MANUAL – INSTALLATION

Price Rooftop Unit Controller

PRTU Series

v300 – Issue Date: 05/08/2023 - 020023-002

PRICE ROOFTOP UNIT CONTROLLER

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SUPPORT ▼

Having difficulty installing this product?
Price is here to help.

Application Support

204.654.5613 option 4

controls@priceindustries.com

priceindustries.com/controls

PRICE ROOFTOP UNIT CONTROLLER

PRODUCT OVERVIEW

Safety Precautions

Short Circuit or incorrect wiring may permanently damage the controls or other equipment. Ensure proper wiring practices. The PRTU is to be used only as an operating controller. If a control failure could lead to personal and/or property damage, the installer must add safety/interlock devices to protect against these events.

Introduction

The Price Rooftop Unit Controller (PRTU) is intended to provide intelligent control of packaged single and multi-stage rooftop equipment typically in the 2-30 ton range. A variety of configurable binary and analog outputs allow control of virtually all rooftop units. All models feature 10 protected binary outputs and 4 protected analog outputs. Indicator LEDs show status of each output in green, red or yellow.

The PRTU comes with a backlit LCD Thermostat with password protected menus to fully configure and setup the unit in the field. Accurate temperature control is accomplished with a proportional integral (PI) algorithm.

The PRTU can function in **standalone mode (not networked to any zone controllers)** or can be networked to poll Price Controllers (Price Intelligent Controller - PIC, Prodigy Smart Diffuser) via BACnet MS/TP.

Features

PRTU Controller

- On board Real Time Clock and Calendar for scheduling
- Super Capacitor backup keeps time clock running during power failures
- Discharge Air Temperature (D.A.T.) monitoring – prevents excessive temperature swings that can trip safeties and waste energy
- Return Air Temperature (R.A.T) monitoring – monitors return air to RTU and prevents freeze up of coil or overheating that can trip safeties and waste energy
- 10 binary outputs rated at 0.5 amps each, protected with thermal fuse (RED LED on trip), automatic recovery when fault is corrected
- Switch for selecting binary output type (24VAC – HOT, COMMON or external)
- 4 analog outputs (0-10VDC), fully configurable for FAN, heating, cooling and spare
- Multi-level surge protection with user replaceable MINI type fuse (10 Amp)
- Pluggable terminal blocks
- BACnet MS/TP Client/Server stack for polling zones for data
- LED's for BACnet wiring fault, BACnet network fault, and MS/TP termination

PRTU Thermostat

- Backlit 14 x 2 LCD Thermostat with true character display
- Motion Sensor on Thermostat allows automatic occupancy mode
- Password protected menu
- Easy to use MENU system for fast and simple setup of system
- Local precision Thermistor
- Included RJ-45 plenum rated cable for fast, error free hookup
- Setup Wizard – walk through setup of PRTU when first powered up

PRICE ROOFTOP UNIT CONTROLLER

PRODUCT OVERVIEW

PRTU Default Sequence of Operations

The PRTU can function in standalone mode (not networked to any zone controllers) or can be networked to poll Price Controllers (Price Intelligent Controller – PIC, Prodigy Smart Diffuser) via BACnet MS/TP. If set to networked mode and the PRTU cannot poll the zones properly due to, bad address, bad wiring, etc. the unit will show BACnet Health of 0% and will default to standalone mode. If more than 50% of the network is online communicating with the PRTU, the PRTU will poll the devices which are communicating. (If greater than 50% of the network is offline the PRTU will default to standalone) In standalone mode the PRTU uses its local Thermostat and Setpoints to control the RTU. This is why we recommend locating/mounting PRTU Stat in a common area that the RTU services (eg. A hallway or open area, ideally not a mechanical room).

Standalone Mode

In this mode the PRTU will control the packaged RTU based on the local temperature conditions as measured at the PRTU Thermostat.

On an increase in space temperature into the cooling proportional band the PRTU will progressively engage stages of cooling (up to 4) in the packaged rooftop unit. On an increase of space temperature greater than the cooling proportional band, all active cooling stages will be energized. As the space temperature approaches the cooling Setpoint, the PRTU will de-energize active cooling stages.

On a decrease in space temperature into the heating proportional band the PRTU will progressively engage stages of heating (up to 4) in the packaged rooftop unit. On a decrease of space temperature greater than the heating proportional band, all active heating stages will be energized. As the space temperature approaches the heating Setpoint, the PRTU will de-energize active heating stages.

Separate heating and cooling Setpoints, along with adjustable changeover timers prevent system cycling between heating and cooling modes. Heating and cooling Setpoints are separated by a default value of 4°F (2°C).

Using the included two 10k Thermistor probes (Type J), the PRTU will monitor the air temperature as it is discharged (D.A.T. – measured on AI1) and returned (R.A.T. – measured an AI2) to the rooftop unit.

If either of the air temperatures exceed the adjustable limits, active heating and cooling stages are de-energized to prevent low or high temperature lockouts in the packaged rooftop unit.

Adjustable minimum on/off times prevent short cycling of outputs.

Networked Mode

In this mode the PRTU will poll up to 30 zone controllers (Price Intelligent Controller (PIC) or Prodigy Smart Diffusers). The number of zones polled must be set in the field. The PRTU will poll the requested zones every 3 minutes. Data polled is room temperature and room Setpoint.

Average Polling – (Recommend for most applications)

In average polling mode the majority demand wins and the RTU will be controlled using that information.

Example: Cooling – 50%, Heat – 40%, Neutral - 10% = Cooling Wins.

Each zone can be weighted. The default is 1. To add more weight to a zone (example: a large meeting room, or VIP room) increase the weight. Increasing the weight to 3 would give that zone 3 votes instead of 1.

To disable a zone set polling to 0. This is ideal for a zone which is poorly supplied and is influencing the system in a non-ideal way.

Networked Mode – Non-majority polling

Non majority favours one of the 3 modes.

Useful for:

- Heat/cool changeover systems WITH reheat at zones (favour cooling)
- Summer: Favour cooling
- Winter: Favour heating

PRTU can be set to switch strategies automatically on season change via the real time clock and calendar. This must be setup in the field.

PRICE ROOFTOP UNIT CONTROLLER

PRODUCT OVERVIEW

Included in Package

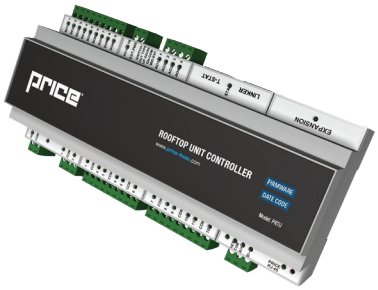
Each PRTU ships with the following items:

1. PRTU Controller (with DIN rail for mounting) (250000-900)
2. PRTU Thermostat (with backlit LCD screen) (250000-910)
3. Plenum rated 35-foot (RJ-45) Thermostat cable (228709-001)
4. Two 10k temperature probes (Type J) (250000-052)
5. Price Electronics Flat head screwdriver (0.1” tip) (020508-003)
6. PRTU - Quick Start Guide (1 page, double-sided)
7. This Manual

Please ensure you have all components before proceeding. Inspect components for shipping damage. Do not install components that appear damaged, contact your local PRICE Sales Rep for quick ship replacements.

As always for the latest information and video please visit **priceindustries.com**.

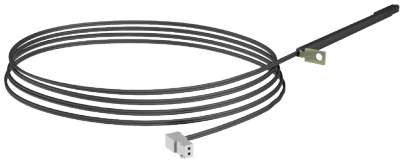
INCLUDED ITEMS ▼



1. PRTU CONTROLLER

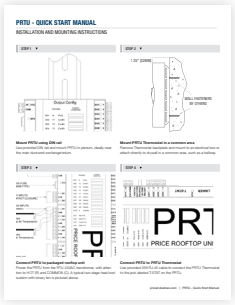
2. PRTU THERMOSTAT

3. PLENUM RATED 35-FOOT (RJ-45) THERMOSTAT CABLE



4. TWO 10K TEMPERATURE PROBES

5. PRICE ELECTRONICS FLAT HEAD SCREWDRIVER



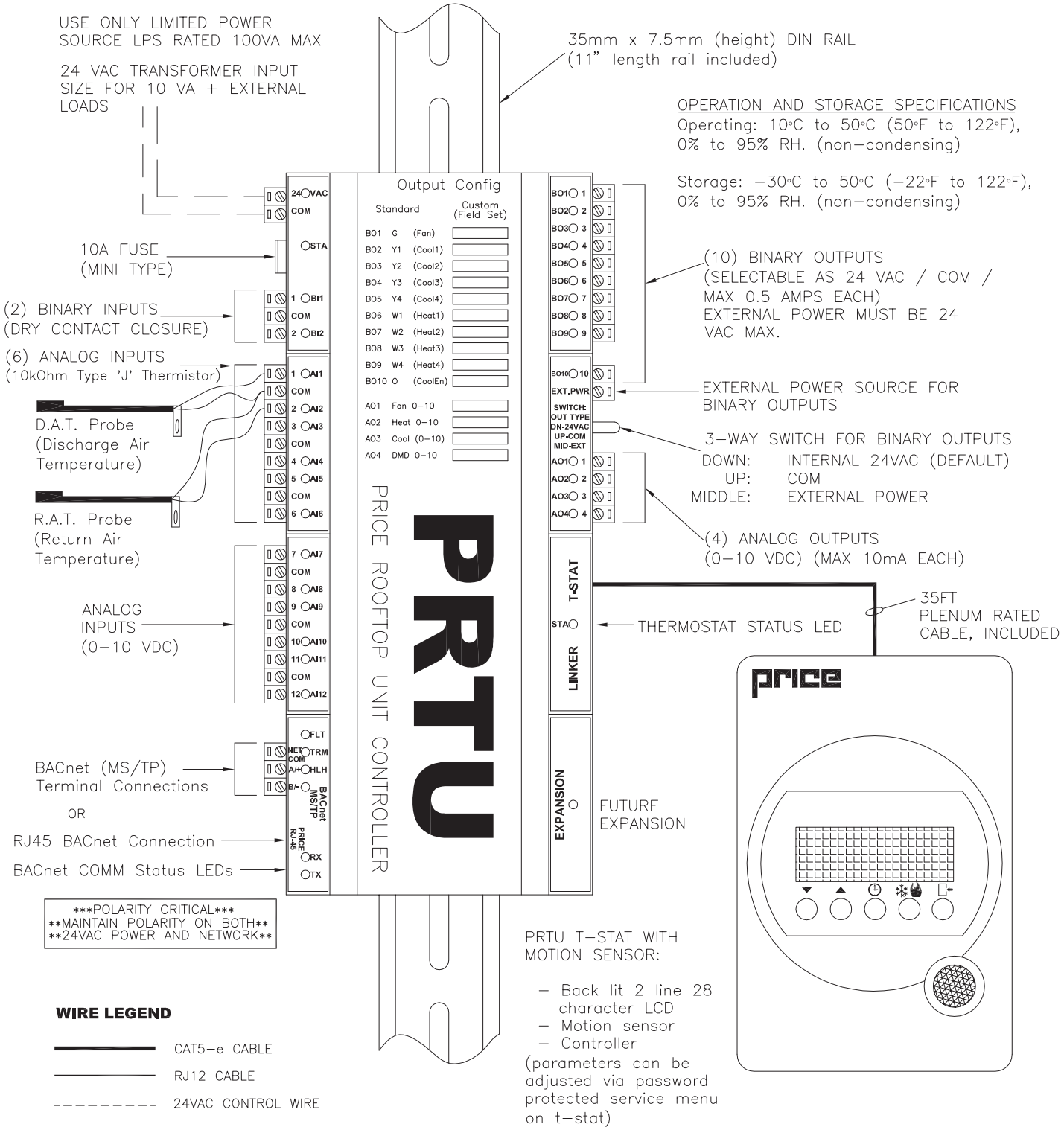
6. PRTU - QUICK START GUIDE

7. THIS MANUAL

PRICE ROOFTOP UNIT CONTROLLER

PRODUCT OVERVIEW

OVERVIEW OF THE PRTU ▼



ALL METRIC DIMENSIONS ( ) ARE SOFT CONVERTED. IMPERIAL DIMENSIONS ARE CONVERTED TO METRIC AND ROUNDED TO THE NEAREST MILLIMETER.

