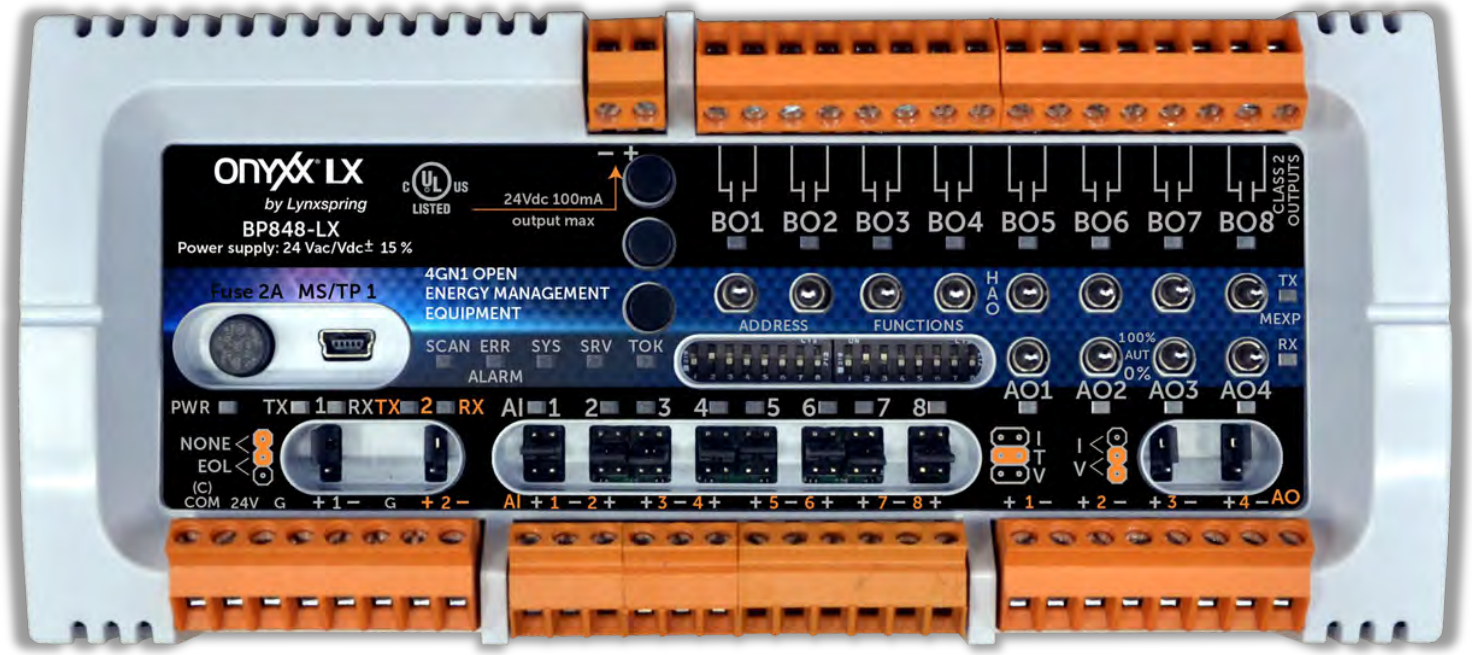
BP848-LX – Configurable IO MSTP Controller Installation and Wiring Guide

LYNXSPRING®

Smart Technology. Smart Equipment. Smart Solutions.

Smarter Buildings.



ONYXX® LX

BY LYNXSPRING

www.lynxspring.com

BP848 - Configurable RTU MSTP Controller
Disclaimer

Before proceeding to the installation of this controller or any Onyxx LX Automation device, please note the following:

This manual applies to *OnyxxLXUIversion4.0* and higher and using *firmwareversion2.238* 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 - Configurable RTU MSTP Controller

Contents

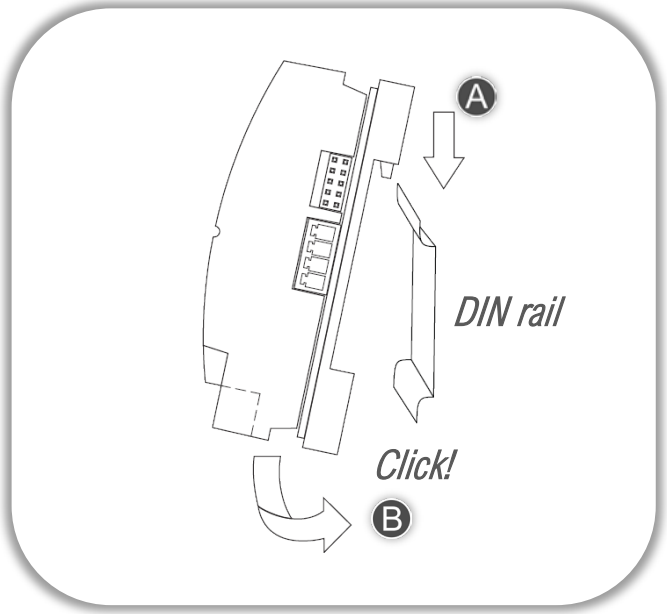
Disclaimer..... p. 2
Installation..... p. 4
- Mounting instructions ..... p. 4
- Product Label..... p. 5
- Terminal Blocks..... p. 6
- Installation, Wiring Instructions and Jumper Settings..... p. 7
- TZ Room Sensor Wiring..... p. 16

Sequence of Operation ..... p. 17-27
Sequence of Operation Details..... p. 27-35
Built-in Application Program Parameters..... p. 36
- Physical Inputs and Outputs..... p. 36
- Analog Values..... p. 37-41
- Binary Values..... p. 42
- Multi-State Values..... p. 43-59
- PID Loops..... p. 60
- TZxxx Room Sensors..... p. 61

RS-485 Network Guidelines ..... p. 62-66
Technical Specifications..... p. 67

BP848 - Configurable RTU MSTP Controller

Installation - Mount the BP848 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.

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.

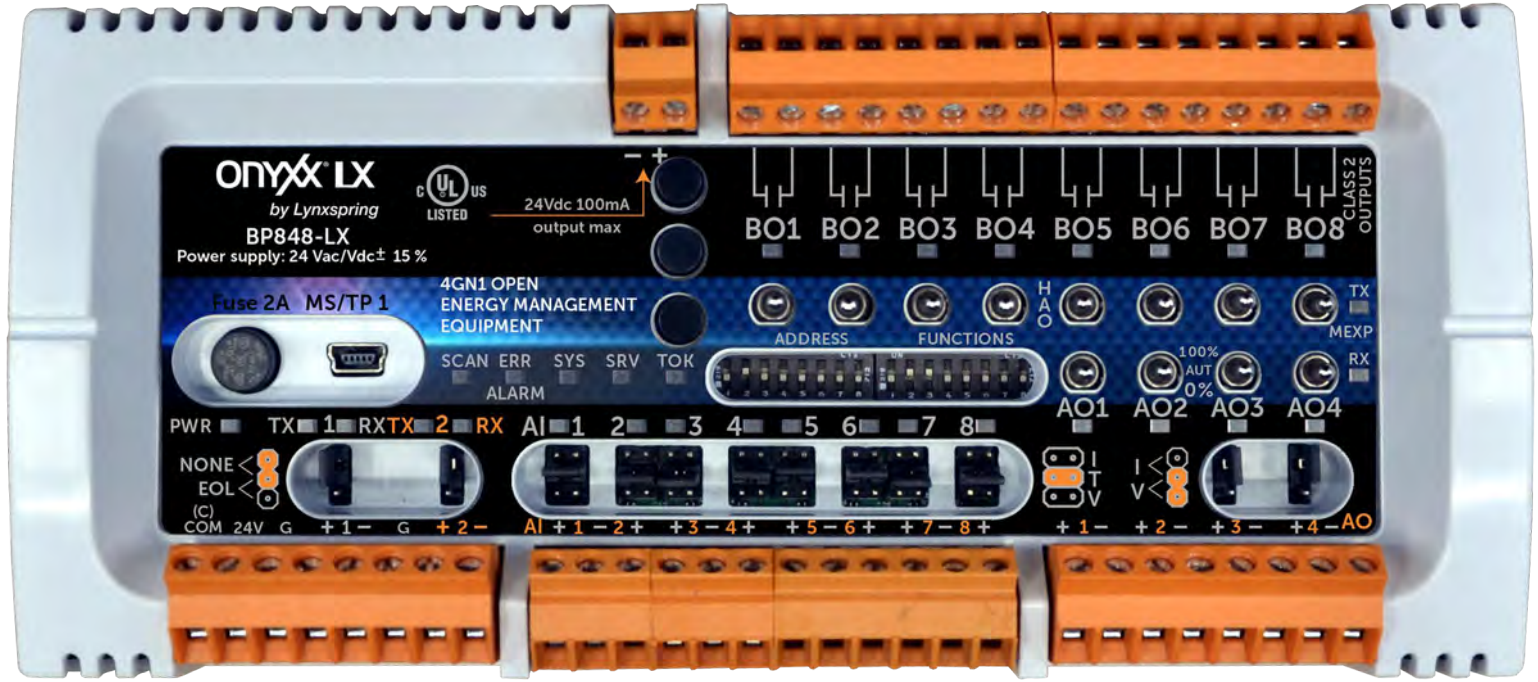
ONYXX® LX
BY LYNXSPRING

Interface
Product label

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

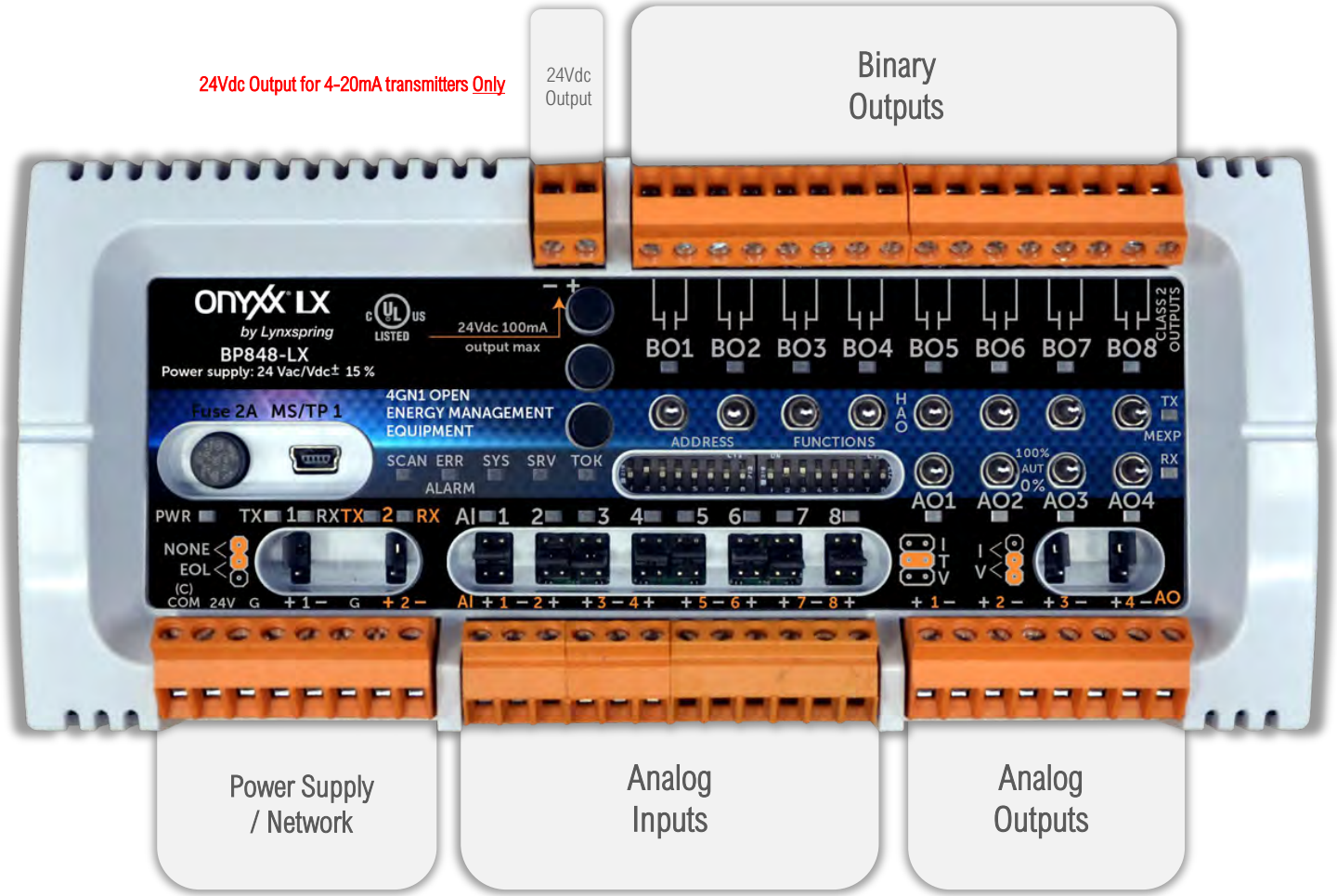
It allows powerful yet flexible solutions that can be tailored and sized according to any project needs.

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



ONYXX® LX
BY LYNXSPRING

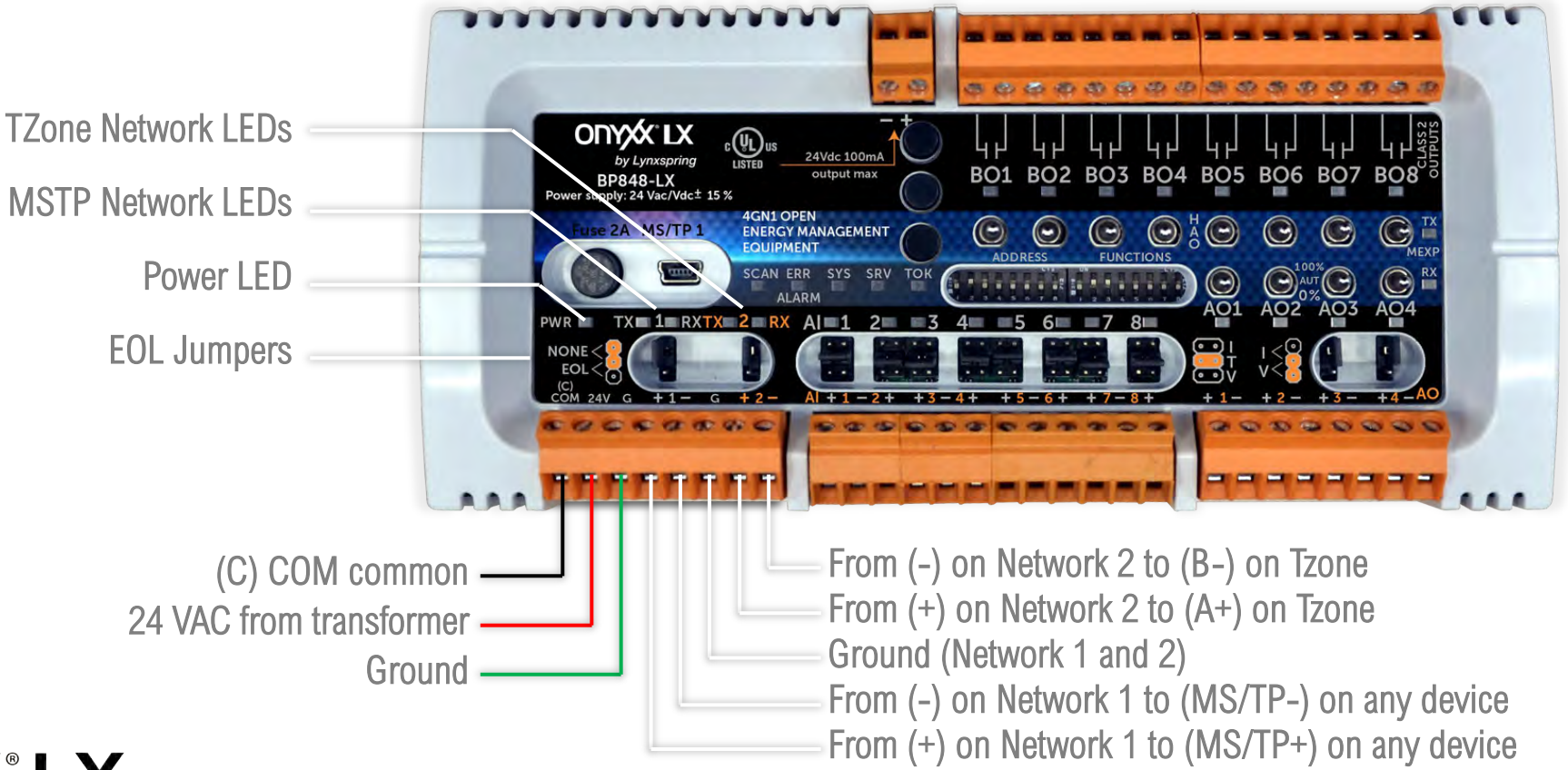
BP848 - Configurable RTU MSTP Controller
Terminal blocks



