BW437-FCU-LX (Fan Coil Unit)
Wall Controller Quick Guide

ONYXX® LX
BY LYNXSPRING

LYNXSPRING®
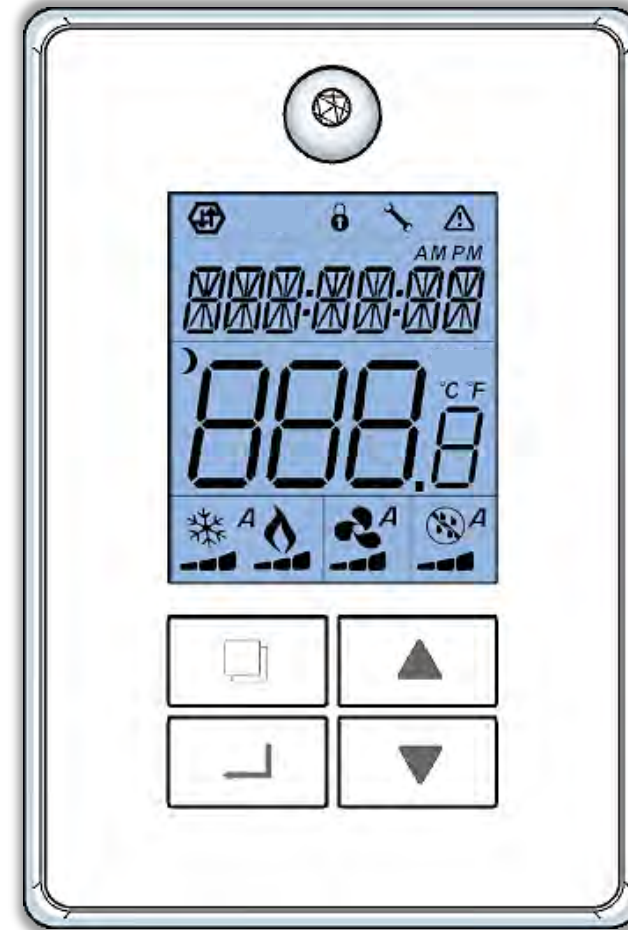
BW437-FCU-LX Quick Guide
Disclaimer

Please read this manual before proceeding to install this controller or any other Onyxx LX device.

This manual applies to *Onyxx LX UI software version 4.0* and higher and using *firmware version 1.050* and higher.

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

Installations shall be made by a properly certified technician and respect all local mandatory codes and regulations.

Electronic controls are static sensitive devices: discharge yourself properly before manipulating and installing a controller.

Any short circuit or incorrect wiring may permanently damage the controller or the controlled 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.

BW437-FCU-LX Quick Guide Symbol Definitions

The following table lists the symbols used in this document to denote certain conditions:

Symbol	Definition
ℹ️	ATTENTION: Identifies information that requires special consideration
▶️	TIP: Identifies advice or hints for the user, often in terms of performing a task
🔲	REFERENCE _ INTERNAL: Identifies an additional source of information within the bookset.
CAUTION	Indicates a situation which, if not avoided, may result in equipment or work (data) on the system being damaged or lost, or may result in the inability to properly operate the process.
⚠️	Indicates a situation where users must observe precautions for handling electrostatic sensitive devices.
⚠️	CAUTION: Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury. It may also be used to alert against unsafe practices.
⚠️	WARNING: Indicates a potentially hazardous situation which, if not avoided, could result in serious injury or death.

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BW437-FCU-LX Quick Guide Contents

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BW437-FCU-LX Quick Guide Models Available
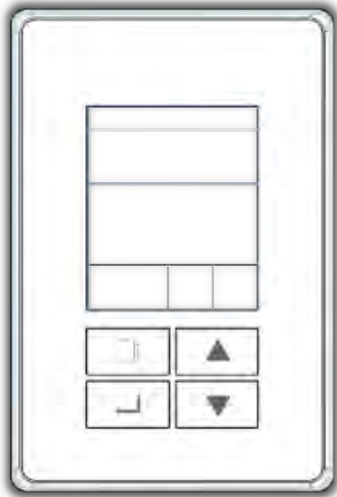
BW437-FCU-LX
Base Model
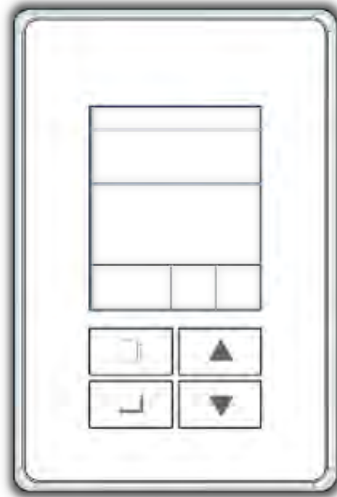
BW437H-FCU-LX
Base Model Base
Model *w/Humidity Sensor*
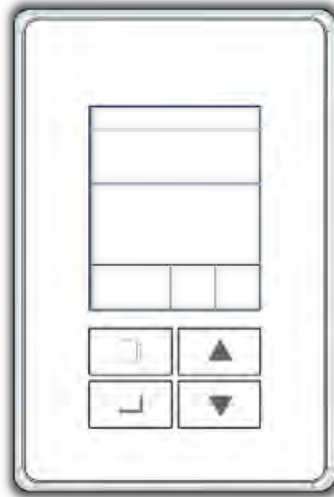
BW437HC-FCU-LX
Base Model
w/Humidity Sensor
w/CO2 Sensor
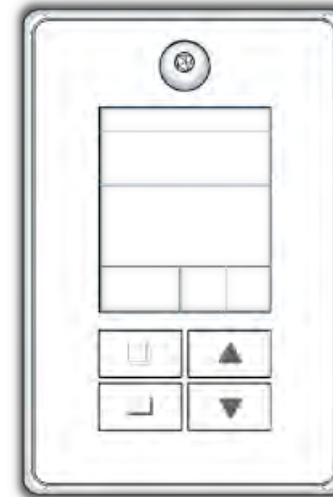
BW437MH-FCU-LX
Base Model
w/PIR Motion Sensor
w/Humidity Sensor
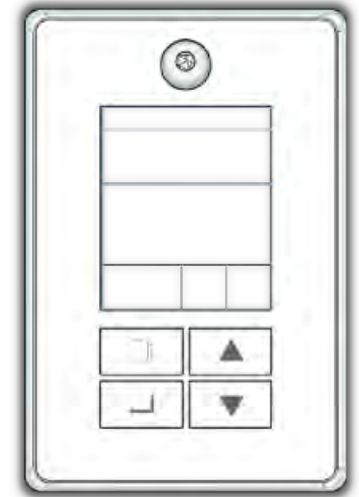
BW437MHC-FCU-LX
Base Model
w/PIR Motion Sensor
w/Humidity Sensor
w/CO2 Sensor

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Installation
BW437-FCU-LX Mounting Instructions

1. After unpacking your BW437-FCU-LX, unscrew the retaining screw at the bottom of the unit.

2. Gently pull the cover away from the base.
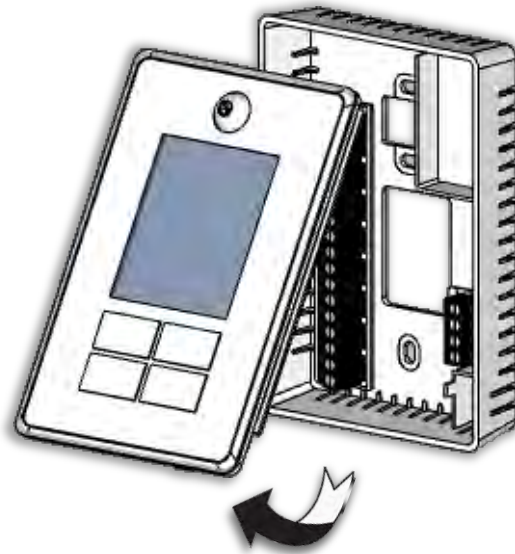
3. Pull the wires through the hole in the base.

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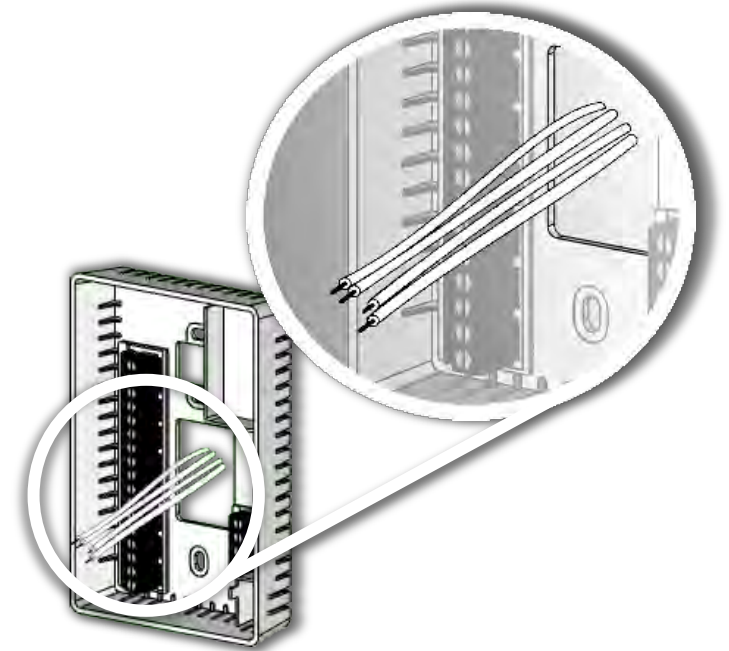
Installation
BW437-FCU-LX Mounting Instructions

4. Connect the wires to the terminal, referring to the chart inside the base for the proper connections.

5. Before replacing the cover, make sure that you have made any necessary modification to DIP switch or jumper settings (see "Jumper Settings").
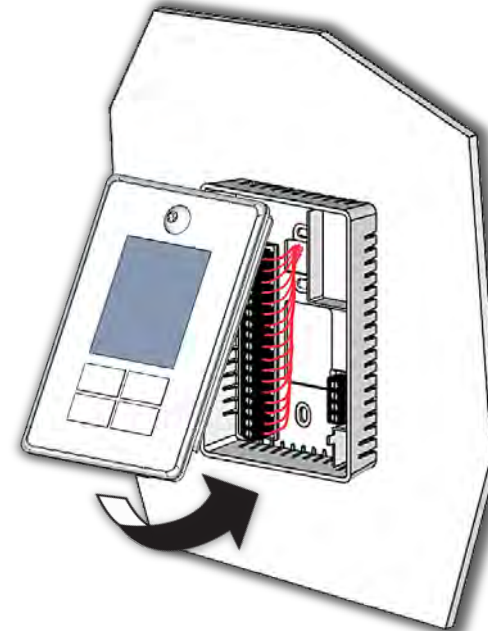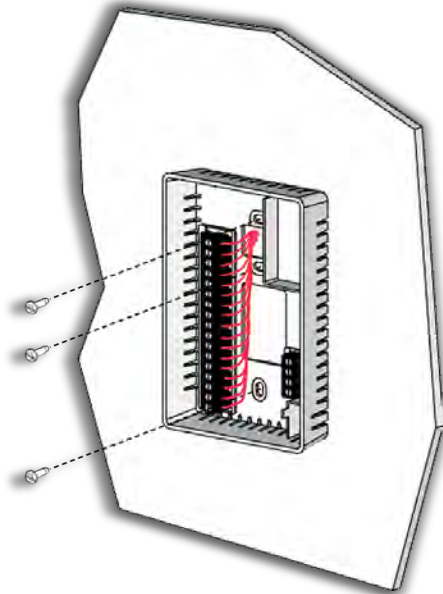
Electronic controls are static sensitive devices; discharge yourself properly before manipulating and installing the device.

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.

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Installation
Internal Jumper Settings

BW437

Power Supply

MS/TP Network

JP2

BO7

AO1

JP3

NONE

EOL
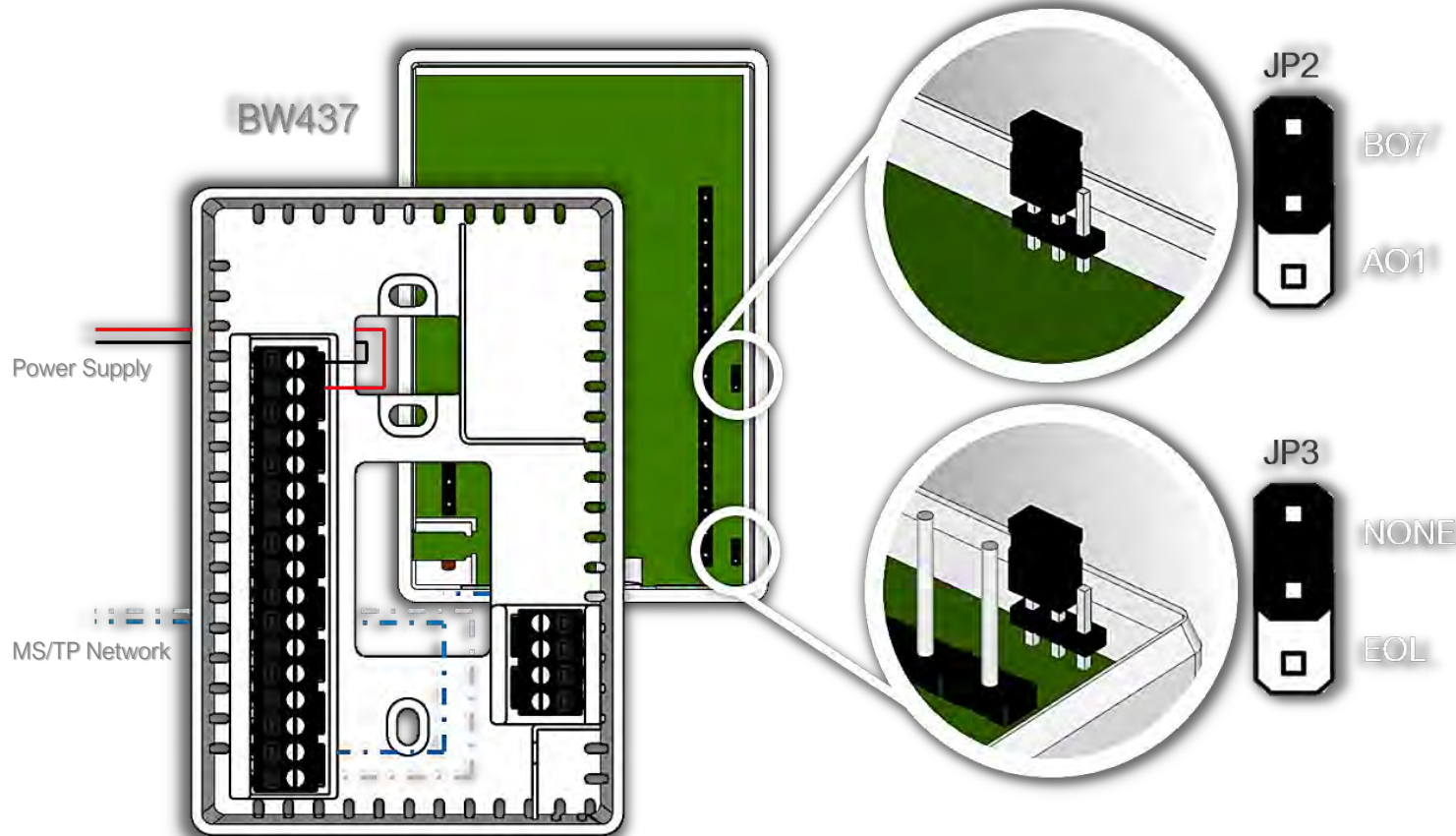
Jumpers setting:

JP2 to select between BO7 or AO1:

Jumper up = Using BO7 (Low Speed Fan)
Jumper down = Using AO1 (ECM)

JP3 enables EOL (120 Ohm):

Set jumpers to EOL position if this device is the last node of the BACnet MS/TP network.

Jumper up = EOL not activated
Jumper down = EOL activated

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Installation
Power Supply Connections

Wire size based on VA rating and distance from Power source

240-120/24VAC
Transformer

Add 24VAC transformer when the power is not supplied by the equipment

The BW437 must be powered using a Class 2, 24Vac transformer. When powering from a 24Vac transformer, do not ground either side of the transformer's secondary

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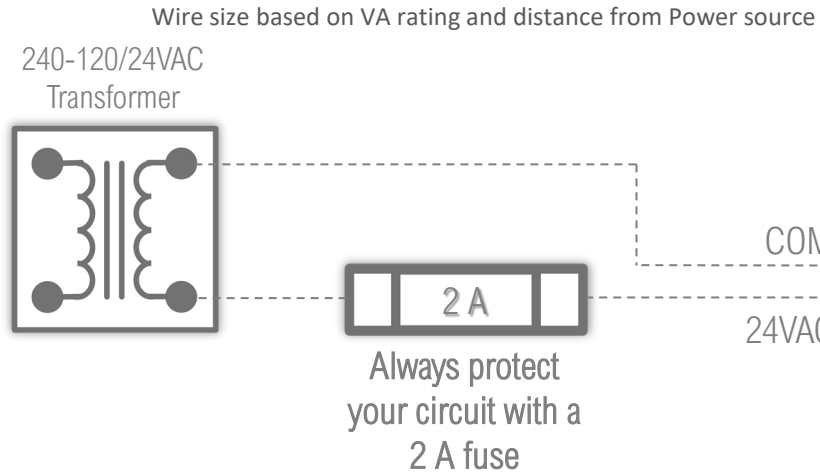
2 A

COM

24VAC

Always protect your circuit with a 2 A fuse

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.