PRICE ROOFTOP UNIT CONTROLLER

INSTALLATION & MOUNTING INSTRUCTIONS

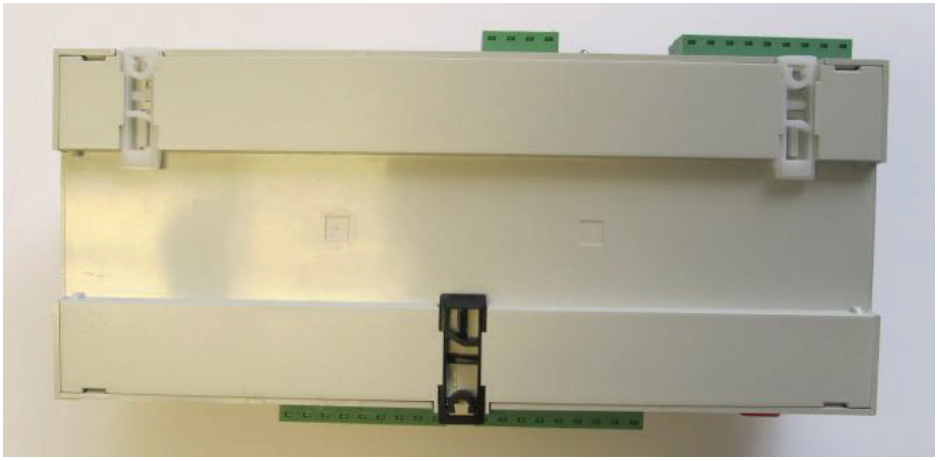
PRTU Controller

To mount the PRTU controller use the included 11" piece of DIN rail. The PRTU must NOT be installed outdoors or inside the RTU. Mount the PRTU on the wall in a mechanical or IT room or install in the plenum space in an approved enclosure, ideally near the main ductwork supply/return of the RTU just above the ceiling tiles.

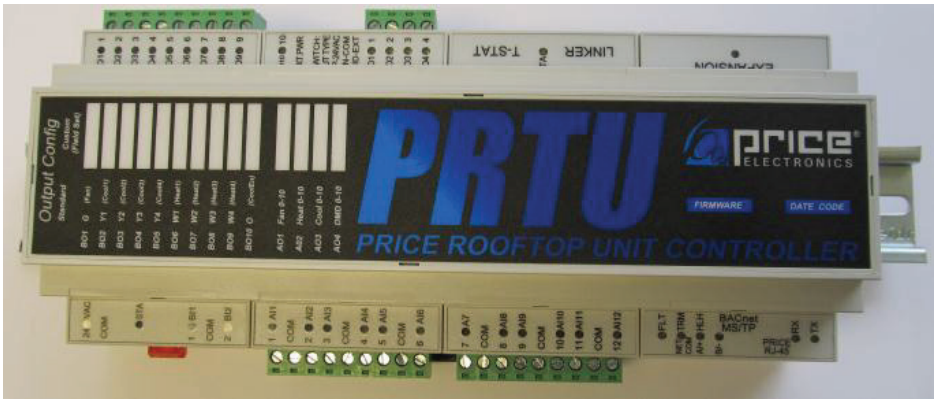
1. Using 3 screws (by others) mount the DIN rail horizontally to a secure, accessible surface
2. Hang the PRTU controller onto the DIN rail using the TOP white clips
3. Using the Price Electronics screwdriver, gently pull down on the BLACK clip, while pushing gently on the PRTU towards the DIN rail
4. The PRTU should click securely into place
5. To remove, repeat above steps in reverse

DIN RAIL ▼

BACK VIEW OF PRTU ▼



FRONT VIEW OF PRTU MOUNTED ON DIN RAIL ▼



PRICE ROOFTOP UNIT CONTROLLER

INSTALLATION & MOUNTING INSTRUCTIONS

PRTU Thermostat

The PRTU Thermostat must be mounted to a wall and wired to the PRTU Controller via the supplied plenum rated 35 ft CAT-5 cable. The cable plugs into the Thermostat and the PRTU T-STAT jack with a RJ-45 connection.

NOTE: The cable run can be extended to 70 ft using a Price cable coupler (NETCC) and additional 35 ft cable (NETC35).

Location

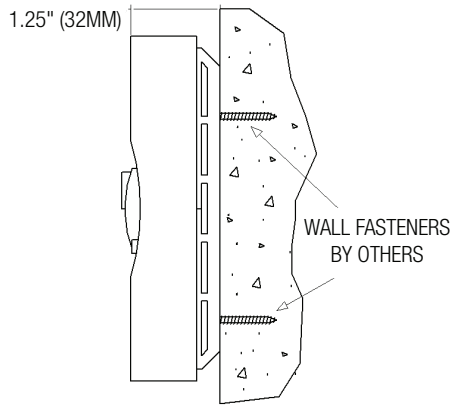
To mount the PRTU Thermostat remove the back plate gently lifting from the bottom. Mount the back plate/Thermostat in common area such as a hallway. This allows the motion sensor to detect people during unoccupied periods. Also if the system needs to operate in standalone mode (using the Thermostat temperature sensor) this allows adequate control of the PRTU.

- Do not mount the Thermostat in direct sunlight (ie: across from a window)
- Do not install on an exterior wall
- Do not mount near equipment that generates heat (monitors, fridge, photocopiers, etc.)
- Ensure nothing will restrict vertical air circulation to the Thermostat (ie: do not cover, enclose, etc.)
- Ensure wall is NOT pressurized! Hot/Cold air from a pressurized wall will directly blow onto the Thermostat's temperature sensor causing 'bad' readings.

Installation Steps

1. The back plate on each Thermostat is removable and can be mounted to a standard electrical box or directly to drywall using anchors supplied by others.
2. Run the CAT-5 cable through the center hole in the plate. Connect the cable to the Thermostat, and then secure the Thermostat onto the wall plate inserting the top portion of the Thermostat first, and then snapping the bottom half in.
3. All Thermostats will come equipped with 0.050" Allen Key for the set screw at the bottom. This helps secure the Thermostat and prevents users from removing it.

SURFACE MOUNT DETAIL ▼



PRTU THERMOSTAT ▼

TECH TIP ▼

Careful Thermostat installation will reduce field issues! Do not twist or kink the blue CAT-5 Thermostat cable. Damaged cables are difficult to troubleshoot!

Thermostat cable product code: NETC35

PRICE ROOFTOP UNIT CONTROLLER

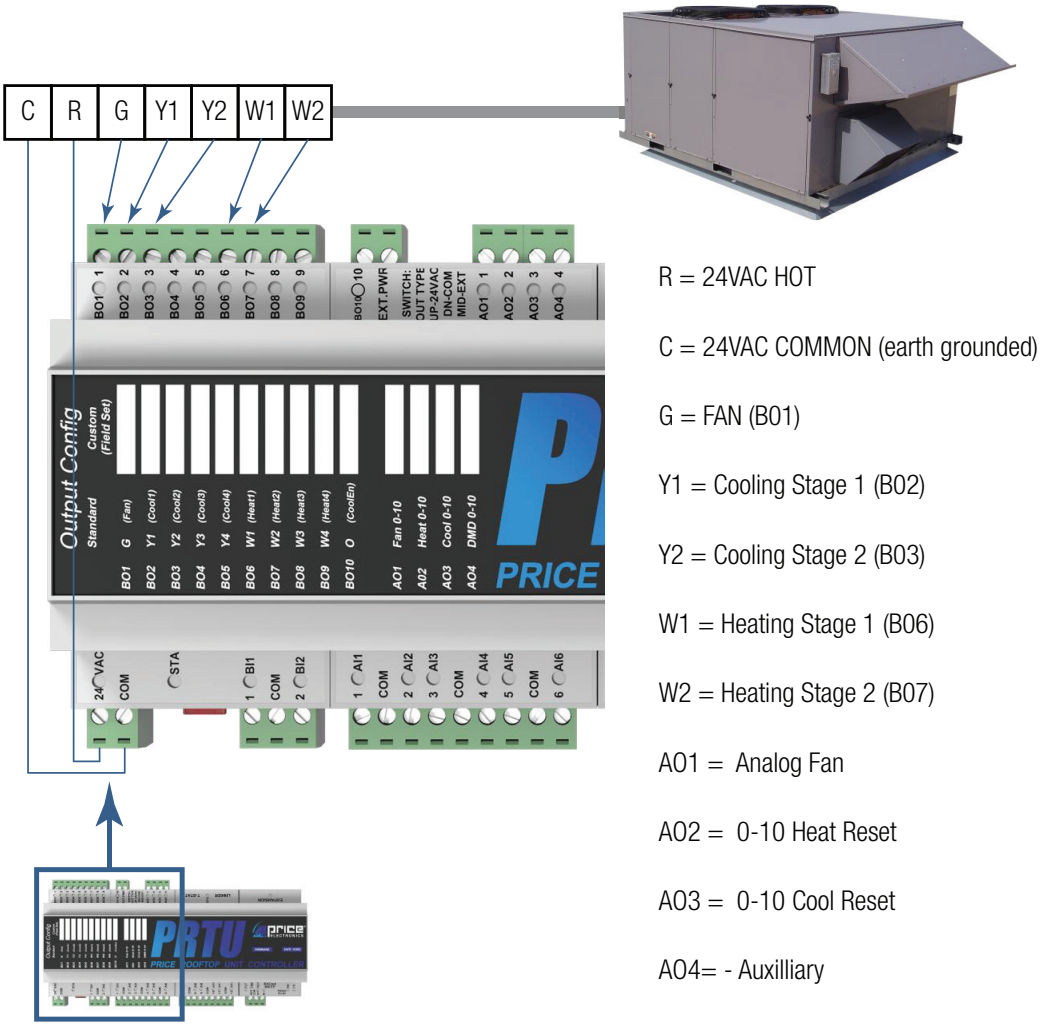
INSTALLATION & MOUNTING INSTRUCTIONS

PRTU Wiring

Wiring of the PRTU to the packaged rooftop unit is simple, but still requires attention to detail. In virtually all installations the PRTU will be powered from the RTU 24VAC transformer. **24VAC HOT and COMMON polarities are critical and must be observed throughout the wiring process!**

As with most 24VAC powered devices, reversing polarity still allows the device to power up, but once connected to another device undesirable results will occur. These are typically difficult to troubleshoot and consume valuable time.