ONYXX® LX
BY LYNXSPRING

Installation

Wiring Instructions, Power and Network terminal block

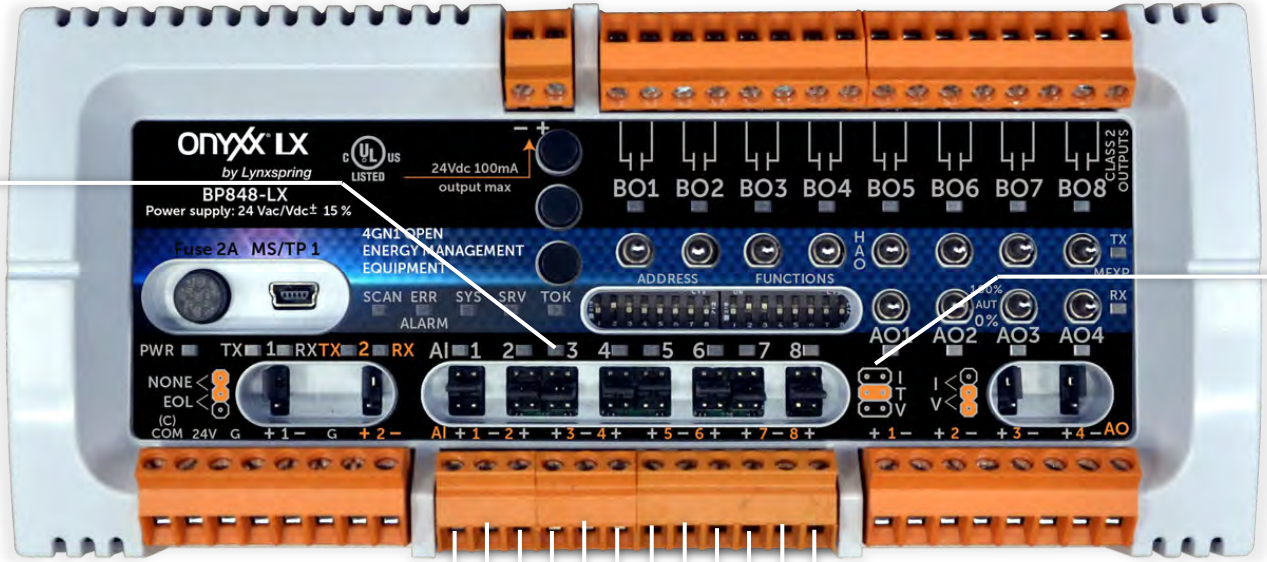


ONYXX® LX BY LYNXSPRING

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

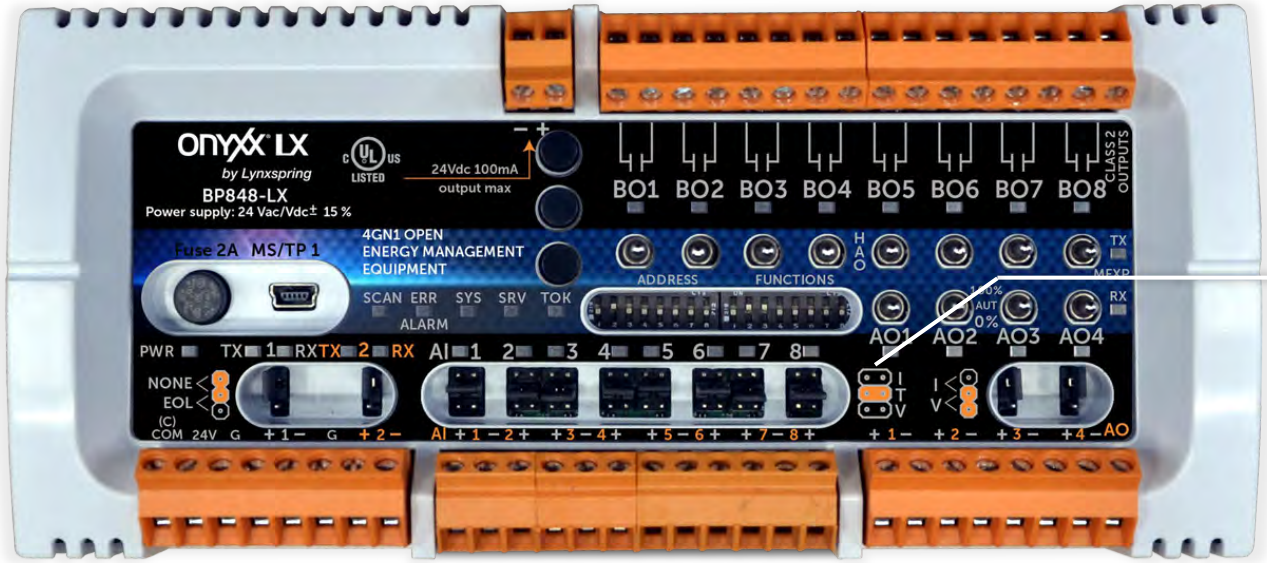
V : Voltage
0-10 VDC / 2-10 VDC

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

Installation

4-20mA / 0-10VDC Analog Inputs Application Note



Input type jumper :

I : Current Intensity

0..20 mA / 4..20 mA

V : Voltage

0-10 VDC / 2-10 VDC

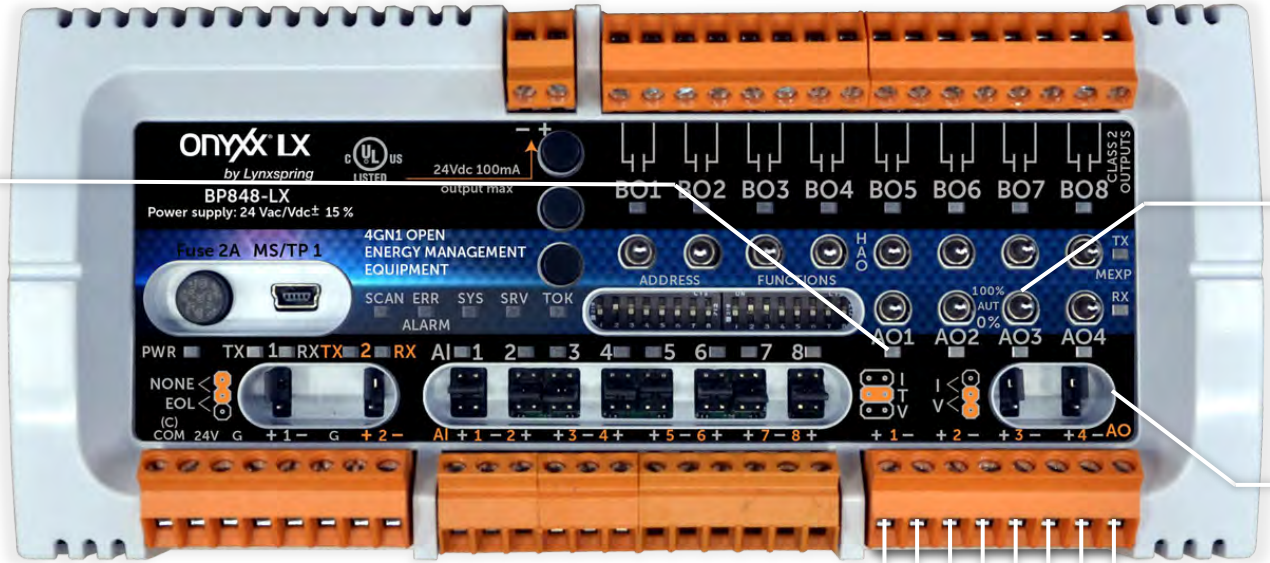
When using a 4-20mA input to the AI's, those are limited to below and must be configured in Onyxx LX UI in the following procedure: -RH Sensor Physical Location, choose an AI, set jumper to I, 2-10VDC = 4-20mA 0% -100%RH
-CO2 choose an AI, set jumper to I, 4-20mA = 400-2000 PPM
-Pressure Sensor Physical Location, choose an AI, set jumper to I, 2-10VDC = 4-20mA 0 -1 inH2O [example]
You cannot use 4-20mA on temp inputs in Onyxx LX UI the system is designed to read 10K type thermistors

ONYXX® LX
BY LYNXSPRING

Installation

Wiring Instructions, Analog Output terminal block

Analog Output
Status LEDs



Analog Output
3 position override switches

Up : 100%
Middle : Automatic
Down : 0%

Analog Output type jumper :

I : Current Intensity
0..20 mA / 4..20 mA

V : Voltage
0..10 Vdc / 2..10 Vdc

Please note that only AO3 & AO4 can be configured using the jumper.
AO1 & AO2 in VDC Only

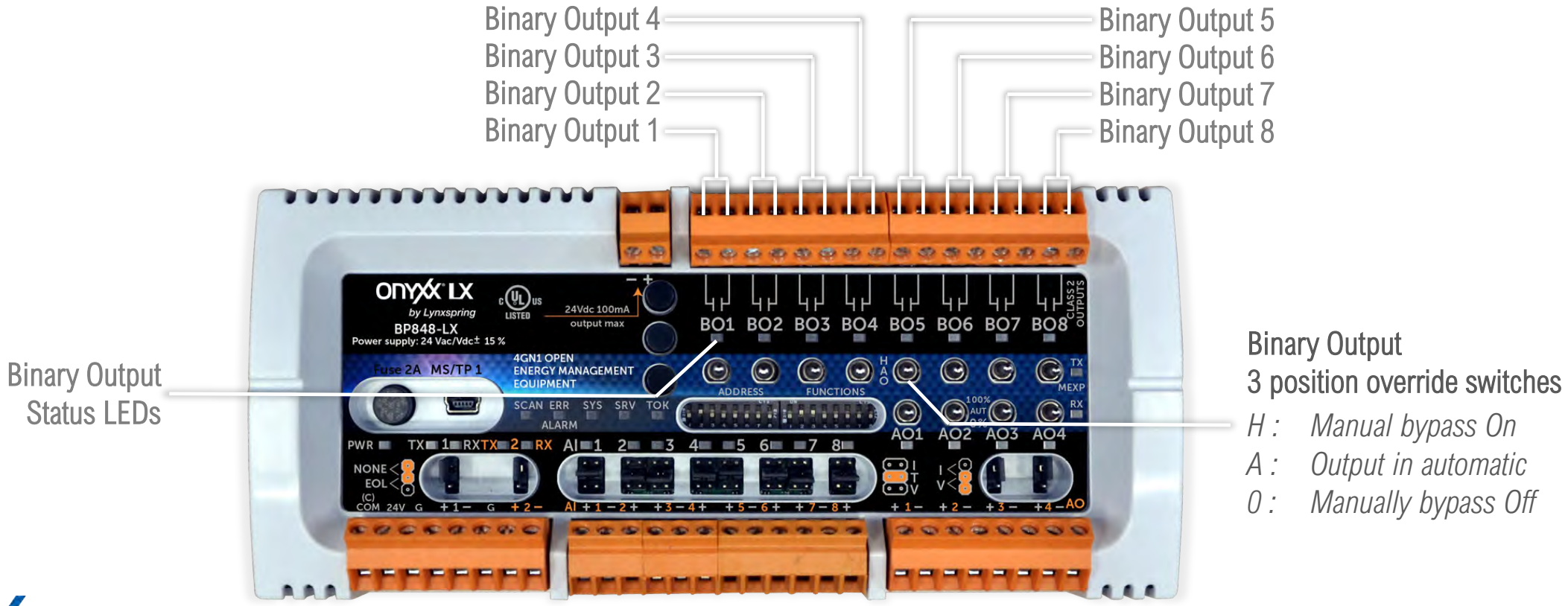
Analog Output 1 (+)
Analog Output 1 (-)
Analog Output 2 (+)
Analog Output 2 (-)
Analog Output 3 (+)
Analog Output 3 (-)
Analog Output 4 (+)
Analog Output 4 (-)

Application Note 4-20mA Outputs
On AO3 and AO4 for 4-20mA, you can use this for the following outputs: Set Jumper to I.
-Modulating Humidifier function by selecting 2-10VDC in your signal type 2-10VDC = 4-20mA 0-100% output
Modulating Heating/Cooling 2-10VDC = 4-20mA 0-100% output
Modulating Economizer 2-10VDC = 4-20mA 0-100% output

ONYXX® LX
BY LYNXSPRING

Installation

Wiring Instructions, Binary Output terminal block



ONYXX® LX
BY LYNXSPRING

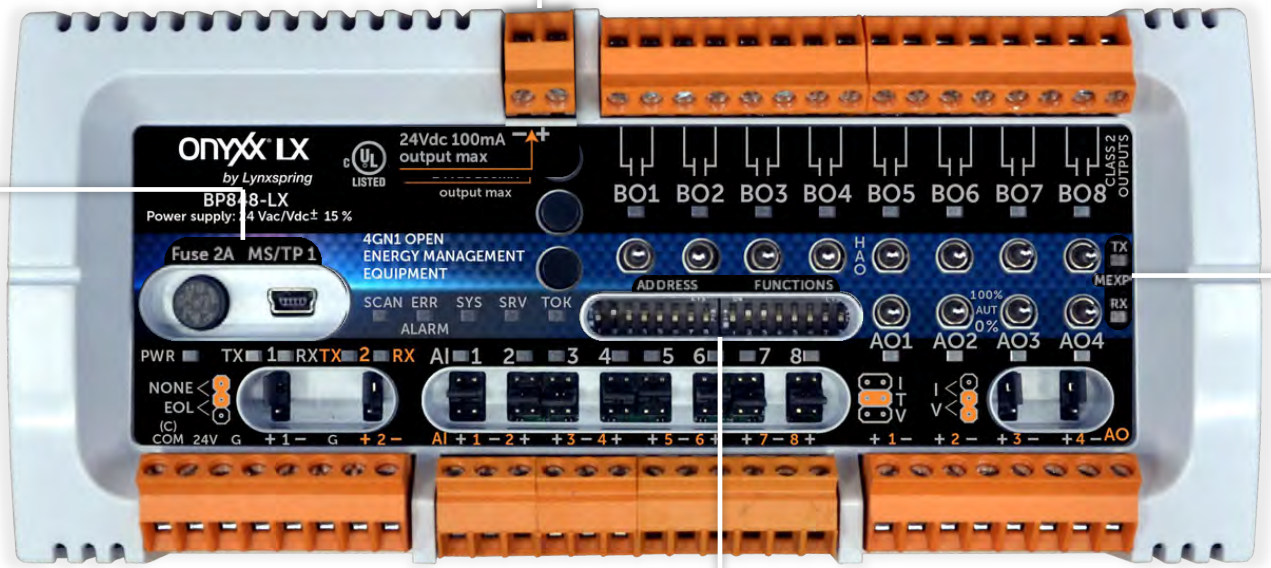
Installation

Wiring Instructions, MS/TP network Access and Addressing

24Vdc Output for 4-20mA transmitters Only

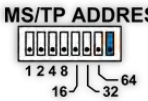
MiniUSB Connection for Networking & 2 A Fuse

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*

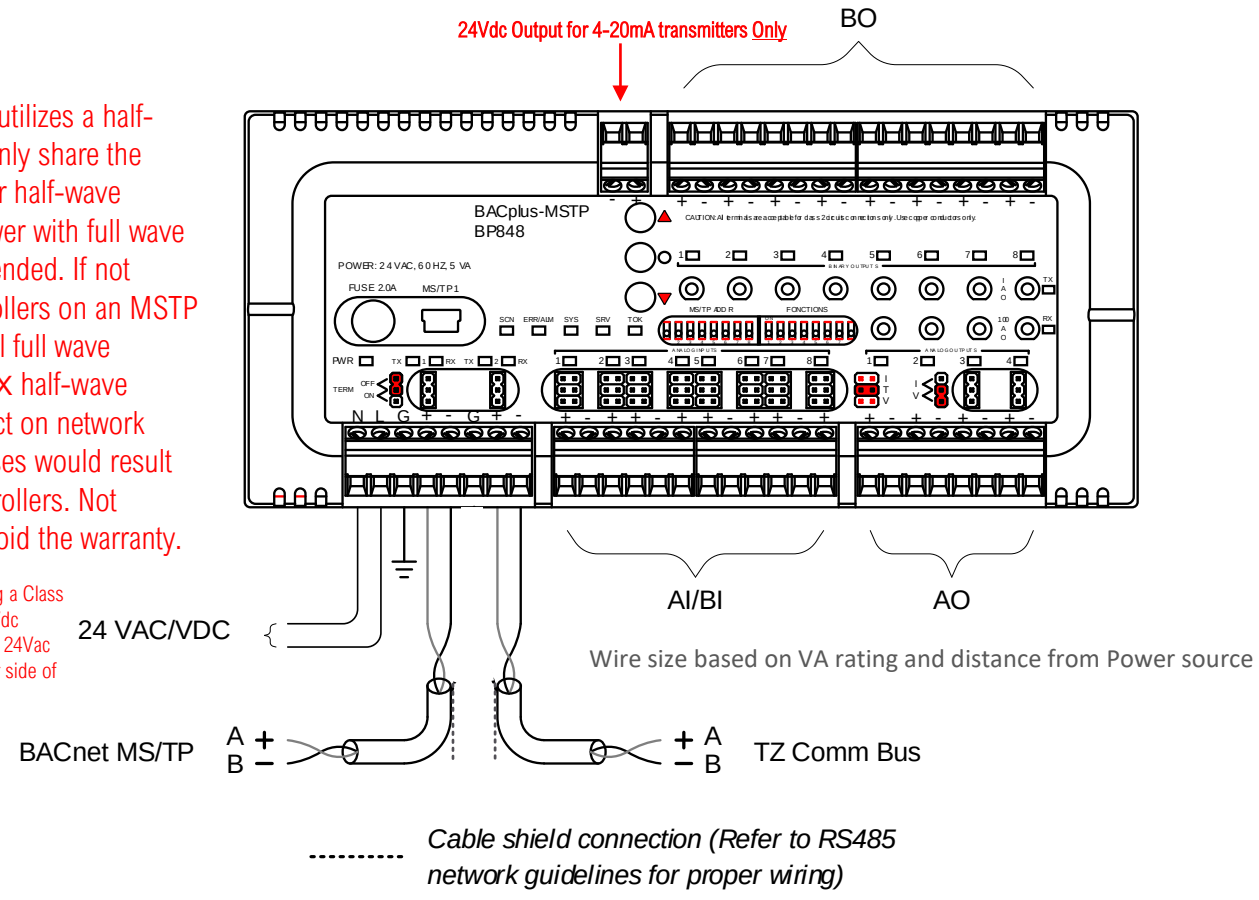
ONYXX® LX BY LYNXSPRING

Installation

Wiring Instructions, MS/TP network, TZ Comm Bus, 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. Sharing AC power with full wave rectified devices is NOT recommended. If not properly wired, connecting controllers on an MSTP BACnet network that have internal full wave rectifier controllers with Onyxx LX half-wave controllers can have adverse effect on network communications and in some cases would result in damaging the Onyxx LX Controllers. Not properly wiring the devices will void the warranty.

The BP848 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.



Wire size based on VA rating and distance from Power source

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

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 a capacitance between conductors and shield less than 60 pF per foot (200 pF per meter).