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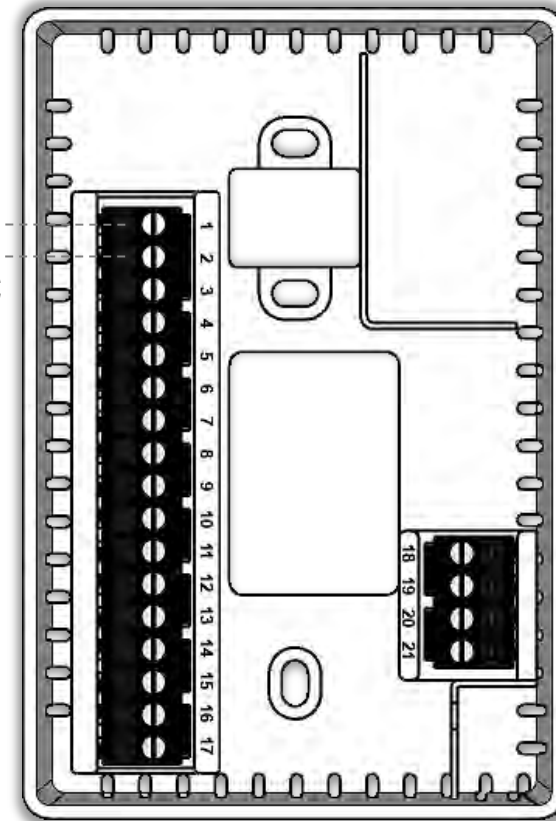
Installation
I/O Wiring Instructions

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

Terminal	Label
1	
2	
3	(R)
4	BO1
5	BO2
6	BO3
7	BO4
8	BO5
9	BO6
10	AO1/BO7
11	AO2
12	AO3
13	COM
14	AI1
15	AI2
16	A+ (MS/TP)
17	B- (MS/TP)

Terminal	Label
18	AO4
19	COM
20	AI3
21	AI4
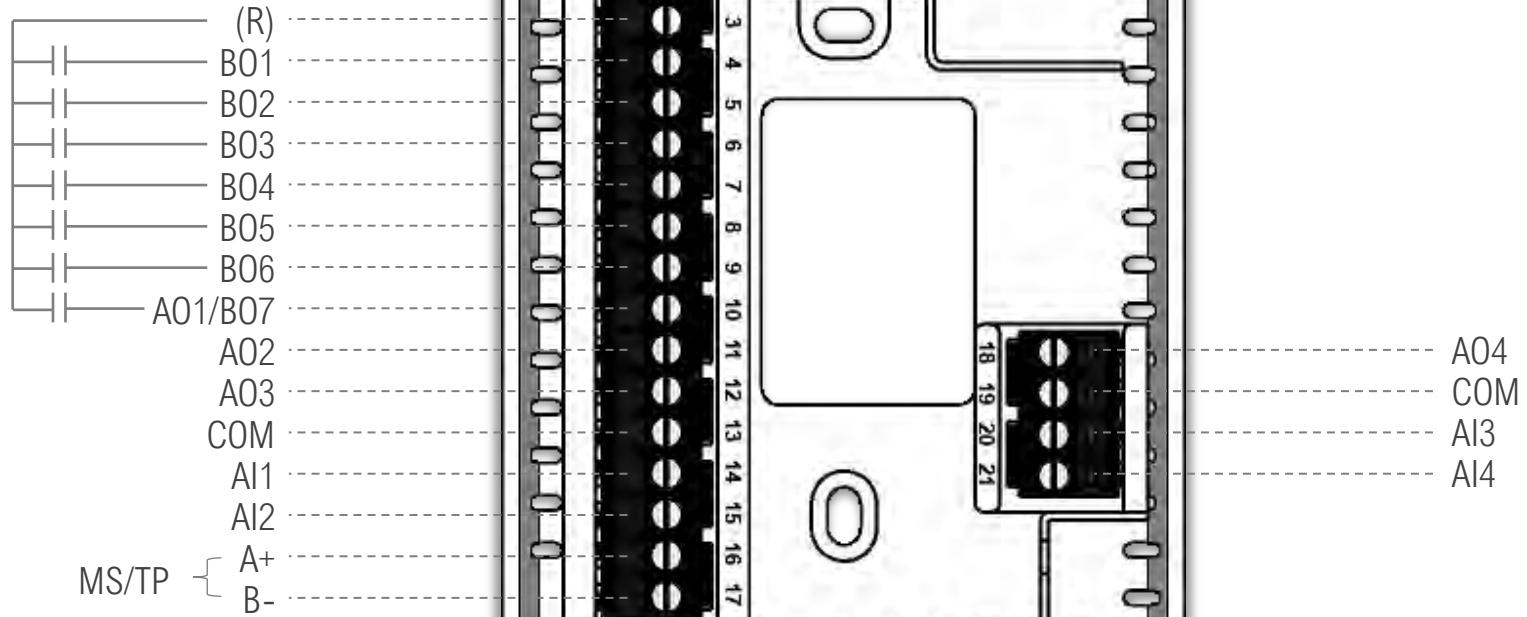
RS-485 Wire Required for communications wiring

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Supported Wire Size 28-16 AWG

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Installation
I/O Wiring Instructions

Fan			
Variable speed	3 speeds	2 speeds	1 speed
	High	High	High
	Medium		
	Low	Low	
Enable			

2 pipes		4 pipes		
On/Off	Floating	On/Off	Floating	
Heat NC valve	Open Cool/Heat	Cool NC valve	Open Cool	BO1
Heat NO valve	Close Cool/Heat	Cool NO valve	Close Cool	BO2
		Heat NC valve	Open Heat	BO3
0-10v Aux/Reheat	0-10v Aux/Reheat	Heat NO valve	Close Heat	BO4
				BO5
				BO6
				BO7
				AO1
Cool/Heat		Cool		AO2
		Heat		AO3
Alarm1	Alarm1	Alarm1	Alarm1	AI1
Alarm2	Alarm2	Alarm2	Alarm2	AI2
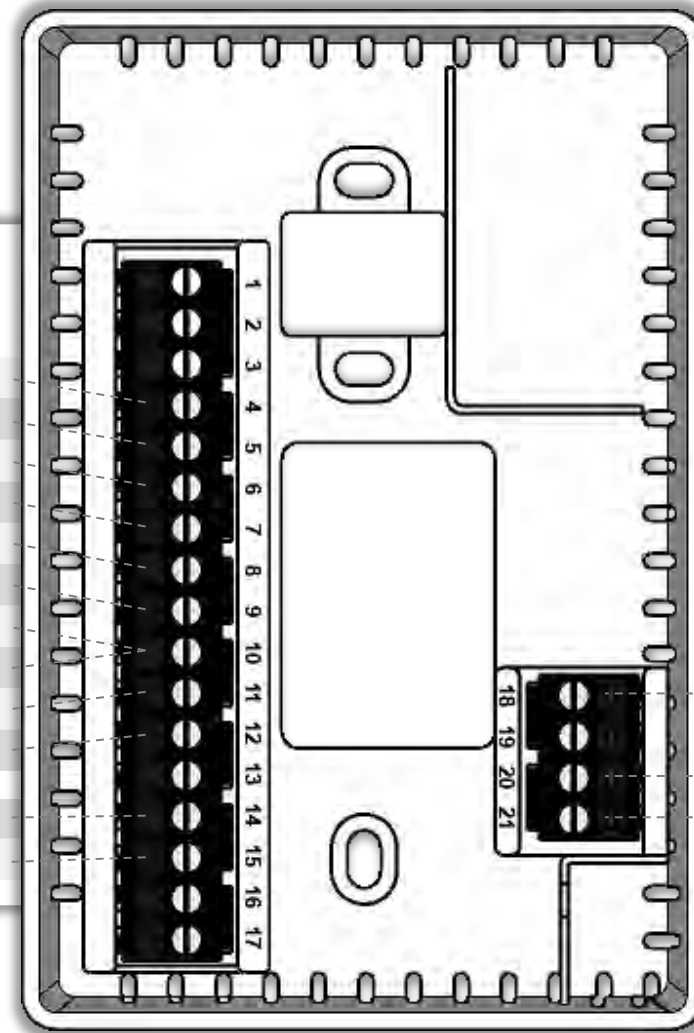
	2 pipes	4 pipes
AO4	0-10v Aux/Reheat	0-10v Aux/Reheat
AI3	ChangeOver	SupplyT
AI4	Remote Sensor	Remote Sensor

Factory Program Terminal Functions

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Parameters
Buttons

This section describes all the user adjustable interface functions of the BW437-FCU-LX

Hold for 3 seconds to display the device Name

Hold for 7 seconds to Enable or Disable PIR state screen display. The backlight display will follow the PIR movement detection for a few minutes

Hold for 3 seconds to display the device Model

System Mode

Up

Fan Mode

Down
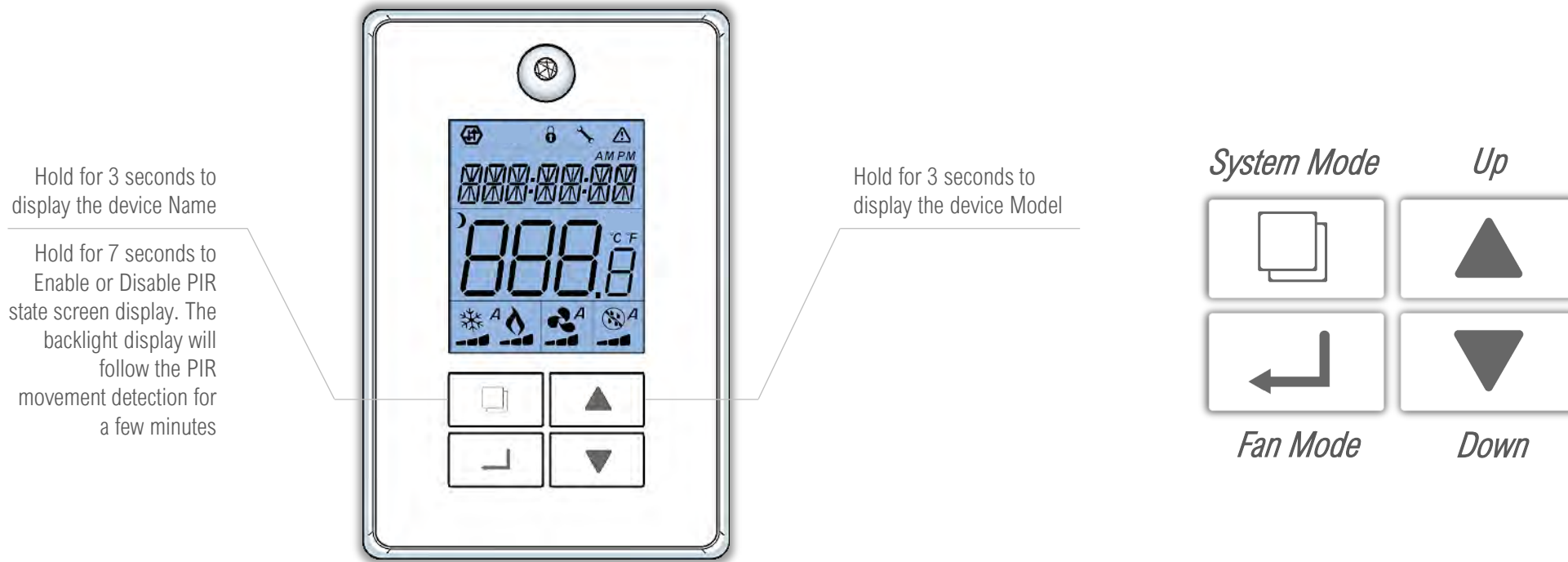
Please note that attempting to adjust the Setpoint using the arrows, in unoccupied mode, will automatically set the controller to Override / Day / Occupied mode

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Display Icons
Local LCD

Icon	Description
(signal icon)	The signal icon indicates network connection status Visible and fixed static = Online to both the BACnet MSTP network and the Strato Automation server Blinking = Online to the BACnet MSTP network only
(lock icon)	The lock icon indicates that setpoints have been locked from the network and cannot be modified by the thermostat keys
(wrench icon)	The wrench icon indicates that the device is in configuration mode
(warning icon)	The warning icon indicates that there may be MSTP communication errors / problem (invalid frames) Check wiring and use an MSTP sniffer tool if necessary
AM PM	Displays whether the time is AM or PM
888.8 °C °F	This line displays the room temperature or room setpoint Use up and down arrows to temporarily modify the display setpoint
888:88:88	Displays the time (hh:mm) on the first line and the day of the week.
(moon icon)	Icon to display night mode / unoccupied.
(water droplet icon) A	The water droplet icon indicates whether the dehumidification or humidification process is on and working The segmented bar indicates whether the humidifier is at 33, 66 or 100% output capacity The A indicates that the humidity function is in Automatic mode
(fan icon) A	The fan icon indicates that fan is on and working The segmented bars indicates whether the fan in 1st, 2nd or 3rd speed The A indicates that the Fan mode is in Automatic mode
(snowflake icon) A	The snowflake indicates that cooling process is on and working The segmented bar indicates whether the cooling is at 33, 66 or 100% output capacity The A indicates that the cooling function is in Automatic mode
A (flame icon)	The flame indicates that heating process is on and working The segmented bar indicates whether the heating is at 33, 66 or 100% output capacity The A indicates that the heating function is in Automatic mode
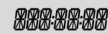
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Using the menus
Network Configuration Settings

A Set the BW437-FCU's configuration in the "CONFIG MODE" directly on the BW437-FCU's screen using the keypad. To be able to do so, press simultaneously ⬜ and ↵ buttons for 3 seconds.

B Press these PIN keys in sequence on the BW437-FCU's keypad ⬜ ⬜ ▲
CONFIG MODE will blink on the screen

C Press the ⬜ button to start cycling thought the configuration menus .

D Press ⬜ button to cycle through each parameter
Access any configuration menu by pressing ↵ on the menu's display screen,
Using the ▲ ▼ and the ⬜ button, adjust each digit to the desired value.
When done, press ↵ once more to confirm the new value.

E Accept to SAVE by selecting YES and pressing ↵

A

B ENTER PIN

B ⬜ ⬜ ▲

C MODE CONFIG

E SAVE YES

D INSTANC 213000

ADDRESS 126

NETWORK 1000

BAUDRAT 76800

MAXFRAM 10

MAXMAST 127

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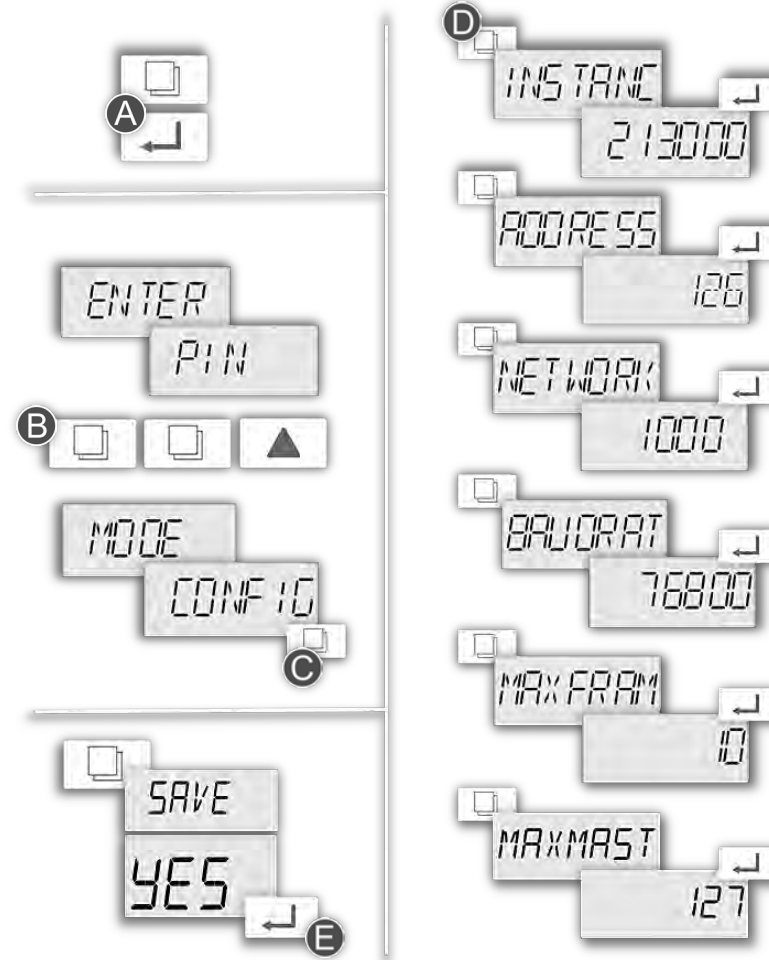
A Access the "SETUP MENU" directly on the BW437FCU's screen using the keypad. To be able to do so, press simultaneously [ ] and [↵] buttons for 3 seconds.

