BP848-DIO-LX – Configurable IO MSTP Controller

Installation and Wiring Guide

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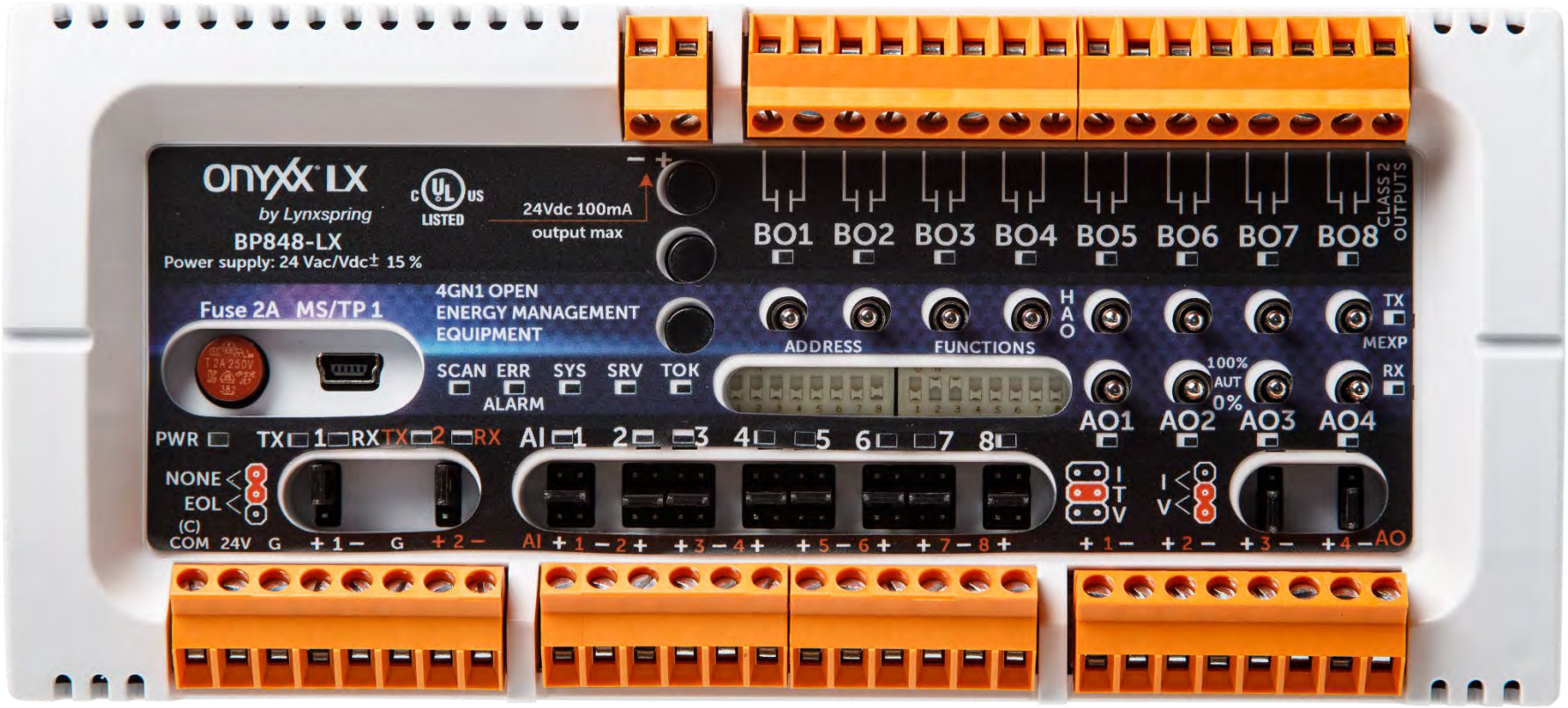

ONYXX® LX

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BP848-DIO-LX - Configurable IO MSTP Controller

Disclaimer

Before proceeding to the installation of this controller or any Onyxx LX device, please note the following: This manual applies to ***Onyxx LX UI software version 4.0*** **and** higher and using ***firmware version 1.008*** and higher.

All firmware updates must be done utilizing a Supplied USB-COM adapter or USB to MSTP converter cable.

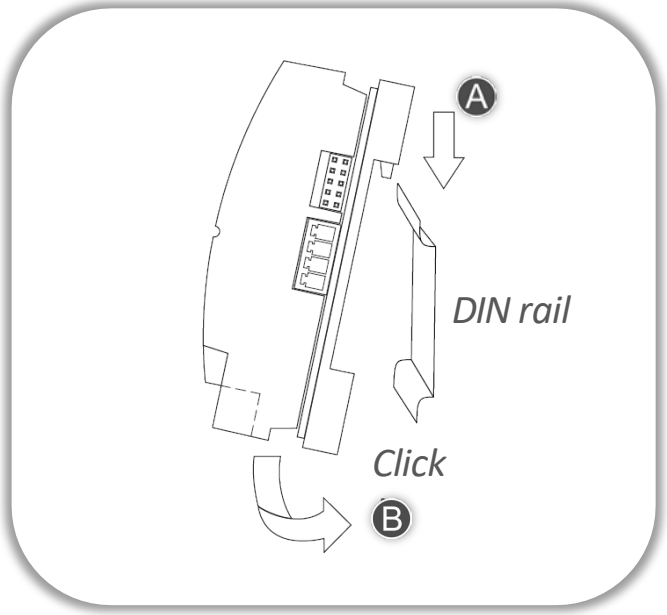
- All installations shall be made by a properly certified technicians and respect all local mandatory codes and regulations.
- Electronic controls are static sensitive devices: discharge yourself properly before manipulating and installing the controller.
- Any short circuit or incorrect wiring may permanently damage the controller or the equipment.
- Double check all wiring before applying power.
- If a control failure could lead to personal injury and/or loss of property, it becomes the responsibility of the installer to add safety devices and/or alarm system to protect against failures.

BP848-DIO-LX - Configurable IO MSTP Controller

Contents

BP848-DIO-LX - Configurable IO MSTP Controller

Installation - Mount the BP848IO Following These Simple Instructions



Mount the controller using the quick mounting method, on a DIN rail .

- A *Align the brackets above the DIN rail and slide the unit down onto the rail Press the bottom of the unit down onto the rail until you hear a "click".*
- B *The easy release spring retaining clip holds the unit firmly in place.*

Short circuits or incorrect wiring may permanently damage the controller. Double check your wiring before applying power. If a control failure could lead to personal injury and/or loss of property, the installer must add safety devices and/or alarm systems to protect against failures.

Make sure the controller is mounted inside an approved enclosure that meets local building code requirements or any other suitable protective enclosure. The installer is responsible for ensuring that local building codes are respected. If replacing an older controller, label the wires before removing the older controller and installing the new one. Never remove or install a controller while it is powered.

Electronic controls are static sensitive devices; discharge yourself properly before manipulating and installing the device.

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Interface

Product Label

This controller is designed to facilitate the control and management of terminal equipment typically used in the HVAC/commercial industry.

It allows powerful yet flexible solutions that can be tailored and sized according to any project needs.

All key functions across all Onyxx LX programmable controllers are very similar and operate in the same fashion.

