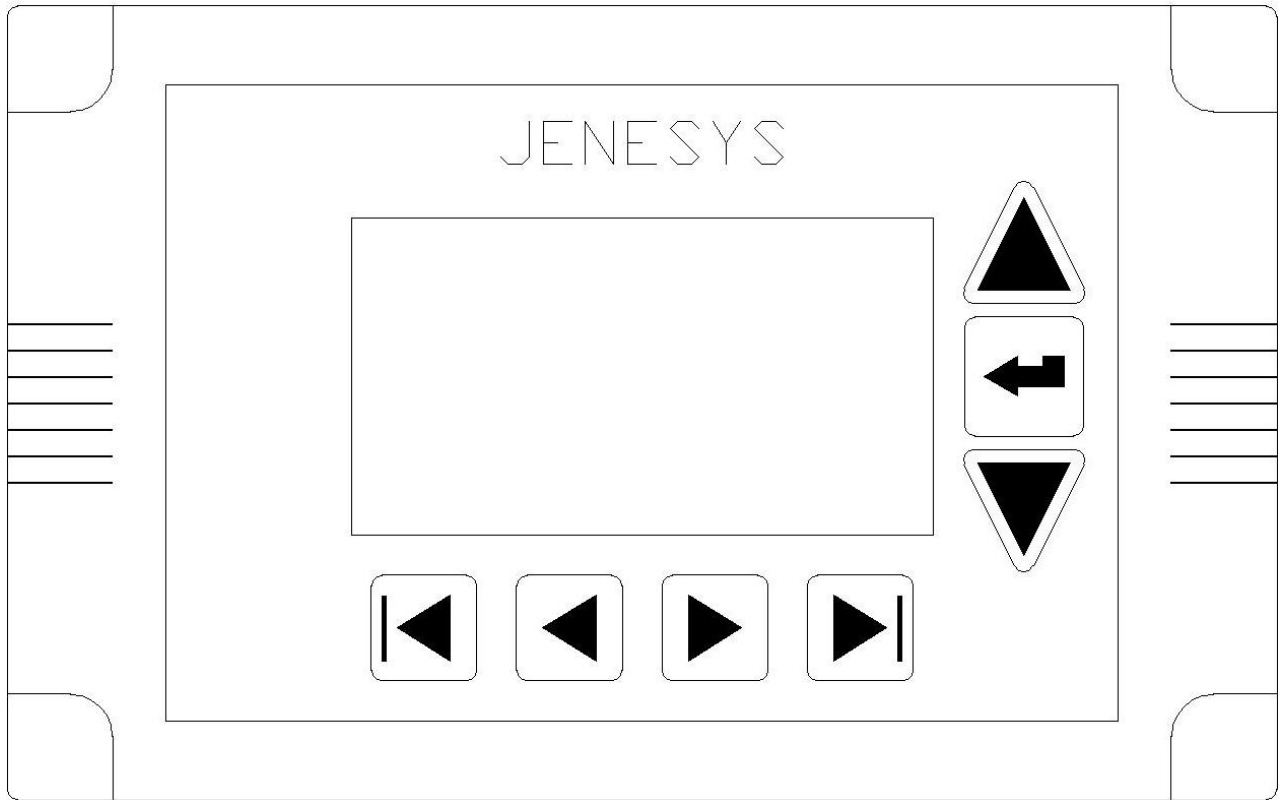


Instruction, Operation, and Maintenance: Controls

Software Versions: R1-R36



VPR Series
VPRX Series
VPRE Series
VPRP Series

Version March 2011
Part Number 474625

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Safety



WARNING:

Improper installation, adjustment, service, maintenance, or alteration can cause property damage, personal injury, or loss of life. Installation, startup, and service must be performed by a qualified installer, service agency, or gas supplier.

The customer must provide proper equipment and fully-trained installers to follow local safety requirements when receiving, installing, or servicing equipment. Consult all local building, electrical, occupational safety, and gas codes.

Lock out all power supplies before servicing the unit to prevent accidental startup. All fan blades should be secured to prevent wind rotation. Remove any restrictive device before restoring power.

The Clean Air Act of 1990 bans the intentional venting of refrigerant (CFC and HCFC) as of July 1, 1992. Approved methods of recovery, recycling, or reclaiming refrigerant must be followed. Fines and/or incarceration may be levied for non-compliance.

Special Design Requests

VPR, VPRE, VPRP and VPRX units are occasionally built with special features requested by the customer. This manual does not reflect any Special Design Requests and only covers standard options.

Warranty Documentation

Manufacturer warrants to the original purchaser that the manufacturer's equipment will be free from defects in material and workmanship if installed, maintained and operated under normal conditions of service in accordance with the instructions of the manufacturer for the following periods:

- Overall unit - for a period of one year from the date of original installation but, in no event, for longer than eighteen months from the date of shipment from its factory
- Compressors - for a period of five years from the date of original installation but, in no event, for longer than 66 months from the date of shipment from its factory

Manufacturer will repair or replace, F.O.B. factory, without charge, any part it has manufactured or supplied which upon examination at its factory shall prove to have been defective. This warranty may not be assigned or transferred. No allegedly defective part or component may be returned to the manufacturer without its prior written authorization.

WARRANTY DOES NOT INCLUDE LABOR CHARGES INCURRED IN THE REMOVAL, REPLACEMENT OR ADJUSTMENT OF DEFECTIVE PARTS OR COMPONENTS, NOR TRANSPORTATION CHARGES INCURRED IN RETURNING ALLEGEDLY DEFECTIVE PARTS OR COMPONENTS TO THE LOCATION OF THE EQUIPMENT. No warranty herein extended shall apply to correction of conditions arising from improper or incorrectly connected air duct, piping, wiring, power supply, blown fuses, freezing, or any other condition resulting from improper installation, operation, or maintenance by anyone other than the manufacturer's employee or its representative. The foregoing warranty shall not apply if damage results from any contingency beyond the manufacturer's control, not to equipment installed outside of the boundaries of the Continental U.S.A., Canada, or Alaska unless specifically noted in writing by the manufacturer, nor to equipment which has been tampered with or altered or upon which, or any component of which, any serial number has been altered, defaced or removed.

The manufacturer shall not be liable to the original Purchaser of any third person for any consequential, secondary, or incidental damages due to or resulting from the design, construction, installation, servicing, or operation of the warranted equipment or for any other cause whatsoever. THE WARRANTIES HEREIN SET FORTH ARE IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, AND ALL OTHER OBLIGATIONS OR LIABILITIES ON THE PART OF THE MANUFACTURER.

The manufacturer neither assumes nor authorizes any person to assume for it any other obligation or liability in connection with warranted equipment or any part thereof. THE MANUFACTURER HEREBY EXCLUDES THE IMPLIED WARRANTY OF MERCHANTABILITY. THE MANUFACTURER HEREBY EXCLUDES THE IMPLIED WARRANTY OF FITNESS FOR ANY PARTICULAR PURPOSE FROM ANY SALE MADE TO THE PURCHASER.

LCD

All VPR, VPRE, VPRP and VPRX series units are equipped with a fully-programmed microprocessor controller with the following standard features:

- Liquid crystal display (LCD) interface
- Internal time clock (may be disabled)
- Primary controls sequence (discharge air control)
- Component safeties and alarms
- Ethernet RJ-45 network port

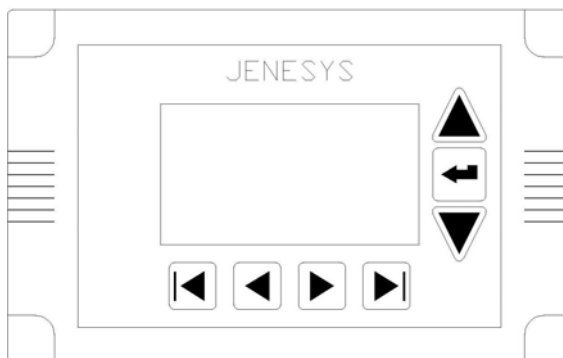
Points, scheduling, and system settings can be manipulated through either the LCD interface or a computer connected to the controller and the free UMT software program.

LCD Overview

The control center of all VPR, VPRE, VPRP and VPRX series units is accessible from the service end of the unit (opposite outdoor air intake hood). The upper right-hand access door houses the control center, unit disconnect, and LCD interface. Note that the LCD interface is accessible through an opening in the control center door to allow servicing without opening the control center (which requires the disconnect to be turned to the off position).

User Interface

Seven interface buttons are located on the bottom and right of the LCD interface. Descriptions of each are shown in the table below.



Button	Description
➡	Press the (Enter) button to select a value and/or to enter a value into memory.
▲ and ▼	Use the up and down arrows to scroll through menus and/or to increase or decrease the value of a selected setpoint.
◀ and ▶	Use the right and left arrows to scroll horizontally through different menus and/or position the cursor below an editable setpoint digit. In addition, the left and right arrows are used for the PREV and NEXT functions as indicated.
◀ and ▶	These two symbols are used only to select the MENU LAST text above it.

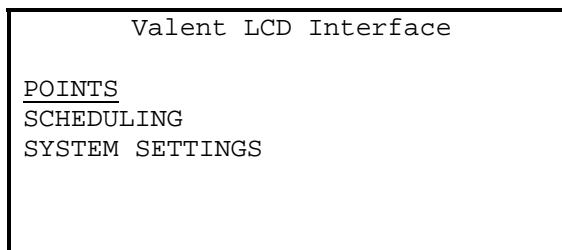
Menu Commands

The buttons described in the user interface section are often used to represent on-screen commands. Please see the table below for a full list of these fields and their purpose.

Menu Item	Description
PREV	Press the ◀ button when the PREV field is shown on the display to go back to the previous menu.
NEXT	Press the ▶ button when the NEXT field is shown on the display to go back to the next set of menu options.
MENU	Press the ◀ button when the MENU field is shown to go back to the main menu.
LAST	Press the ▶ button when the LAST field is shown to advance to the last menu.
dashed underline	Identifies a status-only field. These values can be monitored but not changed.
solid underline	Identifies a field which may be changed within the LCD display.
NULL	Press the ◀ button when the NULL field is shown to set the value to Null or NA (this action is not recommended unless instructed to do so by the factory).
CANC	Press the ▶ button when the CANC field is shown to cancel the current action.
<	Press the ◀ button when the < field is shown to move one character or decimal place to the left.
>	Press the ▶ button when the > field is shown to move one character or decimal place to the right.

Main Menu

Upon initial start-up or after a loss of power, the controller will default to the main menu after a reboot period of 2-4 minutes.



Three options are available within the main menu providing the following parameter adjustments.

Menu	Description
Points	System status and alarms
	Damper settings
	Cooling settings
	Heating settings
	Manual override
	Temperature set points
	Humidity set points
	Unoccupied set points
	Optional set points
	Advanced set points
Scheduling	Set internal time clock
System Settings	TCP/IP settings
	System time
	Time zone

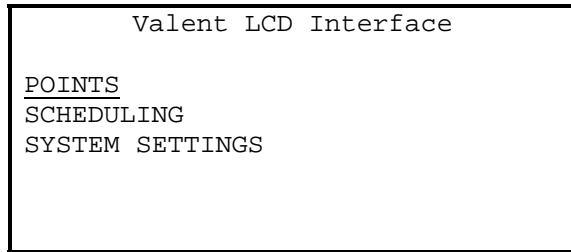
General Navigation

Use the ◀, ▶, ▲, and ▼ arrows on the keypad display to select the field of choice and change the value of a highlighted field. Press ◀ (enter) to select. Use the ▶| button to save a setting on the controller.

Basic Functions

Setpoint Adjustment

1. Push any button on the LCD interface to refresh the display. If the main menu is not shown, press the **MENU** button to return to the main menu.
2. Use the up and down arrows to move the underline cursor to the POINTS selection and press enter.



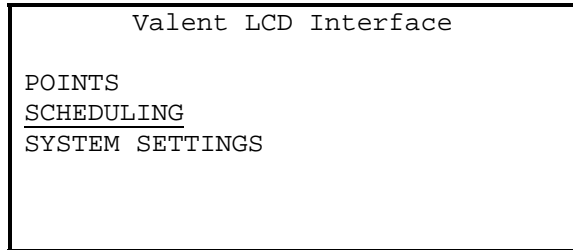
3. Use the up and down arrows as well as the **PREV** and **NEXT** button to navigate to the various set points stored in the controller. *Note that setpoints with a dotted underline are read-only.*
4. Once the desired setpoint is underlined press the enter button to change the value.
5. Modifications are made through the LCD by changing one significant digit at a time. Use the up and down arrows to change the value of the digit and the left and right arrows to move from one digit to the other.
6. Once the setpoint has been modified to the desired value, push the enter button to update the controller. *Note that the controller does not need to be restarted for the setpoint adjustment to take effect.*

Scheduling Adjustment

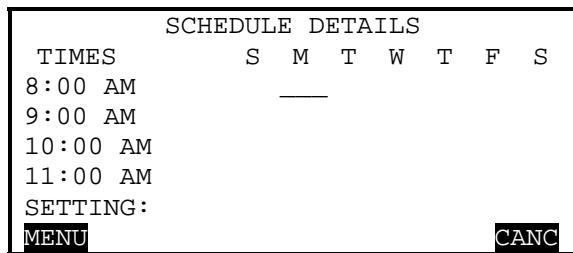
IMPORTANT

Internal schedule is defaulted to 24 hour occupancy from the factory.

1. Push any button on the LCD interface to refresh the display. If the main menu is not shown, press the **MENU** button to return to the main menu.
2. Use the up and down arrows to move the underline cursor to the SCHEDULING selection and press enter.

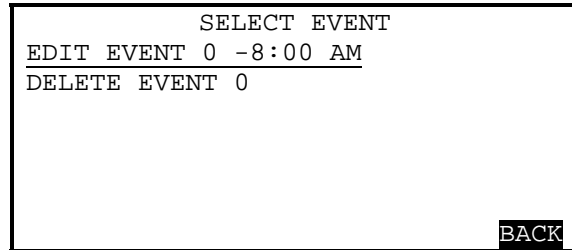


3. Press enter a second time when the SCHEDULING MENU is shown. The SCHEDULING DETAILS screen will be displayed with a seven-day, 24-hour grid.

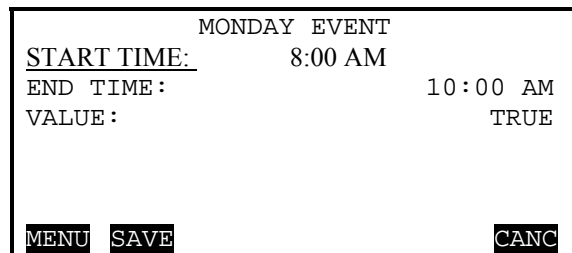


4. Using the left and right arrow keys, move the visible cursor to the day a schedule change is desired. Press the enter button to edit an existing event (if cursor is located on an existing event) or create a new one (if cursor is located on an open time slot).

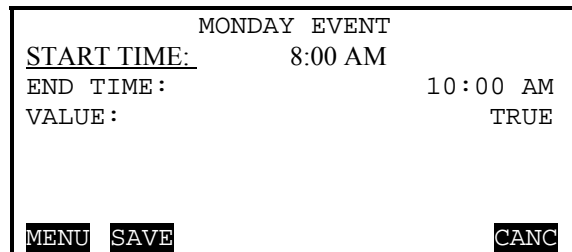
5. If an existing event is selected, the SELECT EVENT menu will appear. Press enter to edit the event or use the down arrow to underline the DELETE EVENT 0 menu option. Press enter to delete the event from the current schedule.



6. The event menu is the identical when editing existing events or creating new ones. Use the up and down arrows to select the desired field and press enter to change its value. Press enter to complete the change.



7. To temporarily disable an event, change the VALUE field from TRUE to FALSE.
8. Press the back arrow to **SAVE** the settings in the controller.



Fan Speed Adjustments

Each VPR, VPRE, VPRP and VPRX rooftop unit includes an variable frequency drive (VFD) for the supply section as well as the exhaust fan section (dedicated VFD for each).

Adjusting the VFD Parameters

Supply Fan

To modify the supply fan speed of a VPR, VPRE, VPRP or VPRX unit, the 0-10 VDC output signal to the VFD must be changed from within the JeneSys controller.

1. Using the LCD display on the controller, go to the advanced setpoints menu.
2. Using the PREV and NEXT buttons, move the underscore to the SUPPLY FAN SPEED and press **↵** (enter) on the keypad.
3. Use the **◀** and **▶** (left and right) and **▲** and **▼** (up/down) arrows to move the cursor to the desired digit allowing the desired output to be entered (e.g., 95.4%).
4. Press the enter button to save the change.

Exhaust Fan

The procedure to modify the exhaust fan speed (if equipped) is similar to adjusting the supply fan speed. However, note that the exhaust fan speed operates based on an offset from the supply fan speed. As a result, the parameter to adjust exhaust fan speed is listed as EF VFD OFFSET with an available adjustment range of -20% to +20%. To modify the EF VFD OFFSET parameter follow the instructions below.

1. Using the LCD display on the controller, go to the advanced setpoints menu.
2. Using the PREV and NEXT buttons, move the underscore to the EF VFD OFFSET and press **↵** (enter) on the keypad.
3. Use the **◀** and **▶** (left and right) and **▲** and **▼** (up/down) arrows to move the cursor to the desired digit allowing the desired output to be entered (e.g., - 14.0%).
4. Press the enter button to save the change.

Advanced Setpoints			
STATIC SETPT	0.07	IN/WC	
EF VFD OFFSET	0.0	%	
SUPPLY FAN SPEED	100.0	%	
LOW LIMIT SETPT	35	F	
LOW LOCKOUT SP	3	F	
STNDBY FAN SPEED	100	%	
MENU	PREV	NEXT	LAST

IMPORTANT


Changes to the supply fan speed parameter (SUPPLY FAN SPEED) will affect the speed of the exhaust fan as well. If a speed change is required

Verification

With the changes made to the VFD parameter(s), confirm the VFD/fan speed by enabling the fan to operate. Upon startup, the fan should quickly ramp to the design speed. The speed (in Hz) is indicated on the front of the display. If the controller is sending a fan speed of 100%, fan speed analog output should be 10 VDC and the fan speed should be the design limit.

Advanced Settings

IP Setting Adjustments

1. Using the keypad buttons, select the "SYSTEM SETTINGS" option and hit the  (enter) key.

```
POINTS
SCHEDULING
SYSTEM SETTINGS
```

2. Once in the system settings menu, use the arrow keys to select the "SET TCP/IP SETTINGS" option.

```
JENESYS SYSTEM SETTINGS

SET TCP / IP SETTINGS
SYS DATE:      NOV 19, 2007
SYS TIME:      15:02
TIMEZONE:      AMERICA/CHICA
                (-5/-6)

MENU
CANC
```

3. Using the arrow keys, navigate through the Jenesys TCP/IP settings menu to change the IP address, subnet mask, or gateway of the local controller.

```
JENESYS TCP / IP SETTINGS

IP ADDRESS:    192.168.1.101
SUBNETMASK:    255.255.255.0
GATEWAY:       192.168.1.1

MENU
SAVE
```

4. When all changes are complete, select the "SAVE" option in the menu. The program will indicate that a reboot is required. Allow 2-30 minutes for the controller to reboot and normal operation restored.

```
-REBOOT-
CONTROLLER MUST
REBOOT TO SAVE
THESE SETTINGS
CONTINUE?

YES   NO
```

Screen Descriptions

The following includes descriptions of each field that may be displayed on the operator interface.

Fan/System

OCCUPANCY

Reports the actual occupancy status of the controller.

View-only

Range: Occupied, Unoccupied

Default: n/a

SUP FAN START/STOP

Reports the status of the supply fan start/stop request as determined by the controller.

View-only

Range: On, Off

Default: n/a

SUP FAN STATUS

Reports the status of the supply fan as determined by the flow-proving differential pressure switch for that fan.

View-only

Range: On, Off

Default: n/a

SUPPLY FAN SPEED

Displays the speed of the supply fan. Each VRP rooftop includes a variable frequency drive (VFD) and direct-drive motor for the supply fan. The controller sends a control signal (0-10 VDC) to the VFD to indicate the speed at which it should run. At 100% the controller sends a control signal of 10 VDC, allowing the fan to operate at the design speed (in Hz), typically 60 Hz.

View-only

Range: 50-100%

Default: 100%

RESET FAN

Resets a fan flow failure caused by a supply air temperature low limit alarm. To activate the reset command, set this value to TRUE, then back to FALSE.

Editable

Range: False, True

Default: False

SYSTEM ENABLE

Enables and disables the control program for the rooftop unit. When disabled, the unit is controlled OFF. When enabled, the unit is allowed to run and

the occupancy input is used to determine the operation of the unit.

Editable

Range: Enable, Disable

Default: Enable

OP MODE

Displays the operating mode of the controller.

View-only

Range: Unoccupied Fan Only

Unoccupied Heating

Unoccupied Cooling

Unoccupied Cooling + Dehumidification

Occupied Fan Only

Occupied Heating

Occupied Cooling

Occupied Cooling + Dehumidification

Default: n/a

FILTER STATUS

Displays the status of the filter differential pressure switch.

View-only

Range: Normal, Alarm

Default: Normal

ALARM OUTPUT

Displays the status of the alarm output. The status is changed to Alarm when any of the following conditions are true:

- Supply Fan Status Alarm
- Supply Air Temperature Low Limit
- Filter Status Alarm (Dirty Filter)
- Unit Shutdown (Input)
- Duct Static High Limit

View-only

Range: Normal, Alarm

Default: Normal

S'WARE VERSION

Displays the software version number.

View-only

Range: n/a

Default: n/a

Status

SUPPLY AIR TEMP

Displays the status of the supply air temperature. The supply air temperature sensor should be mounted in the supply duct downstream of the rooftop unit.

View-only

Range: n/a

Default: n/a

SPACE TEMP

Displays the status of the space temperature.

View-only

Range: n/a

Default: n/a

SPACE RH

Displays the status of the space relative humidity.

View-only

Range: n/a

Default: n/a

SPACE DEWPOINT

Displays the status of the space dewpoint as calculated using the space air temperature and space relative humidity.

View-only

Range: n/a

Default: n/a

COIL LEAVING TEMP

Displays the status of the evaporator coil leaving air temperature.

View-only

Range: n/a

Default: n/a

OUTSIDE TEMP

Displays the status of the outside air temperature.

View-only

Range: n/a

Default: n/a

OUTSIDE RH

Displays the status of the outside air relative humidity.

View-only

Range: n/a

Default: n/a

OUTSIDE DEWPOINT

Displays the status of the outside air dewpoint as calculated using the out-side air temperature and outside relative humidity.

View-only

Range: n/a

Default: n/a

STATIC PRESS

Displays the status of the duct or space static pressure, depending on the application.

View-only

Range: n/a

Default: n/a

Dampers

DAMPER ENABLE

Displays the status of the outside damper enable command of the controller. This command is normally ENABLE during occupied operation and DISABLE during unoccupied operation.

View-only

Range: Enable, Disable

Default: n/a

DAMPER END SWITCH

Displays the status of the outside/return air damper actuator(s). When only the outside air damper actuator is used, this field displays the status of the damper end switch, indicating when the damper is open (status is true). When both return and outside air damper actuators exist, this field displays the combined status of both end switches (wired in parallel). When either damper is open the status of this field is true.

View-only

Range: True, False

Default: n/a

OAD MIN POSITION

Displays and edits the minimum position of the modulating outside air damper.

Editable

Range: 0-100%

Default: 100%

Cooling & Refrigeration

COMPRESSOR 1

Displays the status of compressor 1.

View-only

Range: Off, On

Default: n/a

COMPRESSOR 2

Displays the status of compressor 2, when present.

View-only

Range: Off, On

Default: n/a

COMPRESSOR 3

Displays the status of compressor 3, when present.

View-only

Range: Off, On

Default: n/a

COMPRESSOR 4

Displays the status of compressor 4, when present.

View-only

Range: Off, On

Default: n/a

HPC-A

Displays the status of the high pressure cut-out switch on circuit A. The high pressure cutout device must be manually reset to restore normal compressor operation. To reset, press the red button on the device, normally located in the compressor section of the unit.

View-only

Range: Normal, Alarm

Default: n/a

HPC-B

Displays the status of the high pressure cut-out switch on circuit B, when present. The high pressure cutout device must be manually reset to restore normal compressor operation. To reset, press the red button on the device, normally located in the compressor section of the unit.

View-only

Range: Normal, Alarm

Default: n/a

LPC-A

Displays the status of the low pressure cutout switch on circuit A. The low pressure cutout device is automatically reset when the diagnostic condition no longer exists.

View-only

Range: Normal, Alarm

Default: n/a

LPC-B

Displays the status of the low pressure cutout switch on circuit B, when present. The low pressure cutout device is automatically reset when the diagnostic condition no longer exists.

View-only

Range: Normal, Alarm

Default: n/a

LEAVING COIL SETPOINT

Displays and edits the control setpoint of the leaving evaporator coil temperature. This setpoint is used by the controller in the dehumidification mode to determine when to run each compressor. When not dehumidifying, the compressors are controlled according to the leaving coil temperature and the supply air temperature setpoint.

Editable

Range: 45-55°F

Default: 50°F

CONTROL CLG SETPT

Displays the discharge air cooling setpoint of the controller. In discharge air control, this setpoint can be edited on the SETPOINTS page. When supply temperature reset control is used, this setpoint is calculated automatically.

View-only

Range: 55-75°F

Default: 55°F

REHEAT ENABLE

Displays the status of hot gas re-heat. Reheat is enabled during the dehumidification mode and disabled at all other times.

View-only

Range: Disable, Enable

Default: n/a

REHEAT PCT

Displays the status of the hot gas reheat. Hot gas reheat is used in the dehumidification mode to maintain the supply air temperature at setpoint.

View-only

Range: 0-100%

Default: n/a

REHEAT PURGE

Displays the status of the hot gas reheat purge function. When hot gas reheat is enabled (dehumidification mode), the purge function is used to purge the reheat coil. When the status is False, purge is not active. When the status is True, the purge function opens the hot gas reheat valve to 100% for approximately one minute. When hot gas reheat is enabled, purge is activated approximately once every 45 minutes.

View-only

Range: False, True

Default: n/a

REHEAT SETPOINT

Displays the setpoint to which the supply air temperature is being controlled during the dehumidification/reheat mode. This setpoint is automatically calculated by the controller.

View-only

Range: n/a

Default: n/a

Heat

ELECTRIC HEAT

Displays the capacity of electric heat (in percent).