B Press these PIN keys in sequence on the BW437FCU's keypad [▲] [▲] [▲]
SETUP will appear on the screen for 1 second

C The first configurable object to be displayed in the SETUP menu is the PIPENUM
This is the one used for this next example
The object name and the actual configuration will blink alternatively on screen.
Note that the same steps apply to any other configurable object

D Use the [▲] [▼] to change the object SETUP configuration

E When the value is as wanted, press [ ] or [↵] to save the settings and switch to the next object

F To exit SETUP menu, scroll to the QUIT menu using [ ]

G Press [↵] when YES is displayed

ENTER
PIN

B ▲ ▲ ▲

A [ ] [↵]
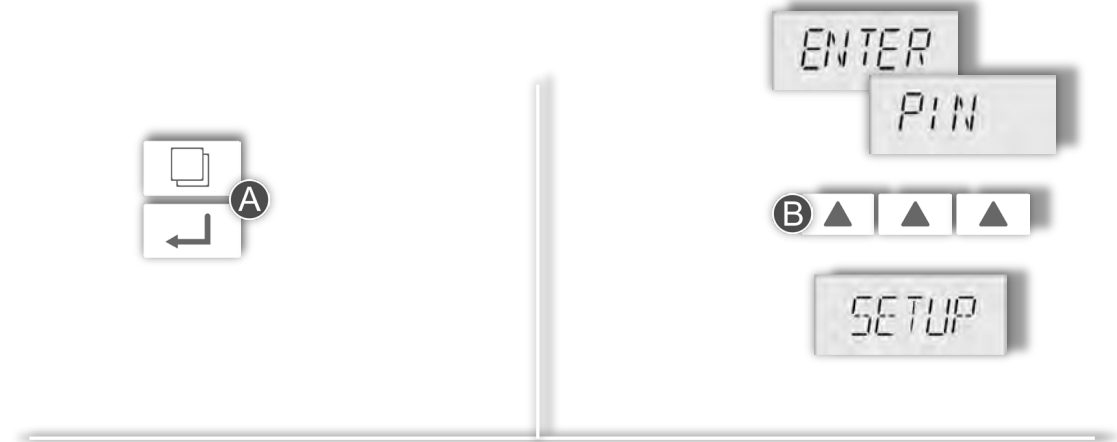
SETUP

	MSV52	BV75	MSV15	MSV58	MSV55	MSV54	MSV46	MSV47	MSV48	BV51	**F**
SETUP											
C PIPENUM	VALVCTL	SCOOPER	FAN_SEO	REHEAT	AUX_CFG	AI1_CFG	AI2_CFG	AI3_CFG	T_UNITS	QUIT	
2 PIPES	ON/OFF	COOLING	L-M-H-A	BASEBRD	NETWORK	NONE	NONE	NONE	IMPER	YES **G**	

SEt **D**

▲ ▼

2 PIPES 4 PIPES

E

Using the menus
Setup menus (quick setup)

SETUP

Object Instance	Setup menu	Description	Options	Function
MSV52	PipeNum	Pipe number installed	2 Pipes	Sets for a 2 pipes system where the same coil is used for heating and cooling
			4 Pipes	Sets for a 4 pipes system with separate heating and cooling coils
BV75	VALVCTL	Valve motors control type	On/Off	Sets the system for using either NO or NC on/off control valves
			Floating	Sets the system for using floating type (Open/Neutral/Close) control valves
MSV15	SeqOper	Control sequence of operation	Cooling	See cooling only sequence below
			Heating	See heating only sequence below
		Sets the main sequence of operation of the controller. System modes (MSV16) not supported will be rejected	Cool-Rt	See cooling with reheat sequence below
			Heat-Rt	See heating with reheat sequence below
			Cl-Ht	See cooling / heating sequence below
			Cl-Ht-R	See cooling / heating with reheat sequence below

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Using the menus
Setup menus (quick setup)

SETUP

Object Instance	Setup menu	Description	Options	Function
MSV58	Fan_Seq	Control fan sequence	L-M-H	Sets the system for regular 3 speeds fan control (Low-Med-High)
			L-H	Sets the system for 2 speeds fan control (Low-High)
			L-M-H-A	Sets the system for 3 speeds fan control with automatic mode (Low-Med-High-Auto)
			L-H-A	Sets the system for 2 speeds fan control with automatic mode (Low-High-Auto)
			On-Auto	Sets the system for single speed fan control (On-Auto) On/Off or Modulating fan control
MSV55	Reheat	Reheat type	Basebrd	Sets the reheat device as a perimeter heating equipment like a baseboard (water or electric)
			Coil	Sets the reheat device like an electric duct heater as a second stage of heat if needed
MSV54	Aux_CFG	Auxiliary output configuration	Reheat	Sets the reheat output BO4 to be used as a control reheat output as per MSV15 & 55
			Occ-NO	Sets the device output BO4 to follow the local occupancy mode where Occ=Closed
			Occ-NC	Sets the device output BO4 to follow the local occupancy mode where Occ=Opened
			Fan-NO	Sets output BO4 to follow the local occupancy mode when fan is On Occ=Closed
			Fan-NC	Sets output BO4 to follow the local occupancy mode when fan is On Occ=Opened
			Network	Sets the device output BO4 to follow object BV14 Aux_cmd

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Using the menus
Setup menus (quick setup)

SETUP

Object Instance	Setup menu	Description	Options	Function
MSV46	AI1_CFG	Analog input 1 configuration	None	Sets the configuration of AI1 to none. Analog status of input can still be read via AI1 object
			Rem NSB	Sets the configuration of AI1 to use a remote time clock contact for occupancy
			Mot-NO	Sets the configuration of AI1 to use a remote PIR sensor for occupancy where Closed=Occ
			Mot-NC	Sets the configuration of AI1 to use a remote PIR sensor for occupancy where Opened=Unocc
			Window	Sets the configuration of AI1 to use a remote window switch for automatic Unocc mode monitor with BV35
MSV47	AI2_CFG	Analog input 2 configuration	None	Sets the configuration of AI2 to none. Analog status of input can still be read via AI2 object
			DoorDry	Sets the configuration of AI2 to use a remote door switch for automatic Unocc mode with AI1=Windows
			Overrid	Sets the configuration of AI2 to use a remote local override switch to by-pass Unocc mode
			Filter	Sets the configuration of AI2 to use a remote local pressure switch for filter status monitoring BV36
			Service	Sets the configuration of AI2 to use a remote local service contact for a local alarm display BV37
MSV48	AI3_CFG	Analog input 3 configuration	None	Sets the configuration of AI3 to none. Analog status of input can still be read via AI3 object
			COC/NH	Sets the configuration of AI3 to use a remote Normally Heat ChangeOverContact for a 2 pipes system
			COC/NC	Sets the configuration of AI3 to use a remote Normally Cool ChangeOverContact for a 2 pipes system
			COS	Sets the configuration of AI3 to use a remote 10K changeover sensor for a 2 pipes system via AV13 object
			SS	Sets the configuration of AI3 to use a remote monitoring 10K sensor via AV12 object

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Application FCU – Typical Control Curves
Temperature control (PID loops)

ChangeOver

Cooling — Heating

63°F 64°F 65°F

Temperature °F

PIDZoneHeat (Loop 2)   100   PIDZoneCool (Loop 1)

100% Loop Output   100% Loop Output

0   0

Reverse Action | Direct Action

-10°F   -5   -3   +3   +5   +10°F

ActiveHeatSP   Deadband 2°F..5°F   ActiveCoolSP
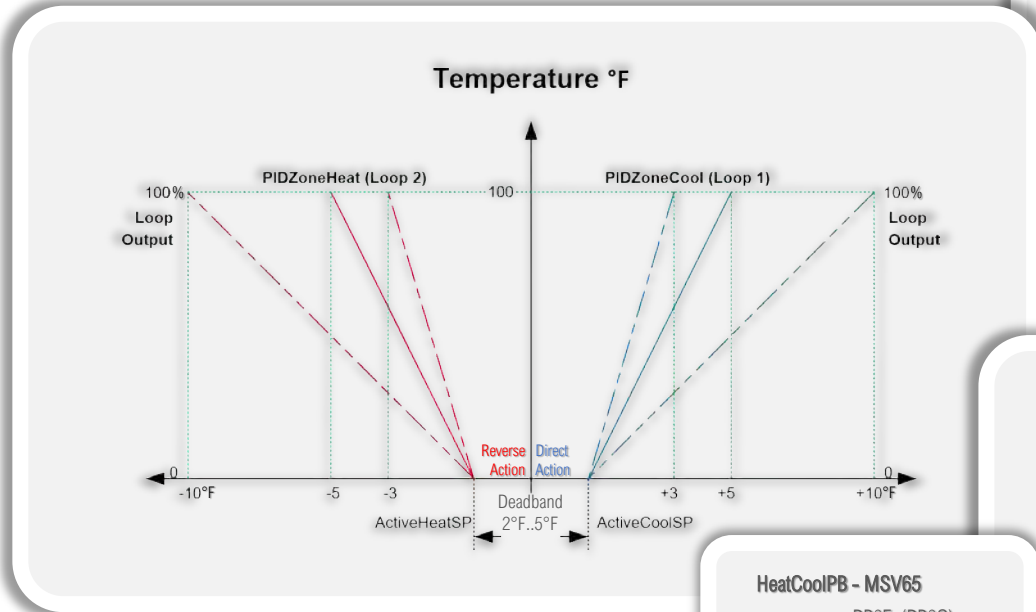
PIDZoneHeat(Loop2) relates to Heating demand(AV21)
PIDZoneCool(Loop1) relates to Cooling demand(AV22)
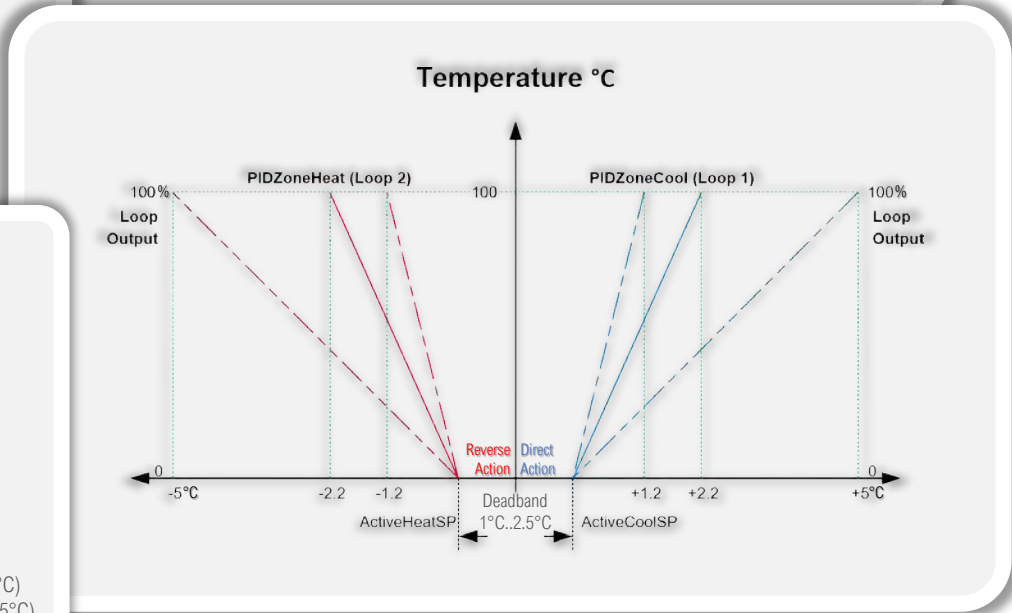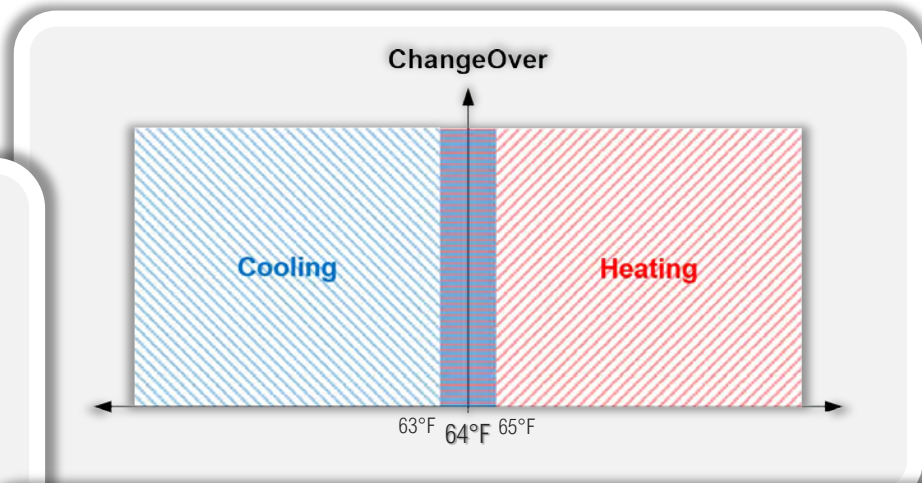
HeatCoolPB – MSV65

	PB°F	(PB°C)
	3°F	(1.2°C)
	4°F	(1.7°C)
	5°F	(2.2°C)
	6°F	(2.8°C)
	7°F	(3.3°C)
	8°F	(3.9°C)
	9°F	(5.0°C)
	10°F	(5.6°C)
Default :	5°F	(2.2°C)

SetpointDB – AV63

	Min:	2°F	(1°C)
	Max:	5°F	(2.5°C)
Default :	Min:	2°F	(1°C)

Temperature °C

PIDZoneHeat (Loop 2)   100   PIDZoneCool (Loop 1)

100% Loop Output   100% Loop Output

0   0

Reverse Action | Direct Action

-5°C   -2.2   -1.2   +1.2   +2.2   +5°C

ActiveHeatSP   Deadband 1°C..2.5°C   ActiveCoolSP

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Installation
I/O Wiring & Sequence

4 pipes – Modulating 0-10 VDC valves

Cooling demand > 25% for at least 180 seconds
Mode is Auto or Cool *(MSV16)*
Fan is running
Window contact is Closed *(BV35 if used)*

Heating demand > 25% for at least 180 seconds
Mode is Auto or Heat *(MSV16)*
Fan is running
Window contact is Closed *(BV35 if used)*

Analog (AO2)

100

25

0

10 25   CoolDemand (%)   100

Analog (AO3)

100

25

0

10 25   HeatDemand (%)   100

Wiring terminals:

COM	1
24VAC	2
(R)	3
BO1	4
BO2	5
BO3	6
BO4	7
BO5	8
BO6	9
AO1/BO7	10
AO2	11
AO3	12
COM	13
AI1	14
AI2	15
A+	16
B-	17
AO4	18
COM	19
AI3	20
AI4	21

JP2 / BO7 / AO1

JP3 / NONE / EOL

MS/TP

S 24 C — COOL

S 24 C — HEAT

4 pipes – modulating 0-10 VDC valves

Add 24VAC transformer when the power is not supplied by the equipment

Sequence of operation

Occupied Mode: Setpoints will revert to those defined by occupied cooling and heating setpoints.

Stand-by Mode (only available when PIR models are used): Setpoints will revert to those defined by stand-by cooling and heating setpoints.

Unoccupied Mode: Setpoints will revert to those defined by unoccupied heating and cooling setpoints.

Occupied Override Mode: The system will revert to occupied mode for the duration determined by the "OvrTime" parameter

On a call for cooling: Cooling valve will modulate to maintain room temperature. Heating valve is closed.

On a call for heat: Heating valve will modulate to maintain room temperature. Cooling valve is closed.

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Installation
I/O Wiring & Sequence
4 pipes – floating valves
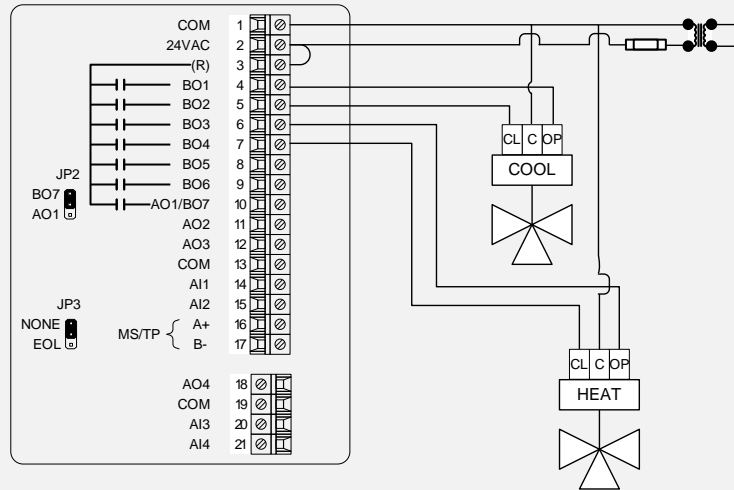
4 pipes – floating valves

Add 24VAC transformer when the power is not supplied by the equipment

ONYXX® LX
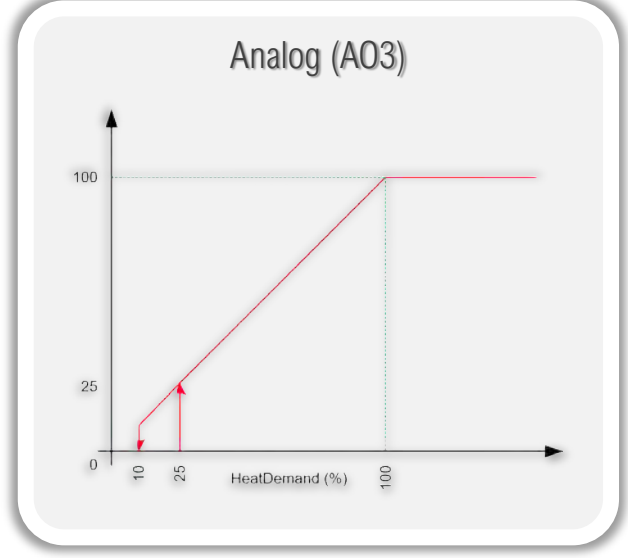BY LYNXSPRING

Cooling demand > 25% for at least 180 seconds
Mode is Auto or Cool *(MSV16)*
Fan is running
Window contact is Closed *(BV35 if used)*

Heating demand > 25% for at least 180 seconds
Mode is Auto or Heat *(MSV16)*
Fan is running
Window contact is Closed *(BV35 if used)*

Floating (BO1&2)

Floating (BO3&4)

Sequence of operation

Occupied Mode: Setpoints will revert to those defined by occupied cooling and heating setpoints.

Stand-by Mode (only available when PIR models are used): Setpoints will revert to those defined by stand-by cooling and heating setpoints.

Unoccupied Mode: Setpoints will revert to those defined by unoccupied heating and cooling setpoints.

Occupied Override Mode: The system will revert to occupied mode for the duration determined by the "OvrTime" parameter

On a call for cooling: Cooling valve will modulate to maintain room temperature. Heating valve is closed.

On a call for heat: Heating valve will modulate to maintain room temperature. Cooling valve is closed.

Installation
I/O Wiring & Sequence
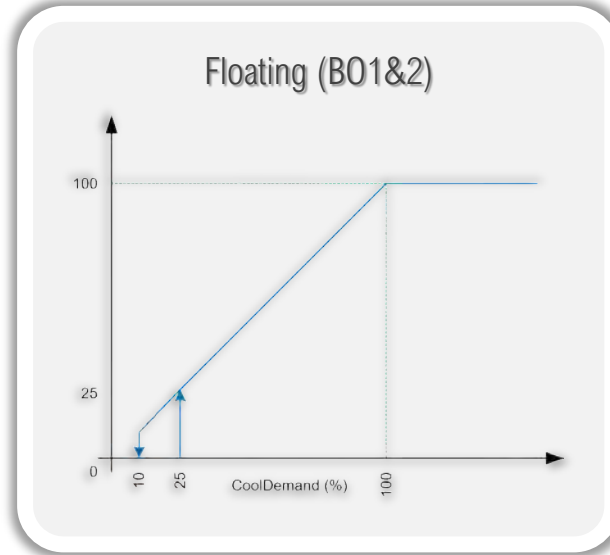### 4 pipes – on/off N.C. valves

4 pipes – on/off N.C. valves

Add 24VAC transformer when the power is not supplied by the equipment

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Cooling demand > 25% for at least 180 seconds
Mode is Auto or Cool *(MSV16)*
Fan is running
Window contact is Closed *(BV35) if used*

Heating demand > 25% for at least 180 seconds
Mode is Auto or Heat *(MSV16)*
Fan is running
Window contact is Closed *(BV35) if used*

On/Off N.C. valve (BO1)

On/Off N.C. valve (BO3)

Sequence of operation

Occupied Mode: Setpoints will revert to those defined by occupied cooling and heating setpoints.

