



Applies to: PREEVA® Models SDH, PDH, RDH, PXH, RXH, PEH, and REH and High Efficiency Models SHH and RHH with Digital Controls, Option D12B, D12C, D12D, D12E, D12F, or D12G

Application and Instructions for Field Adjustment of the Control (Model FX06) in Digital Control Options D12B, D12C, D12D, D12E, D12F, D12G

- Control Option D12B applies to gas-fired heat Models PDH, SDH, & RDH.
- Control Option D12C applies to no-heat Models PXH & RXH and gas-fired Models PDH, SDH, & RDH.
 - Control Options D12D and D12E apply to electric heat Models PEH & REH.
 - Control Option D12F applies to high efficiency gas-fired Model SHH.
- Control Option D12G applies to indoor high efficiency gas-fired Model SHH, outdoor gas-fired Model RDH (Sizes 175-400), and outdoor gas-fired high efficiency Model RHH.
 - A D12 Digital Control is required with Reheat Option AU7.

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Introduction

NOTE: Information does not apply to an FX07 controller. If unit is equipped with an FX07 (ordered as a special), contact your Representative or the factory for control information.

The microprocessor unit (Model FX06) in control Options D12B, D12C, D12D, D12E, D12F, and D12G is custom programmed for the Models listed above. Controller features include

- Custom 3-step control sequence of cooling and dehumidification (reheat)
- 8:1 or 4:1 Gas heating modulation control or two stage heating
- Electric heat with SCR (modulating) control or two stage
- Fully integrated outdoor ambient lockouts based on outdoor dry bulb/dewpoint or enthalpy
- Alarm and equipment shutdown features
- Service/Commissioning Test Mode
- Integrated timer functions for cooling and heating



FX06

(NOTE: Not all control features apply to all Models)

There are four buttons that can be used for adjusting setpoints, viewing unit status, and enabling unit test or shut down modes (See page 4). The controller display will indicate unit status (on, off, or alarm), discharge air temperature, outdoor air temperature, dewpoint, and enthalpy. When equipped with a wall-mounted sensor, space temperature will be displayed.

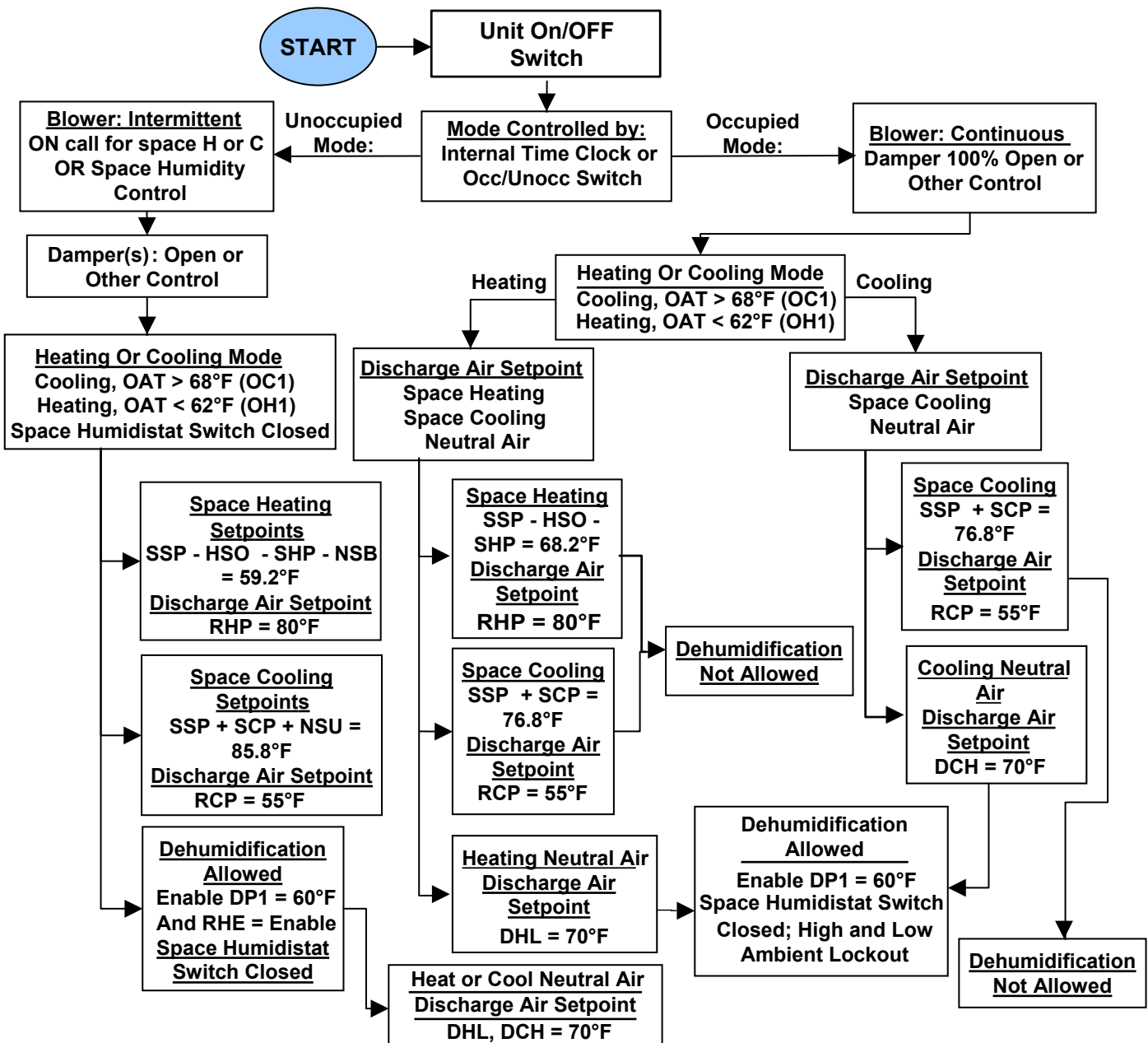
General Sequence of Operation

When the unit is called to operate, the main blower will run continuously in occupied mode and intermittently in unoccupied mode. The unit operates based on four Discharge Air Temperature Setpoints listed below.

1. Standard (Neutral) Heating Discharge Air Temperature Setpoint
2. Space Heating Discharge Air Temperature Setpoint
3. Standard (Neutral) Cooling Discharge Air Temperature Setpoint
4. Space Cooling Discharge Air Temperature Setpoint

The heating and cooling equipment will cycle to maintain the active discharge air temperature setpoint for occupied and unoccupied modes. Heating and cooling may be locked out of operation based upon outdoor air temperature and enthalpy conditions. If equipped with reheat, the control will also activate the dehumidification circuit to maintain a neutral discharge air temperature setpoint and related dewpoint based upon outdoor air and space conditions.

FIGURE 1 - Sequence of Operation with Default Settings



Application

All D12 options have a unit-mounted FX06 controller that is factory-programmed for the application identified by the option code. Each application is available with a remote user interface as shown on page 5 and/or a space reset control as shown on page 24.

Option D12B - applies to PDH, SDH, & RDH - Control is factory programmed for electronic modulation (4:1) gas heating, 3-stage cooling, and dehumidification (reheat). An FX06 controller that is programmed for D12B application is **P/N 223485**.

Option D12C - applies to PDH, SDH, RDH, PXH, & RXH - Control is factory programmed for 2-stage heating, 3-stage cooling, and dehumidification (reheat). FX06 controller programmed for D12C application is **P/N 223486**.

Option D12D - applies to PEH & REH - Control is factory programmed for electric heat with SCR modulation, 3-stage cooling, and dehumidification (reheat). FX06 controller programmed for D12D application is **P/N 234685**.

