415U-2-C wireless I/O gateway

Condor series long-range high-speed industrial wireless I/O for reliable secure connectivity

Description

ELPRO industrial wireless has 30 years of expertise in solving critical industrial applications through our extensive knowledge in wireless I/O, modem and gateway applications. The 415U-2-C extends communications to sensors in local, remote, and difficult-to-reach locations.

Designed with the Condor series long-range, high data speed wireless transceiver and standards-based native Ethernet protocol over the air, gives 415U-2-C the power and flexibility to perform reliably in sprawling harsh industrial environments.

Secure. AES encryption, advanced IP filtering, multi-level 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. Ethernet native support provides solutions to connectivity challenges today and in the future. The ELPRO 415U-2-C also provides Ethernet and serial gateway support for industrial protocols including Modbus TCP/RTU and DNP3 I/O.

Reliable. The Condor series 415U-2-C ProMesh operates reliably with the challenges of obstructed paths by using automatic path selection and frequency agility to allow the communications network to adapt to changes easily with redundancy.

Features

- Exceeding 280 kbps data throughput (50 kHz channel and compression)
- 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 Web dashboard for immediate view of local I/O

- Supports multiple data rates simultaneously for high performance over short and long communication links
- Frequency agility roaming provides reliability and flexibility within the network architecture
- 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
- Standard Ethernet bridge default to allow modem function for external Ethernet host devices (full L2/L3 network support)
- 340–480 MHz frequency range in just 2 models
- 10 mW to 10 W RF power configurable, license or license-free
- Software configurable wireless channel bandwidth supporting 6.25, 12.5, 25.0, 50.0 kHz
- Integrated digital, pulse, and analog I/O
- 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

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
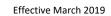- Mining infrastructure: conveyor, re-claimer, pumps

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Specifications

Specification	Description
Transmitter and receiver	
Frequency ①	148–174 MHz
	340–400 MHz
	400–480 MHz
Transmit power—peak ①	10 mW–10 W (+40 dBm) configurable
Transmit power	QPSK — 4 W (+36 dBm)
	16-QAM, 64 QAM — 2.5 W (+34 dBm)
	2-FSK, 4-FSK — 10 W (+40 dBm)
Modulation	QPSK, 16-QAM, 64-QAM
	2-FSK or 4-FSK (compatibility mode)
Receiver sensitivity 6.25/12.5/25 kHz	QPSK-FEC — –116 dBm
	QPSK — –113 dBm
	16-QAM — –104 dBm
	64-QAM — –97 dBm
	2-FSK — –110 dBm
	4-FSK — –102 dBm
Channel spacing	6.25, 12.5, 25.0, 50.0 kHz (software configurable) ④

Data rate raw no compression ②

	6.25 kHz	12.5 kHz	25.0 kHz	50.0 kHz
QPSK-FEC	4 kbps	8 kbps	16 kbps	32 kbps
QPSK	8 kbps	16 kbps	32 kbps	64 kbps
16-QAM	16 kbps	32 kbps	64 kbps	128 kbps
64-QAM	24 kbps	48 kbps	96 kbps	192 kbps
2-FSK		4.8 kbps	9.6 kbps	19.2 kbps
4-FSK		9.6 kbps	19.2 kbps	38.4 kbps
Typical data throughput 64-QAM	45 kbps	80 kbps	140 kbps	280 kbps

Specification	Description
Typical range (LoS QPSK-FEC)	62 miles (100 km) at 4 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
Networking protocols	TCP/IP, UDP, ARP, DHCP, DNS, ICMP, HTTP, VLAN 802.1Q, IPv6 pass through
Industrial protocols	Gateway: Modbus RTU, Modbus TCP, DNP3 I/O Pass through: EtherNet/IP, Profinet, DNP, IEC 61850, and others
Configurable parameters	Unit details, I/O mappings, I/O parameters, radio settings
	DNP3 I/O and gateway (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, 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	
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