View-only

Range: 0-100%

Default: n/a

MOD HEAT ENABLE

Displays the status of the modulating heat. When the status is OFF, modulating heat is disabled. When the status is ON, modulating heat is enabled.

View-only

Range: Off, On

Default: n/a

MOD HEAT PCT

Displays the status of the modulating heat, in percent.

View-only

Range: 0-100%

Default: n/a

CONTROL HTG SETPT

Displays the discharge air heating setpoint of the controller. In discharge air control, this setpoint can be edited on the SETPOINTS page. When supply temperature reset control is used, this setpoint is calculated automatically.

View-only

Range: 60-95°F

Default: 68°F

HEATING ACTION

Displays and edits the heating action (direct or reverse) of the modulating heat source.

Editable

Range: Direct Action:

0% = 0 VDC, 100% = 10 VDC

Reverse Action:

0% = 10 VDC, 100% = 0 VDC

Default: Direct Action

Setpoints

OCC SPACE SETPT

Displays and edits the occupied space setpoint of the controller. This setpoint is used with the setpoint deadband to calculate the occupied cooling setpoint and the occupied heating setpoint. Refer to the following definitions.

Editable

Range: 50-95°F

Default: 71.5°F

SETPT DEADBAND

Displays and edits the occupied heating and cooling setpoint deadband. The deadband is used with the occupied space setpoint to determine the occupied cooling setpoint and occupied heating setpoint. Refer to the following definitions.

Editable

Range: 0-10°F

Default: 3°F

OCC CLG SPC SETPT

Displays the occupied cooling space setpoint. The occupied cooling setpoint is calculated by adding half of the setpoint deadband (SETPT DEADBAND) to the occupied space setpoint (OCC SPACE SETPT).

View-only

Range: n/a

Default: 73°F

OCC HTG SPC SETPT

Displays the occupied heating space setpoint. The occupied heating setpoint is calculated by subtracting half of the setpoint deadband (SETPT DEADBAND) from the occupied space setpoint (OCC SPACE SETPT).

View-only

Range: n/a

Default: 70°F

SPACE DEWPT SETPT

Displays and edits the space dewpoint setpoint. If the space dewpoint is greater than this setpoint plus the space dewpoint deadband, compressor 2 is locked On. If the space dewpoint is greater than the space dewpoint setpoint, compressor 2 is controlled On. If the space dewpoint is less than this set-point minus the deadband, compressor 2 is controlled with normal control logic and is not overridden to On.

Editable

Range: 40-70°F

Default: 60°F

SPACE DEWPT DB

Displays and edits the space dewpoint deadband. The deadband is used with the space dewpoint setpoint to control compressor 2. Refer to the prior definition for space dewpoint setpoint.

Editable

Range: 0-10°F

Default: 3°F

OA DEWPT SETPT

Displays and edits the outside air dewpoint setpoint. When the outside dewpoint is greater than the outside dewpoint setpoint, dehumidification is enabled.

When the outside air dewpoint is below the outside air dewpoint setpoint minus the outside air dewpoint deadband, dehumidification is disabled.

Editable

Range: 40-80°F

Default: 55°F

OA DEWPT DB

Displays and edits the outside air dewpoint deadband. The deadband is used with the outside air dewpoint setpoint to enable or disable dehumidification. Refer to the prior definition for outside air dewpoint setpoint.

Editable

Range: 0-10°F

Default: 3°F

OCC SPACE RH SETPT

Displays and edits the occupied space relative humidity setpoint. When the occupied space RH is greater than the setpoint, dehumidification is enabled. When the occupied space RH is less than the setpoint minus the occupied space RH deadband, dehumidification is disabled.

Editable

Range: 40-70%

Default: 55%

OCC SPACE RH DB

Displays and edits the occupied space relative humidity deadband. The deadband is used with the occupied space RH setpoint to enable or disable dehumidification of the occupied space. Refer to the prior definition for occupied space RH setpoint.

Editable

Range: 0-10%

Default: 3%

UNOCC CLG SETPT

Displays and edits the cooling night cycle setpoint. When the space temperature is greater than the unoccupied cooling setpoint, unoccupied cooling is enabled. When the space temperature falls below the unoccupied cooling setpoint minus the deadband, unoccupied cooling is disabled.

Editable

Range: 50-90°F

Default: 80°F

UNOCC CLG DB

Displays and edits the cooling night cycle deadband. The unoccupied cooling deadband is used with the unoccupied cooling setpoint to enable or disable unoccupied cooling. Refer to the prior definition for unoccupied cooling setpoint.

Editable

Range: 0-10°F

Default: 5°F

UNOCC HTG SETPT

Displays and edits the unoccupied heating setpoint. When the space temperature is less than the unoccupied heating setpoint, unoccupied heating is enabled. When the space temperature rises above the unoccupied heating setpoint plus the deadband, unoccupied heating is disabled.

Editable

Range: 45-90°F

Default: 60°F

UNOCC HTG DB

Displays and edits the unoccupied heating deadband. The deadband is used with the unoccupied heating setpoint to enable or disable unoccupied heating. Refer to the prior definition for unoccupied heating setpoint.

Editable

Range: 0-10°F

Default: 5°F

UNOCC SPC DWPT SETPT

Displays and edits the unoccupied space dewpoint setpoint. When the space dewpoint is greater than the unoccupied space dewpoint setpoint plus the unoccupied space dewpoint deadband, unoccupied dehumidification is enabled. When the space dewpoint falls below the setpoint, unoccupied dehumidification is disabled.

Editable

Range: 40-80°F

Default: 53°F

UNOCC SPC DWPT DB

Displays and edits the unoccupied space dewpoint deadband. The deadband is used with the unoccupied space dewpoint setpoint to enable or disable unoccupied dehumidification. Refer to the prior definition for unoccupied space dewpoint setpoint.

Editable

Range: 0-10°F

Default: 6°F

SAT CLG HI LIMIT

Displays and edits the supply air temperature cooling setpoint high limit. When the supply air temperature setpoint is determined automatically based on the space temperature (supply air temperature reset), this high limit defines the maximum supply air temperature setpoint for the unit in the cooling mode.

Editable

Range: 50-110°F

Default: 75°F

SAT CLG LOW LIMIT

Displays and edits the supply air temperature cooling setpoint low limit. When the supply air temperature setpoint is determined automatically based on the space temperature (supply air temperature reset), this low limit defines the minimum supply air temperature setpoint for the unit in the cooling mode.

Editable

Range: 50-110°F

Default: 55°F

SAT HTG HI LIMIT

Displays and edits the supply air temperature heating setpoint high limit. When the supply air temperature setpoint is determined automatically based on the space temperature (supply air temperature reset), this high limit defines the maximum supply air temperature setpoint for the unit in the heating mode.

Editable

Range: 50-110°F

Default: 95°F

SAT HTG LOW LIMIT

Displays and edits the supply air temperature heating setpoint low limit. When the supply air temperature setpoint is determined automatically based on the space temperature (supply air temperature reset), this low limit defines the minimum supply air temperature setpoint for the unit in the heating mode.

Editable

Range: 50-110°F

Default: 60°F

AMB CLG LOCKIN

Displays and edits the ambient temperature below which compressor 1 is locked On in continuous operation. Because the unit is equipped with modulating hot gas reheat, varying amounts of hot gas reheat will be used to maintain the supply air temperature at setpoint while compressor 1 is On.

Editable

Range: 60-90°F

Default: 75°F

CMP 1 AMB L'OUT

Displays and edits the compressor ambient lockout setpoint. Compressors are allowed to operate when the outside air temperature is greater than the ambient lockout setpoint. When the outside air temperature falls below the ambient lockout setpoint minus the 2°F deadband, all compressors are prevented from operating.

Editable

Range: 50-70°F

Default: 55°F

CMP 2 AMB L'OUT

Displays and edits ambient lock-out setpoint for compressor 2. Compressor 2 is allowed to operate when the outside air temperature is greater than the ambient lockout setpoint. When the outside air temperature falls below the ambient lockout setpoint minus the 3°F deadband, compressor 2 is prevented from operating.

Editable

Range: 50-80°F

Default: 58°F

CMP 3 4 AMB L'OUT

Displays and edits the ambient lockout setpoint for compressors 3 and 4. Compressors 3 and 4 are allowed to operate when the outside air temperature is greater than the ambient lockout setpoint. When the outside air temperature falls below the ambient lockout setpoint minus the 3°F deadband, compressors 3 and 4 are prevented from operating.

Editable

Range: 50-80°F

Default: 61°F

OCC HARDWIRED

Displays and edits the occupancy source of the controller. When the occupancy command is provided via hardwired input, the occupancy hardwired field is TRUE. When occupancy is to be determined by the local occupancy schedule, the occupancy hardwired field is FALSE.

Editable

Range: False, True

Default: True

SUPPLY OR RESET

Displays and edits the primary control sequence of the controller. When the control sequence is SUPPLY, the controller attempts to maintain the supply air temperature at the supply air temperature setpoint (adjustable). When the control sequence is SUPPLY WITH RESET, the controller also attempts to maintain the supply air temperature at setpoint, but the setpoint varies automatically based on the difference between the space temperature and space temperature setpoint.

Editable

Range: Supply, Supply with Reset

Default: Supply with Reset

FORCE HEAT SETPT

Displays and edits the force heat setpoint of the controller. Modulating heat operation is forced on at 35% capacity (adjustable) minimum whenever the outside air temperature is less than the force heat setpoint. When the outside air temperature is greater than the force heat setpoint, modulating heat operation is returned to normal.

Editable

Range: -100-60°F

Default: 20°F

FORCE HEAT PCT

Displays and edits the force heat percentage of the controller. Modulating heat operation is forced on at the minimum capacity specified in this setpoint when the outside air temperature is less than the force heat setpoint. Refer to the prior definition for force heat set-point.

Editable

Range: 0-100%

Default: 35%

SUPPLY CLG SETPT

Displays and edits the supply/discharge cooling setpoint when the controller is using the discharge air control sequence. In this mode, the discharge air temperature setpoint is defined in the operator display and is adjustable.

Editable

Range: 50-90°F

Default: 55°F

SUPPLY HTG SETPT

Displays and edits the supply/discharge heating setpoint when the controller is using the discharge air control sequence. In this mode, the discharge air temperature setpoint is defined in the operator display and is adjustable.

Editable

Range: 50-90°F

Default: 68°F

UNOCC DEH

Displays and edits the unoccupied dehumidification setpoint type (relative humidity or dewpoint).

Editable

Range: RH, Dewpoint

Default: Dewpoint

UNOCC RH SETPT

Displays and edits the unoccupied space relative humidity setpoint. When combined with the unoccupied relative humidity deadband, these setpoints define the unoccupied dehumidification enable point for the controller. When the relative humidity is greater than the setpoint plus the deadband, unoccupied dehumidification is enabled. When the relative humidity falls below the setpoint, unoccupied dehumidification is disabled.

Editable

Range: 0-100%

Default: 55%

UNOCC RH DB

Displays and edits the unoccupied space relative humidity deadband. When combined with the unoccupied relative humidity setpoint, these setpoints define the unoccupied dehumidification enable point for the controller. Refer to the prior definition for Unoccupied RH Setpoint.

Editable

Range: 0-10F

Default: 5F

STATIC SETPT

Displays and edits the static pressure setpoint.

Depending on the configuration and application of the controller (space/building or duct static pressure control), this setpoint is used to define the applicable pressure setpoint.

Editable

Range: -1.0 to 1.0 in.w.c. (space)

or -2.0 to 8.0 in.w.c. (duct)

Default: 0.07 in w.c. (space)

or 1.5 in. w.c. (duct)

DUCT STATIC HIGH LIMIT

Displays and edits the duct static pressure high limit setpoint. This setpoint is used for duct static (VAV) applications to define the duct static pressure at which the unit shuts down.

Editable

Range: 0.0 to 8.0 in. w.c.

Default: 2.5 in. w.c.

SUPPLY FAN SPEED

Edits the default speed of the supply fan for constant volume applications. Each VRP rooftop includes a variable frequency drive (VFD) and direct-drive motor for the supply fan. The controller sends a control signal (0-10 VDC) to the VFD to indicate the speed at which it should run. At 100%, the controller sends a control signal of 10 VDC, allowing the fan to operate at the design speed (in Hz), typically 60 Hz.

Editable

Range: 50-100%

Default: 100%

Manual Override

OUTPUT CONTROL

Initiates or cancels manual output control (manual override) of the controller outputs. When AUTO is selected, the outputs are controlled automatically. When OVERRIDE is selected, the outputs are controlled Off until they are overridden by the user.

Editable

Range: Auto, Override

Default: Auto

SUPPLY FAN

Initiates or cancels manual control of the supply fan. When output control is set to Override (refer to prior definition), the supply fan is controlled Off. This setpoint can be used to override the supply fan. When the supply fan is overridden to On, the supply fan will not start until the outside air damper end switch is made (the damper is confirmed open).

Editable

Range: Off, On

Default: Off

FAN SPEED PCT

Overrides the supply fan speed percentage while the fan is running in Override mode.

Editable

Range: 50-100%

Default: 100%

OA DAMPER PCT

Overrides the outside air damper percentage while the fan is running in Override mode.

Editable

Range: 0-100%

Default: 100%

COMPRESSOR1

Overrides Compressor 1 while the fan is running in the Override mode. Because electric and modulating heat operation automatically disable compressor operation, those heat sources must be controlled Off to permit compressor overrides.

Editable

Range: Off, On

Default: Off

COMPRESSOR2

Overrides Compressor 2 while the fan is running in the Override mode. Because electric and modulating heat operation automatically disable compressor operation, those heat sources must be controlled Off to permit compressor overrides.

Editable

Range: Off, On

Default: Off

COMPRESSOR3

Overrides Compressor 3 while the fan is running in the Override mode. Because electric and modulating heat operation automatically disable compressor operation, those heat sources must be controlled Off to permit compressor overrides.

Editable

Range: Off, On

Default: Off

COMPRESSOR4

Overrides Compressor 4 while the fan is running in the Override mode. Because electric and modulating heat operation automatically disable compressor operation, those heat sources must be controlled Off to permit compressor overrides.

Editable

Range: Off, On

Default: Off

HOT GAS REHEAT

Overrides hot gas reheat while the fan is running in the Override mode. Hot gas reheat operation is only possible while Compressor 1 is running.

Editable

Range: Off, On

Default: Off

HOT GAS REHEAT PCT

Overrides the hot gas re-heat percentage while the fan is running in the Override mode. Hot gas reheat operation is only possible while Compressor 1 is running.

Editable

Range: 0-100%

Default: 0%

ELECTRIC HEAT

Overrides electric heat while the fan is running in the Override mode. Because electric heat is automatically disabled while compressors are on, all compressors must be overridden to Off to allow electric heat operation.

Editable

Range: Off, On

Default: Off

ELECT PCT

Overrides the electric heat percentage while the fan is running in the Override mode. Because electric heat is automatically disabled while compressors are on, all compressors must be overridden to Off to allow electric heat operation.

Editable

Range: 0-100%

Default: 0%

MODULATING HEAT

Overrides modulating (gas/water/steam) heat while the fan is running in the Override mode. Because modulating heat is automatically disabled while compressors are on, all compressors must be overridden to Off to allow modulating heat operation.

Editable

Range: Off, On

Default: Off

MOD HEAT PCT

Overrides the modulating (gas/water/steam) heat percentage while the fan is running in the Override mode. Because modulating heat is automatically disabled while compressors are on, all compressors must be overridden to Off to allow modulating heat operation.

Editable

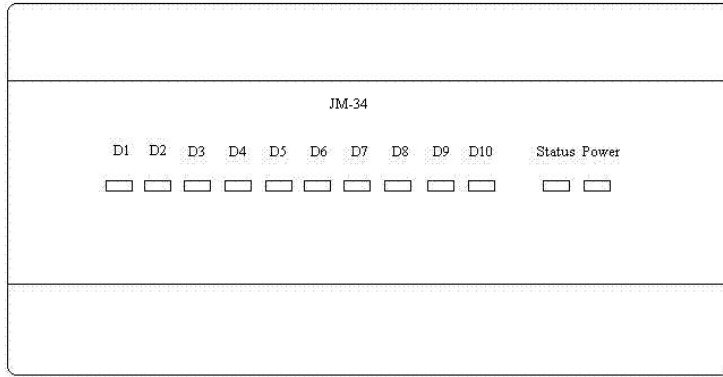
Range: 0-100%

Default: 0%

I/O Modules

34 Point Module

A 34-point module is used for the primary inputs and outputs of the controls system. On the face of the 34-point module are a series of LEDs that serve as the status indicators described below.



LED	Controlled Point	Terminals	Notes
D1	Supply Fan Start/Stop	D1	Enables the supply fan VFD
		1C2	
D2	Compressor 1 Start/Stop	1C2	Engages compressor one's contactor
		D2	
D3	Compressor 2 Start/Stop	D3	Engages compressor two's contactor, Used only for units with 2 or more compressors
		3C4	
D4	Compressor 3 Start/Stop	3C4	Engages compressor three's contactor, used only for units with 3 or more compressors
		D4	
D5	Compressor 4 Start/Stop	D5	Engages compressor four's contactor, used only for units with 4 compressors
		5C6	
D6	Gas Heat Enable	5C6	Enables the gas furnace
		D6	
D7	Gas Heat Enable 2nd Stage	D7	Enables 2nd stage, on 450 models only
		7C8	
D8	(not used)	7C8	
		D8	
D9	Alarm Output	D9	Contact closes on unit alarm
		9C10	
D10	(not used)	9C10	
		D10	
Status			LED is lit when IO module is communicating with the Jenesys controller
Power			LED is lit when IO module is powered

Universal Inputs

Universal Input		Terminals	Notes
1	Supply Air Temperature	U1	10kΩ Thermistor, Type III
		0V	
2	Cooling Coil Leaving Air Temperature	0V	10kΩ Thermistor, Type III
		U2	
3	Outside Air Temperature	U3	10kΩ Thermistor, Type III
		0V	
4	Space Temperature	0V	10kΩ Thermistor, Type III
		U4	
5	Outside Air Relative Humidity	U5	0-10 VDC (0-100%)
		0V	
6	Space Relative Humidity	0V	0-10 VDC (0-100%)
		U6	
7	Damper End Switch	U7	Contact Closed = End Switch(es) Made, Damper(s) OPEN
		0V	
8	Supply Fan Status	0V	Contact Closed = Fan ON
		U8	
9	High Pressure Cutout, Circuit A	U9	Contact Closed = Normal
		0V	
10	Low Pressure Cutout, Circuit A	0V	Contact Closed = Normal
		U10	
11	High Pressure Cutout, Circuit B	U11	Contact Closed = Normal
		0V	
12	Low Pressure Cutout, Circuit B	0V	Contact Closed = Normal
		U12	
13	Filter Status	U13	Contact Closed = Dirty Filter
		0V	
14	(not used)	0V	
		U14	
15	Occupancy Input	U15	Contact Closed = Occupied
		0V	
16	Shutdown Input	0V	Contact Closed = Run
		U16	

Supply Air Temperature (Universal Input 1)

The supply air temperature sensor ships with the unit. The sensor wire is factory-provided and is pre-terminated in the unit. The sensor ships loose (in the control panel) and must be field installed downstream of the unit, with the probe in the supply duct. The supply air sensor is a 10k Ω thermistor (at 77°F), type III thermistor curve.

Cooling Coil Leaving Air Temperature (Universal Input 2)

The coil leaving air temperature sensor is factory wired and installed in the coil section of the unit between the evaporator and reheat coils, closest to the evaporator coil. The coil leaving air sensor is a 10k Ω thermistor (at 77°F), type III thermistor curve.

Outside Air Temperature (Universal Input 3)

The outside air temperature sensor is factory wired and installed on the outside of the unit under the outside air damper hood. The sensor is a combination sensor (temperature and relative humidity). The outside air temperature sensor is a 10k Ω thermistor (at 77°F), type III thermistor curve.

Space Temperature (Universal Input 4)

The space temperature sensor must be field wired and installed. Refer to wiring instructions in this manual. The space temperature sensor is a 10k Ω thermistor (at 77°F), type III thermistor curve.

Outside Air Relative Humidity (Universal Input 5)

The outside air relative sensor is factory wired and installed on the outside of the unit under the outside air damper hood. The sensor is a combination sensor (temperature and relative humidity). The outside air relative humidity sensor is a DC voltage device (0-10 VDC, 0-100% RH).

Space Relative Humidity (Universal Input 6)

The space temperature sensor must be field wired and installed. Refer to wiring instructions in this manual. The space relative humidity sensor is a DC voltage device (0-10 VDC, 0-100% RH).

Damper End Switch (Universal Input 7)

Units may be equipped with only the outside air damper (100% outside air only) or outside and return dampers (100% outside air with recirculation). In all cases, the damper actuator is controlled with a 0-10 VDC signal from the controller to the actuator. When actuators are included for outside and return dampers, both dampers are concurrently controlled with one 0-10 VDC signal (opposing direction handled physically with the actuators). For applications with one damper actuator, the damper end contact closure is wired to the controller to indicate when the damper is open sufficiently for air flow. For applications with both outside and return dampers, the end switches are wired in parallel. In those applications, at least one end switch must close to indicate the damper is open sufficiently for air flow.

Supply Fan Status (Universal Input 8)

The supply fan status of the unit is determined with a differential pressure switch. The switch is mounted in the control panel with tubing running to the high and low pressure sides of the fan. When the fan speed increases enough to create the pressure differential, the contacts internal to the switch close, confirming fan operation.

High Pressure Cutout, Circuit A (Universal Input 9)

Each refrigeration circuit (one or two compressors per circuit, depending on the unit) includes both high and low pressure switches. When the refrigerant pressure of the circuit exceeds the switch limit, the cutout device contacts open, causing a shutdown alarm. When the high pressure condition is addressed, the high pressure cutout device must be manually reset by pressing the red button on the device.

Low Pressure Cutout, Circuit A (Universal Input 10)

Each refrigeration circuit (one or two compressors per circuit, depending on the unit) includes both high and low pressure switches. When the refrigerant pressure of the circuit falls below the switch limit, the cutout device contacts open, causing a shutdown alarm. The low pressure cutout device automatically resets when the fault condition is addressed.

High Pressure Cutout, Circuit B (Universal Input 11)

Each refrigeration circuit (one or two compressors per circuit, depending on the unit) includes both high and low pressure switches. When the refrigerant pressure of the circuit exceeds the switch limit, the cutout device contacts open, causing a shutdown alarm. When the high pressure condition is addressed, the high pressure cutout device must be manually reset by pressing the red button on the device.

Low Pressure Cutout, Circuit B (Universal Input 12)

Each refrigeration circuit (one or two compressors per circuit, depending on the unit) includes both high and low pressure switches. When the refrigerant pressure of the circuit falls below the switch limit, the cutout device contacts open, causing a shutdown alarm. The low pressure cutout device automatically resets when the fault condition has been addressed.

Filter Status Input (Universal Input 13)

The filter status differential pressure switch (optional) indicates the pressure across the filters. If the contacts close for five continuous minutes on the pressure switch, the controller interprets a dirty filter condition. The unit operates normally, but the alarm LED is illuminated on the controller.

Occupancy Input (Universal Input 15)

The hardwired occupancy input of the controller can be used to determine the occupancy mode. When the input contacts are closed, the mode of the controller is occupied. When the contacts are open, the mode is unoccupied. The factory-installed jumper wire should be removed when a field-installed occupancy device is used. If the hardwired input is used to determine the occupancy of the controller, the OCC HARDWIRED field (operator interface or PC tool) should be set to TRUE. When the hardwired input is not being used to determine the occupancy, the OCC HARDWIRED field should be set to NULL.

Shutdown Input (Universal Input 16)

The shutdown input of the controller prevents unit operation when the input contacts are open. The factory-installed jumper wire should be removed when a field-installed shutdown device is used.

Digital Outputs

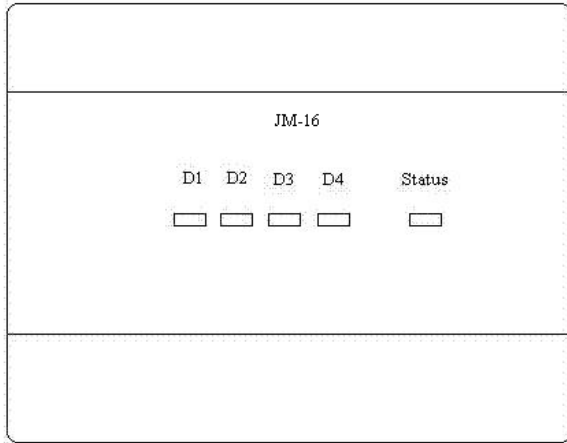
Digital Output		Terminals	Notes
1	Supply Fan Start/Stop	D1	
		1C2	
2	Compressor 1 Start/Stop	1C2	
		D2	
3	Compressor 2 Start/Stop	D3	Used only for units with 2 or more compressors
		3C4	
4	Compressor 3 Start/Stop	3C4	Used only for units with 3 or more compressors
		D4	
5	Compressor 4 Start/Stop	D5	Used only for units with 4 compressors
		5C6	
6	Gas Heat Enable	5C6	
		D6	
7	(not used)	D7	
		7C8	
8	(not used)	7C8	
		D8	
9	Alarm Output	D9	
		9C10	
10	Outside Air Damper Control	9C10	Used for 2-position dampers
		D10	

Analog Outputs

Analog Output		Terminals	Notes
1	Outside Air Damper Control	AO1	0-10 VDC (0-100%). Used for (analog) modulating dampers.
		0V	
2	(not used)	0V	
		AO2	
3	Modulating Gas Control	AO3	0-10 VDC (0-100%)
		0V	
4	Supply Fan Speed Control (VFD)	0V	0-10 VDC (0-100%)
		AO4	
5	Electric Heat Control	AO5	0-10 VDC (0-100%)
		0V	
6	(not used)	0V	
		AO6	
7	Modulating Hot Gas Reheat Control	AO7	0-10 VDC (0-100%)
		0V	
8	(not used)	0V	
		AO8	

16 point module

All VPRX, VPRE, and VPRP units include a 16-point expansion module for the secondary inputs and outputs of the controls system. On the face of the 16-point module are a series of LEDs that serve as the status indicators described below.