TYPICAL HOOKUP TO A 2 STAGE HEAT/COOL UNIT WITH A BINARY FAN ▼



R = 24VAC HOT

C = 24VAC COMMON (earth grounded)

G = FAN (B01)

Y1 = Cooling Stage 1 (B02)

Y2 = Cooling Stage 2 (B03)

W1 = Heating Stage 1 (B06)

W2 = Heating Stage 2 (B07)

AO1 = Analog Fan

AO2 = 0-10 Heat Reset

AO3 = 0-10 Cool Reset

AO4= - Auxilliary

TECH TIP ▼

Ensure 24VAC polarity is correct and consistent among all devices! Ensure 24VAC COMMON is earth grounded.

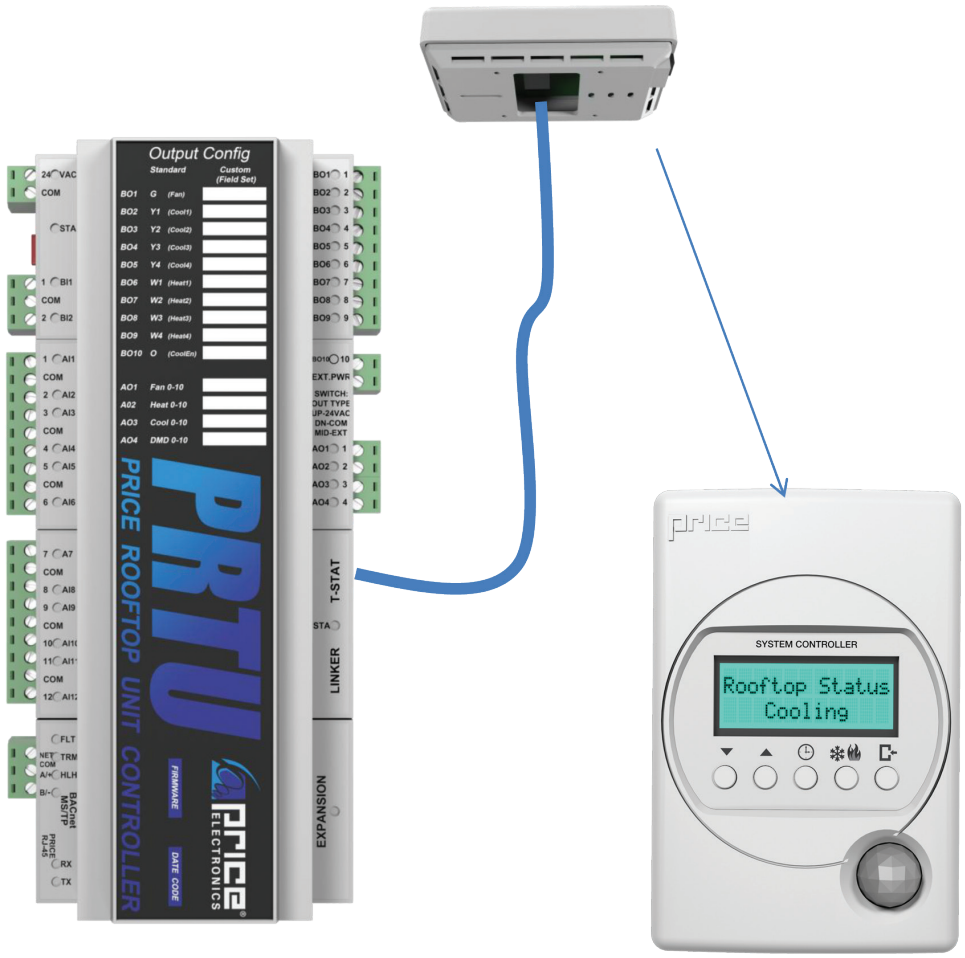
PRICE ROOFTOP UNIT CONTROLLER

INSTALLATION & MOUNTING INSTRUCTIONS

PRTU Thermostat Wiring

Plug Thermostat cable into RJ-45 Jack of the Thermostat and in RJ-45 jack labeled T-STAT on PRTU. Thermostat gets power from PRTU, which is getting 24VAC from Rooftop unit. On power up, Thermostat displays its firmware version V3.XX.X and PRTU firmware version V1.XX.X.

CAPTION ▼



Zone Polling via BACnet MS/TP Network

The PRTU can poll zones for load data (room temperature and room Setpoint) over a BACnet MS/TP connection (a.k.a. the NETWORK). Price Controllers that support BACnet and zone control are currently the Price Intelligent Controller (PIC) and Prodigy Smart Diffuser (PPD). To simplify the wiring of MS/TP Price uses an RJ-45 connection. Pins 1 and 2 are used for the MS/TP data (+ and -), while Pins 7 and 8 are used for a BACnet common connection. Pins 3, 4, 5, 6 are no connects. Please note this is not an Ethernet connection! Price uses RJ-45 jacks and cable due to their excellent specifications and availability.

The PRTU has both a RJ-45 connection and a 3 position terminal plug that can access the MS/TP port. Typically you will use the RJ-45 connection to connect to the ZONE CONTROLLERS.

Before networking to the controllers please use the checklist below:

- ☐ All zone controllers are powered up and functioning
- ☐ All zone controllers have consistent 24VAC HOT and 24VAC COMMON power correctly hooked up
- ☐ Each zone controller has a UNIQUE MAC Address starting at 1 and going up to a maximum of 30
- ☐ Each zone controller has a UNIQUE DEVICE INSTANCE address starting at 101 (going to 130)
- ☐ Each zone controller is running at a MS/TP baud rate of 76,800 (Price default for all controllers, recommend you use this and do not change on any controllers)
- ☐ All controllers must be wired in DAISY CHAIN format. Controller to controller, no 'T' or split connections
- ☐ **NOTE:** Bad wiring, Addresses, Baud Rates, etc. will cause network to crash and/or be unreliable. Triple check all wiring and settings! PRTU will run in stand-alone mode unless network is good. Once errors are fixed, PRTU will automatically switch back to networked mode

BACnet Addressing Tips:

If only installing one PRTU please use the default addresses. Each PRTU has two address types a LOCAL and a SYSTEM address.

On PRTU the LOCAL address (MAC Address) is unique to the MS/TP segment and has a range of 101-126. This ensures it does not collide with the Zone Controllers addresses (which are limited form 1-99).

On PRTU the SYSTEM address (DEVICE INSTANCE) is unique to the building network and has a range of 1-4.19M.

PRTU DEFAULT – MAC - 101

PRTU DEFAULT – INSTANCE - 100

PRICE ROOFTOP UNIT CONTROLLER

INSTALLATION & MOUNTING INSTRUCTIONS

Networking Setup

SETUP WITH NO WEB ACCESS ▼

PRTU

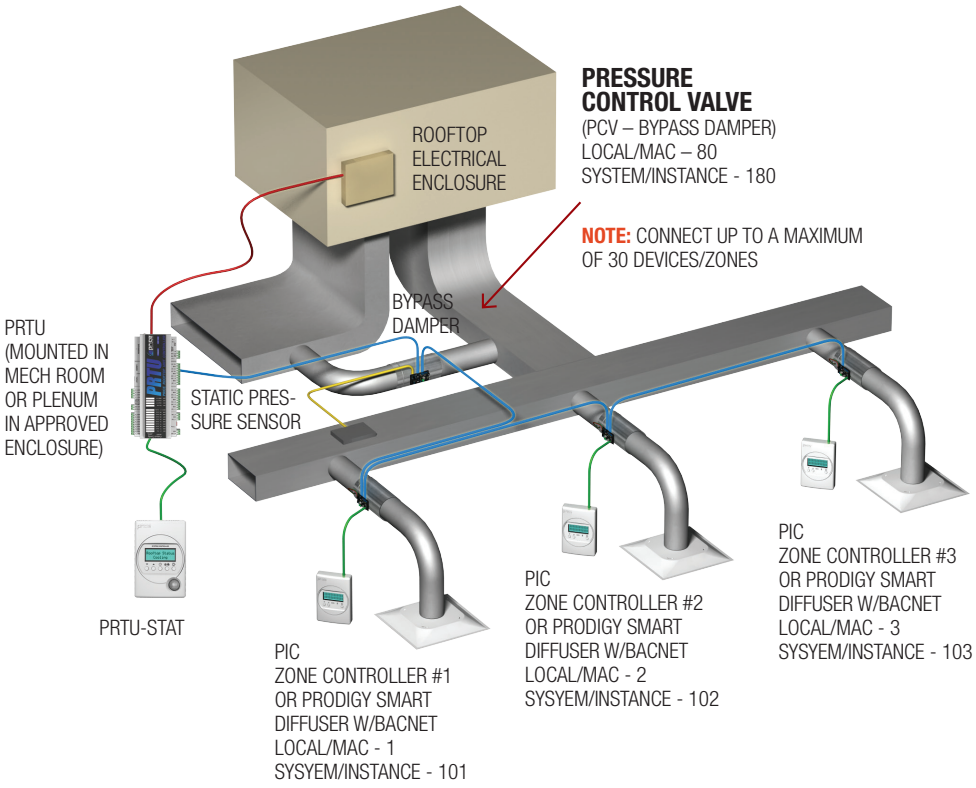
- Number of polling zones = 3
- LOCAL/MAC – 101
- SYSTEM/DEVICE INSTANCE – 100

IMPORTANT: The LOCAL/MAC of each PIC/PRODIGY would be 1, 2, and 3, while the instances would be 101, 102, 103

Termination of MS/TP Network

Each MS/TP Network should be terminated to prevent reflections and ensure a reliable network. Terminate a total of 2 times, once at beginning of the network and once at the last device. In the example below, enable termination at the PRTU (via the BACnet menu) and the last Prodigy/PIC controller using the DIP switch #8 (TRM).

NOTE: The PCV does not ship with an LCD T-Stat. To change its instance, you can temporarily borrow an LCD T-Stat from any other controller (eg. Prodigy, PIC or even PRTU) to setup the PCV. Alternatively you can purchase an LCD-SETUP tool or LINKER 2. The MAC Address can be set locally through the dip switches on the attached BACnet module. Always cycle 24VAC power after setting address. Address does not change unitl you do this.