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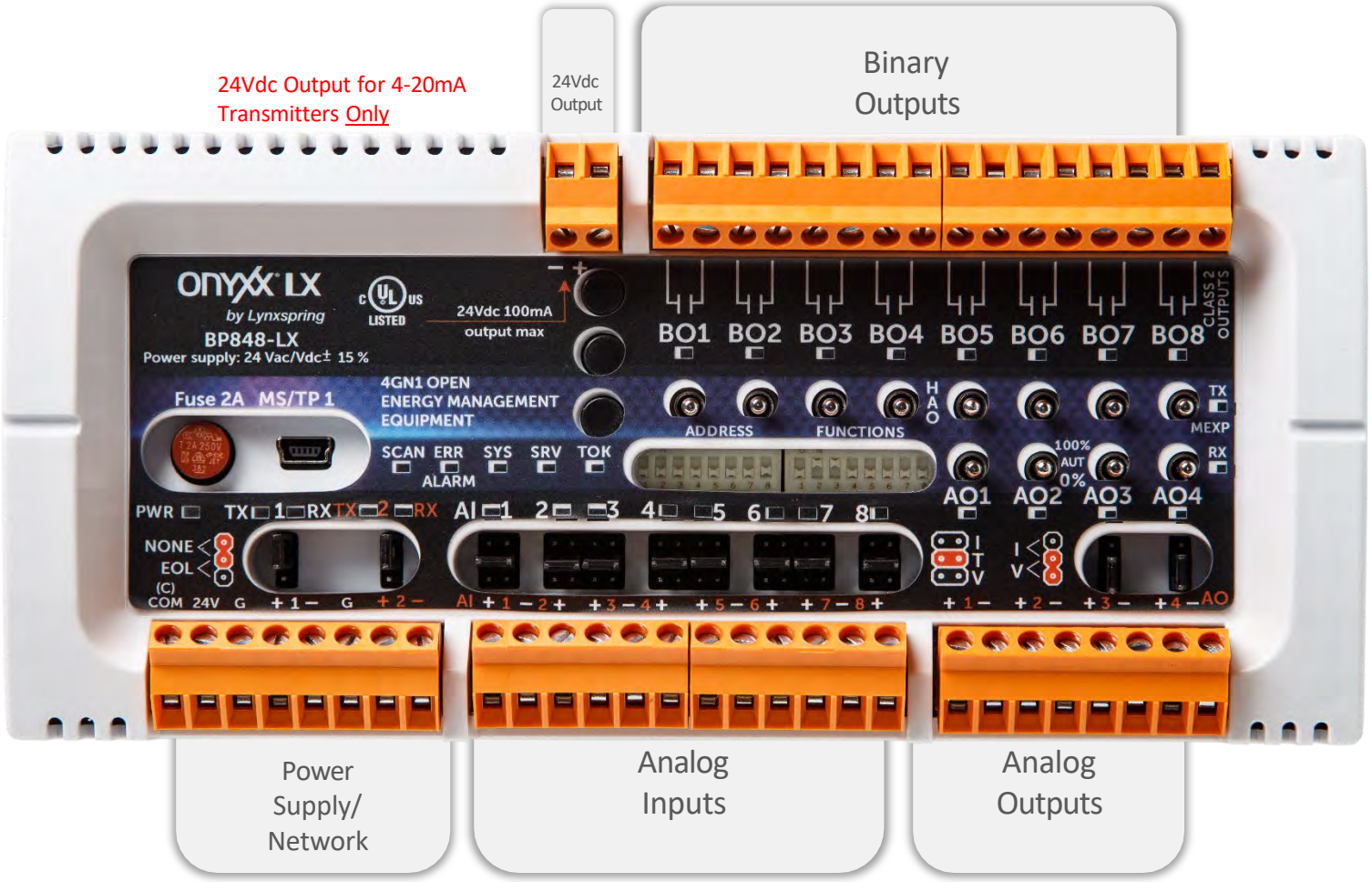
Terminal Blocks



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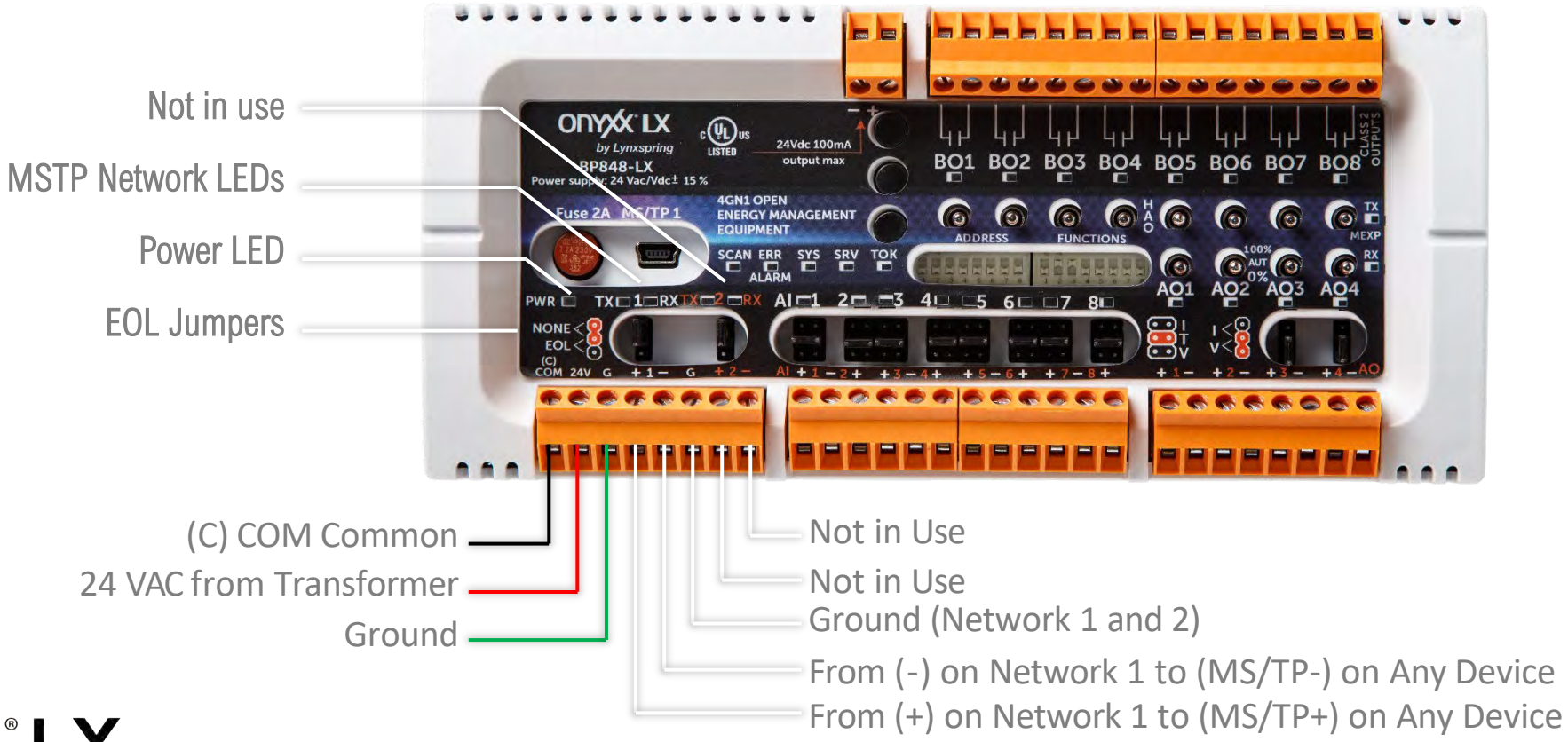
Installation

