

ELPRO Technologies

CONDOR II

ELPRO EL-925U-2
WIRELESS MESH I/O AND GATEWAY

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

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.

Compatibility 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

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.
- Centralised Encryption Key Rotation for automated over the air management/rotation of system encryption keys.
- System Firmware Upgrade: Centralise management of firmware patch updates and over the air deployment.
- Radio Access Control: Extension of existing MAC/IP filtering to include black/whitelist filtering based on MAC or Serial number.
- Port Forwarding: Advanced network Port Forward configuration for connected Ethernet devices.

SPECIFICATIONS

CONDOR

ELPRO EL-925U-2
WIRELESS I/O GATEWAY

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	900Mhz Frequency Hopping Spread Spectrum (FHSS) [b d] 869Mhz 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]
Typical data rate	19.2–115.2 kbps [b d], 14.4–76.8 kbps [c]
Typical range (LoS)	20 miles (32 km) @ 4W EIRP [b] 9.3 miles (15 km) @ 1W EIRP [d] 6 miles (10 km) @ 500 mW EIRP [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: MQTT, SparkplugB, Modbus RTU, Modbus TCP, DNP3 I/O, HART to Modbus Pass through: EtherNet/IP, Profinet, DNP, IEC 61850, and others
Configurable parameters	Unit details, I/O mappings, I/O parameters, radio settings, Dashboard, IO Plus logic DNP3 I/O and gateway (level 2+) Modbus TCP/RTU gateway Embedded Modbus master/slave for I/O transfer PromeshTM 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, Access Control List
Security	WPA2-PSK, AES 256 bit, multilevel password protected configuration, Auto Encryption Key rotation
IP filtering	IP address, MAC address, ARP filtering whitelist/ blacklist & serial number, Access Control List

LED Indications & Diagnostics	
LED Indication	Power/OK, Radio TX/RX/Link, RS-232, RS-485, digital I/O, analog I/O status
Reported diagnostics	RSSI Measurments (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

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: PI 1/2:50 kHz, PI 3/4: 1kHz Max. I/P pulse width: PI 1/2: 10 µs, PI 3/4: 0.2ms
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: 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 outputs	2 AO 2 (sourcing) Current range: 0-24 mA Accuracy: 0.1% Resolution: 13 bits
Thermocouple input	Supported types J,K and T [g]
Analog Loop Power	+24 Vdc output provided to power loop devices Max. Current 100mA - 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 at 13.8V (idle), 110 mA at 24V (idle)
Transmit current draw	500 mA at 13.8V, 250 mA at 24V

General	
Size (H x W x D)	7.20 x 1.38 x 6.20 inches (183 x 35 x 156 mm)
Housing	IP20 rated high-density thermoplastic
Terminal blocks	Removable, max. conductor 12 AWG 0.1 in^2 (2.5 mm^2)
Mounting	DIN rail
Temperature rating	-40 to +140°F (-40 to +60°C)
Humidity rating	0-90% RH non condensing
Weight	1.1 lb (0.5 kg)

[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

Specifications subject to change

Order Codes		
EL-925U-2-869	Wireless I/O Gateway	Fixed 869Mhz
EL-925U-2-900	Wireless I/O Gateway	FHSS 900Mhz

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