



### Applications

XO-3 typical application:

- Lighting automation

Other applications of the XO and XI line of controllers:

- HVAC automation
- Industrial automation

### Applications

The X Series are microprocessor based I/O controllers designed to control, optimize and improve the energy efficiency of a wide variety of equipment types. When used with the cX Network Application Server/Router, all controller I/O are fully programmable with the OPIX Now! Portal Application. The no-cost programming tools are available to registered users.

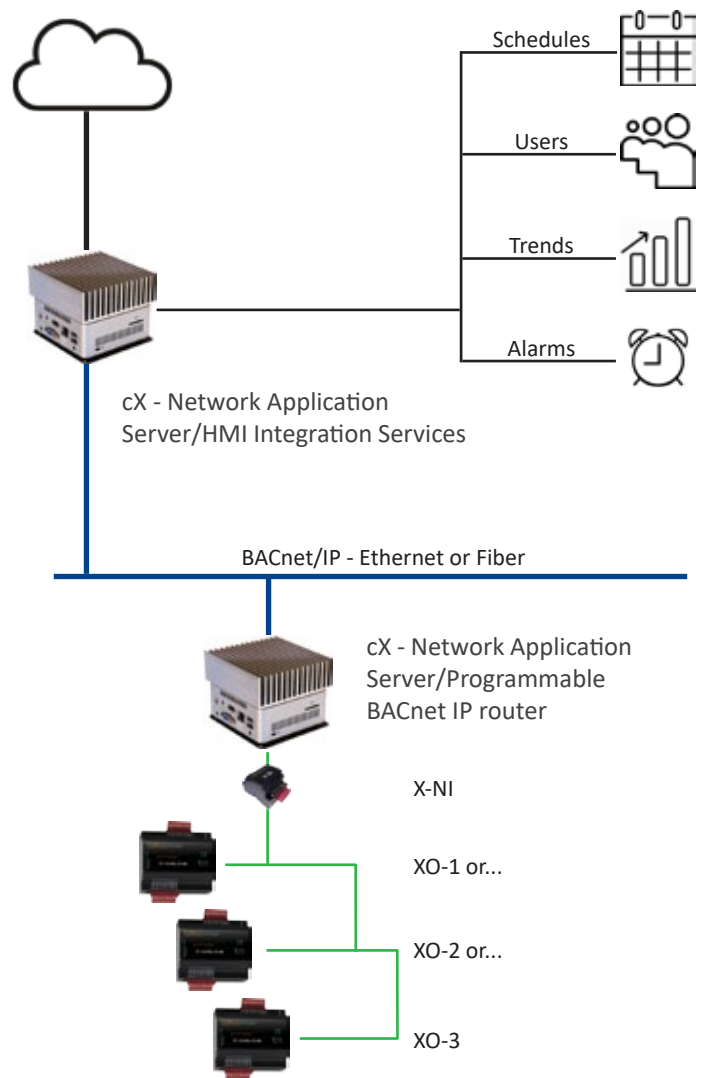
The XO-3 uses the FTTP-Bus fully isolated transceiver for best in its class networking over twisted pair media. FTTP-Bus networks are polarity and topology free. The network utilizes open standard BACnet/IP protocol and is encrypted using FIPS grade algorithms.

The XO-3 features fast response times suitable for lighting, building and lite industrial automation. Up to 30 XO-3 controllers can be connected to each FTTP-Bus sub network, automatically recognized by the programmable host (cX Application Server) and made available automatically for simple graphical programming.

There are no limits to program length or complexity other than the underlying physical hardware memory.