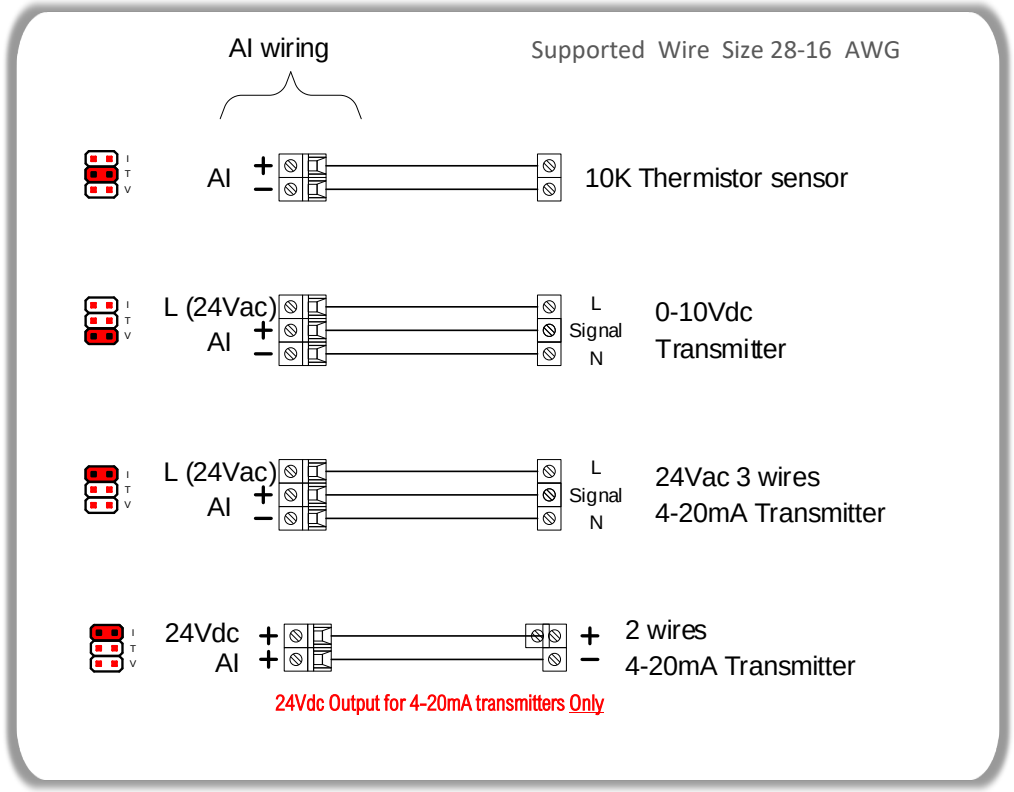
For maximum protection from electrostatic discharge or other forms of EMI connect each controller to earth ground using a #16 AWG and keep these wires as short as possible.

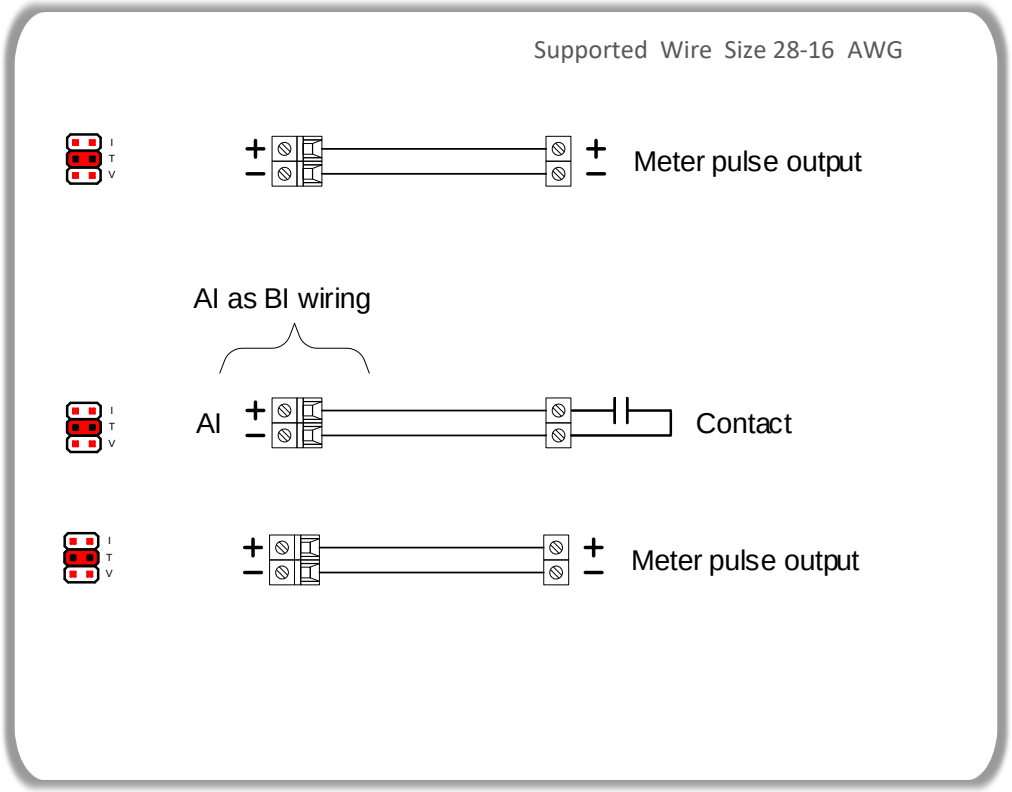
For details on grounding within control panels, NFPA 79 and UL508A provide the required details.

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.

Installation

Wiring Instructions, Analog Input Wiring



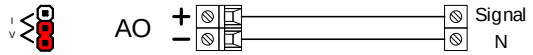


Installation

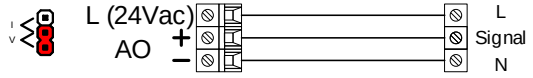
Wiring Instructions, Analog Output and Binary Output Wiring

AO wiring

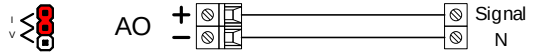
Supported Wire Size 28-16 AWG



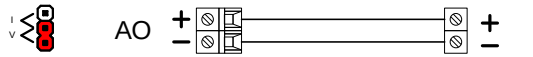
Self powered 0 to 10Vdc device



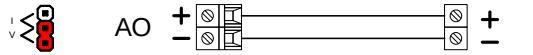
0 to 10Vdc device (4mA max)



4-20mA device



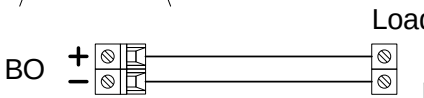
0 / 10Vdc on/off output (20mA max)



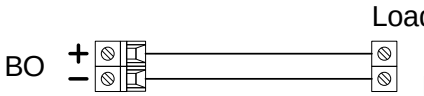
0 / 10Vdc time proportional pulse output (from 2 to 30sec @ 20mA max)

BO wiring

Supported Wire Size 28-16 AWG



Isolated on/off contact to drive load
max 1A @ 30Vac/dc



Isolated time proportional output
Pulses from 2 to 30sec max 1A @ 30Vac/dc

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.

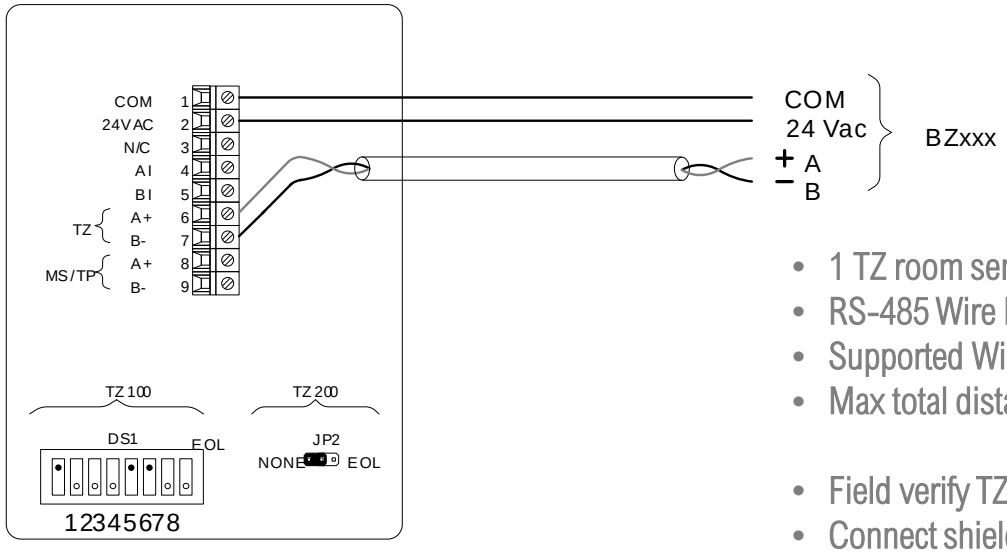
If Using 24Vdc for Binary outputs, use an external 24Vdc power supply

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

ONYXX® LX

BY LYNXSPRING

TZ Room Sensor Wiring



- 1 TZ room sensor allowed per BP848 controller
- RS-485 Wire Required for communications wiring
- Supported Wire Size 28-16 AWG for power wiring, recommend 18 AWG
- Max total distance of communication wire of 300 ft from controller to the TZ room sensor.

- Field verify TZone addressing and EOL jumpers
- Connect shield to ground, at only one extremity of the network
- MS/TP A+ and B+ are optional; they are directly connected to the USB connector below the TZxxx. The goal is to allow access to the MSTP network from the special USB to MSTP adapter.
- If there is a loss in communication to the TZ controller BV24 will indicate a fault, AV 9 will = - 40 °F and the fan, heating and cooling will be disabled, and the economizer damper will return to minimum position.

Sequence of Operation

Fan Control

The Fan can be configured for *On/Off, Modulating*, *On-Off+Modulating or 2 or 3 speed* control. When configured for modulating or On-Off +Modulating control, the controller can control a VFD device and speed control.

The Fan will turn On-Off based on the schedule or a command from the network. The Fan can be configured to operate in *Continuous* mode or *Intermittent* during occupied times. When set for Intermittent, the Fan will follow the *Minimum On Time* (1 min) to prevent short cycling of the Fan.

Modulating/On-Off+Modulating control

The modulating signal output will operate from minimum to maximum speed based upon demand. There are two points you can set for modulating fan speed control. A minimum speed AV21 [default is 30%] and a maximum speed AV28 [default is 100%].

Modulating/On-Off+Modulating control for VFD and Duct Static Pressure

The VFD signal will modulate to maintain static duct pressure compared to the *Pressure Setpoint* (1" WC). The VFD has a *Minimum Speed* (30%) setpoint to prevent motor overheating.

2 [Low-High] or 3 [Low, Medium and High] Speed Fan control

The 2 or 3 speed fan control has two separate functions. When selecting to use 2 speed, the fan will start in low speed and switch to high speed based on demand. A two-speed motor is required to use this function. You will utilize BO1 for High and BO2 for Low. When selecting 3 speed you can chose to manually set your fan speed to low, medium or high speed, or you can select auto which will switch speeds based upon demand. A three-speed motor is required to use this function. When utilizing 2 or 3 speed fan control, you must choose a fan sequence MSV97 and a Fan Mode MSV12.

Sequence of Operation

ONYXX® LX BY LYNXSPRING

Fan Status
When configured, the status is used internally to prove the Fan before starting any heating or cooling operations and if detected as faulted will lock out fan until physical input is cleared.

Outside Air Temperature (OAT)
When configured, the outside air is used to enable the economizer for free Cooling and used as a Heating and Cooling lockout.

If the OAT is greater than the *Heating Authorization* setpoint (65°F/18°C), Heating will not be enabled.
If the OAT is greater than the *Cooling Authorization* setpoint (53°F/12°C), Cooling will be enabled.

Supply Sensor Freeze Protection
If the supply air sensor has been configured, the Fan will shut down if the supply air falls below the *Freeze Setpoint* (37°F) for more than 30 seconds. Not configurable, requires supply air sensor. Supply Air temperature must read over 39 °F for three minutes to re-enable fan.

Freeze Stat Input
If the Freeze Stat input has been configured, a physical freeze stat latching device [normally open] is installed, and the freeze stat input reads active [contact closed on freezing condition], a message on live view will display BV7 [Active] and the unit will not function until the latching device is reset and either a power cycle or writing Off to MSV11 and then back to the mode function.

Anti-Ice input
If the anti-ice input has been configured, and ice is detected on the coil from a physical input and reads Ice_detected, then cooling is NOT allowed, and cooling demand will be forced to zero 0% until the anti-ice input has been cleared and reads normal.

Drain Pan Overflow input/Condensate avoidance
If the drain pan overflow input has been configured, and the drain pan input reads *overflow*, then cooling is NOT allowed, and cooling demand will be forced to zero 0% and will not interrupt fan control until the drain pain overflow has been cleared and reads normal.

Sequence of Operation

Room Temperature Setpoint Control

The controller can be configured to use a single TZone Room sensor for setpoint control.

An ACI [A/AN-R2SO-RJ6-16-C5] wired sensor slider (0-5K = 65°F -85°F) with push-button override can be used by selecting AI-1 for Room Temp [MSV-17] and AI-2 for Room Temp Setpoint [MSV-18] in Onyxx LX UI setup.

A Trane Wired Sensor [BAYSENS074A] 1K room Dial setpoint (50°F -85°F) with push-button override / cancel and can be used by selecting AI-1(Trane) for Room Temp [MSV-2] and AI-2 (Trane) for Room Temp Setpoint [MSV-3] in Onyxx LX UI setup. This is to be used with a Trane Tracer SC system writing Occupancy [BV-5] at present value. Timed Override Status can be read from [MSV-72] for Trane sequence of operation.

The controller can be configured to use MSV 3 set to virtual for setpoint control to write to AV 15 RoomTSP.

Occupied Cooling control with Room Sensor

During occupied mode and a call for Cooling, the system will cycle the configured outputs to maintain the occupied *Cooling Setpoint* (74°F).

Cooling demand needs to be 15% to start. Cooling will disable lower than 5% demand. Valve modulation will be from 0 to 100%.So, the valve will start at 15% demand and will modulate until 100%. Cooling valve will close until 5% then switch to 0%.

Cooling outputs can be configured for staged control (up to 4 stages), modulating (up to 2 outputs), or 1 stage + modulating. As the room temperature drops below the cooling setpoint, outputs are cycled on and off to maintain the Cooling setpoint.

Occupied Heating mode with Room Sensor

During occupied mode and a call for Heating, the system will cycle the configured outputs to maintain the occupied Heating Setpoint (72°F). As the room temperature drops below the heating setpoint, outputs are cycled on and off to maintain the Heating setpoint.

Heating demand needs to be 15% to start. Heating will disable lower than 5% demand. Valve modulation will be from 0 to 100%. So,the valve will start at 15% demand and will modulate until 100%. Heating valve will close until 5% then switch to 0%.

When the Downstream T° sensor is configured, the outputs will cycle to maintain a discharge air setpoint of the *High Limit Heating* (default 122°F) setpoint until the space temperature is satisfied.

Sequence of Operation

Unoccupied Cooling control with Room Sensor
During unoccupied mode and a call for Cooling, the system will cycle the configured outputs to maintain the *Unoccupied Cooling Setpoint* (80°F).

Unoccupied Heating mode with Room Sensor
During unoccupied mode and a call for Heating, the system will cycle the configured outputs to maintain the *Unoccupied Heating Setpoint* (65°F).

Standby Cooling control with Room Sensor
When a motion sensor is configured on an AI or a TZ200 room sensor is used with a PIR sensor, and motion is not sensed in the space for 60 min (cfg) Cooling will be maintaining the Cooling Setpoint plus the standby cooling offset.

Standby Heating control with Room Sensor
When a motion sensor is configured on an AI or a TZ200 room sensor is used with a PIR sensor, and motion is not sensed in the space for 60 min (cfg) Heating will be maintaining the Heating Setpoint minus the standby heating offset.

Sequence of Operation

Constant Volume Control

This mode is used with BZ122 and BZ424 VAV controllers. The control supports voting or demand for Cooling and Heating as required from the VAV controllers.

Fan Mode

Operates as described in the Fan Control.

With **Onyxx LX UI** the controller can be configured to use the calculated Heating and cooling demand from each BZ122 and BZ424 controller assigned to the BP848 controller. When using this mode, configure the *Control T°* Location to Address List. Next, in the *MS/TP Address List (2)* option, choose the VAV controllers by the controllers' MS/TP address to report their cooling and heating demands to the controller. The unit will control its Heating and Cooling based on demand.

Sequence of Operation

ONYXX® LX BY LYNXSPRING

Demand Control

In this mode, the unit will control the heating outputs and cooling outputs based on the Cooling and heating demand from the VAV controllers. The unit can control based on the Minimum, Average, or Maximum demand call for heat or Cooling. To set the unit's control on demand, set the *HtgDemandType* and *ClgDemandType* to the appropriate setting.
Example –

- Demand Minimum - Heating or Cooling works with the smallest demand
- Demand Average - Heating or Cooling works with the average demand
- Demand Maximum - Heating or Cooling works with the biggest demand

The controller will monitor the Heating and cooling demand from the VAV controllers as stated above.

If the cooling demand is greater than 15% for more than 3 min, the Fan is on, fan status is true, and the cooling demand is greater than the heating demand, the cooling mode will be energized.
Cooling outputs will be staged on/off or modulate to maintain the *Minimum Supply Setpoint* (55°F/13°C) at 100% demand call. When the demand call is 0%, the Cooling will be staged on/off or modulated to maintain the *Neutral Supply Setpoint* (68°F/20°C).

Cooling demand needs to be 15% to start. Cooling will disable lower than 5% demand. Valve modulation will be from 0 to 100%. So, the valve will start at 15% demand and will modulate until 100%. Cooling valve will close until 5% than switch to 0%.

Note: Neutral setpoint is designed for colder climates to supply air tempering for minimum outside air.

If the heating demand is greater than 15% for more than 3 min, the Fan is on, fan status is true, and the heating demand is greater than the cooling demand, the heating mode will be energized.
Heating outputs will be staged on/off or modulate to maintain the *Maximum Supply Setpoint* (104°F/40°C) at 100% demand call. When the demand call is 0%, the heat will be staged on/off or modulated to maintain the *Neutral Supply Setpoint* (68°F/20°C).