LED	Controlled Point	Terminals	Notes
D1	Exhaust Fan Start/Stop	D1	Enables the exhaust fan VFD
		1C2	
D2	Heat Wheel Start/Stop	1C2	Engages the heat wheel's contactor
		D2	
D3	Gas Heat Enable 3rd Stage	D3	Enables 3rd stage, on 450 models ordered with 12 to 1 modulation only.
		3C4	
D4	(not used)	3C4	
		D4	
Status			LED is lit when IO module is communicating with the Jenesys controller

Universal Inputs

	Universal Inputs	Terminals	Notes
1	Static Pressure Sensor	U1	0-10 VDC (display range varies)
		0V	
2	Exhaust Temperature	0V	10kΩ Thermistor, Type III
		U2	
3	Exhaust Damper End Switch	U3	Contact Closed = End Switch(es) Made, Damper(s) OPEN
		0V	
4	Exhaust Fan Status	0V	Contact Closed = Fan ON
		U4	
5	CO ₂ Sensor	U5	0-10 VDC (0-2000 ppm)
		0V	
6	Fan Speed Command	0V	0-10 VDC (0-100%)
		U6	
7	Freezestat	U7	Contact Closed = End Switch(es) Made, Freezestat NORMAL
		0V	
8	(not used)	0V	
		U8	

Digital Outputs

	Digital Outputs	Terminals	Notes
1	Exhaust Fan Start/Stop	D1	
		1C2	
2	Energy Recovery Wheel Start/Stop	1C2	
		D2	
3	(not used)	D3	
		3C4	
4	(not used)	3C4	
		D4	

Analog Outputs

	Analog Outputs	Terminals	Notes
1	Exhaust Fan Speed Control (VFD)	AO1	0-10 VDC (0-100%)
		0V	
2	Exhaust Damper Control	0V	0-10 VDC (0-100%). Used for (analog) modulating dampers.
		AO2	
3	(not used)	AO3	
		0V	
4	(not used)	0V	
		AO4	

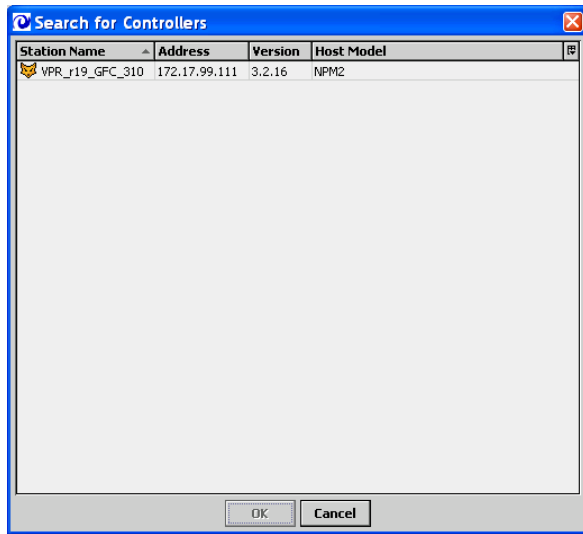
Universal Maintenance Tool (UMT)

In order to complete the communication integration The UMT software is provided with a CD included in the control panel of the unit or is available for download at <http://208.116.12.42/umt.exe>.

Basic Functions

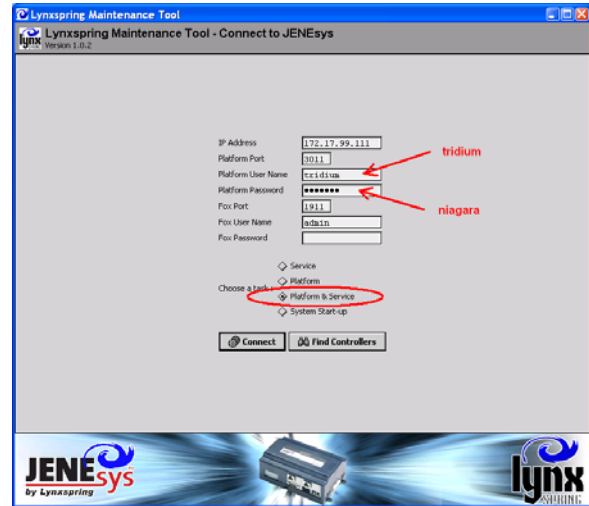
Controller Log In

When the Universal Maintenance Tool is started, it automatically searches for all unit controllers on the current network.

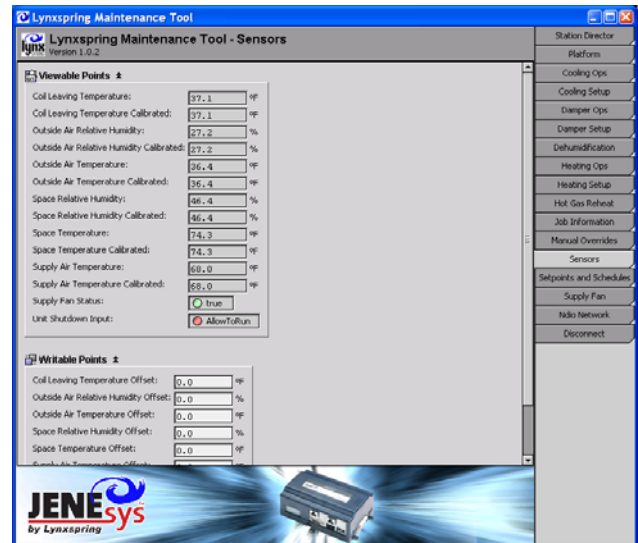


The first step to using the UMT software is logging into the desired controller using the instructions below.

1. Select the desired unit controller and click on the "OK" button.
2. Enter in the default username provided below.
USERNAME: tridium
PASSWORD: niagara
3. From the task list select "Platform & Service".
4. Press the "Connect" button in the UMT window.

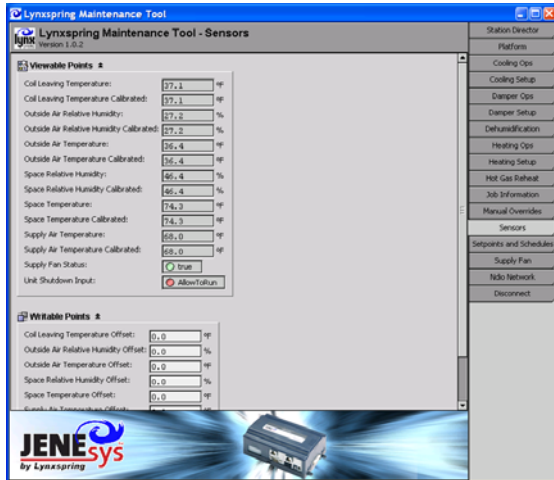


The UMT software package will connect to the selected unit and download data from the individual station. Monitor the progress bar on the screen for the status of this operation. The download process should take approximately three minutes. When the download is complete, the Station Director screen is displayed.



Unit Status

Select the Sensors tab to see a summary of the temperature inputs to the unit controller.

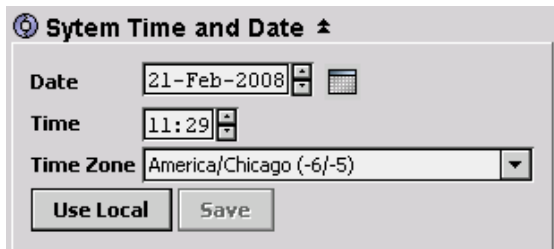


System Time and Date

Edit the time and date as required, then select Save.

OR

Use the time and date from the local PC by selecting Use Local. Then select Save.

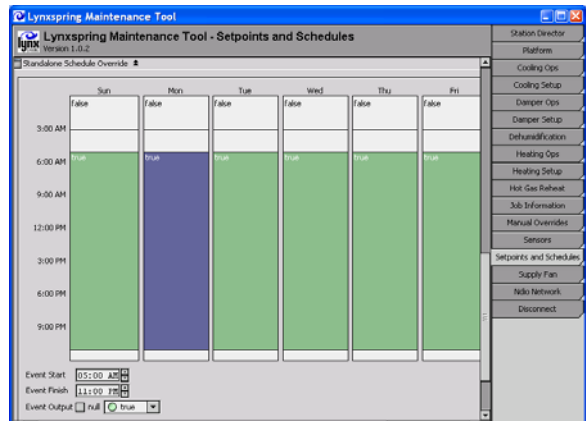
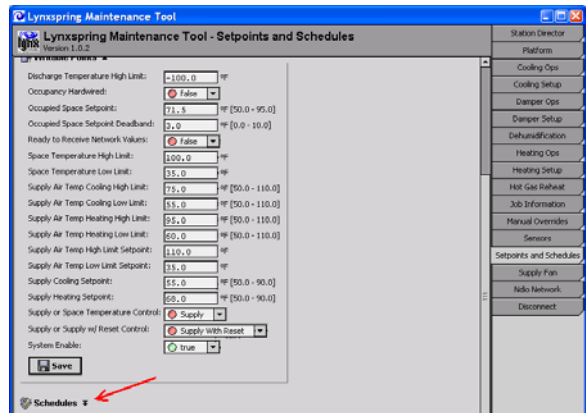


View and Edit Time Schedules

On the Setpoints and Schedules tab, scroll down to the Schedules heading. Click on the double arrows to reveal the schedule entries for the unit controller.

On the Schedules page, the occupied hours of operation are displayed for each of the seven days of the week. To edit the schedule, use the mouse to drag the start/stop times for each day. Simply click on the dividing line in the column and push it up or down to a new time. Alternatively, Event Start and Event Finish times can be edited directly using the fields near the bottom of the screen.

When the changes are complete, press Save at the bottom of the screen.



Edit Space Temperature Setpoints

To edit the occupied (daytime) space temperature setpoints, select the Setpoints and Schedules tab. The Occupied Space Setpoint defines the middle of occupied heating and occupied cooling setpoints. The Occupied Space Setpoint Deadband defines the difference between the two setpoints.

Example:

Occupied Space Setpoint = 71.5°F

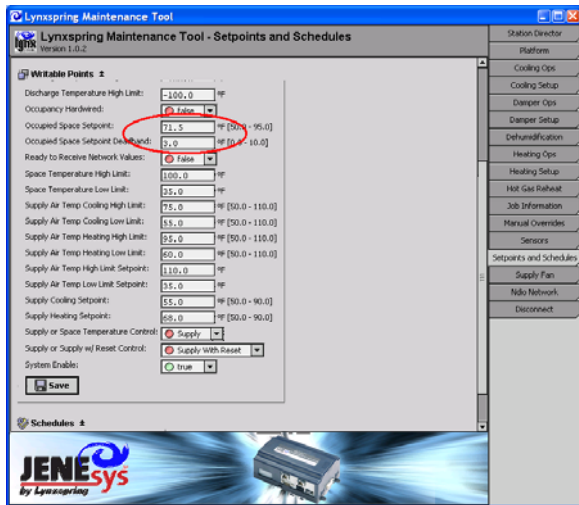
Occupied Space Setpoint Deadband = 3.0°F

Result:

Occupied Cooling Setpoint = 73.0°F

Occupied Heating Setpoint = 70.0°F

With the changes complete to the setpoint or deadband, press Save.



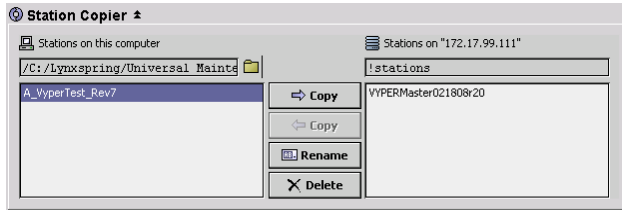
IMPORTANT:

The discharge air temperature setpoint is automatically calculated based on the actual space temperature and space temperature setpoint. Though the high/low limits for the discharge air temperature can be edited, the actual setpoint is determined automatically.

Advanced Functions

Station Copier

From the Station Director screen, select the Platform tab. Expand any of the options by clicking on the double arrows to the right of the title.



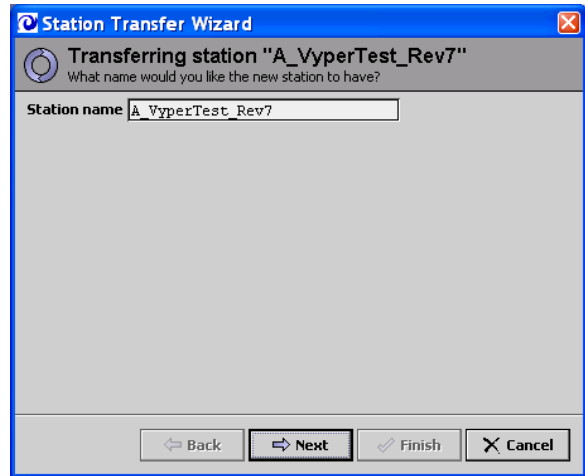
Use the Station Copier utility to copy application programs (stations) between the PC and the connected unit/controller. The information on the left side of the screen represents folders and files from the connected PC. The information on the right side of the screen represents the station running on the connected unit/controller.

The files associated with the station should be located in the Stations folder of the Universal Maintenance Tool, normally found on the PC in:

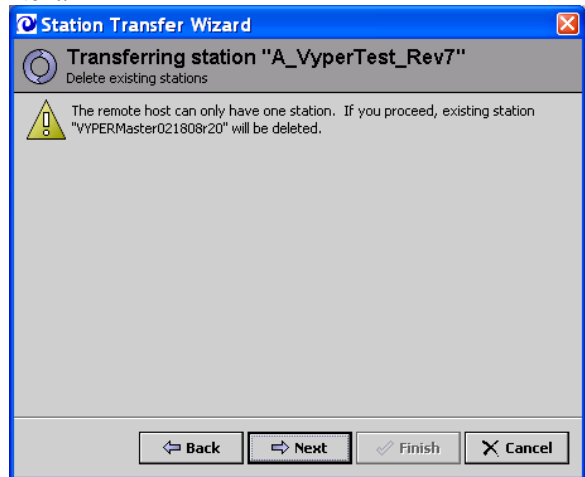
C:\Lynxspring\Universal Maintenance Tool\stations

Copying a Station from the PC to the Controller (Download)

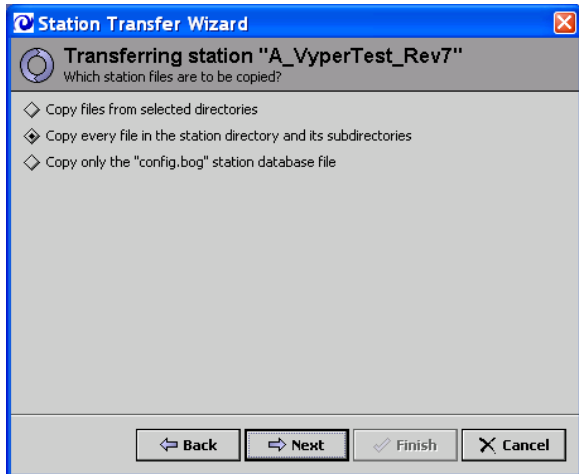
1. Highlight the desired station from the list on the left side of the screen.
2. Select **Copy** to start the station transfer wizard and download the station from the PC to the controller.
3. Select **Next**.



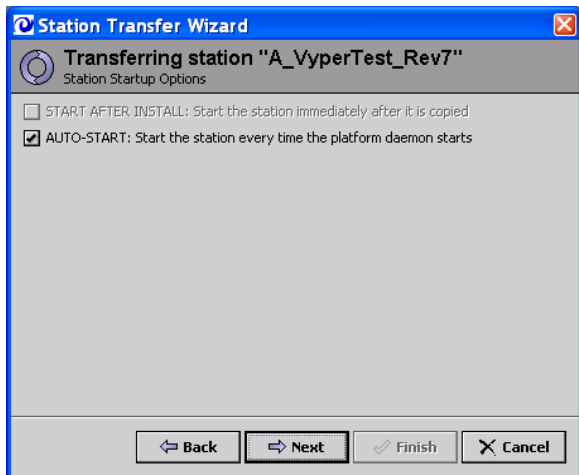
4. Assuming there is an existing station in the controller, the wizard warns that the existing controller will be replaced by the new one. Select **Next**.



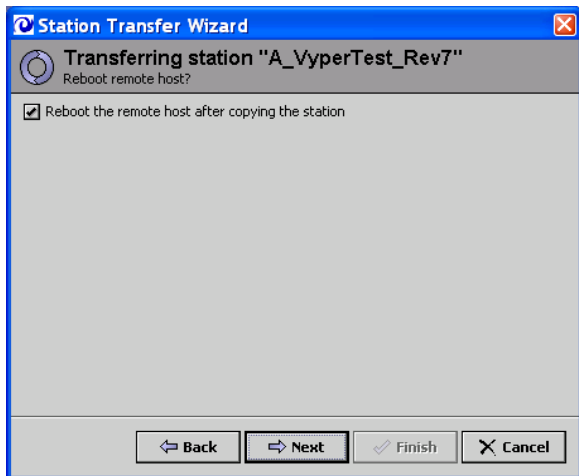
5. Select **Copy every file**, then select **Next**.



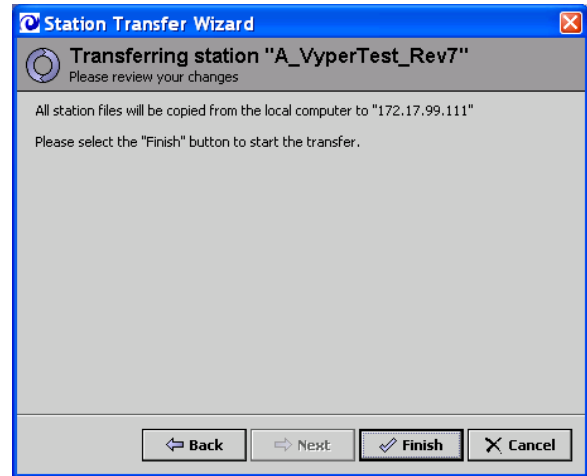
6. Select Auto-START, then select Next.



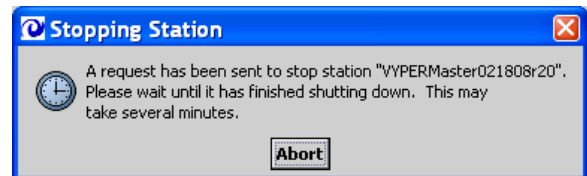
7. Select Reboot the remote host, then select Next.



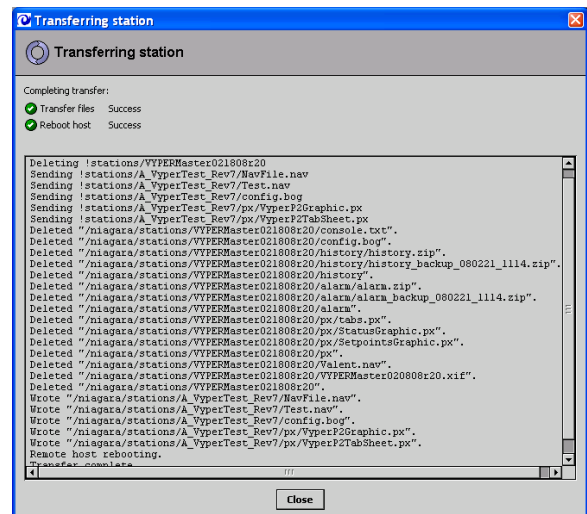
8. Select Finish.



9. A pop-up indicates that the existing station is being shut down. This screen automatically closes when the shutdown is complete.




10. When the file transfer is complete, select Close.
The controller automatically reboots.
NOTE: Allow 2-3 minutes for the controller to reboot.

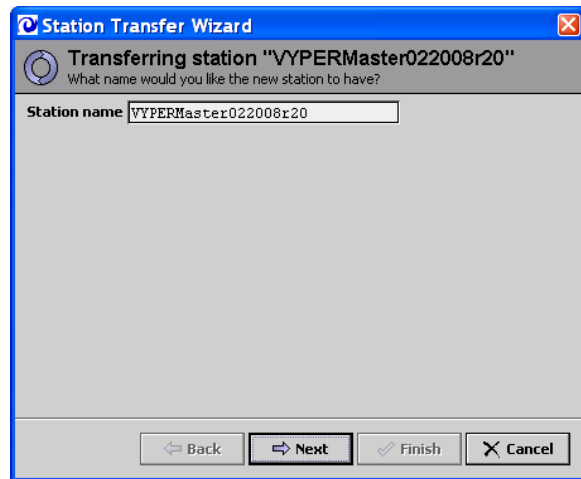


11. Disconnect from the controller and reconnect if desired.

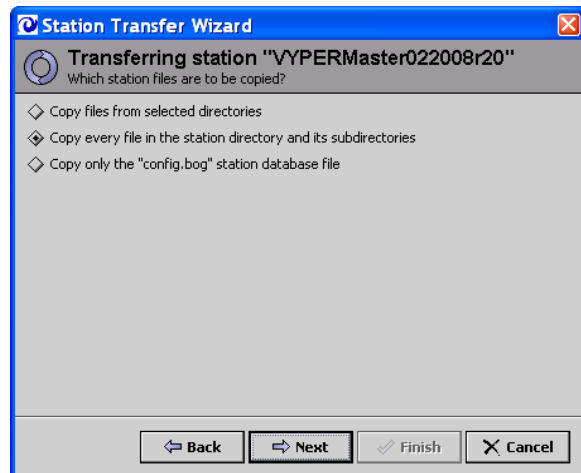
Copying a Station from the Controller to the PC (Upload)

The station copier can also be used to upload or backup the station from the controller to the PC.

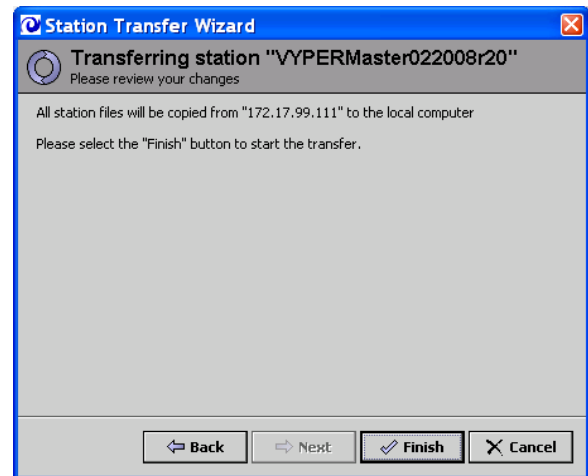
1. Select the controller's station from the right side of the screen.
2. Select  Copy to upload/backup the station from the controller to the PC.
3. Select Next.



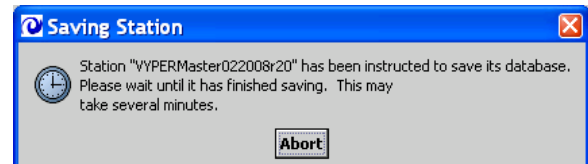
4. Select Copy every file, then select Next.



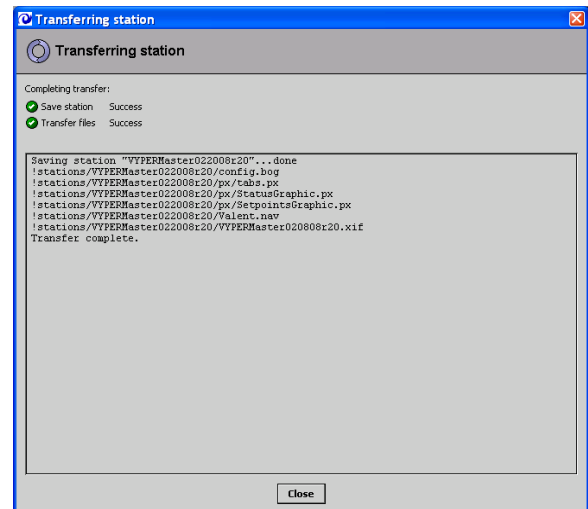
5. Select Finish.



6. A pop-up indicates that the existing station is being saved. This screen automatically closes.



7. When the file transfer is complete, select Close.



TCP/IP Configuration

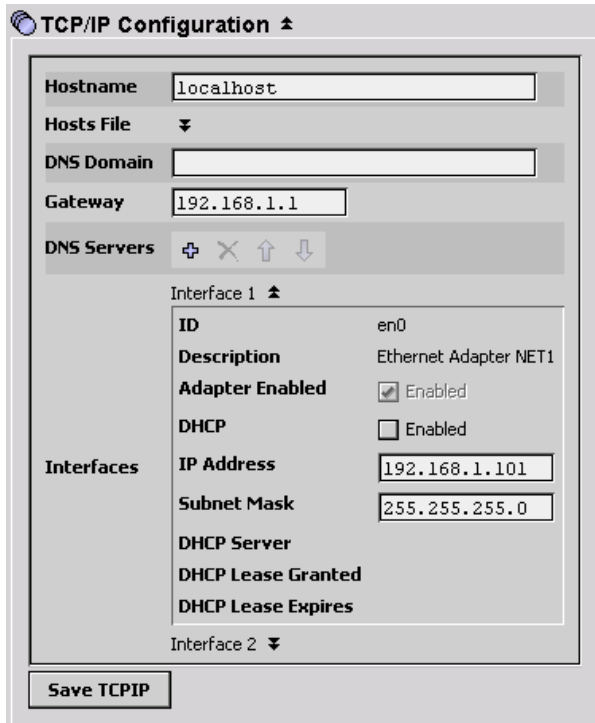
Use the TCP/IP Configuration utility to edit the network address and related parameters for the controller. The controller ships with the following default settings:

Default Gateway: 192.168.1.1

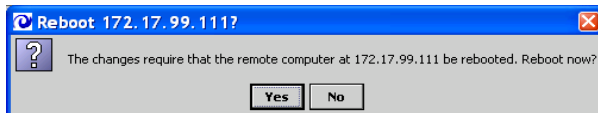
Address: 192.168.1.101

Subnet Mask: 255.255.255.0

- Expand Interface 1 by clicking on the double-arrows to the right of the title. Do not change the parameters for Interface 2.



- Edit the gateway, IP address, and subnet mask as required, then press Save TCP/IP.
- The pop-up message asks for confirmation to reboot the controller. Select Yes.



- The pop-up message confirms that the controller is rebooting. Select OK.
- Note: Allow 2-3 minutes for the controller to reboot.



- Disconnect from the controller and reconnect if desired.

File Transfer Client

Use the file transfer client only under the direction of the factory.

NDIO Network

NDIO (or ndio) refers to the input/output module(s) of the controller. Expand the table for the 34-point input/output module or 16-point module (used only in certain applications) by clicking on the double-arrows to the right of the title.

Each hardware input and output point is listed along with the type, address, and current value. The address corresponds to the physical point of connection on the input/output module. For example, Boolean Input 13 is universal input 13 on the input/output module defined as a Boolean (digital) input.