Specification	Description
Connections	
LAN	1 x 10/100Base-T auto-MDIX RJ-45
Serial	1 x RS-232, 1 x RS-485, 110–230400 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 ③	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 ③	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%
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 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 62368
Hazardous area	Class I, Division 2—pending IEC EX Zone 2; ATEX Zone 2—pending
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 13.8 V (idle), 130 mA at 24 V (idle)
Transmit current draw	2.5 A at 13.8 V (10 W RF), 1.5 A at 24 V (10 W RF) 0.9 A at 13.8 V (500 mW RF), 0.5 A at 24 V (500 mW RF)
General	
Size (H x W x D)	7.20 x 1.38 x 6.20 inches (183 x 35 x 156 mm)
Housing	Powder-coated aluminum and high-density thermoplastic, IP20 rated
Terminal blocks	Removable, max. conductor 12 AWG
Mounting	DIN rail
Temperature rating	–40 to +158 °F (–40 to +70 °C)
Humidity rating	0–90% RH noncondensing
Weight	1.6 lb (0.7 kg)

① Available RF power and frequency may vary depending on country of application. Please confirm with local regulatory body.

② Data compression will provide an improvement in over-the-air data throughput of up to 50%, depending on data content..

③ Discrete input and output function shared for total of 8 discrete inputs and outputs.

④ 50.0kHz Channel Spacing available upon application

Accessories

Description	Product code
Antennas	
400 MHz dipole antenna, N-type female, 2 dBi gain	**UDP400-C**
400 MHz collinear antenna, N-type female, 5 dBi gain	**BU3-400**
400 MHz collinear antenna, N-type female, 8 dBi gain	**BU6-400**
400 MHz Yagi antenna, N-type female, 6 dBi gain, includes bracket	**YU3-400**
400 MHz Yagi antenna, N-type female, 9 dBi gain, includes bracket	**YU6-400**
400 MHz Yagi antenna, N-type female, 12 dBi gain, includes bracket	**YU9-400**
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**
Coaxial cable tail, 24 in (600 mm), SMA to N-type female or male	**CCTAIL-SMA-F/M**
Ethernet cable, 6 ft (1.8 m), 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 units	**CBLUSB-ATOB**
Surge diverters	
Coaxial surge diverter, bulkhead N-type female to N-type female	**CSD-N-6000**
Power supply surge diverter, 110 Vac/15 A	**MA15/D/1/SI**
Power supply surge diverter, 240 Vac/10 A	**MA15/D/2/SI**
I/O interface	
215/915/415U series single channel thermocouple adaptor, type j, k, t, cold junction comp	**915U-TCADP**
Mounting brackets	
415U series flat wall mounting kit	**BR-415-PLATE**
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, 24 Vdc/2.5 A	**PSG60E**

Ordering

Description	Band	RF power	Product code
Wireless IO/gateway	148–174 MHz	10 mW–10 W	**415U-E-C1**
Base/repeater/remote, 96 kbps	340–400 MHz	10 mW–10 W	**415U-2-C3**
QAM, 10.4–30 Vdc, 10 W, 6.25/12/5/25/50 kHz	400–480 MHz	10 mW–10 W	**415U-2-C4**
415U-2 wireless Ethernet modem/gateway including IECEx/ATEX for hazardous area use	340–400 MHz	10 mW–10 W	**415U-2-C3-EX**
	400–480 MHz	10 mW–10 W	**415U-2-C4-EX**

Related products

Description	Band	RF power	Product code
Wireless Ethernet Modem/gateway Base/repeater/remote, 96 kbps QAM, 10.4–30 Vdc, 10 W, 6.25/12/5/25/50 kHz	148–174 MHz	10 mW–10 W	**415U-E-C1**
	340–400 MHz	10 mW–10 W	**415U-E-C3**
	400–480 MHz	10 mW–10 W	**415U-E-C4**
Redundant base station/repeater Base/repeater/remote, 96 kbps QAM, 10.4–30 Vdc, 10 W, 6.25/12/5/25/50 kHz	148-174 MHz	10 mW–10 W	**415U-BSR-C1**
Redundant base station/repeater Base/repeater/remote, 96 kbps QAM, 10.4–30 Vdc, 10 W, 6.25/12/5/25/50 kHz	340–400 MHz	10 mW–10 W	**415U-BSR-C3**
Redundant base station/repeater Base/repeater/remote, 96 kbps QAM, 10.4–30 Vdc, 10 W, 6.25/12/5/25/50 kHz	400–480 MHz	10 mW–10 W	**415U-BSR-C4**

Note: Specifications subject to change.

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