Heating demand needs to be 15% to start. Heating will disable lower than 5% demand. Valve modulation will be from 0 to 100%. So, the valve will start at 15% demand and will modulate until 100%. Heating valve will close until 5% then switch to 0%.

Note: Neutral setpoint is designed for colder climates to supply air tempering for minimum outside air.

Sequence of Operation

Heat Pump Control

In this mode, the unit will control based on the sequence of operation described in the *Room Temp Control* and the *Constant Volume Control*.

The compressor will be energized whenever there is a call for heating or cooling. The Reversing Valve can be configured to energize on a cooling (O) call or a call for heating (B).
Note: This is based on the equipment manufacture so ensure this is set correctly to prevent damage to the equipment.

If the room temp is three or more degrees below the heating setpoint, the *AUX Heat* will be enabled.

Outside Air Lockouts (OAT)

If configured, the compressors can be disabled if the OAT falls below the compressor lockout setpoint (default 40°F).
If configured, the Auxiliary Heat can be disabled if the OAT rises above the Aux. Heating Lockout (default 140°F)

Sequence of Operation

Static Pressure Control

Static pressure can be controlled by either modulating a Bypass damper or by controlling a VFD.

Modulating/On-Off+Modulating control

The VFD signal will modulate to maintain duct static pressure compared to the Pressure Setpoint (1" WC). The VFD has a *Minimum Speed* (20%) setpoint to prevent motor overheating.

Bypass Damper control

The Bypass damper will be modulated to maintain the duct static pressure compared to the Pressure Setpoint (1" WC).

Economizer

The controller can be configured with the economizer option to take advantage of free cooling. The two *Control Types* of that can be configured are Off-Auto or Modulating control.

Dry Bulb

The economizer is enabled to utilize free cooling when there is a call for cooling and the outside air temperature is less than the OAT Econo Authorization setpoint.
When the control type is set to Off-Auto, and economizer is enabled, the output will energize the manufacturers equipment economizer control.
When the control type is set for Modulating, the controller will modulate the outside air damper from minimum to 100% to maintain the *Minimum Supply Setpoint* (55°F/13°C) at 100% demand call. When the demand call is 0%, the economizer will be set Off or Modulated to maintain the *Neutral Supply Setpoint* (68°F/20°C). This sequence requires an Outdoor Air Sensor only and setting the OAT Econo Authorization setpoint at a value higher than the OAT [ex. OAT Econo Authorization setpoint = 70 °F and OAT = 62 then Economizer will operate] Setting the Economizer schedule, Econo control type and output location.

Enthalpy

If the calculated enthalpy is LESS than the enthalpy setpoint, the economizer will run in free cooling mode when it receives a call for cooling and our sequence allows compressor operation during economizer mode which can be a way to save energy when we cool the outdoor air instead of the return air. This sequence requires an Outdoor Air sensor, a Supply Air sensor, a Mixed Air sensor and a Humidity sensor location in Econo Config and Control Sensor physical location in Hum and Dehumid Config. The OAT Econo Authorization setpoint must be a value higher than the OAT [ex. OAT Econo Authorization setpoint = 70 °F and OAT = 62 then Economizer will operate] Setting the Economizer schedule, Econo control type and output location to run the Enthalpy Economizer sequence.

Sequence of Operation

Power Exhaust

The power exhaust works with the Economizer mode and can control either by Off-On, Modulating, or Off-On+Modulating control.

Modulating/On-Off+Modulating control

When the *Control Type* is set to Modulating/Off-On+Modulating, the fan will be enabled when the economizer damper is equal to the *Economizer Position (On)* setpoint (cfig) and be disabled when the damper is equal to the *Economizer Position (Off)* setpoint (cfg).

The speed of the fan will modulate based on the economizer damper position. The fan speed will be set at the *Min Speed (AO)* setpoint when the economizer is at the *Economizer Position (On)* setpoint.

On-Off

When the *Control Type* is set to Off-On, the fan will be enabled when the economizer damper is equal to the *Economizer Position (On)* setpoint (cfig) and be disabled when the damper is equal to the *Economizer Position (Off)* setpoint (cfg).

Fan Status

The fan status can be configured for status only.

Sequence of Operation

Humidifier

The humidifier mode is enabled to control an external humidifier when the space humidity is low. The Humidifier outputs can be configured for staged control (up to 2 stages), modulating, or 1 stage + modulating.

When the Humidity in the space is less than *the Control RH Setpoint*, and the Outside air is less than the *Outdoor RH Setpoint*, the outputs will be staged on/off or modulate to maintain the *Control RH Setpoint*.

When a *High Limit RH* sensor is configured, typically in the supply duct, the humidifier outputs will be limited and staged on/off or modulate to maintain the *High Limit RH Setpoint*. This will prevent saturating the duct with too much moisture.

Demand Control Ventilation Application and Sequence (as set per AV 31, MSV-20 & 21)

If the current CO2 measured reading from the MSV-20 selected zone sensor and/or the selection from MSV-21 exceeds the CO2 setpoint [AV31], the outdoor air damper will open to the maximum position [AV-68] and the fan will increase to 100% if using a Modulating Fan or On if Fan is On/Off type.

If the measured reading from the MSV-20 selected zone sensor and/or the selection from MSV-21 reaches within 100ppm greater than the CO2 setpoint [AV31], the fan and damper will modulate toward normal operation in the BP848 controller. Once the measured reading from the MSV-20 selected zone sensor and/or the selection from MSV-21 is less than the CO2 setpoint [AV31], the BP848 controller returns to normal operation.

CO2 can be configured using a TZ200 series controller, an analog input 0-10vdc [0-2000ppm fixed scale], or an external BACnet point.

Sequence of Operation Details

Dehumidification

Sequence of operation: Choosing a BO MSV 56

When *Dehumidification* is enabled, if the humidity sensor rises above *the Dehumidification Control Setpoint*, *the Dehumidification Output* will enable until the humidity sensor falls below *the Dehumidification Control Setpoint*. ***Dehumidification*** is independent of temperature control. This sequence is for external dehumidification control.

Sequence of operation: Choosing Reheat MSV 56

When *Dehumidification* is enabled, if the humidity sensor rises above *the Dehumidification Control Setpoint*, *the Dehumidification Output* will enable until the humidity sensor falls below *the Dehumidification Control Setpoint*. ***Dehumidification*** is independent of temperature control. A supply air sensor and a humidity input is required. This sequence is for internal dehumidification control.

When configured with modulating heating or cooling, the chilled water valves would open to 100% (adj) providing dehumidification and the hot water valves would modulate to maintain the SAT setpoint preventing overcooling.

On a call for dehumidification, all compressors are turned on. The first stage heat gas, reheat valve or electric coil is modulated to maintain a supply temp “SupSPcalc” between 55° “SupSPminClg” and 68°F “SupSPneutral”.

The “SupSPcalc” is calculated from cooling demand “ZClgDemand” 0 to 45%. ZClgDemand at 0% will maintain 68°F in the supply. Progressively ZClgDemand at 45% will maintain 55°F in the supply.

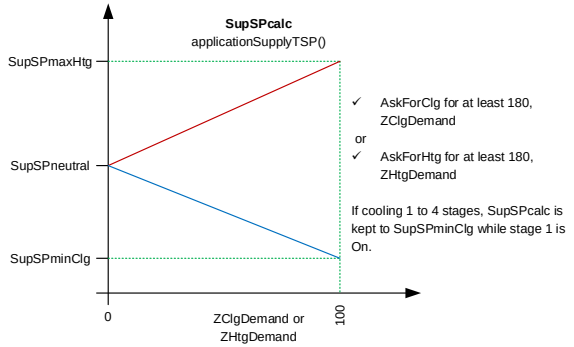
When ZClgDemand reach over 45% the unit reverts to normal cooling mode and reheat is de-energized.
If ZClgDemand lower than 30% and there is still a call for dehumidification all compressors are turned back on (the minimum on and off times and stages delays are still active during compressor operation).

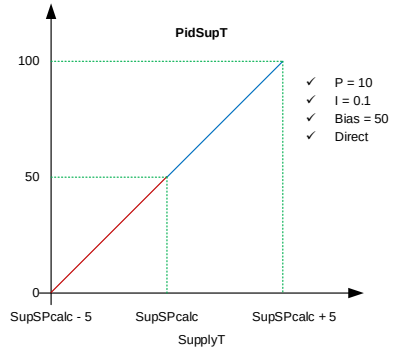
When the humidity control setpoint is satisfied, reheat and compressors resume normal functions.
During the Dehumidification cycle, Economizers are disabled until the dehumidification cycle is terminated.
During the Dehumidification cycle, if modulating fan or multiple speed is selected [MSV23], then fan will be set to maximum/high until dehumidification cycle is terminated.
If during a dehumidification cycle, there is a call for heating, the dehumidification cycle is terminated.
If during a dehumidification cycle, there is a CO2 event [DCV], the dehumidification cycle is terminated.

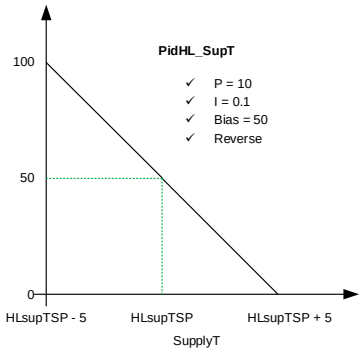
**Note When using the Dehumidification sequence with an Economizer sequence, the Dehumidification sequence will only work with Enthalpy Economization Sequence, and it will not work with Drybulb Economization Sequence.*

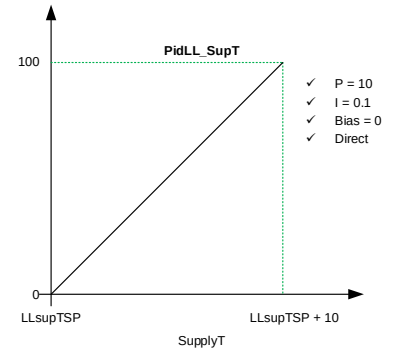
Sequence of Operation Details

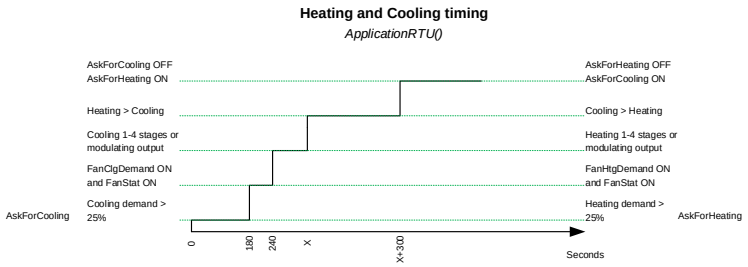
Temperature

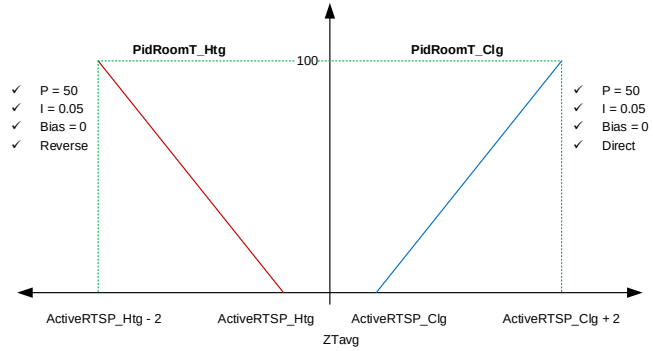










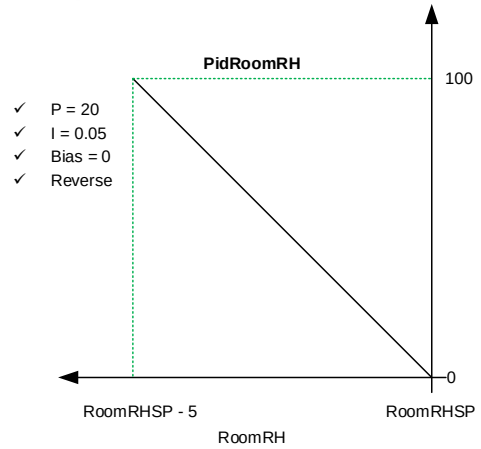


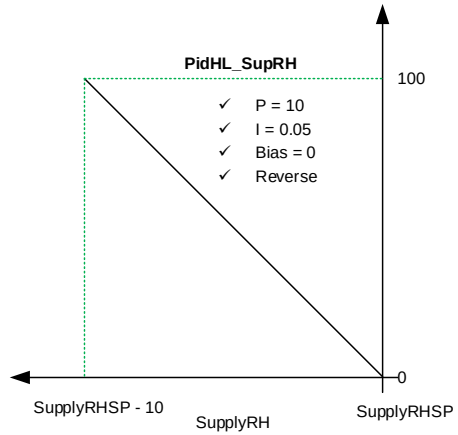
ONYXX® LX BY LYNXSPRING

www.lynxspring.com

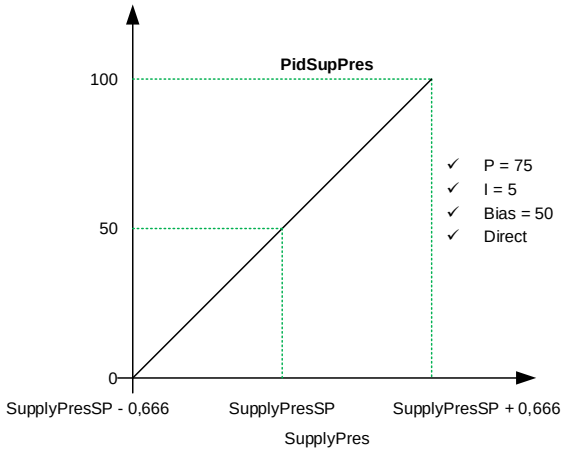
Sequence of Operation Details

Humidity





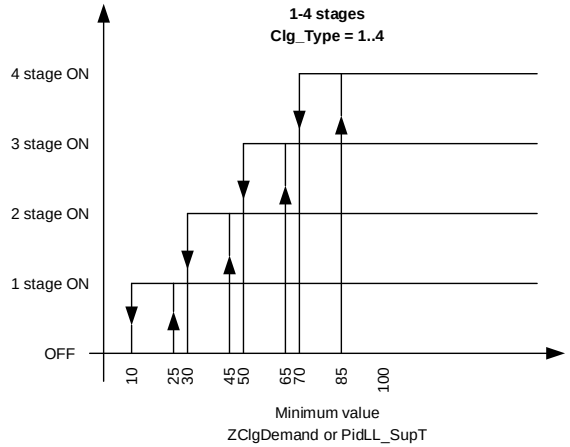
Pressure



ONYXX® LX BY LYNXSPRING

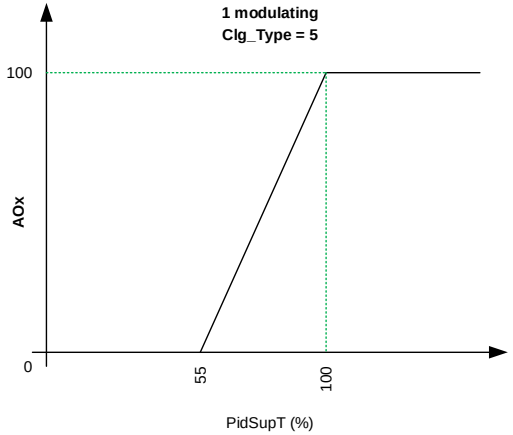
Sequence of Operation Details

Cooling



- ✓ AskForCooling for at least 180 seconds
- ✓ FanClgDemand ON for at least 60 seconds
- ✓ There is at least 180 seconds between each stage
- ✓ isFanRunning true
- ✓ isCoolingAllowed true

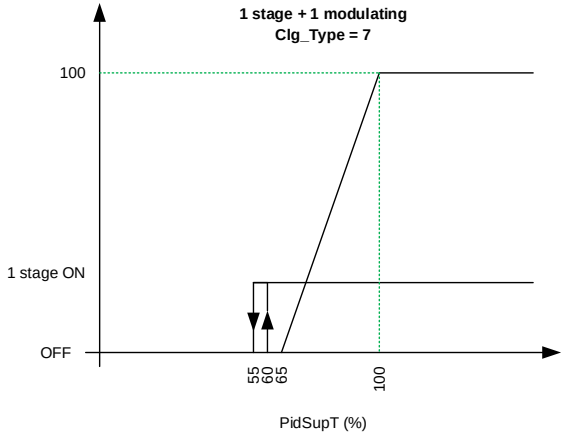
Stage 1 ON = ZClgDemand.var1 (25)
Stage 2 ON = ZClgDemand.var2 (45)
Stage 3 ON = ZClgDemand.var3 (65)
Stage 4 ON = ZClgDemand.var4 (85)
Deadband = ZClgDemand.var5 (15)



- ✓ AskForCooling for at least 180 seconds

or

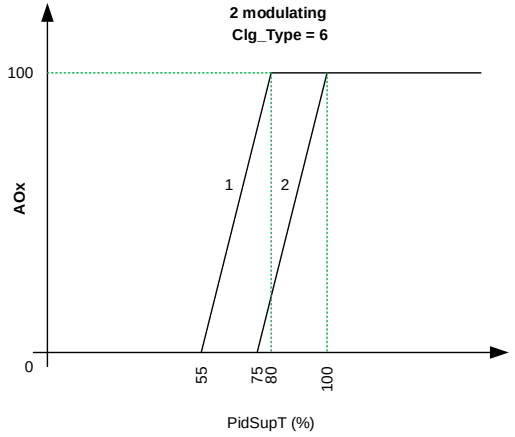
- ✓ AskForHeat is OFF
- ✓ Occupied mode
- ✓ FanClgDemand ON for at least 60 seconds
- ✓ isCoolingAllowed true



- ✓ AskForCooling for at least 180 seconds

or

- ✓ AskForHeat is OFF
- ✓ Occupied mode
- ✓ FanClgDemand ON for at least 60 seconds
- ✓ isCoolingAllowed true