### Product Part Numbers

HW Part Number: XO3-006

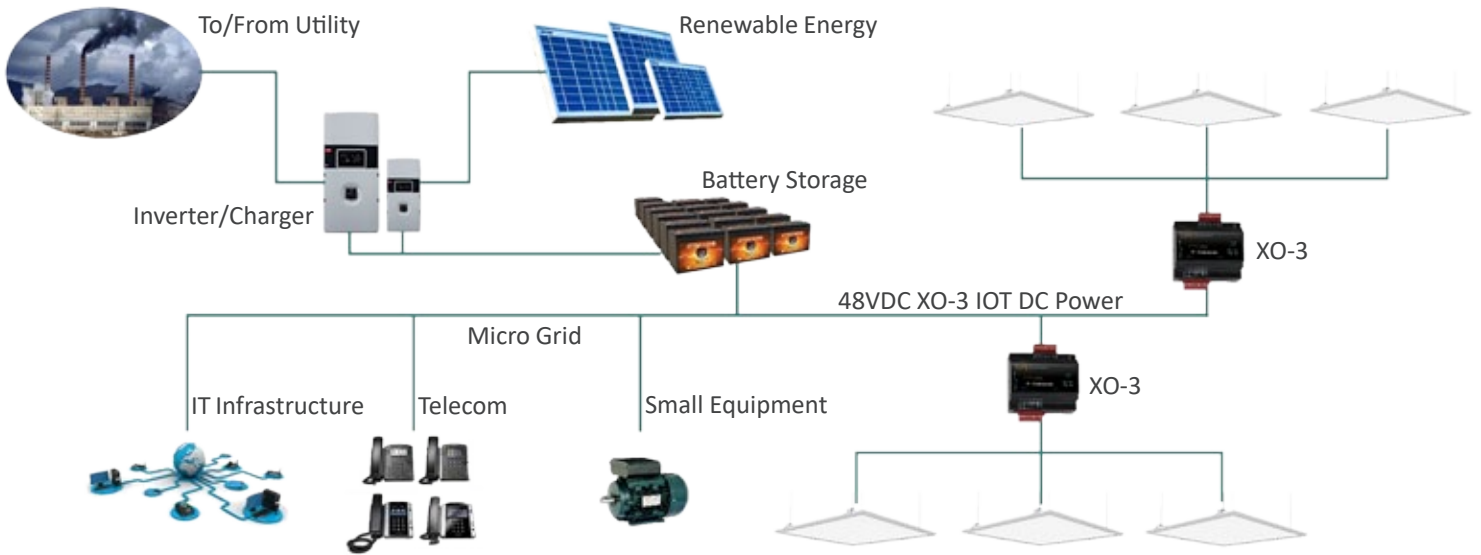


### IOT Platform

The XO-3 is a generic platform of 48V DC devices designed for operation directly on a resilient micro-grid. The micro-grid is typically created by combining Photovoltaic Arrays (solar panels) or other renewable energy sources with battery banks and inverters. The inverters may connect the micro-grid with the local/building power grid. Some of the micro-grid benefits include:

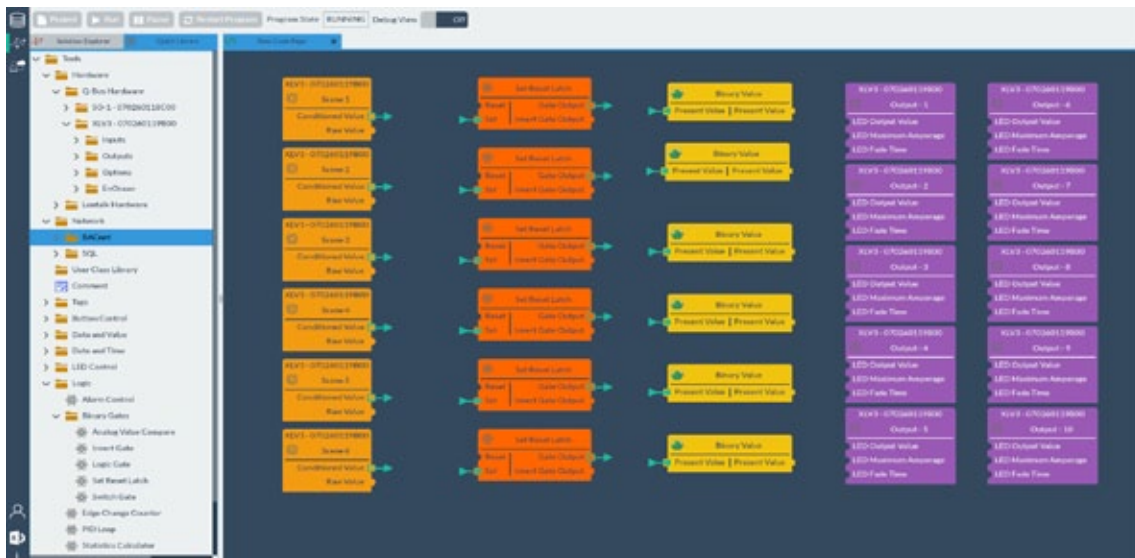
- Resiliency through independence from the utility grid and by incorporating easy battery bank and PV integration.
- Superior efficiency by avoiding multiple voltage translations.
- Future proofing by investing in DC.
- Enlarged profits.