Stand-by Mode (only available when PIR models are used): Setpoints will revert to those defined by stand-by cooling and heating setpoints.

Unoccupied Mode: Setpoints will revert to those defined by unoccupied heating and cooling setpoints.

Occupied Override Mode: The system will revert to occupied mode for the duration determined by the "OvrTime" parameter

On a call for cooling: Cooling valve will open to maintain room temperature. Heating valve is closed.

On a call for heat: Heating valve will open to maintain room temperature. Cooling valve is closed.

Installation
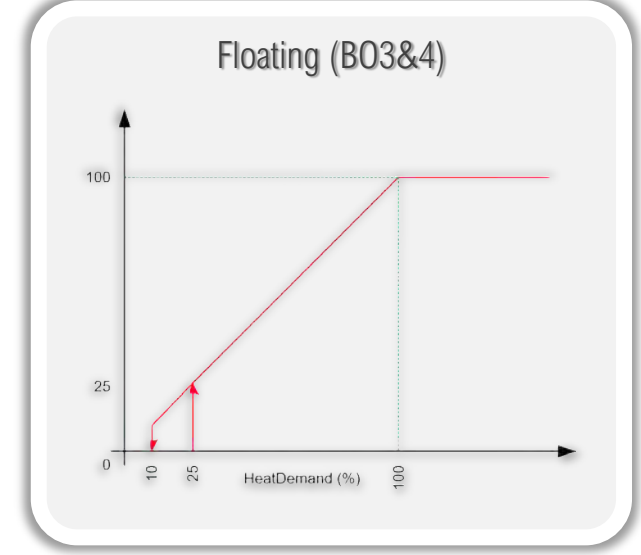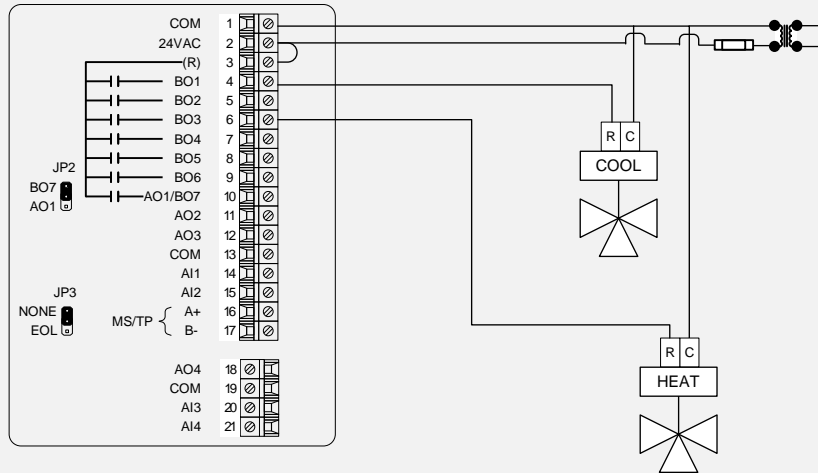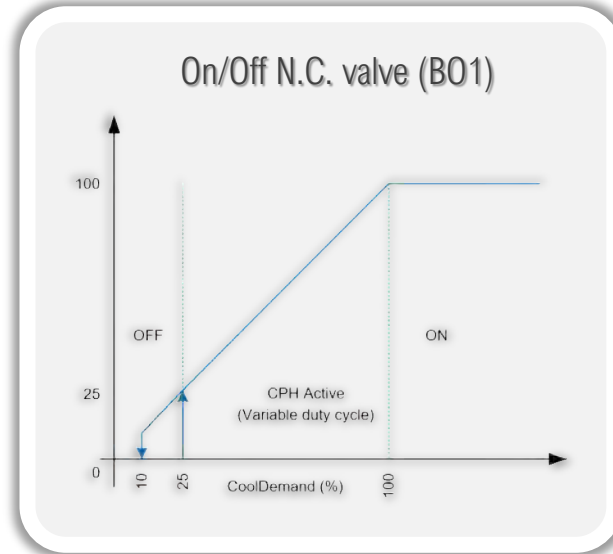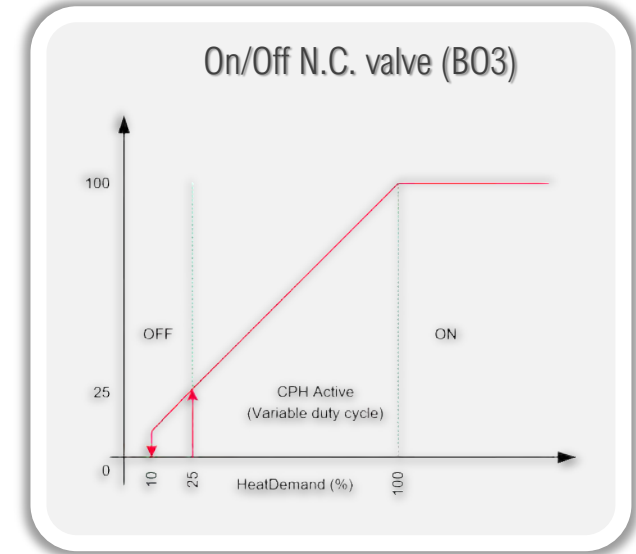## I/O Wiring & Sequence
4 pipes – on/off N.O. valves

4 pipes – on/off N.O. valves

Add 24VAC transformer when the power is not supplied by the equipment

Cooling demand > 25% for at least 180 seconds
Mode is Auto or Cool *(MSV16)*
Fan is running
Window contact is Closed *(BV35) if used*

Heating demand > 25% for at least 180 seconds
Mode is Auto or Heat *(MSV16)*
Fan is running
Window contact is Closed *(BV35) if used*

On/Off N.O. valve (BO2)

On/Off N.O. valve (BO4)

Sequence of operation

Occupied Mode: Setpoints will revert to those defined by occupied cooling and heating setpoints.

Stand-by Mode (only available when PIR models are used): Setpoints will revert to those defined by stand-by cooling and heating setpoints.

Unoccupied Mode: Setpoints will revert to those defined by unoccupied heating and cooling setpoints.

Occupied Override Mode: The system will revert to occupied mode for the duration determined by the "OvrTime" parameter

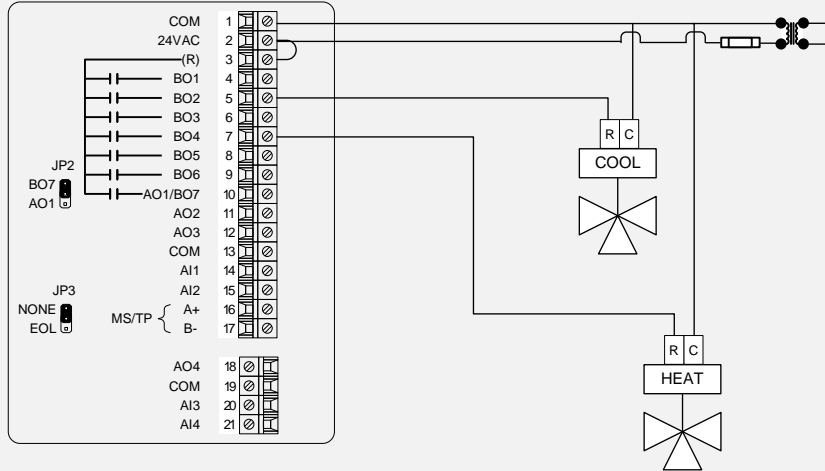**On a call for cooling:** Cooling valve will open to maintain room temperature. Heating valve is closed.

On a call for heat: Heating valve will open to maintain room temperature. Cooling valve is closed.
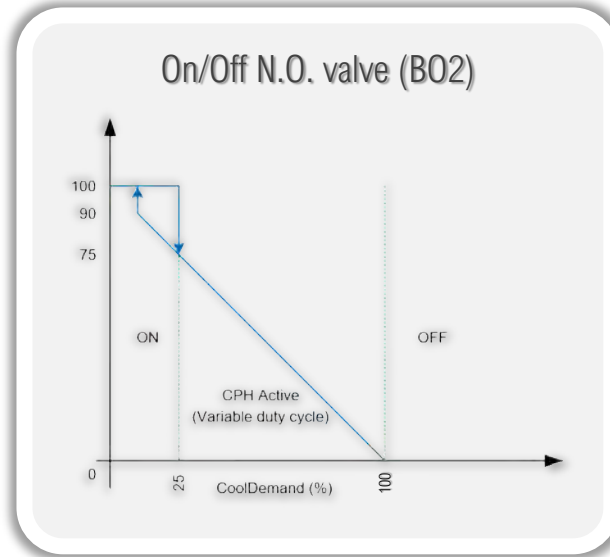
Installation
I/O Wiring & Sequence
2 pipes – modulating 0-10 VDC valve

COM 1
24VAC 2
(R) 3
BO1 4
BO2 5
BO3 6
BO4 7
BO5 8
BO6 9
AO1/BO7 10
AO2 11
AO3 12
COM 13
AI1 14
AI2 15
A+ 16
B- 17
AO4 18
COM 19
AI3 20
AI4 21

JP2
BO7
AO1

JP3
NONE
EOL
MS/TP

S 24 C
COOL / HEAT

COS

2 pipes – modulating 0-10 VDC valve
*COS : Change Over Sensor

Add 24VAC transformer when the power is not supplied by the equipment

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Cooling demand > 25% for at least 180 seconds
Mode is Auto or Cool *(MSV16)*
Fan is running
Window contact is Closed *(BV35 if used)*

Heating demand > 25% for at least 180 seconds
Mode is Auto or Heat *(MSV16)*
Fan is running
Window contact is Closed *(BV35 if used)*

Analog (AO2)

100

25

0

10 25 CoolDemand (%) 100

Analog (AO2)

100

25

0

10 25 HeatDemand (%) 100

Sequence of operation

Occupied Mode: Setpoints will revert to those defined by occupied cooling and heating setpoints.

Stand-by Mode (only available when PIR models are used): Setpoints will revert to those defined by stand-by cooling and heating setpoints.

Unoccupied Mode: Setpoints will revert to those defined by unoccupied heating and cooling setpoints.

Occupied Override Mode: The system will revert to occupied mode for the duration determined by the "OvrTime" parameter

On a call for cooling: If the supply water temperature is less than 17.0°C (63F). Cooling valve will modulate to maintain room temperature. Heating valve is closed.

On a call for heat: If the supply water temperature is greater than 18.5°C (65F). Heating valve will modulate to maintain room temperature. Cooling valve is closed.

Installation
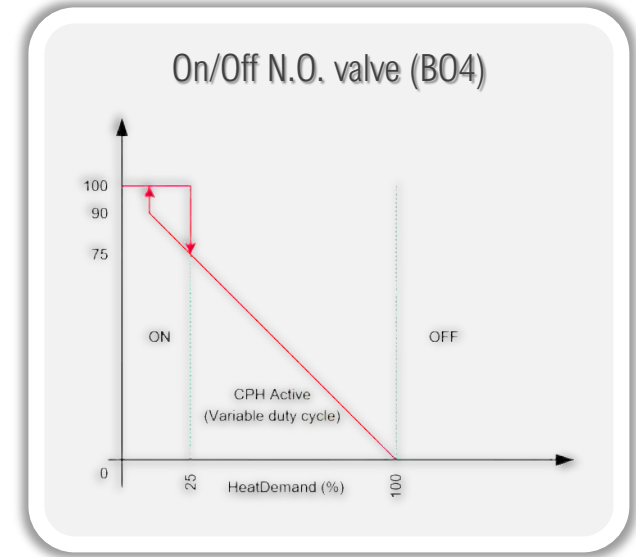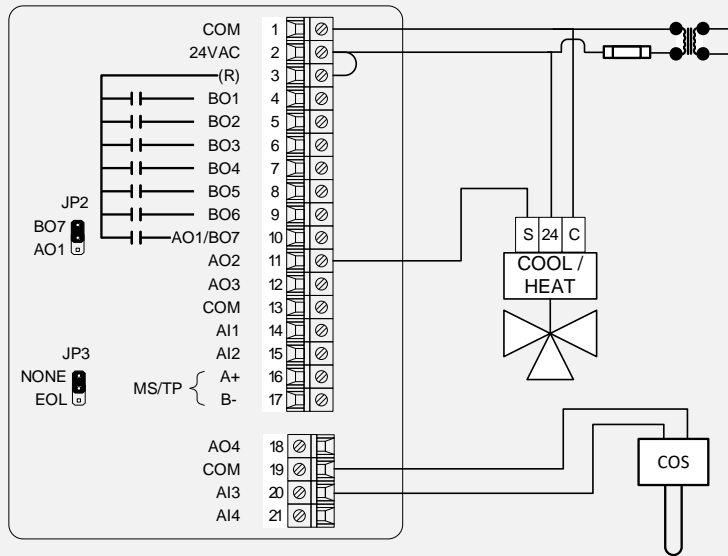# I/O Wiring & Sequence
2 pipes – floating valves

COM 1
24VAC 2
(R) 3
BO1 4
BO2 5
BO3 6
BO4 7
BO5 8
BO6 9
AO1/BO7 10
AO2 11
AO3 12
COM 13
AI1 14
AI2 15
A+ 16
B- 17
AO4 18
COM 19
AI3 20
AI4 21

JP2
BO7
AO1

JP3
NONE
EOL
MS/TP { A+ B-

CL C OP
COOL / HEAT

*
COS

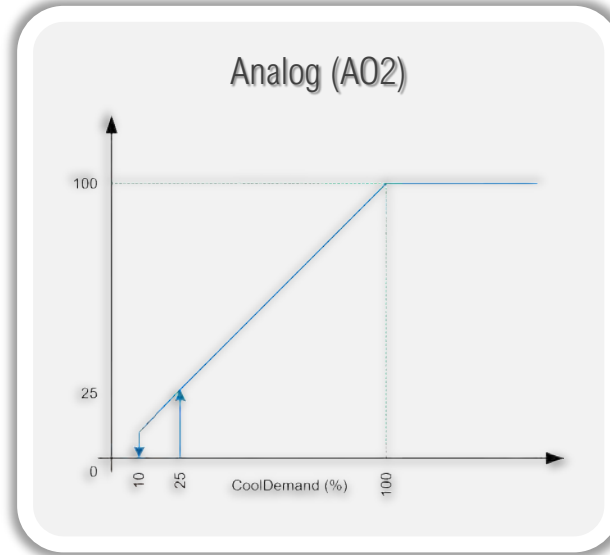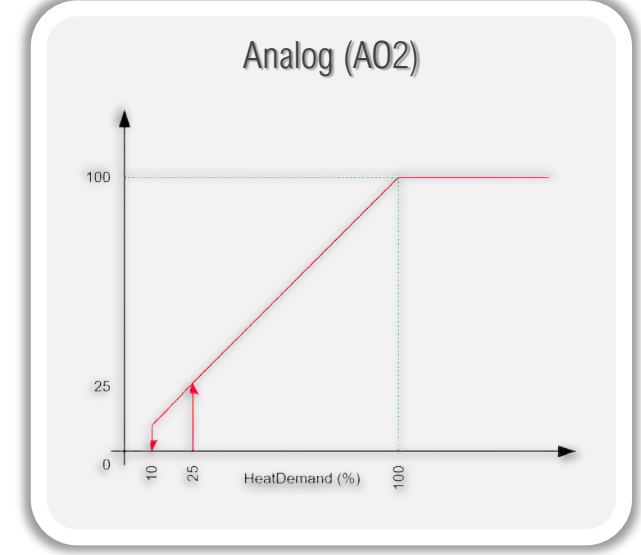### 2 pipes – floating valves
*COS : Change Over Sensor
Add 24VAC transformer when the power is not supplied by the equipment

Cooling demand > 25% for at least 180 seconds
Mode is Auto or Cool *(MSV16)*
Fan is running
Window contact is Closed *(BV35 if used)*

Heating demand > 25% for at least 180 seconds
Mode is Auto or Heat *(MSV16)*
Fan is running
Window contact is Closed *(BV35 if used)*

Floating (BO1&2)

100

25

0

10 25 CoolDemand (%) 100

Floating (BO1&2)

100

25

0

10 25 HeatDemand (%) 100

Sequence of operation

Occupied Mode: Setpoints will revert to those defined by occupied cooling and heating setpoints.

Stand-by Mode (only available when PIR models are used): Setpoints will revert to those defined by stand-by cooling and heating setpoints.

Unoccupied Mode: Setpoints will revert to those defined by unoccupied heating and cooling setpoints.

Occupied Override Mode: The system will revert to occupied mode for the duration determined by the "OvrTime" parameter

On a call for cooling: If the supply water temperature is less than 17.0°C (63F). Cooling valve will modulate to maintain room temperature. Heating valve is closed.
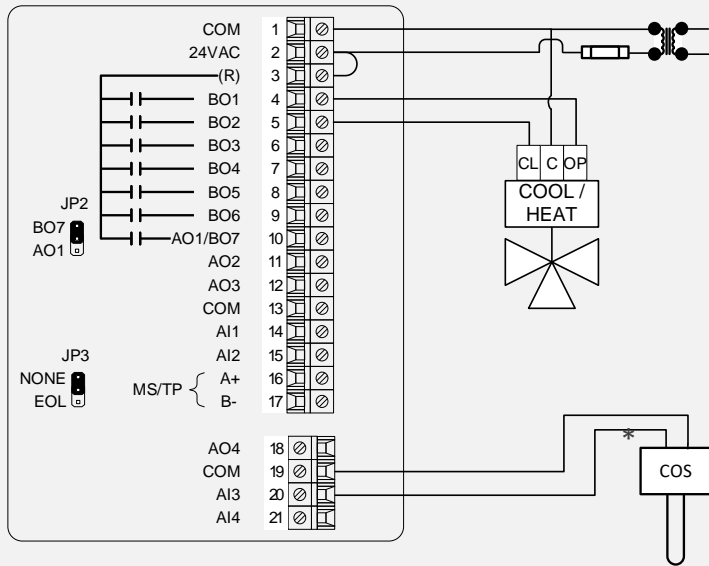
On a call for heat: If the supply water temperature is greater than 18.5°C (65F). Heating valve will modulate to maintain room temperature. Cooling valve is closed.