Wiring Instructions, Power and Network Terminal Block



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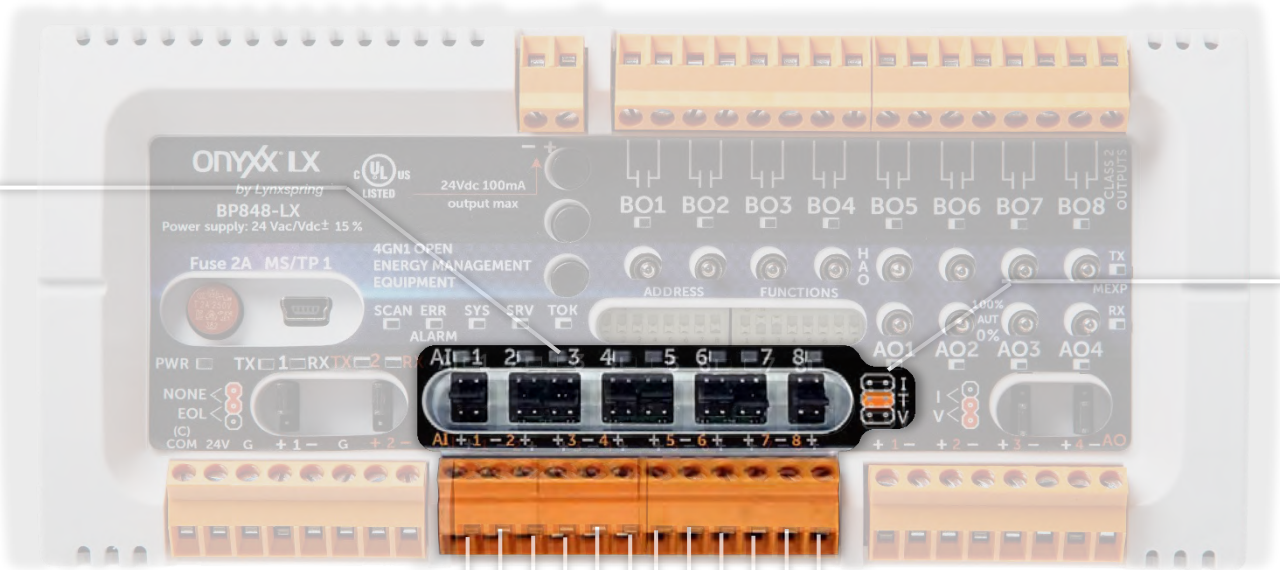
Installation

Wiring Instructions, Analog Inputs Terminal Block

Analog Inputs
Status LEDs



Input type Jumper :

- I : Current Intensity
  0..20 mA / 4..20 mA
- T : Thermistor
  10K Type 3 (std) or Type 2
- V : Voltage
  0-10 VDC / 2-10 VDC

- Analog Input/Universal Input 1 (+)
- Analog Input/Universal Input 1 & 2 (-)
- Analog Input/Universal Input 2 (+)
- Analog Input/Universal Input 3 (+)
- Analog Input/Universal Input 3 & 4 (-)
- Analog Input/Universal Input 4 (+)
- (+) Analog Input/Universal Input 5
- (-) Analog Input/Universal Input 5 & 6
- (+) Analog Input/Universal Input 6
- (+) Analog Input/Universal Input 7
- (-) Analog Input/Universal Input 7 & 8
- (+) Analog Input/Universal Input 8

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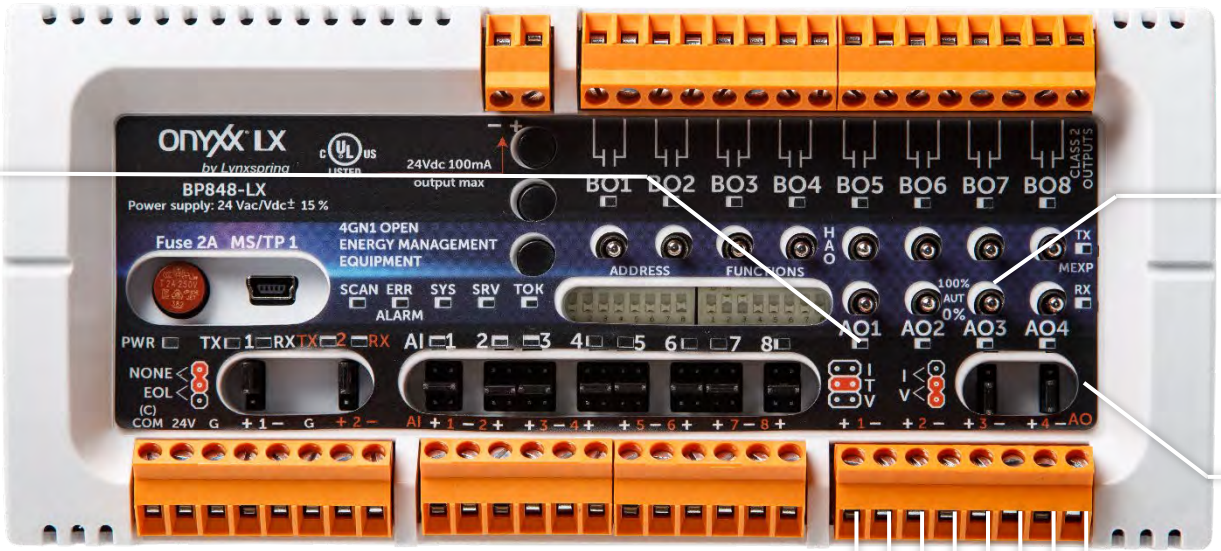
Installation

Wiring Instructions, Analog Output Terminal Block

Analog Output
Status LEDs



Analog Output
3 position override switches

Up : 100%/ON
Middle : Automatic
Down : 0%/OFF

Analog Output type Jumper:

V: Voltage only for
BP848IO Analog Outputs

0..10 Vdc / 2..10 Vdc

AO1, AO2, AO3, & AO4 in VDC Only

Analog Output 1 (+)
Analog Output 1 (-)
Analog Output 2 (+)
Analog Output 2 (-)
Analog Output 3 (+)
Analog Output 3 (-)
Analog Output 4 (+)
Analog Output 4 (-)

