

415U-2 wireless I/O and gateway

Long range scalable industrial wireless I/O for reliable secure connectivity



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Description

The Eaton ELPRO 415U-2 wireless networking I/O and gateway is a multiple I/O node that extends communications to sensors and actuators in local, remote, or difficult to reach locations. Designed with a long range, license or license-free wireless transceiver, the 415U-2 can provide IP-based networking across sprawling industrial environments typical of industrial applications.

Available with models supporting 360–512 MHz, and up to 5.0 W RF power, the ELPRO 415U-2 provides robust/secure two-way wireless communications in extremely challenging outdoor industrial environments. The internal radio transceiver is designed to operate reliably with the challenges of obstructed paths, typical of remote monitoring and control applications. Supporting base, repeater, and remote functionality, as well as frequency agility, the 415U-2 provides reliable redundant networks in fixed frequency applications.

The ELPRO 415U-2 can also provide Ethernet and serial gateway support for industrial protocols including Modbus[®] TCP/RTU and DNP3.

Features

- Multi-hop repeater and gateway functionality
- Gather-scatter and block mapping
- Modbus TCP and RTU I/O gateway
- DNP3 remote I/O and DNP3 TCP gateway
- Internal programmable data and event logging with remote access
- Configurable digital, pulse, and analog I/O to 14-bit resolution
- Over-the-air network diagnostics and configuration
- Over-the-air context-based data compression for maximum throughput
- Advanced security encryption provided with WPA2, 802.11i and AES256
- Frequency agility roaming provides reliability and flexibility within the network architecture
- Expandable digital, analog, and pulsed I/O using 115S modules
- 360–512 MHz frequency licensed bands
- 10 mW to 5 W RF power (model specific)
- Radio data rates from 4800 bps to 19.2 kbps
- 12.5 kHz and 25.0 kHz channel bandwidth options

Applications

- Water and wastewater systems
- Oil and gas networks
- Irrigation pivot or channel management
- Mining operations infrastructure

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Specifications

Table 1. Specifications

Specification	Description
Transmitter and receiver	
Frequencies	360–380 MHz, 380–400 MHz, 400–420 MHz, 420–440 MHz, 430–450 MHz, 450–470 MHz, 470–490 MHz, 490–512 MHz
Transmit power	0.5–5.0 W (+27 to +37 dBm) 10–500 mW (+10 to +27 dBm)
Modulation	2-level FSK or 4-level FSK
Receiver sensitivity	12.5 kHz: –102 dBm (9600 bps), –110 dBm (4800 bps) 25.0 kHz: –102 dBm (19.2 kbps), –110 dBm (9600 bps)
BER	1 x 10 ⁻⁵
Channel spacing	10.0, 12.5, 20.0, 25.0 kHz (supports 5 or 6.25 kHz frequency steps)
Data rate	12.5 kHz: 4800 bps, 9600 bps 25.0 kHz: 9600 bps, 19.2 kbps
Typical range (LoS)	31 miles (50 km) at 5 W; 10 miles (16 km) at 0.5 W
Antenna connector	SMA female
Protocols and configuration	
System address	ESSID; 1 to 31 character text string
Protocols supported	TCP/IP, UDP, ARP, DHCP, DNS, ICMP, HTTP, FTP, VLAN 802.1Q, Modbus RTU, Modbus TCP, DNP3
Configurable parameters	Unit details, I/O mappings and parameters, radio settings (for more information, refer to the user manual) DNP3 I/O support (level 2) Modbus TCP/RTU gateway Embedded Modbus master/slave for I/O transfer Frequency agility parameters for automatic selection of radio paths, prioritization of traffic flows, bandwidth efficiency features, bandwidth utilization, routing, bridging, VLAN
User configuration	Network access: Ethernet Remote access: Over-the-air
Security	WPA2-PSK, 802.11i, AES256 bit, multi-level password protected configuration
Address filtering	IP address, whitelist/blacklist MAC address, whitelist/blacklist 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	
Network management	Optional Network Management system (future)
Radio diagnostics	RSSI measurements (dBm), connectivity information/statistics, channel utilization
Connections	
LAN	1 x 10/100Base-T auto-MDIX RJ45
Serial	1 x RS-232, 1 x RS-485, 1200–230,400 bps Supports automatic detection of 115S serial expansion I/O
Operation	
Modes	Base, repeater, remote station, or manual setup for advanced configuration

