



## QUANTUM EDGE III

# ELPRO EL-QE-E QUANTUM EDGE BASE

## Industrial Wireless Controller & I/O Gateway

### DESCRIPTION

The EL-QE-E is the base model in ELPRO Technologies next generation product line. The I/O Gateway, Controller, and/or Protocol Converter provides a powerful IIoT Gateway Solution in upcoming networking applications.

Able to provide a mesh Point to Point or Point to Multi-Point topology within “Fog” or “Cloud” based IT/OT architectures.

It uses efficient communication methods that map data via an IP-based wireless network while simultaneously providing protocol conversion from the base radio to other nodes in the network or to the Cloud via industrial protocols such as DNP3, MQTT Sparkplug and LoRaWAN.

The Quantum base model provides core Ethernet and 2.4Ghz or 5Ghz WiFi communication mediums with future releases adding Licensed UHF/VHF/900Mhz, Unlicensed 900Mhz FHSS & 869MHZ wireless technologies, 5G Cellular and even some new communication mediums such as LoRaWAN will be added.

The product provides innovative and cutting edge features such as Node-Red, a flow based development tool that is embedded and provides custom based programming for connecting hardware devices, AP's and online services.

It will also provide a Linux based Docker container which is an open sourced platform for developing, and running custom applications.

The ELPRO Quantum Edge Base model comes standard with short range 2.4GHz or 5Ghz selectable WiFi, which is compatible with our existing 245U-E Ethernet modems and the 215U-2 wireless I/O products. Upcoming models will have additional communications interfaces that will provide communication with other Radio and Cellular frequency bands and communication mediums.

### APPLICATIONS

- Factory automation and safety interlocks
- Process monitoring and control
- Water treatment facilities
- Tank and equipment monitoring
- Environmental monitoring
- Energy management
- Asset management
- Valve position monitoring

### FEATURES

Integrated digital, analog, and pulse I/O

Expandable I/O for extra local alarms and inputs/outputs

Support for serial MTL HART MUX communications

HART Multi-drop interface on all analog input/outputs (upcoming release)

ELPRO ProMesh™ redundant path selection and network formation

Gather-scatter/block mapping and integrity checking transmissions for efficient event triggered peer-to peer I/O

Modbus TCP/UDP and RTU I/O gateway

DNP3 I/O gateway, including internal status registers

MQTT and SparkplugB Gateway IoT Connectivity

LoRa Gateway & Application Server (future)

Rockwell EtherNet/IP Gateway (Future)

Data Logging

IO Plus Logic engine for compatibility with existing Condor implementations.

User configurable Internal Web based Dashboard to display I/O and Diagnostics

Node-Red, Flow-based Programming environment with configurable Control, Actions and User Dashboards.

Docker Container support for third party functionality (future)

Over-the-air network diagnostics and configuration

System Firmware Upgrade: Centralised management of firmware patch updates and automated over the air deployment

Centralised & Automated over the air management/rotation of system encryption keys

Over the air Transparent Layer 2 Wireless LAN (IEEE802.11)

Supports multiple data rates simultaneously for high performance over short and long communication links

Standard Ethernet bridge to allow modem function for external Ethernet host devices (full L2/L3 network support)

Secure data protection using advanced Encryption methods

Port Forwarding (NAT): Advanced network Port Forward, configuration for connected Ethernet devices.

Radio Access Control: Extension of existing MAC/IP filtering to include black/white-list filtering based on MAC or Serial number.

#### Order Codes

EL-QE-B Quantum Base, Short range Wifi (2.4/5Ghz), IO, Ethernet, Serial

# SPECIFICATIONS

## Primary Communications

Technology	IEEE 802.11ac Wave 2 1x1 WiFi
Frequency bands <sup>a</sup>	2.400–2.483.5 GHz <sup>a</sup> / 5.150–5.895 GHz <sup>a</sup>
Transmit power	2.4Ghz - 18dBm (62mW)/5Ghz - 15dBm (32mW)
Modulation	Orthogonal frequency data modulation (OFDM)
Receiver sensitivity	2.4Ghz: -92 dBm@7.2Mbps, -62 dBm@200 Mbps 5Ghz: -91 dBm@7.2Mbps, -59 dBm@433 Mbps
Channel spacing	2.4Ghz (13, overlapping 20Mhz channels) / 5Ghz (13, 20Mhz channels). 20/40/80 MHz channel size support
Supported Data Rates	2.4Gh (1 –200 Mbps) <sup>a</sup> / 5Ghz (6 - 433 Mbps) <sup>a</sup> "Auto Mode" selects fastest rate possible relative to RSSI and Channel Width.
Typical range	Both 2.4Ghz & 5Ghz - 250m (820ft) LoS <sup>a</sup>
Antenna connector	1 x female SMA, standard polarity