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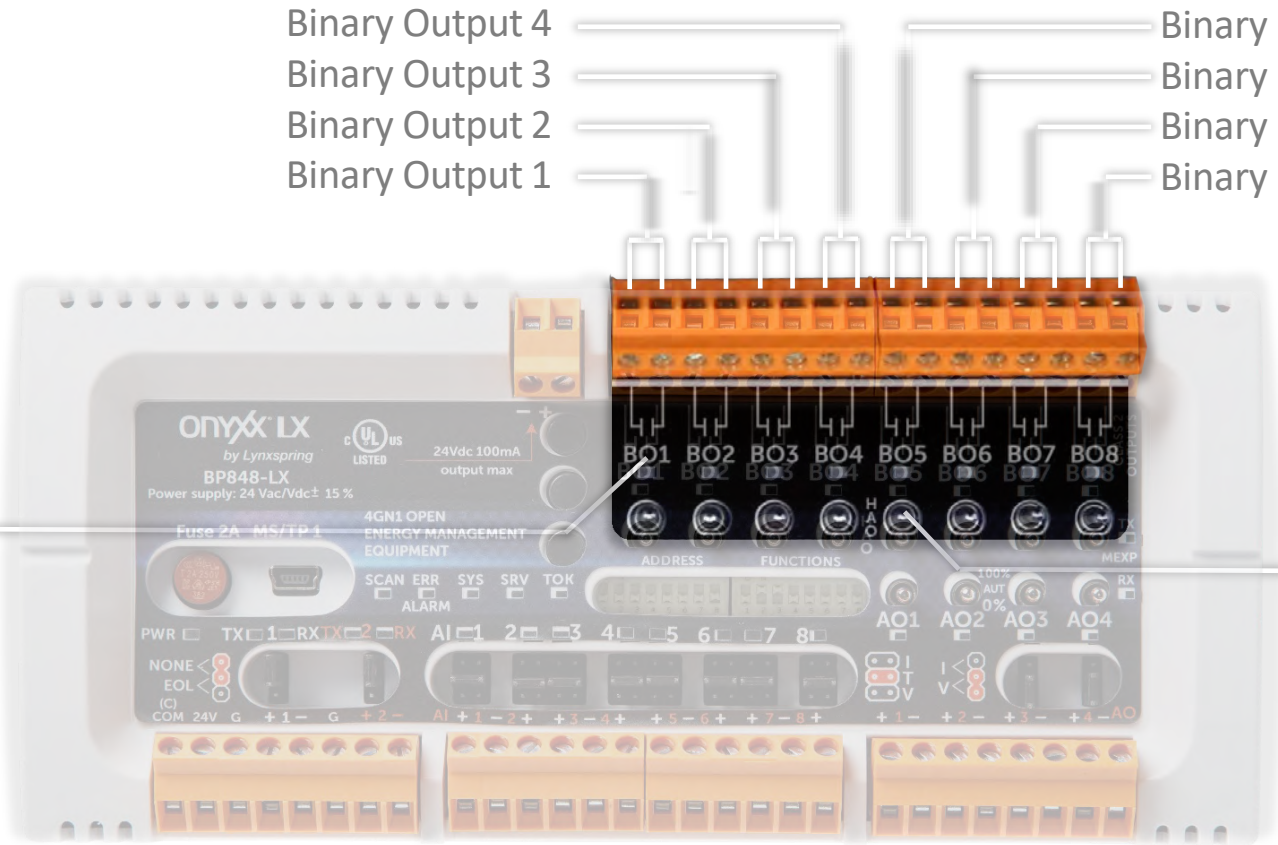
Installation

Wiring Instructions, Binary Output Terminal Block



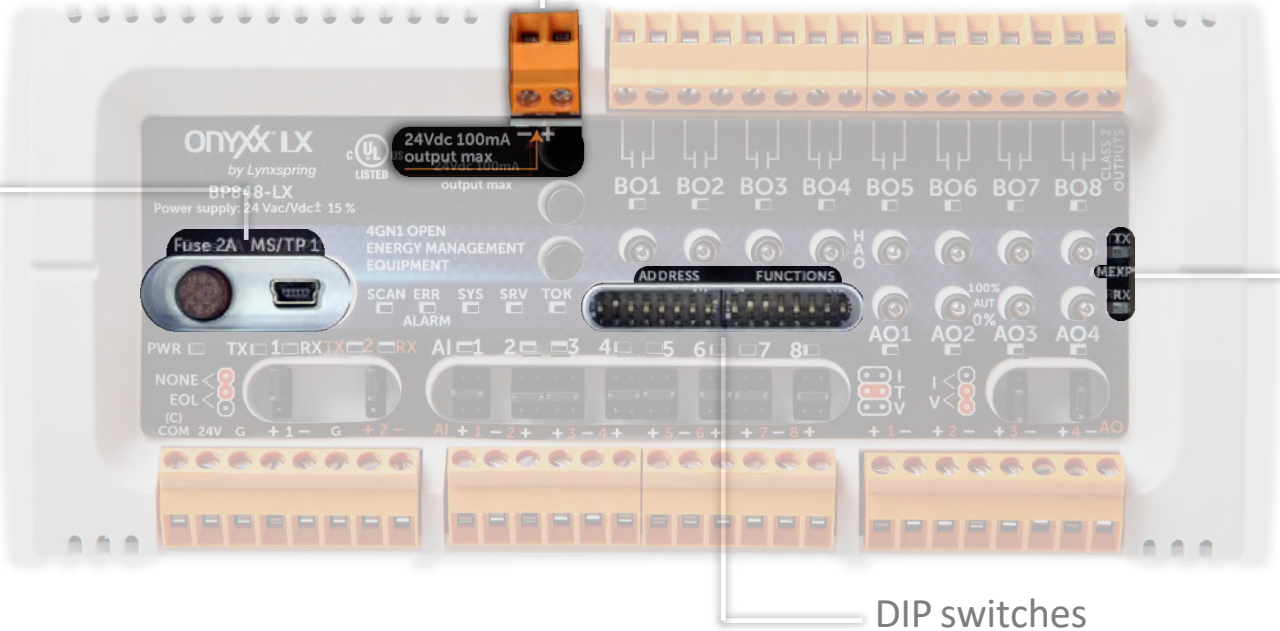
Installation

Wiring Instructions, MS/TP Network Access, and Addressing

24Vdc Output for 4-20mA Transmitters Only

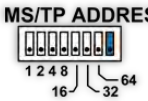
MiniUSB Connection for Networking & 2 A Fuse

MEXP Network Status LEDs



DIP switches

MS/TP ADDRESS



Address configures the MS/TP address
The Values of the On Switches adds up
1-2-4-8-16-32-64
Possible Address : 1 - 127

BAUD RATE

76800 BAUD SHOWN
Blue = Keep to off position

Functions configures the Baud Rate (BPS)
Switches Configuration : Off = 0, On = 1
Available baud rates :
010 - 9600 BPS, 110 - 19200 BPS, 001 - 38400 BPS, 011 - 76800 BPS