Alarms

Unit Alarm Output displays the status of the unit alarm output (Digital Output 9) of the controller. This output is Alarm (LED is on) whenever any of the following conditions is True:

Supply Fan Status Alarm

Fan commanded On but fan status is False
Supply Air Temperature Low Alarm
SAT falls below the low alarm setpoint (35°F, adjustable)

Dirty Filter

Filter status input is True (high differential pressure across the filters)
Unit Shutdown
Shutdown input contacts are open

Duct Static Alarm

For VAV applications, when the duct static pressure exceeds duct static pressure high limit (2.5 in. w.c., adjustable)
View Only
Range: Normal, Alarm

Unit Shutdown Input

Displays the status of the unit shutdown input (Universal Input 16) of the controller. When the input contacts are closed, the unit is AllowToRun. When the input contacts are open, Shutdown is initiated (supply fan off, all heating and cooling off, outside air damper closed).

View Only
Range: AllowToRun, Shutdown

Supply Fan Status Alarm

Displays the status of the fan status alarm. If the supply fan is commanded On and the fan status input (Universal Input 8) is False, the supply fan status alarm is set to Alarm after 30 seconds.

View Only
Range: Normal, Alarm

Supply Air Temperature Low Alarm

Displays the status of the supply air temperature low temperature alarm. When the supply air temperature falls below the supply air temperature low alarm setpoint (35°F, adjustable), the supply air temperature low alarm is Alarm and the unit is shut down. The unit remains off until the supply air temperature is 10°F greater than the low limit setpoint.

View Only
Range: Normal, Alarm

Supply Air Temperature High Alarm

Displays the status of the supply air temperature high temperature alarm. When the supply air temperature rises above the supply air temperature high alarm setpoint (110°F, adjustable), the supply air temperature high alarm is Alarm. The alarm point returns to Normal when the supply air temperature is 5°F less than the high limit setpoint. This alarm does not affect unit operation.

View Only
Range: Normal, Alarm

Filter Status

Displays the status of the filter status input (Universal Input 13). When the input contacts are open, the filter status is Normal. When the input contacts are closed, the filter status is Alarm. A filter status alarm does not affect unit operation. The unit alarm output is Alarm whenever the filter status input is Alarm.

View Only
Range: Normal, Alarm

Filter Switch Enable

Used to enable/disable the filter status alarm. When filter switch enable is True, the filter switch input is active. When filter switch enable is False, the filter switch input is inactive.

Editable

Range: False, True

Default: True

Cooling Operations

Ambient Lockin

Compressor 1 displays the ambient lockin setpoint. When the outside air temperature is greater than the ambient lockin setpoint, compressor 1 remains on and does not cycle. The ambient lockin logic is only active during the occupied mode.

View Only

Ambient Lockout, Compressor 1

Displays the ambient lockout setpoint for compressor 1. Compressor 1 operation is disabled when the outside air temperature is 2°F less than the ambient lockout setpoint for that compressor (55°F, adjustable). Compressor 1 operation is enabled when the outside air temperature is greater than the ambient lockout setpoint for that compressor.

View Only

Ambient Lockout, Compressor 2

Displays the ambient lockout setpoint for compressor 2. Compressor 2 operation is disabled when the outside air temperature is less than the ambient lockout setpoint for that compressor (58°F, adjustable). Compressor 2 operation is enabled when the outside air temperature is 3°F greater than the ambient lockout setpoint for that compressor.

View Only

Ambient Lockout, Compressors 3&4

Displays the ambient lockout setpoint for compressors 3 and 4. Compressors 3 and 4 are disabled when the outside air temperature is less than the ambient lockout setpoint for that compressor (61°F, adjustable). Compressors 3 and 4 are enabled when the outside air temperature is 3°F greater than the ambient lockout setpoint for those compressors.

View Only

Ambient Temperature

Displays a calibrated outside air temperature, which is the outside air temperature plus/minus any offset adjustment.

View Only

Compressor 1 Command

Represents the commanded state of Compressor 1, Digital Output 2 of the controller.

View Only

Compressor 2 Command

Represents the commanded state of Compressor 2, Digital Output 3 of the controller.

View Only

Compressor 3 Command

Represents the commanded state of Compressor 3, Digital Output 4 of the controller.

View Only

Compressor 4 Command

Represents the commanded state of Compressor 4, Digital Output 5 of the controller.

View Only

Cooling Call 1 Control

Is True when the controller is calling for cooling operation (compressor 1). Several other conditions must be met for the compressor to operate. For example, the outside air temperature must be above the ambient lockout setpoint.

View Only

Cooling Call 2 Control

Is True when the controller is calling for cooling operation (compressor 2). Several other conditions must be met for the compressor to operate. For example, the outside air temperature must be above the ambient lockout setpoint.

View Only

Cooling Mode

Is True when the outside air temperature is above the ambient lockout setpoint and the unit is not actively heating.

View Only

Day Operation

Is True when either of the following conditions is True:

Occupied Cooling Operation and
Supply Fan Status True and
Occupancy is Occupied and
Cooling Mode is True

OR

Occupied Dehumidification Operation and
Supply Fan Status True and
Occupancy is Occupied and
Daytime Dehumidification is True

Note: Daytime Dehumidification is True when:
Space RH is greater than the Space RH Setpoint
OR

Outside Dewpoint is greater than the Outside
Dewpoint Setpoint
View Only

HPC-A

Represents the status of Universal Input 9, the high pressure cutout input for circuit A. When tripped, HPC-A requires manual reset. The high pressure cutout switches are located in the compressor section of the unit. Press the red button on the switch to reset.
View Only

HPC-B

Represents the status of Universal Input 11, the high pressure cutout input for circuit B. When tripped, HPC-B requires manual reset. The high pressure cutout switches are located in the compressor section of the unit. Press the red button on the switch to reset.
View Only

LPC-A

Represents the status of Universal Input 10, the low pressure cutout input for circuit A. LPC-A is automatically reset when the pressure is above the mechanical limit of the switch.
View Only

LPC-B

Represents the status of Universal Input 12, the low pressure cutout input for circuit B. LPC-B is automatically reset when the pressure is above the mechanical limit of the switch.
View Only

Night Operation

Is True when the following conditions are True:

Supply Fan Status is True and
Occupancy is False (unoccupied) and
Either night cooling OR night dehumidification is True

Notes: Night cooling is True when Cooling Mode is True and Space Temperature is greater than the Space Unoccupied Cooling Setpoint.

Night Dehumidification

Is True when:

Cooling Mode is True and Space RH is greater than the Space Unoccupied RH Setpoint
OR

Cooling Mode is True and Space Dewpoint is greater than the Space Unoccupied Dewpoint Setpoint
View Only

Operating Mode is always one of the following modes:

Unoccupied Fan Only

Unoccupied Heating

Unoccupied Cooling

Unoccupied Cooling + Dehumidification

Occupied Fan Only

Occupied Heating

Occupied Cooling

Occupied Cooling + Dehumidification

View Only

Cooling Call One Interstage Delay Off

Displays and edits an interstage delay that prevents Compressor 1 from being controlled Off for at least two minutes (adjustable) after Compressor 2 is controlled Off.

Note: This data field is used for one- and two-compressor machines only.

Editable

Default: 2 Minutes

Cooling Call Two Interstage Delay ON

Displays and edits an interstage delay that prevents Compressor 2 from being controlled On for at least two minutes (adjustable) after Compressor 1 is controlled On.

Note: This editable data field is used for one- and two-compressor machines only.

Editable

Default: 2 Minutes

Minimum Off Time, Compressor 1

Displays and edits an adjustable minimum off time for compressor 1. When the compressor is controlled Off, it remains off for three minutes minimum (adjustable).

Note: This editable data field is used for one- and two-compressor machines only.

Editable

Default: 3 minutes

Minimum Off Time, Compressor 2

Displays and edits an adjustable minimum off time for compressor 2. When the compressor is controlled Off, it remains off for three minutes minimum (adjustable).

Note: This editable data field is used for one- and two-compressor machines only.

Editable

Default: 3 minutes

Minimum ON Time, Compressor 1

Displays and edits an adjustable minimum on time for compressor 1. When the compressor is controlled On, it remains on for five minutes minimum (adjustable).

Note: This editable data field is used for one- and two-compressor machines only.

Editable

Default: 5 minutes

Minimum ON Time, Compressor 2

Displays and edits an adjustable minimum on time for compressor 2. When the compressor is controlled On, it remains on for five minutes minimum (adjustable).

Note: This editable data field is used for one- and two-compressor machines only.

Editable

Default: 5 minutes

Cooling Setup

Compressor 1 Locked ON

Displays the lock status of compressor 1. When the outside air temperature is greater than the ambient lockin setpoint, compressor 1 remains on and does not cycle. The ambient lockin logic is only active during the occupied mode.

View Only

Control Setpoint

Is the active cooling control setpoint for the controller in cooling mode. In the dehumidification mode, the controller attempts to maintain the leaving evaporator coil temperature at the coil setpoint of 55°F (adjustable) and modulates the hot gas reheat to maintain the supply air setpoint.

In the cooling mode (no dehumidification), the controller attempts to maintain the supply air temperature at the supply air cooling setpoint. When the unit is configured for supply air control (supply or reset control parameter), the controller attempts to maintain the supply air at the fixed supply air cooling setpoint.

When configured for space temperature control with supply air reset, the controller attempts to control the supply air temperature at setpoint while that setpoint is automatically varied based on the space temperature and the following space temperature setpoints:

Occupied Cooling Setpoint

Occupied Heating Setpoint

Unoccupied Cooling Setpoint

Unoccupied Heating Setpoint

View Only

Control Temperature

Represents the active temperature sensor being used for control purposes. Depending on the operation of the controller, the control temperature is one of the following:

Space Temperature

Supply Air Temperature

Leaving Evaporator Coil Temperature

View Only

Call One Disable Space Deadband

Used by the controller to determine proper compressor operation. This value should not be edited.

Editable

Default: 0.0°F

Call One Disable Supply Deadband

Used by the controller to determine proper compressor operation. This value should not be edited.

Editable

Default: 0.0°F

Call One Enable Space Deadband

Used by the controller to determine proper compressor operation. This value should not be edited.

Editable

Default: 0.75°F

Call One Enable Supply Deadband

Used by the controller to determine proper compressor operation. This value should not be edited.

Editable

Default: 3.0°F

Call Two Disable Space Deadband

Used by the controller to determine proper compressor operation. This value should not be edited.

Editable

Default: 0.5°F

Call Two Disable Supply Deadband

Used by the controller to determine proper compressor operation. This value should not be edited.

Editable

Default: 1.0°F

Call Two Enable Space Deadband

Used by the controller to determine proper compressor operation. This value should not be edited.

Editable

Default: 1.5°F

Call Two Enable Supply Deadband

Used by the controller to determine proper compressor operation. This value should not be edited.

Editable

Default: 5.0°F

Compressor 1 Ambient Lockout

Displays and edits the compressor ambient lockout setpoint. Compressor 1 operation is disabled when the outside air temperature is 2°F less than this ambient lockout setpoint (55°F, adjustable). Compressor 1 operation is enabled when the outside air temperature is greater than this ambient lockout setpoint.

Editable

Range: 50-70°F

Default: 55°F

Compressor 2 Ambient Lockout

Displays and edits the compressor ambient lockout setpoint. Compressor 2 operation is disabled when the outside air temperature is less than this ambient lockout setpoint (58°F, adjustable). Compressor 2 operation is enabled when the outside air temperature is 3°F greater than this ambient lockout setpoint.

Editable

Range: 50-80°F

Default: 58°F

Compressor 3&4 Ambient Lockout

Displays and edits the compressor ambient lockout setpoint. Compressors 3 and 4 are disabled when the outside air temperature is less than this ambient lockout setpoint (61°F, adjustable). Compressors 3 and 4 are enabled when the outside air temperature is 3°F greater than this ambient lockout setpoint.

Editable

Range: 50-80°F

Default: 61°F

Interstage Delay Off, Compressor 1

Prevents compressor 1 from being controlled Off for at least two minutes (adjustable) after compressor 2 has been controlled Off.

Note: This editable data field is used for three- and four-compressor machines only.

Editable

Default: 2 Minutes

Interstage Delay Off, Compressor 2

Prevents compressor 2 from being controlled Off for at least two minutes (adjustable) after compressor 3 has been controlled Off.

Note: This editable data field is used for three- and four-compressor machines only.

Editable

Default: 2 Minutes

Interstage Delay Off, Compressor 3

Prevents compressor 3 from being controlled Off for at least two minutes (adjustable) after compressor 4 has been controlled Off.

Editable

Default: 2 Minutes

Interstage Delay ON, Compressor 2

Prevents compressor 2 from being controlled On for at least two minutes (adjustable) after compressor 1 has been controlled On.

Note: This editable data field is used for three- and four-compressor machines only.

Editable

Default: 2 Minutes

Interstage Delay ON, Compressor 3

Prevents compressor 3 from being controlled On for at least two minutes (adjustable) after compressor 2 has been controlled On.

Editable

Default: 2 Minutes

Interstage Delay ON, Compressor 4

Prevents compressor 4 from being controlled On for at least two minutes (adjustable) after compressor 3 has been controlled On.

Editable

Default: 2 Minutes

Minimum Off Time, Compressor 1

Displays and edits an adjustable minimum off time for compressor 1. When the compressor is controlled Off, it remains off for a minimum of three minutes (adjustable).

Note: This editable data field is used for three- and four-compressor machines only. Changes to this parameter should only be made under the direction of the factory.

Editable

Default: 3 minutes

Minimum Off Time, Compressor 2

Displays and edits an adjustable minimum off time for compressor 2. When the compressor is controlled Off, it remains off for a minimum of three minutes (adjustable).

Note: This editable data field is used for three- and four-compressor machines only. Changes to this parameter should only be made under the direction of the factory.

Editable

Default: 3 minutes

Minimum Off Time, Compressor 3

Displays and edits an adjustable minimum off time for compressor 3. When the compressor is controlled Off, it remains off for a minimum of three minutes (adjustable). Changes to this parameter should only be made under the direction of the factory.

Editable

Default: 3 minutes

Minimum Off Time, Compressor 4

Displays and edits an adjustable minimum off time for compressor 4. When the compressor is controlled Off, it remains off for a minimum of three minutes (adjustable). Changes to this parameter should only be made under the direction of the factory.

Editable

Default: 3 minutes

Minimum ON Time, Compressor 1

Displays and edits an adjustable minimum on time for compressor 1. When the compressor is controlled On, it remains on for a minimum of five minutes (adjustable).

Note: This editable data field is used for three- and four-compressor machines only. Changes to this parameter should only be made under the direction of the factory.

Editable

Default: 5 minutes

Minimum ON Time, Compressor 2

Displays and edits an adjustable minimum on time for compressor 2. When the compressor is controlled On, it remains on for a minimum of five minutes (adjustable).

Note: This editable data field is used for one- and two-compressor machines only. Changes to this parameter should only be made under the direction of the factory.

Editable

Default: 5 minutes

Minimum ON Time, Compressor 3

Displays and edits an adjustable minimum on time for compressor 3. When the compressor is controlled On, it remains on for a minimum of five minutes (adjustable). Changes to this parameter should only be made under the direction of the factory.

Editable

Default: 5 minutes

Minimum ON Time, Compressor 4

Displays and edits an adjustable minimum on time for compressor 4. When the compressor is controlled On, it remains on for a minimum of five minutes (adjustable). Changes to this parameter should only be made under the direction of the factory.

Editable

Default: 5 minutes

Outside Temp to Lock In Compressor 1

Displays and edits an adjustable temperature for locking on operation of compressor 1. When the outside air temperature is greater than this setpoint (75°F, adjustable), compressor 1 is locked on, barring any critical alarm conditions.

Editable

Damper Operations

Damper End Switch

Displays the status of the damper end switch. When the damper end switch is True, at least one of the dampers (outside or return) is sufficiently open for air flow. On units with only outside air dampers (no return dampers), the supply fan can only operate when the damper end switch is made (True).

View Only

Outdoor Air Damper Enable, 2-position

Displays the status of the two-position damper enable point. Digital Output 10 is used to enable two-position dampers. For units with no return dampers, the outside dampers are first controlled Open. When damper operation is confirmed (damper end switch True), the supply fan is enabled. For units with return dampers, the supply fan is enabled prior to damper operation.

View Only

Outside Air Damper Position

Displays the status of the modulating damper percentage. Analog Output 1 is used to control modulating dampers. For units with no return dampers, the outside dampers are first controlled Open. When damper operation is confirmed (damper end switch True), the supply fan is enabled. For units with return dampers, the supply fan is enabled prior to damper operation.

View Only

Damper Setup

Damper Close Delay Time

Used to delay closing the dampers by 20 seconds (adjustable) when the fan is commanded Off. Changes to this parameter should only be made under the direction of the factory.

Editable

Default:

20 seconds for outside plus recirculation dampers

4 minutes for outside dampers only

Damper Open Delay Time delays opening the dampers by 30 seconds (adjustable) when the fan is commanded On. This delay allows the mechanical heating and cooling to adjust the air temperature before opening the outside dampers.

Editable

Default: 30 seconds

Outside Air Damper Open Position

Position of the damper during occupied operation. The outside damper is always closed during unoccupied operation for units with return air dampers. For units without return dampers, the outside damper must be open for occupied or unoccupied supply fan operation.

Editable

Range: 0-100%

Default: 100%

Dehumidification

Dehumidification Mode (occupied)

True when cooling mode is True and:
Space Relative Humidity is greater than the Space Relative Humidity Setpoint

OR

Outside Dewpoint is greater than the Outside Dewpoint Setpoint

Note: Outside Dewpoint is calculated from the outside relative humidity and outside temperature.

View Only

Dehumidification Night Cycle (unoccupied dehumidification mode)

True when cooling mode is True and:
Space Relative Humidity is greater than the Space Unoccupied RH Setpoint plus Deadband

OR

Space Dewpoint is greater than the Space Unoccupied Dewpoint Setpoint plus Deadband

Note: Unoccupied dehumidification can be determined by either space relative humidity or space dewpoint (selectable).

View Only

Outside Dewpoint

Calculated from the outside relative humidity and outside temperature.

View Only

Space Dewpoint

Calculated from the space relative humidity and space temperature.

View Only

Space Humidity (RH)

Determined by the space relative humidity (RH) sensor, 0-10VDC signal, connected to Universal Input 6. 0VDC = 0% RH, 10VDC = 100% RH.

View Only

Leaving Coil Setpoint

Used during dehumidification. In dehumidification, the controller attempts to maintain the leaving evaporator coil temperature at the leaving coil setpoint. Hot gas reheat is used to raise the supply air temperature to the supply air temperature setpoint. Changes to this parameter should be made only under direction from the factory.

Editable

Range: 45-55°F

Default: 50°F

Outside Dewpoint Deadband

Combined with the outside dewpoint setpoint to determine the (occupied) dehumidification mode. In the occupied mode, dehumidification is True when the outside dewpoint is greater than the outside dewpoint setpoint or the space relative humidity is greater than the space relative humidity setpoint.

Dehumidification is False when the outside dewpoint is less than the outside dewpoint setpoint minus the outside dewpoint deadband and the space relative humidity is less than the space relative humidity setpoint minus the space relative humidity deadband.

Notes: The outside dewpoint is calculated from the outside relative humidity and outside temperature. Unoccupied dehumidification can be determined based on space relative humidity or space dewpoint (selectable) but does not use outside conditions.

Editable

Range: 0-10°F

Default: 3°F

Outside Dewpoint Setpoint

Combined with the outside dewpoint deadband to determine the (occupied) dehumidification mode. In the occupied mode, dehumidification is True when the outside dewpoint is greater than the outside dewpoint setpoint or the space relative humidity is greater than the space relative humidity setpoint.

Dehumidification is False when the outside dewpoint is less than the outside dewpoint setpoint minus the outside dewpoint deadband and the space relative humidity is less than the space relative humidity setpoint minus the space relative humidity deadband.

Notes: The outside dewpoint is calculated from the outside relative humidity and outside temperature. Unoccupied dehumidification can be determined based on space relative humidity or space dewpoint (selectable) but does not use outside conditions.

Editable

Range: 30-70°F

Default: 55°F

Space RH Deadband

Combined with the space relative humidity (RH) setpoint to determine the (occupied and unoccupied) dehumidification mode. In the occupied mode, dehumidification is True when the outside dewpoint is greater than the outside dewpoint setpoint or the space relative humidity is greater than the space relative humidity setpoint. Dehumidification is False when the outside dewpoint is less than the outside dewpoint setpoint minus the outside dewpoint deadband and the space relative humidity is less than the space relative humidity setpoint minus the space relative humidity deadband.

Notes: The outside dewpoint is calculated from the outside relative humidity and outside temperature. Unoccupied dehumidification can be determined based on space relative humidity or space dewpoint (selectable).

Editable

Range: 0-10°F

Default: 3°F

Space RH Setpoint

Combined with the space relative humidity (RH) deadband to determine the (occupied and unoccupied) dehumidification mode. In the occupied mode, dehumidification is True when the outside dewpoint is greater than the outside dewpoint setpoint or the space relative humidity is greater than the space relative humidity setpoint.

Dehumidification is False when the outside dewpoint is less than the outside dewpoint setpoint minus the outside dewpoint deadband and the space relative humidity is less than the space relative humidity setpoint minus the space relative humidity deadband.

Notes: The outside dewpoint is calculated from the outside relative humidity and outside temperature. Unoccupied dehumidification can be determined based on space relative humidity or space dewpoint (selectable).

Editable

Range: 40-70°F

Default: 55°F

Space Unoccupied Dewpoint Deadband

Combined with the space unoccupied dewpoint setpoint to determine the (unoccupied) dehumidification mode. In the unoccupied mode, dehumidification is True when the space dewpoint is greater than the space unoccupied dewpoint setpoint plus the space unoccupied dewpoint deadband. Dehumidification is False when the space dewpoint is less than the space unoccupied dewpoint setpoint. Note: Unoccupied dehumidification can be determined based on space relative humidity or space dewpoint (selectable).

Editable

Range: 0-10°F

Default: 6°F

Space Unoccupied Dewpoint Setpoint

Combined with the space unoccupied dewpoint setpoint to determine the (unoccupied) dehumidification mode. In the unoccupied mode, dehumidification is True when the space dewpoint is greater than the space unoccupied dewpoint setpoint plus the space unoccupied dewpoint deadband. Dehumidification is False when the space dewpoint is less than the space unoccupied dewpoint setpoint. Note: Unoccupied dehumidification can be determined based on space relative humidity or space dewpoint (selectable).

Editable

Range: 40-80°F

Default: 53°F

Space Unoccupied RH Deadband

Combined with the space unoccupied relative humidity (RH) setpoint to determine the (unoccupied) dehumidification mode. In the unoccupied mode, dehumidification is True when the space relative humidity is greater than the space unoccupied relative humidity setpoint plus the space unoccupied relative humidity deadband. Dehumidification is False when the space relative humidity is less than the space unoccupied relative humidity setpoint.

Note: Unoccupied dehumidification can be determined based on space relative humidity or space dewpoint (selectable).

Editable

Space Unoccupied RH Setpoint

Combined with the space unoccupied relative humidity setpoint to determine the (unoccupied) dehumidification mode. In the unoccupied mode, dehumidification is True when the space relative humidity is greater than the space unoccupied relative humidity setpoint plus the space unoccupied relative humidity deadband. Dehumidification is False when the space relative humidity is less than the space unoccupied relative humidity setpoint.

Note: Unoccupied dehumidification can be determined based on space relative humidity or space dewpoint (selectable).

Editable

Unoccupied Dehumidification Control

Based on either space dewpoint or space relative humidity (selectable).

Editable

Range: Space Dewpoint, Space RH

Default: Space Dewpoint

Heating Operations

Force Heat Outside Temperature

Displays the outside air temperature. This temperature is used in conjunction with the Force Heat Setpoint to determine when the heat is forced On.

View Only

Force Heat Setpoint

Displays an outside air temperature setpoint. Heat is forced on when the outside air temperature falls below this setpoint.

View Only

Force Heat Status Percentage

Displays the percentage at which heat is enabled when it is forced On. Refer to prior Force Heat descriptions.

View Only

Force Heat Status, Electric Heat Only

True when heat is forced On for units with electric heat only (no modulating gas/water/steam heat).

View Only

Force Heat Status, Modulating Heat Only

True when heat is forced On for units with modulating heat only (no electric heat).

View Only

Force Heat Status, Modulating and Electric Heat

True when heat is forced On for units with both modulating and electric heat.

View Only

Heat Enable Command, Electric Heat

True when all compressors are off and:
Occupied heating operation or
Unoccupied heating operation or
Low supply air temperature
View Only

Heat Enable Command, Modulating Heat

True when all compressors are off and:
Occupied heating operation or
Unoccupied heating operation or
Low supply air temperature
View Only

Heat Enable, Compressor Status

True only when all compressors are off.
View Only
Heat Operation, Day is True when:
Supply fan command is True and
Occupancy mode is Occupied and
Heating mode is True and
Heating call is True
View Only

Heat Operation, Fan Command

True when:
Run/Stop input is ALLOW TO RUN
No fan alarms are present
Occupancy mode is Occupied or
Occupancy mode is Unoccupied and night heating or
cooling is needed
View Only

Heat Operation, Heating Call

True when the space/supply temperature is below the
active heating setpoint. Heating call remains True
until the space/supply temperature is at least two
degrees above the active heating setpoint for 15
consecutive minutes (adjustable).
View Only

Heat Operation, Heating Call Setpt

The active heating setpoint used by the controller.
This can be either the space temperature or supply air
temperature heating setpoint.
View Only

Heat Operation, Heating Call Temp

The active temperature used by the controller. This
can be either the space temperature or the supply air
temperature.
View Only

Heat Operation, Heating Mode

True 15 minutes after cooling mode changes to False.
The time delay is used to prevent rapid cycling
between heating and cooling modes during moderate
conditions.
View Only

Heat Operation, Low Supply

True when the supply air temperature is less than the
supply air temperature critical limit setpoint. Low
supply air temperature logic remains True until the
supply air temperature is at least five degrees above
the supply air temperature critical limit setpoint.
View Only

Heat Operation, Night

True when:
Supply fan command is True and
Occupancy mode is Unoccupied and
Heating mode is True
Heating call (unoccupied) is True
View Only

Heat Operation, Occupancy

True in the occupied mode and False in the
unoccupied mode.
View Only

Heating Percentage, Electric Heat

The amount of heating capacity being delivered by
the electric heater (0-100%). The value of the heating
percentage is zero when the supply fan status is Off.
View Only

Heating Percentage, Modulating Heat

The amount of heating capacity being delivered by
the modulating heat source (0-100%). The value of
the heating percentage is zero when the supply fan
status is Off.
View Only

PID Output, Electric Heat

The result of the proportional-integral-derivative loop
used to calculate the amount of electric heat needed.
This value is normally the same as the heating
percentage (electric heat).
View Only

PID Output, Low Limit

Calculates the amount of heat needed to raise the
supply air temperature when it is less than the supply
air temperature low limit setpoint.
View Only

PID Output, Modulating Heat

The result of the proportional-integral-derivative loop used to calculate the amount of modulating heat needed. This value is normally the same as the heating percentage (modulating heat).