## Secondary Communications

Secondary Communications (Future model variations)	900MHz WiFi, 2.4GHz High Power WiFi, 5GHz High Power WiFi, High Speed Cellular, LoRaWan, 900MHz unlicensed FHSS, 869MHz unlicensed, Narrow-band Long range UHF/VHF radio,
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## 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 Client & Broker, SparkplugB, Modbus RTU, Modbus TCP/UDP, DNP3 I/O, HART to Modbus, ELPRO WIB compatibility Pass through: EtherNet/IP, PROFIBUS DP, 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/UDP/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, Access Control List
IP filtering	IP address, MAC address, ARP filtering white-list/blacklist & serial number, Access Control List

## Compliance

EMC	FCC CFR47 Part 15; EN 301 489-3; EN 301 489-5
RF (radio)	EN 300 328 (2.4Ghz); EN 301 893 (5Ghz); FCC Part 15.247;
Safety	EN/IEC 62368 UL Listed
Hazardous area	UL Class I, Division 2 IEC EX / ATEX Zone 2

## Connections

LAN	3 x 1Gb auto-MDIX RJ-45
Serial	1 x RS-232, 1 x RS-485, 300–460,800 baud plus Profibus 12Mb/s, SDI-12 Serial over IP modem support
USB	Type C, Type A Host
SD-Card	1 x Micro SD-Card

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## Input and output

Discrete input/output	8 digital I/O (1-4 configurable as PI or PO) Inputs: Contact to GND, 2 Vdc, Wetting 5 mA Outputs: open Drain to 30VDC, 400mA max Max. I/P pulse rate – 50 kHz Min. I/P pulse width – 8 µs
High current output	One digital output N/O (Form A) contact to 60 Vdc 5Amp Output current (continuous) 30A start current (Peak 100msec)
Analog inputs	6 AI (selectable for Voltage/current) Dip Switch Selectable for mA or voltage Each pair configurable for differential input Accuracy: 0.1% full scale resolution 14-bit ADC Analog In support HART Protocol FSK Physical layer
Analog output	2 AO (sourcing) Current range: 0.5mA - 24 mA Current resolution: 13 bits Accuracy (current): 0.1% Analog Out support HART Protocol FSK Physical layer
Analog loop power	+24 Vdc output provided to power loop devices Max. Current 200 mA – current limited
Expansion	Compatible with 115S series Modbus I/O modules

## LED Indications & Diagnostics

LED Indication	Power/OK, Radio Primary & Secondary (if fitted), TX/RX/Link, RS-232, RS-485, LAN/100/1000, I/O status
RF (radio)	EN 300 328 (2.4Ghz); EN 301 893 (5Ghz); FCC Part 15.247;
Safety	EN/IEC 62368 UL Listed
EMC	FCC CFR47 Part 15; EN 301 489-3; EN 301 489-5

## Power supply

Main supply	10.8-60 Vdc, under voltage / over voltage crowbar protection, Replaceable Fuse Supply max 60W (including battery charging)
Battery Supply	12V PbSO4 (Lead-acid) or LiFePO4 (Lithium Iron Phosphate) backup battery. Battery charging over 17V. 12V / 24V Solar Panel up to 200W. Charge up to 5A / 60W from main supply Low Temp Charge disable (Selectable -20 or 0°C (-4 or 32°F) Over/Under Voltage protection with replaceable fuse.
Average current draw	300 mA at 13.8 V (idle), 130 mA at 24 V (idle)

## General

Processor Core	AMD64x Dual Core Processor Arm® Cortex®-A53 2G RAM Memory, 8G Flash Memory
Dimensions	180 x 150 x 40mm (HxDxW), 6.70 x 5.9 x 1.6 inches
Weight	0.8 kg (1.8 lb)
Housing	Die-cast, Powder-coated aluminum and high-impact Plastic, Poly Carbonate/ABS Blend, IP20 rated
Terminal blocks	Removable, max. Conductor 24-16 AWG (1.5mm <sup>2</sup> max)
Mounting	DIN rail
Temperature rating	-40 to +70°C (-40 to +158°F)
Humidity rating	0-90% RH non-condensing
Altitude	0-2000m / 6500ft (Performance derating applies above this altitude)

<sup>a</sup> Available RF power and frequency may vary depending on country and model selected. Please confirm with local regulatory body.

<sup>b</sup> Data compression will provide an improvement in over-the-air data throughput of up to 50%, depending on data content.

<sup>c</sup> Discrete input and output function shared for total of 8 discrete inputs and outputs.

Specifications subject to change

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# HOW TO ORDER

Simply send us an email at  
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