PRICE ROOFTOP UNIT CONTROLLER

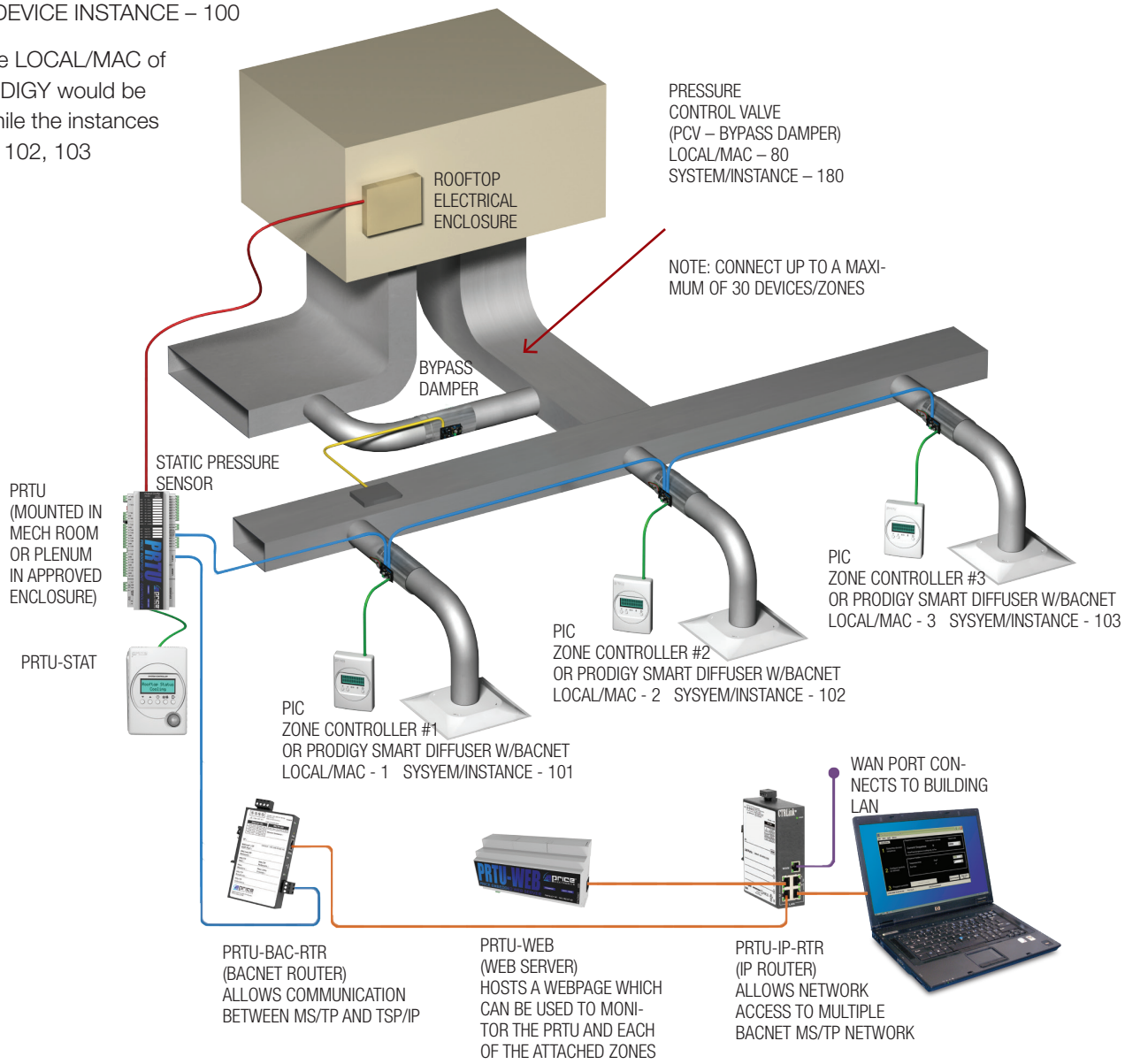
INSTALLATION & MOUNTING INSTRUCTIONS

EXAMPLE: SETUP WITH WEB ACCESS ▼

PRTU

- Number of polling zones = 3
- LOCAL/MAC – 101
- SYSTEM/DEVICE INSTANCE – 100

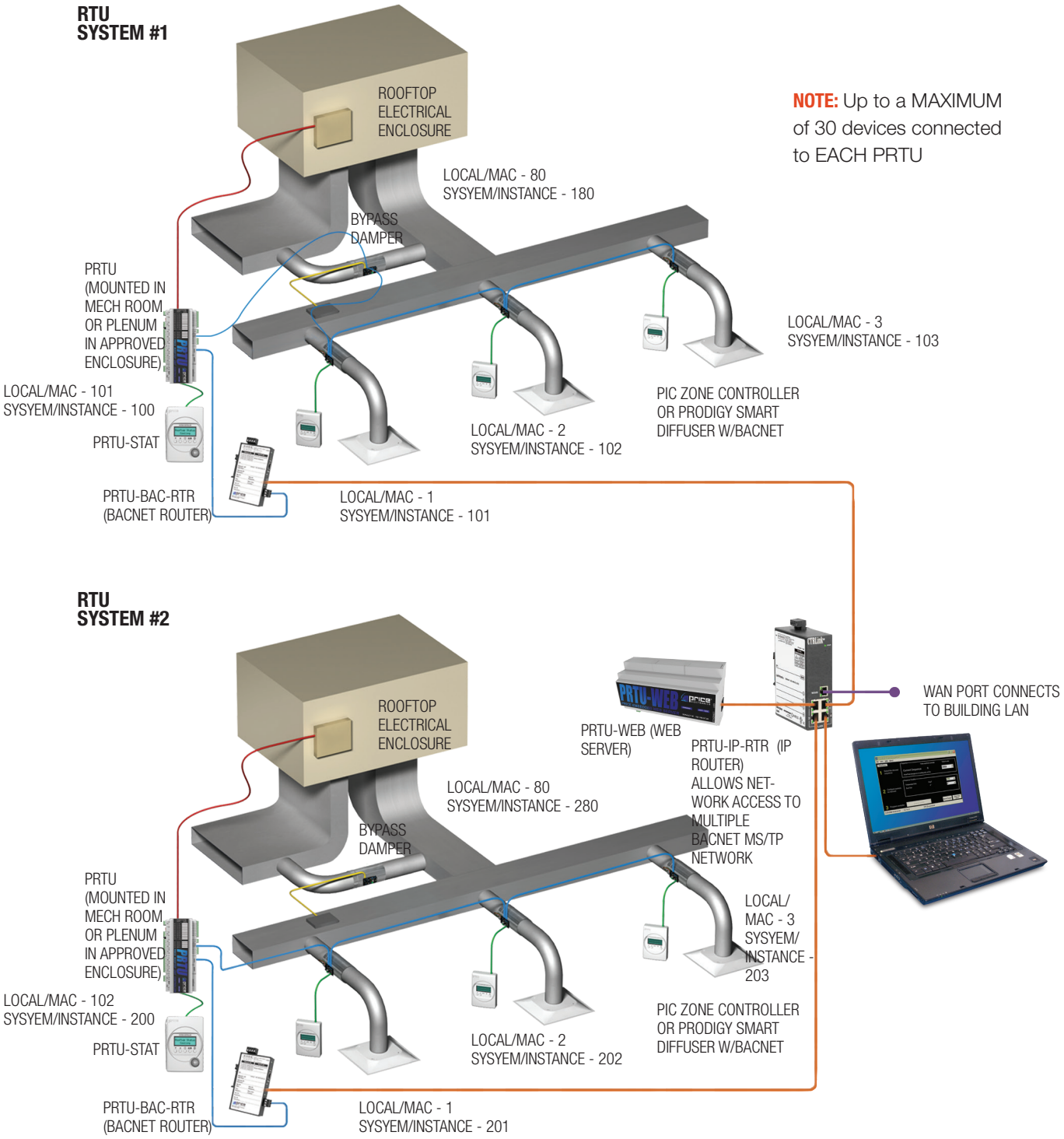
IMPORTANT: The LOCAL/MAC of each PIC/PRODIGY would be 1, 2, and 3, while the instances would be 101, 102, 103



PRICE ROOFTOP UNIT CONTROLLER

INSTALLATION & MOUNTING INSTRUCTIONS

EXAMPLE: SETUP WITH MULTIPLE SYSTEMS ▼



NOTE: Laptop with Web Browser used for setting up the PRTU-IP-RTR and PRTU-WEB locally. After setup is complete, devices can be accessed using any computer with web browser on building LAN.

PRICE ROOFTOP UNIT CONTROLLER

DISPLAY NAVIGATION

Wizard Menu

The first time the PRTU is powered on, the attached T-Stat will step through the setup wizard.

SERVICE MENU: WIZARD	
WELCOME! SETUP WIZARD	**Setup Wizard** – Press MENU key to advance through the wizard
SETUP WIZARD 1: TIME/DATE	**Time/Date** – Set all the time and date information
CLOCK MODE	**12 Hour** – The time will be displayed in 12 hour time (Default) **24 Hour** – The time will be displayed in 24 hour time
SET HOUR	Set the current hour (0-23 or 1-12 am/pm)
SET MINUTE	Set the current minute (0-59)
SET WEEKDAY	Set the current day on the week (Sunday, Monday, Tuesday, Wednesday, Thursday, Friday)
SET DAY	Set the current day of the month (1-31)
SET MONTH	Set the current month (January, February, March, April, May, June, July, August, September, October, November, December)
SET YEAR	Set the last two digits of the year (0-99)
SETUP WIZARD 2: OPERATION	**Operation** – Setup of the # of stages, Strategy, etc.
TEMP. UNITS	**Fahrenheit** – Display units in F (Default) **Celsius** – Display units in C
UNITS MUST MATCH ZONES!	**WARNING:** If the units chosen do not match the units selected for each zone, the controller may not function correctly
# COOLING STG	The total number of stages of cooling that are available to the PRTU (1-4)

PRICE ROOFTOP UNIT CONTROLLER

DISPLAY NAVIGATION

Wizard Menu Continued...