View Only

PID Output, Stage 1 Electric Heat

The result of the proportional-integral-derivative loop used to calculate the amount of electric heat needed for the first stage of heating.

View Only

PID Output, Stage 2 Modulating Heat

The result of the proportional-integral-derivative loop used to calculate the amount of modulating heat needed for the second stage of heating.

View Only

PID Output, Stage 3 Electric Heat

The result of the proportional-integral-derivative loop used to calculate the amount of electric heat needed for the third stage of heating (modulating plus electric).

View Only

Supply Air Temp Low Limit Setpoint

Used for low supply air temperature logic to prevent low supply air temperatures. The low limit function is invoked when the supply air temperature is less than the supply air temperature low limit setpoint. Low supply air temperature logic remains True until the supply air temperature is at least five degrees above the supply air temperature low limit setpoint.

View Only

Supply Air Temperature

Displays the temperature of the supply air, which is used for low supply air temperature logic. Refer to the prior definition.

View Only

Heating Setup

Force Heat Output Minimum

Defines the heat capacity (in percentage) that is to be delivered when heat is forced On due to low outside air temperature.

Editable

Range: 0-100%

Default: 35%

Force Heat Setpoint

Is an outside air temperature setpoint. Heat is forced On if the outside air temperature falls below this setpoint.

Editable

Range: -100-60°F

Default: 20°F

Heat Call Off Delay

The amount of time the space/supply temperature must be above the active heating setpoint before heating call switches to False. This value should only be changed under the direction of the factory.

Editable

Default: 15 minutes

Heating Action

Used to change the operation of the modulating heat output. In Direct Action the output delivers 0VDC at 0% and 10VDC at 100% heating capacity. In Reverse Action the output delivers 10VDC at 0% and 0VDC at 100% heating capacity.

Editable

Range: Direct Action, Reverse Action

Default: Direct Action

Low Limit Setpoint

Used for low supply air temperature logic to prevent low supply air temperatures. The low limit function is invoked whenever the supply air temperature is less than the supply air temperature low limit setpoint. Low supply air temperature logic remains True until the supply air temperature is at least five degrees above the supply air temperature low limit setpoint.

Editable

Default: 60°F

Minimum Heat Output, Elec Ht

Should only be changed under the direction of the factory.

Editable

Default: 0%

Minimum Heat Output, Mod Ht

Should only be changed under the direction of the factory.

Editable

Default: 0%

Minimum Heat Output, Stage 1

Should only be changed under the direction of the factory.

Editable

Default: 0%

Minimum Heat Output, Stage 2

Should only be changed under the direction of the factory.

Editable

Default: 0%

PID Integral Time, Electric Heat

Should only be changed under the direction of the factory.

Editable

Default: 1.0

PID Integral Time, Modulating

Should only be changed under the direction of the factory.

Editable

Default: 5.0

PID Proportional Value, Electric Heat

Should only be changed under the direction of the factory.

Editable

Default: 1.0

PID Proportional Value, Modulating

Should only be changed under the direction of the factory.

Editable

Default: 5.0

PID Value to Enable Elec Ht Stage 3

Should only be changed under the direction of the factory.

Editable

Default: 95%

PID Value to Enable Gas Stage 2

Should only be changed under the direction of the factory.

Editable

Default: 95%

Supply Air Temperature Critical Limit

Used for low supply air temperature logic to prevent low supply air temperatures. Low supply air temperature logic is True when the supply air temperature is less than the supply air temperature critical limit setpoint. Low supply air temperature logic remains True until the supply air temperature is at least five degrees above the supply air temperature critical limit setpoint. This value should only be changed under the direction of the factory.

Editable

Default: 35°F

Hot Gas Reheat

Control Temperature Setpoint

Automatically calculated by the controller when configured for space temperature control with supply air temperature reset. The controller attempts to maintain the supply air temperature at the control temperature setpoint during the dehumidification mode (cooling plus hot gas reheat). The supply air cooling setpoint and supply air heating setpoint may be edited when configured for supply air temperature control.

View Only

Dehumidification Mode, Occupied

True when cooling mode is True and:
Space Relative Humidity is greater than the Space Relative Humidity Setpoint

OR

Outside Dewpoint is greater than the Outside Dewpoint Setpoint

Note: Outside Dewpoint is calculated from the Outside Relative Humidity and Temperature.

View Only

Dehumidification Mode, Unoccupied

True when cooling mode is True and:
Space Relative Humidity is greater than the Space Unoccupied Relative Humidity Setpoint plus

Deadband

OR

Space Dewpoint is greater than the Space Unoccupied Dewpoint Setpoint plus Deadband

Note: Unoccupied dehumidification can be determined by either space relative humidity or space dewpoint (selectable).

View Only

Hot Gas Reheat Output

The capacity (in percentage) being delivered by the hot gas reheat valves and coil. Hot gas reheat is controlled by dehumidification logic in an attempt to maintain the supply air temperature at setpoint.

View Only

Occupancy

Displays the occupancy status of the space. The controller displays Occupied during the day (occupied hours) and Unoccupied at night (unoccupied hours).

View Only

PID Output, Hot Gas Reheat

The calculated percentage to be delivered by the hot gas reheat. This value matches the hot gas reheat output except during the hot gas reheat purge cycles, at which time the hot gas reheat output is 100% regardless of the PID output.

View Only

Supply Air Temperature

Measured by the field-installed (factory-provided) sensor, which is located in the supply duct immediately downstream of the rooftop unit. The sensor is a thermistor (type III) and is wired to Universal Input 1 at the controller.

View Only

Supply Fan Status

Measured by the factory-installed differential switch which is used to verify fan flow. The contacts from that switch are wired to Universal Input 8 at the controller. When the contacts are closed, the fan status is True.

View Only

MHGR Purge Pct Time Per Period

Should only be changed under the direction of the factory.

Editable

Default: 98

MHGR Purge Percentage

Should only be changed under the direction of the factory.

Editable

Default: 100%

MHGR Purge Time Period

Should only be changed under the direction of the factory. Hot gas reheat purge is invoked once every 45 minutes to purge the reheat coil. In the purge mode the hot gas reheat valves are driven to 100 percent for approximately one minute (2% of 45 minutes).

Editable

Default: 45 minutes

Minimum Heat Output

Should only be changed under the direction of the factory.

Editable

Default: 0%

PID Integral Time, MHGR

Should only be changed under the direction of the factory.

Editable

Default: 0.5

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PID Proportional Value, MHGR

Should only be changed under the direction of the factory.

Editable

Default: 5.0

Setpoint Differential During Cooling

Should only be changed under the direction of the factory.

Editable

Default: 0.0°F

Job Information

Control Features

Currently not used.

Editable

Job Name

May be edited as needed.

Editable

Sales Rep

Is currently not used but may be edited as needed.

Editable

Software Version

Displays the version of the application software in the controller and should not be edited.

Editable

Default: r20

Start Up Date

Currently not used but may be edited as needed.

Editable

Start Up Tech

Currently not used but may be edited as needed.

Editable

Unit Number

Currently not used but may be edited as needed.

Editable

Warranty Start Date

Currently not used but may be edited as needed.

Editable

Manual Overrides

Damper End Switch

Displays the status of the damper end switch. When the damper end switch is True, at least one of the dampers (outside or return) is sufficiently open for air flow. On units with only outside air dampers (no return dampers), the supply fan is permitted to operate only when the damper end switch is made (True).

View Only

Supply Fan Status

Measured by the factory installed fan flow-proving differential switch. The contacts from that switch are wired to Universal Input 8 at the controller. When the contacts are closed, the fan status is True.

View Only

Output Control

Used to change the control of the outputs between Auto and Override. In Auto, the outputs of the controller are driven by the control logic in the controller. In Override, the outputs of the controller are driven Off (digital) and to 0% (analog). At that point, the outputs can be individually controlled to the desired state for test purposes. Output control automatically returns to Auto after two hours.

Editable

Range: Auto, Override

Default: Auto

Supply Fan

Used to override the supply fan of the unit. When output control is changed to Override, all outputs of the controller are driven Off (digital) and to 0% (analog). To manually override the control of the fan, change the supply fan to On. The supply fan percentage (speed) may also be adjusted as needed. The supply fan automatically returns to Auto after 90 minutes or when output control is Auto.

Editable

Range: Off, On

Default: Off

Fan Speed Pct

Used to override the supply fan percentage (speed). When output control is changed to Override, all outputs of the controller are driven Off (digital) and to 0% (analog). To manually override the control of the fan, change the supply fan to On. The supply fan percentage (speed) may be adjusted as needed. The supply fan automatically returns to Auto after 90 minutes or when output control is Auto.

Editable

Range: 50-100%

Default: 100%

Outside Damper Position

Used to adjust the outside damper position while the outputs are controlled in Override. The default damper position in override is 100%. The outside damper automatically returns to Auto after 90 minutes or when output control is Auto. The outside damper may only be overridden if the fan status is True.

Editable

Range: 0-100%

Default: 100%

Compressor 1

Used to override the output for compressor 1. When output control is changed to Override, all outputs of the controller are driven Off (digital) and to 0% (analog). To manually override the control of the compressor 1 output, change compressor 1 to On. The compressor 1 output automatically returns to Auto after 60 minutes or when output control is Auto. Compressor overrides are only possible when the supply fan status is True and when all heat is off.

Editable

Range: Off, On

Default: Off

Compressor 2

Used to override the output for compressor 2. When output control is changed to Override, all outputs of the controller are driven Off (digital) and to 0% (analog). To manually override the control of the compressor 2 output, change compressor 2 to On. The compressor 2 output automatically returns to Auto after 60 minutes or when output control is Auto. Compressor overrides are only possible when the supply fan status is True and when all heat is off.

Editable

Range: Off, On

Default: Off

Compressor 3

Used to override the output for compressor 3. When output control is changed to Override, all outputs of the controller will be driven Off (digital) and to 0% (analog). To manually override the control of the compressor 3 output, change compressor 3 to On. The compressor 3 output automatically returns to Auto after 60 minutes or when output control is Auto. Compressor overrides are only possible when the supply fan status is True and when all heat is off.

Editable
Range: Off, On
Default: Off

Compressor 4

Used to override the output for compressor 4. When output control is changed to Override, all outputs of the controller are driven Off (digital) and to 0% (analog). To manually override the control of the compressor 4 output, change compressor 4 to On. The compressor 4 output automatically returns to Auto after 60 minutes or when output control is Auto. Compressor overrides are only possible when the supply fan status is True and when all heat is off.

Editable
Range: Off, On
Default: Off

Hot Gas Reheat

Used to override the output for hot gas reheat. When output control is changed to Override, all outputs of the controller are driven Off (digital) and to 0% (analog). To manually override the control of the hot gas reheat, change hot gas reheat to On and edit the hot gas reheat percentage as needed. The hot gas reheat output automatically returns to Auto after 30 minutes or when output control is Auto. Hot gas reheat overrides are only possible when the compressor 1 is on.

Editable
Range: Off, On
Default: Off

Hot Gas Reheat Percentage

Used to override the percentage of the hot gas reheat. When output control is changed to Override, all outputs of the controller are driven Off (digital) and to 0% (analog). To manually override the control of the hot gas reheat, change hot gas reheat to On and edit the hot gas reheat percentage as needed. The hot gas reheat output automatically returns to Auto after 30 minutes or when output control is Auto. Hot gas reheat overrides are only possible when the compressor 1 is on.

Editable
Range: 0-100%
Default: 100%

Electric Heat

Used to override the output for electric heat. When output control is changed to Override, all outputs of the controller are driven Off (digital) and to 0% (analog). To manually override the control of the electric heat, change electric heat to On and edit the electric heat percentage as needed. The electric heat output automatically returns to Auto after 30 minutes or when output control is Auto. Electric heat overrides are only possible when the supply fan status is True and all compressors are off.

Editable
Range: Off, On
Default: Off

Electric Heat Percentage

Used to override the percentage of the electric heat. When output control is changed to Override, all outputs of the controller are driven Off (digital) and to 0% (analog). To manually override the control of the electric heat, change electric heat to On and edit the electric heat percentage as needed. The electric heat output automatically returns to Auto after 30 minutes or when output control is Auto. Electric heat overrides are only possible when the supply fan status is True and all compressors are off.

Editable
Range: 0-100%
Default: 100%

Modulating Heat

Used to override the output for modulating heat. When output control is changed to Override, all outputs of the controller are driven Off (digital) and to 0% (analog). To manually override the control of the modulating heat, change modulating heat to On and edit the modulating heat percentage as needed. The modulating heat output automatically returns to Auto after 30 minutes or when output control is Auto. Modulating heat overrides are only possible when the supply fan status is True and all compressors are off.

Editable
Range: Off, On
Default: Off

Modulating Heat Percentage

Used to override the percentage of the modulating heat. When output control is changed to Override, all outputs of the controller are driven Off (digital) and to 0% (analog). To manually override the control of the modulating heat, change modulating heat to On and edit the modulating heat percentage as needed. The modulating heat output automatically returns to Auto after 30 minutes or when output control is Auto. Modulating heat overrides are only possible when the supply fan status is True and all compressors are off.

Editable
Range: 0-100%
Default: 100%

Sensors

Coil Leaving Temperature

Measured with a thermistor (type III) factory installed at the discharge side of the evaporator coil. The sensor is wired to Universal Input 2 on the controller.

View Only

Coil Leaving Temperature Calibrated

The result of the measured coil leaving temperature plus/minus any offset applied with the coil leaving temperature offset parameter.

View Only

Duct Static Pressure Calibrated

The result of the measured duct static pressure plus/minus any offset applied with the duct static pressure offset parameter.

View Only

Duct Static Pressure Sensor

Displays the interpreted value of the voltage read from the duct static pressure sensor. The duct static pressure sensor should be field installed approximately 2/3 down the supply duct. The output signal from the sensor must be 0-10 VDC. The duct static pressure sensor, when used, must be connected to Universal Input 14 on the controller. For the sensor voltage to be interpreted correctly, the conversion scale and offset values must be set up correctly for that device (refer to the Appendix).

View Only

Outside Air Relative Humidity

Measured by the factory installed RH sensor located under the weather hood near the outside air dampers of the unit. The sensor provides a 0-10 VDC signal to the controller, Universal Input 5, that corresponds to the outside relative humidity: 0 VDC = 0% RH, 10 VDC = 100% RH.

View Only

Outside Air Relative Humidity Calibrated

The result of the measured outside air relative humidity plus/minus any offset applied with the outside air relative humidity offset.

View Only

Outside Air Temperature

Measured by the factory installed sensor located under the weather hood near the outside air dampers of the unit. The sensor is a thermistor (type III) and is wired to Universal Input 3 at the controller.

View Only

Outside Air Temperature Calibrated

The result of the measured outside air temperature plus/minus any offset applied with the outside air temperature offset.

View Only

Space Relative Humidity

Measured by the field installed RH sensor located in the space/room served by the rooftop unit. That sensor provides a 0-10 VDC signal to the controller, Universal Input 6, that corresponds to the space relative humidity: 0 VDC = 0% RH, 10 VDC = 100% RH.

View Only

Space Relative Humidity Calibrated

The result of the measured space relative humidity plus/minus any offset applied with the space relative humidity offset.

View Only

Space Static Pressure Calibrated

The result of the measured space static pressure plus/minus any offset applied with the space static pressure offset parameter.

View Only

Space Static Pressure Sensor

Displays the interpreted value of the voltage read from the space static pressure sensor. The space static pressure sensor should be field installed in the space/room served by the rooftop unit. The output signal from the sensor must be 0-10 VDC. The space static pressure sensor, when used, must be connected to Universal Input 14 on the controller. For the sensor voltage to be interpreted correctly, the conversion scale and offset values must be set up correctly for that device (refer to the Appendix).

View Only

Space Temperature

Measured by the field installed (factory provided) sensor located in the space/room served by the rooftop unit. The sensor is a thermistor (type III) and is wired to Universal Input 4 at the controller.

View Only

Space Temperature Calibrated

The result of the measured space temperature plus/minus any offset applied with the space temperature offset.

View Only

Supply Air Temperature

Measured by the field installed (factory provided) sensor located in the supply duct immediately downstream of the rooftop unit. The sensor is a thermistor (type III) and is wired to Universal Input 1 at the controller.

View Only

Supply Air Temperature Calibrated

The result of the measured supply air temperature plus/minus any offset applied with the supply air temperature offset.

View Only

Supply Fan Status

Measured by the factory installed fan flow-proving differential switch. The contacts from that switch are wired to Universal Input 8 at the controller. When the contacts are closed, the fan status is True.

View Only

Unit Shutdown Input

Used in conjunction with a field installed shutdown device to disable the entire rooftop unit. The contacts from that device are wired to Universal Input 16 at the controller. When the contacts from that device are open, the unit shutdown input is Shutdown and unit operation is disabled.

View Only

Coil Leaving Temperature Offset

Applied to the evaporator coil leaving temperature for calibration. The result is reported in the coil leaving temperature calibrated value.

Editable

Range: -10 to 10°F

Default: 0°F

Duct Static Pressure Offset

Applied to the duct static pressure sensor value for calibration. The result is reported in the duct static pressure calibrated value.

Editable

Range: -10 to 10 in. w.c

Default: 0 in. w.c.

Outside Air Relative Humidity Offset

Applied to the outside air relative humidity sensor value for calibration. The result is reported in the outside air relative humidity calibrated value.

Editable

Range: -20 to 20%

Default: 0%

Outside Air Temperature Offset

Applied to the outside air temperature sensor value for calibration. The result is reported in the outside air temperature calibrated value.

Editable

Range: -20 to 20°F

Default: 0F

Space Relative Humidity Offset

Applied to the space relative humidity sensor value for calibration. The result is reported in the space relative humidity calibrated value.

Editable

Range: -20 to 20%

Default: 0%

Space Static Pressure Offset

Applied to the space static pressure sensor value for calibration. The result is reported in the space static pressure calibrated value.

Editable

Range: -10 to 10 in. w.c

Default: 0 in. w.c.

Space Temperature Offset

Applied to the space temperature sensor value for calibration. The result is reported in the space temperature calibrated value.

Editable

Range: -20 to 20°F

Default: 0°F

Static Pressure Sensor Scale

Man be edited based on the sensor used. Refer to the Appendix for more information.

Editable

Default: n/a

Supply Air Temperature Offset

Applied to the supply air temperature sensor value for calibration. The result is the Supply Air Temperature Calibrated value.

Editable

Range: -20 to 20°F

Default: 0°F

Setpoints and Schedules

Control Cooling Setpoint

The active supply air cooling setpoint. In cooling or dehumidification mode, the controller attempts to maintain the supply air temperature at the control cooling setpoint. The control cooling setpoint is automatically calculated by the controller when configured for space temperature control with supply air temperature reset. The supply air cooling setpoint and supply air heating setpoint may be edited when configured for supply air temperature control.

View Only

Control Heating Setpoint

The active supply air heating setpoint. In heating mode, the controller attempts to maintain the supply air temperature at the control heating setpoint. The control heating setpoint is automatically calculated by the controller when configured for space temperature control with supply air temperature reset. The supply air cooling setpoint and supply air heating setpoint may be edited when configured for supply air temperature control.

View Only

Integrator has Enabled Network Values

Currently not used by the controller.

View Only

Occupancy

Displays Occupied during the day (occupied hours) and Unoccupied and night (unoccupied hours). The occupancy of the controller is determined by:

- Hardwired occupancy input
- Local time clock/schedule
- Communicated command from building automation system

When a hardwired occupancy input is used, remove the occupancy input jumper wire on Universal Input 15. Connect the occupancy device to that input. The setup parameter for Occupancy Hardwired must be set to True.

The occupancy can also be determined by the local time clock/schedule in the controller. When the local clock/schedule is used, set Occupancy Hardwired to False. Ensure that the time and date are set correctly in the controller.

Finally, a communicated command from a building automation system (BAS) can be used to determine the occupancy of the controller. When a communicated command is to be used, set Occupancy Hardwired to False. Communication is possible via several communication protocols including LonTalk, BACnet IP, BACnet Ethernet, and BACnet MS/TP.

View Only

Occupancy Input

Represents the status of the hardwired occupancy input, Universal Input 15 on the controller. When the hardwired occupancy input is Closed, the input is Occupied. When the hardwired occupancy input is Open, the input is Unoccupied.

View Only

Occupancy Standalone Plus Integration

Represents the status of the standalone (local) schedule and the communicated signal from an integrated automation system. When Occupancy Standalone Plus Integration is True, the result is Occupied. When Occupancy Standalone Plus Integration is False, the result is Unoccupied.

View Only

Occupancy Standalone Schedule

Represents the status of the standalone (local) schedule. When Occupancy Standalone Schedule is True, the result is Occupied. When Occupancy Standalone Schedule is False, the result is Unoccupied.

View Only

Space Occupied Cooling Setpoint

Determined by adding half of the Occupied Space Setpoint Deadband to the Occupied Space Setpoint.
View Only

Space Occupied Heating Setpoint

Determined by subtracting half of the Occupied Space Setpoint Deadband from the Occupied Space Setpoint.
View Only

Supply Air Temperature

Measured by the field installed (factory provided) sensor, located in the supply duct immediately downstream of the rooftop unit. The sensor is a thermistor (type III) and is wired to Universal Input 1 at the controller.
View Only

Supply Air Temperature High Alarm

Displays an alarm condition for the supply air temperature. When the measured supply air temperature is greater than the supply air temperature high alarm setpoint (110°F adjustable), the high alarm is True. When the supply air temperature falls at least five degrees below the high alarm setpoint, the high alarm is False. This alarm does not affect unit operation.
View Only

Supply Air Temperature Low Alarm

Displays a low temperature alarm for the supply air temperature. When the measured supply air temperature is less than the supply air temperature low alarm setpoint (35°F adjustable), the low alarm is True. When the supply air temperature rises at least ten degrees above the low alarm setpoint, the low alarm is False.
View Only

Occupancy Hardwired

Must be False if the occupancy is determined either by the local time clock/schedule or a network command (LonTalk, BACnet, etc.). Occupancy Hardwired must be True if the occupancy is to be determined by the hardwired occupancy input - Universal Input 15 on the controller.
Editable
Range: False, True
Default: False

Occupied Space Setpoint

Plus half of the Occupied Space Setpoint Deadband is the Space Occupied Cooling Setpoint. The Occupied Space Setpoint minus half of the deadband is the Space Occupied Heating Setpoint.
Editable
Range: 50-95°F
Default: 71.5°F

Occupied Space Setpoint Deadband

Combined with the Occupied Space Setpoint to derive the Space Occupied Cooling Setpoint and the Space Occupied Heating Setpoint. Refer to the prior definition.
Editable
Range: 0-10°F
Default: 3°F
Ready to Receive Network Values is currently not used by the controller.
Editable
Range: True, False
Default: False

Space Temperature High Limit

Currently not used by the controller.
Editable
Default: 100°F

Space Temperature Low Limit

Currently not used by the controller.
Editable
Default: 35°F

Supply Air Temp Cooling High Limit

Defines the maximum supply air temperature setpoint used in the cooling mode, when space temperature control with supply air temperature reset is used. This setpoint limit is not used during supply air temperature control (no reset).
Editable
Range: 50-110°F
Default: 75°F

Supply Air Temp Cooling Low Limit

Defines the minimum supply air temperature setpoint used in the cooling mode, when space temperature control with supply air temperature reset is used. This setpoint limit is not used during supply air temperature control (no reset).
Editable
Range: 50-110°F
Default: 55°F

Supply Air Temp Heating High Limit

Defines the maximum supply air temperature setpoint used in the heating mode, when space temperature control with supply air temperature reset is used. This setpoint limit is not used during supply air temperature control (no reset).

Editable

Range: 50-110°F

Default: 95°F

Supply Air Temp Heating Low Limit

Defines the minimum supply air temperature setpoint used in the heating mode, when space temperature control with supply air temperature reset is used. This setpoint limit is not used during supply air temperature control (no reset).

Editable

Range: 50-110°F

Default: 60°F

Supply Air Temp High Alarm Setpoint

Displays an alarm condition for the supply air temperature. When the measured supply air temperature is greater than the supply air temperature high alarm setpoint (110°F, adjustable), the high alarm is True. When the supply air temperature falls at least five degrees below the high alarm setpoint, the high alarm is False. This alarm does not affect unit operation.

Editable

Default: 110°F

Supply Air Temp Low Alarm Setpoint

Displays an alarm condition for the supply air temperature. When the measured supply air temperature is less than the supply air temperature low alarm setpoint (35°F, adjustable), the low alarm is True. When the supply air temperature rises at least ten degrees above the low alarm setpoint, the low alarm is False.

Editable

Default: 35°F

Supply Cooling Setpoint

The supply air temperature setpoint is the cooling mode when supply air temperature control is used (no space temperature reset).

Editable

Range: 50-90°F

Default: 55°F

Supply Heating Setpoint

The supply air temperature setpoint is the heating mode when supply air temperature control is used (no space temperature reset).

Editable

Range: 50-90°F

Default: 68°F

Supply or Space Temperature Control

Displays the control sequence for the unit controller.

In supply air temperature control, the unit can be configured for supply air temperature control or space temperature control with supply air reset.

Note: Most control sequences use supply temperature control. Consult the factory for space temperature control sequences (no supply air temperature reset).

Editable

Range: Supply, Space

Default: Supply

Supply or Supply w/ Reset Control

Displays the temperature control mode. In supply air temperature control, the unit attempts to control the supply air temperature at fixed heating and cooling setpoints (adjustable). In space temperature control with supply air temperature reset, the unit compares the space temperature to the space temperature heating setpoint and cooling setpoint to calculate the supply air temperature setpoint. The unit then modulates heating and cooling to maintain the supply air temperature at the setpoint, which automatically varies.

Editable

Range: Supply, Supply w/ Reset

Default: n/a

System Enable

Must be True for normal unit operation. When system enable is False, the unit is completely disabled and will not operate.

Editable

Range: True, False

Default: True

Unoccupied Space Cooling Deadband

(5°F, adjustable) Combined with the space unoccupied cooling setpoint (80°F, adjustable) to determine unoccupied cooling operation. During unoccupied operation, cooling is enabled when the space temperature is above the space unoccupied cooling setpoint plus the deadband. Cooling is disabled when the space temperature is less than the space unoccupied cooling deadband.