Option D12E - applies to PEH & REH - Control is factory programmed for 2-stage electric heat, 3-stage cooling, and dehumidification (reheat). FX06 controller programmed for D12E application is **P/N 234686**. **NOTE:** Option D12E is not recommended for a makeup air application.

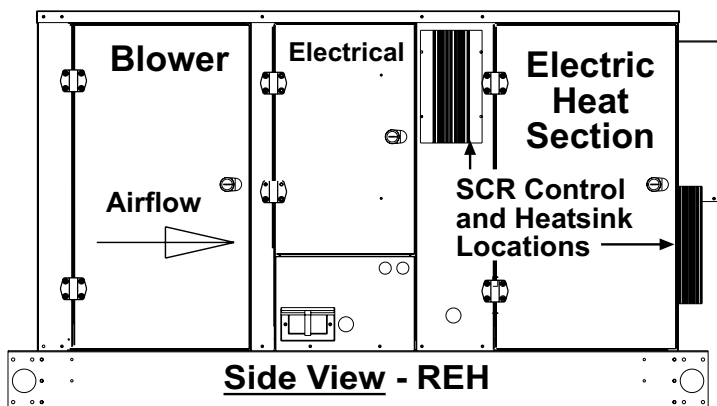
Option D12F - applies to SHH* - Control is factory programmed space temperature control for 2-stage gas heat, 3-stage cooling. The wall-mounted adjustable setpoint module (Option CL67) is required. FX06 controller programmed for D12F application is **P/N 257432**.

Option D12G - applies to RDH (Sizes 175-400), RHH & SHH* - Control is factory programmed for electronic modulation (8:1) gas heating, 3-stage cooling, and dehumidification (reheat). FX06 controller programmed for D12G application is **P/N 260087**.

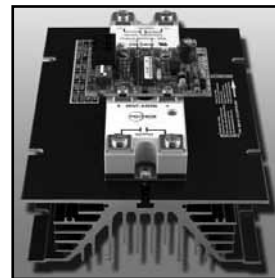
***SHH NOTE:** Model SHH manufactured prior to 2/13 was not a makeup air heating unit; therefore, some control functions do not apply. Option D12F would be used with a mixing box with economizer cooling controls (Opt GE21 or GE22) or to interface with a LON or N2 system.

Option D12D Control for Modulating Electric Heat - Model PEH or REH units with Option D12D have additional controls to provide the electric heat modulation. Depending on their size and voltage, PEH and REH units with Option D12D are equipped with one or two SCR power controllers. The SCR controllers cause modulation of specified heating elements while other elements are turned on and off or staged. Depending on the size of the heating unit, staging is controlled either by the FX06 controller or an additional staging module,

FIGURE 2 - Locations of the SCR Power Controller(s) with Heatsink used on Models REH and PEH with Modulating Heat Control Option D12D



SCR Power Controller and Heatsink in Option D12D (one or two required depending on size and voltage)



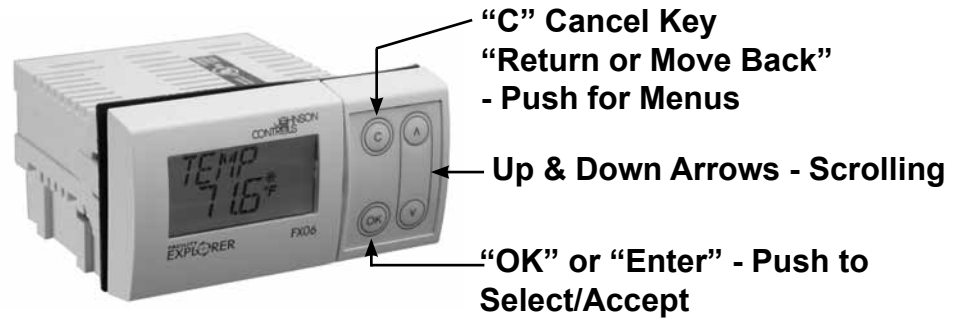
Voltage	P/N
208/230-1 (AK2/3)	223175
208/230-3 (AK5/6)	234057
460/3 (AK7)	220688
575/3 (AK8)	234058

DANGER

High voltages are present on the terminals of the SCR power controller(s).

WARNING
The heatsink on the SCR power controllers is **HOT** to the touch.

FX06 Controller Display



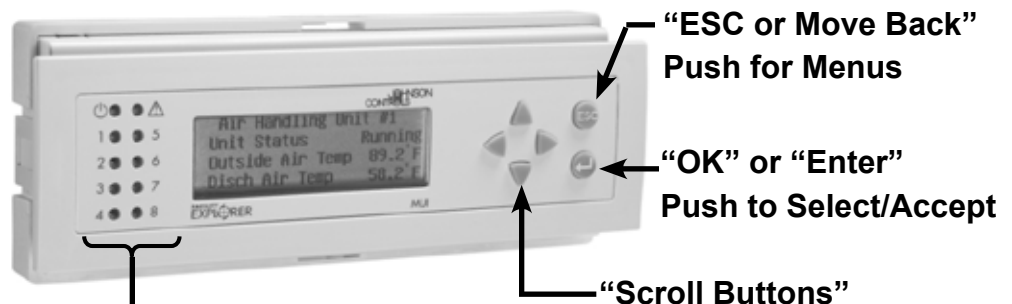
Upon Start-up or power on, the FX06 controller provides data from the home page variables. Pressing the up and down arrows will display one item from the home page menu.

- » The control once powered up will operate based upon the time schedule or occupancy physical point state. Press and hold the “C” key to turn the controller OFF/ON.
- » Pressing the “C” button, displays the menu pages. Use the “Up” or “Down” to move between menu selections. Press the “OK” button to view menu variables.
- » Press the “OK” key to select a variable to change. Use the “up” or “down” button to change the values. Press the “OK” key again to accept the change or the “C” key to move back to previous level.

Menu Options	
Item	Description
Home Page	Unit ON/OFF Status
01	Unit Status & Modes
02	Temperature Setpoints
03	OA Reset Schedule
04	Commissioning Parameters
05	Sensor Calibration
06	Controller Setup : Time, Address, Date
07	Time Schedules
08	Alarm Events
See Variable List for location and functionality of all parameters. See pages 15-22.	

Optional Remote Medium User Interface, Option RB2A, P/N 223125

The remote user interface display mimics all menus and functions on the FX06 controller except the “Test Function”.



Display Lights	
Symbol and 01 - 08	
Unit ON/OFF	Alarm
Comp #1 ON	Reheat ON
Comp #1 ON	Not Used
Stg #1 Heat ON	Not Used
Stg #1 Heat ON	Not Used

The remote user interface display is a four-line, backlit unit requiring 24Vac/dc power and a two wire network connection between the unit controller and the display. The display receives all of its programming and functionality from the controller located in the unit. The display can be mounted 500 ft (152M) away from the controller. (Consult the factory for longer distances.) Refer to the wiring diagram for details.

Upon startup or power on, the remote display provides data from the home page variables. Pressing the up and down arrows will display four lines of text, a single variable and data per line.

- » Pressing the “ESC” button displays the menu pages. Use the “left” or “right” arrows to move between menu pages. Press the “return” key to select a menu. The menu options are the same for the local and remote display.
- » Some menus have more than one page of data. You can use the left/right arrows to move between pages and use the up/down arrows to scroll between variable data.
- » Press the “OK” key to select a variable to change. Use the “up” or “down” button to change the values. Press the “OK” key again to accept the change or the “ESC” key to move back to the previous level.
- » Pressing the ESC for 10 seconds will reset the FX06 controller which clears the alarms.