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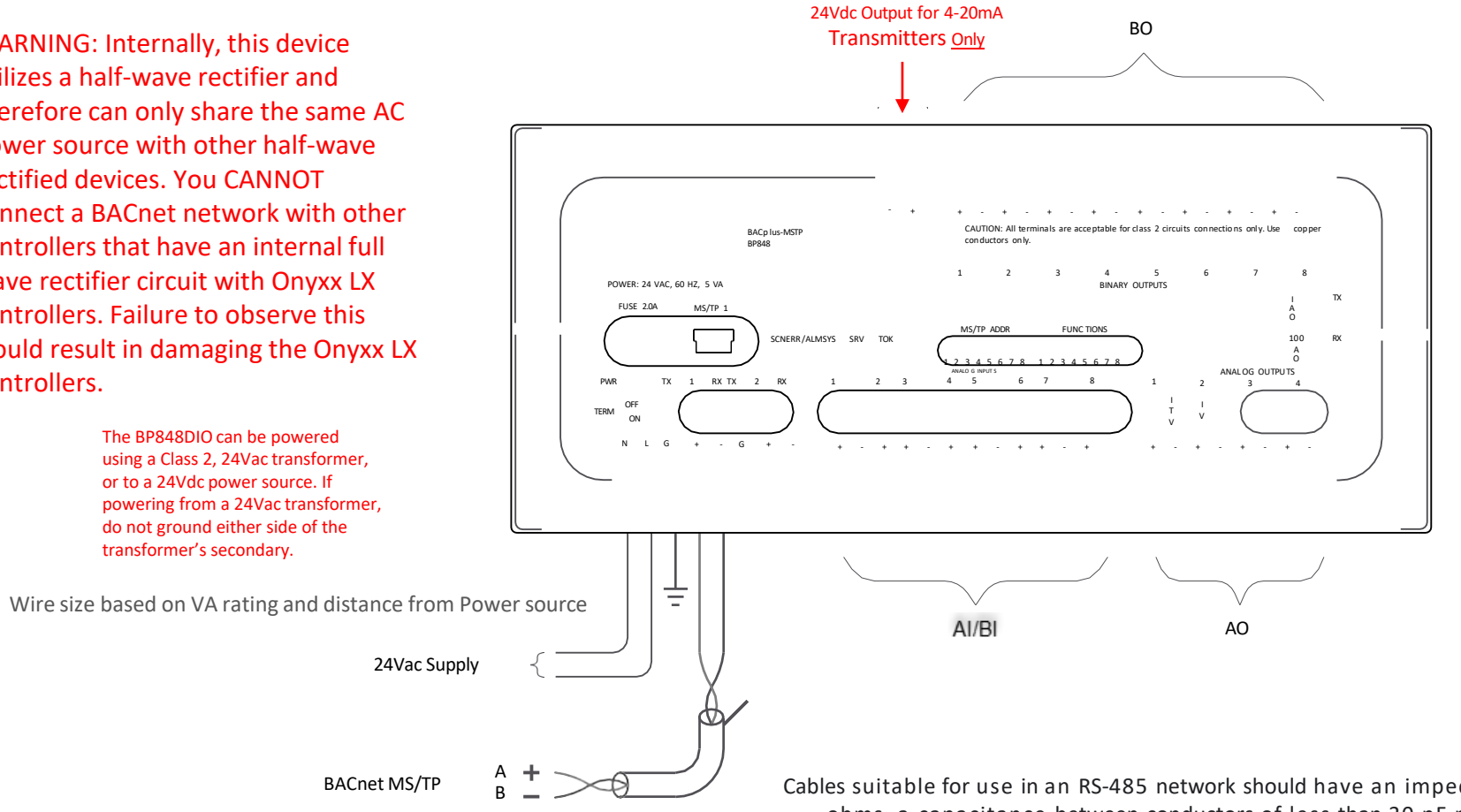
Installation

Wiring Instructions, MS/TP Network, and Power

WARNING: Internally, this device utilizes a half-wave rectifier and therefore can only share the same AC power source with other half-wave rectified devices. You CANNOT connect a BACnet network with other controllers that have an internal full wave rectifier circuit with Onyxx LX controllers. Failure to observe this would result in damaging the Onyxx LX controllers.

The BP848DIO can be powered using a Class 2, 24Vac transformer, or to a 24Vdc power source. If powering from a 24Vac transformer, do not ground either side of the transformer's secondary.



For maximum protection from electrostatic discharge or other forms of EMI connect each controller to earth ground using a #16 AWG and keep these wires as short as possible.

For details on grounding within control panels, NFPA 79 and UL508A provide the required details.

Proper grounding of a controller is important to ensure a high probability of surviving a nearby lightning strike as well as other possible electrical surges.

Cables suitable for use in an RS-485 network should have an impedance of between 100 and 130 ohms, a capacitance between conductors of less than 30 pF per foot (100 pF per meter), and capacitance between conductors and shield less than 60 pF per foot (200 pF per meter).

Cable shield connection (Refer to RS485 network guidelines for proper wiring)

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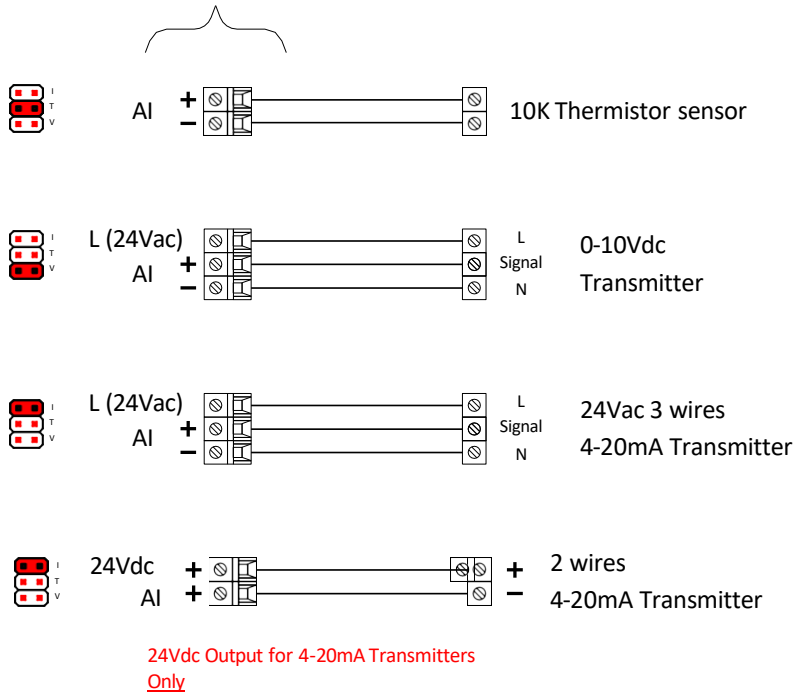
Installation