# HEATING STG	The total number of stages of heating that are available to the PRTU (1-4)
STRATEGY	**Standalone** – The PRTU will not expect to see any zones (If the BACnet network fails, the PRTU will default to this mode **Networked** – The PRTU is expecting to see attached zones
SETUP WIZARD 3: BACNET	**BACnet** – Setup of BACnet settings such as RTU #/MAC, number of polled zones
SET RTU # NO DUPLICATES	**WARNING:** Having multiple RTU's with the same number, the system may not function correctly
SET RTU #	Assign a unique number to the RTU (RTU-01 to RTU-26)
MAC SET TO	Tells you what the MAC Address for this PRTU is set to (101 to 126)
DEVICE INSTANCE SET TO	Tells you what the Device Instance for the PRTU is (100-900)
# OF ZONES	Set the number of zones that will be connected to the PRTU (1-30). **NOTE:** In Standalone mode this menu option will be skipped
ADDR ZONES FR	Assign the following addresses to each of zones connected to the PRTU, starting from the displayed address **NOTE:** In Standalone mode this menu option will be skipped.
TO	And finishing at this displayed address. **NOTE**: In Standalone mode this menu option will be skipped
SETUP WIZARD COMPLETE!	Complete – PRTU has been setup and will now re-boot to apply all settings, Thermostat will re-boot as well
SEE MANUAL FOR ADV SETUP	See this manual for advanced setup options
PRESS MENU TO EXIT	**NOTE:** The Wizard will force you to go through all settings in order. You can re-run the wizard at any time by going through the service menu. Once you have gone through the Wizard fully, the PRTU will reset

TECH TIP

Set the PRTU address using the WIZARD or BACnet menu. Set the PIC or Prodigy addresses using the DIP switches for LOCAL/MAC and the LCD Thermostat for setting the SYSTEM/INSTANCE (ADDRESS MENU). When changing DIP switches you must CYCLE POWER on controller! Since the DIP switches are only read on startup. TIP: Press UP/DOWN buttons on LCD stat at same time, this will display the startup screen and show you the current address. (Works on PRTU, PIC and PRODIGY)

PRICE ROOFTOP UNIT CONTROLLER

DISPLAY NAVIGATION

LCD Thermostat – Initial Start-Up

When the LCD Thermostat is first powered from the PRTU controller, it will display the following information: (Also press both UP/DOWN at same time to show this screen anytime.)

PRICE ELECTRONICS	Start-up screen
LCD THERMOSTAT MOTION MODEL	PRTU Thermostat has LCD screen and motion sensor
LCD THERMOSTAT VERSION 3.XX.X	**LCD Thermostat** – Firmware V3.xx.x or higher
LOADING: 0-100%	**Loading Screen** – Thermostat pulls in variables from PRTU
PRTU VERSION 1.XX.X	**PRTU Controller** – Firmware Version 1.xx.x or higher
MAC ADDRESS LOCAL 101	**Displays current MAC Address (local MS/TP segment)** – Must be unique to MS/TP segment
DEVICE INST. SYSTEM 100	**Displays current Device Instance (System address)** – Must be unique to building
DEVICE INST. SYSTEM 100	After start-up LCD will cycle between Current Mode, Time/Date and Room Temperature (if in standalone – non-networked mode)

Service Menu and Time/Mode Buttons

▼ Down Button

Used for menu selection and standalone Setpoint adjustment.

▲ Up Button

Used for menu selection and standalone Setpoint adjustment – press both to display Thermostat Startup screens.

Time Set Button

Used to set real time clock and calendar. Can be password protected, but this is off by default.

Mode Set Button

Used to set mode of the system. Can force Cooling only, Heating only, Ventilation (fan) or Auto-changeover (Default). Can be password protected, but this is off by default.

Menu Button

Used to enter Service Menu. Hold button for 5 seconds to enter the Menu.

Passcode: Down, Up, Up, Down

NOTE: This is the same passcode for SERVICE and TIME/DATE set buttons.

CONTROLLER ▼

PRICE ROOFTOP UNIT CONTROLLER

DISPLAY NAVIGATION

Service Menu

The Service Menu contains all setup and configuration parameters. Each PRTU ships as a standalone controller, in Fahrenheit units and is setup to control a 2-stage heating and 2-stage cooling packaged rooftop unit with a binary fan. All MAIN menus are listed on this page. Use the WIZARD and/or below menus to setup the PRTU for your application.

Passcode: Down, Up, Up, Down

NOTE: This is the same passcode for Service and Time/Mode set buttons.

SERVICE MENU: STRATEGY	**Strategy Menu** – Allows setting of standalone and polling modes
SERVICE MENU: SETPOINT	**Setpoint Menu** – Units, Night heat/cool, and limits
SERVICE MENU: INPUT	**Input Menu** – T-Stat offset, reading of inputs (AI1-AI12)
SERVICE MENU: OUTPUT	**Output** – Of binary and analog outputs
SERVICE MENU: BACNET	**BACnet Menu** – BACnet addresses (MAC and System)
SERVICE MENU: STAT SETUP	**Stat Setup Menu** – Motion Sensor setup, Time/mode password enable
SERVICE MENU: DIAGNOSTIC	**Diagnostic** – Displays BACnet health, Zones up
SERVICE MENU: POLLING	**Polling Menu** – Set # of zones, zone weights, proportional band
SERVICE MENU: TIME/DATE SET	**Time/Date Set Menu** – Setting of real time clock and calendar
SERVICE MENU: SCHEDULE SET	**Schedule Set Menu** – Setting of occupancy schedule
SERVICE MENU: OPERATION	**Operation Menu** – Sets PRTU mode, Fan configuration, # of stages
SERVICE MENU: SETUP WIZARD	**Setup Wizard** – Steps the user through a simple setup process. Intended to get PRTU up and running quickly. Wizard runs on first power up, but can be re-run at any time
PRESS MENU TO EXIT	**Exit Menu** – Exits back to main cycle screen

PRICE ROOFTOP UNIT CONTROLLER

DISPLAY NAVIGATION

Strategy Menu

Once in Service Menu, Scroll Down and Press 'Menu/Enter' to enter the Strategy Menu.

SERVICE MENU: STRATEGY	
SEASNL STRAT NO	**SEASNL STRAT YES** — See Page 18
STRATEGY STANDALONE	**Standalone** – PRTU controls the RTU using its local LCD Thermostat. Set point control at LCD Thermostat
STRATEGY AVG POLLING	**Average Polling** – PRTU controls the RTU using information from the zone controllers. Each zone gets a vote for neutral, heating or cooling
STRATEGY NM POLLING	**Non Majority Polling** – PRTU controls the RTU using information from the zone controller. Each zone gets a vote for neutral, heating or cooling, however the PRTU will favor a certain mode
NONMAJOR MODE COOLING	**Non Majority Mode** – Set the mode, cooling, heating, or neutral here. The default is cooling and it will "win" at 35%
NEW MJRTY 35%	**New Majority %** – Set the % at which the mode will be enabled.
STRATEGY ENERGY HOG	**Energy Hog** – Appropriately named, this strategy will enable either cooling or heating if any zone is out by even 1%. Typically this system will never be in neutral mode. Not recommended except for unique situations
PRESS MENU TO EXIT	**Exit Menu** – Exits back to SERVICE menu

DISPLAY NAVIGATION

Strategy Menu – Seasonal Strategy

Once in Service Menu, Scroll Down and Press 'Menu/Enter' to enter the Strategy Menu.

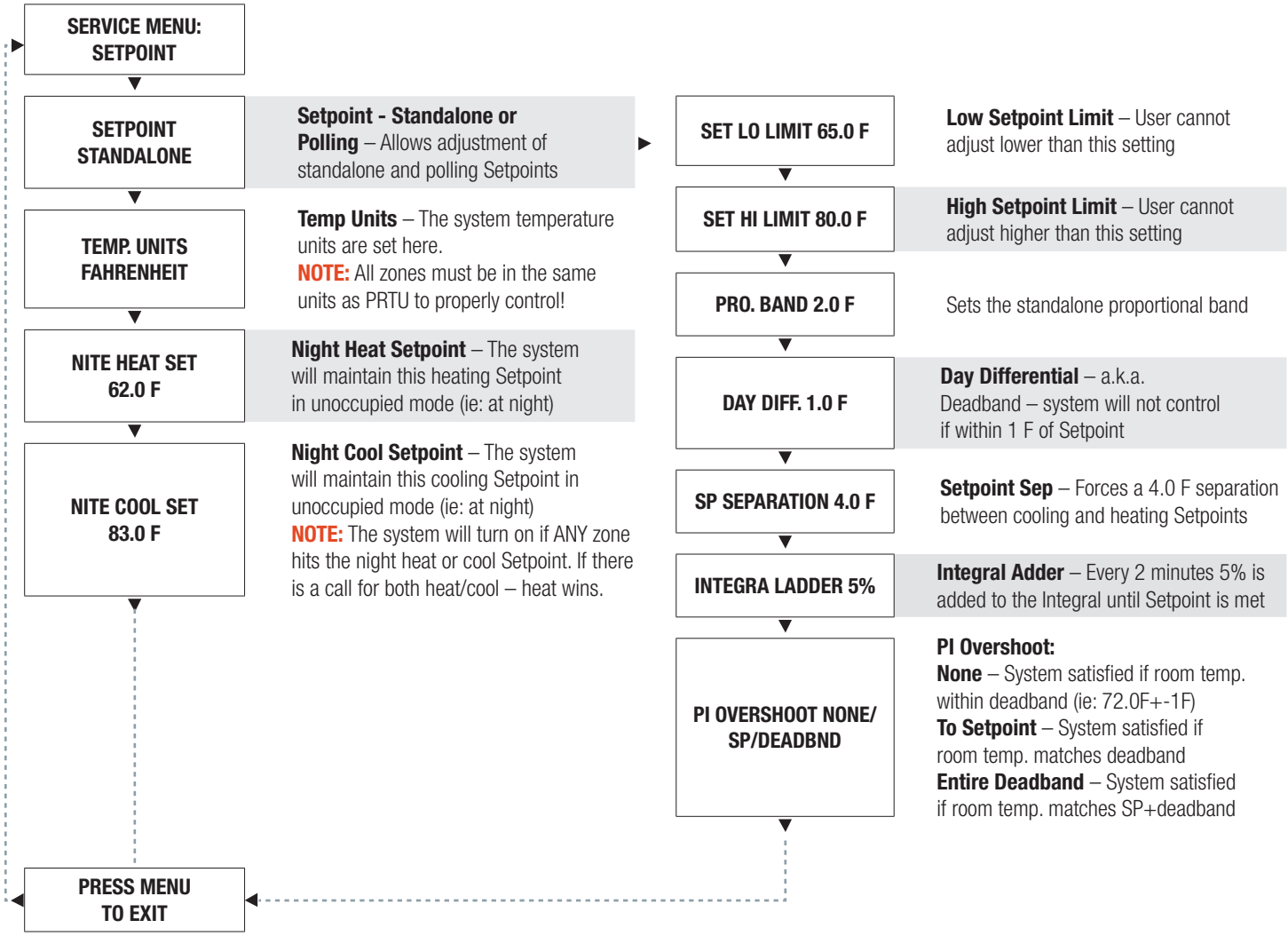
Then select Seasonal Strategy – Yes. This allows automatic changing of the strategy based on Spring, Summer, Fall and Winter. For example you could favor cooling in summer, heating in winter and use standard average polling for spring/fall. The intent is to allow the system to control optimally as the seasons change.