Installation Warnings and Notes

DANGER:

Risk of Electrical Shock - To avoid possible electrical shock or equipment damage, disconnect power supply before making electrical connections.

IMPORTANT INSTALLATION NOTES

- 1) **All Installations** - The FX06 control is DC voltage. DC voltage wires must not be run in the same conduit as the 24V or line voltage wiring. All field-installed DC sensor wire must be in shielded cable.
- 2) The discharge air sensor is factory wired in the low voltage control box. The installer must relocate the discharge air sensor to the supply ductwork or unit discharge for proper heating discharge air control. (See instructions on page 25.)
- 3) **Installation with an optional communication card insert (Option BHB2 or BHB3)** - Always remove controller power when installing or removing a communication card insert.

IMPORTANT: The Model FX06 controller is designed for use only as an operating control. Where an operating control failure would result in personal injury or loss of property, it is the responsibility of the installer to add devices (safety and/or limit controls) or systems (alarm and/or supervisory systems) that provide protection from or warning of control failure.

Unit Power and Blower Operation

General Operation

The FX06 controller also has an ON/OFF button (function key). When the FX06 (on/off) input (Point BI-3) is closed, the unit will operate in either occupied or unoccupied mode. When the occupied / unoccupied switch (Point BI-4) is closed, the unit will run in occupied mode; otherwise the unit operates in unoccupied mode.

Time Clock

An FX06 controller has a built-in real-time clock that supports all real-time functions including the display of time and date on the screen and the time stamping of each event. The unit will switch between occupied and unoccupied mode based upon a time of day schedule.

Installation Warnings and Notes (cont'd)

The unit will run in occupied mode when either BI-4 or the time clock calls for occupied mode. If both the internal time clock and external contacts are used, the physical input (point BI-4) will override the air handler to occupied mode if the physical point is closed. If the physical point is open, the internal time clock dictates the state.

Time Clock NOTE 1: Space sensor is required for unoccupied mode.

Time Clock NOTE 2: Make sure the BI-4 jumper is open when the internal time clock is used to avoid conflict of settings.

Occupied Mode

Blower operation is continuous in occupied mode. The FX06 contact BO-1 will close providing power for the outside air damper to open. If equipped with a 2-position damper, the outdoor air damper is electrically interlocked with the blower circuit. When the damper actuator opens to 80%, the blower is allowed to run. If power is lost, the mechanical spring will drive the damper closed.

If the unit is equipped with return air dampers, the blower control relay is not interlocked with the dampers.

Unoccupied Mode

The blower cycles ON/OFF with a call for either heating or cooling from the space sensor. Once the space heating or cooling unoccupied setpoints are satisfied, the blower will continue to run for 60 seconds then shut OFF.

During the Unoccupied Cycle the space setpoints will increase as follows:

$$\text{Space Cooling Setpoint (SSP)} = (\text{SSP} + \text{SCP} + \text{NSU}) = 75^{\circ}\text{F} + 1.8 + 9^{\circ}\text{F} = 85.8^{\circ}\text{F}$$

$$\text{Space Heating Setpoint} = (\text{SSP} - \text{HSO} - \text{SHP} - \text{NSB}) = 75^{\circ}\text{F} - 5^{\circ}\text{F} - 1.8 - 9^{\circ}\text{F} = 59.2^{\circ}\text{F}$$

(NSU and NSB default value = 9°F, adjustable from 0-35°F)

Unoccupied Override Mode

If the space override dial on the space sensor is turned during an unoccupied period, the air handling unit will operate in occupied mode for a period of four hours. (UOT = 240 minutes)

Heating and Cooling Control Modes

The unit operates based upon four Discharge Air Temperature Setpoints.

1. Standard (Neutral) Heating Discharge Air Setpoint
2. Space Heating Discharge Air Setpoint
3. Standard (Neutral) Cooling Discharge Air Setpoint
4. Space Cooling Discharge Air Setpoint

With the space sensor installed, the unit will operate to maintain the space heating and cooling setpoints as required. When the space temperature sensor is satisfied (or not installed), the unit will operate to maintain the standard (neutral) discharge air setpoint. The space cooling setpoint (SSP) default value is 75°F. The space heating setpoint is a given differential (HSO) below the space cooling setpoint. The differential (HSO) can be adjusted from 1-30°F. The default value of 5°F makes the default heating setpoint 70°F.

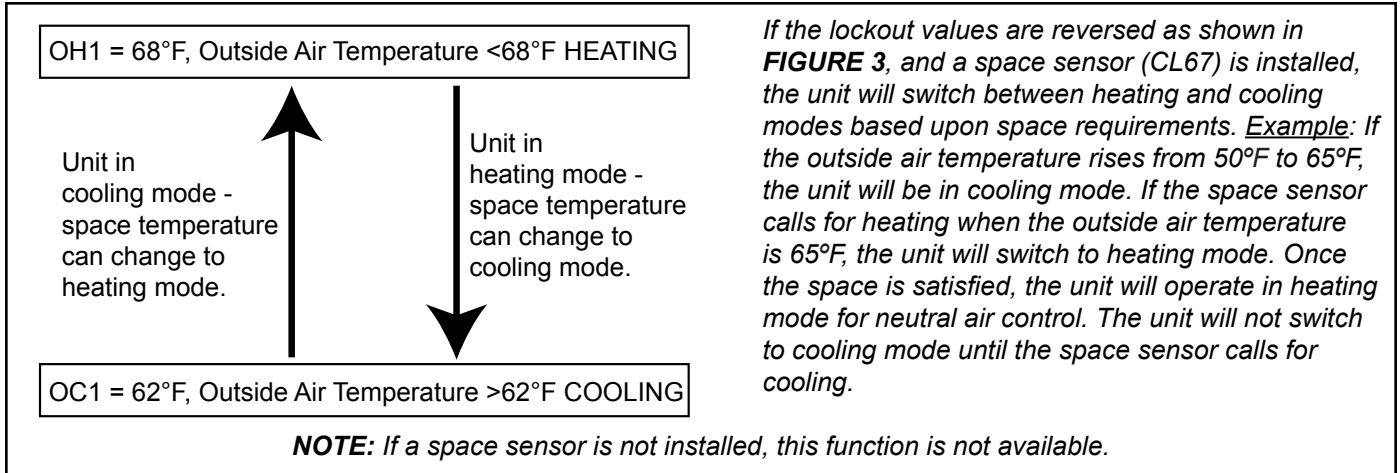
When the space temperature sensor is satisfied (or not installed), the unit will discharge standard (neutral) air. The default cooling mode setpoint (DCH) value is 70°F. The default heating mode setpoint (DHL) is 70°F. These setpoints can automatically be adjusted by a user defined reset schedule.

The heating or cooling mode is determined by outside air conditions and mode lockout values. If the outside air temperature value (Point AI-3) is greater than the cooling mode lockout value (OC1, default 68°F), the unit is in cooling mode. If the outside air temperature is lower than the heating mode lockout value (OH1, default 62°F), the unit is in heating mode (gas or electric).

Unit is in Cooling Mode when outside air temperature **rises** above OC1

Unit is in Heating Mode when outside air temperature **falls** below OH1

FIGURE 3 - Reverse Lockout Values to switch between heating and cooling based on space temperature (instead of outside air temperature).



Heating and Cooling Control Modes (cont'd)

Heating Mode (cont'd)

If a local space sensor is installed, the unit will change the neutral air discharge setpoint to the room discharge air heating setpoint (RHP) whenever the space requires heating. Whenever the space temperature is below the setpoint by a value greater than the space heating proportional band (SHP), then space heating is required. The SHP default value is 1.8°F, adjustable from 1 to 8 °F.