Wiring Instructions, Analog Input Wiring

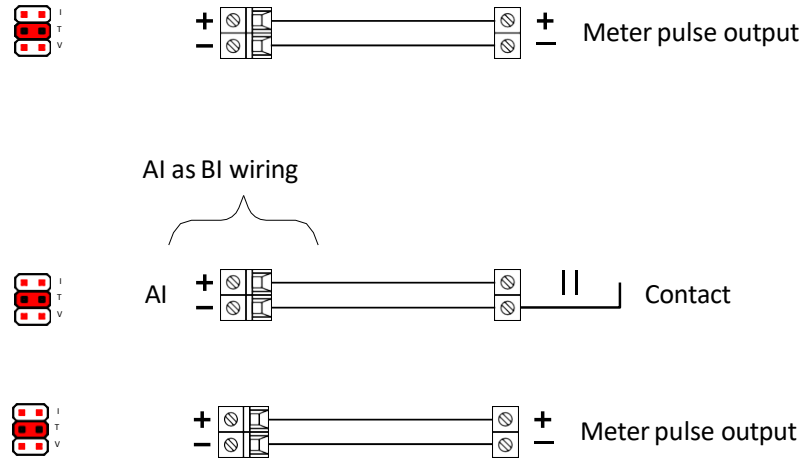
AI wiring

Supported Wire Size 28-16 AWG



24Vdc Output for 4-20mA Transmitters Only

Supported Wire Size 28-16 AWG



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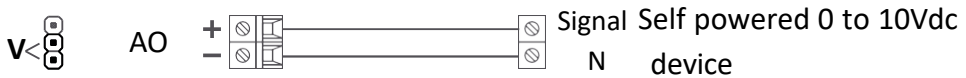
Installation

Wiring Instructions, Analog Output, and Binary Output Wiring

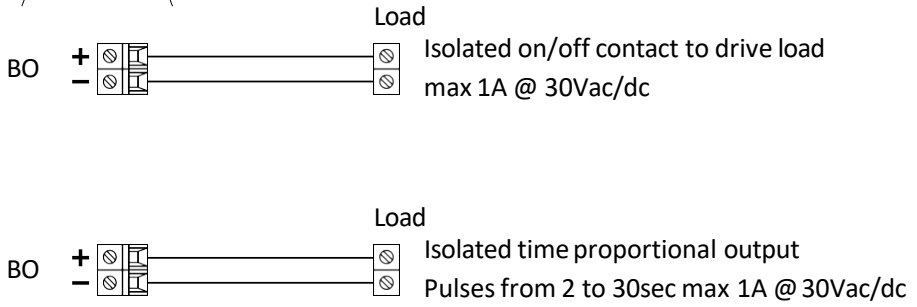
Supported Wire Size 28-16 AWG

AO wiring



BO wiring

Supported Wire Size 28-16 AWG



Note: The BO outputs are isolated electronic and not polarized contacts (equivalent to a mecanical relay); So, the +/- indications are irrelevant and can be connected any direction.

If using 24Vdc for Binary Outputs,
use an external 24Vdc power supply

***Lynxspring recommends using pilot relays in any application utilizing Binary outputs as switching loads. ***

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Sequence of Operation

Quick Set Up in Onyxx LX

Select Temperature units [BV-9], Default is Fahrenheit

Select Thermistor 10K Type [BV-10], Default is Type III Binary

Outputs Set Up in Onyxx LX

Select Polarity for B0-1 – BO8, Default is Normal

Select Schedule Control for B0-1 – BO8, Default is None

Analog Input Set Up

Choose your type of input and select the correct jumper to match. Refer to Wiring Instructions, Analog Input Wiring-

AI_1-AI_8 BACnet points are used to read DC Volts only- [“V” Voltage jumper setting]

BV_1 – BV_8 BACnet points are used to read for dry contact, on/off state. [BV_1 is linked with AI_1, etc] [“I” Current jumper setting]

AV_1 – AV_8 BACnet points are used to read Temperature. [AV_1 is linked with AI_1, etc] [“T” Temperature jumper setting]

BV_9 BACnet point is used to set Temperature units. [Default is F] BV_10

BACnet point is used to set Thermistor type. [Default is 10KIII]

AV_11 – AV_18 BACnet points are used to read percent values. [AV_11 is linked with AI_1, etc] Note 1 VDC = 10% for the scale [“V” Voltage jumper setting]

AV_21 – AV_28 BACnet points are used to read Current (mA). [AV_21 is linked with AI_1, etc] [“I” Current jumper setting]

Use the objects page in Onyxx LX to view the AIs and commission your input type.

If using a third-party device, use the BACnet Object list to bring in the necessary BACnet points.

Sequence of Operation

Binary Objects Set Up

BO_1 – B0_8 are equipped with an HAO [Hand / Auto / Off] switches

These BACnet points are equipped with schedules per output that are accessed through the objects tab in Onyxx LX to operate as stand-alone if needed. They are defaulted to Off/On.

MSV_1 – MSV_8 are linked to BO_1 – BO_8 and used to configure Off/On or schedule by double clicking on the respective row in the objects tab in Onyxx LX.

BV_11 – BV_18 are linked to BO_1 – BO_8 and used to configure normal (open) and reverse (closed) polarity for the outputs providing versatility in application. Default is normal (open).

Schedule_1 – Schedule_8 are linked to BO_1 – BO_8 and used to configure the onboard stand-alone schedule. To access the individual schedules, double-click on the respective row in the objects tab in Onyxx LX.

Use the objects page in Onyxx LX to view the BOs and commission your input type.

If using a third-party device, use the BACnet Object list to bring in the necessary BACnet points.

Sequence of Operation

Analog Outputs Set Up

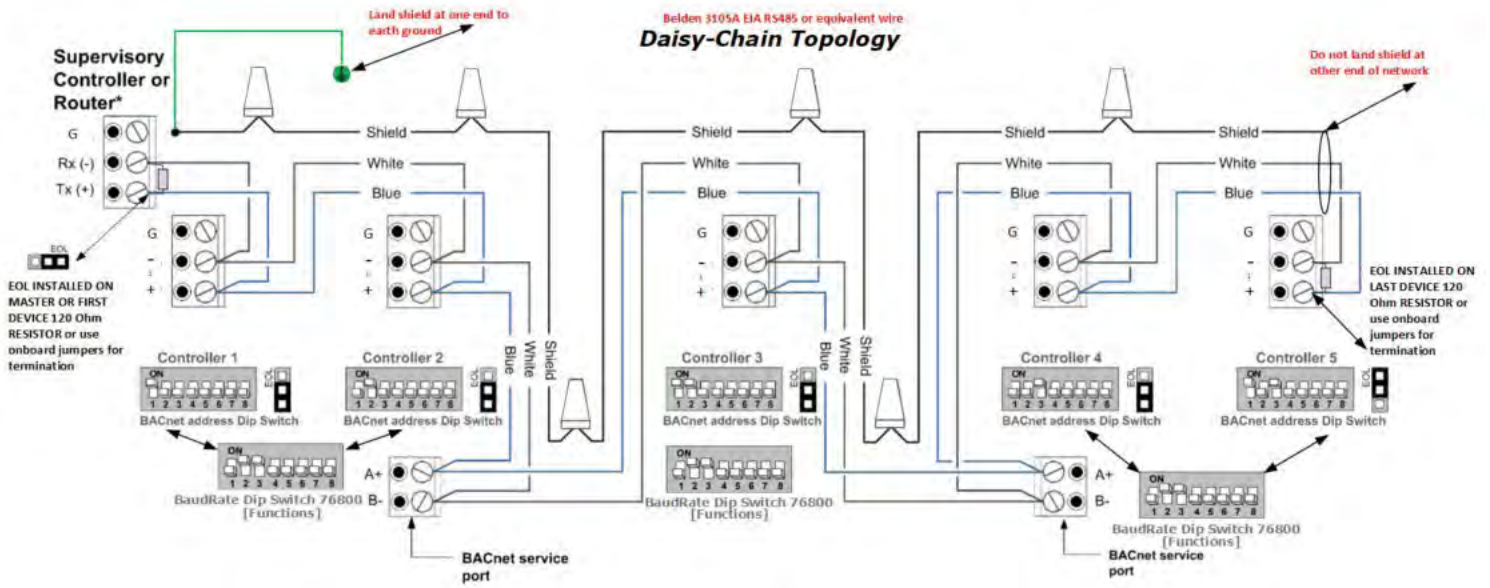
AO_1 –AO_4 0-10VDC, self powered.