PRICE ROOFTOP UNIT CONTROLLER

DISPLAY NAVIGATION

Setpoint Menu

Once in Service Menu, Scroll Down and Press 'Menu/Enter' to enter the Setpoint Menu.



PRICE ROOFTOP UNIT CONTROLLER

DISPLAY NAVIGATION

Input Menu

Once in Service Menu, Scroll Down and Press 'Menu/Enter' to enter the Input Menu.

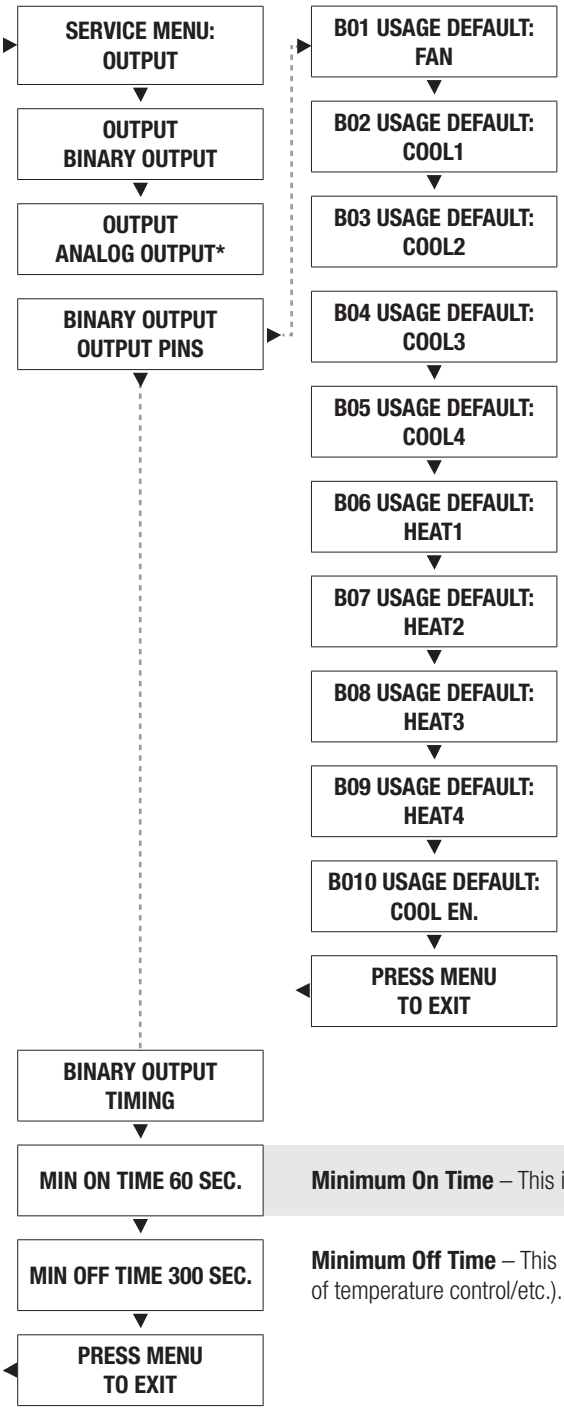
SERVICE MENU: INPUT	
T-STAT TEMP. 72.0 F	**T-Stat Temperature** – Current PRTU Stat Temperature
T-STAT OFFSET 0.0 F	**T-Stat Offset** – Allows offset of T-Stat Thermistor. Typically not recommended. Default: +-0.0F
DAT (AI1) -59.0 F	**DAT** – Discharge Air Temperature Sensor. This sensor is included with PRTU and should be installed in the discharge/supply duct of RTU. This feedback helps limit excessive temperature swings with large and oversized equipment. Will read -59.0 F if not connected. PRTU will IGNORE if reading is -59.0 F and control normally. +300.0 F means a short circuit in wiring or damaged probe. Disconnect and replace ASAP.
RAT (AI2) -59.0 F	**RAT** – Return Air Temperature Sensor. This sensor is included with PRTU and should be installed in return duct to RTU. Helps prevent tripping of safeties (heating and cooling) if return exceeds limits. This can occur with a ducted bypass and VAV zones. Will read -59.0 F if not connected. PRTU will ignore if reading is -59.0 F and control normally. +300.0 F means a short circuit in wiring or damaged probe. Disconnect and replace ASAP.
AI3-AI6 -59.0 F	**AI3-AI6** – Analog inputs 3, 4, 5, 6 are 10k type J inputs and are currently only used for monitoring. Extra probes can be installed to monitor other temperatures. These points are available for monitoring and logging over BACnet. However they do not affect control. Range: -59.0 F - +300.0 F
AI7-AI12 0-10VDC	**Ai7-AI12** – Analog inputs 7, 8, 9, 10, 11, 12 are 0-10VDC inputs and are currently only used for monitoring. Extra sensors can be installed to monitor other voltages. These points are available for monitoring and logging over BACnet. However they do not affect control. Range: 0-10VDC.
PRESS MENU TO EXIT	

PRICE ROOFTOP UNIT CONTROLLER

DISPLAY NAVIGATION

Output Menu – Binary

Once in Service Menu, Scroll Down and Press 'Menu/Enter' to enter the Output Menu.



B01 – B010 – Default – RTU FAN – Each B01-10 can be re-tasked to either:

- Fan
- Cool 1 (stage 1)
- Cool 2 (stage 2)
- Cool 3 (stage 3)
- Cool 4 (stage 4)
- Heat 1 (stage 1)
- Heat 2 (stage 2)
- Heat 3 (stage 3)
- Heat 4 (stage 4)
- Cool Enable (active on cooling)
- Heat Enable (active on heating)

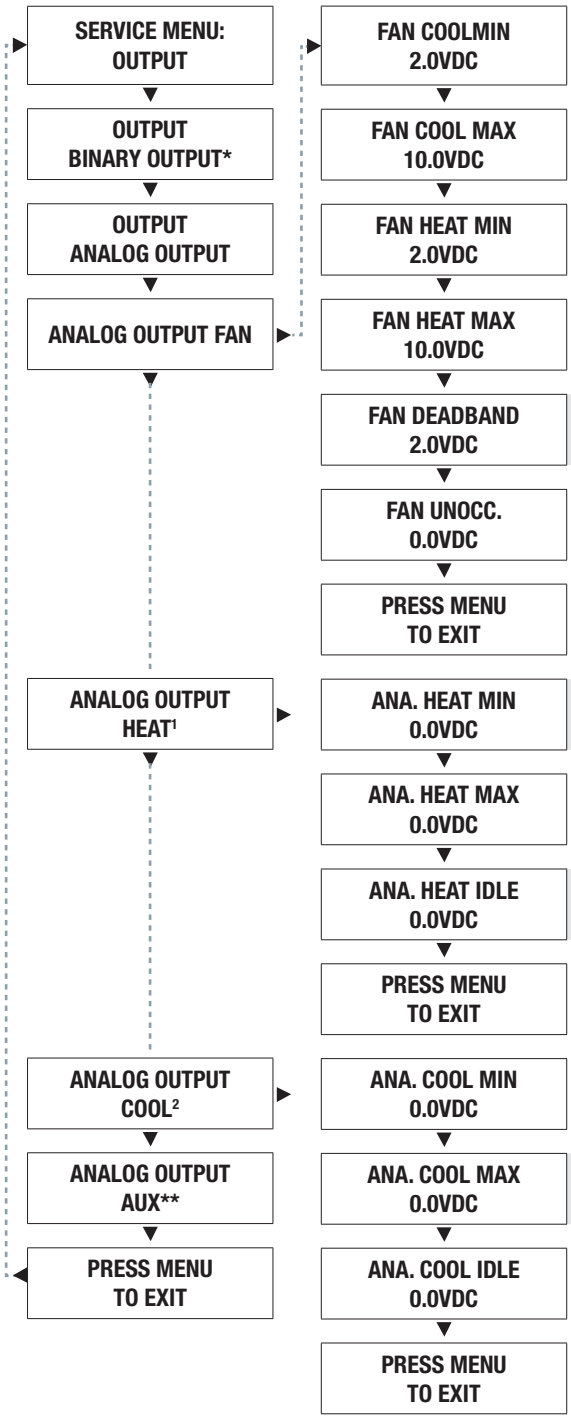
Minimum On Time – This is the minimum time the binary output can be on (regardless of temperature control/etc.)

Minimum Off Time – This is the minimum time the binary output will be off (regardless of temperature control/etc.). Intended to prevent short cycling of equipment

* See page 22 for Output Menu - Analog

Output Menu – Analog

Once in Service Menu, Scroll Down and Press 'Menu/Enter' to enter the Output Menu.



FAN – AO1 – All fan voltages are tied to the PI controller and occupancy. Each mode can be set between 0-10VDC. Cooling mode the PI controller is between -100% to -1%. Heating mode the PI controller is between +100% to +1%

Fan Deadband – Output when PI = 0% - satisfied

Fan Unoccupied – Output when PRTU is unoccupied

Analog Heat Minimum – Output when PI = just enters heating

Analog Heat Maximum – Output when PI = max heating

Analog Heat Idle – Output when PI = 0% or cooling

Analog Cool Minimum – Output when PI = just enters cooling

Analog Cool Maximum – Output when PI = max cooling

Analog Cool Idle – Output when PI = 0% or heating

* See page 21 for Output - Binary

** Aux - spare output (AO4)

[1] HEAT - AO2 - Heating analog output proportional to room PI Min and Max voltages are adjustable between 0 and 10 VDC

[2] Cool - AO3 - Cooling analog output proportional to room PI Min and Max voltages are adjustable between 0 and 10 VDC

BACnet Menu (Addressing)

Once in Service Menu, Scroll Down and Press 'Menu/Enter' to enter the BACnet Menu.

SERVICE MENU: BACNET	
MAC ADDRESS 101	**MAC Address** – The unique address of the PRTU, ranging from 101 to 126 **(Default 101)**
DEVICE INST. 100	**Device Instance** – This is the unique address for the PRTU, see the explanation below for more information **(Default 100)**
BAUD RATE 76800	**Baud Rate** – The rate with which the PRTU communicates over BACnet: 9600, 19200, 38400 and 76800 **(Default)**
RS-485 TERM DISABLED	**RS-485 Termination** – This enables the RS-485 termination on the PRTU MS/TP BACnet port. Remember, only terminate the network twice in total, once at the beginning and once again at the end of the network.
PRESS MENU TO EXIT	

Device Instance - Detail

Tier 0 is always "00" on PRTU

Tier 1 is the MAC Address minus 100 (Range 1-26, Default: 1)

Tier 2 is settable between 0 and 99 (Default: 0)

Tier 3 is settable between 0 and 4 (Default: 0)

Factory default local/MAC Address: 101

Factory system/Instance address: 100

TIER 3	TIER 2	TIER 1	TIER 0
3,	**22**	**0,1**	**00**

PRICE ROOFTOP UNIT CONTROLLER

DISPLAY NAVIGATION

Stat Setup Menu

Once in Service Menu, Scroll Down and Press 'Menu/Enter' to enter the Stat Setup Menu.