XO-3 devices can be powered directly from local/building AC power through a 48VDC power supply (recommended Meanwell HLG-600H-54 or better) or be integrated as a component of a micro-grid as depicted below:



### OPIX Now! Portal

The OPIX Now! Portal Application provides graphical programming interface for free programming of the inputs, outputs, and the logic in between the two. The app stores configuration for multiple XO-3 IOT controllers and arranges it into projects. Programs can be backed up and sent for use in another project. The Portal currently runs on full version of windows desktops and tablets.



## EnOcean Wireless

EnOcean is a wireless sensor technology for the “last 50 feet”. By the use of energy harvesting the need for power wiring or batteries is removed practically eliminating sensor maintenance. Supported and tested EnOcean profiles

- Light Sensors
  - A5-06-01
  - A5-06-02
- Occupancy Sensor
  - A5-07-01
  - A5-07-02
  - A5-07-03
  - A5-08-01
  - A5-08-02
- RPS Switches and Key Card

Software features include:

- EnOcean packet monitoring with filtering and teach packet recognition.
- Easy single click device registration.
- Offline device registration for engineered solutions.
- 902MHz frequency support in US markets.
- EnOcean Device heartbeat support with alarming.
- Standard ON/OFF or timed based switches (great for dimming).

The use of EnOcean sensors requires separate purchase of 902MHz antenna. Antenna connects to the XO-3 IOT by standard CAT-5 cable (straight-through). Max cable length is 250 feet.

Max distance between sensors and the antenna is 35ft indoors. Longer distances can be achieved by careful planning of sensor and antenna locations.

Please refer to EnOcean installation notes for more info:

[https://www.enocean.com/fileadmin/redaktion/pdf/tec\\_docs/AN001\\_INSTALLATION\\_NOTES\\_Nov08\\_en.pdf](https://www.enocean.com/fileadmin/redaktion/pdf/tec_docs/AN001_INSTALLATION_NOTES_Nov08_en.pdf)



## Wired BACnet IP - Ethernet

BACnet IP over Ethernet allows XO-3 IOT controller to be used in networks of hundreds or thousands of IoT devices. Wired backbone assures system stability and resiliency. Standard twisted pair wire can be run from one controller to the next and so on.

XO-3 IOT pioneers device-level system security with FIPS grade AES 256 encryption. Encryption can be turned off in case of a requirement to integrate with other BACnet IP system vendors that don't support device-to-device encryption.

BACnet IP protocol standardizes communications and makes it possible to integrate the XO-3 IOT platform with other compliant networks. AllJoyn BACnet interface can be used to link XO-3 IOT devices to IoT cloud. The cX Network Appliance can be used for management of the BACnet network, trend storage, data analytics, sensor data binding to other BACnet controllers, scheduling, alarming, etc.