Use the objects page in Onyxx LX to view the AOs and commission your input type.

If using a third-party device, use the BACnet Object list to bring in the necessary BACnet points.

RS-485 Network Guidelines

RS-485 Network Guidelines BP Controllers



Troubleshooting tips for 485 networks

1. Ensure that the communication wire is Belden 3105A or equivalent [twisted shielded pair].
2. Ensure your polarity is validated on both sides of your coms cable at each device + to + and – to -.
3. Ensure you have a 120 ohm resistor on both your beginning master device and your last device (or onboard jumpers).
4. Ensure your shield is grounded only at one side and the source is a true earth ground [et. Building steel/beam, dedicated ground].
5. Make sure you are individually addressed on each device.
6. Make sure your Baud Rate is the same on all devices.

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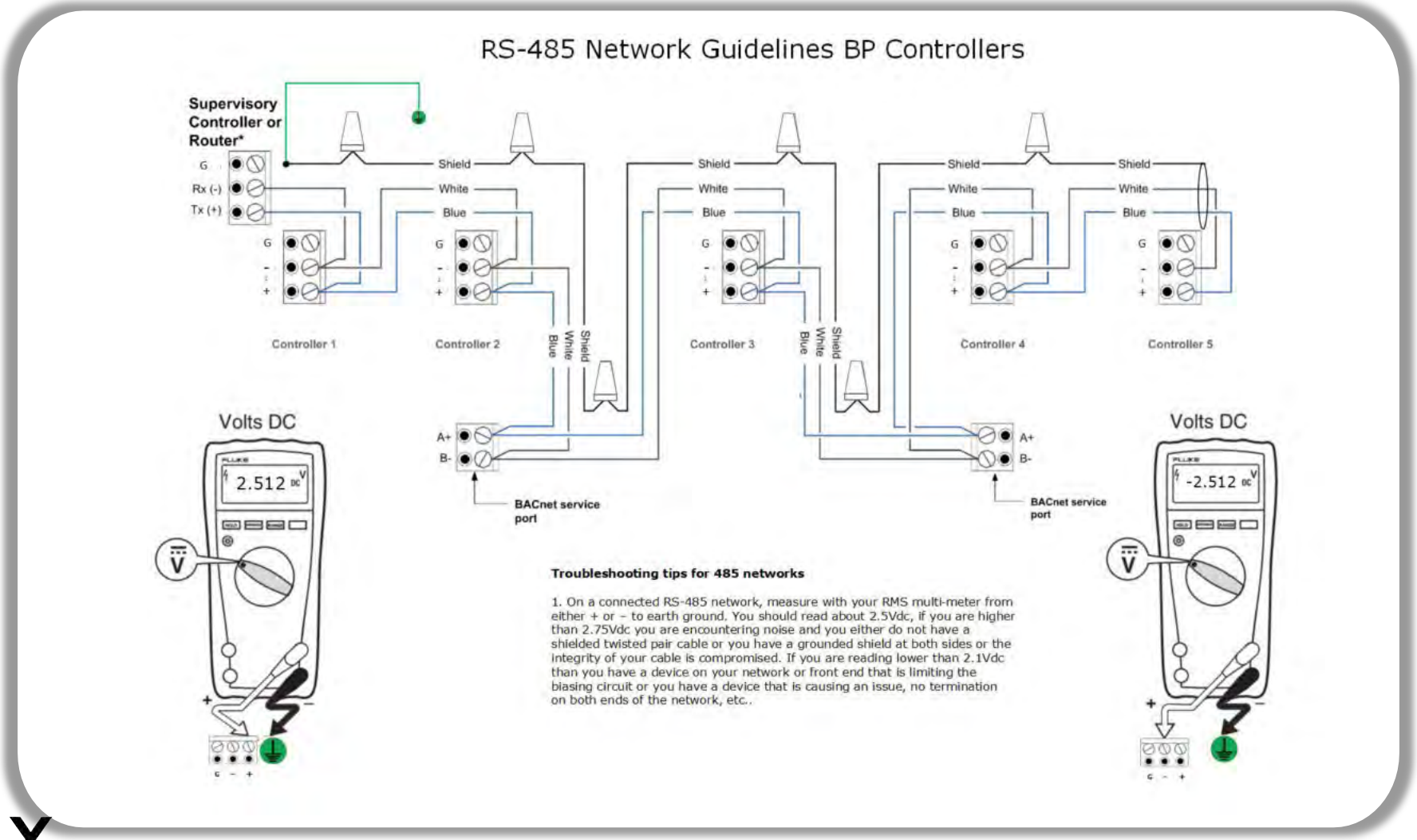
RS-485 Network Guidelines



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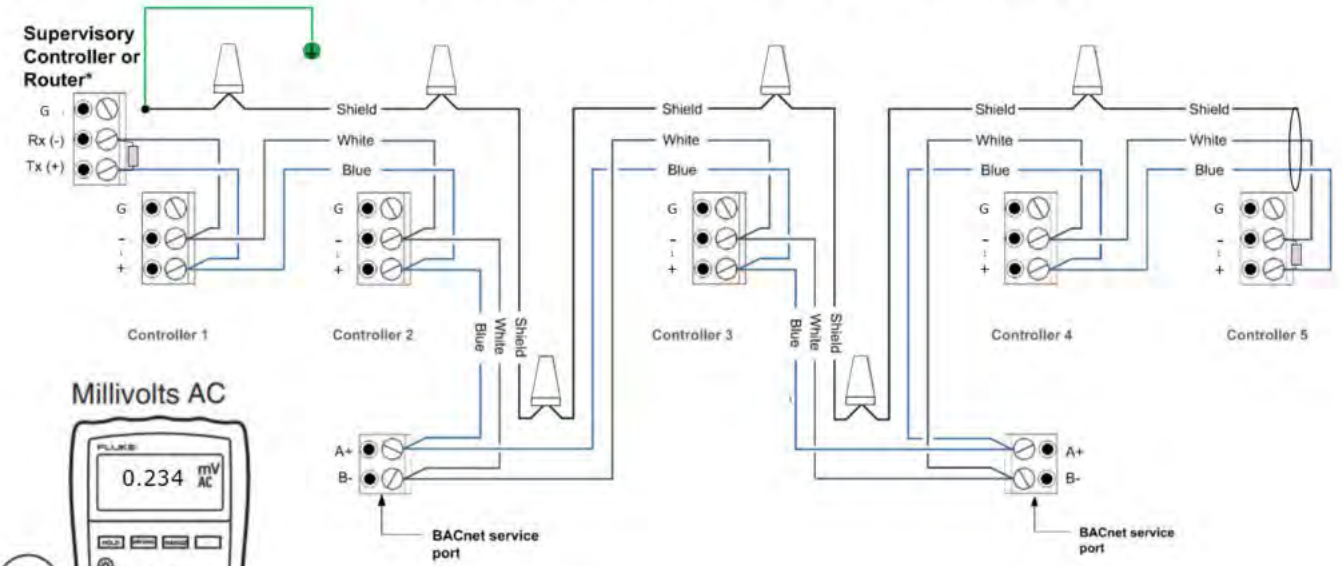
RS-485 Network Guidelines

RS-485 Network Guidelines BP Controllers



Troubleshooting tips for 485 networks

1. Measure with your multi-meter from + to – with your RS-485 network connected. You should read between 200mVac to 600mVac average. If you read greater than 700mVac average then you may have a device that is compromising your network or you do not have your shield landed in one location or your controller grounded.