SERVICE MENU: STAT SETUP	
OCCUPANCY SCH. OCCUPIED	**Occupancy** – Displays what is currently causing the space to be occupied **(This is a read only variable)**
MOTION ENABLE ON	**Motion Enable** – If motion is detected, occupancy is set
SENSITIVITY 5	**Sensitivity** – Sets how sensitive the motion T-Stat is, ranges from 1 (least sensitive) to 9 (most sensitive) **(Default 5)**
MOTION TEST OFF	**Motion Test** – Tests the motion sensor, when motion is detected, the T-Stat will beep (**Default Off)**
LCD BACKLIGHT ALWAYS ON	**LCD Back Light** – Sets how the back lighting works, Button Push, Always Off or Always On **(Default)**
SOUND OPTIONS ON	**Sound Options** – Changes how the sounds work, On **(Default)**, Off, or Diagnostic
TIME PASSWORD DISABLED	**Time Password** – This protects the TIME push button with the service passcode
MODE PASSWORD DISABLED	**Mode Password** – This protects the MODE push button with the service passcode
PRESS MENU TO EXIT	

PRICE ROOFTOP UNIT CONTROLLER

DISPLAY NAVIGATION

Diagnostic Menu

Once in Service Menu, Scroll Down and Press 'Menu/Enter' to enter the Diagnostic Menu.

SERVICE MENU: DIAGNOSTIC	
BACNET HEALTH	**BACnet** – This shows the current state of the MS/TP network. No connection means no devices detected (Yellow LED), 0-99% means devices detected but errors are present (Red LED), 100% means a proper healthy network is up (Green LED).
LOAD DEFAULTS	**Load Defaults** – Resets the PRTU back to the factory defaults. **NOTE:** This will clear ALL settings!
PRESS MENU TO EXIT	

Polling Menu

Once in Service Menu, Scroll Down and Press 'Menu/Enter' to enter the Polling Menu.

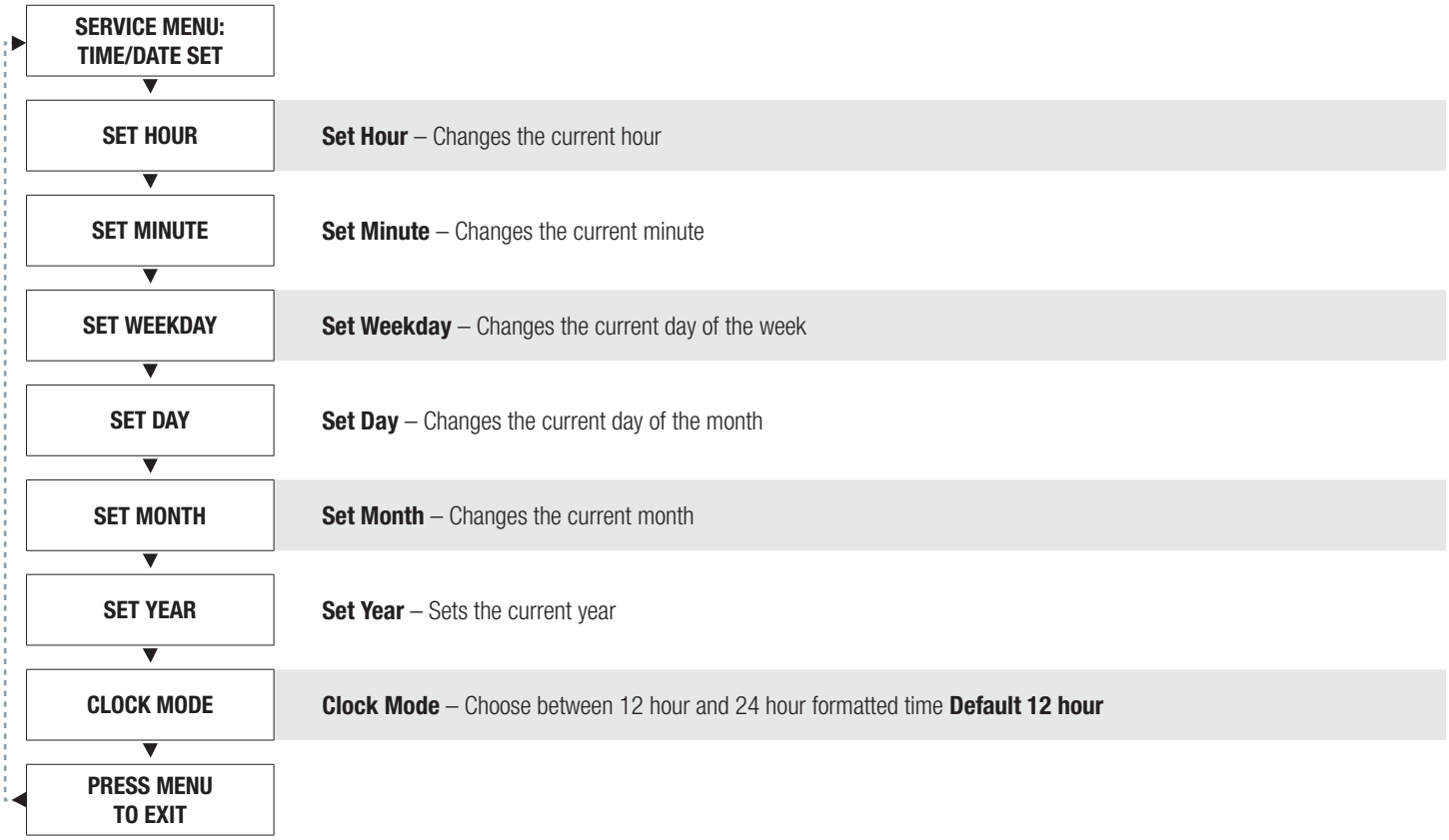
SERVICE MENU: POLLING	
# OF ZONES 1	**Number of Zones** – Sets the expected number of controllers that the PRTU will expect to see Default 1, Range 1-30
DIFFERENTIAL 1.0°F	**Differential** – Dead band on each side of Setpoint **Default 1.0°F, 0.5°C**
PROP. BAND 2.0°F	**Proportional Band** – Proportional band **Default 2°F, 1°C**
ZONE SELECT 1	**Zone Select** – Used with Zone Weight to select a specific zone **Default 1**
ZONE1 WEIGHT 1	**Zone Weight** – Sets the number of weight or "votes" for the selected zone **Default 1**
PRESS MENU TO EXIT	

PRICE ROOFTOP UNIT CONTROLLER

DISPLAY NAVIGATION

Time/Date Set Menu

Once in Service Menu, Scroll Down and Press 'Menu/Enter' to enter the Time/Date Set Menu.



PRICE ROOFTOP UNIT CONTROLLER

DISPLAY NAVIGATION

Schedule Menu

Once in Service Menu, Scroll Down and Press 'Menu/Enter' to enter the Schedule Menu.

SERVICE MENU: SCHEDULE SET	
DAY SELECT SUNDAY	**Day Select** – Select current day for schedule setup
SUN #ON TIMES 1	**Sun Number On Times** – Sets whether schedule is active on this day. 1 = schedule will be active, 0 = schedule will be OFF that day
SUN HOUR ON 6 AM	**Sun Hour On** – Sets system HOUR ON (occupied) time
SUN MIN ON 0	**Sun Minutes On** – Sets system MINUTE ON (occupied) time
SUN HOUR OFF 8 PM	**Sun Hour Off** – Sets system HOUR OFF (unoccupied) time
SUN MIN OFF 0	**Sun Minimum Off** – Sets system MINUTE OFF (unoccupied) time
MENUS REPEAT FOR MON-SAT	**MON-SAT** – Menus repeat for Monday through Saturday
PRESS MENU TO EXIT	

PRICE ROOFTOP UNIT CONTROLLER

DISPLAY NAVIGATION

Operation Menu

Once in Service Menu, Scroll Down and Press 'Menu/Enter' to enter the Operation Menu.

SERVICE MENU: OPERATION	
AUTO CHNGOVER	**Auto Changeover** – Sets the RTU mode, auto changeover for auto heat/cool cycle, HEAT only, COOL only, FAN/Ventilation only, OFF - disable system
FAN CONFIG DAY/NIGHT	**Fan Configuration** – Day/Night fan run during occupied, off at night, On Demand – fan runs when needed, 24/7 – fan runs continuously
# COOLING STG 2	**Number of Cooling Stages** – Sets the number of stages of cooling available between 1 to 4 – **Default 2**
# HEATING STG 2	**Number of Heating Stages** – Sets the number of stages of heating available between 1 to 4 – **Default 2**
FAN PRTY TIME 5 MIN.	**Fan Priority Time** – Sets the minimum time the fan will run before cooling/heating stages have fired and after they've turned off. This helps prevent the RTU burner/coils/DX from tripping their local safeties when the main fan turns off/on
H/C ON DELAY 4 MIN.	**Heating/Cooling ON Delay** – Mode Change delay from dead band into H/C. Waits this amount of time to enter heat or cool mode from deadband. Also minimum time between stages energizing 1 thru 4 (ie: 4 minutes to energize first stage from deadband and 4 minutes for each additional stage)
H/C OFF DELAY 2 MIN.	**Heating/Cooling OFF Delay** – Mode Change delay from H/C into dead band. Waits this amount of time to enter dead band from heating or cooling.
CHNGOVER DELAY 15 MIN.	**Changeover Delay** – This is the delay the unit must wait between switching heating and cooling modes. Intent is to prevent unnecessary cycling
MOT. OVERRIDE 240 MIN.	**Motor Override** – If motion is enabled and detected during unoccupied periods the system will switch to occupied for this amount of time
DAT HOT TRIP1 135.0°F	**DAT Hot Trip 1** – This sets the limit on the DAT probe. Stages 2-4 of Heat will be disabled to not exceed this limit. Stage 1 is left active
DAT HOT TRIP2 145.0°F	**DAT Hot Trip 2** – This sets the hard limit on the DAT probe. All stages of Heat will be disabled to not exceed this limit (1 thru 4)
RAT HOT TRIP1 120.0°F	**RAT Hot Trip 1** – This sets the limit on the RAT probe. Stages 2-4 of Heat will be disabled to not exceed this limit. Stage 1 is left active
RAT HOT TRIP2 125.0°F	**RAT Hot Trip 2** – This sets the hard limit on the RAT probe. All stages of Heat will be disabled to not exceed this limit (1 thru 4)
CYCLE THRU COOL TRIP POINTS	**Cool Trip Points** – This sets the cooling trip points (same as HOT side)
PRESS MENU TO EXIT	

DISPLAY NAVIGATION

Wizard Menu

Once in Service Menu, Scroll Down and Press 'Menu/Enter' to enter the Wizard Menu.