Specification	Description
Input and output	
Discrete input ❶	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 Min. I/P pulse width—DI 1/2: 10 µs, PI 3/4: 0.2 ms
Discrete output ❷	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 input	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%
Compliance	
EMC	FCC CFR47 Part 15; EN 301 489-3; EN 301 489-5
RF (radio)	FCC CFR47 Part 90; IC RSS 119; EN 300 113; EN 300 220; AS/NZS4295; AS/NZS4268
Safety	EN/IEC 60950-1
Hazardous area	Pending UL Class I, Division 2; IEC EX Zone 2; ATEX Zone 2
Power supply	
Nominal supply	10.8–30 Vdc, under/overvoltage protection
Average current draw	220 mA at 13.8 V (idle), 130 mA at 24 V (idle)
Transmit current draw	1.5 A at 13.8 V (5 W), 950 mA at 24 V (5 W) 0.6 A at 13.8 V (500 mW), 350 mA at 24 V (500 mW)
General	
Size in inches (mm)	7.16 x 6.14 x 1.57 (182 x 156 x 40)
Housing	Powder-coated aluminum and high-density thermoplastic, IP20 rated
Terminal blocks	Removable, max. conductor 12 AWG
Mounting	DIN rail
Temperature rating	–22 to +140 °F (–30 to +60 °C)
Humidity rating	0–99% RH noncondensing
Weight	1.6 lb (0.7 kg)

❶ Discrete input and output function shared for total 8 discrete inputs and outputs.

❷ Available RF power and frequency may vary depending on country of application.

Note: Specifications subject to change.

Accessories

Table 2. Accessories

Description	Product code	Data sheet
Interface		
T-type TCP thermocouple adapter (plugs into I/O connector)	915U-TCADP	TD032088EN
Data logging feature key (use XM option to extend logging memory)	915U-LOG	TD032090EN
DNP3 remote I/O and DNP3 TCP protocol feature key	915U-DNP3	TD032097EN
Antennas		
400 MHz dipole antenna, N-type female, 2 dBi gain	UDP400-C	TD032037EN
Collinear antenna, N-type female, 5 dBi gain	BU3-400	TD032038EN
Collinear antenna, N-type female, 8 dBi gain	BU6-400	TD032039EN
Cables		
Coaxial cable kit, 9.8 in (3 m)/32 in (10 m)/65 in (20 m), N-type to SMA	CC3/10/20-SMA	TD032019EN
Coaxial cable tail, 24 in (600 mm), SMA to N-type female or male	CCTAIL-SMA-F/M	TD032023EN
Ethernet cable, 6 in (1.8 m), straight through, RJ-45 to RJ-45	ETH-C5A	TD032024EN
Surge diverters		
Coaxial surge diverter, bulkhead N female to N female	CSD-N-6000	TD032031EN
Power supply surge diverter, 110 Vac/15 A	MA15/D/1/SI	TD032029EN
Power supply surge diverter, 240 Vac/10 A	MA15/D/2/SI	TD032029EN
Mounting brackets		
Mounting bracket kit for collinear antenna	BR-COL-KIT	TD032071EN
Mounting bracket/plate for 415U-2 flat panel mount	BR-415-PLATE	—
Power supplies		
DIN rail power supply, 85–264 Vac, 24 Vdc/2.5 A	PSG60E	TD032034EN

Ordering

Table 3. Ordering

Description	Product code	Frequency	RF power
Wireless I/O base/repeater/remote, unlicensed applications	415U-2-L	360–512 MHz	10–500 mW
Wireless I/O base/repeater/remote, licensed applications	415U-2-H	360–512 MHz	0.5–5 W
Wireless I/O base/repeater/remote, unlicensed, extended logging memory	415U-2XM-L	360–512 MHz	10–500 mW
Wireless I/O base/repeater/remote, licensed, extended logging memory	415U-2XM-H	360–512 MHz	0.5–5 W

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