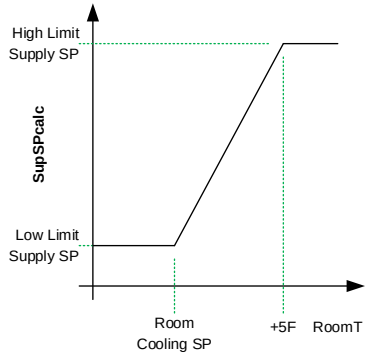
- ✓ AskForCooling for at least 180 seconds

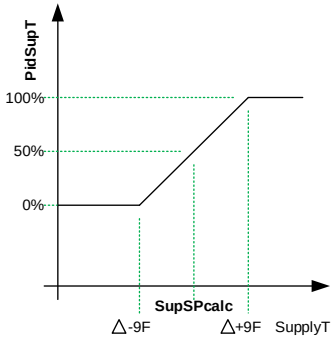
or

- ✓ AskForHeat is OFF
- ✓ Occupied mode
- ✓ FanClgDemand ON for at least 60 seconds
- ✓ isCoolingAllowed true

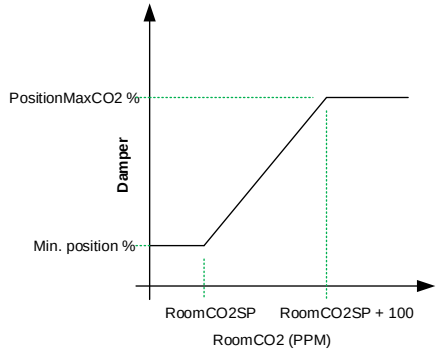
ONYXX® LX
BY LYNXSPRING

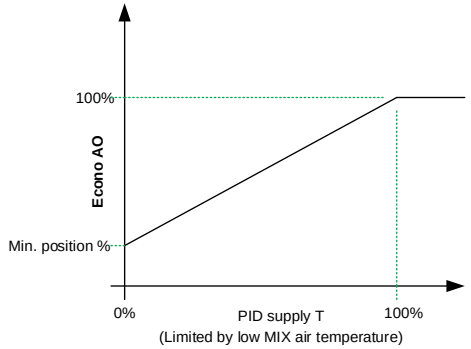
Sequence of Operation Details

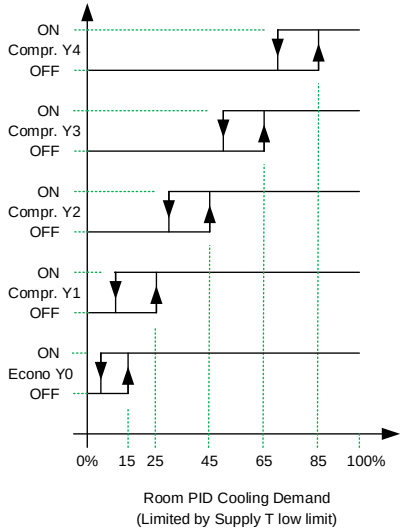


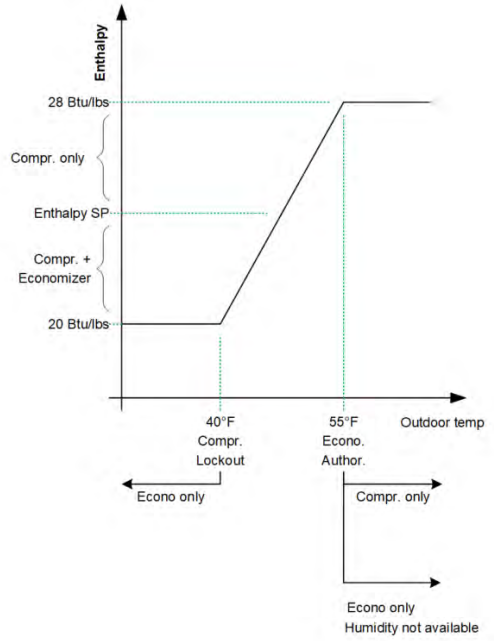


Economizer







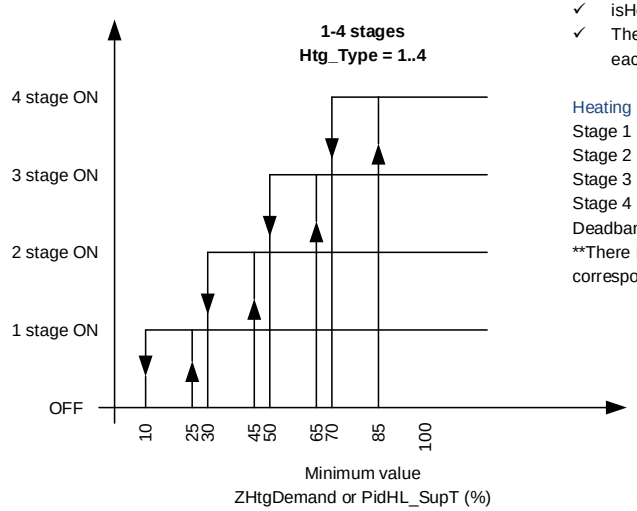


ONYXX® LX
BY LYNXSPRING

Sequence of Operation Details

Heating

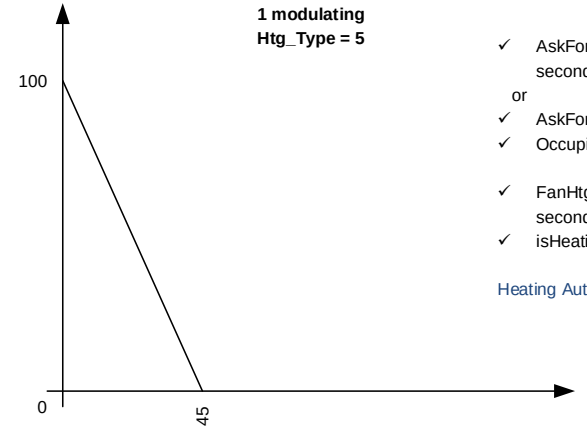
1-4 stages
Htg_Type = 1..4



- ✓ AskForHeating for at least 180 seconds
- ✓ isHeatingAllowed true
- ✓ There is at least 60 seconds between each stage

Heating Authorization = OAT.var1
Stage 1 ON = ZHtgDemand.var1 (25)
Stage 2 ON = ZHtgDemand.var2 (45)
Stage 3 ON = ZHtgDemand.var3 (65)
Stage 4 ON = ZHtgDemand.var4 (85)
Deadband = ZHtgDemand.var5 (15)
**There is no parameters in Solonet that corresponding to these values.

1 modulating
Htg_Type = 5

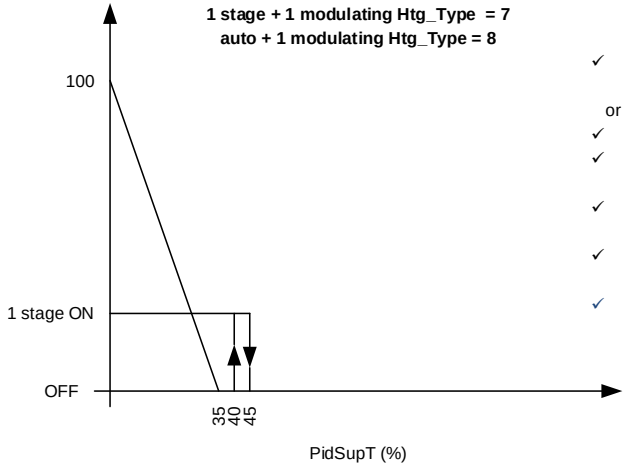


- ✓ AskForHeating for at least 180 seconds
  or
- ✓ AskForCool is OFF
- ✓ Occupied mode

- ✓ FanHtgDemand ON for at least 60 seconds
- ✓ isHeatingAllowed true

Heating Authorization = OAT.var1

1 stage + 1 modulating Htg_Type = 7
auto + 1 modulating Htg_Type = 8

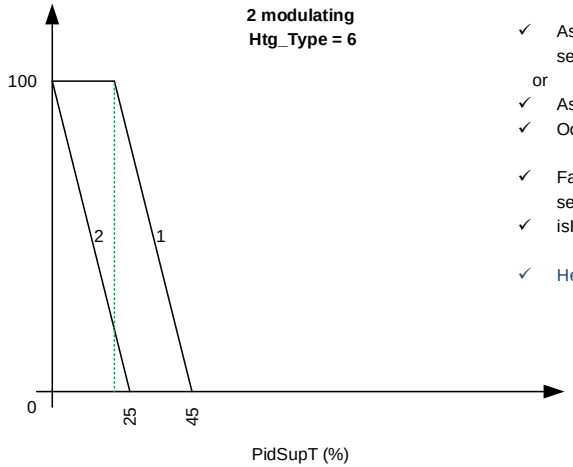


- ✓ AskForHeating for at least 180 seconds
  or
- ✓ AskForCool is OFF
- ✓ Occupied mode

- ✓ FanHtgDemand ON for at least 60 seconds
- ✓ isHeatingAllowed true

- ✓ Heating Authorization = OAT.var1

2 modulating
Htg_Type = 6



- ✓ AskForHeating for at least 180 seconds
  or
- ✓ AskForCool is OFF
- ✓ Occupied mode

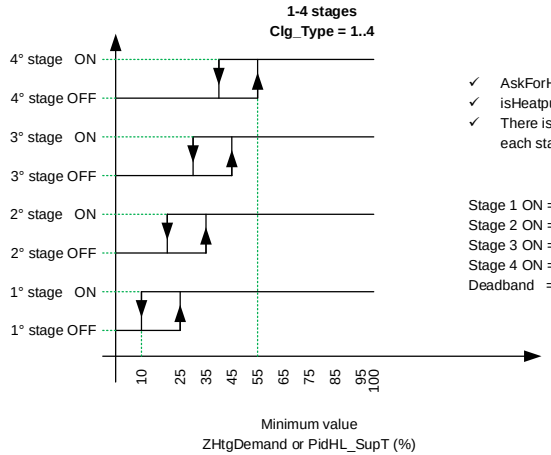
- ✓ FanHtgDemand ON for at least 60 seconds
- ✓ isHeatingAllowed true

- ✓ Heating Authorization = OAT.var1

Sequence of Operation Details

HEAT PUMP CONTROL

setHeatingHpY() (Compressors)

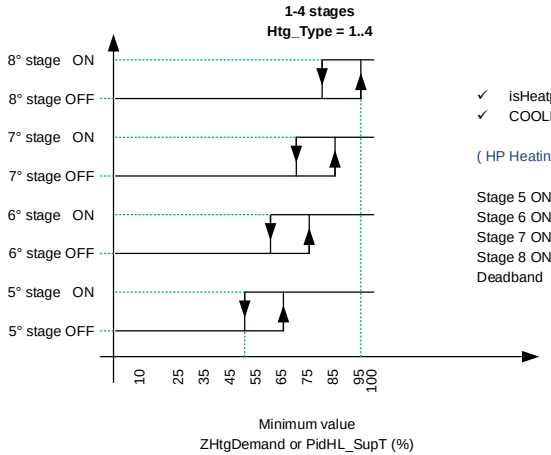


- ✓ AskForHeating for at least 180 seconds
- ✓ isHeatpumpAllowed true
- ✓ There is at least 60 seconds between each stage

Stage 1 ON = ZClgDemand.var1 (25)
Stage 2 ON = ZClgDemand.var2 (35)
Stage 3 ON = ZClgDemand.var3 (45)
Stage 4 ON = ZClgDemand.var4 (55)
Deadband = ZClgDemand.var5 (15)

Note:
Use ZClgDemands private variables to compare with ZHtgDemand when heatpump heating mode **is permitted** (depend on OAT)

setHeatingHp() (Auxiliary heat)

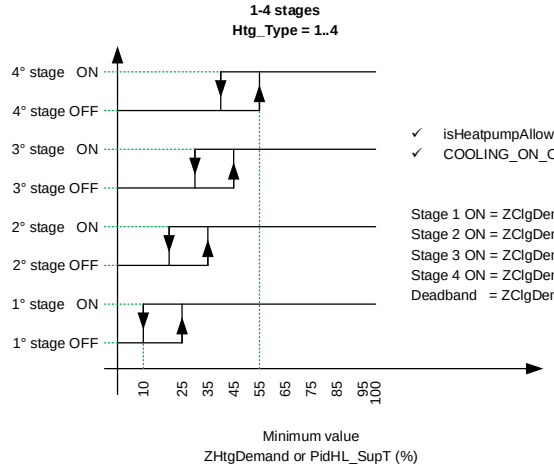


- ✓ isHeatpumpAllowed true
- ✓ COOLING_ON_OFF_DELAY_SECONDS completed

(HP Heating Authorization = OAT.var1)

Stage 5 ON = ZHtgDemand.var1 (65)
Stage 6 ON = ZHtgDemand.var2 (75)
Stage 7 ON = ZHtgDemand.var3 (85)
Stage 8 ON = ZHtgDemand.var4 (95)
Deadband = ZHtgDemand.var5 (15)

Note:
Use ZhtgDemands private variables to compare with ZHtgDemand when heatpump heating mode **is permitted** (depend on OAT)



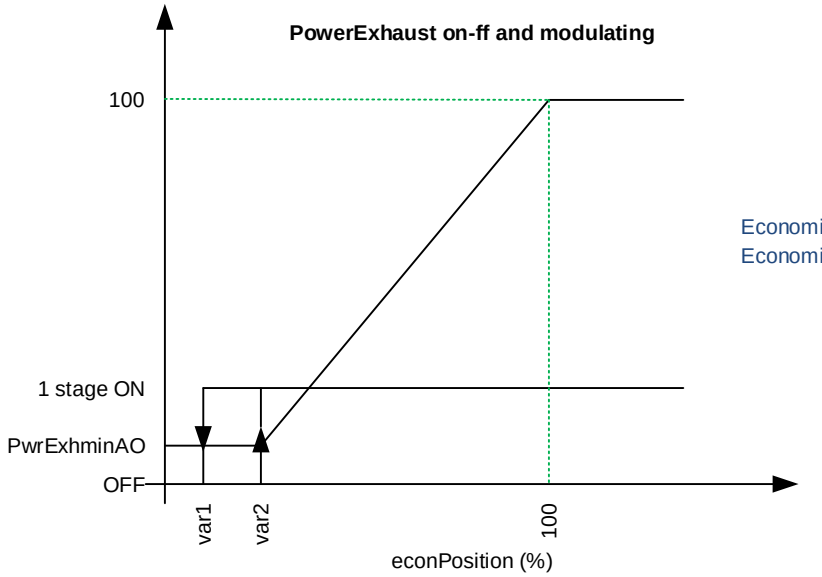
- ✓ isHeatpumpAllowed false
- ✓ COOLING_ON_OFF_DELAY_SECONDS completed

Stage 1 ON = ZClgDemand.var1 (25)
Stage 2 ON = ZClgDemand.var2 (35)
Stage 3 ON = ZClgDemand.var3 (45)
Stage 4 ON = ZClgDemand.var4 (55)
Deadband = ZClgDemand.var5 (15)

Note:
Use ZClgDemands private variables to compare with ZHtgDemand when heatpump heating mode **NOT permitted** (depend on OAT)

ONYXX® LX
BY LYNXSPRING

Sequence of Operation Details

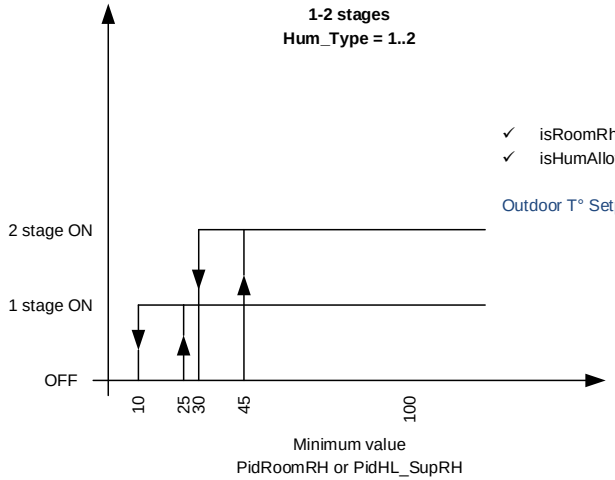


Economizer Position (On) = PwrExh_Type.var1
Economizer Position (Off) = PwrExh_Type.var2

Sequence of Operation Details

Humidifier

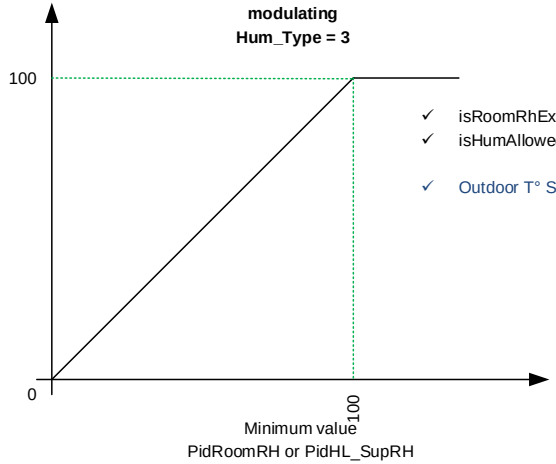
1-2 stages
Hum_Type = 1..2



- ✓ isRoomRhExist
- ✓ isHumAllowed true

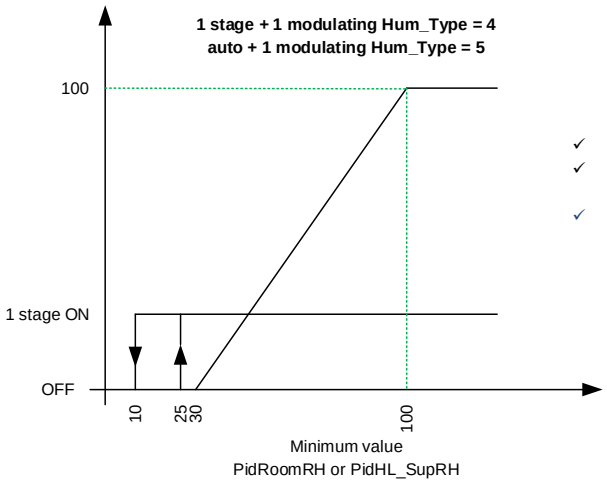
Outdoor T° Setpoint = Hum_Type.var1

modulating
Hum_Type = 3



- ✓ isRoomRhExist
- ✓ isHumAllowed true
- ✓ Outdoor T° Setpoint = Hum_Type.var1

1 stage + 1 modulating Hum_Type = 4
auto + 1 modulating Hum_Type = 5



- ✓ isRoomRhExist
- ✓ isHumAllowed true
- ✓ Outdoor T° Setpoint = Hum_Type.var1

ONYXX® LX
BY LYNXSPRING

Physical Inputs and Outputs (AI's, AO's, BI's & AO's)