### I/O Configuration

#### Outputs

|                |   |
|----------------|---|
| Analog Outputs | 6 x Analog<br>Constant current analog outputs 1.5A DC max. Each output is protected by a 4A blow fuse. Fuses are soldered to the board. |
|----------------|---|

### Installation

|          |   |
|----------|---|
| Comments | Must be installed into Nema-Rated enclosure |
|----------|---|

### Status Lights

#### LED

|                     |   |
|---------------------|---|
| Device Status Green | Pulsing Green = Normal<br>Off = No power or other fault |
| Service Pin Green   | Off = Normal/Running<br>On = No Application             |

### Agency Approvals

|                       |                                   |
|-----------------------|-----------------------------------|
| Safety Certifications | UL916 Energy Management Equipment |
|-----------------------|-----------------------------------|

### Mechanical

#### Hardware

|             |                    |
|-------------|--------------------|
| Processor   | ARM Cortex M4      |
| Transceiver | Q-Bus; 78kbps      |
| Indicators  | LED, Power, Status |

#### Power

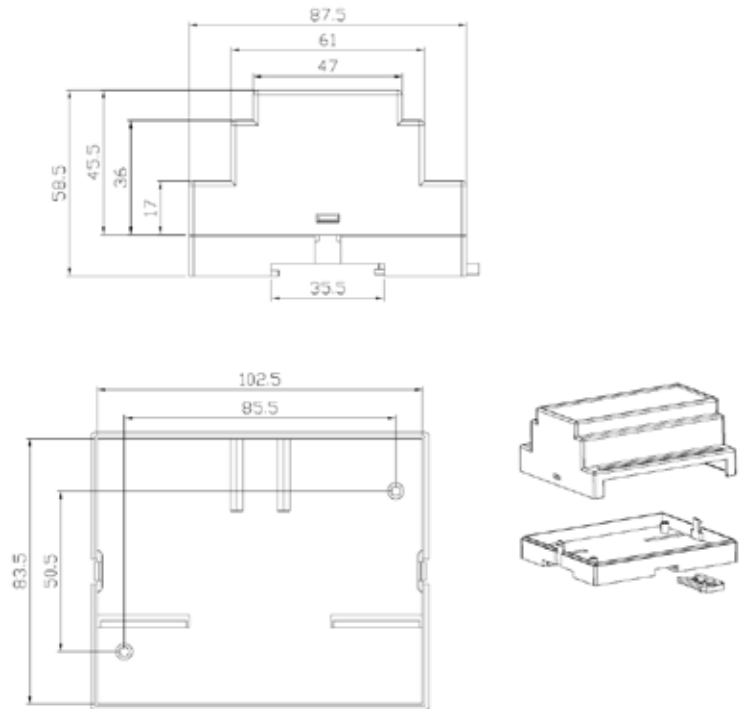
|                |                     |
|----------------|---------------------|
| Supply Voltage | 40V AC or 60VDC Max |
| Supply Current | 10A Max             |

#### Enclosure

|              |                 |
|--------------|-----------------|
| Material     | ABS             |
| Color        | Black           |
| Installation | 35mm DIN        |
| Connectors   | Removable (red) |

#### Environment

|             |                       |
|-------------|-----------------------|
| Temperature | 0°-50°C (32°-122°F)   |
| Humidity    | 0-90% non-condensing  |
| Storage     | -20°-70°C (-4°-158°F) |





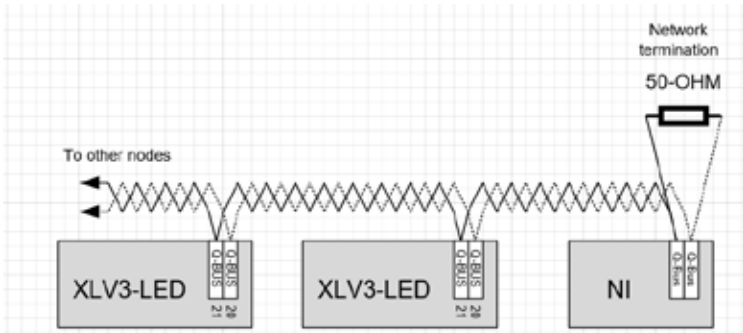
### Wired BACnet IP - Ethernet

The XO-3 IOT controller must be installed into a NEMA-rated enclosure using DIN rail. Standard 35mm DIN rail (top hat rail EN 50022 – 35 × 7.5mm) is used to speed up the installation. Mount the DIN rail onto enclosure's backplate, then snap-in the XO-3 IOT controller onto the DIN rail. The red clips on the back of the enclosure will latch onto the DIN rail. To remove the controller, use a thin screwdriver to gently pull out the clips while removing the enclosure from the DIN rail.