Example:

Space heating setpoint = $(SSP - HSO) = 75^{\circ}F - 5^{\circ}F = 70^{\circ}F$

Space heating proportional band (SHP) = 1.8°F (Range 1 to 8°F)

Space heating active $[(SSP - HSO) - SHP]: 70^{\circ}F - 1.8^{\circ}F = \underline{68.2^{\circ}F}$

Room discharge air temperature heating setpoint (RHP) = 80°F

During the Unoccupied Cycle the space setpoints will increase as follows:

Space Heating Setpoint = $(SSP - HSO - SHP - NSB) =$

$75^{\circ}F - 5^{\circ}F - 1.8 - 9^{\circ}F = 59.2^{\circ}F$

(NSB default value = 9°F; adjustable from 0 to 35°F)

When the space temperature is more than SHP above the setpoint (71.8°F), the unit will switch to neutral air control and space heating requirements will be OFF. The neutral discharge air control setpoint value will be the DHL value.

It may be useful to change the neutral air setpoint if the indoor ambient comfort conditions significantly change based upon outdoor air conditions. The discharge air setpoint can be set to automatically adjust between the DHL and the DHH values depending upon the outside air conditions.

Example: Elder care centers tend to require higher space temperatures during the winter season (example 78°F). Therefore, when the outside air is 60°F, the unit can deliver 70°F neutral air. And, when the outside air temperature drops to 30°F, the unit can provide 78°F neutral air. The higher neutral air setpoint provides neutral air matching the space temperature, thus better comfort control.

Gas Heat Staging and Modulation

Upon a call for heat to maintain the active discharge air setpoint, the unit will fire both stages for 20 seconds. Upon proof of ignition, the unit switches to low fire. If the discharge air temperature (DAT) rises above 1/2 HPP value above the setpoint ($70^{\circ}F + 2.5^{\circ}F = 72.5^{\circ}F$) after initially starting, the 1st stage will remain ON for 180 seconds then turn OFF. After the first 120 seconds from the 1st stage activating, if the DAT does not increase above 1/2 of the band ($67.5^{\circ}F$), the controller will turn on 2nd stage or high fire. If the DAT increases above $72.5^{\circ}F$, then the stages start turning OFF in the reverse sequence. If the DAT remains between the proportional band (HPP = 5, $67.5^{\circ}F$ to $72.5^{\circ}F$), the unit will not add or subtract a stage of heating.

The modulating gas control systems do not have a second stage. The modulating gas valve will modulate gas flow to maintain the temperature setpoint.

Electric Heat Staging and Modulation

Upon a call for heat to maintain the active discharge air setpoint, the unit will turn on both stages for 20 seconds. If the discharge air temperature (DAT) rises above 1/2 HPP value above the setpoint ($70^{\circ}F + 5^{\circ}F = 75^{\circ}F$) after initially starting, the 1st stage will remain ON for 180 seconds then turn OFF. After the first 180 seconds from the 1st stage activating, if the DAT does not increase above 1/2 of the band ($65^{\circ}F$), the controller will turn on 2nd stage. If the DAT increases above $75^{\circ}F$, then the stages start turning OFF in the reverse sequence. If the DAT remains between the proportional band (HPP = 10, $65^{\circ}F$ to $75^{\circ}F$), the unit will not add or subtract a stage of heating.

The SCR controller accepts the 0-10v modulating signal from the FX06 controller. The control stages the electric heat value to maintain the electric heat output based upon the 0-100% control signal.

Heating Mode Lockout

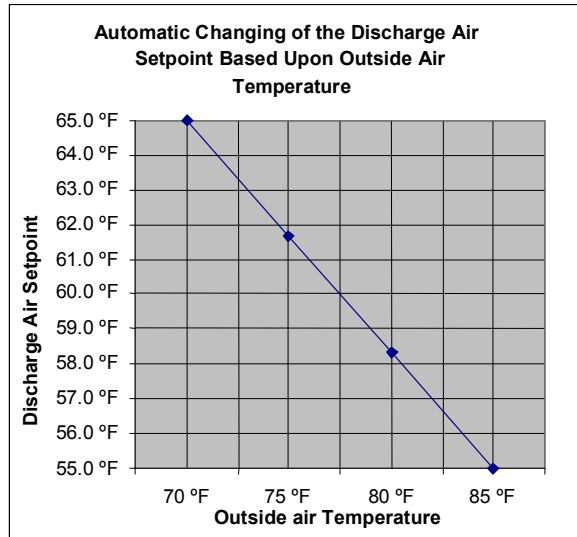
If the Discharge Air Temperature (Point AI-4), does not rise above LSP ($36^{\circ}F$) in 600 seconds after blower enables, the unit will shut down. Upon a rise in discharge air temperature ($LSP + 30^{\circ}F = 66^{\circ}F$), the unit is enabled. Three consecutive lockouts within one hour will result in a continuous lockout state (24 VAC power must be cycled to reset the controller). If the Outdoor Air Temperature sensor fails, the blower will operate without cooling, reheat, or heating equipment active. If the Outdoor Air Temperature rises above the OH1 heating lockout ($62^{\circ}F$), the heating equipment will be turned OFF after the minimum run times.

Cooling Mode

When the unit is in cooling mode, the unit will discharge air based upon the neutral air cooling setpoint point (DCH) and the room discharge air cooling setpoint (RCP). If the space sensor is not installed, the unit will operate to provide neutral air only.

FIGURE 5 - Outside Air Reset (DCL) allows automatic changing of discharge air temperature based on outside air temperature.

Discharge Air Setpoint	Outside Air Temperature
DCL = 55°F	OC2 = 85°F
DCH = 65°F	OC3 = 70°F



Variable Name	Description	Default Value (Range)
DCH	Standard Discharge Air Setpoint (Primary Setpoint) DCH is the value of the discharge air cooling setpoint when the outside air temperature is at its coldest value to allow minimum cooling. The discharge air temperature will not change to a higher value than DCH regardless of the outside air temperature. If the reset option is disabled, the DCH becomes the primary neutral air cooling discharge air setpoint.	65°F (50° to 115°F)
DCL	Outdoor Air Reset Option The value of the neutral discharge air cooling setpoint when the outside air temperature is at its warmest value to allow maximum cooling. The discharge air temperature will not change to a lower value than DCL regardless of the outside air temperature. The default value disables reset functionality.	55°F (49° to 115°F)
OC2	Outdoor Reset Dry Bulb Cooling – High Setting The value of the outside air temperature corresponding to the DCL coldest cooling setpoint value.	85°F (20° to 70°F)
OC3	Outdoor Reset Dry Bulb Cooling – Low Setting The value of the outside air temperature corresponding to the DCH warmest cooling setpoint value.	70°F (-40° to 65°F)
Disable	Making the DCL value higher than the DCH value disables this functionality.	Disabled

If a space sensor is installed, the unit will change from the neutral discharge air temperature setpoint to the room discharge air heating setpoint (RCP) value whenever the space requires cooling. Whenever the space temperature is above the setpoint by a value greater than the space cooling proportional band (SCP), the space will call for space cooling to be ON. The SCP default value is 1.8°F.

