

# 945U-E Wireless Ethernet Modem

Long-range wireless Ethernet for high-speed and reliable connectivity



## Description

The ELPRO 945U-E Wireless Ethernet Modem is a robust, license-free wireless transceiver capable of long-range and high-bandwidth communications. Operating at 900 MHz and up to 1W, the 802.11 standards-based ELPRO 945U-E is optimized for throughputs of up to 54 Mbps, which provides robust and secure two-way wireless communications in challenging outdoor environments typical of industrial monitoring and control applications.

Capable of operating in access point client configuration, functioning as a network bridge/router, or serving as a serial server (RS-232/RS-485), the ELPRO 945U-E offers node-to-node deterministic mesh network repeatability for further range, and multiple channel spacing options to increase network scalability. Integrated Modbus® server capability allows seamless I/O expansion through the use of ELPRO 115S expansion modules.

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## Features

- 902–928 MHz frequency and 250–630 mW (up to 1W for –H) RF power
- 802.11 DSSS to 54 Mbps data throughput
- 1.25/2.5/5/10/20 MHz channel spacing options
- Transmit and receive antenna diversity
- Access point/client and bridge/router configuration
- Serial client/server/multicast Modbus TCP-to-RTU gateway
- 10/100Base-T IEEE 802.3 Ethernet
- Spanning tree (self-healing) support
- Deterministic AP-to-AP mesh network repeatability
- AP-to-AP fast roaming for movable machinery
- IEEE 802.11i secure 128-bit AES encryption (WPA2)
- MAC and IP address filtering
- Digital I/O channel transfer
- Configurable settings for high noise environments
- Over-the-air network diagnostics and configuration
- VLAN tagging supported for bridging and routing modes

## Applications

- Remote well head monitoring
- Pipeline leak detection
- Mining operations infrastructure
- Water treatment facilities
- Video surveillance and security
- Facilities management
- Automated vehicle control
- Tank farm monitoring
- Networking wind turbines
- Solar collectors

## Specifications

SPECIFICATION	DESCRIPTION
<b>Transmitter and Receiver</b>	
Frequency	902–928 MHz ① 915–928 MHz ②
Transmit power	250 mW (+24 dBm) to 1W (+30 dBm)
Transmission	Direct sequence spread spectrum (DSSS)
Modulation	802.11g orthogonal frequency data modulation (OFDM)
Receiver sensitivity	–95 dBm @ 0.25 Mbps, –71 dBm @ 54 Mbps (8% FER)
Channel spacing	9 x 1.25 MHz, 9 x 2.5 MHz, 4 x 5 MHz, 4 x 10 MHz, 2 x 20 MHz
Data rate	1–54 Mbps ① 0.25–27 Mbps ② Auto mode selects fastest rate possible relative to RSSI
Range (LoS)	18 miles (30 km) @ 1W ③
Antenna connector	2 x female SMA standard polarity ④ Use CSD-SMA-2500 surge diverter

## Specifications (continued)

SPECIFICATION	DESCRIPTION
<b>Input and Output</b>	
Discrete I/O	Input voltage-free contact ① Output FET 30 Vdc 500 mA ②
<b>Ethernet Port</b>	
Ethernet port	10/100Base-T, RJ-45 connector, IEEE 802.3
Link activity	Link, 100BaseT via LED
<b>Serial Port</b>	
RS-232	D-B9 female DCE, RTS/CTS/DTR/DCD
RS-485	2-pin terminal block, non-isolated ③
Data rate (Bps)	1200, 2400, 4800, 9600, 14400, 19200, 38400, 57600, 76800, 115200, 230400
Serial settings	7/8 data bits, stop/start/parity (configurable)
<b>Protocols and Configuration</b>	
System address	ESSID; 1 to 31-character text string
Protocols supported	TCP/IP, UDP, ARP, SNMP, RADIUS/802.1x, DHCP, DNS, PPP, ICMP, HTTP, FTP, TFTP, TELNET, Modbus and Modbus TCP
User configuration	User-configurable parameters via HTTPS embedded Web server
Configurable parameters	Access point/client/bridge/router/VLAN Point to point, point to multipoint Wireless distribution system (AP-to-AP repeater) Modbus TCP/RTU gateway Serial client/server/multicast Simultaneous RS-232/RS-485 connection Embedded Modbus master/slave for I/O transfer
Security	Data encryption, 802.11i with CCMP 128-bit AES Support for 802.1x Radius server Secure HTTP protocol
Bandwidth protection	MAC address, whitelist/blacklist IP filtering, whitelist/blacklist ARP/GARP filtering, whitelist/blacklist
<b>LED Indication and Diagnostics</b>	
LED indication	Power/OK, RX, TX/link, link/100bT, RS-232, LAN, RS-485, digital I/O status
Reported diagnostics	RSSI measurements (dBm), connectivity information/statistics, system log file
Network management	Optional network management system
<b>Compliance</b>	
EMC	FCC Part 15; EN 301 489–17; AS/NZS CISPR22
RF (radio)	EN 300 328; FCC Part 15; RSS 210
Hazardous area ④	CSA Class I, Division 2; ATEX; IECEx NA IIC
Safety	IEC 60950 (RoHS compliant)
UL	UL listed
<b>General</b>	
Size	4.5" x 6.7" x 1.2" (114 mm x 168 mm x 30 mm)
Housing	Powder-coated aluminum
Mounting	DIN rail
Terminal blocks	Removable, max. conductor 12 AWG, 0.1 in. <sup>2</sup> (2.5 mm <sup>2</sup> )
Temperature rating	–40°F to +140°F (–40°C to +60°C)
Humidity rating	0–99% RH noncondensing
Weight	1.1 lb (0.5 kg)

