925U-2 Wireless Mesh Networking I/O and Gateway

Long-range, scalable, industrial multiple I/O node and gateway

Features

- 902–928 MHz frequency hopping spread spectrum (FHSS) up to 1W RF Power
- 869 MHz wideband up to 500 mW for Europe
- Secure data protection with WPA and AES256 encryption
- Full Ethernet protocol over the air provides a standards-based flexibility to support future and legacy devices
- ProMesh automatic path selection and network formation
- Internal user configurable Web dashboard to display I/O and Diagnostics
- IO Plus Logic engine for basic controlling of I/O points
- Supports multiple data rates simultaneously for high performance over short and long communication links
- Over-the-air context-based data compression and forward error correction provides maximum reliability and transmission efficiency
- Redundancy modes for base, repeater, and remote
- Wireless point-to-point or multipoint I/O and gateway functionality
- Modbus TCP and RTU I/O gateway
- DNP3 I/O gateway, including internal status registers
- IoT connectivity with MQTT Sparkplug B Gateway
- Standard Ethernet bridge default to allow modem function for external Ethernet host devices (full L2/ L3 network support)
- Configurable digital, pulse, and analog I/O to 14-bit resolution
- Gather-scatter/block mapping and integrity checking transmissions for efficient event triggered peer-to-peer I/O
- Over-the-air network diagnostics and configuration
- Expandable I/O for local alarms and inputs/outputs

Description

ELPRO's industrial wireless solutions have 30 years plus of expertise in solving critical industrial applications through our extensive knowledge in wireless I/O, modem and gateway applications. The 925U-2 extends communications to sensors in local, remote, and difficult-to-reach locations.

The 900MHz Unlicensed Frequency Hopping wireless transceiver supports over-the-air Ethernet protocols which gives the 925U-2 the power and flexibility to perform reliably in sprawling harsh industrial environments.

Secure AES encryption, advanced IP filtering, multilevel authentication, user access and change event logging features provide the user with the tools to ensure the highest level of data integrity and protection against malicious attacks.

Flexible native Ethernet support provides solutions to connectivity challenges today and in the future. The ELPRO 925U-2 also provides Ethernet and serial gateway support for industrial protocols including Modbus TCP/RTU and DNP3 I/O, MQTT +Sparkplug B.

The Condor series 925U-2 ProMesh™ operates reliably with the challenges of obstructed paths by using automatic path selection to allow the communications network to adapt to changes easily with redundancy.

Compatability with the legacy 915U-2's is available with a firmware upgrade.

Applications

- Water and wastewater: flows, levels, pumps
- Renewables- solar farms, wind turbines, hydro
- Irrigation: slew gate controls, levels
- Oil and gas networks: gas well production, lift pump
- Environmental: storm warning, smoke stacks, filters
- Mining infrastructure: conveyor, re-claimer, pumps

Specifications

SPECIFICATION	DESCRIPTION
Transmitter and receiver	
Frequency	902–928 MHz [abd], 869.525 MHz [c], 869.875 MHz [c]
Transmit power—peak	1 mW (+0 dBm) to 1W (+30 dBm) [b d] 1 mW (+0 dBm) to 500 mW (+27 dBm) [c]
Transmission	Frequency hopping spread spectrum (FHSS) [b d] Single frequency [c]
Modulation	Frequency shift keying (FSK)
Receiver sensitivity	–109 dBm @ 19.2 kbps (3% FER) [b d] –109 dBm @ 14.4 kbps (3% FER) [c]
Channel spacing	50 x 250 kHz [b d], single 250 kHz [c]
Data rate	19.2–115.2 kbps [b d], 14.4–76.8 kbps [c]
Typical range (LoS)	20 miles (32 km) @ 4W ERIP [b] 9.3 miles (15 km) @ 1W EIRP [d] 6 miles (10 km) @ 500 mW ERIP [c]
Antenna connector	SMA female standard polarity
Protocols and configuration	
System address	ESSID; 1 to 31-character text string
Networking protocols	TCP/IP, UDP, ARP, DHCP, DNS, ICMP, HTTP, VLAN 802.1Q, IPv6 pass through
Industrial protocols	Gateway: Modbus RTU Master/Slave, Modbus-TCP Client/Server, DNP3 I/O, MQTT +Sparkplug Pass through: EtherNet/IP, Profinet, DNP, IEC 61850, and others
Configurable parameters	Unit details, I/O mappings, I/O parameters, radio settings, Dahsboard, IO Plus logic
	DNP3 I/O and gateway (level 2+)
	Modbus TCP/RTU gateway
	MQTT Client +SparkplugB
	Embedded Modbus master/slave for I/O transfer
	Promesh™ for automatic selection of radio paths, prioritization of traffic flows, bandwidth efficiency features, bandwidth utilization, redundancy, routing, bridging, VLAN
User configuration	Network access: USB or Ethernet
	Remote access: over the air
Security	WPA2-PSK, AES 256 bit, multilevel password protected configuration
IP filtering	IP address, MAC address, ARP filtering whitelist/blacklist
LED indications and diagnostics	
LED indication	Power/OK, Radio TX/RX/Link, RS-232, RS-485, digital I/O, analog I/O status
Reported diagnostics	RSSI measurements (dBm), connectivity information/ statistics, system log file
Network diagnostics	Diagnostic capture to Wireshark™ format file
Radio diagnostics	Channel utilization, RSSI measurements (dBm), background noise, connectivity information/statistics available Web/Modbus reg
Logging	Optional internal data logging for I/O and events. Logging memory 1 MB
Connections	
LAN	1 x 10/100Base-T auto-MDIX RJ-45
Serial	1 x RS-232, 1 x RS-485 [f], 1200–230400 bps Serial over IP modem support