Object Instance	Object name	Description	Default value	Tags	Minimum range value	Maximum range value	Inactive_Text	Active_Text
AI0	AI_1	Analog input 1	---	Cfg	0	4092		
AI1	AI_2	Analog input 2	---	Cfg	0	4092		
AI2	AI_3	Analog input 3	---	Cfg	0	4092		
AI3	AI_4	Analog input 4	---	Cfg	0	4092		
AI4	AI_5	Analog input 5	---	Cfg	0	4092		
AI5	AI_6	Analog input 6	---	Cfg	0	4092		
AI6	AI_7	Analog input 7	---	Cfg	0	4092		
AI7	AI_8	Analog input 8	---	Cfg	0	4092		
BO0	BO_1	Binary output 1	Off	Cfg	---	---	Off	On
BO1	BO_2	Binary output 2	Off	Cfg	---	---	Off	On
BO2	BO_3	Binary output 3	Off	Cfg	---	---	Off	On
BO3	BO_4	Binary output 4	Off	Cfg	---	---	Off	On
BO4	BO_5	Binary output 5	Off	Cfg	---	---	Off	On
BO5	BO_6	Binary output 6	Off	Cfg	---	---	Off	On
BO6	BO_7	Binary output 7	Off	Cfg	---	---	Off	On
BO7	BO_8	Binary output 8	Off	Cfg	---	---	Off	On
AO1	AO_1	Analog output 1	---	Cfg	0%	100 %		
AO2	AO_2	Analog output 2	---	Cfg	0%	100 %		
AO3	AO_3	Analog output 3	---	Cfg	0%	100 %		
AO4	AO_4	Analog output 4	---	Cfg	0%	100 %		

ONYXX® LX BY LYNXSPRING

Please note that objects tagged as:

- Cfg: represent configuration properties of the device that are typically only set once during commissioning and start-up
- User: represent properties or objects that are typically manipulated by users of the controller
- Status: represent objects or properties that are "typically" meant to be displayed on graphics for various required visualization
- Cmd: represent objects that can be controlled directly by other BACnet external process

Analog Values

Object Instance	Object name	Description	Default value	Tags	Minimum range value	Maximum range value	Inactive_Text	Active_Text
AV0	AddrList_Grp1	Address List, Group 1 (qty)	---	Cfg	0	25		
AV1	AddrList_Grp2	Address List, Group 1 (qty)	---	Cfg	0	25		
AV2	AddrList_Grp3	Address List, Group 1 (qty)	---	Cfg	0	25		
AV5	ZNbOnline	Number of zones currently online	---	Status	0	75		
AV6	ZHtgDemand	Zones Heating Demand	---	Status	0%	100 %		
AV7	ZClgDemand	Zones Cooling Demand	---	Status	0%	100 %		
AV8	ZTmin	Minimum Zones Room T°	0°F	Status	32°F (0°C)	122°F (50°C)		
AV9	ZTavg	Average Zones Room T°	0°F	Status	32°F (0°C)	122°F (50°C)		
AV10	ZTmax	Maximum Zones Room T°	0°F	Status	32°F (0°C)	122°F (50°C)		
AV11	ZUnoccHLTSP	Zones unoccupied H.L. T° setpoint	82.4°F (29.1°C)	User	32°F (0°C)	122°F (50°C)		
AV12	ZUnoccLLTSP	Zones unoccupied L.L. T° setpoint	64.4F (17.7°C)	User	32°F (0°C)	122°F (50°C)		
AV14	ReturnT	Return T°	71.6F (22.0°C)	Status	32°F (0°C)	122°F (50°C)		
AV15	RoomTSP	Room (return) T° Setpoint	72.0F (22.2°C)	User	32°F (0°C)	122°F (50°C)		
AV16	SupplyT	Supply T°	55.4°F (13.0°C)	Status	32°F (0°C)	122°F (50°C)		
AV17	HLsupTSP	H.L. supply T° setpoint (recom. 50°C)	122F (50°C)	Cfg	32°F (0°C)	122°F (50°C)		
AV18	LLsupTSP	L.L. supply T° setpoint (recom. 8°C)	46.4F (8.11°C)	Cfg	32°F (0°C)	122°F (50°C)		
AV19	FZsupTSP	Freeze supply T° setpoint (recom. 3°C)	37.4F (3.0°C)	Cfg	32°F (0°C)	122°F (50°C)		
AV20	FanStThreshold	Fan analog input status threshold	0%	Cfg	0%	100 %		
AV21	FanMinAO	Fan analog min. output	0%	Cfg	0%	100 %		
AV22	SupplyPres	Supply static pressure	0"WC	Status	0"WC	1"WC		

ONYXX® LX
BY LYNXSPRING

Please note that objects tagged as:

- Cfg: represent configuration properties of the device that are typically only set once during commissioning and start-up
- User: represent properties or objects that are typically manipulated by users of the controller
- Status: represent objects or properties that are "typically" meant to be displayed on graphics for various required visualization
- Cmd: represent objects that can be controlled directly by other BACnet external process

Analog Values

Object Instance	Object name	Description	Default value	Tags	Minimum range value	Maximum range value	Inactive_Text	Active_Text
AV23	SupplyPresSP	Supply static pressure setpoint	0"WC	Cfg	0"WC	1"WC		
AV24	FanMinOnTime	Fan minimum ON time	10Min	Cfg	0.5 Min	30 Min		
AV26	MotionTime	Motion sensor active time	60 Min	Cfg	0 Min	300 Min		
AV27	OvrTime	Occupancy override active time	60 Min	Cfg	0 Min	300 Min		
AV28	FanMaxAO	Fan analog max output	10Min	Cfg	0.5 Min	30 Min		
AV29	OAT	Outside air T°	0°F	Status	32°F (0°C)	122°F (50°C)		
AV30	RoomCO2	Room (return) CO2	0 PPM	Status				
AV31	RoomCO2SP	Room (return) CO2 Setpoint	800 PPM	Cfg				
AV33	RTSPmin_Occ	Minimum Room T° setpoint	59.0°F (15.0°C)	Cfg	32°F (0°C)	122°F (50°C)		
AV34	RTSPmax_Occ	Maximum Room T° setpoint	82.0°F (27.7°C)	Cfg	32°F (0°C)	122°F (50°C)		
AV35	RTSPclg_Occ	Room T° cooling setpoint, occupied	74.0°F (23.3°C)	User	32°F (0°C)	122°F (50°C)		
AV36	RTSPhtg_Occ	Room T° heating setpoint, occupied	72.0°F (22.2°C)	User	32°F (0°C)	122°F (50°C)		
AV37	RTSP_DeadBand	RTSP deadband between Clg and Htg	2°F	Cfg				
AV38	RTSPclg_Unocc	Room T° cooling setpoint, unoccupied	78.8°F (26°C)	User	32°F (0°C)	122°F (50°C)		
AV39	RTSPhtg_Unocc	Room T° heating setpoint, unoccupied	64.4°F (18°C)	User	32°F (0°C)	122°F (50°C)		
AV40	RTSPclg_STBd t	Standby mode, RTSP clg offset (pos.)	2°F	Cfg				
AV41	RTSPhtg_STBdt	Standby mode, RTSP htg offset (neg.)	-2°F	Cfg				
AV42	ActiveRTSP_Clg	Active cooling room T° setpoint	78.8°F (26°C)	Status	32°F (0°C)	122°F (50°C)		
AV43	ActiveRTSP_Htg	Active heating room T° setpoint	64.4°F (18°C)	Status	32°F (0°C)	122°F (50°C)		
AV46	PwrExhMinAO	Power exhaust analog min. output	0%	Status	0%	100 %		
AV47	PwrExhStThres	PwrExh analog input status threshold	0%	Status	0%	100 %		

ONYXX® LX BY LYNXSPRING

Please note that objects tagged as:

- Cfg: represent configuration properties of the device that are typically only set once during commissioning and start-up
- User: represent properties or objects that are typically manipulated by users of the controller
- Status: represent objects or properties that are "typically" meant to be displayed on graphics for various required visualization
- Cmd: represent objects that can be controlled directly by other BACnet external process

Analog Values

Object Instance	Object name	Description	Default value	Tags	Minimum range value	Maximum range value	Inactive_Text	Active_Text
AV49	PidSupPresOut	PID supply pressure output	0%	Status	0%	100 %		
AV50	DehumSP	Dehumidification Setpoint						
AV51	RoomRH	Room(or return) R.H.	144.9%	Status	0%	100 %		
AV52	RoomRHSP	Room (or return) R.H. setpoint	25%	User	0%	100 %		
AV53	SupplyRH	Supply (hi limit) R.H.	156.8%	Cfg	0%	100 %		
AV54	SupplyRHSP	Supply (hi limit) R.H. setpoint	75%	Cfg	0%	100 %		
AV56	SupSPmaxHtg	Supply T° setpoint @ 100% htg demand	104.0°F (40.0°C)	Status	32°F (0°C)	122°F (50°C)		
AV57	SupSPneutral	Supply T° setpoint @ 0% htg, 0% clg	68.0°F (20.0°C)	Status	32°F (0°C)	122°F (50°C)		
AV58	SupSPminClg	Supply T° setpoint @ 100% clg demand	55.4°F (13.0°C)	Status	32°F (0°C)	122°F (50°C)		
AV59	SupSPcalc	Supply T° setpoint calculated	55.4°F (13.0°C)	Cfg	32°F (0°C)	122°F (50°C)		
AV60	ComprLockout	Compressor Lockout	4.0°F (-20.0°C)	Cfg	-22°F (-30°C)	176°F (80°C)		
AV61	ComprStgDelay	Compressor stages delay	10 sec	Cfg	0 sec	300 sec		
AV62	HtgStgDelay	Heating stages delay	10 sec	Cfg	0 sec	300 sec		
AV63	FanRunTime	Fan run time before stages permitted	10 sec	Cfg	0 sec	300 sec		

ONYXX® LX BY LYNXSPRING

Please note that objects tagged as:

- Cfg: represent configuration properties of the device that are typically only set once during commissioning and start-up
- User: represent properties or objects that are typically manipulated by users of the controller
- Status: represent objects or properties that are "typically" meant to be displayed on graphics for various required visualization
- Cmd: represent objects that can be controlled directly by other BACnet external process

Analog Values

Object Instance	Object name	Description	Default value	Tags	Minimum range value	Maximum range value	Inactive_Text	Active_Text
AV65	FanHtgOffDelay	Delay to stop fan if no heating demand	0 Min	Cfg	0%	100 %		
AV66	FanClgOffDelay	Delay to stop fan if no cooling demand	0 Min	Cfg	0%	100 %		
AV67	EconMinPos	Economizer minimum position	20%	Cfg	0%	100 %		
AV68	EconMaxPos	Economizer maximum CO2 position	100%	Cfg	0%	100 %		
AV69	PwrExhOff	Power Exh off (Economizer position)	10%	Cfg	0%	100 %		
AV70	PwrExhOn	Power Exh on (Economizer position)	50%	Cfg	0%	100 %		
AV71	OATHumAuth	Outside air temp humidifier authorize	32.0°F (0.0°C)	Cfg	-4°F (-20°C)	122°F (50°C)		
AV72	OATHtgAuth	Outside air temp Heating authorize	32.0°F (0.0°C)	Cfg	-4°F (-20°C)	122°F (50°C)		
AV73	OATEconAuth	Outside air temp Economizer authorize	32.0°F (0.0°C)	Status	-4°F (-20°C)	122°F (50°C)		
AV75	OAHum	Outside air Humidity	32.0°F (0.0°C)	Status	-4°F (-20°C)	122°F (50°C)		
AV76	OAE	Outside air Enthalpy	-	Status	20 BTU/lbs	28 BTU/lbs		
AV77	EnthSP	Economizer Enthalpy Setpoint	-	Cfg	20 BTU/lbs	28 BTU/lbs		
AV78	MixedAirTSP	Economizer Mixed Air Setpoint	32.0°F (0.0°C)	Cfg	-4°F (-20°C)	122°F (50°C)		
AV79	MAT	Economizer Mixed Air Temperature	32.0°F (0.0°C)	Cfg	-4°F (-20°C)	122°F (50°C)		
AV80	Calib_RoomT	Room T° calibration	0°F (0°C)	Cfg	-9°F (-5°C)	9°F (5°C)		
AV81	Calib_RoomSP	Room T° Setpoint calibration	0°F (0°C)	Cfg	-9°F (-5°C)	9°F (5°C)		

ONYXX® LX BY LYNXSPRING

Please note that objects tagged as:

- Cfg: represent configuration properties of the device that are typically only set once during commissioning and start-up
- User: represent properties or objects that are typically manipulated by users of the controller
- Status: represent objects or properties that are "typically" meant to be displayed on graphics for various required visualization
- Cmd: represent objects that can be controlled directly by other BACnet external process

Analog Values

Object Instance	Object name	Description	Default value	Tags	Minimum range value	Maximum range value	Inactive_Text	Active_Text
AV89	ChOverSP	Changeover temperature setpoint	64.0°F (17.8°C)	Cfg	0°F (-17.8°C)	122°F (50°C)		
AV90	ChOverT	Changeover temperature reading	-40.0°F (-40.0°C)	Cfg	0°F (-17.8°C)	122°F (50°C)		
AV91	HtgRunTme	Heating run time (for floating output)	95 sec	Cfg	0	360		
AV92	ClgRunTme	Cooling run time (for floating output)	95 sec	Cfg	0	360		

ONYXX® LX BY LYNXSPRING

Please note that objects tagged as:

- Cfg: represent configuration properties of the device that are typically only set once during commissioning and start-up
- User: represent properties or objects that are typically manipulated by users of the controller
- Status: represent objects or properties that are "typically" meant to be displayed on graphics for various required visualization
- Cmd: represent objects that can be controlled directly by other BACnet external process

Binary Values

Object Instance	Object name	Description	Default value	Tags	Minimum range value	Maximum range value	Inactive_Text	Active_Text
BV2	ZOvr	Zones occupancy override activated	Off	Status				
BV3	ZMotion	Zones motion detected	Off	Status			Off	Active
BV5	SystemOccSchd	System occupancy schedule	Night	Status			Off	Active
BV6	EconOccSched	Economiser occupancy schedule	Night	Status			Night	Day
BV7	FreezeCond	Freeze condition active ?	Normal	Status			Night	Day
BV8	FreeClgAuth	Free cooling authorized?	No	Status			No	Yes
BV10	SaveAndRestart	Save objects to flash and restart	Normal	Status			Normal	Active
BV14	FanControl	Supply fan control	Continuous	Cfg			Normal	Active
BV15	FanStat	Fan status	Off	Status			Continuous	Intermittent
BV16	PwrExhStat	Power exhaust status	Off	Status			Off	On
BV17	FanHtgDemand	Intermittent fan demand on Heating	Off	Status			Off	On
BV18	FanClgDemand	Intermittent fan demand on Cooling	Off	Status			Off	On
BV19	Dehdemand	Dehumidification Demand	Off	Status			Off	On
BV20	DehAuth	Dehumidification Authorization	No	Status			No	Yes
BV21	EnthalpyAuth	Economizer Enthalpy Authorization	No	Status			No	Yes
BV23	DehAuth	Dehumidification Authorization	No	Status			No	Yes
BV24	TZstatus	TZxxx communication status	Normal	Status			Normal	Fault
BV40	ChOverStatus	Change over status	Cold	Status			Cold	Hot
BV41	Anti_Ice	Ice detection status on coil	Normal	Status			Normal	Ice_Detected
BV42	Drain_Pan	Overflow detection inside drain pan	Normal	Status			Normal	Overflow

ONYXX® LX
BY LYNXSPRING

Please note that objects tagged as:

- Cfg: represent configuration properties of the device that are typically only set once during commissioning and start-up
- User: represent properties or objects that are typically manipulated by users of the controller
- Status: represent objects or properties that are "typically" meant to be displayed on graphics for various required visualization
- Cmd: represent objects that can be controlled directly by other BACnet external process

Multi-State Values

Object Instance	Object name	Description	Tags	Default value	State texts
MSV0	Units_Type	Units configuration (T° & Pressure)	Cfg	°F, H2O	°F, H2O °C, H2O °F, PA °C, PA
MSV1	Tstor10K_Type	Thermistors type (std type 3 or type 2)	Cfg	Type 3 (std)	Other Type 3 (std) Type 2
MSV2	RoomT_Loc	Room T° physical location	Cfg	AI-1	None AI-1..AI-8 Tzone AdrList
MSV3	RoomTSP_Loc	Room (return) T° SP location (occ.)	Cfg	Virtual	None AI-1..AI-8 Tzone AdrList

ONYXX® LX BY LYNXSPRING

Please note that objects tagged as:

- Cfg: represent configuration properties of the device that are typically only set once during commissioning and start-up
- User: represent properties or objects that are typically manipulated by users of the controller
- Status: represent objects or properties that are "typically" meant to be displayed on graphics for various required visualization
- Cmd: represent objects that can be controlled directly by other BACnet external process

Multi-State Values

Object Instance	Object name	Description	Tags	Default value	State texts
MSV4	Units_Type	Cooling control type	Cfg	None	None 1 Stage 2 Stage 3 Stage 4 Stage 1 modulating 2 modulating 1 Stg + 1 mod.
MSV5	Clg_Type	Cooling BO physical loc. (first stage)	Cfg	None	None BO-2..BO-8
MSV6	ClgBO_Loc	Cooling AO physical loc. (first stage)	Cfg	None	None AO-1..AO-4
MSV7	ClgAO_Loc	Cooling output 1 formula	Cfg	Off-On	0-10 VDC, Dir. 0-10 VDC, Rev. 2-10 VDC, Dir. 2-10 VDC, Rev. Off-On Pulse, Dir. Pulse, Rev.