SPECIFICATION	DESCRIPTION
<b>Power Supply</b>	
Nominal supply	9–30 Vdc, under/over voltage protection
Average current draw	300 mA @ 12V (idle), 160 mA @ 24V (idle)
Transmit current draw	500 mA @ 12V (+30 dBm), 250 mA @ 24V (+30 dBm)

**Note:** Specifications are subject to change.

- ① Configured for US
- ② Configured for Australia, Brazil
- ③ Typical maximum line-of-sight range
- ④ Supports signal diversity or high gain antenna
- ⑤ Can be used to transfer I/O status or communications failure output
- ⑥ Maximum distance 3937' (1200m)
- ⑦ Certifications pending for 945U-E-H (1W)

## Accessories

PRODUCT CODE	DESCRIPTION	DATA SHEET
<b>Antennas - 900 MHz</b>		
DG900	Whip antenna, SMA male, angle bracket, –2 dBi gain, 3' (1m) or 16.4' (5m) coaxial cable	TD032047EN
WH900	Whip antenna, SMA male, –2 dBi gain	TD032045EN
CFD890EL	Dipole antenna, SMA male, mounting bracket, 2 dBi gain, 16' (5m) coaxial cable	TD032048EN
SG900EL	Collinear antenna, N-type female, 5 dBi gain	TD032049EN
SG900-6	Collinear antenna, N-type female, 8 dBi gain	TD032050EN
YU6-900	Yagi antenna, N-type female, 9 dBi gain	TD032042EN
YU16-900	Yagi antenna, N-type female, 15 dBi gain	TD032051EN
<b>Cables</b>		
CC3/10/20-SMA	Coaxial cable kit, 9.8' (3m)/32' (10m)/65' (20m), N-type to SMA male	TD032019EN TD032020EN TD032021EN
CCTAIL-SMA-F/M	Coaxial cable tail, 24" (600 mm), SMA to N-type female or male	TD032023EN
ETH-C5X	Ethernet cable, 6' (1.8m), crossover, RJ-45 to RJ-45	TD032025EN
ETH-C5A	Ethernet cable, 6' (1.8m), straight through, RJ-45 to RJ-45	TD032024EN
SER-DB9	Serial RS-232 cable, DB-9 male to DB-9 female, straight through	TD032026EN
SER-RJ45	Configuration cable, RS-232 serial, DB-9 female to RJ-45	TD032027EN
<b>Surge Diverters</b>		
CSD-SMA-2500	SMA surge diverter for use with CC10/CC20-SMA	TD032030EN
CSD-N-6000	Coaxial surge diverter, bulkhead N female to N female	TD032031EN
MA15/D/1/SI	Power supply surge diverter, 110 Vac/15A	TD032029EN
IOP32D	Signal surge diverter, 2 x 2-wire/1 x 4-wire	TD032032EN
<b>Power Supplies</b>		
PS-DINAC-12DC-OK	DIN rail power supply, 100–250 Vac, 12 Vdc/2.5A	TD032033EN
PSG60E	DIN rail power supply, 85–264 Vac, 24 Vdc/2.5A	TD032034EN
<b>Mounting Brackets</b>		
BR-COL-KIT	Mounting bracket kit for collinear antenna	TD032071EN
BR-YAG-KIT	Mounting bracket kit for Yagi antenna	TD032072EN

## Ordering

PRODUCT CODE	DESCRIPTION	FREQUENCY	RF POWER
945U-E	Ethernet 802.11g, 900 MHz, high speed	902–928 MHz DSSS	630 mW
945U-E-H	Ethernet 802.11g, 900 MHz, high speed	902–928 MHz DSSS	1W

**Note:** Available RF power and frequency may vary depending on country of application.

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