SERVICE MENU: WIZARD	
WELCOME! SETUP WIZARD	**Setup Wizard** – Press **Menu** key to advance through the wizard
SETUP WIZARD TIME/DATE	**Time/Date** – Set all time and date information
SETUP WIZARD OPERATION	**Operation** – Setup of the # of stages, strategy, etc.
SETUP WIZARD BACNET	**BACnet** – Setup of BACnet settings such as RTU #/MAC, number of polled zones
SETUP WIZARD COMPLETE!	**Complete** – PRTU has been setup and will now re-boot to apply all settings, Thermostat will re-boot as well
PRESS MENU TO EXIT	

NOTE: The Wizard will force you to go through all settings in order. You can re-run the wizard at any time by going through the Service Menu.

Troubleshooting Guide

Fault	Symptom	Solution
Doesn't power on	All lights are off (including 24VAC LED)	Check & replace the fuse with a standard 10 Amp automotive style fuse. Check for 24VAC +-10%.
BACnet doesn't communicate	BACnet TX light is blinking green, RX is off	Ensure all BACnet cables are connected between everything on the local BACnet network.
	BACnet does not share a common reference	Ensure all units that are connected via the local BACnet network share a common ground (Earth) connection and that (+) and (-) are connected correctly.
	BACnet HLH LED is red	The PRTU is detecting traffic, but it is all corrupted. Check that the network length is below 1050 feet. All baud rates are the same, each device has a unique MAC and INSTANCE. **NOTE:** No more than 30 MS/TP devices per segment.
	BACnet HLH LED is solid yellow	The PRTU is detecting traffic, but it is partially corrupted. Check that the network length is below 1050 feet. All baud rates are the same, each device has a unique MAC and INSTANCE.
	BACnet HLH LED is blinking yellow	Ensure all BACnet cables are connected between everything on the local BACnet network. This says the PRTU detects no devices whatsoever.
Binary Output isn't working	Power selector switch is set incorrectly	The power selector switch needs to be fully down to switch 24VAC, fully up to switch ground and in the middle to switch external power.
	Corresponding LED is red	The output is shorted, this will have to be resolved for normal operation.
	Corresponding LED is blinking yellow	There is a BACnet override in place, that is forcing it off, this will have to be removed for the unit to control the output.
	Corresponding LED is solid yellow	There is a BACnet override in place, that is forcing it on, this will have to be removed for the unit to control the output.

Troubleshooting Guide

Fault	Symptom	Solution
Analog Input isn't working	Corresponding LED is solid yellow	There is BACnet override in place, this will have to be removed for the input to respond as expected.
	Corresponding LED is red	(0-10 Input) The voltage to the input is exceeding 10VDC. In addition, if the voltage is sufficiently high, it will cause corruption to the other analog inputs.
		(Temperature Input) The temperature being read is over 250°F (120°C), check the attached temperature probe. Price temperature probes should read 10,000 (10k) ohms at 77°F (25°C).
Analog Output isn't working	Corresponding LED is solid yellow	There is a BACnet override in place, this will have to be removed for the output to respond as expected.
	Corresponding LED is blinking yellow	There is a BACnet override in place forcing the output off, this will have to be removed for the output to respond as expected.
	Corresponding LED is red	There is a short on the output, it will have to be fixed before the output will work as expected.
T-Stat isn't working	T-Stat is not turning on	Check that the cable is plugged into both the T-Stat and the PRTU.
	STA LED next to T-Stat port is yellow	The PRTU is unable to detect the T-Stat, check the cable.
	STA LED next to T-Stat port is blinking yellow	The temperature probe in the T-Stat is shorted, check the cable and the T-Stat.
	STA LED next to T-Stat port is red	The temperature sensor in the T-Stat is shorted out.

Hardware Specifications

Power Requirements	24VAC, 47-63 Hz 10VA (not including output loading) NEC Class II Use only Limited Power Source LPS rated 100VA Max
Ambient Ratings	10°C to 50°C (50°F to 122°F) 0% to 95% RH (non-condensing)
Outputs	[10] 24VAC Binary Outputs. Configurable. Max 0.5 Amps each External power must be 24 VAC Max • Fan • Heat 1, Heat 2, Heat 3, Heat 4 • Cool 1, Cool 2, Cool 3, Cool 4 • Heat Enable • Cool Enable [4] Analog 0-10VDC. Configurable. Max: 10mA each • Fan (ECM) • Heat • Cool • Aux
Inputs	[6] Analog 0-10V inputs, 67.5k ohm input impedance [6] Thermistor Sensor, Type J 10k ohm Thermistor [2] Binary Inputs (Dry Contact Closure) [1] Thermostat Input, Type J 10k ohm Temperature Sensor (RJ45 Connection) • Accuracy of +/- 0.5°F from 55°F to 85°F (+/ 0.25°C from 13°C to 25°C) 3-Way Switch For Binary Outputs • Down: Internal 24VAC (Default) • Up: COM • Middle: External Power eat Enable • Cool Enable 10A Fuse Mini (Note: Replace with 10A Mini-Blade Auto Fuse)
Communication ports	BACnet MS/TP Connection with RJ45 Jack and 3-Position Terminal Block • Communication speeds: 9,600, 19,200, 38,400, 76,800 (default) • Maximum recommended devices per MS/TP segment: 30 devices • For local setup using Price USB LINKER service tool
Size	8.25" x 3.55" x 2.25"
Weight	0.8lb. (400g)

PRICE ROOFTOP UNIT CONTROLLER

COMMISSIONING CHECKLIST

Price Controls Commissioning Checklist

The following items shall be verified by the commissioning technician on site. Ideally, the mechanical contractor or controls contractor should be present when the commissioning technician is on site verifying Price equipment.

Initial Check:

- ☐ All controls parts supplied by Price must be inspected for damage due to shipping, and for proper installation. This includes PRTU rooftop controller, PIC controllers, Prodigy diffusers, thermostat cables and BACnet network
- ☐ All applicable Service and Installation (S&I) Manuals are present. If not please download from: **www.priceindustries.com/controls**
- ☐ All zone Rooftop units must be installed and operational.
  - RTU fan is operational
  - RTU cooling stages are operational
  - RTU heating stages are operational

PRTU (Rooftop Controller) check and startup:

Wiring (From RTU to PRTU controller)

- ☐ Ensure wiring is complete between RTU and PRTU controller
- ☐ PRTU must be powered from the rooftop unit with 24 VAC. Proper hot and common polarity must be observed.
- ☐ 24 VAC HOT from RTU wired to PRTU – 24 VAC terminal
- ☐ 24 VAC COM from RTU wired to PRTU – COM terminal. Also, this must be earth grounded.
- ☐ Fan, cooling stages, and heating stages are properly wired to binary outputs on PRTU.
- ☐ PRTU switch output type s selected to proper output type. Default: Down is 24 VAC switched HOT outputs.
- ☐ Discharge Air Temperature (DAT) probe installed in RTU discharge ductwork. Correctly wired to AI1.
- ☐ Return Air Temperature (RAT) probe installed in RTU return ductwork. Correctly wired to AI2.
- ☐ PRTU thermostat installed in a convenient place for the user that also can measure the room temperature of the general zone being controlled.
- ☐ PRTU thermostat wired properly with included plug-and-play NETC35 cable.

Setup Wizard:

- ☐ Complete the Setup Wizard on PRTU. Set the appropriate # of stages, mode, time, schedule, etc.
- ☐ Verify fan comes on within 10 seconds of powering up PRTU controller after setup wizard has run. Ensure BO1 output LED is green. Note: Red indicates overload and/or short circuit.
- ☐ Check duct probe readings on T-stat. Go into Service Menu -> INPUT and confirm proper DAT and RAT temperature readings. Note: -59 °F indicates no sensor is connected.

Price Controls Commissioning Checklist Continued

The following items shall be verified by the commissioning technician on site. Ideally, the mechanical contractor or controls contractor should be present when the commissioning technician is on site verifying Price equipment.

PIC/Prodigy (Zone Controller) check and startup:

- ☐ Duct work and VAV boxes / Prodigy units are installed correctly.
- ☐ VAV controllers (PIC) / Prodigy diffusers have 24 VAC power via transformer or Price Power Module (PPM) and HOT/COM polarity is observed.
- ☐ 24 VAC COM must be earth grounded.
- ☐ In cases where a PPM is used, line voltage must be supplied to the PPM unit, and the 24 VAC cables from this unit must be run to the VAV / Prodigy controllers and plugged in. These are C35 cables, usually white or grey.

BACnet Network:

- ☐ Network is run in a daisy chain format (not bus or star configuration).
- ☐ BACnet cables (NETC35) are plugged into BACnet jacks on BACnet expansion boards.
- ☐ If Price NETC35 BACnet cables are not being used, 3-position terminal block from the network must be wired and polarity is maintained throughout. (See appropriate Installation Manual for detail).
- ☐ RX and TX (receive and transmit) lights are flashing consistently on the BACnet expansion board and yellow BACnet fault LED is not lit.
- ☐ MAC address dip switches are set to the correct MAC address – i.e. 1, 2, 3 etc.
- ☐ Device instance addresses are set (this is done through the LCD stat or Linker device supplied for the job).
- ☐ Thermostats for the PIC / Prodigy units are mounted on the wall and in the appropriate area to control the VAV box or diffuser. Thermostat cable is connected properly at both ends.

PCV (bypass box) check and startup:

- ☐ PCV round duct damper is installed in proper part of the duct work and will operate as a bypass damper.
- ☐ Duct static probe is installed 2/3 of the way downstream of the PCV unit.
- ☐ Duct static probe is pneumatically piped back to the HI side (red) of the transducer on the PCV controller. Low side (green) of the transducer is left open.
- ☐ PCV cross-flow sensor (SP300) should be completely disconnected. No tubing from this sensor should be connected to the controller.

Price Controls Commissioning Checklist Continued

The following items shall be verified by the commissioning technician on site. Ideally, the mechanical contractor or controls contractor should be present when the commissioning technician is on site verifying Price equipment.

Network check and startup:

- ☐ All BACnet network connections are made to all controllers (PRTU, PCV, PIC, Prodigy, etc.)
- ☐ NETc35 cable is plugged into the Price RJ45 jack on the PRTU controller (BACnet network).
- ☐ Check BACnet health and "# of zones up" on PRTU thermostat by using the Info Menu (see PRTU I&S Manual for details). BACnet health must be 100% and # of zones up should match actual number of zones. Note: PCV controllers are not included in # of zones up.
- ☐ Set all zone set points to cooling, and ensure PRTU goes into cooling mode.
- ☐ Set all zone set points to heating (wait for 15 minute changeover delay on PRTU), and ensure PRTU goes into heating mode.
- ☐ After testing, set all zone thermostats back to reasonable setpoints such as 72°F (22°C).

Job Site Notes:

PRICE ROOFTOP UNIT CONTROLLER

NOTES

PRICE ROOFTOP UNIT CONTROLLER

NOTES

This document contains the most current product information as of this printing.
For the most up-to-date product information, please go to priceindustries.com