ONYXX® LX BY LYNXSPRING

Please note that objects tagged as:

- Cfg: represent configuration properties of the device that are typically only set once during commissioning and start-up
- User: represent properties or objects that are typically manipulated by users of the controller
- Status: represent objects or properties that are "typically" meant to be displayed on graphics for various required visualization
- Cmd: represent objects that can be controlled directly by other BACnet external process

Multi-State Values

Object Instance	Object name	Description	Tags	Default value	State texts
MSV8	Clg2_Form	Cooling output 2 formula	Cfg	None	0-10 VDC, Dir. 0-10 VDC, Rev. 2-10 VDC, Dir. 2-10 VDC, Rev. Off-On Pulse, Dir. Pulse, Rev.
MSV9	Clg3_Form	Cooling output 3 formula	Cfg	None	0-10 VDC, Dir. 0-10 VDC, Rev. 2-10 VDC, Dir. 2-10 VDC, Rev. Off-On Pulse, Dir. Pulse, Rev.
MSV10	Clg4_Form	Cooling output 4 formula	Cfg	None	0-10 VDC, Dir. 0-10 VDC, Rev. 2-10 VDC, Dir. 2-10 VDC, Rev. Off-On Pulse, Dir. Pulse, Rev.
MSV11	Mode	System Mode	Cfg		Off Auto Cool Heat

ONYXX® LX BY LYNXSPRING

Please note that objects tagged as:

- Cfg: represent configuration properties of the device that are typically only set once during commissioning and start-up
- User: represent properties or objects that are typically manipulated by users of the controller
- Status: represent objects or properties that are "typically" meant to be displayed on graphics for various required visualization
- Cmd: represent objects that can be controlled directly by other BACnet external process

Multi-State Values

Object Instance	Object name	Description	Tags	Default value	State texts
MSV12	FanMode	Fan mode	Cfg	None	Low. Medium High, Auto
MSV13	Htg_Type	Heating control type	Cfg	None	None,1 Stage,2 Stage 3 Stage,4 Stage 1 modulating 2 modulating 1 Stg + 1 mod. 1 Auto + 1 mod
MSV14	HtgBO_Loc	Heating BO physical loc. (first stage)	Cfg	None	None BO-2..BO-8
MSV15	HtgAO_Loc	Heating AO physical loc. (first stage)	Cfg	None	None AO-1..AO-4
MSV16	Htg1_Form	Heating output 1 formula	Cfg	Off-On	0-10 VDC, Dir. 0-10 VDC, Rev. 2-10 VDC, Dir. 2-10 VDC, Rev. Off-On Pulse, Dir. Pulse, Rev.

ONYXX® LX BY LYNXSPRING

Please note that objects tagged as:

- Cfg: represent configuration properties of the device that are typically only set once during commissioning and start-up
- User: represent properties or objects that are typically manipulated by users of the controller
- Status: represent objects or properties that are "typically" meant to be displayed on graphics for various required visualization
- Cmd: represent objects that can be controlled directly by other BACnet external process

Multi-State Values

Object Instance	Object name	Description	Tags	Default value	State texts
MSV17	Htg2_Form	Htg2_Form	Cfg	Off-On	0-10 VDC, Dir. 0-10 VDC, Rev. 2-10 VDC, Dir. 2-10 VDC, Rev. Off-On Pulse, Dir. Pulse, Rev.
MSV18	Htg3_Form	Htg3_Form	Cfg	Off-On	0-10 VDC, Dir. 0-10 VDC, Rev. 2-10 VDC, Dir. 2-10 VDC, Rev. Off-On Pulse, Dir. Pulse, Rev.
MSV19	Htg4_Form	Htg4_Form	Cfg	Off-On	0-10 VDC, Dir. 0-10 VDC, Rev. 2-10 VDC, Dir. 2-10 VDC, Rev. Off-On Pulse, Dir. Pulse, Rev.

ONYXX® LX BY LYNXSPRING

Please note that objects tagged as:

- Cfg: represent configuration properties of the device that are typically only set once during commissioning and start-up
- User: represent properties or objects that are typically manipulated by users of the controller
- Status: represent objects or properties that are "typically" meant to be displayed on graphics for various required visualization
- Cmd: represent objects that can be controlled directly by other BACnet external process

Multi-State Values

Object Instance	Object name	Description	Tags	Default value	State texts
MSV20	CO2_Loc	CO2 sensor physical location	Cfg	None	None AI-1..AI-8 External
MSV21	CO2_Form	CO2 sensor Formula	Cfg	None	Min Avg Max
MSV23	Fan_Type	Fan conrol type (BO-0 and/or AO)	Cfg	Off-On	Off-On Modulating Off-On + Mod.
MSV24	FanAO_Form	Fan analog output formula	Cfg	0-10 VDC	0-10 VDC 2-10 VDC Unused
MSV25	FanStat_Loc	Fan status physical location	Cfg	None	None AI-1..AI-8 External
MSV26	FanStat_Form	Fan status formula	Cfg	None	Off-On 0-10 VDC, % 2-10 VDC, %

ONYXX® LX BY LYNXSPRING

Please note that objects tagged as:

- Cfg: represent configuration properties of the device that are typically only set once during commissioning and start-up
- User: represent properties or objects that are typically manipulated by users of the controller
- Status: represent objects or properties that are "typically" meant to be displayed on graphics for various required visualization
- Cmd: represent objects that can be controlled directly by other BACnet external process

Multi-State Values

Object Instance	Object name	Description	Tags	Default value	State texts
MSV27	OAT_Loc	Outside air T° physical location	Cfg	None	None AI-1..AI-8 External
MSV28	SupT_Loc	Supply T° physical location	Cfg	None	None AI-1..AI-8 External
MSV29	Econ_Type	Economizer control	Cfg	None	None Off-Auto Modulating
MSV30	Econ_Loc	Economizer physical location	Cfg	None	None BO-5 BO-6 BO-7 BO-8 AO-1 AO-2 AO-3 AO-4
MSV31	Econ_Form	Economizer output formula	Cfg	None	Off-On 0-10 VDC 2-10 VDC

ONYXX® LX BY LYNXSPRING

Please note that objects tagged as:

- Cfg: represent configuration properties of the device that are typically only set once during commissioning and start-up
- User: represent properties or objects that are typically manipulated by users of the controller
- Status: represent objects or properties that are "typically" meant to be displayed on graphics for various required visualization
- Cmd: represent objects that can be controlled directly by other BACnet external process

Multi-State Values

Object Instance	Object name	Description	Tags	Default value	State texts
MSV32	PwrExh_Type	Power exhaust control type ==VAR==	Cfg	None	None Off-On Modulating Off-On + Mod.
MSV33	PwrExhBO_Loc	Power exhaust BO physical location	Cfg	None	None Off-On Modulating Off-On + Mod.
MSV34	PwrExhAO_Loc	Power exhaust AO physical location	Cfg	None	None BO-2..BO-8
MSV35	PwrExhAO_Form	Power exhaust analog output formula	Cfg	None	0-10 VDC 2-10 VDC Unused
MSV36	PwrExhStat_Loc	Power exhaust status physical location	Cfg	None	None AI-1 AI-2 AI-3 AI-4 AI-5 AI-6 AI-7 AI-8 External
MSV37	PwrExStat_Form	Power exhaust status formula	Cfg	None	Off-On 0-10 VDC 2-10 VDC

Please note that objects tagged as:

- Cfg: represent configuration properties of the device that are typically only set once during commissioning and start-up
- User: represent properties or objects that are typically manipulated by users of the controller
- Status: represent objects or properties that are "typically" meant to be displayed on graphics for various required visualization
- Cmd: represent objects that can be controlled directly by other BACnet external process

Multi-State Values

Object Instance	Object name	Description	Tags	Default value	State texts
MSV38	RetT_Loc	Return T° physical location	Cfg	None	None AI-1..AI-8 External
MSV40	BypassDmp_Loc	Bypass damper physical location	Cfg	None	None Float BO-2,3 Float BO-3,4 Float BO-4,5 Float BO-5,6 Float BO-6,7 Float BO-7,8 AO-1 AO-2 AO-3 AO-4
MSV41	BypassDmp_Form	Bypass damper output formula	Cfg	0-10 VDC, Dir.	0-10 VDC, Dir. 0-10 VDC, Rev. 2-10 VDC, Dir. 2-10 VDC, Rev. Floating, Dir. Floating, Rev.

ONYXX® LX BY LYNXSPRING

Please note that objects tagged as:

- Cfg: represent configuration properties of the device that are typically only set once during commissioning and start-up
- User: represent properties or objects that are typically manipulated by users of the controller
- Status: represent objects or properties that are "typically" meant to be displayed on graphics for various required visualization
- Cmd: represent objects that can be controlled directly by other BACnet external process

Multi-State Values

Object Instance	Object name	Description	Tags	Default value	State texts
MSV42	PresSnsr_Loc	Pressor Sensor Location	Cfg	None	None AI-1..AI-8 External
MSV43	PresSnsr_Form	Pressure sensor formula	Cfg	0-10 VDC, 1.0"	0-10 VDC, 1.0" 0-10 VDC, 2.5" 0-10 VDC, 5.0" 2-10 VDC, 1.0" 2-10 VDC, 2.5" 2-10 VDC, 5.0"
MSV44	Motion_Loc	Motion sensor location	Cfg	None	Auto Detect NO, AI-4 (BI) NC, AI-4 (BI) NO, AI-5 (BI) NC, AI-5 (BI) NO, AI-6 (BI) NC, AI-6 (BI) NO, AI-7 (BI) NC, AI-7 (BI) NO, AI-8 (BI) NC, AI-8 (BI) External

Please note that objects tagged as:

- Cfg: represent configuration properties of the device that are typically only set once during commissioning and start-up
- User: represent properties or objects that are typically manipulated by users of the controller
- Status: represent objects or properties that are "typically" meant to be displayed on graphics for various required visualization
- Cmd: represent objects that can be controlled directly by other BACnet external process

Multi-State Values

Object Instance	Object name	Description	Tags	Default value	State texts
MSV45	SystemSch_Loc	System scheduler location	Cfg	None (Off)	None (Off) None (On) Scheduler AI-1 (BI)..AI-8 (BI) External
MSV46	EconSch_Loc	Economizer scheduler location	Cfg	None (Off)	None (Off) None (On) Scheduler AI-1 (BI)..AI-8 (BI) External
MSV47	Hum_Type	Humidifier control type ==VAR==	Cfg	None	None 1 Stage 2 Stage Modulating 1 Stg + 1 mod. Auto + mod.
MSV48	HumBO_Loc	Hum. BO physical loc. (first stage)	Cfg	None	None BO-2..BO-8
MSV49	HumAO_Loc	Hum. AO physical loc. (first stage)	Cfg	None	None AO-1..AO-4

ONYXX® LX BY LYNXSPRING

Please note that objects tagged as:

- Cfg: represent configuration properties of the device that are typically only set once during commissioning and start-up
- User: represent properties or objects that are typically manipulated by users of the controller
- Status: represent objects or properties that are "typically" meant to be displayed on graphics for various required visualization
- Cmd: represent objects that can be controlled directly by other BACnet external process

Multi-State Values

Object Instance	Object name	Description	Tags	Default value	State texts
MSV50	Hum1_Form	Humidifier output 1 formula	Cfg	0-10 VDC, Dir	0-10 VDC, Dir. 0-10 VDC, Rev. 2-10 VDC, Dir. 2-10 VDC, Rev. Off-On Pulse, Dir. Pulse, Rev.
MSV51	Hum2_Form	Humidifier output 2 formula	Cfg	0-10 VDC, Dir.	0-10 VDC, Dir. 0-10 VDC, Rev. 2-10 VDC, Dir. 2-10 VDC, Rev. Off-On Pulse, Dir. Pulse, Rev.
MSV52	RoomRH_Loc	Room (return) RH sensor location	Cfg	None	None AI-1..AI-8 External Local TZ200 TZ200 List
MSV53	RoomRH_Form	Room (return) RH sensor formula	Cfg	0-10 VDC, %	0-10 VDC, % 2-10 VDC, % Unused

Please note that objects tagged as:

- Cfg: represent configuration properties of the device that are typically only set once during commissioning and start-up
- User: represent properties or objects that are typically manipulated by users of the controller
- Status: represent objects or properties that are "typically" meant to be displayed on graphics for various required visualization
- Cmd: represent objects that can be controlled directly by other BACnet external process

Multi-State Values

Object Instance	Object name	Description	Tags	Default value	State texts
MSV54	SupplyRH_Loc	Supply (hi limit) R.H. sensor location	Cfg	None	None AI-1..AI-8 External
MSV55	SupplyRH_Form	Supply (hi limit) R.H. sensor formula	Cfg	0-10 VDC, Dir.	0-10 VDC, % 2-10 VDC, % Unused
MSV56	Deh_Loc	Dehumidification output location	Cfg	None	None BO-2 – BO8 Modulating
MSV57	HumInput	Humidity Input	Cfg	None	None AI-1 – AI-8 External Local TZ200 TZ200 List
MSV58	MixedAirTempInput	Mixed Air Temp Input	Cfg	None	None AI-1 – AI-8 External

ONYXX® LX BY LYNXSPRING

Please note that objects tagged as:

- Cfg: represent configuration properties of the device that are typically only set once during commissioning and start-up
- User: represent properties or objects that are typically manipulated by users of the controller
- Status: represent objects or properties that are "typically" meant to be displayed on graphics for various required visualization
- Cmd: represent objects that can be controlled directly by other BACnet external process

Multi-State Values

Object Instance	Object name	Description	Tags	Default value	State texts
MSV60	HtgDemandType	Heating demand type selection (in occupied mode)	Cfg	Average	Minimum Average Maximum
MSV61	ClgDemandType	Cooling demand type selection (in occupied mode)	Cfg	Average	Minimum Average Maximum
MSV62	RoomTSPType	Room temp setpoint type (in occupied mode)	Cfg	None	Heating Central Cooling

ONYXX® LX BY LYNXSPRING

Please note that objects tagged as:

- Cfg: represent configuration properties of the device that are typically only set once during commissioning and start-up
- User: represent properties or objects that are typically manipulated by users of the controller
- Status: represent objects or properties that are "typically" meant to be displayed on graphics for various required visualization
- Cmd: represent objects that can be controlled directly by other BACnet external process

Multi-State Values

Object Instance	Object name	Description	Tags	Default value	State texts
MSV65	Equipment	Equipment Type	Cfg	RTU/AHU	RTU/AHU Heatpump
MSV66	RevValve	Reversing Valve Type (O/B)	Cfg	None	None O (O on cool) B (B on heat)
MSV67	OB_Loc	Reversing Valve O/B Output Location	Cfg	None	None BO-2 BO-3 BO-4 BO-5 BO-6 BO-7 BO-8
MSV68	HtgClgMode	Heating/cooling mode	Status	N/A	Heat Cool Unused
MSV72	TimedOvrStatus	Timed Override Status	Status	Idle	Idle TimeOvrRequest TimeOvrCancel

ONYXX® LX BY LYNXSPRING

Please note that objects tagged as:

- Cfg: represent configuration properties of the device that are typically only set once during commissioning and start-up
- User: represent properties or objects that are typically manipulated by users of the controller
- Status: represent objects or properties that are "typically" meant to be displayed on graphics for various required visualization
- Cmd: represent objects that can be controlled directly by other BACnet external process

Multi-State Values

Object Instance	Object name	Description	Tags	Default value	State texts
MSV90	ChOverTyp	FCU ChangeOver input type	Cfg	None	None, ChOver NO Heat, ChOver NO Cool, ChOver Sensor
MSV91	ChOverLoc	FCU ChangeOver input location	Cfg	None	None AI1-AI8 External
MSV92	Anti_Ice_Loc	Anti ice input location (BI)	Cfg	None	None AI1-AI8
MSV93	Freeze_Lo	Freezing detection location (BI)	Cfg	None	None AI1-AI8
MSV94	FanLock	Fan lock	Status	None	None Lock
MSV95	Cond_Loc	Condensation input location	Cfg	one	None AI1-AI8

ONYXX® LX BY LYNXSPRING

Please note that objects tagged as:

- Cfg: represent configuration properties of the device that are typically only set once during commissioning and start-up
- User: represent properties or objects that are typically manipulated by users of the controller
- Status: represent objects or properties that are "typically" meant to be displayed on graphics for various required visualization
- Cmd: represent objects that can be controlled directly by other BACnet external process

Multi-State Values

Object Instance	Object name	Description	Tags	Default value	State texts
MSV96	SeqOper	CFG Control sequence of operation	Cfg	Cool-Heat-Auto	Cool-heat-Auto Cool-Heat, Cool Only Heat Only
MSV97	Fan_Seq	CFG Control fan sequence	Cfg	L-M-H	L-M-H, L_H L-M-H-A L-H-A, On-Auto
MSV98	Key Lock	CFG Keypad lock level	Cfg	None	None Fan Mode Fan+Mode All

ONYXX® LX BY LYNXSPRING

Please note that objects tagged as:

- Cfg: represent configuration properties of the device that are typically only set once during commissioning and start-up
- User: represent properties or objects that are typically manipulated by users of the controller
- Status: represent objects or properties that are "typically" meant to be displayed on graphics for various required visualization
- Cmd: represent objects that can be controlled directly by other BACnet external process

PID Loops

Object Instance	Object name	Description	Action	Kp	Ki	Bias
LOOP1	PidRoomT_Clg	Room T° control loop, cooling	Direct	20	0.05	0
LOOP2	PidRoomT_Htg	Room T° control loop, heating	Reverse	20	0.05	0
LOOP4	PidSupPres	Supply pressure control loop	Direct	75	5	50
LOOP6	PidSupT	Supply T° control loop	Direct	5	0.1	50
LOOP7	PidHL_SupT	Supply T° high limit control loop	Reverse	5	0.1	50
LOOP8	PidLL_SupT	Supply T° low limit control loop	Direct	5	0.1	50
LOOP10	PidRoomRH	Room RH control loop	Reverse	20	0.05	0
LOOP11	PidHL_SupHR	Supply RH high limit control loop	Direct	10	0.05	0
LOOP12	PidMAT	Mix air T for economizer control	Direct	10	0.05	0