Example:

Space cooling setpoint SSP = 75°F (Default)

Space cooling proportional band (SCP) = 1.8°F (adjustable 1 to 8°F)

Space cooling active above: (SSP + SCP) = 75°F + 1.8°F = 76.8°F

Space cooling discharge air setpoint (RCP) = 55°F

During the Unoccupied Cycle the space setpoints will increase as follows:

Space Cooling Setpoint = (SSP + SCP + NSU) = 75°F + 1.8°F + 9°F = 85.8°F
(NSU default value = 9°F, adjustable from 0-35°F)

When the space temperature is more than SCP below the setpoint (73.2°F), the unit will switch to neutral air control. The control setpoint value will be the DCH value.

Heating and Cooling Control Modes (cont'd)

Cooling Mode (cont'd)

Cooling Staging

The neutral air setpoint can be automatically adjusted based on outside air values. The discharge air setpoint will float between the DCL value and the DCH value depending upon the outside air conditions. In low humidity applications where the unit may serve other mechanical equipment directly, it may be beneficial to automatically adjust the setpoint to minimize the use of mechanical equipment. **NOTE: This function is not recommended for humidity sensitive applications.**

Upon a call for cooling mode to maintain the active discharge air setpoint, the unit will enable a stage when the discharge air temperature is more than ½ of the cooling proportional band (CPP) above the setpoint. (Default CPP value is 10°F.)

Example: Active setpoint = 70°F. The 1st stage enables when the discharge air temperature is greater than 75°F. Likewise if the discharge air temperature is below 65°F, an active stage of cooling is turned OFF.

The system has intra-stage time delays of 4.5 minutes. Thus, compressors have a minimum ON and OFF time of 4.5 minutes. After the first stage has been turned ON and the discharge air temperature is still 5°F greater than the setpoint (1/2 CPP) and 4.5 minutes has passed, the unit will turn on stage 2 cooling.

If after 4.5 minutes the same condition exists, stage 3 will be active. If the discharge air temperature value is within the cooling proportional band (CPP is 65°F - 75°F), the active stage will remain ON. If the DAT falls 5°F below the setpoint, the staging control will act in reverse, turning OFF stages.

Cooling Mode Lockout

The unit is equipped with a manual reset high pressure switch and an auto-reset low pressure switch for each compressor circuit. If any pressure switch trips, that particular mechanical cooling circuit is disabled. Each circuit on the evaporator coil has an auto-reset froststat which will disable the cooling circuit if the temperature drops below 36°F.

To reduce compressor cycling, the compressors are enabled to run based upon outdoor dry bulb temperature and enthalpy settings. No mechanical cooling is allowed to operate if the outside air temperature is below the cooling mode lockout (OC1). Default OC1 setting is 68°F; adjustable range is 58 to 130°F. If the compressors are enabled and the temperature falls below the OC1 setting, the minimum run time will keep the compressors ON. **ALL** compressors will immediately turn OFF after the current minimum run time expires; the unit does not stage down.

If the unit is equipped with an outdoor air humidity sensor (Point AI-2), the compressors are locked out until the outside air enthalpy value rises above the lockout settings

- ❖ Stage 1 compressor is locked out when the outdoor air enthalpy is below EN1 settings.
- ❖ Stage 2 compressor is locked out when the outdoor air enthalpy is below EN2 setting.
- ❖ Stage 3 compressors are locked out when the outdoor air enthalpy is below EN3 settings.

Dehumidification (Reheat)

All of the D12 options used with dehumidification (Option AU7 or AU8) include a relative humidity transmitter. Depending on whether the unit includes a mixing box, the sensor is either factory-mounted in the mixing box or shipped separately for field installation in the outside air inlet. On indoor units the sensor should be mounted near the inlet of the outdoor air duct.

The sensor sequences compressor operation based on outdoor dewpoint.

Reheat control is enabled based on the outdoor dewpoint temperature setpoint (DP1). If the outside air dewpoint is above the setpoint (DP1 = 60°F), BO-4 will be ON activating the reheat system. The reheat circuit adds 7 to 17°F to the discharge air temperature after it leaves the main cooling section of the unit. The reheat control output will be OFF based upon any of the following conditions:

1. The space temperature sensor calls for the unit to provide space cooling. In this mode the reheat is OFF. Once space cooling (SSP) is satisfied, reheat can restart.
2. The unit is equipped with a space humidistat with setpoint control. If the humidistat is not calling for dehumidification, thus the switch is open to BI-2, the reheat circuit is OFF.
3. If the outdoor air temperature is below the low ambient lockout (ROL), the reheat circuit will be OFF. The ROL default value is 65°F.
4. If the outdoor air temperature is above the high ambient lockout (ROH), the reheat circuit will be OFF. The ROH default value is 120°F.
5. If the unit is in unoccupied mode and the (RHE) reheat value is NO, reheat is not allowed in the unoccupied mode. If the RHE default value is YES, reheat

is allowed in the unoccupied mode based upon space humidistat. If a space humidistat is not installed, the contact is wired closed thus allowing reheat in the unoccupied mode.

6. If the outdoor air temperature sensor fails, cooling, reheat, and heating equipment are not allowed to operate.

Control Adjustment Guidelines for a Reheat System

The discharge air temperature can be adjusted when the reheat point is ON. When reheat is ON, the discharge air temperature can be reset as follows.

$$\text{DCH} = \text{DCH} + \text{RSP}$$

NOTE: If outdoor reset is used, DCL must replace DCH.

NOTE: It is important that RSP be used when the DCH value is lower than 65°F. Because the reheat system adds 7 to 17°F to reheat, a DCH setpoint of 55°F must discharge 40°F from the main coil to maintain a 55°F setpoint value. This low discharge temperature may damage the unit.

There are many ways to combine settings based on each application. The type of reheat application will determine the setting for **DCH** and **RSP**. The typical application requires RSP to be 0°F when DCH is 70°F. The unit will discharge a dewpoint of 52 to 55°F at 70°F discharge air temperature.

EXAMPLE 1) Neutral Air Application (corridor or kitchen makeup air)

Since the unit reheat override is based primarily on space temperature, the reheat override parameter ROH will be adjusted outside of operating range. Below are the proposed settings:

DP1 = 58; reheat enabled above 58°F dewpoint

ROL = 58; reheat compressor locked out below 58°F dry bulb

OC1 = 65; cooling compressors locked out below 65°F (Assumes reheat pump alone is adequate.)

EN1 = 29; 1st stage cooling compressor enabled above 29 btu/lb

OH1 = 70; heating locked out above 70°F ambient

DCH = 70; cooling duct discharge air setpoint with RSP = 0 (use DCL with outdoor reset)

RSP = 0; regardless of ambient dewpoint, the duct discharge air temperature setting is 70°F

ROH = 115; high ambient reheat override is set where reheat is not disabled

RCP = 55; if the space temperature exceeds the cooling setpoint, reheat is disabled and discharge air is supplied at 55°F

EXAMPLE 2) Neutral Air Application (Space Temperature Override – RH input Jumpered and Reheat Override)

If space sensible loads increase with outdoor ambient dry bulb, it may be preferred to override reheat mode by using the ROH reheat override in conjunction with space temperature override. Below are the proposed settings:

DP1 = 58; reheat enabled above 58°F dewpoint

ROL = 58; reheat compressor locked out below 58°F dry bulb

OC1 = 68; cooling compressors locked out below 68°F (Assumes reheat pump alone is adequate.)