### Q-Bus Network Wiring

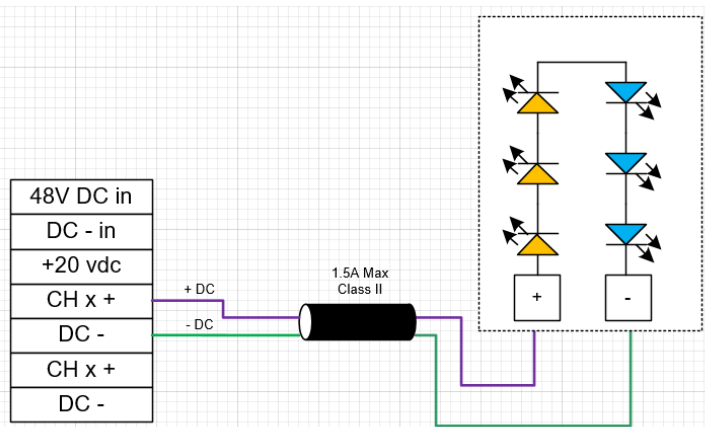
Use only low capacitance LEVEL IV, 22AWG, twisted pair for network wiring. This wire type is sometimes called the "Echelon wire". Wire is available from many distributors i.e. Windy City Wire and Cable. Part number 105500. Total network wire length is not to exceed 1000ft. Network must be terminated with one 50-OHM, 1/4-watt resistor, typically located at the network interface (NI-FT) of the programmable host. To avoid interference, the network wiring should be installed at least 1/2 inch from other network and AC power wiring.



### Wired BACnet IP - Ethernet

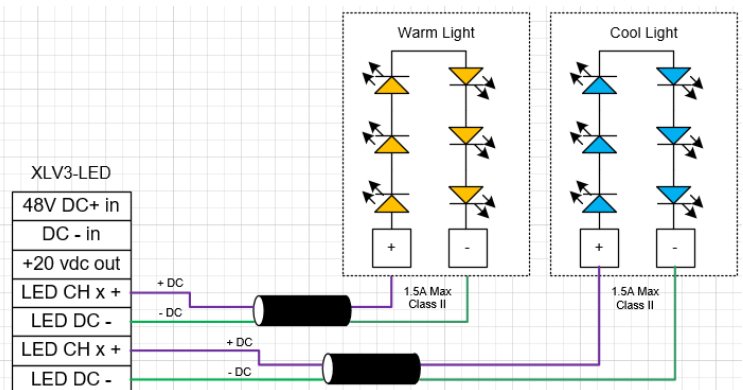
XO-3 IOT is to be used as an LED low voltage lighting system and powered by a power supply listed by a Nationally Recognized Testing Laboratory and for permanent installation and use in location in accordance with NEC, NFAP, Article 411.

LED Fixtures suitable for installation with the XO-3 IOT controller consist of an LED string (light engine) and a connector that allows for direct wire connection from the LED string to one of the output channels on the XO-3 IOT controller. Note that there is no LED DRIVER in the lighting fixture as the XO-3 IOT controller is the LED Driver with 6 output channels. Some LED fixtures are tunable and feature cool and warm light LEDs. In such case two output channels are used; one to drive the cool LEDs and the other to drive the warm LEDs.



Typical LED Fixture Connection

DETAIL "OA"



Tunable LED Fixture Connection

DETAIL "OB"