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Installation
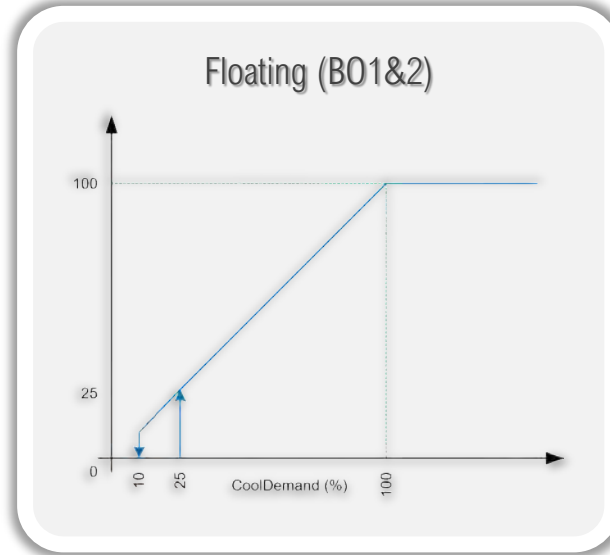## I/O Wiring & Sequence
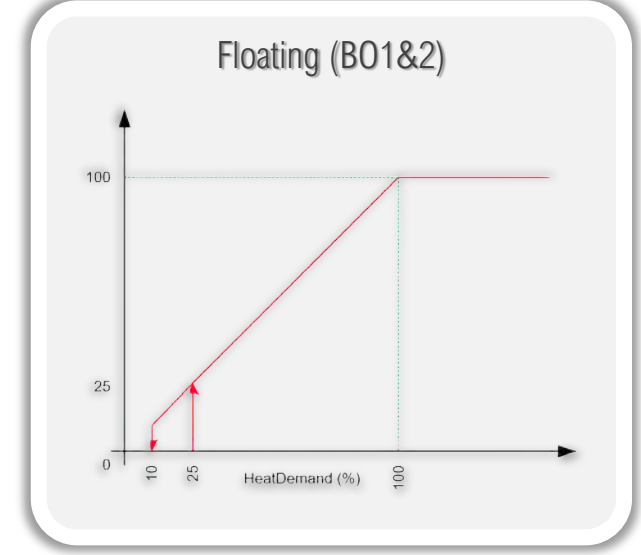### 2 pipes – on/off N.C.

2 pipes – on/off N.C.

*COS : Change Over Sensor

Add 24VAC transformer when the power is not supplied by the equipment

Cooling demand > 25% for at least 180 seconds
Mode is Auto or Cool *(MSV16)*
Fan is running
Window contact is Closed *(BV35) if used*

Heating demand > 25% for at least 180 seconds
Mode is Auto or Heat *(MSV16)*
Fan is running
Window contact is Closed *(BV35) if used*

On/Off N.C. valve (BO1)

On/Off N.C. valve (BO1)

Sequence of operation

Occupied Mode: Setpoints will revert to those defined by occupied cooling and heating setpoints.

Stand-by Mode (only available when PIR models are used): Setpoints will revert to those defined by stand-by cooling and heating setpoints.

Unoccupied Mode: Setpoints will revert to those defined by unoccupied heating and cooling setpoints.

Occupied Override Mode: The system will revert to occupied mode for the duration determined by the "OvrTime" parameter

On a call for cooling: If the supply water temperature is less than 17.0°C (63F). Cooling valve will open to maintain room temperature. Heating valve is closed.

On a call for heat: If the supply water temperature is greater than 18.5°C (65F). Heating valve will open to maintain room temperature. Cooling valve is closed.
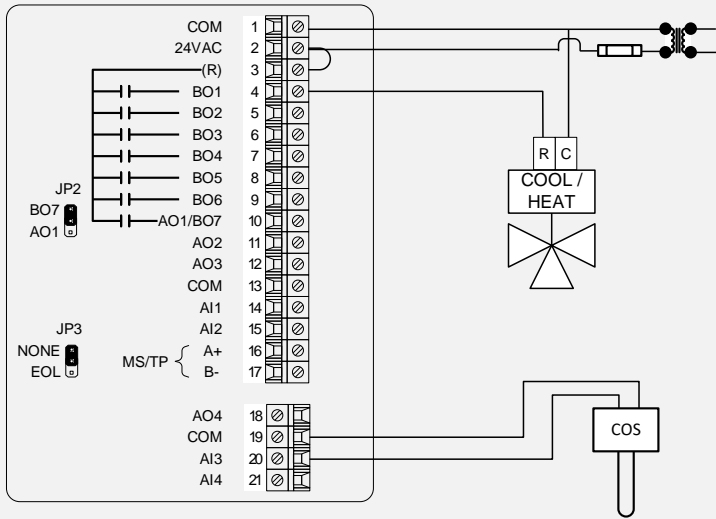
Installation
I/O Wiring & Sequence
2 pipes – on/off N.O.

COM — 1
24VAC — 2
(R) — 3
BO1 — 4
BO2 — 5
BO3 — 6
BO4 — 7
BO5 — 8
BO6 — 9
JP2
BO7
AO1
AO1/BO7 — 10
AO2 — 11
AO3 — 12
COM — 13
AI1 — 14
AI2 — 15
JP3
NONE
EOL
MS/TP { A+ — 16
B- — 17
AO4 — 18
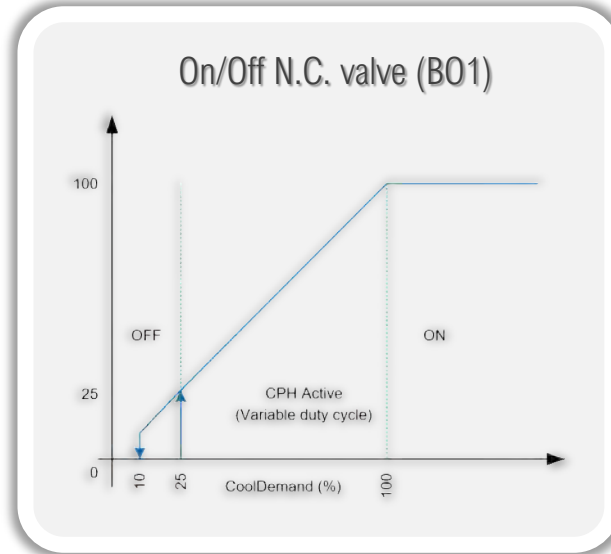COM — 19
AI3 — 20
AI4 — 21

R C
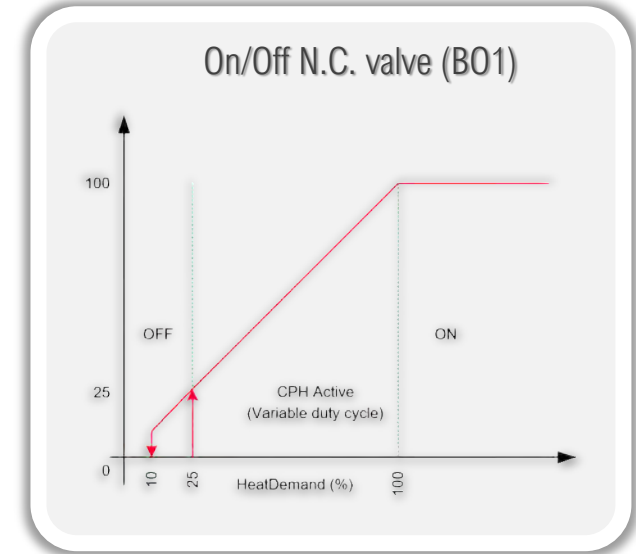COOL / HEAT

COS

2 pipes – on/off N.O.

*COS : Change Over Sensor

Add 24VAC transformer when the power is not supplied by the equipment

Cooling demand > 25% for at least 180 seconds
Mode is Auto or Cool *(MSV16)*
Fan is running
Window contact is Closed *(BV35) if used*

Heating demand > 25% for at least 180 seconds
Mode is Auto or Heat *(MSV16)*
Fan is running
Window contact is Closed *(BV35) if used*

On/Off N.O. valve (BO2)

100
90
75
0

ON   OFF

CPH Active
(Variable duty cycle)

25   100
CoolDemand (%)

On/Off N.O. valve (BO2)

100
90
75
0

ON   OFF

CPH Active
(Variable duty cycle)

25   100
HeatDemand (%)

Sequence of operation

Occupied Mode: Setpoints will revert to those defined by occupied cooling and heating setpoints.

Stand-by Mode (only available when PIR models are used): Setpoints will revert to those defined by stand-by cooling and heating setpoints.

Unoccupied Mode: Setpoints will revert to those defined by unoccupied heating and cooling setpoints.

Occupied Override Mode: The system will revert to occupied mode for the duration determined by the "OvrTime" parameter

On a call for cooling: If the supply water temperature is less than 17.0°C (63F). Cooling valve will open to maintain room temperature. Heating valve is closed.

On a call for heat: If the supply water temperature is greater than 18.5°C (65F). Heating valve will open to maintain room temperature. Cooling valve is closed.
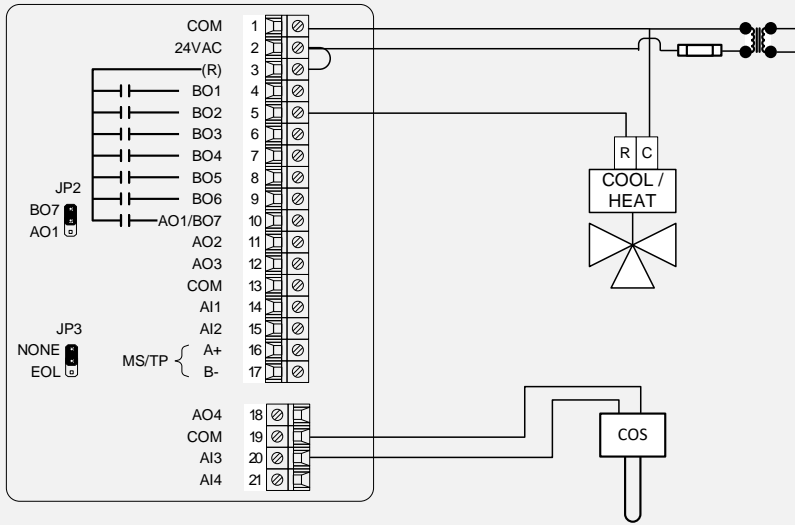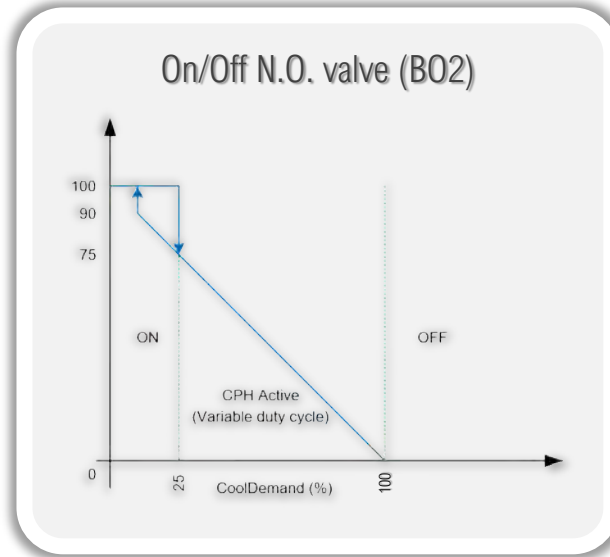
Installation
I/O Wiring & Sequence
Fan control – ECM (0-10VDC) MSV58 = On-Auto

COM 1
24VAC 2
(R) 3
BO1 4
BO2 5
BO3 6
BO4 7
BO5 8
BO6 9
AO1/BO7 10
AO2 11
AO3 12
COM 13
AI1 14
AI2 15
A+ 16
B- 17
AO4 18
COM 19
AI3 20
AI4 21

JP2
BO7
AO1

JP3
NONE
EOL
MS/TP

24 Vac low voltage Fan Coil

C
24
O
S
Control

O : Fan Start (optional)
S : Fan Speed 0-10v

Fan – ECM
Add 24VAC transformer when the power is not supplied
by the equipment

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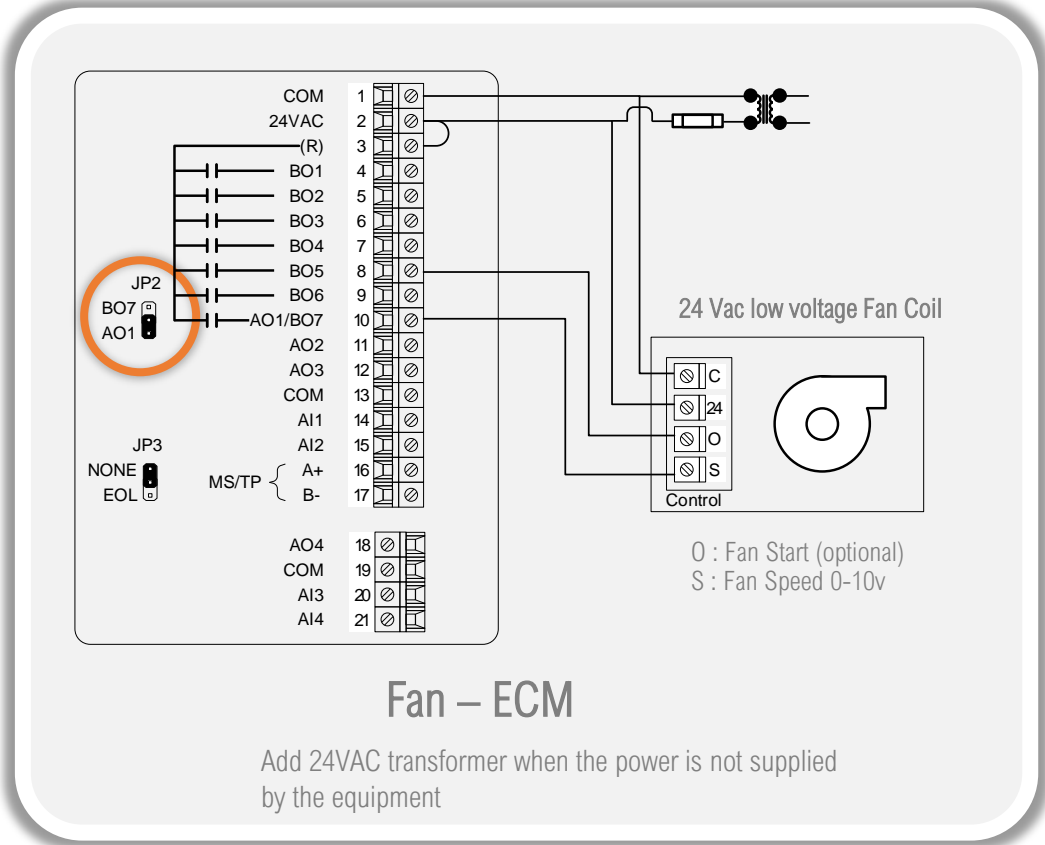
Cooling demand > 25%
or
Heating demand > 25%
Fan mode : Auto

Cooling demand > 25%
or
Heating demand > 25%
Fan mode : Auto / Anti cycle of 1 second

Autospeed and Occupied mode

Fan
100
30
High
OFF
30   100   %
Maximum value
FanClgDemand (%) or FanHtgDemand (%)

Autospeed / Autodemand or Unoccupied mode

Fan
100
30
High
OFF
1   30   100   %
Maximum value
FanClgDemand (%) or FanHtgDemand (%)
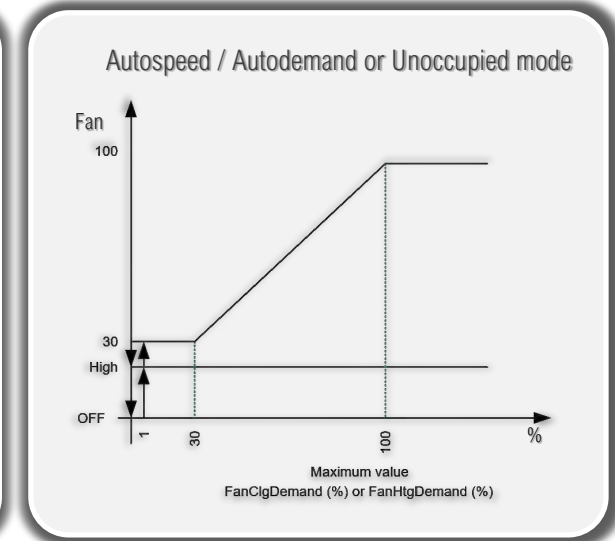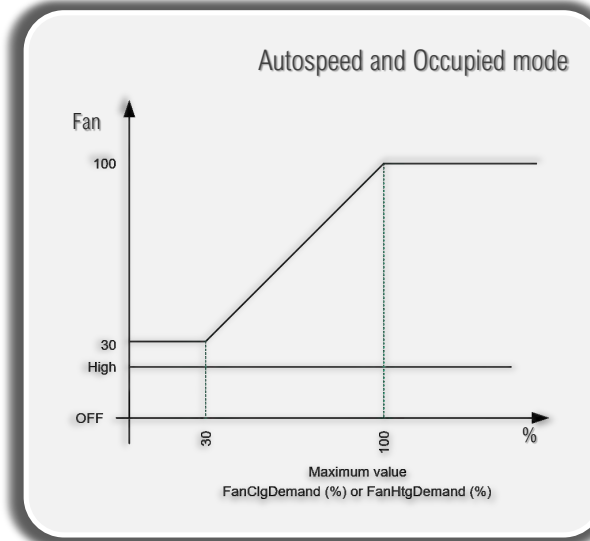
Fan sequence of operation

Occupied Mode:

Fan = **Auto mode** will modulate the fan from the minimum set fan speed (AV25 ECM_min) to 100% at the same time as the main PI cooling and heating demand.

With the fan mode set to **ON**, the fan will drive directly to 100% demand.