EN1 = 29; 1st stage cooling compressor enabled above 29 btu/lb

OH1 = 72; heating locked out above 72°F ambient

DCH = 62; cooling duct discharge air with reheat overrides (use DCL with outdoor reset)

RSP = 8; the duct discharge air temperature setting with reheat is 70°F (62 + 8)

ROH = 92; reheat mode is disabled over 92°F ambient dry bulb with a supply air temperature of 62°F

RCP = 55; if the space temperature exceeds the cooling setpoint, reheat is disabled and discharge air is supplied at 55°F

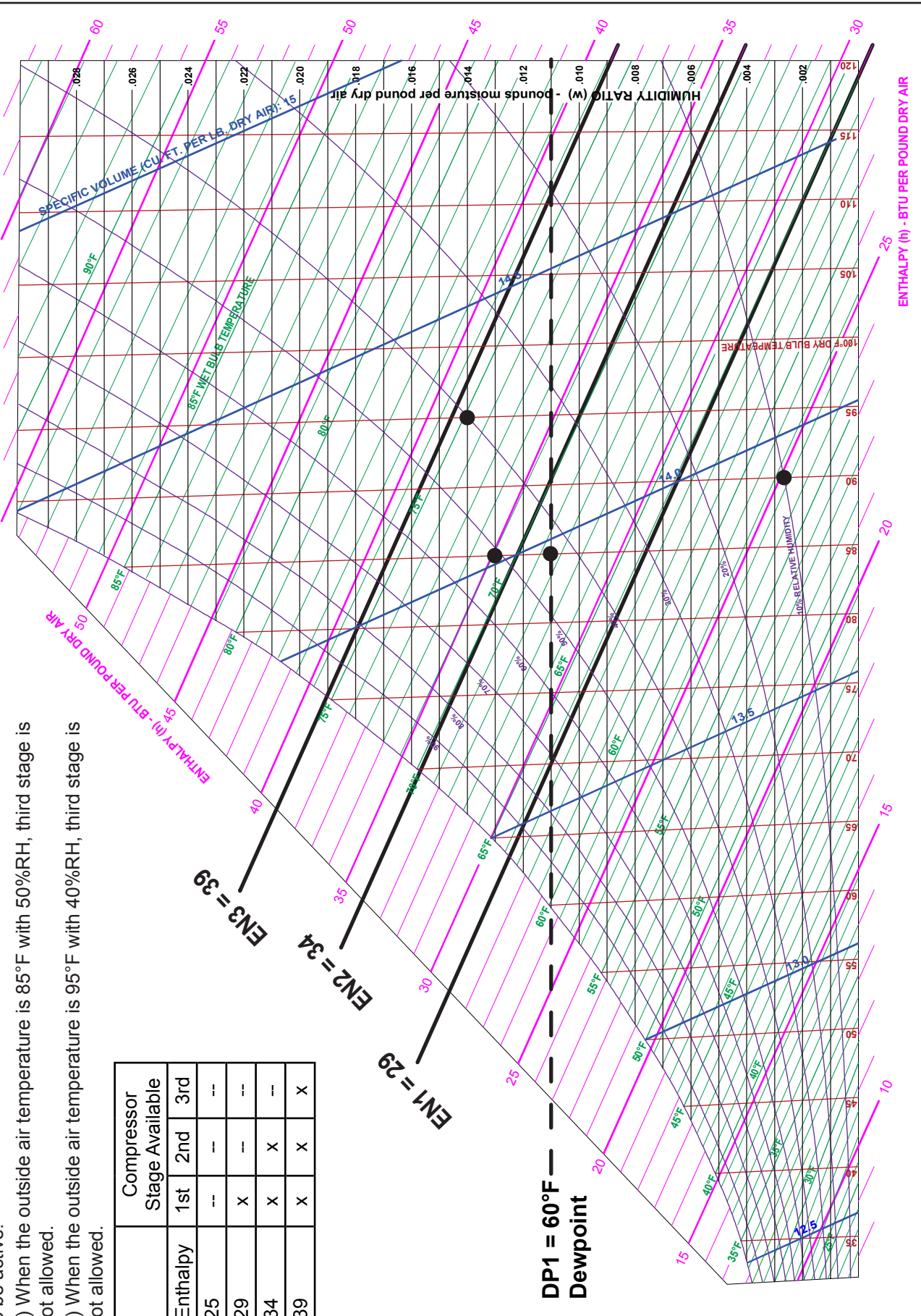
In this mode, if the dewpoint is below 58°F, the unit will discharge 62°F air to the space in neutral air mode. If the dewpoint rises above 58°F, the unit will discharge 70°F air to the space in neutral air mode. If the space requires cooling, the unit will discharge 55°F air to the space until the space setpoint is satisfied.

FIGURE 6 - Optional humidity transmitter measures outdoor air humidity and controls compressor operation based on enthalpy settings EN1, EN2, EN3

Example:

- 1) When the outside air temperature is 90°F with 10%RH, the enthalpy is ~25. The standard enthalpy setting EN1 (29) will not allow cooling mode to be active.
- 2) When the outside air temperature is 85°F with 50%RH, third stage is not allowed.
- 3) When the outside air temperature is 95°F with 40%RH, third stage is not allowed.

Enthalpy	Compressor Stage Available		
	1st	2nd	3rd
25	--	--	--
29	X	--	--
34	X	X	--
39	X	X	X



DP1 = 60°F
Dewpoint

Menu Pages

To access Menu Pages, press the "C" Key; choose Menu #1 - Unit Status.

Menu 01		Unit Status and Modes	
Display Name	Control Variable Description	Reading or Status	
SPCT	Space Temperature Value from Sensor (Option CL67) "--" if not installed	XXX.X°F	
DAT	Discharge Air Temperature	XXX.X°F	
OAT	Outside Air Temperature	XXX.X°F	
Enth	Outside Air Enthalpy Value (BTU/LBS)	XXX.X	
DP	Outside Air Dewpoint Temperature	XXX.X°F	
OA HUM PERC	Outside Air Relative Humidity Percent	XXX.X%	
DA WHSP	The active discharge air heating setpoint for the given conditions	XXX.X°F	
DA WCSP	The active discharge air cooling setpoint for the given conditions	XXX.X°F	
MODE	The active stages of cooling or heating the controller has requested. Cooling = CLG1, CLG2, CLG3; Heating = HTG1, HTG2, HTG3, Reheat. When the unit is not requiring heating, cooling, or reheat, the controller display shows "OFF".	Status only	
OCC STATUS	Current Unit Mode - Occupied or Unoccupied	Status only	
OCC OVRD STAT	Temporary Occupied Override - When the wall switch occupied button is pushed, the unit switches from unoccupied mode to occupied mode for the given time	Status only	
SHUTDOWN	Normal Operation or Shutdown - When the remote ON/OFF contact closure is open, the unit will be OFF (SHUTDOWN). If the contact closure is closed, the controller display shows "ON", and the unit will follow its sequence of operation.	Status only	
DA CNTRL MODE	Active Discharge Air Control Mode - Neutral Air Heating (DAH), Neutral Air Cooling (DAC); Room Air Cooling (RMC), Room Air Heating (RMH)	Status only	
RM WHSP	Active Space Heating Setpoint - Displays the active setpoint determined by occupied or unoccupied mode.	XXX.X°F	
RM WCSP	Active Space Cooling Setpoint - Displays the active setpoint determined by occupied or unoccupied mode.	XXX.X°F	
HTG OUTPUT PCT	Percentage of Heating Output - Displays the percentage of heating output from 0-100%.	XXX.X%	

FX06 Commissioning Parameters Level

Menu 02		Temperature Setpoints			
Display	Control Variable Description	Default Value		Range	
SSPHI	The maximum value that the space setpoint dial can be set	D12B	78°F	55° to 90°F	
		D12C	78°F		
		D12D	78°F		
		D12E	78°F		
		D12F	78°F		
		D12G	78°F		
SSPLO	The minimum value that the space setpoint dial can be set	D12B	72°F	55° to 90°F	
		D12C	72°F		
		D12D	72°F		
		D12E	72°F		
		D12F	72°F		
		D12G	72°F		
SSP (status only)	Space Cooling Temperature Setpoint (SSP) - This is a setpoint from the space sensor (Option) above which the unit will begin to initiate space cooling. As the space temperature increases above this value, the space cooling discharge air setpoint will become active (RCP). The range of the dial is governed by the high (SSPHI) and low (SSPLO) values above.				