Editable

Range: 0-10°F

Default: 5°F

Unoccupied Space Cooling Setpoint

(80°F, adjustable) is combined with the space unoccupied cooling deadband (5°F, adjustable) to determine unoccupied cooling operation. During unoccupied operation, cooling is enabled when the space temperature is above the space unoccupied cooling setpoint plus the deadband. Cooling is disabled when the space temperature is less than the space unoccupied cooling deadband.

Editable

Range: 50-90°F

Default: 80°F

Unoccupied Space Heating Deadband

(5°F, adjustable) is combined with the space unoccupied heating setpoint (60°F, adjustable) to determine unoccupied heating operation. During unoccupied operation, heating is enabled when the space temperature is below the space unoccupied heating setpoint. Heating is disabled when the space temperature is greater than the space unoccupied heating setpoint plus the deadband.

Editable

Range: 0-10°F

Default: 5°F

Unoccupied Space Heating Setpoint

(60°F, adjustable) is combined with the space unoccupied heating deadband (5°F, adjustable) to determine unoccupied heating operation. During unoccupied operation, heating is enabled when the space temperature is below the space unoccupied heating setpoint. Heating is disabled when the space temperature is greater than the space unoccupied heating setpoint plus the deadband.

Editable

Range: 45-90°F

Default: 60°F

Standalone Schedule Override

Displays and overrides the schedule in the controller. To edit the times, scroll down to Schedules. Click on the double arrows to expand the Schedules section. Edit the start and stop times as needed, then press Save.

Editable

Defaults: (All Days) 5:00 AM to 11:00 PM

Supply Fan

Low Supply Air Temperature Alarm

True in heating mode when the measured supply air temperature is less than the supply air temperature low alarm setpoint (35°F, adjustable). The supply fan is then controlled Off (alarm condition) and must be manually reset. (Refer to Reset SAT Low Temp Alarm.) The low alarm is False when the supply air temperature rises at least ten degrees above the low alarm setpoint.

View Only

Range: True, False

Night Cycle for Cooling

True when the supply fan is commanded On for cooling operation in unoccupied mode.

View Only

Range: True, False

Night Cycle for Dehumidification

True when the supply fan is commanded On for dehumidification operation in unoccupied mode.

View Only

Range: True, False

Night Cycle for Heating

True when the supply fan is commanded On for heating operation in unoccupied mode.

View Only

Range: True, False

Occupancy

Displays Occupied during the day (occupied hours) and Unoccupied at night (unoccupied hours).

View Only

Supply Fan Command

True when:

Run Stop Input (hardwired) is AllowToRun and

System enable is True and

All fan alarms are False and

Duct static pressure high limit is False (duct static VAV units) and

Occupancy is True (occupied) or

Night operation is True (night heating, cooling, or dehumidification)

View Only

Range: True, False

Supply Fan Speed

Displays the defined speed for the supply fan. The rooftop unit includes a variable frequency drive (VFD) for the supply fan motor. In constant volume operation, the speed of the fan remains constant at the defined speed (0-100%, adjustable). At 100%, the fan speed is determined according to the setup of the VFD (the design frequency, in Hz). The speed of the supply fan may be slowed for constant volume operation by adjusting the supply fan speed in the controller (50-100%). The minimum speed must not be less than 50% of the design flow to ensure proper heating and cooling operation.

For variable air volume (VAV) applications, the speed of the fan is automatically determined by the controller (50-100%).

Editable

Range: 50-100%

Default: 100%

Supply Fan Status

Reflects the status of the differential pressure switch for the supply fan (Universal Input 8). When the input contacts are closed, the supply fan status is True. When the input contacts are open, the supply fan status is False.

View Only

Range: True, False

Supply Fan Status Alarm

True when the supply fan is commanded On and the supply fan status is False for 30 consecutive seconds. The supply fan status alarm is automatically reset when the supply fan status changes to True.

View Only

Unit Alarm Output

Displays the status of the unit alarm output (Digital Output 9) of the controller. This output is Alarm (LED is on) when any of the following conditions is True:

Supply Fan Status Alarm: Fan commanded On but fan status is False

Supply Air Temperature Low Limit: Supply air temperature falls below the low limit setpoint (35°F, adjustable)

Dirty Filter: Filter status input is True (high differential pressure across the filters)

Unit Shutdown: Shutdown input contacts are open

Duct Static High Limit: For VAV applications, when the duct static pressure exceeds duct static pressure high limit (2.5 in. w.c., adjustable)

View Only

Range: Normal, Alarm

Unit Shutdown Input

Displays the status of the unit shutdown input (Universal Input 16) of the controller. When the input contacts are closed the unit is allowed to run. When the input contacts are open, shutdown is initiated (supply fan off, all heating and cooling off, outside air damper closed).

View Only

Range: AllowToRun, Shutdown

Reset SAT Low Temp Alarm

Resets the low supply air temperature alarm. To initiate the reset, press the Reset button on the screen. Also refer to Low Supply Air Temperature Alarm.

Editable

Supply Fan Off Delay Time

Should only be changed under the direction of the factory. Under normal control, when fan operation is no longer required, a three-minute delay is imposed to allow ample time for the unit to blow off any remaining heating and/or cooling energy. When any of the shutdown conditions is initiated, such as the unit shutdown input, the fan is immediately controlled Off.

Editable

Default: 3 minutes

Supply Fan VFD Status

Duct Static Pressure

Displays the reading from the duct static pressure sensor. For variable air volume (VAV) applications, the duct static pressure sensor (0-10 VDC signal) must be connected to Universal Input 14 of the controller. The scale and offset of the sensor input must be correctly configured based on the signal and corresponding pressure values of that sensor.

View Only

Space Static Pressure

Displays the reading from the space static pressure sensor. For variable air volume (VAV) applications, the space static pressure sensor (0-10 VDC signal) must be connected to Universal Input 14 of the controller. The scale and offset of the sensor input must be correctly configured based on the signal and corresponding pressure values of that sensor.

View Only

Supply Fan VFD Speed Control Signal

The calculated fan speed based on the variable air volume (VAV) algorithm. For VAV applications, the speed of the supply fan is varied to maintain the measured duct static pressure or space static pressure at setpoint.

View Only

Range: 50-100%

Default: n/a

Duct Static Alarm

Indicates Alarm if the measured duct static pressure is greater than the duct static high limit. The duct static alarm is returned to Normal when the duct static pressure is less than the high limit for 15 consecutive minutes.

View Only

Range: Alarm, Normal

Static Pressure Setpoint

Edits the setpoint for the duct or space static pressure. Also refer to Supply Fan VFD Speed Control Signal.

Editable

Range: -2.0 to 8.0 in. w.c.

Default: 0.07 in. w.c. (space pressure applications), 1.5 in. w.c. (duct static applications)

Duct Static Control Gain (Output/Throttling Range)

Should only be changed under the direction of the factory.

Editable

Default: 1.0

Space Static Control Gain (Output/Throttling Range)

Should only be changed under the direction of the factory.

Editable

Default: 5.0

Duct Static Control Reset (Rate/Minute)

Should only be changed under the direction of the factory.

Editable

Default: 12.0

Space Static Control Reset (Rate/Minute)

Should only be changed under the direction of the factory.

Editable

Default: 12.0

Duct Static Maximum Control Signal Output Set Point

Should only be changed under the direction of the factory.

Editable

Default: 100.0

Space Static Maximum Control Signal Output Set Point

Should only be changed under the direction of the factory.

Editable

Default: 100.0

Duct Static Minimum Control Signal Output Set Point

Should only be changed under the direction of the factory.

Editable

Default: 50.0

Space Static Minimum Control Signal Output Set Point

Should only be changed under the direction of the factory.

Editable

Default: 50.0

Duct Static High Limit

Edits the high limit for the duct static pressure, which is used to determine any alarm condition. Also refer to Duct Static Alarm.

Editable

Range: 0.0 to 8.0 in. w.c.

Default: 2.5 in. w.c.

Duct Alarm Off Delay

Should only be changed under the direction of the factory.

Editable

Default: 15 minutes

BACnet IP Communication Guide

In order to complete the communication integration through BACnet IP, BACnet MSTP, or LonTalk, a Windows-based computer with a factory-provided Universal Maintenance Tool (UMT) software is required. The UMT software is provided with a CD included in the control panel of the unit or is available for download at <http://208.116.12.42/umt.exe>.

Connecting to the Controller

14. Install the Universal Maintenance Tool (UMT) software on the computer being used to communicate with the controller.
15. Connect the computer and the microprocessor controller with the use of an ethernet cable. Computer should be connected through an ethernet port and the controller through the Web Server port as shown in Figure 1.

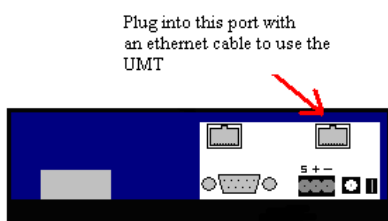


Figure 1

16. Configure the network settings in the computer to the default addresses stored in the controller as programmed from the factory:

Default IP	192.168.1.100
Default Gateway	192.168.1.1
Subnet Mask	255.255.255.0

17. Start the UMT software program on the computer. Upon start-up, UMT will check for JeneSys-based controllers on current network.
18. Once the desired controller is identified, double-click on the controller name to continue (see Figure 2).

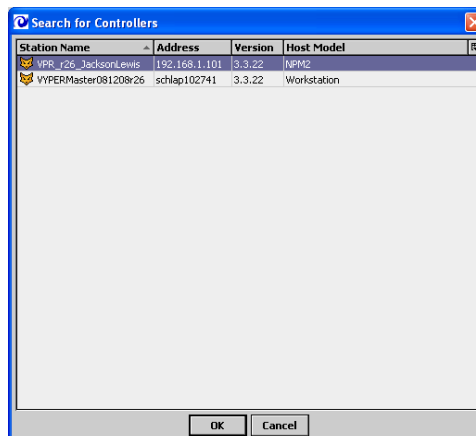


Figure 2

19. With a controller selected, a password screen will appear (Figure 3). Enter the following items where appropriate:

IP Address	192.168.1.101
Platform Port	3011
Platform Username	tridium
Platform Password	niagara
Fox Port	1911
Fox Username	admin
Fox Password	[leave blank]

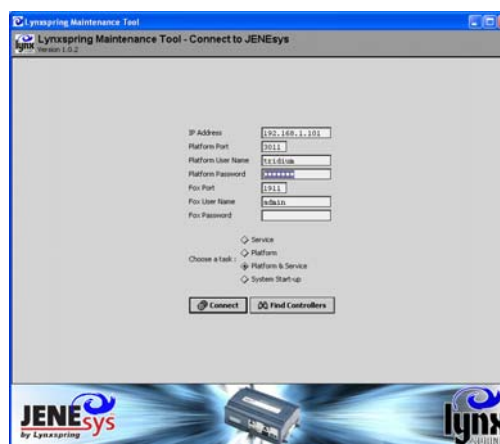


Figure 3

20. Click on the "Connect" button to establish the connection between the computer (via UMT) and the controller.

Modifying BACnet IP Settings

Once communication has been established between the UMT and the controller (see *Connecting to the Controller*), the default settings can be accessed and modified.

General BACnet Settings

- After establishing a connection to the controller using the UMT, select the "BACnet Network" tab in the UMT menu.
- The following default values are preprogrammed into the controller but can be changed in this menu (Figure 4):

BACnet Object ID	11
Network Number:	1
BACnet Adapter	Ethernet Adapter NET1
UDP Port	0xBAC0
BACnet IP Device Type	Standard
BACnet BBMD Address	Null

- Once any desired changes are made to these settings, click on the "Save" button.
- Click on the "Enable" button to turn on BACnet communication.

IP Address

- After establishing a connection to the controller using the UMT, select the "Platform & Service" tab in the UMT menu (Figure 5).
- Select "Interface 1" from the menu to access the IP address settings. To save changes, click on the "Save TCP/IP" button.

Wiring to BACnet IP

The connection for BACnet IP is located on the bottom edge of the controller as illustrated in Figure 6.



Figure 4



Figure 5

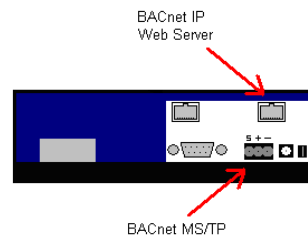


Figure 6

BACnet IP Points List

Analog Values

Instance	Object Type	Read/Write	Object Name	Description	Default	Min	Max
0	AV	R	CoolCoilTemp	Calibrated Cooling Coil Temp	-	-	-
1	AV	R/W	UnnOccHtgSP	Unoccupied Heating Setpoint	60	45	90
2	AV	R	OutdoorRH	Outdoor Air Relative Humidity	-	-	-
3	AV	R	SpaceRH	Space Relative Humidity	-	-	-
4	AV	R	SpaceTemp	Space Temperature	-	-	-
5	AV	R	SupplyAirTemp	Supply Air Temperature	-	-	-
6	AV	R	OADamper	Outside Damper Position	-	-	-
7	AV	R	EffectSetpt	Units effective setpoint	-	-	-
8	AV	R	HeatSecondary	Electric Heat Percentage	-	-	-
9	AV	R	HeatPrimary	Modulating Heat Percentage	-	-	-
10	AV	R	HotGasOutput	Hot Gas Reheat Valve Position	-	-	-
11	AV	R	OADewpoint	Outside Air Dewpoint	-	-	-
12	AV	R/W	OADewptStpt	Outside Air Dewpoint Stpt	55	40	80
13	AV	R/W	EF_VFD_Offset	Exhaust Fan VFD Offset	0	-20	20
14	AV	R/W	Setpoint	Occupied Space Setpoint	72	50	95
15	AV	R/W	SpaceRHSetpt	Space Humidity Setpoint	55	40	70
16	AV	R/W	SupCoolingSP	Supply Cooling Setpoint	55	50	90
17	AV	R/W	SupHeatingSP	Supply Heating Setpoint	68	50	90
18	AV	R/W	UnOccClgSp	Unoccupied Cooling Setpoint	80	50	90
19	AV	R/W	UnOccDewptSP	Unoccupied Dewpoint Setpoint	53	40	80
20	AV	R	FanOutput	Supply Fan Speed	-	-	-
21	AV	R/W	UnOccRHsetpt	Unoccupied Humidity Setpoint	55	0	100
22	AV	R/W	NetSpaceTemp	Space Temperature Input	NA	0	100
23	AV	R/W	NetSpaceRH	Space RH Input	NA	0	100
24	AV	R	ExhaustTemp	Exhaust Temp	-	-	-
25	AV	R/W	HWFrstPrctSP	Heat Wheel Frost Protect Setpoint	20	0	45
26	AV	R	ExhaustFanSpeed	Exhaust Fan VFD Speed	-	-	-
27	NA	NA	NA	For factory use only	-	-	-
28	AV	R/W	NetSpaceCO2	CO2 From Net	0	0	9999
29	AV	R/W	CO2_Sp	CO2 High Limit Setpoint	700	0	2000
30	AV	R/W	CO2_DamperPos	High CO2 Damper Position	100	0	100
31	AV	R/W	NetStatic	Network Static Pressure	NA	-5	5
32	AV	R/W	StaticSP	Static Pressure Setpoint	0.7	-2	8
33	AV	R	OutdoorTemp	Outdoor Air Temperature	-	-	-
34	AV	R	RADamper	Return Air Damper Position	-	-	-
35	AV	R	StaticPress	Static Pressure	-	-	-
36	AV	R	CO2	Space CO2	-	-	-
37	AV	R/W	FanSpeed	Net Fan Speed	NA	50	100
38	AV	R/W	MinOADamperPos	Minimum Outside Air Damper Position	100	0	100
39	AV	R/W	AFMS_setpt	IAQ Damper Flow Setpoint	0	0	20000
40	AV	R	IAQDmprPos	IAQ Damper Position	-	-	-
41	AV	R	DuctStatic	Duct Static Pressure	-	-	-
42	AV	R/W	NetDuctStatic	Net Duct Static Pressure	NA	-5	5
43	AV	R/W	DuctStaticSetpt	Duct Static Setpoint	1	-2	8
44	AV	R	HW_VFD_Spd	Heat Wheel VFD Speed	-	-	-

Binary Values

Instance	Object Type	Read/Write	Object Name	Description	Default	Min	Max
0	BV	R	FanStatus	Supply Fan Status	-	-	-
1	BV	R	DamperOpen	OA Damper End Switch	-	-	-
2	BV	R	HPC_A	High Pressure Cutout A	-	-	-
3	BV	R	HPC_B	High Pressure Cutout B	-	-	-
4	BV	R	LPC_A	Low Pressure Cutout A	-	-	-
5	BV	R	LPC_B	Low Pressure Cutout B	-	-	-
6	BV	R	EffectOccup	Occupancy State	-	-	-
7	BV	R	SF_SS	Supply Fan Start Stop	-	-	-
8	NA	NA	NA	For factory use only	-	-	-
9	BV	R	Compr1Status	Compressor 1 Start Stop	-	-	-
10	BV	R	Compr2Status	Compressor 2 Start Stop	-	-	-
11	BV	R	Compr3Status	Compressor 3 Start Stop	-	-	-
12	BV	R	Compr4Status	Compressor 4 Start Stop	-	-	-
13	BV	R/W	OccSchedule	Net In Schedule	NA	-	-
14	BV	R	DehumidMode	Dehumidification Mode	-	-	-
15	NA	NA	NA	For factory use only	-	-	-
16	BV	R	in_alarm	Alarm Output	-	-	-
17	BV	R	FilterStatus	Filter Status	-	-	-
18	BV	R	ExhaustFanStat	Exhaust Fan Status	-	-	-
19	BV	R	ExhaustFanSS	Exhaust Fan Start Stop	-	-	-
20	BV	R	HeatWheelSS	Heat Wheel Start Stop	-	-	-
21	BV	R/W	ResetLockout	Reset After Alarm Lockout	FALSE	-	-
22	NA	NA	NA	For factory use only	-	-	-
23	NA	NA	NA	For factory use only	-	-	-
24	NA	NA	NA	For factory use only	-	-	-
25	BV	R	RunStopInput	Shutdown Input	-	-	-
26	BV	R	LowLimit	Low Limit Output	-	-	-
27	NA	NA	NA	For factory use only	-	-	-
28	BV	R	SF_Alarm	Supply Fan Alarm	-	-	-
29	BV	R	EF_Alarm	Exhaust Fan Alarm	-	-	-
30	BV	R	DuctHighLimit	Duct High Limit	-	-	-
39	BV	R/W	EconoLockout	Allows Economizer mode when OA Enthalpy is less than Space Enthalpy	FALSE	-	-

BACnet MSTP Communication Guide

In order to complete the communication integration through BACnet IP, BACnet MSTP, or LonTalk, a Windows-based computer with a factory-provided Universal Maintenance Tool (UMT) software is required. The UMT software is provided with a CD included in the control panel of the unit or is available for download at <http://208.116.12.42/umt.exe>.

Connecting to the Controller

27. Install the Universal Maintenance Tool (UMT) software on the computer being used to communicate with the controller.
28. Connect the computer and the microprocessor controller with the use of an ethernet cable. Computer should be connected through an ethernet port and the controller through the Web Server port as shown in Figure 1.

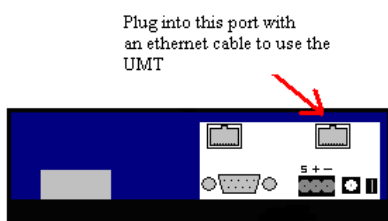


Figure 1

29. Configure the network settings in the computer to the default addresses stored in the controller as programmed from the factory:

Default IP	192.168.1.100
Default Gateway	192.168.1.1
Subnet Mask	255.255.255.0

30. Start the UMT software program on the computer. Upon start-up, UMT will check for JeneSys-based controllers on current network.
31. Once the desired controller is identified, double-click on the controller name to continue (see Figure 2).

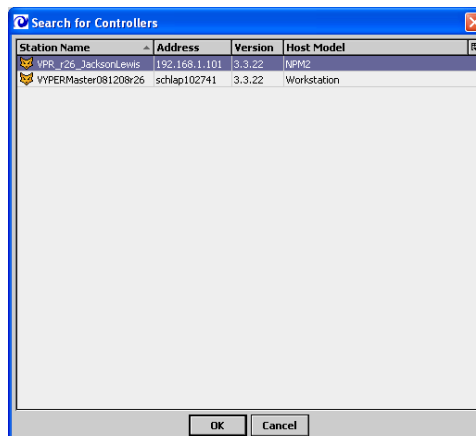


Figure 2

32. With a controller selected, a password screen will appear (Figure 3). Enter the following items where appropriate:

IP Address	192.168.1.101
Platform Port	3011
Platform Username	tridium
Platform Password	niagara
Fox Port	1911
Fox Username	admin
Fox Password	[leave blank]

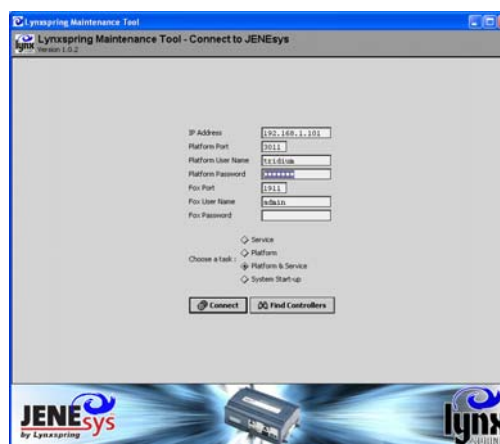


Figure 3

33. Click on the "Connect" button to establish the connection between the computer (via UMT) and the controller.

Modifying BACnet MSTP Settings

Once communication has been established between the UMT and the controller (see *Connecting to the Controller*), the default settings can be accessed and modified.

General BACnet Settings

34. After establishing a connection to the controller using the UMT, select the "BACnet Network" tab in the UMT menu.
35. The following default values are preprogrammed into the controller but can be changed in this menu (Figure 4):

BACnet Object ID	11
Network Number:	2
MSTP Address	1
UDP Port	0xBAC0
MSTP Baud Rate	9600

36. Once any desired changes are made to these settings, click on the "Save" button.
37. Click on the "Enable" button to turn on BACnet communication.

Wiring to BACnet MSTP

The communication wiring for BACnet MSTP should be made with shielded 18 AWG, twisted pair, 2-conductor wire connected to the three-prong, pluggable connector on the bottom of the controller as shown in figure 6



Figure 4

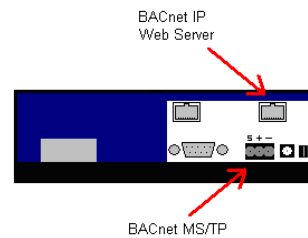


Figure 5

BACnet MSTP Points List

Analog Values

Instance	Object Type	Read/Write	Object Name	Description	Default	Min	Max
0	AV	R	CoolCoilTemp	Calibrated Cooling Coil Temp	-	-	-
1	AV	R/W	UnnOccHtgSP	Unoccupied Heating Setpoint	60	45	90
2	AV	R	OutdoorRH	Outdoor Air Relative Humidity	-	-	-
3	AV	R	SpaceRH	Space Relative Humidity	-	-	-
4	AV	R	SpaceTemp	Space Temperature	-	-	-
5	AV	R	SupplyAirTemp	Supply Air Temperature	-	-	-
6	AV	R	OADamper	Outside Damper Position	-	-	-
7	AV	R	EffectSetpt	Units effective setpoint	-	-	-
8	AV	R	HeatSecondary	Electric Heat Percentage	-	-	-
9	AV	R	HeatPrimary	Modulating Heat Percentage	-	-	-
10	AV	R	HotGasOutput	Hot Gas Reheat Valve Position	-	-	-
11	AV	R	OADewpoint	Outside Air Dewpoint	-	-	-
12	AV	R/W	OADewptStpt	Outside Air Dewpoint Stpt	55	40	80
13	AV	R/W	EF_VFD_Offset	Exhaust Fan VFD Offset	0	-20	20
14	AV	R/W	Setpoint	Occupied Space Setpoint	72	50	95
15	AV	R/W	SpaceRHSetpt	Space Humidity Setpoint	55	40	70
16	AV	R/W	SupCoolingSP	Supply Cooling Setpoint	55	50	90
17	AV	R/W	SupHeatingSP	Supply Heating Setpoint	68	50	90
18	AV	R/W	UnOccClgSp	Unoccupied Cooling Setpoint	80	50	90
19	AV	R/W	UnOccDewptSP	Unoccupied Dewpoint Setpoint	53	40	80
20	AV	R	FanOutput	Supply Fan Speed	-	-	-
21	AV	R/W	UnOccRHsetpt	Unoccupied Humidity Setpoint	55	0	100
22	AV	R/W	NetSpaceTemp	Space Temperature Input	NA	0	100
23	AV	R/W	NetSpaceRH	Space RH Input	NA	0	100
24	AV	R	ExhaustTemp	Exhaust Temp	-	-	-
25	AV	R/W	HWFrstPrctSP	Heat Wheel Frost Protect Setpoint	20	0	45
26	AV	R	ExhaustFanSpeed	Exhaust Fan VFD Speed	-	-	-
27	NA	NA	NA	For factory use only	-	-	-
28	AV	R/W	NetSpaceCO2	CO2 From Net	0	0	9999
29	AV	R/W	CO2_Sp	CO2 High Limit Setpoint	700	0	2000
30	AV	R/W	CO2_DamperPos	High CO2 Damper Position	100	0	100
31	AV	R/W	NetStatic	Network Static Pressure	NA	-5	5
32	AV	R/W	StaticSP	Static Pressure Setpoint	0.7	-2	8
33	AV	R	OutdoorTemp	Outdoor Air Temperature	-	-	-
34	AV	R	RADamper	Return Air Damper Position	-	-	-
35	AV	R	StaticPress	Static Pressure	-	-	-
36	AV	R	CO2	Space CO2	-	-	-
37	AV	R/W	FanSpeed	Net Fan Speed	NA	50	100
38	AV	R/W	MinOADamperPos	Minimum Outside Air Damper Position	100	0	100
39	AV	R/W	AFMS_setpt	IAQ Damper Flow Setpoint	0	0	20000
40	AV	R	IAQDmprPos	IAQ Damper Position	-	-	-
41	AV	R	DuctStatic	Duct Static Pressure	-	-	-
42	AV	R/W	NetDuctStatic	Net Duct Static Pressure	NA	-5	5
43	AV	R/W	DuctStaticSetpt	Duct Static Setpoint	1	-2	8
44	AV	R	HW_VFD_Spd	Heat Wheel VFD Speed	-	-	-

Binary Values

Instance	Object Type	Read/Write	Object Name	Description	Default	Min	Max
0	BV	R	FanStatus	Supply Fan Status	-	-	-
1	BV	R	DamperOpen	OA Damper End Switch	-	-	-
2	BV	R	HPC_A	High Pressure Cutout A	-	-	-
3	BV	R	HPC_B	High Pressure Cutout B	-	-	-
4	BV	R	LPC_A	Low Pressure Cutout A	-	-	-
5	BV	R	LPC_B	Low Pressure Cutout B	-	-	-
6	BV	R	EffectOccup	Occupancy State	-	-	-
7	BV	R	SF_SS	Supply Fan Start Stop	-	-	-
8	NA	NA	NA	For factory use only	-	-	-
9	BV	R	Compr1Status	Compressor 1 Start Stop	-	-	-
10	BV	R	Compr2Status	Compressor 2 Start Stop	-	-	-
11	BV	R	Compr3Status	Compressor 3 Start Stop	-	-	-
12	BV	R	Compr4Status	Compressor 4 Start Stop	-	-	-
13	BV	R/W	OccSchedule	Net In Schedule	NA	-	-
14	BV	R	DehumidMode	Dehumidification Mode	-	-	-
15	NA	NA	NA	For factory use only	-	-	-
16	BV	R	in_alarm	Alarm Output	-	-	-
17	BV	R	FilterStatus	Filter Status	-	-	-
18	BV	R	ExhaustFanStat	Exhaust Fan Status	-	-	-
19	BV	R	ExhaustFanSS	Exhaust Fan Start Stop	-	-	-
20	BV	R	HeatWheelSS	Heat Wheel Start Stop	-	-	-
21	BV	R/W	ResetLockout	Reset After Alarm Lockout	FALSE	-	-
22	NA	NA	NA	For factory use only	-	-	-
23	NA	NA	NA	For factory use only	-	-	-
24	NA	NA	NA	For factory use only	-	-	-
25	BV	R	RunStopInput	Shutdown Input	-	-	-
26	BV	R	LowLimit	Low Limit Output	-	-	-
27	NA	NA	NA	For factory use only	-	-	-
28	BV	R	SF_Alarm	Supply Fan Alarm	-	-	-
29	BV	R	EF_Alarm	Exhaust Fan Alarm	-	-	-
30	BV	R	DuctHighLimit	Duct High Limit	-	-	-
39	BV	R/W	EconoLockout	Allows Economizer mode when OA Enthalpy is less than Space Enthalpy	FALSE	-	-

LonTalk Communication Guide

In order to complete the communication integration through BACnet IP, BACnet MSTP, or LonTalk, a Windows-based computer with factory-provided Universal Maintenance Tool (UMT) software is required. The UMT software is provided with a CD included in the control panel of the unit or is available for download at <http://208.116.12.42/umt.exe>.