In the controller deadband between heating and cooling setpoints Autodemand (Keepfan BV66) = FanLow allows the fan to stay at the minimum set fan speed and (Keepfan BV66) = FanOff will shuts down the fan completely.

Stand-by & Unoccupied Mode:
Fan will always operate in Auto mode during Stand-by or Unoccupied periods

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Installation
I/O Wiring & Sequence
Fan control – 3 speed fans MSV58 = L-M-H

COM   1
24VAC   2
(R)   3
BO1   4
BO2   5
BO3   6
BO4   7
BO5   8
BO6   9

JP2
BO7
AO1   AO1/BO7   10

24 Vac low voltage Fan Coil

AO2   11
AO3   12
COM   13
AI1   14
AI2   15

JP3
NONE
EOL   MS/TP { A+   16
                     B-   17

AO4   18
COM   19
AI3   20
AI4   21

C
H
M
L
Control

Fan – 3 speeds

Add 24VAC transformer when the power is not supplied
by the equipment

ONYXX® LX
BY LYNXSPRING

Cooling demand > 25%
or
Heating demand > 25%
or
Occupied mode
Fan mode : Auto
Anti cycle of 1 second

Cooling demand > 25%
or
Heating demand > 25%
Fan mode : Auto
Anti cycle of 1 second

Autospeed and Occupied mode

Fan

High

Medium

Low

OFF

33   50   66   100   %

Maximum value
FanClgDemand (%) or FanHtgDemand (%)

Autospeed / Autodemand or Unoccupied mode

Fan

High

Medium

Low

OFF

1   33   50 66   100   %

Maximum value
FanClgDemand (%) or FanHtgDemand (%)

Occupied Mode:

Fan = **Auto mode** will modulate the fan from low to high speed the same time as the main PI cooling and heating demand.

With the fan mode set to **Low**, the fan will drive to Low speed.
With the fan mode set to **Medium**, the fan will drive to Medium speed.
With the fan mode set to **High**, the fan will drive to High speed.

In the controller deadband between heating and cooling setpoints Autodemand (Keepfan BV66) = FanLow allows the fan to stay at Low fan speed and (Keepfan BV66) = FanOff will shuts down the fan completely.

Stand-by & Unoccupied Mode:
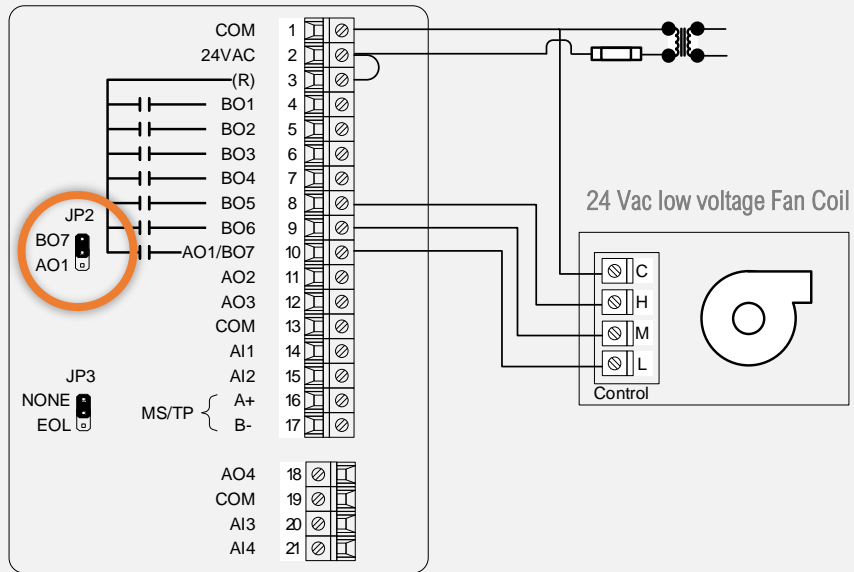Fan will always operate in Auto mode during Stand-by or Unoccupied periods

Installation
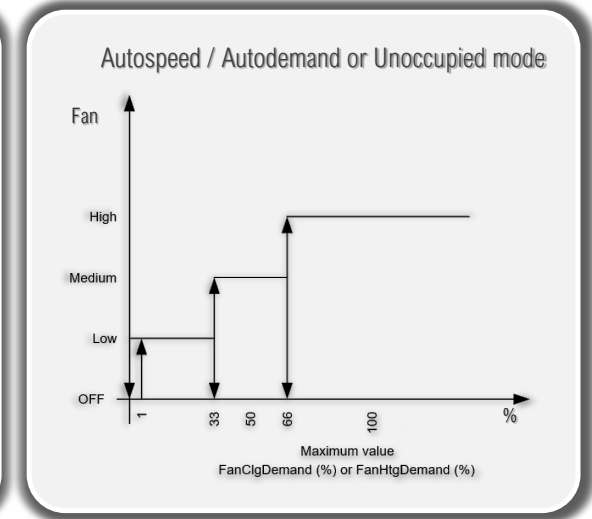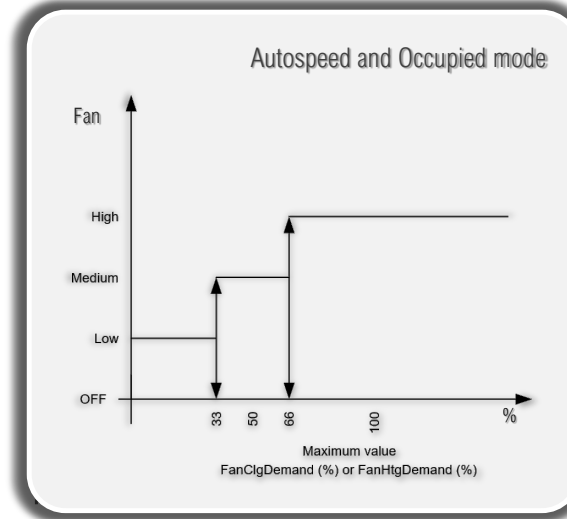## I/O's Wiring & Sequence
Fan control – 2 speed fans MSV58 = L-H
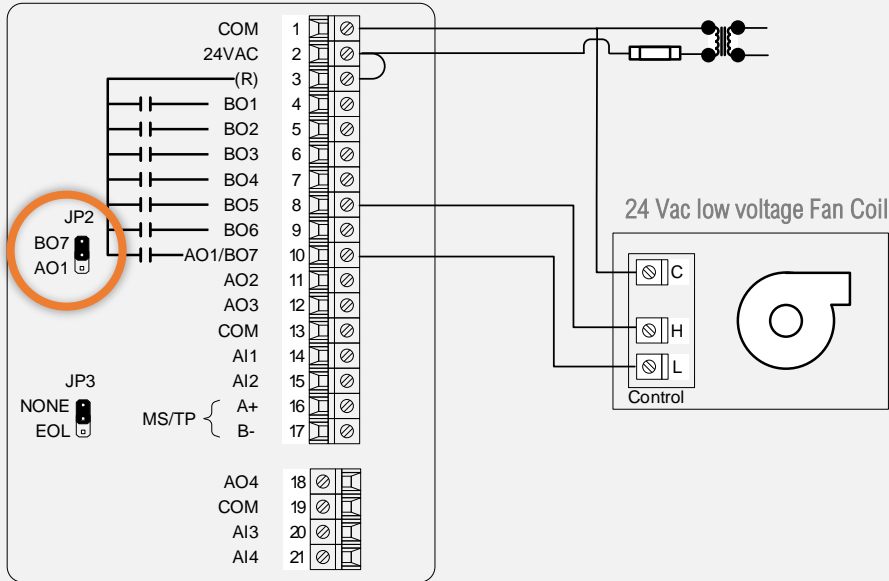
Fan – 2 speeds

Add 24VAC transformer when the power is not supplied by the equipment

ONYXX® LX
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Cooling demand > 25%
or
Heating demand > 25%
or
Occupied mode
Anti cycle of 1 second

Cooling demand > 25%
or
Heating demand > 25%
Fan control : Auto
Anti cycle of 1 second

Autospeed and Occupied mode

Autospeed / Autodemand or Unoccupied mode

Fan sequence of operation

Occupied Mode:

Fan = **Auto mode** will modulate the fan from low to high speed the same time as the main PI cooling and heating demand.

With the fan mode set to **Low**, the fan will drive to Low speed.
With the fan mode set to **High**, the fan will drive to High speed.

In the controller deadband between heating and cooling setpoints Autodemand (Keepfan BV66) = FanLow allows the fan to stay at Low fan speed and (Keepfan BV66) = FanOff will shuts down the fan completely.

Stand-by & Unoccupied Mode:

Fan will always operate in Auto mode during Stand-by or Unoccupied periods

Fan control – single speed fans MSV58 = On-Auto

Fan – Single speed

Add 24VAC transformer when the power is not supplied by the equipment

24 Vac low voltage Fan Coil

Control

Fan sequence of operation

Occupied Mode:

Fan = **Auto mode** will energize the fan when the main PI cooling and heating demands are above 1% demand.

With the fan mode set to **ON**, the fan will energize all the time during Occupied periods.

In the controller deadband between heating and cooling setpoints, Autodemand (Keepfan BV66) = FanLow allows the fan to stay ON and (Keepfan BV66) = FanOff will shuts down the fan completely.

Stand-by & Unoccupied Mode:
Fan will always operate in Auto mode during Stand-by or Unoccupied periods

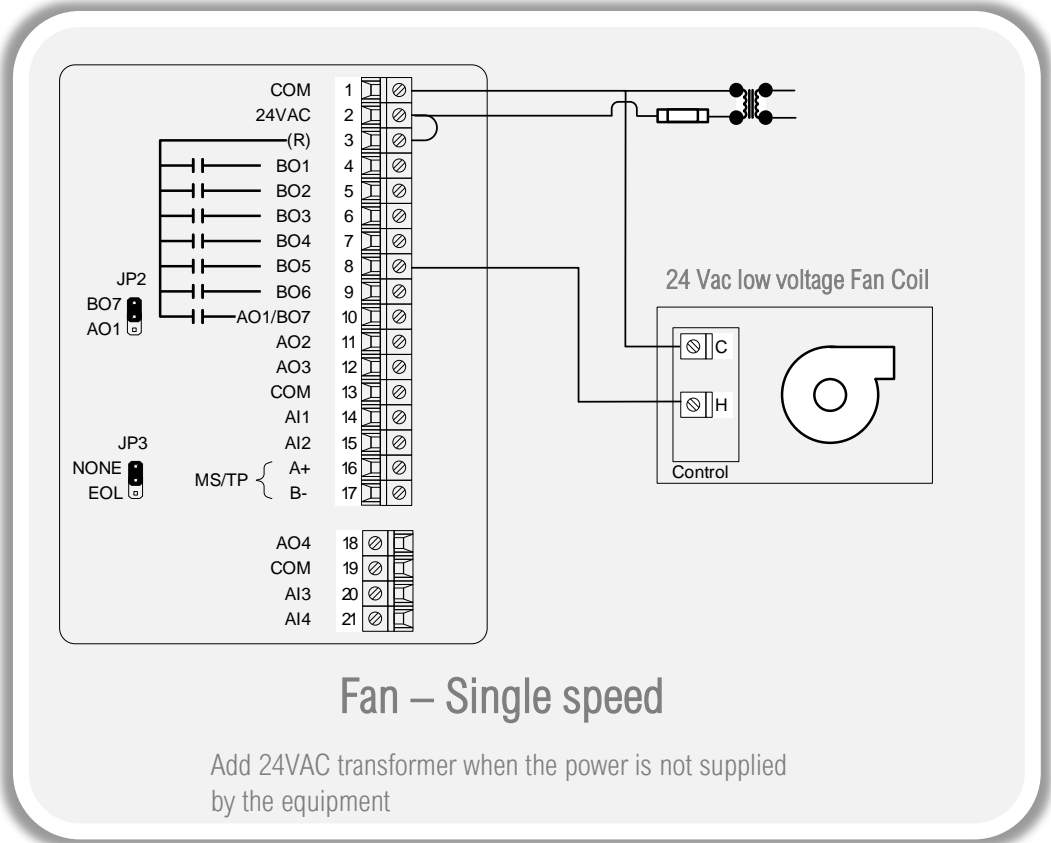# Installation
I/O Wiring & Sequence
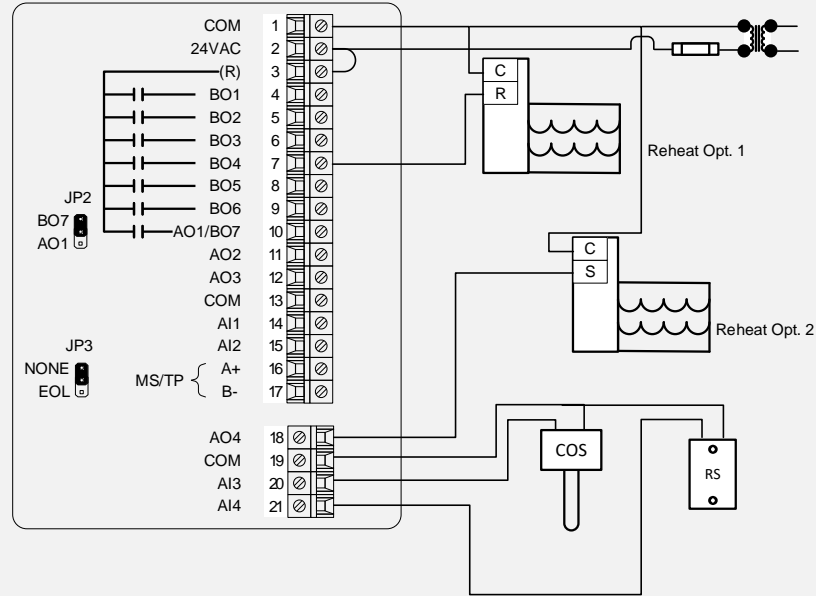
2 pipes – Reheat and sensors

*COS : Change Over Sensor
*RS : Room Sensor

Add 24VAC transformer when the power is not supplied by the equipment

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Call For Heating for at least 180 seconds
Fan is running
Reheat is allowed
MSV54 = Reheat

On/Off

Analog
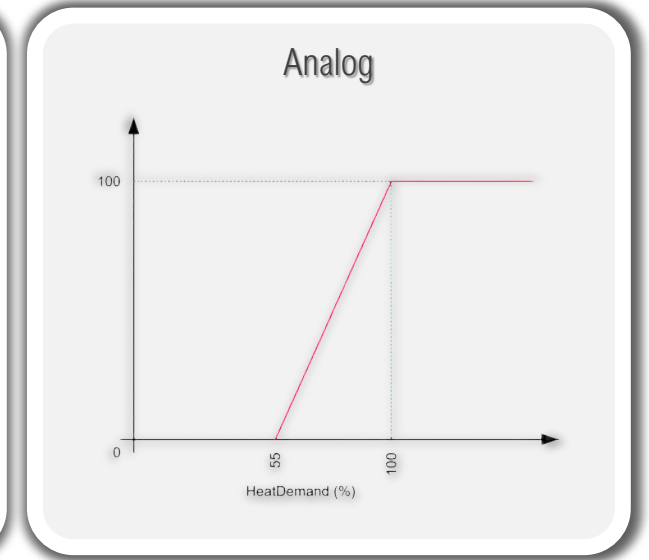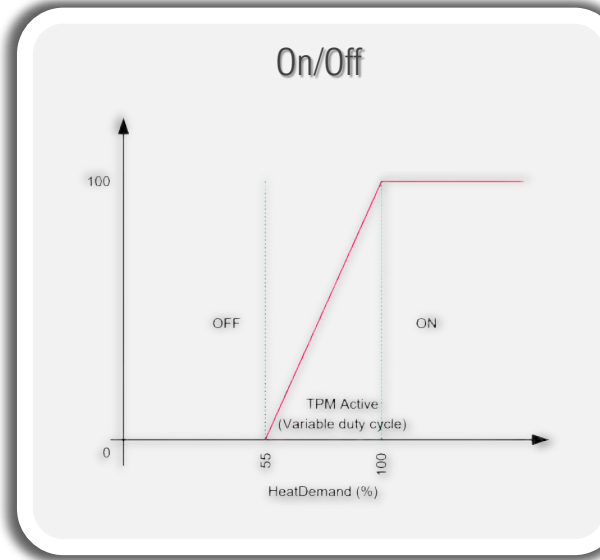
Reheat operation

Only valid if MSV15 (Sequence of Operation) is set to a Reheat sequence: Cool-Rt, Heat-Rt or Cool-Heat-Rt

Occupied, Stand-by & Unoccupied Mode:

The Reheat stage can either be modulating 0-10 VDC / AO4 or On/Off BO4. The Reheat stage will be used as the main heating device if the system main water for the FCU is cold water and will be used as a second heating stage if the system main water for the FCU is hot water water

A typical reheat device in some area used in conjunction with an FCU can even be a separate baseboard heating unit

---

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BY LYNXSPRING

Installation
I/O Wiring & Sequence

Call For Heating for at least 180 seconds
Fan is running
Reheat is allowed
MSV54 = Reheat

Diagram labels (left wiring diagram)

Terminal	#
COM	1
24VAC	2
(R)	3
BO1	4
BO2	5
BO3	6
BO4	7
BO5	8
BO6	9
AO1/BO7	10
AO2	11
AO3	12
COM	13
AI1	14
AI2	15
A+	16
B-	17
AO4	18
COM	19
AI3	20
AI4	21

JP2
BO7
AO1

JP3
NONE
EOL
MS/TP

C
S
Reheat

SS

RS

## 4 pipes – Reheat and sensors

*SS : Supply Sensor
*RS : Room Sensor

Add 24VAC transformer when the power is not supplied by the equipment

Analog

100

0

55   100

HeatDemand (%)