(continued)

Menu 02 (cont'd)		Temperature Setpoints (cont'd)		
Display	Control Variable Description	Default Value		Range
HSO	<u>Space Heating Setpoint Offset</u> This value is subtracted from the SSP value to calculate the space heating setpoint. (Example: SSP - HSO = 75° - 5° = 70°.) As the space temperature drops below 70°F, the space heating discharge air setpoint will become active (rHP).	D12B	5°F	1° to 30°F
		D12C	5°F	
		D12D	5°F	
		D12E	5°F	
		D12G	5°F	
DP1	<u>Reheat Enabled Setpoint – Ambient Dewpoint</u> At dewpoints below this value, reheat will not be enabled.	D12B	60°F	52° to 80°F
		D12C	60°F	
		D12D	60°F	
		D12E	60°F	
		D12G	60°F	
DCH	<u>Standard (Neutral) Cooling Discharge Air Temperature Setpoint (Primary Setpoint)</u> If the reset option is disabled, the DCH becomes the primary neutral air cooling discharge air temperature setpoint. If the reset option is active, this is the maximum cooling value based on outdoor air conditions. The discharge air temperature will not change to a higher value than DCH regardless of the outside air temperature.	D12B	70°F	50° to 115°F
		D12C	70°F	
		D12D	70°F	
		D12E	70°F	
		D12G	70°F	
DHL	<u>Standard (Neutral) Heating Discharge Air Temperature Setpoint (Primary Setpoint)</u> If the reset option is disabled, the DHL becomes the primary neutral air heating discharge air temperature setpoint. If the reset option is active, this is the lowest heating value based on outdoor air conditions. The discharge air temperature will not change to a lower value than DHL regardless of the outside air temperature.	D12B	70°F	50° to 115°F
		D12C	70°F	
		D12D	70°F	
		D12E	70°F	
		D12G	70°F	
RCP	<u>Room (space) Discharge Air Cooling Temperature Setpoint</u> When a space temperature sensor is installed and the temperature in the space increases above the space cooling setpoint (SSP) through the space cooling prop band (SCP), the RCP value will become the active discharge air setpoint. The value of RCP will only be used by the unit if a space temperature sensor is used.	D12B	55°F	49° to 115°F
		D12C	55°F	
		D12D	55°F	
		D12E	55°F	
		D12G	55°F	
RHP	<u>Room Discharge Air Temperature Heating Setpoint</u> When the temperature in the space decreases below the space heating setpoint (SSP-HSO) through the space heating prop band (SHP), the RHP value will become the active discharge air setpoint. This value will only be used by the unit if a space temperature sensor is installed.	D12B	80°F	45° to 120°F
		D12C	80°F	
		D12D	80°F	
		D12E	80°F	
		D12G	80°F	

Menu 03		OA Reset Schedule		
Display	Control Variable Description	Default Value		Range
DCL	<u>Outside Air Reset Option</u> The value of the neutral discharge air cooling setpoint when the outside air temperature is at its warmest value to allow maximum cooling. The discharge air temperature will not change to a higher value than DCL regardless of the outside air temperature. The default value disables reset functionality.	D12B	90°F	49° to 115°F
		D12C	90°F	
		D12D	90°F	
		D12E	90°F	
		D12G	90°F	
DCH	<u>Standard Cooling (Neutral) Discharge Air Temperature Setpoint (Primary Setpoint)</u> If the reset option is disabled, the DCH becomes the primary neutral air cooling discharge air temperature setpoint. If the reset option is active, this is the maximum cooling value based on outdoor air conditions. The discharge air temperature will not change to a higher value than DCH regardless of the outside air temperature.	D12B	70°F	50° to 115°F
		D12C	70°F	
		D12D	70°F	
		D12E	70°F	
		D12G	70°F	

DHL	<u>Standard Heating (Neutral) Discharge Air Temperature Setpoint (Primary Setpoint)</u> If the reset option is disabled, the DHL becomes the primary neutral air heating discharge air temperature setpoint. If the reset option is active, this is the lowest heating value based on outdoor air conditions. The discharge air temperature will not change to a lower value than DHL regardless of the outside air temperature.	D12B	70°F	50° to 115°F
		D12C	70°F	
		D12D	70°F	
		D12E	70°F	
		D12F	70°F	
		D12G	70°F	
DHH	<u>Outdoor Reset Option - Duct Discharge Air Temperature Heating Setpoint</u> When used in conjunction with DHL, OH2 and OH3, the neutral discharge air heating setpoint will be adjusted based on the outdoor air temperature. If DHH is higher than DHL, the controller will reset the discharge air temperature setpoint from the low value of DHL to the high value of DHH as the outdoor air goes from the high value of OH2 to the low value of OH3. The default value disables this feature.	D12B	50°F	45° to 120°F
		D12C	50°F	
		D12D	50°F	
		D12E	50°F	
		D12F	50°F	
		D12G	50°F	
OH2	<u>Outdoor Reset Dry Bulb Heating – High Setting</u> The value of the outside air temperature corresponding to the DHL low heating setpoint value.	D12B	60°F	20° to 70°F
		D12C	60°F	
		D12D	60°F	
		D12E	60°F	
		D12F	60°F	
		D12G	60°F	
OH3	<u>Outdoor Reset Dry Bulb Heating – Low Setting</u> The value of the outside air temperature corresponding to the DHH high heating setpoint value.	D12B	30°F	-45° to 65°F
		D12C	30°F	
		D12D	30°F	
		D12E	30°F	
		D12F	30°F	
		D12G	30°F	
OC2	<u>Outdoor Reset Dry Bulb Cooling – High Setting</u> The value of the outside air temperature corresponding to the DCL coldest cooling setpoint.	D12B	60°F	20° to 70°F
		D12C	60°F	
		D12D	60°F	
		D12E	60°F	
		D12F	60°F	
		D12G	60°F	
OC3	<u>Outdoor Reset Dry Bulb Cooling – Low Setting</u> The value of the outside air temperature corresponding to the DCH warmest cooling setpoint.	D12B	20°F	-40° to 65°F
		D12C	20°F	
		D12D	20°F	
		D12E	20°F	
		D12F	20°F	
		D12G	20°F	

Menu 04		Commissioning Parameters		
Display	Control Variable Description	Default Value		Range
SCP	<u>Space Cooling Proportional Band</u> This value determines when the unit switches between space cooling and neutral air control. When the space temperature rises or falls greater than this amount, the unit switches states. Example: SSP + SCP = 75° + 1.8° = 76.8°, space cooling mode. Example: SSP - SCP = 75° - 1.8° = 73.2°, neutral air cooling mode.	D12B	1.8°F	1° to 8°F
		D12C	1.8°F	
		D12D	1.8°F	
		D12E	1.8°F	
		D12F	1.8°F	
		D12G	1.8°F	
SHP	<u>Space Heating Proportional Band</u> This value determines when the unit switches between space heating and neutral air control. When the space temperature rises or falls greater than this amount, the unit switches states. Example: (SSP - HSO) + SHP = 70° + 1.8° = 71.8°, neutral air heating mode. Example: (SSP - HSO) - SHP = 70° - 1.8° = 68.2°, space heating mode.	D12B	1.8°F	1° to 8°F
		D12C	1.8°F	
		D12D	1.8°F	
		D12E	1.8°F	
		D12F	1.8°F	
		D12G	1.8°F	