SPECIFICATION	DESCRIPTION
Operation	
Modes—topology	Point to multipoint
	Base, repeater, remote unit types
	ProMesh automatic path selection or fixed links
	Manual mode for advanced configuration
Input and output	
Discrete input [c]	8 digital I/O (1–4 configurable as PI or PO)
	On-state voltage: <2.1 Vdc
	Wetting current: 5 mA
	Max. I/P pulse rate–DI 1/2: 50 kHz, DI 3/4: 1 kHz
	Max. I/P pulse width–DI 1/2: 10 µs, PI 3/4: 0.2 ms
Discrete output [c]	8 digital I/O (1–4 configurable as PI or PO)
	Working voltage maximum: 30 Vdc
	Working current maximum: 200 mA
	Max. O/P pulse rate–PO max. rate: 1 kHz
Analog inputs	4 AI (2 differential, 2 single ended)
	Current range: 0–24 mA
	Voltage input range: AI 1/2: 0–25 V, AI 3/4: 0–5 V
	Accuracy: 0.1%
	Resolution: 14 bits
Analog output	2 AO (sourcing)
	Current range: 0–24 mA
	Current resolution: 13 bits
	Accuracy (current): 0.1%
Thermocouple Input	Supported type Type J, K, and T. [g]
Analog loop power	+24 Vdc output provided to power loop devices
	Max. current 100 mA—current limited
Expansion	115S series Modbus I/O modules
Compliance	
EMC	FCC Part 15; EN 301 489; AS 3548
RF (radio)	FCC Part 15.247; EN 300 220; AS 4268.2; RFS29 NZ
Safety	IEC 60950 (RoHS compliant)
Hazardous area	UL/CSA Class I, Division 2; ATEX; IECEx Na IIC
Power supply	
Nominal supply	10.8-30 Vdc, undervoltage/overvoltage protection
Battery charger	Lead-acid or gel cell backup, 500 mA charge
Average current draw	220 mA @ 12V (idle), 110 mA @ 24V (idle)
Transmit current draw	500 mA @ 12V (1W), 250 mA @ 24V (1W)
General	
Size (H x W x D)	5.91” x 7.09” x 1.38” (180 mm x 150 mm x 35 mm)
Housing	IP20 rated high-density thermoplastic
Terminal blocks	Removable, max. conductor 12 AWG 0.1 in² (2.5 mm²)
Mounting	DIN rail
Temperature rating	–40 to +140°F (–40 to +60°C)
Humidity rating	0–90% RH noncondensing
Weight	1.1lb (0.5 kg)

Accessories

DESCRIPTION	PRODUCT CODE
Antennas	
Whip antenna, SMA male, angle bracket, −2 dBi gain, 3.2' (1m) or −4 dBi gain, 16.4' (5m) coaxial cable	**DG800-1/5[c], DG900-1/5[b]**
Dipole antenna, SMA male, mounting bracket, 2 dBi gain, 16' (5m) coaxial cable	**CFD890EL**
Collinear antenna, N-type female, 5 dBi gain	**SG900EL**
Collinear antenna, N-type female, 8 dBi gain	**SG900-6**
Cables	
Coaxial cable kit, 9.8 ft (3 m)/32 ft (10 m)/65 ft (20 m), N-type to SMA	**CC3/10/20-SMA**
RS-232 serial cable, DB-9 female to RJ-45	**SER-RJ45**
Ethernet cable, 6' (1.8m), straight through, RJ-45 to RJ-45	**ETH-C5A**
USB 2.0 configuration cable - Type A to Type B, 1 m long, included with 215U-2/415U-x-C/925U-2 units	**CBLUSB-ATOB**
Surge diverters	
SMA surge diverter for use with CC10/CC20-SMA	**CSD-SMA-2500**
Coaxial surge diverter, bulkhead N-type female to N-type female	**CSD-N-6000**
Power supply surge diverter, 110 Vac/15A or 240 Vac/15A	**MA15D1SI/D2SI**
Signal surge diverter, 2 x 2-wire/1 x 4-wire	**IOP32D**
I/O interface	
Data logging feature key DNP3 feature key ALERT2 feature key	**915U-LOG 915U-DNP3 FK-115E-A2**
T-type TCP thermocouple adapter, uses two analog inputs and two analog outputs	**915U-TCADP**
Mounting brackets	
Mounting bracket kit for collinear antenna UDP, BU3, BU6	**BR-COL-KIT**
Mounting bracket kit for Yagi antennas, YU3, YU6, YU9	**BR-YAG-KIT**
Power supplies	
DIN rail power supply, 85–264 Vac, 12 Vdc/4A	**PS-DINAC-12DC-OK**
DIN rail power supply, 85–264 Vac, 24 Vdc/2.5 A	**PS-DINAC-24DC-OK**

Ordering

DESCRIPTION	BAND	RF BAND	PRODUCT CODE
Wireless IO/Gateway	902 - 928MHz [a]	10mW - 1W	**EL-925U-2-900**
Wireless IO/Gateway	869.XXXMHz [a]	500mW/5mW [a]	**EL-925U-2-869**

[a.] Specific parameters set with Country/Region selection in configuration

[b.] 902-928 MHz FCC 15.247 band (USA)

[c.] 869 MHz ISM band (Europe)

[d.] 915-928 MHz LIPD Class licence (Australia)

[e.] Typical maximum line-of-sight range (check local conditions of use)

[f.] Maximum distance 3937' (1200m)

[g.] Optional, see 915U-TCP datasheet

Note: Specifications are subject to change.

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