Reheat operation

Only valid if MSV15 (Sequence of Operation) is set to a Reheat sequence: Cool-Rt, Heat-Rt or Cool-Heat-Rt
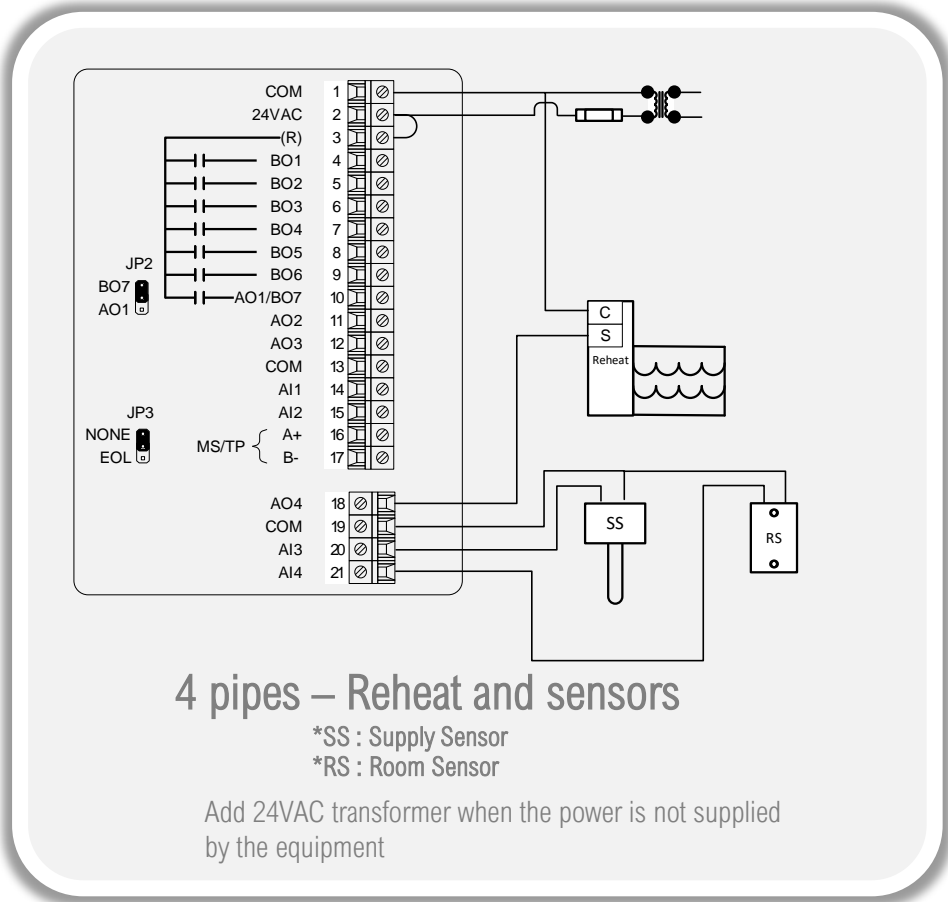
Occupied, Stand-by & Unoccupied Mode:

The Reheat stage is 0-10 Vdc / AO4 only. The Reheat stage will be used as the main heating device if the system main water for the FCU is cold water and will be used as a second heating stage if the system main water for the FCU is hot water water

A typical reheat device in some area used in conjunction with an FCU can even be a separate baseboard heating unit
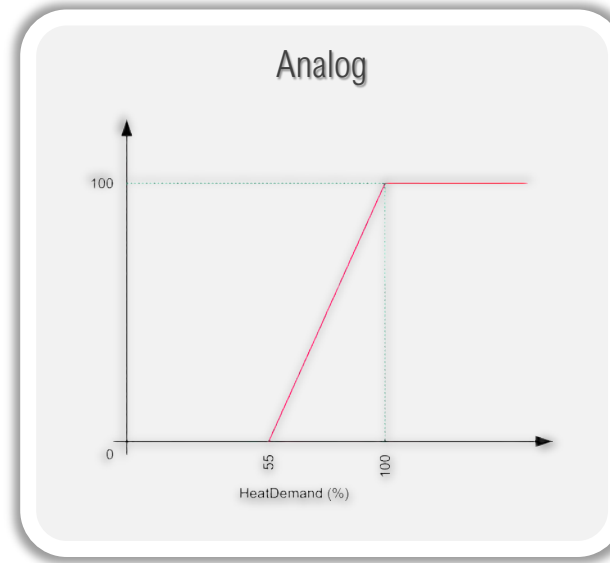
ONYXX® LX
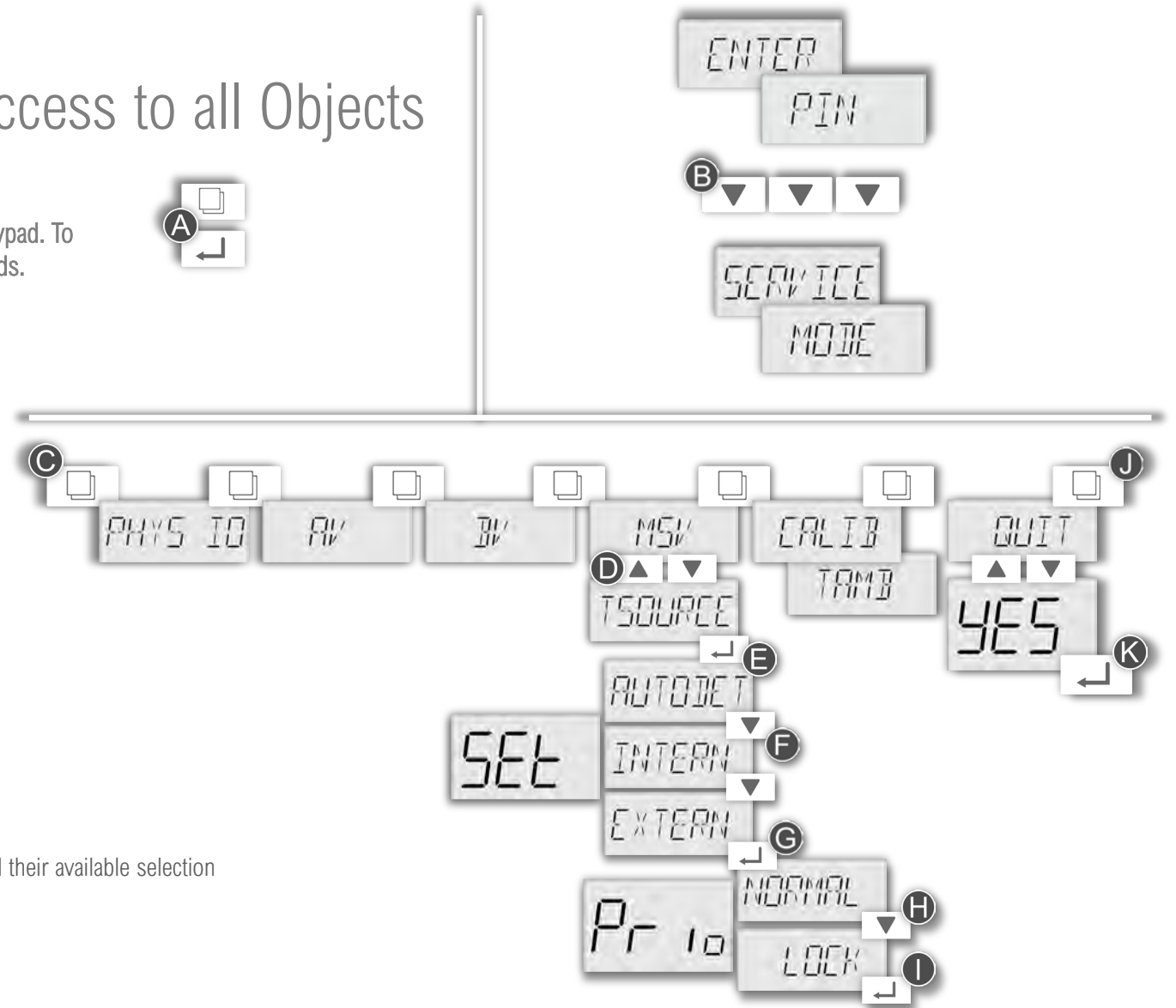BY LYNXSPRING

Using the menus
Service menus / Allows Keypad Access to all Objects

A Access the "Service menus" directly on the BW437-FCU's screen using the keypad. To be able to do so, press simultaneously [▯] and [↵] buttons for 3 seconds.

B Press these PIN keys in sequence on the BW437FCU's keypad
"SERVICE MODE" will blink on the screen

C Use the [▯] button to scroll through the list of menus

D Use the [▲] [▼] to scroll trough a category of objects

E Press [↵] on any object to access its configurable settings

F Use the [▲] [▼] to scroll trough the settings

G Once your setting is selected, press [↵] to access the Priority screen

H Use the [▲] [▼] to select the objects priority

I Once your priority is selected, press [↵] to confirm your choice

J To exit SERVICE MODE, press [▯] for 3 seconds to access the QUIT screen

K Using the [▲] [▼] press [↵] when "YES" is displayed

Notes:

Please refer to the object list tables below for a reference on each objects and their available selection

The typical priority set at stage **H** is "Normal"

ENTER PIN

B ▼ ▼ ▼

SERVICE MODE

A [▯] [↵]

C [▯] [▯] [▯] [▯] [▯] [▯] [▯] **J**

PHYS IO | AV | BV | MSV | CALIB | QUIT

D ▲ ▼   TAMB   ▲ ▼

TSOURCE   **YES**

↵ **E**   ↵ **K**

AUTODET ▼ **F**

SEt INTERN

▼

EXTERN **G**

↵

NORMAL **H**

Pr io ▼

LOCK **I**

↵

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BY LYNXSPRING

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Using the menus
Test IO mode menu / Allows Local Testing of I/O's

A Access the "Test IO mode" directly on the BW437's screen using the keypad. To be able to do so, press simultaneously [□] and [↵] buttons for 3 seconds.

B Press these PIN keys in sequence on the BW437FCU's keypad
"TEST IO MODE" will blink on the screen

C Use the [□] button to scroll through the list of IO's

D Use the [▲] [▼] to change the binary output object state

E AI reading goes from 0 to 4095 (raw count value / not adjustable)

F Use the [▲] [▼] to change the analog output object value

G To exit TEST IO MODE, scroll to the QUIT menu using [□]

H Using the [▲] [▼], press [↵] when "YES" is displayed
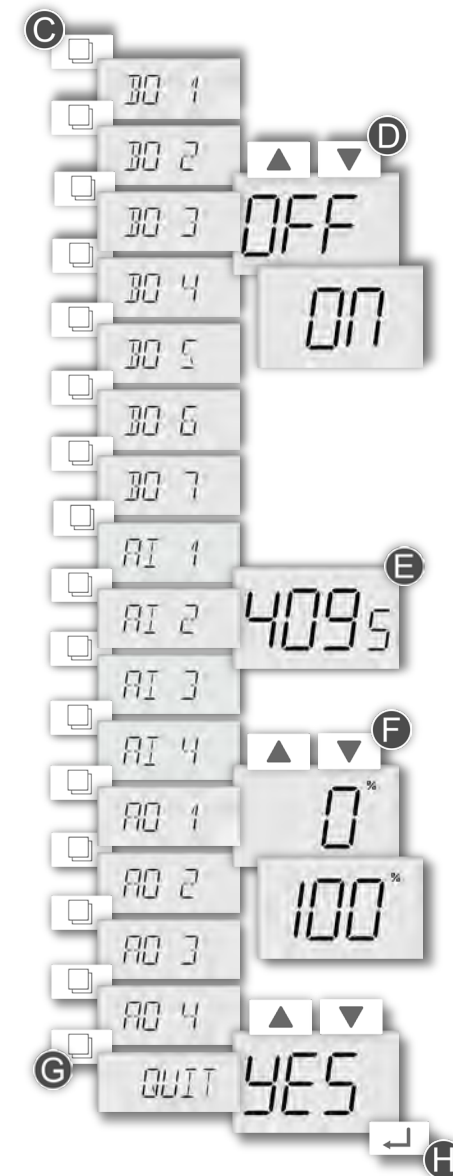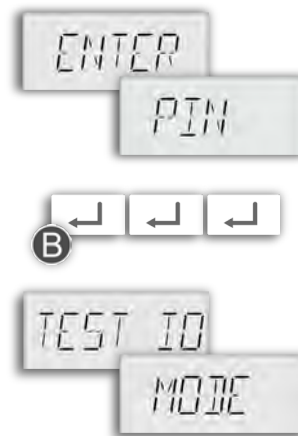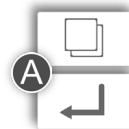
Notes:

Exiting the Test IO mode will revert the controller to its normal state of operation as per the configuration used

A [□] [↵]

B ENTER PIN [↵] [↵] [↵] TEST IO MODE

C BO 1
BO 2
BO 3 OFF ON **D**
BO 4
BO 5
BO 6
BO 7
AI 1
AI 2 4095 **E**
AI 3
AI 4
AO 1 0% **F**
AO 2 100%
AO 3
AO 4 [▲] [▼]
QUIT YES **G** **H**

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

PHYS IO

Object Instance	FCU Object name	Description	Default value	Tags	Minimum range value	Maximum range value	Inactive_Text	Active_Text
BO1	BO_1	Binary output 1	Off	Status			Off	On
BO2	BO_2	Binary output 2	On	Status			Off	On
BO3	BO_3	Binary output 3	Off	Status			Off	On
BO4	BO_4	Binary output 4	On	Status			Off	On
BO5	BO_High	High speed fan output	Off	Status			Off	On
BO6	BO_Med	Medium speed fan output	Off	Status			Off	On
BO7	BO_Low	Low speed fan output	Off	Status			Off	On
AO1	AO_ECM	Fan ECM output	0%	Status	0%	100%		
AO2	AO_2	Analog output 2	0%	Status	0%	100%		
AO3	AO_3	Analog output 3	0%	Status	0%	100%		
AO4	AO_4	Auxiliary / Reheat output	0%	Status	0%	100%		
AI1	AI_1	Analog input 1		Status	Based on AI1_cfg object MSV46			
AI2	AI_2	Analog input 2		Status	Based on AI2_cfg object MSV47			
AI3	AI_3	Analog input 3		Status	Based on AI3_cfg object MSV48			
AI4	AI_4	Remote sensor		Status				
AI5	RoomT	Room temperature	N/A	Status	32°F (0°C)	122°F (50°C)		
AI6	RoomRH	Room humidity	N/A	Status	5%	90%		
AI7	RoomCO2	Room CO2		Status	0 PPM	2000 PPM		
BI1	Motion	Motion detection	Off	Status			Off	Active

Use JP2 jumper to choose between BO7 or AO1

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Analog Values

Object Instance	FCU Object name	Description	Tags	Default value	Minimum range value	Maximum range value
AV1	RoomTSP	Room Temperature setpoint	User	72°F (22°C)	54°F (12°C)	90°F (32°C)
AV7	Eff_T	Effective temperature used for control	Status	---	-40°F (-40°C)	122°F (50°C)
AV9	OATemp	Outdoor air temperature	Status	---	-40°F (-40°C)	122°F (50°C)
AV12	SATemp	Supply air temperature	Status	---	-40°F (-40°C)	122°F (50°C)
AV13	CHOV_T	Changeover temperature	Status	---	-40°F (-40°C)	122°F (50°C)
AV21	HTG_Dem	Heating demand	Status	---	0%	100%
AV22	CLG_Dem	Cooling demand	Status	---	0%	100%
AV23	Fan_HT__Demand	Fan heating demand	Status	---	0%	100%
AV24	Fan_CL__Demand	Fan cooling demand	Status	---	0%	100%
AV25	ECM_Min	ECM minimum speed output	Cfg	30%	0%	100%
AV30	EffHTSP	Effective heating setpoint	Status	71°F (21°C)		
AV31	EffCLSP	Effective cooling setpoint	Status	73°F (23°C)		
AV39	OccHTSP	Occupied heating setpoint	User	71°F (21°C)		
AV40	OccCLSP	Occupied cooling setpoint	User	73°F (23°C)		
AV41	STBHTSP	Standby heating setpoint	Cfg	69°F (20.5°C)		
AV42	STBCLSP	Standby cooling setpoint	Cfg	78°F (25.5°C)		
AV43	Unoc_HT_SP	Unoccupied heating setpoint	Cfg	62°F (16.5°C)		
AV44	Unoc_CL_SP	Unoccupied cooling setpoint	Cfg	80°F (26.5°C)		
AV50	RT_Cal	Room temperature calib	Cfg	0°(C/F)	-3°(C/F)	3°(C/F)
AV58	MaxHTSP	Maximum heating setpoint	Cfg	90°F (32°C)	40°F (4.5°C)	90°F (32°C)
AV59	MinCLSP	Minimum cooling setpoint	Cfg	54°F (12°C)	54°F (12°C)	100°F (37.5°C)
AV63	SP_DB	Setpoint deadband	Cfg	2°F (1°C)	2°F (1.1°C)	5°F (2.8°C)
AV67	StandbyDLY_Hrs	Standby time delay	Cfg	0.5 Hour	0.5 Hour	24.0 Hours
AV68	Unoc_T_DLY_Hrs	Unoccupied time delay	Cfg	0.0 Hour	0.0 Hour	24.0 Hours

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Binary Values

Object Instance	FCU Object name	Description	Tags	Default value	Inactive_Text	Active_Text
BV1	SaveObj	Save all objects to flash	Cfg	Normal	Normal	Save
BV8	OVRSTAT	Occupancy override status	Status	Normal	Normal	Overrid
BV14	Aux_Cmd	Auxiliary network command	Cmd	Off	Off	On
BV25	AuxStat	Auxiliary output status	Status	Off	Off	On
BV29	AI1Stat	Analog input 1 binary contact status	Status	Deactivated	Deactivated	Activated
BV30	AI2Stat	Analog input 2 binary contact status	Status	Deactivated	Deactivated	Activated
BV31	AI3Stat	Analog input 3 binary contact status	Status	Deactivated	Deactivated	Activated
BV32	Mot_Det	Motion detection	Status	Moving	None	Moving
BV35	Window	Window detection status	Status	Close	Close	Open
BV36	Filter	Filter sensor status	Status	Normal	Normal	Alarm
BV37	ServALM	Service alarm status	Status	Normal	Normal	Alarm
BV40	Ch_Over	Change over status	Status	Cool	Cool	Heat
BV50	AutoMod	Auto mode authorised	Cfg	Yes	No	Yes
BV51	T_Units	Temperature units	Cfg	Imper	Imper	Metric
BV64	Reh_Opt	Reheat control option	Cfg	Pulse1S	Pulse1S	On/Off
BV66	KeepFan	Fan auto mode	Cfg	Fan Low	Fan Low	Fan Off
BV75	VALVCTL	Valve motors control type	Cfg	On/Off	On/Off	Floatng
BV78	AO2_Dir	AO2 action	Cfg	Direct	Direct	Reverse
BV79	AO3_Dir	AO3 action	Cfg	Direct	Direct	Reverse