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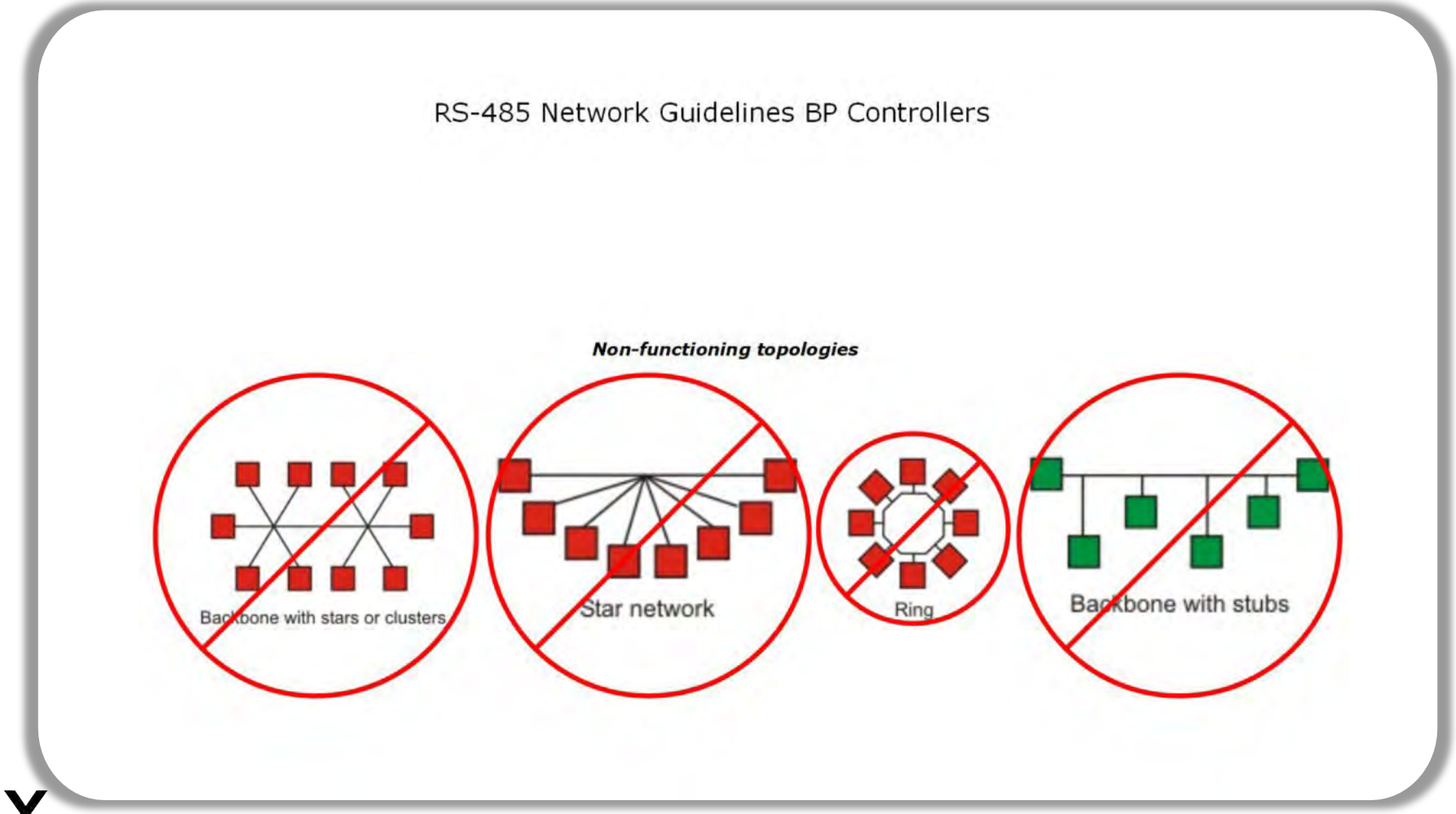
RS-485 Network Guidelines



Technical Specifications

Power supply:
- 24 VAC/VDC ± 15%; Class 2
- 2.0A Field replaceable fuse

Current consumption:
- 6 VA controller only

Communication protocols:
- BACnet MS/TP
- BTL listed: B-ASC, BACnet Application Specific Controller
- Baud 9600, 19200, 38400, 76800 Bps (76800 default)
- Dip switch addressing
- EOL resistor built-in, jumper
- Mini USB2 MS/TP network access (USB-485 cable adapter)

Hardware
- Microprocessor: STM32 (ARM CortexTM M3) 32 bits,
- CPU Speed: 180MHz
- Memory: 2MB non-volatile Flash
- (application program)
- RAM: 256 KB RAM
- Real-time clock (RTC): Built-in capacitor (one-week backup)

Inputs:

8 Universal Inputs (AI/BI)
- Thermistor 10KΩ (type 2 or 3)
- Dry contact, 500 ms minimum (On-Off)
- Voltage 0 - 10 VDC (Input impedance of 100 K Ω)
- Current 0 - 20 mA (internal resistance of 162 Ω)
- Resolution: 12 Bits (4096 segments)

Outputs:

8 Binary Outputs Mosfet SSR
- External [Isolated] Power
- 10 to 30VAC/VDC, 0.35A max+
- Built-in thermal overcurrent protection (automatic reset)
- Supports PWM (Pulse-width modulation)

4 Analog Outputs
- Voltage 0 - 10 VDC linear

Programming:
- Using Objects tab in Onyxx LX or third-party device

Mechanical:
- Dimensions: 88.3 mm x 191 mm x 42 mm 3,5” x 7,5” x 1,6”
- Stocking temperature: -30 °C to 50 °C / -22 °F to 122 °F
- Operating conditions: -25 °C to 45 °C / -13 °F to 113 °F
- 10% to 90% H.R. without condensation
- Weight: 315 g / 0.7 lb
- Mounting type: Quick mount on DIN rail or with a retractable screw clip system.
- Enclosure: White color, ABS material UL94VO

Warranty:
- 1 year

Certifications:
- UL 916 Energy Management Equipment
- BTL listed: B-ASC, BACnet Application Specific Controller

WARNING: Internally, this device utilizes a half-wave rectifier and therefore can only share the same AC power source with other half-wave rectified devices.

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