Connecting to the Controller

38. Install the Universal Maintenance Tool (UMT) software on the computer being used to communicate with the controller.
39. Connect the computer and the microprocessor controller with the use of an ethernet cable. Computer should be connected through an ethernet port and the controller through the Web Server port as shown below.

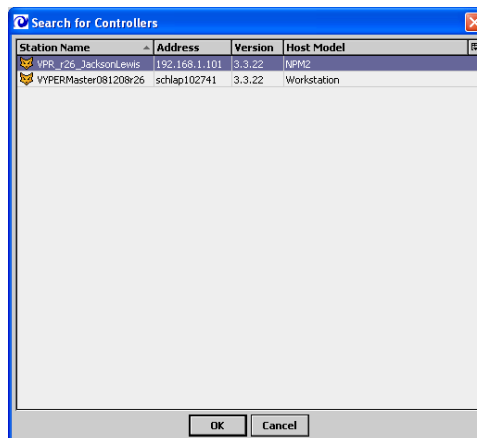
Plug into this port with an ethernet cable to use the UMT



40. Configure the network settings in the computer to the default addresses stored in the controller as programmed from the factory:

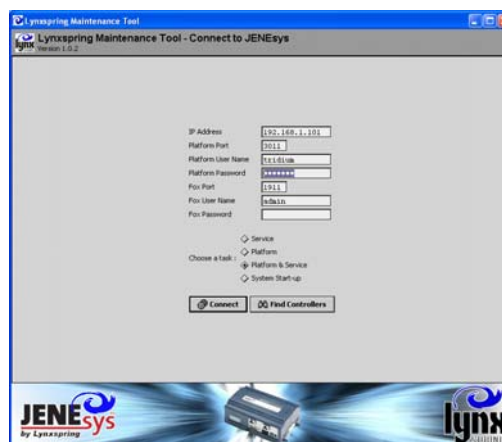
Default IP	192.168.1.100
Default Gateway	192.168.1.1
Subnet Mask	255.255.255.0

41. Start the UMT software program on the computer. Upon start-up, UMT will check for JeneSys-based controllers on current network.
42. Once the desired controller is identified, double-click on the controller name to continue (see Figure 2).



43. With a controller selected, a password screen will appear. Enter the following items where appropriate:

IP Address	192.168.1.101
Platform Port	3011
Platform Username	tridium
Platform Password	niagara
Fox Port	1911
Fox Username	admin
Fox Password	[leave blank]



44. Click on the "Connect" button to establish the connection between the computer (via UMT) and the controller.

Modifying LonTalk Settings

Once communication has been established between the UMT and the controller (see *Connecting to the Controller*), the default settings can be accessed and modified.

General LonTalk Settings

45. After establishing a connection to the controller using the UMT, select the "Lon Network" tab in the UMT menu.
46. The following default values are preprogrammed into the controller but can be changed in this menu:

Neuron ID	Varies
Program ID	90 00 8e 01 03 80 00 03
Subnet	1
Node	127
Domain Length	1
ID Length	00



47. Once any desired changes are made to these settings, click on the "Save" button.
48. After saving the changes, and XIF file can be created by clicking on the "Generate XIF" button.

Wiring to LonTalk

The communication wiring for LonTalk should be made with shielded 22 AWG, twisted pair, 2-conductor wire connected to the two-prong, pluggable connector on the TOP of the controller as illustrated below.

Lon Talk Adapter on top of Jene controller.



LonTalk Points List

Inputs

Name	NvlIndex	Direction	SnvtType	Description
nviRequest	0	Input	Snvt Obj Request	Standard Lon Object
nviSetpoint	2	Input	Snvt Temp P	Occupied Space Setpoint
nviOccSchedule	26	Input	Snvt Tod Event	Net In Schedule
nviOADewptStpt	28	Input	Snvt Temp P	Outside Air Dewpoint Setpoint
nviSpaceRHSetpt	31	Input	Snvt Lev Percent	Space Humidity Setpoint
nviFanSpeed	32	Input	Snvt Lev Percent	Net Fan Speed
nviNetStatic	33	Input	Snvt Press P	Network Static Pressure
nviHWFrstPrctSP	35	Input	Snvt Temp P	Heat Wheel Frost Protect Setpoint
nviSupCoolingSp	36	Input	Snvt Temp P	Supply Cooling Setpoint
nviSupHeatingSp	37	Input	Snvt Temp P	Supply Heating Setpoint
nviEF_VFD_Offset	41	Input	Snvt Lev Percent	Exhaust Fan VFD Offset
nviUnnOccHtgSP	42	Input	Snvt Temp P	Unoccupied Heating Setpoint
nviUnOccClgSp	44	Input	Snvt Temp P	Unoccupied Cooling Setpoint
nviUnOccDewptSP	45	Input	Snvt Temp P	Unoccupied Dewpoint Setpoint
nviNetSpaceRH	46	Input	Snvt Lev Percent	Space Relative Humidity Input
nviNetSpaceTemp	47	Input	Snvt Temp P	Space Temperature Input
nviUnOccRHsetpt	48	Input	Snvt Lev Percent	Unoccupied Humidity Setpoint
nviNetSpaceCO2	49	Input	Snvt Ppm	CO2 From Net
nviResetLockout	50	Input	Snvt Switch	Reset After Alarm Lockout
nviStaticSP	61	Input	Snvt Press P	Static Pressure Setpoint
nviMinOADamprPos	63	Input	Snvt Lev Percent	Minimum Outside Air Damper Position
nviEconoLockout	64	Input	Snvt Switch	Economizer Lockout Point
nviCO2_Sp	65	Input	Snvt Temp P	CO2 High Limit Setpoint
nviCO2_DamperPos	66	Input	Snvt Temp P	High CO2 Damper Position
nvoGasHtOut2	67	Output	Snvt Switch	450 Gas 2nd Stage
nvoGasHtOut3	68	Output	Snvt Switch	450 Gas 3rd Stage
nvoAFMS	69	Output	Snvt Flow	Air Flow Measuring Station Output
nviAFMS_setpt	70	Input	Snvt Flow	IAQ AFMS Flow Setpoint
nvoIAQdamperPos	71	Output	Snvt Lev Percent	IAQ Damper Position
nvoInAlarm	72	Output	Snvt Switch	Unit Alarm
nviNetDuctStatic	73	Input	Snvt Press P	Duct Static Pressure Input
nvoDuctStatic	74	Output	Snvt Press P	Duct Static Pressure
nviDuctScaticSP	75	Input	Snvt Press P	Duct Static Pressure Setpoint
nvoHW_VFD_Spd	76	Output	Snvt Lev Percent	Heat Wheel VFD Speed

Outputs

Name	NvlIndex	Direction	SnvtType	Description
nvoStatus	1	Output	Snvt Obj Status	Standard Lon Object
nvoSpaceTemp	3	Output	Snvt Temp P	Space Temperature
nvoOutdoorTemp	4	Output	Snvt Temp P	Outdoor Air Temperature
nvoEffectSetpt	5	Output	Snvt Temp P	Units Effective Setpoint
nvoCoolCoilTemp	6	Output	Snvt Temp P	Calibrated Cooling Coil Temp
nvoOutdoorRH	7	Output	Snvt Lev Percent	Outdoor Air Relative Humidity
nvoSpaceRH	8	Output	Snvt Lev Percent	Space Relative Humidity
nvoOADamper	9	Output	Snvt Lev Percent	Outside Damper Position
nvoHeatPrimary	10	Output	Snvt Lev Percent	Modulating Heat Percentage
nvoHeatSecondary	11	Output	Snvt Lev Percent	Electric Heat Percentage
nvoHotGasOutput	12	Output	Snvt Lev Percent	Hot Gas Reheat Valve Position
nvoDamperOpen	13	Output	Snvt Switch	Outside Air Damper End Switch
nvoHPC_A	14	Output	Snvt Switch	High Pressure Cutout A
nvoLPC_A	15	Output	Snvt Switch	Low Pressure Cutout A
nvoHPC_B	16	Output	Snvt Switch	High Pressure Cutout B
nvoLPC_B	17	Output	Snvt Switch	Low Pressure Cutout B
nvoRunStopInpnt	18	Output	Snvt Switch	Shutdown Input
nvoFanOutput	19	Output	Snvt Switch	Supply Fan Speed
nvoFanStatus	20	Output	Snvt Switch	Supply Fan Status
nvoCompr1Status	21	Output	Snvt Switch	Compressor 1 Start Stop
nvoCompr2Status	22	Output	Snvt Switch	Compressor 2 Start Stop
nvoCompr3Status	23	Output	Snvt Switch	Compressor 3 Start Stop
nvoCompr4Status	24	Output	Snvt Switch	Compressor 4 Start Stop
nvoGasHtOutput	25	Output	Snvt Switch	Hot Gas Reheat Valve Position
nvoEffectOccup	27	Output	Snvt Occupancy	Occupancy State
nvoOADewpoint	29	Output	Snvt Temp P	Outside Air Dewpoint
nvoDamperCmd	30	Output	Snvt Switch	Damper Command
nvoExhaustTemp	34	Output	Snvt Temp P	Exhaust Temp
nvo_HW_SS	38	Output	Snvt Switch	Heat Wheel Start Stop
nvoExhFanStat	39	Output	Snvt Switch	Exhaust Fan Status
nvoExhFanSS	40	Output	Snvt Switch	Exhaust Fan Start Stop
nvoSupplyAirTemp	43	Output	Snvt Temp P	Supply Air Temperature
nvoDehumidMode	51	Output	Snvt Switch	Dehumidification Mode
nvoSF_SS	52	Output	Snvt Switch	Supply Fan Start Stop
nvoRADamper	53	Output	Snvt Lev Percent	Return Air Damper Position
nvoStaticPress	54	Output	Snvt Press P	Static Pressure
nvoCO2	55	Output	Snvt Ppm	Space CO2
nvoLowLimit	56	Output	Snvt Switch	Low Limit Output
nvoSF_Alarm	57	Output	Snvt Switch	Supply Fan Alarm
nvoEF_Alarm	58	Output	Snvt Switch	Exhaust Fan Alarm
nvoDuctHighLimit	59	Output	Snvt Switch	Duct High Limit
nvoEF_Speed	60	Output	Snvt Lev Percent	Exhaust Fan VFD Speed
nvoFilterStatus	62	Output	Snvt Switch	Filter Status

Web User Interface (Web UI) Installation and Operation

All VPR, VPRE, VPRP and VPRX series units are equipped with a fully-programmed microprocessor controller with the following standard features:

- Liquid crystal display (LCD) interface
- Internal time clock (may be disabled)
- Primary controls sequence (discharge air control)
- Component safeties and alarms
- Ethernet RJ-45 network port

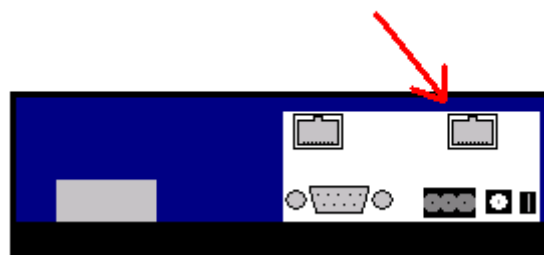
In addition to these standard features, an optional web-based communication option titled *Web UI* is available for remote monitoring and set point adjustment through a standard web browser when the controller is connected to the local area network. All of the functions available through the controllers LCD are available through the Web UI interface.

Initial Setup

Wiring

The Web UI feature requires connection to the local area network. Using a standard CAT5, CAT6, or Ethernet LAN cable, connect to the JENESys controller as shown in figure 1. Note that the drawing references the bottom of the controller.

Web UI Connection



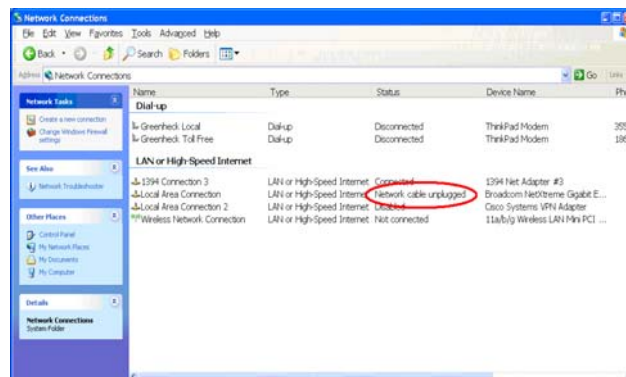
A suggested IP address for the computer communicating with the Valent unit is:

192.168.1.100 [PC]

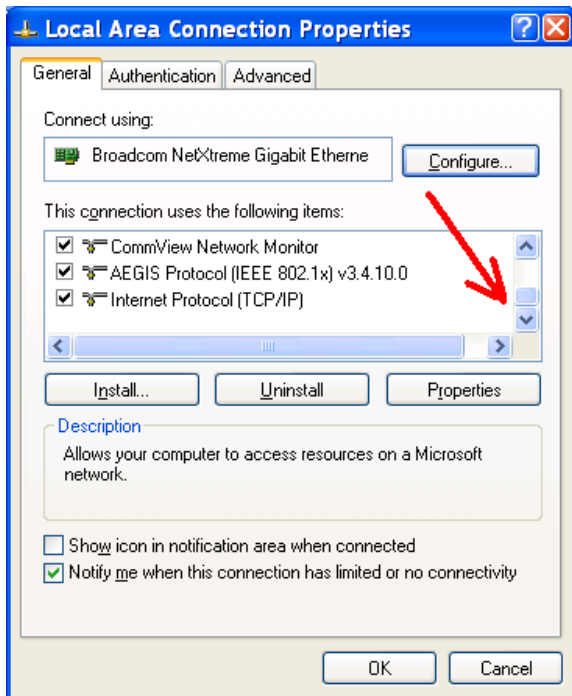
IP Address Modification: PC

To change the static IP address of the PC, refer to the following instructions (Windows XP).

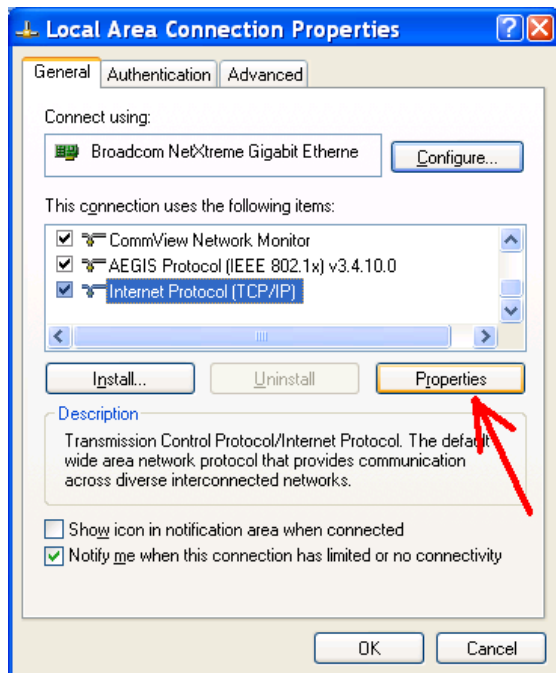
1. Click START in the lower-left-hand corner of the screen.
2. Select Control Panel.
3. Select Network Connections.
4. Identify the target LAN connection with the status of "Network cable unplugged" as shown below.



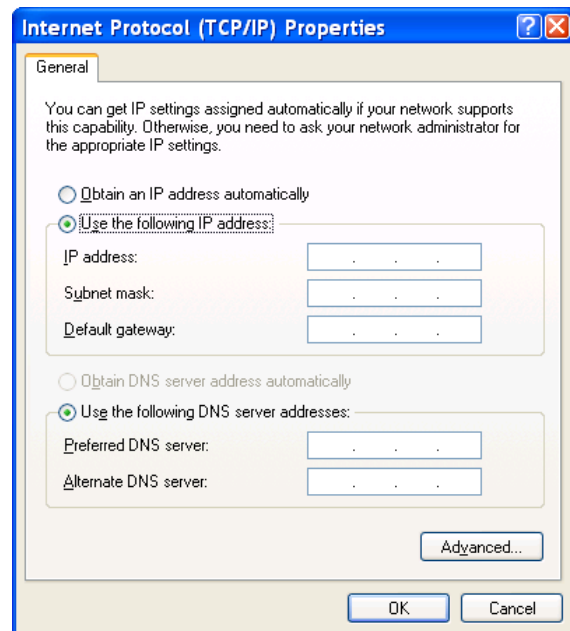
- Right-click on the identified Local Area Connection. Select Properties.
- Scroll down until the selection Internet Protocol (TCP/IP) is visible.



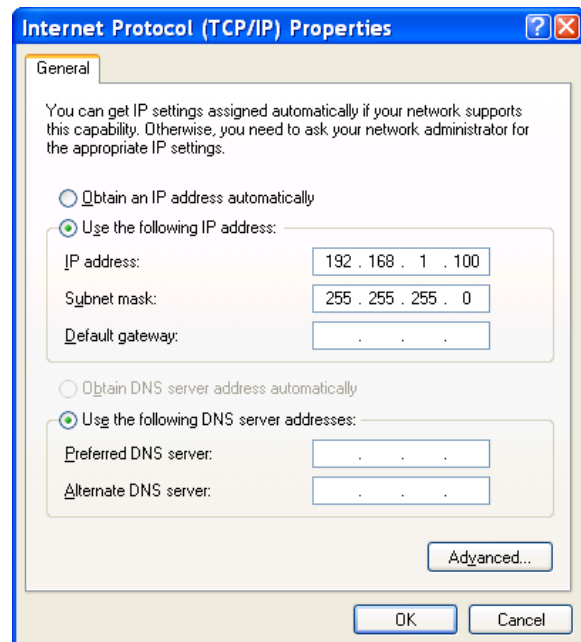
- Highlight Internet Protocol (TCP/IP) and press the Properties button as shown below.



- Assign a new IP address manually by first selecting Use the following IP address button as shown below.

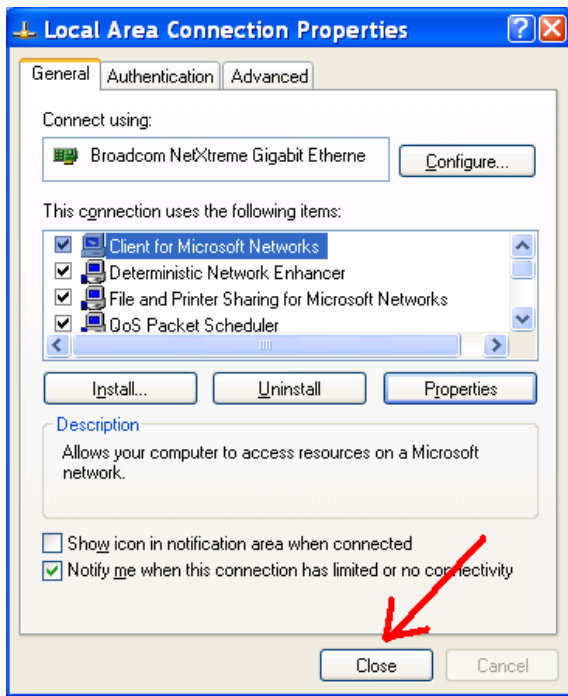


- Type in the following information as shown below. Press "OK" when completed.



IP address: 192.168.1.100
Subnet mask: 255.255.255.0

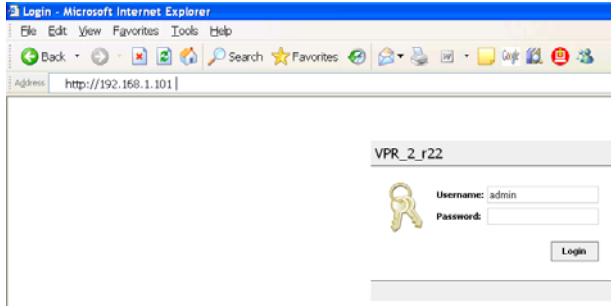
- Windows will again display the screen in Figure 3 (also shown in figure 7). Click on “Close” to exit this screen.



Alternately, the IP address of the Valent unit controller can be changed to be in the same range as the connected PC, especially for instances when the PC and Valent unit are connected to the same network/LAN. In those cases, request a static IP address from the network administrator and use the LCD or UMT to edit the address of the Valent unit.

Login Instructions

To access the JENESys program type the IP address from above into the web browser. It is the same as the IP address of the JENESys controller. If the IP address is correct the following login screen should appear.

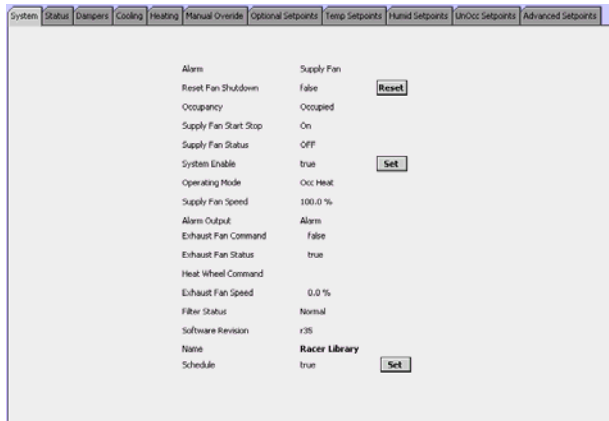


The following is the login information:

Username: admin
Password: (leave the password field empty)

Navigation Instructions

Upon successful connection and login, the following screen should appear.

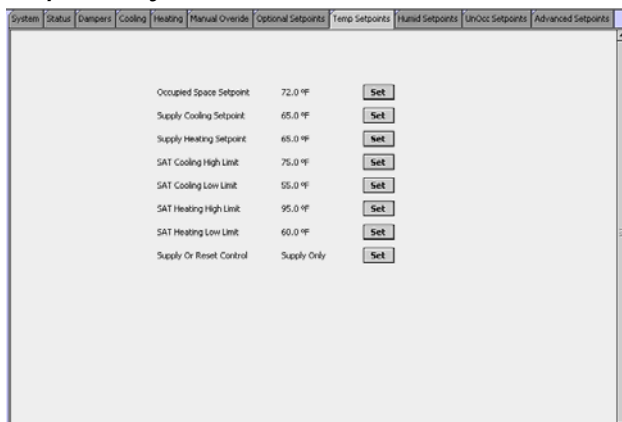


Select the desired tab from the top of the screen. The data displayed on each tab is a combination of view-only and editable information. Refer to the Valent IOM for additional information on content. Note: The information displayed on these tabs is consistent with the information displayed on the JENEsys LCD and with the information described in the IOM.

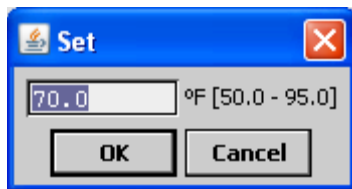
Changing the set points is made easy with the Web UI. The following three examples demonstrate how to change the occupied space set point, altering the schedule, and changing the fan speed.

Basic Functions

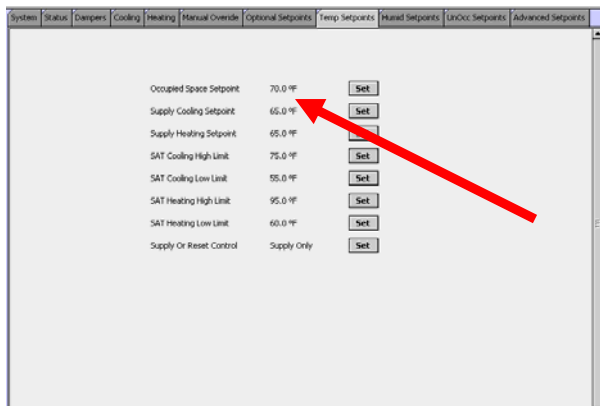
Setpoint Adjustments



The occupied space set point is on the 'Temp Setpoints' tab located by the red arrow. The set point has a 'set' button to the right of it. By clicking the button, the following pop up will appear.