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Multi-State Values

MSV

Object Instance	FCU Object name	Description	Tags	Default value	State texts
MSV2	Tsource	Temperature input location	Cfg	AutoDet	AutoDet Intern Extern
MSV15	SeqOper	Control sequence of operation	Cfg	Cl-Ht	Cooling Heating Cool-Rt Heat-Rt Cl-Ht Cl-Ht-R
MSV16	MODE	System mode	User	Off	Off Auto Cool Heat
MSV17	FAN	Fan mode	User	Auto	Lo Med Hi Auto
MSV18	Occ_Cmd	Occupancy command	Cmd	Loc_Occ	Loc_Occ Occupied Unoccup

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Multi-State Values

MSV

Object Instance	FCU Object name	Description	Tags	Default value	State texts
MSV19	KeyLock	Keypad lock level	Cfg	None	None Fan Mode FanMode All
MSV26	BO3_BO4	BO3/BO4 status	Status	Close	Stopped Open Close
MSV27	BO1_BO2	BO1/BO2 status	Status	Close	Stopped Open Close
MSV28	FanStat	Fan status	Status	Off	Off Low Med High
MSV33	Eff_Occ	Effective occupancy mode	Status	Occupied	Occupied Unoccup TempOcc Standby

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Multi-State Values

MSV

Object Instance	FCU Object name	Description	Tags	Default value	State texts
MSV46	AI1_CFG	Analog input 1 configuration	Cfg	None	None Rem NSB Mot-NO Mot-NC Window
MSV47	AI2_CFG	Analog input 2 configuration	Cfg	None	None *Door Dry* (door switch) *Overrid* (remote local override switch) Filter Service
MSV48	AI3_CFG	Analog input 3 configuration	Cfg	None	None *COC/NH* (Normally Heat ChangeOverContactfor) *COC/NH* (Normally Cool ChangeOverContactfor) *COS* (Change over Sensor) *SS* (remote monitoring 10K sensor)
MSV52	PipeNum	Pipe number	Cfg	4 Pipes	2 Pipes 4 Pipes
MSV54	Aux_CFG	Auxiliary output configuration	Cfg	Reheat	Reheat Occ-NO Occ-NC Fan-NO Fan-NC Network

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Multi-State Values

MSV

Object Instance	FCU Object name	Description	Tags	Default value	State texts
MSV55	Reheat	Reheat type	Cfg	Basebrd	Basebrd Coil
MSV58	Fan_Seq	Control fan sequence	Cfg	On-Auto	L-M-H L-H L-M-H-A L-M-H On-Auto
MSV61	Occ_Opt	Occupancy options schedule or motion	Cfg	None	No S_and_M S_or_M Sc-Only
MSV62	OvrTime	Override time delay	Cfg	2 hours	0 - 24 hours
MSV65	PB	Heating / cooling proportional band	Cfg	5 F 2.2 C	3 F (1.2 C) - 10 F (5.6 C)
MSV70	SP_AUTO	Zone Temperature setpoint in auto mode	Cfg	Center	Heating Center Cooling
MSV75	BO3Time	BO3/BO4 travel time for 3 states valve	Cfg	1.5 minutes	0.5 min - 6 min
MSV76	BO1Time	BO1/BO2 travel time for 3 states valve	Cfg	1.5 minutes	0.5 min - 6 min
MSV77	CL_CPH	Cooling output cycle per hour	Cfg	4 CPH	3 - 8 CPH
MSV78	HT_CPH	Heating output cycle per hour	Cfg	4 CPH	3 - 8 CPH

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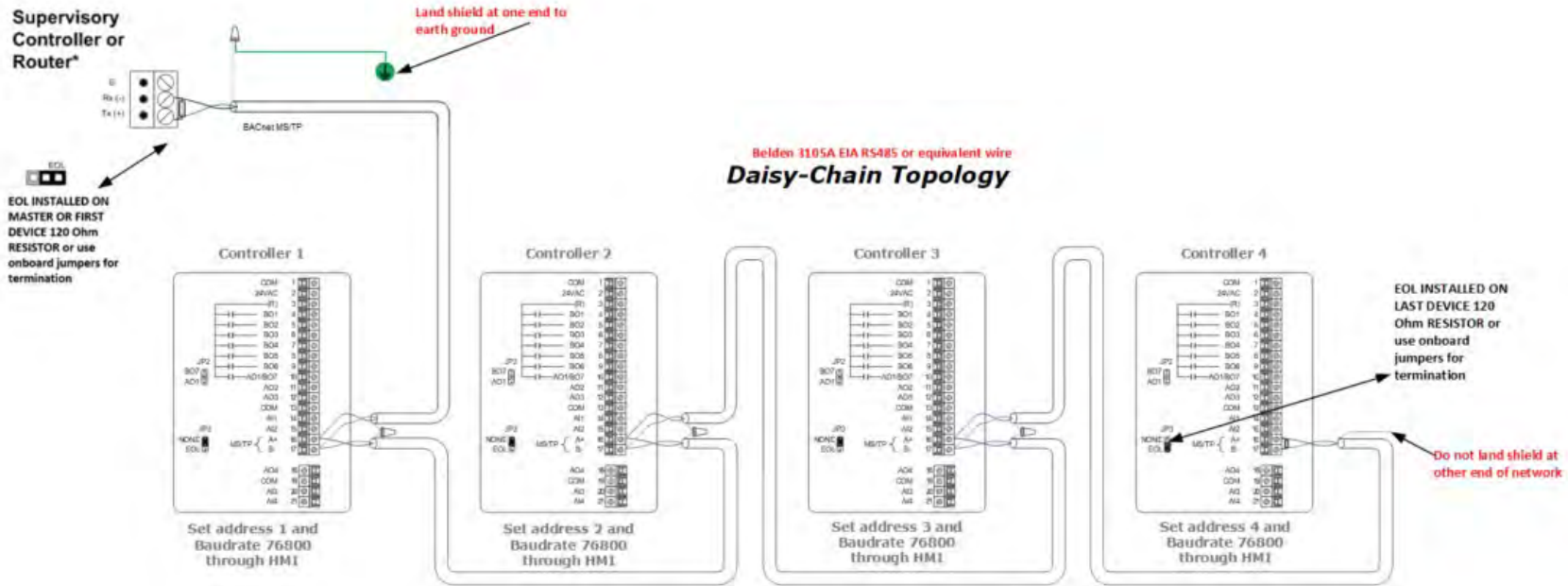- Cmd: represent objects that can be controlled directly by other BACnet external process

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RS-485 Network Guidelines BW Controllers

Supervisory Controller or Router*

Land shield at one end to earth ground

BACnet MS-TP

EOL INSTALLED ON MASTER OR FIRST DEVICE 120 Ohm RESISTOR or use onboard jumpers for termination

Belden 3105A EIA RS485 or equivalent wire
Daisy-Chain Topology

Controller 1 — Set address 1 and Baudrate 76800 through HMI

Controller 2 — Set address 2 and Baudrate 76800 through HMI

Controller 3 — Set address 3 and Baudrate 76800 through HMI

Controller 4 — Set address 4 and Baudrate 76800 through HMI

EOL INSTALLED ON LAST DEVICE 120 Ohm RESISTOR or use onboard jumpers for termination
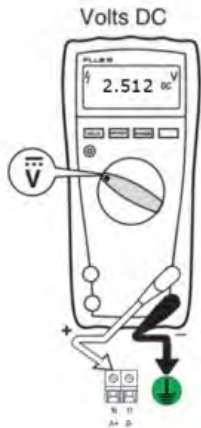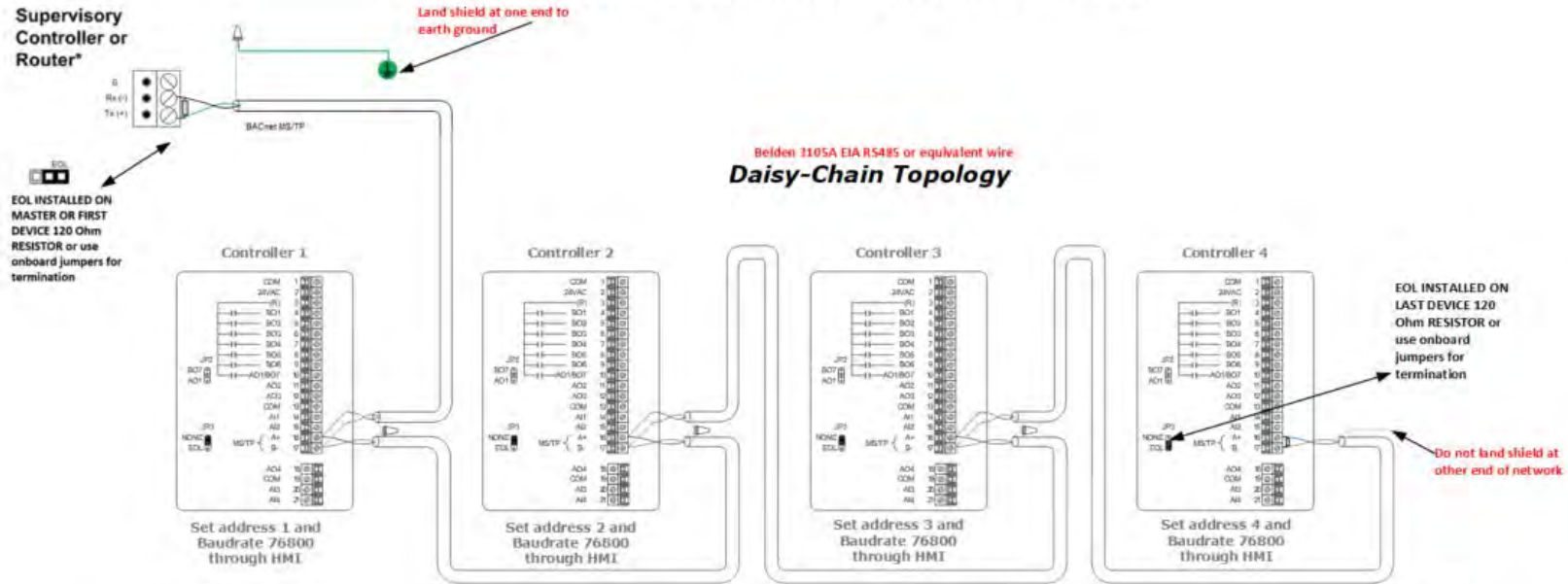
Do not land shield at other end of network

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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Do not land shield at other end of network

Volts DC — 2.512

Volts DC — -2.512

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 BW Controllers
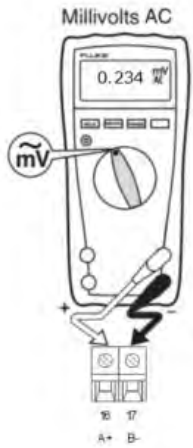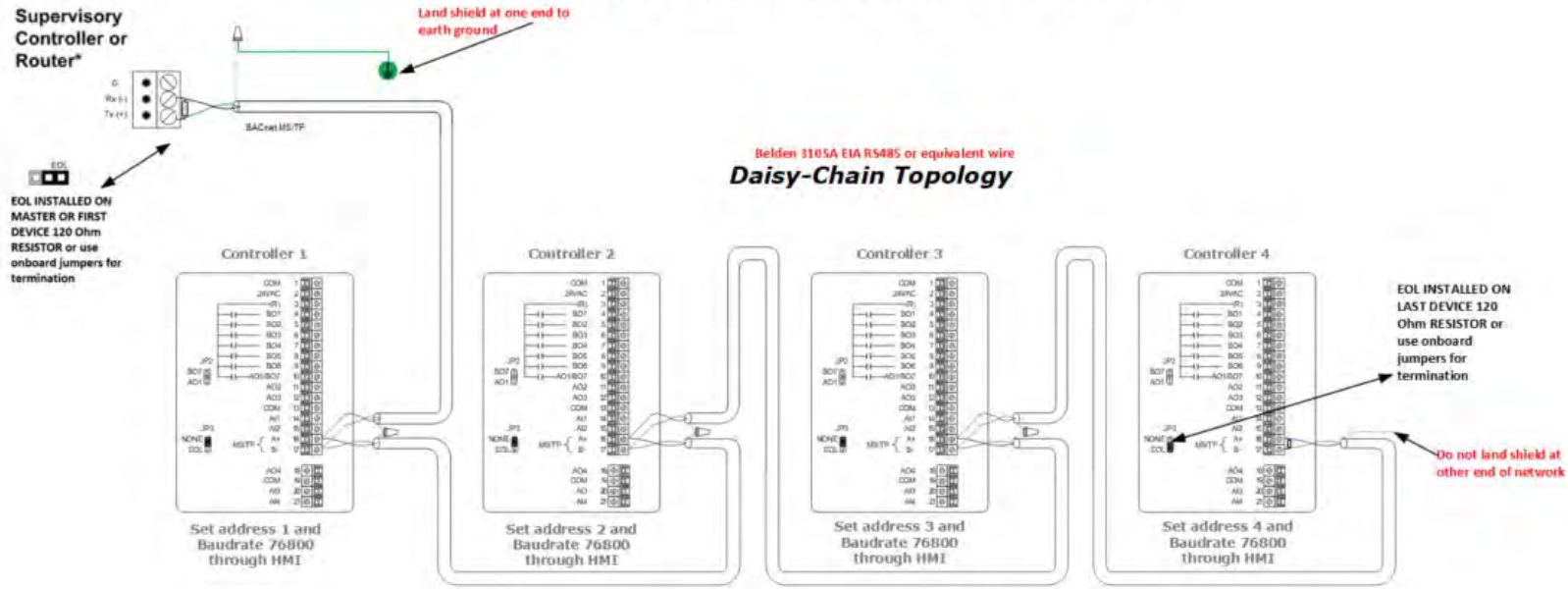
RS-485 Network Guidelines BZ Controllers

Non-functioning topologies

Backbone with stars or clusters

Star network

Ring

Backbone with stubs
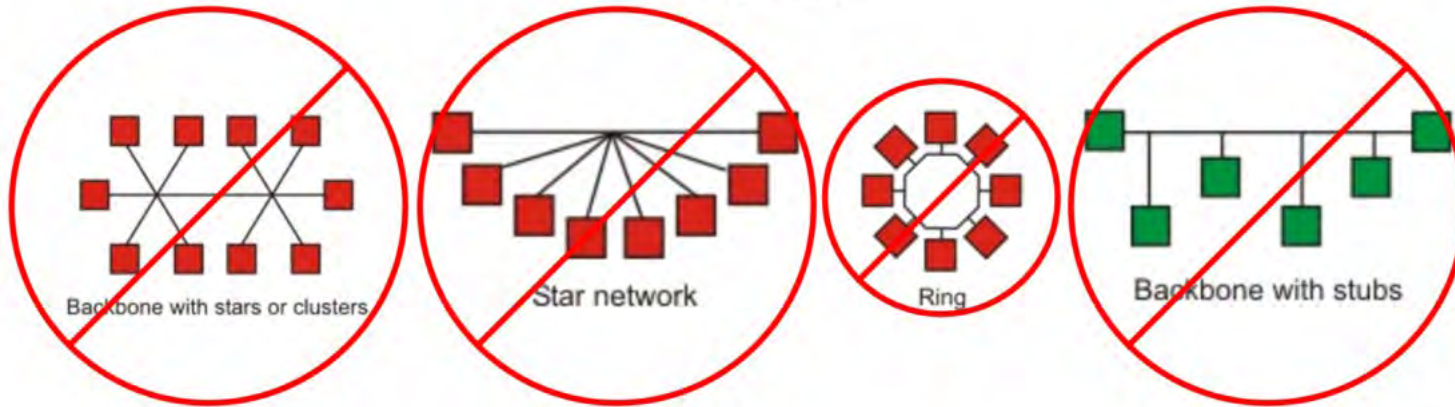
Technical Specifications

Power supply:
- 24 VAC/VDC ± 15%; Class 2

Current consumption:
- 1.5 VA controller only
- 96 VA Max (including outputs 0.5A each)

Communication protocols:
- BACnet MS/TP
- BTL listed: B-ASC, BACnet Application Specific Controller
- Baud 9600, 19200, 38400, 76800 Bps (76800 default)
- Addressing: Keypad configuration
- Mini USB2 MS/TP network access (USB-485 Cable Adapter)

Hardware
- Microprocessor: STM32 (ARM CortexTM M3) 32 bits,
- CPU Speed: 72MHz
- Memory: 768 KB non-volatile Flash
- (application program)
- RAM: 96 KB RAM
- Real-time clock (RTC): Built-in capacitor (one-week backup)

Backlight display / LCD
- Multi-HVAC system symbols, time display, four-segment main numeric display with one decimal

Programming:
- Configurable with the Onyxx LX UI Software

Inputs:
4 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)
- Resolution: 12 Bits (4096 segments)

Outputs:
6 Binary Outputs
- Mosfet Solid State Relays, Isolated
- 10 to 30VAC/VDC, 0.5A max

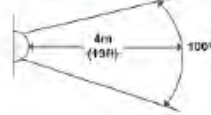3 Analog Outputs
- Voltage 0 - 10 Vdc linear

1 Universal AO/DO's
- Jumper selectable
- Same specification as above

Humidity sensor: Sensirion SHT31
±2 @ 0-100% RH

PIR sensor
- Operating Principle: Passive Infrared
- Detection Angle: 100 degrees
- Detection Distance: 4M (13ft) maximum
- Detection Area

CO2 sensor: Sensirion SCD30
- Self-calibrating, non-dispersive infrared (NDIR)
- Sensor Range: 0-5000 PPM
- Accuracy: ± 30 PPM @ 3% of reading
- Accuracy is valid after a minimum of 3 weeks of continuous operation
- Response Time T63: 2 minutes

Mechanical:
- Dimensions: B 3.25" x A 4.88" x 0.8" B 83 mm x A 124 mm x 20 mm
- Stocking temperature: -30 °C to 50 °C / -22 °F to 122 °F
- Operating conditions: -25 °C to 50 °C / -13 °F to 113 °F 10% to 90% H.R. without condensation
- Weight: 120 g / 0.25 lb
- Mounting type: Standard 2" x 4" electrical junction box
- 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.