IP67						•	•	•														
Aluminium IP69K										•								•				
Sheet metal aluminium / Stainless steel			•							•											•	•
Module: PCB card only										•	•	•	•	•	•	•	•	•	•	•	•	•
<b>Interface connector</b>																						
RJ-45	1)				2)																	
D9	•																					
D15		•	•	•	2)					•											•	•
ODU 8 pin						•	•	•														
26 pin header / 26 pin strip										•												•
USB	1)				2)																	
1.27 mm pitch socket											•	•	•	•	•	•						
Deutsch DT04-6P-CL09									•									•	•	•		
Screw connector																						•
<b>Model or variant w. display</b>																						
	•	•		•	•	•	•	•													•	

## Size / Weight

130 x 77 x 77 mm / 940 g	SATEL XPRS	89 x 49 x 10 mm / 50 g	SATELLINE-M3-TR1, SATELLINE-M3-TR1 869
176 x 95 x 42 mm / 460 g	SATEL-EASy Proof,	114 x 61 x 22 mm / 265 g	SATELLINE-M3 VHF
174 x 95 x 46 mm / <500 g	SATEL Proof-TR4+/TR9	57 x 36 x 6.9 mm / 20 g	SATEL-TR4+, SATEL-TR49, SATEL-TR489, SATEL-R4+, SATEL-TR300
187 x 84 x 50 mm / 850 g	SATEL Compact-Proof	57 x 36 x 6.7 mm / 20 g	SATELLINE-M3-TR9, SATELLINE-M3-R9
189 x 138 x 71mm / 1420 g	SATELLINE-EASy Pro,	51 x 30 x 4.75 mm / 10 g	SATEL-TR49 SnapOn
180 x 138 x 71mm / 1400 g	SATEL-EASy Pro+		
139 x 67 x 29 mm / <350 g	SATELLINE-EASy, EASy 869, 3AS VHF, SATEL-EASy+		

# Available frequencies for SATEL radio modems



## Channel width and data speed

Channel width	Max. air data speed			Max. serial data speed
	12.5 kHz	20 kHz	25 kHz	
SATEL XPRS IP radio router	60.5 kbps (QAM)		121 kbps (QAM)	256 kbps
SATELLINE-EASy Pro	9600 bps	9600 bps	19200 bps	38400 bps
SATELLINE-EASy	9600 bps	9600 bps	19200 bps	38400 bps
SATEL EASy-Proof	9600 bps	9600 bps	19200 bps	38400 bps
SATEL Compact-Proof	9600 bps	9600 bps	19200 bps	38400 bps
SATELLINE-3AS VHF	9600 bps	9600 bps	19200 bps	38400 bps
SATEL Compact-Proof 869			19200 bps	38400 bps
SATELLINE-EASy 869			19200 bps	38400 bps



# Protocols

SATEL radio modems are compatible with all commonly used industrial protocols. Here are some examples of the protocols: ANSI, CACTUS, COMLI, DNP 3.0 Serial & IP, 4 Exoline, HostLink, IEC 60870-5-101, IEC 60870-5-104, IEC 61850, Mewtocol, Modbus ASCII, Modbus RTU, Modbus TCP, Modbus RTU over TCP, Profibus DP, R-com, RP-570, RP-571, SATELLINK, S-bus, Siemens 3946 (R), Siemens Sinaut ST1/ST7 FT1.2, Siemens Sinaut ST7 FT2.0 ja NMEA 0183, SNMP, NTP, Ethernet/IP, SATEL NMS, Rockwell DF etc.

**Ask for more information from your local distributor.**

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