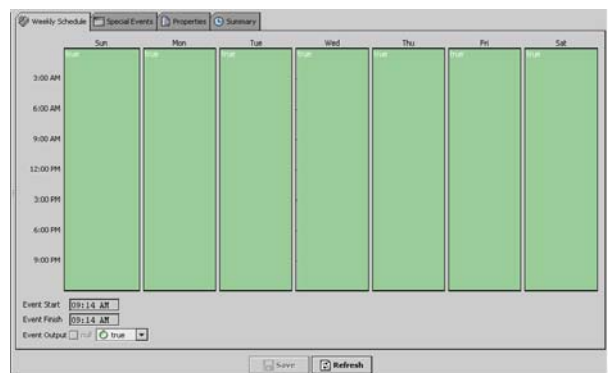
Here, the user is able to make changes to the temperature in the occupied space. By clicking ok, the changes will take effect as shown below.



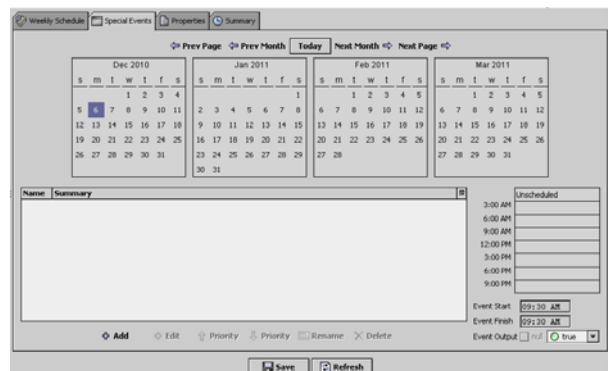
Scheduling Adjustments



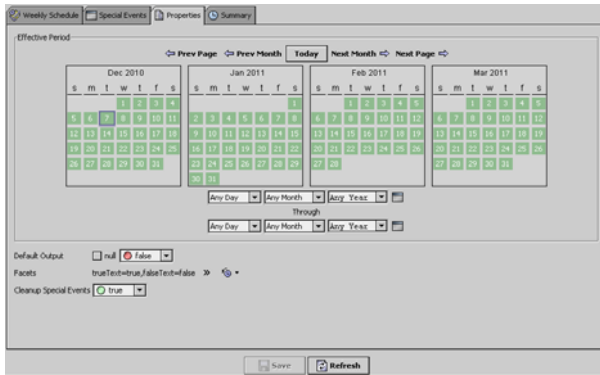
The schedule set point is on the 'System' tab. The set point is located by the red arrow. By clicking the 'set' button, it will display the following page.



The 'Weekly Schedule' tab allows the user to turn the unit on and off on a set schedule every week without having to change anything on a weekly basis. The following page is the 'Specials Events' tab.

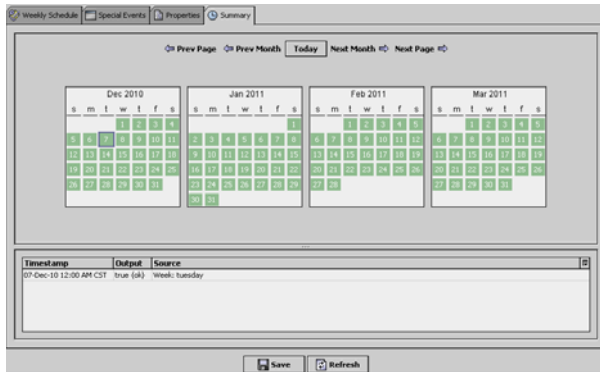


This tab allows the user to make exception to the 'Weekly Schedule', by changing the usual performance of the unit for a specific event. The following page is the 'Properties' tab.



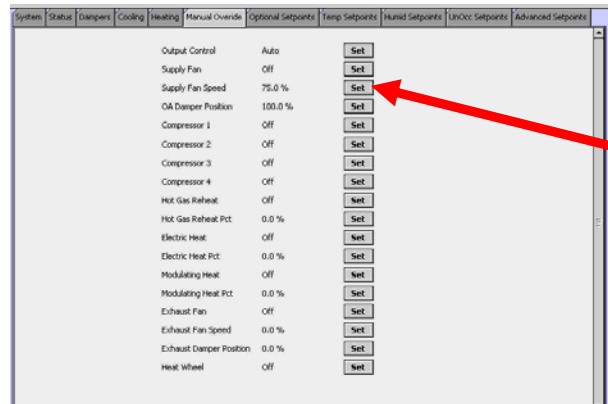
The 'Properties' tab should only be changed under factory direction.

The last tab in the scheduling page is the 'Summary'.

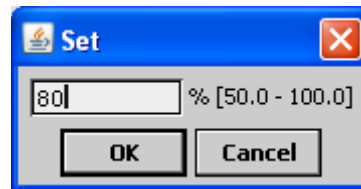


The 'Summary' tab essentially summarizes the previous three tabs and allows the user to see what is being done over the course of a specified day.

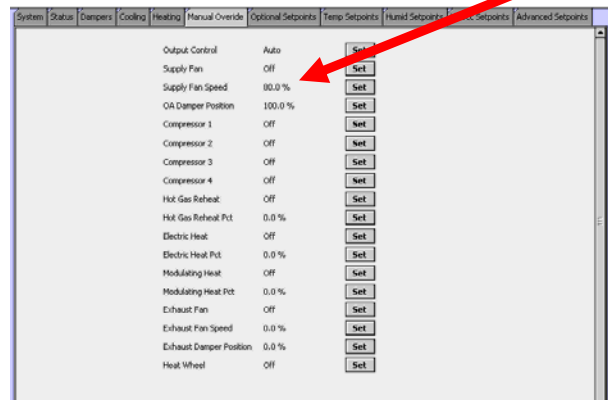
Fan Speed Adjustments



The supply fan speed set point is on the 'Manual Override' tab located by the red arrow. The set point has a 'set' button to the right of it. By clicking the button, the following pop up will appear.



Here, the user is able to make changes to the temperature in the occupied space. By clicking ok, the changes will take effect as shown below.



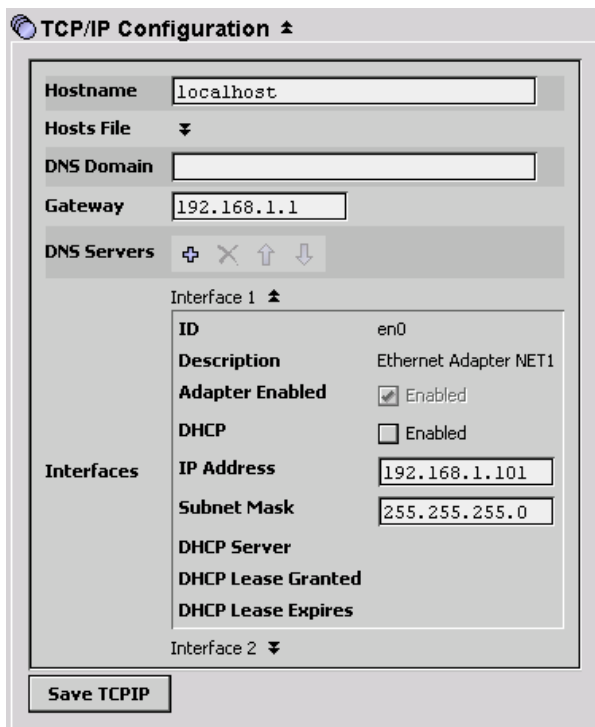
Advanced Functions

TCP/IP Configuration

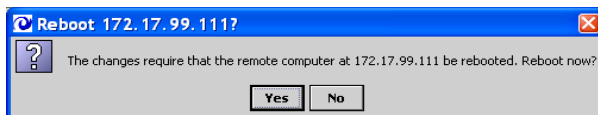
Use the TCP/IP Configuration utility to edit the network address and related parameters for the controller. The controller ships with the following default settings:

Default Gateway: 192.168.1.1
IP Address: 192.168.1.101
Subnet Mask: 255.255.255.0

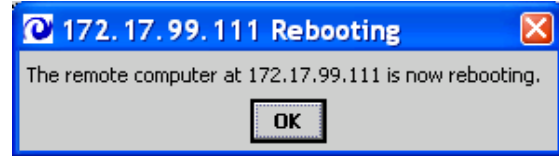
1. Expand Interface 1 by clicking on the double-arrows to the right of the title. Do not change the parameters for Interface 2.



2. Edit the gateway, IP address, and subnet mask as required, then press Save TCPIP.
3. The pop-up message asks for confirmation to reboot the controller. Select Yes.



4. The pop-up message confirms that the controller is rebooting. Select OK. *Note: Allow 2-3 minutes for the controller to reboot.*



5. Disconnect from the controller and reconnect if desired.

Sequence of Control

1. OCCUPANCY

1.1. Occupied

1. Unit shall enter occupied mode if one of the following conditions is met:
 - 1.1. Internal time clock in microprocessor controller determines occupied mode.
 - 1.2. Dry contact for occupied mode is closed.
2. The controller shall perform the following operations in occupied mode:
 - 2.1. Supply fan shall enable.
 - 2.2. 30 seconds (adj.) after confirmation of supply fan pressure switch, outside air damper shall be energized to the minimum position (adj., default set at 100%).
 - 2.3. 30 seconds (adj.) after confirmation of supply fan pressure switch, return air damper shall be energized and controlled inversely to the outside air damper.
 - 2.4. 30 seconds (adj.) after confirmation of the supply fan pressure switch, exhaust fan shall enable.

1.2. Unoccupied

1. Unit shall enter unoccupied mode if both of the following conditions are met:
 - 1.1. Internal time clock in microprocessor controller determines unoccupied mode.
 - 1.2. Dry contact for occupied mode is opened.
2. The controller shall perform the following operations in unoccupied mode:
 - 2.1. Cooling, dehumidification, heating, or economizer shall be disabled.
 - 2.2. After 30 seconds (adj.) the supply fan shall be disabled.
 - 2.3. Outside air damper shall be de-energized and fail closed.
 - 2.4. Return air damper shall be de-energized and fail open.

1.3. Night Setback

1. Unit shall enter night setback mode if the following conditions are met:
 - 1.1. Relative humidity in the space is greater than 55% (adj.) OR Dewpoint in the space is greater than 53°F (adj.).
 - 1.2. Space temperature is greater than 80°F (adj.).
 - 1.3. Space temperature is less than 60°F (adj.).
2. The controller shall perform the following operations in night setback mode:
 - 2.1. Supply fan shall enable.
 - 2.2. Cooling, dehumidification, heating, or economizer sequences will enable.
 - 2.3. Outside air damper shall be de-energized and fail closed.
 - 2.4. Return air damper shall be de-energized and fail open.
3. Night setback mode will disable when one of the following conditions are met:
 - 3.1. Space conditions are satisfied.
 - 3.2. Internal time clock in microprocessor controller determines unoccupied mode.

- 3.3. Dry contact for occupied mode is closed.
2. DISCHARGE AIR CONTROL SEQUENCE:
 - 2.1. Discharge Air Control with Space Temperature and Humidity Reset
 1. The discharge air temperature set point shall be automatically determined based on the difference between the measured space temperature and active space temperature set point (discharge air temperature reset).
 - 2.2. Discharge Air Control
 1. The discharge air set point is determined based on the discharge air heating and cooling set points (adj.) stored in the controller.
 - 2.3. Energy Recovery
 1. Upon entering the occupied mode of operation, the controller shall enable the energy recovery sequence if one of the following conditions are met:
 - 1.1. The outdoor air temperature is 5°F (adj.) below the space temperature set point.
 - 1.2. The outdoor air temperature is 5°F (adj.) above the space temperature set point.
 2. Upon enabling the energy recovery sequence, the controller shall perform the following functions:
 - 2.1. Energy recovery wheel motor energized.
 - 2.2. If the exhaust air temperature drops below 35°F (adj.), the controller shall perform the following operations:
 - 2.3. Energy wheel de-energized for 90 seconds.
 - 2.4. Energy wheel energized for 3 minutes.
3. COOLING & DEHUMIDIFICATION: AIR-COOLED WITH FIXED STAGE COMPRESSORS
 - 3.1. Cooling
 1. Cooling sequence shall be enabled when all of the following conditions are met:
 - 1.1. Unit is in occupied mode.
 - 1.2. Outside air temperature is greater than 50°F (adj.)
 - 1.3. Outside air dew point is less than 55°F by 2 to 5°F (adj.).
 2. The controller shall perform the following functions in cooling mode:
 - 2.1. Compressors will sequence in order to cool below the discharge air setpoint.
 - 2.2. The modulating hot gas reheat is enabled and modulated to maintain the discharge air temperature set point.
 3. Cooling mode shall be disabled when the following conditions are met:
 - 3.1. Outside air temperature falls below 50°F by 2 to 5°F maximum (adj.).
 - 3.2. Dehumidification
 1. Dehumidification mode shall be enabled if one of the following two conditions are met:
 - 1.1. Outside air dew point is greater than 55°F (adj.)
 - 1.2. Space relative humidity is greater than 55% RH (adj.).
 2. Upon entering dehumidification mode the controller shall provide the following operations:

- 2.1. Compressor(s) shall be sequenced to maintain a leaving air temperature off the evaporator coil of 50°F (adj.).
- 2.2. 3-way valve shall modulate refrigerant gas flowing into hot-gas reheat coil to maintain the discharge air temperature set point.
- 2.3. Once every 45 minutes (adj.), 3-way valve shall be opened to maximum capacity for 45 seconds allowing oil in refrigeration circuit to cycle back to compressors.
3. Dehumidification mode shall be disabled if both of the following conditions are true:
 - 3.1. Outside air dew point falls below 55°F by 2 to 5°F maximum (adj.)
 - 3.2. Space relative humidity falls below 55% RH by 2 to 5% maximum (adj.).
4. COOLING & DEHUMIDIFICATION: AIR-COOLED WITH DIGITAL SCROLL™ COMPRESSORS
 - 4.1. Cooling
 1. Cooling sequence shall be enabled when all of the following conditions are met:
 - 1.1. Unit is in occupied mode.
 - 1.2. Outside air temperature is greater than 55°F (adj.).
 - 1.3. Outside air dew point is less than 55°F by 2 to 5°F (adj.).
 2. Upon entering cooling mode the controller shall perform the following functions:
 - 2.1. Hot gas reheat valve shall remain disabled in the closed position.
 - 2.2. Digital Scroll compressor shall modulate to meet the discharge air temperature set point.
 - 2.3. If the unit is unable to meet the discharge air set point, additional fixed stages of cooling shall enable in addition to the Digital Scroll compressor to meet the discharge air set point.
 - 2.4. If the discharge air set has been met and the Digital Scroll compressor is at its minimum modulation, a fixed compressor stage shall be disabled.
 3. Cooling mode shall be disabled when the following conditions are met:
 - 3.1. Outside air temperature falls below 55°F by 2 to 5°F maximum (adj.).
 - 4.2. Dehumidification
 1. Dehumidification mode shall be enabled if one of the following two conditions are met:
 - 1.1. Outside air dew point is greater than 55°F (adj.).
 - 1.2. Space relative humidity is greater than 55% RH (adj.).
 2. The controller shall provide the following operations in dehumidification mode:
 - 2.1. Digital Scroll compressor shall modulate to meet the evaporator coil set point.
 - 2.2. If the unit is unable to meet the evaporator coil set point, additional fixed stages of cooling shall enable in addition to the Digital Scroll compressor to meet the discharge air set point.
 - 2.3. If the evaporator coil set point has been met and the Digital Scroll compressor is at its minimum modulation, a fixed compressor stage shall be disabled.
 - 2.4. Hot gas reheat valve shall modulate capacity to maintain discharge air set point.
 3. If hot gas reheat is in the open position for 5 minutes, one of two modes shall enable:

- 3.1. Temperature priority: The hot-gas reheat gets locked to 100%, and the Digital Scroll will modulate to maintain the discharge air temperature set point. Getting as much dehumidification as possible, while maintaining the discharge air temperature.
 - 3.2. Dehumidification priority (default): The hot-gas reheat gets locked to 100%, and the Digital Scroll will modulate to maintain the coil leaving air temperature. Getting the most dehumidification possible, but allowing the discharge air temperature to get cooler than the discharge air temperature set point.
 4. Once every 45 minutes (adj.) the hot gas reheat valve shall be controlled full open for 45 seconds (adj.) to allow oil return to the compressors.
 5. Dehumidification mode shall be disabled if both of the following conditions are true:
 - 5.1. Outside air dew point falls below 55°F by 2 to 5°F maximum (adj.)
 - 5.2. Space relative humidity falls below 55% RH by 2 to 5% maximum (adj.).
5. COOLING & DEHUMIDIFICATION: WATER-SOURCE HEAT PUMP WITH DIGITAL SCROLL™ COMPRESSORS
- 5.1. Cooling
 1. Cooling sequence shall be enabled when all of the following conditions are met:
 - 1.1. Unit is in occupied mode.
 - 1.2. Outside air temperature is greater than 55°F (adj.).
 - 1.3. Outside air dew point is less than 55°F by 2 to 5°F (adj.).
 2. Upon entering cooling mode the controller shall perform the following functions:
 - 2.1. Hot gas reheat valve shall remain disabled in the closed position.
 - 2.2. Digital Scroll compressor shall modulate to meet the discharge air temperature set point.
 - 2.3. If the unit is unable to meet the discharge air set point, additional fixed stages of cooling shall enable in addition to the Digital Scroll compressor to meet the discharge air set point.
 - 2.4. If the discharge air set has been met and the Digital Scroll compressor is at its minimum modulation, a fixed compressor stage shall be disabled.
 - 2.5. Water valve on coaxial heat exchanger shall modulate water flow to maintain refrigerant head pressure set point.
 3. Cooling mode shall be disabled when the following conditions are met:
 - 3.1. Outside air temperature falls below 55°F by 2 to 5°F maximum (adj.).
 - 5.2. Dehumidification
 1. Dehumidification mode shall be enabled if one of the following two conditions are met:
 - 1.1. Outside air dew point is greater than 55°F (adj.).
 - 1.2. Space relative humidity is greater than 55% RH (adj.).
 2. The controller shall provide the following operations in dehumidification mode:
 - 2.1. Digital Scroll compressor shall modulate to meet the evaporator coil set point.

- 2.2. If the unit is unable to meet the evaporator coil set point, additional fixed stages of cooling shall enable in addition to the Digital Scroll compressor to meet the discharge air set point.
- 2.3. If the evaporator coil set point has been met and the Digital Scroll compressor is at its minimum modulation, a fixed compressor stage shall be disabled.
- 2.4. Hot gas reheat valve shall modulate capacity to maintain discharge air set point.
- 2.5. Water valve on coaxial heat exchanger shall modulate water flow to maintain refrigerant head pressure set point.
3. If hot gas reheat is in the open position for 5 minutes, one of two modes shall enable:
 - 3.1. Dehumidification priority (default): The hot-gas reheat gets locked to 100%, and the Digital Scroll will modulate to maintain the coil leaving air temperature. Getting the most dehumidification possible, but allowing the discharge air temperature to get cooler than the discharge air temperature set point.
 - 3.2. Temperature priority: The hot-gas reheat gets locked to 100%, and the Digital Scroll will modulate to maintain the discharge air temperature set point. Getting as much dehumidification as possible, while maintaining the discharge air temperature.
4. Once every 45 minutes (adj.) the hot gas reheat valve shall be controlled full open for 45 seconds (adj.) to allow oil return to the compressors.
5. Dehumidification mode shall be disabled if both of the following conditions are true:
 - 5.1. Outside air dew point falls below 55°F by 2 to 5°F maximum (adj.)
 - 5.2. Space relative humidity falls below 55% RH by 2 to 5% maximum (adj.).

6. HEATING SEQUENCE

6.1. Temperator

1. Heating shall be enabled when unit is not in cooling, dehumidification, or economizer mode.
2. The controller shall perform the following operations in heating mode:
 - 2.1. Electric heater shall modulate to meet the discharge air set point.
 - 2.2. After operating at 100% for 5 minutes (adj.), the electric heater shall disable and the indirect gas furnace shall enable.
 - 2.3. Indirect gas furnace shall modulate to meet the discharge air set point.
 - 2.4. After firing at 100% for 5 minutes (adj.), the indirect gas shall continue to fire at 100% and the electric heater shall modulate to meet the discharge air set point.
3. Heating mode shall disable if any of the conditions below are met:
 - 3.1. Cooling mode enabled.
 - 3.2. Dehumidification mode enabled.
 - 3.3. Occupied mode disabled.
 - 3.4. Economizer mode enabled.

6.2. Indirect Gas Furnace

1. Heating shall enable when unit is not in cooling, dehumidification, or economizer mode.

2. The controller shall perform the following operations in heating mode:
 - 2.1. Indirect gas furnace shall modulate to meet the discharge air set point.
 3. Heating mode shall disable if any of the conditions below are met:
 - 3.1. Cooling mode enabled.
 - 3.2. Dehumidification mode enabled.
 - 3.3. Occupied mode disabled.
 - 3.4. Economizer mode enabled.
- 6.3. Electric Heat
1. Heating shall enable when unit is not in cooling, dehumidification, or economizer mode.
 2. The controller shall perform the following operations when entering heating mode:
 - 2.1. SCR electric heater shall modulate to maintain the discharge air set point.
 3. Heating mode shall disable if any of the conditions below are met:
 - 3.1. Cooling mode enabled.
 - 3.2. Dehumidification mode enabled.
 - 3.3. Occupied mode disabled.
 - 3.4. Economizer mode enabled.
- 6.4. Hot Water Heat
1. Heating shall be enabled when unit is not in cooling or dehumidification mode.
 2. The controller shall perform the following operations when entering heating mode:
 - 2.1. Normally-open hot water valve (provided by others) shall modulate to maintain the supply air temperature set point.
 3. Heating mode shall disable if any of the conditions below are met:
 - 3.1. Cooling mode enabled.
 - 3.2. Dehumidification mode enabled.
 - 3.3. Occupied mode disabled.
 - 3.4. Economizer mode enabled.
 - 3.5. The temperature at the surface of the hot water coil is less than the factory-supplied low-limit thermostat (adj.).
 - 3.6. The discharge air temperature falls below 35°F.
 4. When low limit shutdown is invoked more than 3 times (adjustable) in a week, manual reset is required to restore normal unit operation.
 5. When the fan status is off and the OAT is less than 35°F the hot water valve will open fully.
- 6.5. Water Source Heat Pump
1. Heating shall be enabled when unit is not in cooling, dehumidification, or economizer mode.
 2. The controller shall perform the following operations in heating mode:
 - 2.1. Digital Scroll compressor shall modulate to meet the discharge air temperature set point.

- 2.2. If the unit is unable to meet the discharge air set point, additional fixed stages of heating shall enable in addition to the Digital Scroll compressor to meet the discharge air set point.
- 2.3. If the discharge air set has been met and the Digital Scroll compressor is at its minimum modulation, a fixed compressor stage shall be disabled.
- 2.4. Water valve on coaxial heat exchanger shall modulate water flow to maintain refrigerant head pressure set point.
- 3. Heating mode shall disable if any of the conditions below are met:
 - 3.1. Cooling mode enabled.
 - 3.2. Dehumidification mode enabled.
 - 3.3. Occupied mode disabled.
 - 3.4. Economizer mode enabled.

7. ECONOMIZER

- 7.1. Economizer mode shall be enabled if both of the following two conditions are met:
 - 1. Outside air enthalpy is less than space / return air enthalpy.
 - 2. Space / discharge air requires cooling.
 - 3. Economizer enable is set to true on LCD or UMT.
- 7.2. Upon entering economizer mode the controller shall provide the following operations:
 - 1. Outside air damper and return air damper shall modulate inversely in order to maintain the cooling discharge air temperature set point.

8. SECONDARY SEQUENCE OF CONTROL

8.1. Variable Air Volume: Duct Static Pressure

- 1. Variable air volume sequence shall be enabled when the following conditions are met:
 - 1.1. Controller is in the occupied mode.
- 2. Under the variable air volume sequence the controller shall perform the following operations:
 - 2.1. Supply fan speed shall be modulated through a variable frequency drive in order to maintain duct static pressure set point.
- 3. Duct static pressure sensor shall be provided by factory and installed in the field.

8.2. Variable Air Volume: 0-10 VDC Signal Provided by Others

- 1. Variable air volume sequence shall be enabled when the following conditions are met:
 - 1.1. Controller is in occupied mode.
- 2. Under the variable air volume sequence the controller shall perform the following operations:
 - 2.1. Supply fan speed shall be modulated based on a 0-10 VDC signal (provided by others).
- 3. 10 VDC shall represent the design airflow of the rooftop ventilator.
- 4. 0 VDC shall represent the lowest available turndown available on the rooftop ventilator set at the factory.
- 5. 0-10 VDC signal shall be provided by others.

8.3. Demand Control Sequence: CO2 Control

1. CO2 control is enabled when the following conditions are met:
 - 1.1. Controller is in occupied mode.
 2. Under CO2 sequence the controller shall perform the following operations:
 - 2.1. Outdoor air and return air dampers shall be modulated to maintain space CO2 set point (adj.).
 3. CO2 sensor shall be provided by factory and installed in the field.
- 8.4. Pressurization Control: Supply Air Modulation
1. Variable air volume sequence shall be enabled when the following conditions are met:
 - 1.1. Controller is in the occupied mode.
 2. Under the variable air volume sequence the controller shall perform the following operations:
 - 2.1. Supply fan speed shall be modulated through a variable frequency drive in order to maintain building static pressure set point.
 3. Building static pressure sensor shall be provided by factory and installed in the field.
- 8.5. Pressurization Control: Exhaust Fan Modulation
1. Constant air volume sequence shall be enabled when the following conditions are met:
 - 1.1. Controller is in occupied mode.
 2. Under the constant air volume sequence the controller shall perform the following operations:
 - 2.1. Exhaust fan speed shall be modulated through a variable frequency drive in order to maintain space static pressure set point.
 3. Space static pressure sensor shall be provided by factory and installed in the field.
- 8.6. Pressurization Control: Mixing Box Modulation
1. Constant air volume sequence shall be enabled when the following conditions are met:
 - 1.1. Controller is in occupied mode.
 2. Under the constant air volume sequence the controller shall perform the following operations:
 - 2.1. Outside air damper and return air damper shall modulate inversely in order to maintain space static pressure set point.
 3. Space static pressure sensor shall be provided by factory and installed in the field

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