TZ Series Room Sensors

Object name	*Description*	*Room T*	*Setpoint*	*Units*	*Override*	*Status*
*Tzone1***	*Wall mount interface*	*Current Value*	*Adjustable*	*°F*	*Normal*	*Normal*

ONYXX® LX
BY LYNXSPRING

RS-485 Network Guidelines

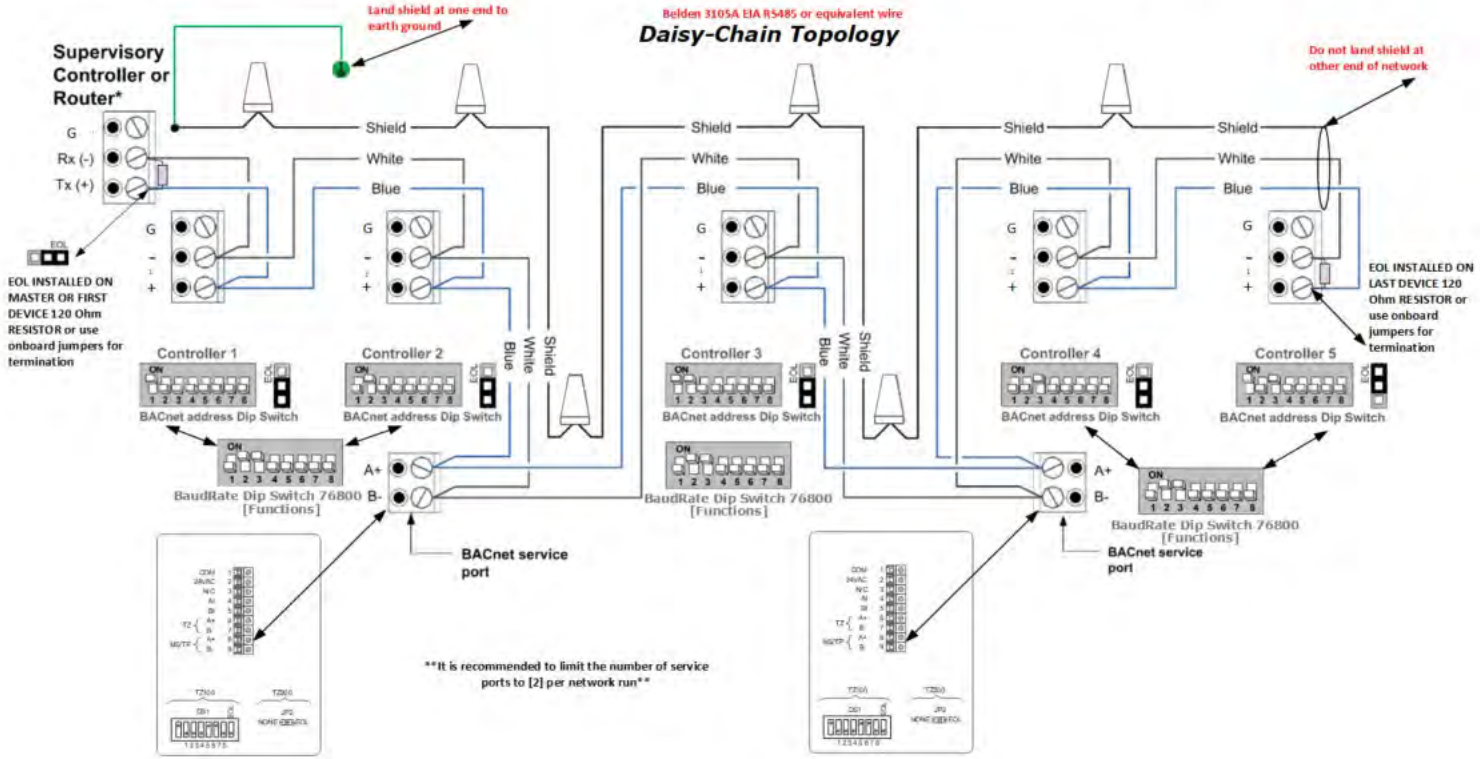
RS-485 Network Guidelines BP Controllers

The best way to ensure a robust and reliable RS-485 network is to build it around a daisy-chain configuration.

Connecting a multidrop 485 network.

The EIA RS-485 Specification labels the data wires "A" and "B", but many manufacturers label their wires "+" and "-". In our experience, the "+" wire should be connected to the "A" line, and the "-" wire to the "B" line. Reversing the polarity will not damage a 485 device, but it will not communicate. This said, the rest is easy: always connect + to + and - to -.

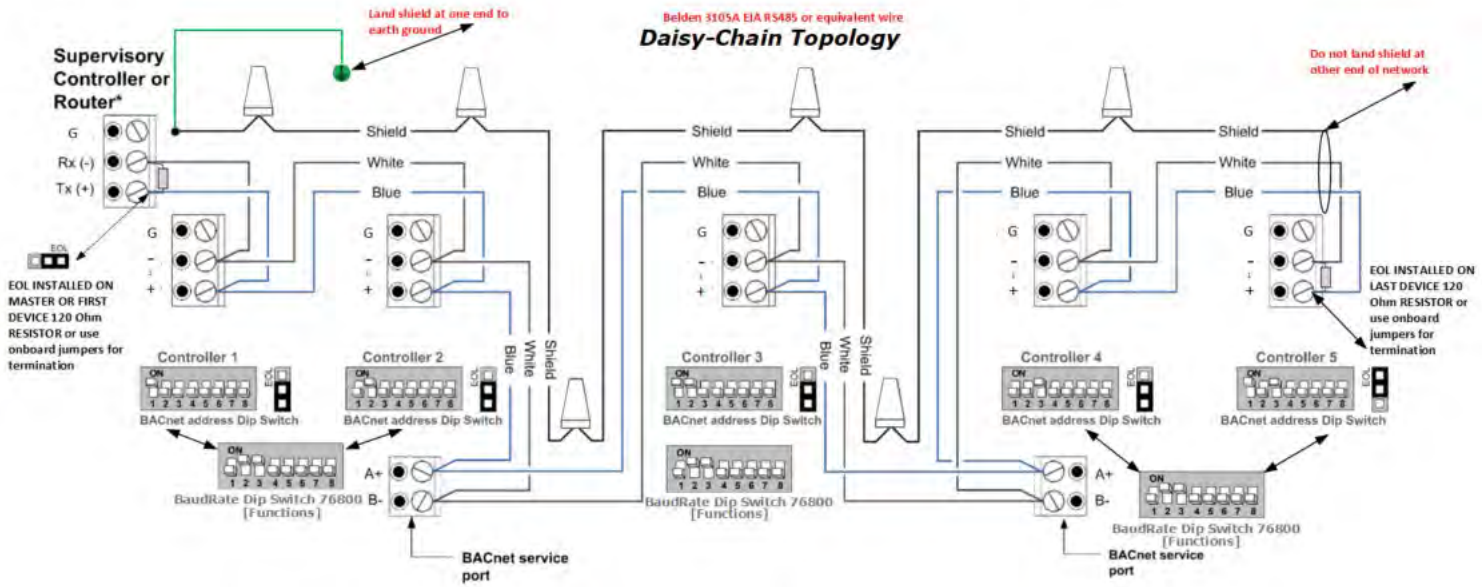
Signal ground, don't forget it. While a differential signal does not require a signal ground to communicate, the ground wire serves an important purpose. Over a distance of hundreds or thousands of feet there can be very significant differences in the voltage level of "ground." The function of the signal ground wire is to tie the signal ground of each of the nodes to one common ground. If the ground voltage rises above 3 Vac, data will be lost and often the port itself will be damaged. However, if the differences in signal grounds is too great, further attention is necessary.



RS-485 Network Guidelines

ONYXX® LX BY LYNXSPRING

RS-485 Network Guidelines BP Controllers



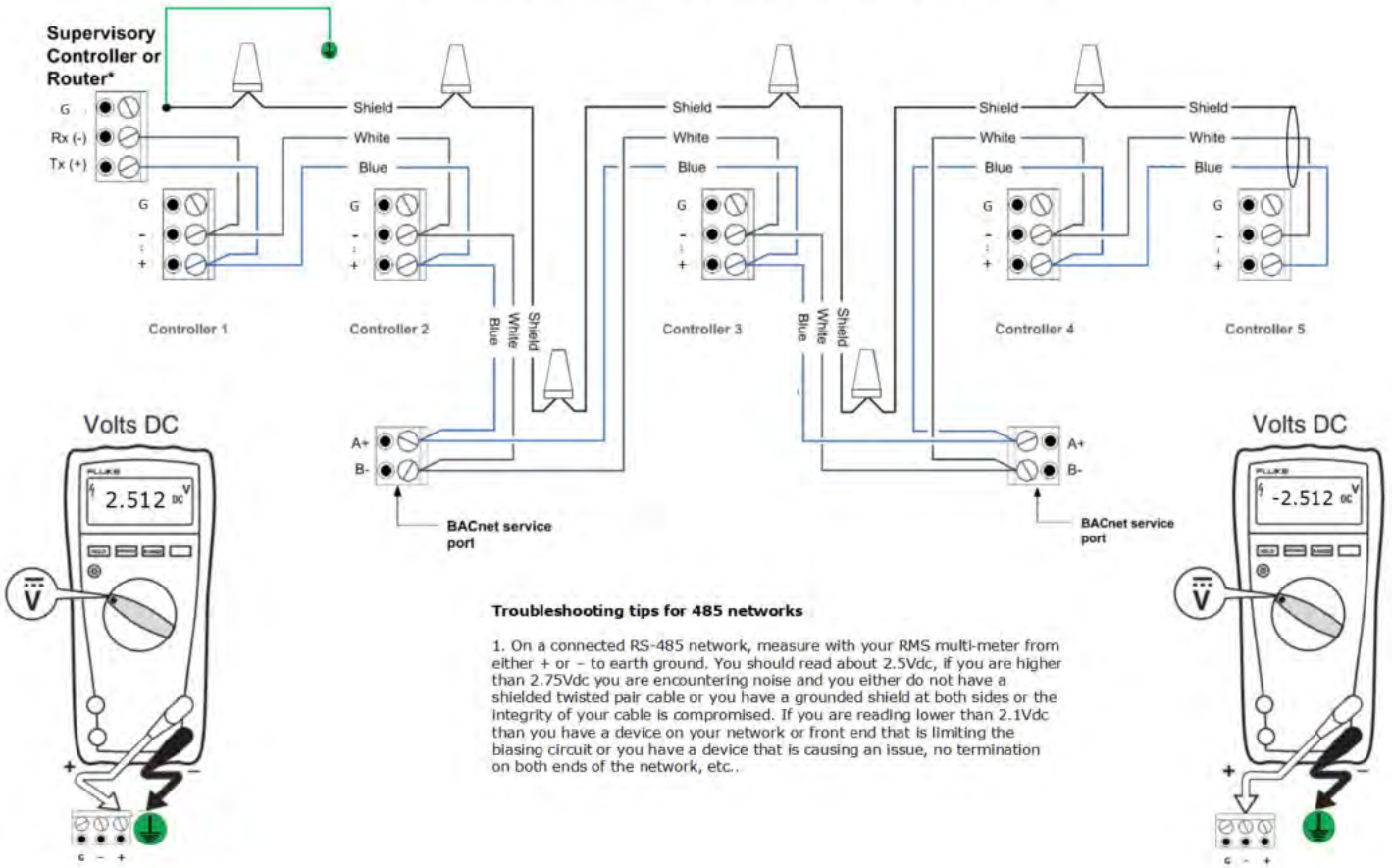
Troubleshooting tips for 485 networks

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.

RS-485 Network Guidelines

ONYXX® LX BY LYNXSPRING

RS-485 Network Guidelines BP Controllers

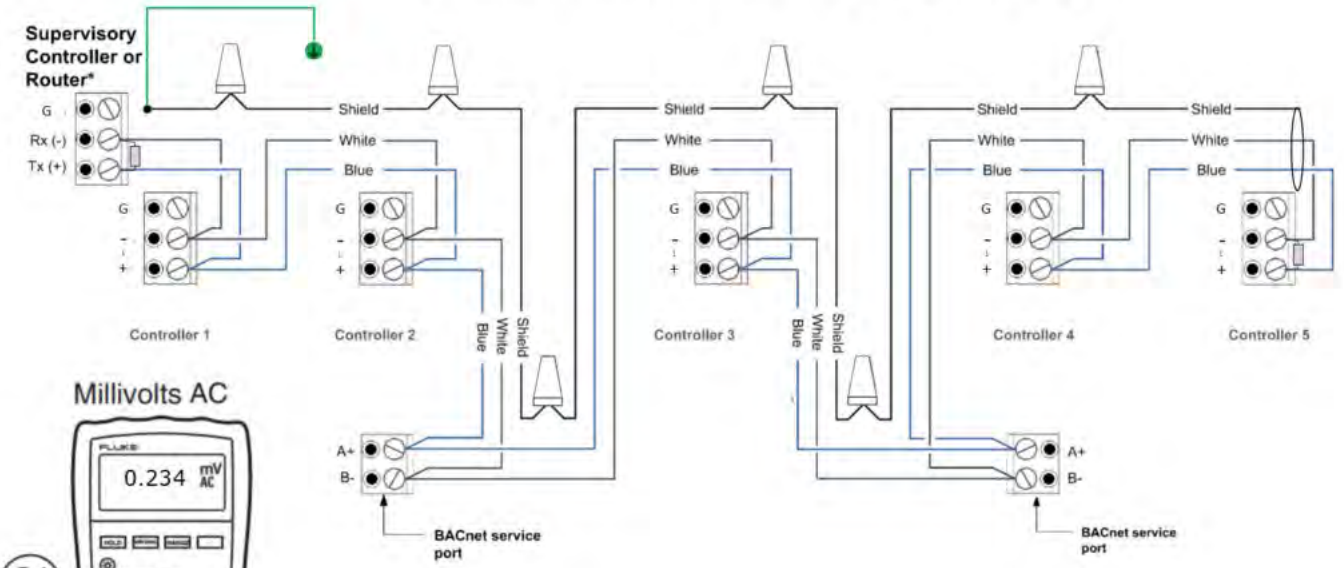


Troubleshooting tips for 485 networks

1. On a connected RS-485 network, measure with your RMS multi-meter from either + or – to earth ground. You should read about 2.5Vdc, if you are higher than 2.75Vdc you are encountering noise and you either do not have a shielded twisted pair cable or you have a grounded shield at both sides or the integrity of your cable is compromised. If you are reading lower than 2.1Vdc than you have a device on your network or front end that is limiting the biasing circuit or you have a device that is causing an issue, no termination on both ends of the network, etc..

RS-485 Network Guidelines

RS-485 Network Guidelines BP Controllers



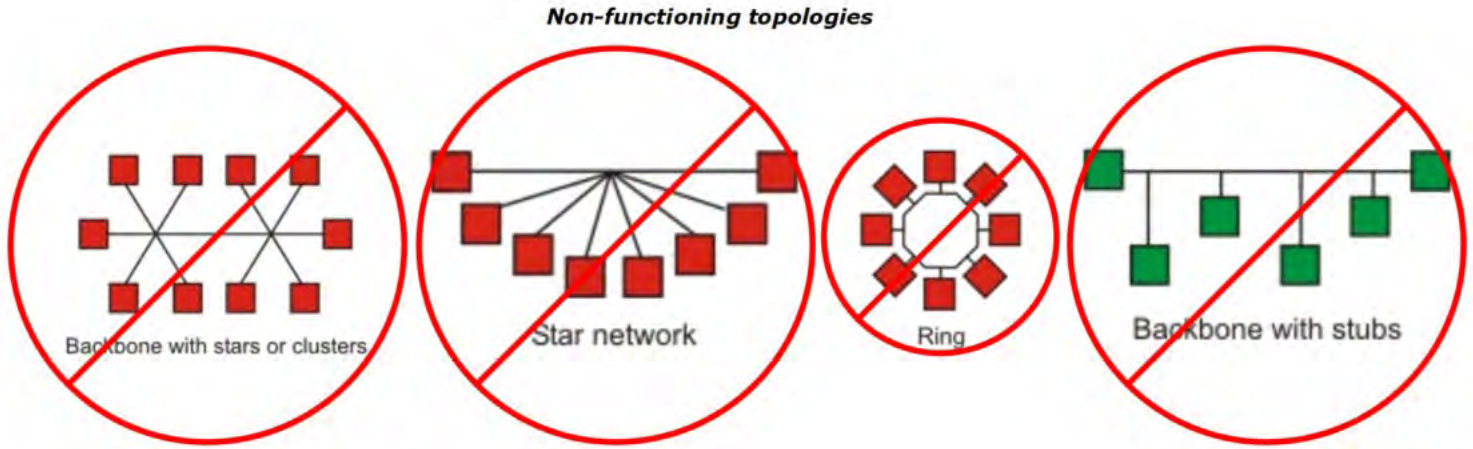
Troubleshooting tips for 485 networks

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.

RS-485 Network Guidelines

ONYXX® LX BY LYNXSPRING

RS-485 Network Guidelines BP Controllers



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
- RS-485 transceivers feature a 1/4-unit load receiver input impedance, allowing up to 128 transceivers on the bus. These devices are intended for half-duplex communications.
- BTL listed: B-ASC, BACnet Application Specific Controller
- Baud 9600, 19200, 38400, 76800 Bps (76800 default)
- Dip switch addressing
- EOL resistor built-in, jumper
- TZ Comm Bus
- 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
- 2 AO's can be 0 - 20mA.

Onboard 24Vdc 100mA output max:

24Vdc Output for 4-20mA transmitters Only
Not for use on Binary Outputs

Tzone wall interface:
- Tzone room sensor

Programming:
- Configurable using pre-loaded applications: Onyxx LX UI software

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.