(continued)

Menu 04 (cont'd)		Commissioning Parameters (cont'd)			
Display	Control Variable Description	Default Value		Range	
CPP	<p><u>CPP - Cooling Discharge Air Prop Band</u> The value of CPP is divided in half around the value of DCH (duct discharge cooling setpoint). When the discharge air temperature goes above DCH + ½ CPP, a stage of cooling is activated. When the discharge air temperature goes below DCH – ½ CPP value, a stage of cooling is deactivated.</p>	D12B	10°F	2° to 40°F	
		D12C	10°F		
		D12D	10°F		
		D12E	10°F		
		D12F	10°F		
		D12G	10°F		
HPP	<p><u>Heating Discharge Air Proportional Band</u> The value of HPP is divided in half around the value of DHL (duct discharge heating setpoint). When the discharge air temperature goes below DHL + ½ HPP, a stage of heating is activated. When the discharge air temperature goes below DHL – ½ HPP value, a stage of heating is deactivated.</p>	D12B	4°F	4° to 30°F	
		D12C	5°F		
		D12D	20°F		
		D12E	5°F		
		D12F	5°F		
		D12G	5°F		
ICT	<p><u>Heating Integration Constant</u> This adjustable parameter defines the integration time used with proportional-integral (PI) control of discharge air.</p>	D12B	40	0 - 999 seconds	
		D12C	1		
		D12D	40		
		D12E	0		
		D12F	1		
		D12G	40		
HDB	<p><u>Space Heating Dead Band</u> The space heating dead band is a value around the heating setpoint at which nothing will occur -- hence "dead band". For instance, if the space heating setpoint is 70°F and the Space Heating Dead Band has a value of 2°, then the temperature in the space drops below 70° (SSP - HSO - 1/2 HDB) to 67.2° before the unit will switch to space heating control. Likewise, a value of 72.8° will switch back to neutral air heating control.</p>	D12B	2°F	0° to 9°F	
		D12C	0°F		
		D12D	2°F		
		D12E	0°F		
		D12F	0°F		
		D12G	2°F		
OC1	<p><u>Cooling Mode Lockout – Ambient Dry Bulb</u> If the outdoor air temperature is less than the value of oC1, cooling mode will be disabled. When the outside air temperature rises above oC1, the unit will be in cooling mode.</p>	D12B	68°F	58° to 130°F	
		D12C	68°F		
		D12D	68°F		
		D12E	68°F		
		D12F	68°F		
		D12G	68°F		
OH1	<p><u>Heating Mode Lockout - Ambient Dry Bulb</u> If the outside air temperature is greater than the value of OH1, heating mode will be disabled. When the outside air falls below OH1, the unit will be in heating mode.</p>	D12B	62°F	20° to 105°F	
		D12C	62°F		
		D12D	62°F		
		D12E	62°F		
		D12F	62°F		
		D12G	62°F		
DP1	<p><u>Reheat Enabled Setpoint – Ambient Dewpoint</u> At dewpoints below this value, reheat will not be enabled.</p>	D12B	60°F	52° to 80°F	
		D12C	60°F		
		D12D	60°F		
		D12E	60°F		
		D12F	60°F		
		D12G	60°F		
ROL	<p><u>Low Ambient Reheat Override – Dry Bulb</u> If the outdoor air temperature is below this setpoint, the reheat will not be enabled.</p>	D12B	65°F	54° to 75°F	
		D12C	65°F		
		D12D	65°F		
		D12E	62°F		
		D12F	65°F		
		D12G	65°F		

ROH	High Ambient Reheat Override – Dry Bulb If the outdoor air temperature is above this setpoint, the reheat will not be enabled.	D12B	120°F	60° to 120°F
		D12C	120°F	
		D12D	120°F	
		D12E	120°F	
		D12F	120°F	
LSP	Low Limit Freeze Protection Setpoint If the discharge air temperature sensor senses discharge air temperature below the value of LSP for 600 seconds, the blower will be disabled and the outside air damper will close. The control will reset when the discharge air sensor senses discharge air 30° above the value of LSP. If this sequence occurs three times within one hour, the control will go to continuous lockout.	D12B	36°F	-40° to 40°F
		D12C	36°F	
		D12D	36°F	
		D12E	36°F	
		D12F	36°F	
EN1	1st Stage Enthalpy Cooling Reference Lockout If the outdoor enthalpy is below this value, cooling mode is not allowed. Above this value, 1 st stage cooling is allowable.	D12B	29°	15° to 40°
		D12C	29°	
		D12D	29°	
		D12E	29°	
		D12F	29°	
EN2	2nd Stage Enthalpy Cooling Lockout Provides an enthalpy differential to the EN1 setting (add this differential to the EN1 value). If outdoor enthalpy is below this value, the 2nd or 3rd stage cooling control is not allowed	D12B	5°	0° to 20°
		D12C	5°	
		D12D	5°	
		D12E	5°	
		D12F	5°	
EN3	3rd Stage Enthalpy Cooling Lockout EN3 provides an enthalpy differential to the EN2 setting (add this differential to the EN2 value). If outdoor enthalpy is below this value, the 3rd stage of cooling is not allowed.	D12B	5°	0° to 20°
		D12C	5°	
		D12D	5°	
		D12E	5°	
		D12F	5°	
NSU	Night Setup - Cooling This value is added to the space cooling setpoint (SSP) for unoccupied periods. If the cooling setpoint (SSP) is 75° during the occupied mode, and NSU is 9, then during unoccupied modes, the cooling setpoint will be 84°F (75 +9).	D12B	9°F	0° to 35°F
		D12C	9°F	
		D12D	9°F	
		D12E	9°F	
		D12F	9°F	
NSB	Night Set Back – Heating This value is the amount subtracted from the space heating setpoint in the unoccupied mode. Example: SSP - HSO - NSB ~ 75 - 5 - 9 = 61°F space heating setpoint in the unoccupied mode.	D12B	-9°F	-35° to 0°F
		D12C	-9°F	
		D12D	-9°F	
		D12E	-9°F	
		D12F	-9°F	
RCP	Room (space) Discharge Air Cooling Temperature Setpoint When a space temperature sensor is installed and the temperature in the space increases above the space cooling setpoint (SSP) through the space cooling prop band (SCP), the RCP value will become the active discharge air setpoint. The value of RCP will not be used by the unit if a space temperature sensor is not used.	D12B	55°F	49° to 115°F
		D12C	55°F	
		D12D	55°F	
		D12E	55°F	
		D12F	55°F	
RHP	Room (space) Discharge Air Heating Temperature Setpoint When a space temperature sensor is installed and the temperature in the space falls below the space cooling setpoint (SSP - HSO) by a difference of the space heating prop band (SHP), the RHP value will become the active discharge air setpoint. The value of RHP will only be used by the unit if a space temperature sensor is installed.	D12B	80°F	45° to 120°F
		D12C	80°F	
		D12D	80°F	
		D12E	80°F	
		D12F	80°F	

(continued)

Menu 04 (cont'd)		Commissioning Parameters (cont'd)			
Display	Control Variable Description	Default Value		Range	
RSP	<u>Reheat Setpoint Offset</u> If the unit is equipped with reheat and conditions are such that reheat is being called for, the neutral air cooling setpoint value will increase by RSP amount. This value should not be used unless the neutral air discharge air temperature setpoint (DCH) is lower than 65°F.	D12B	0°F	0° to 30°F	
		D12C	0°F		
		D12D	0°F		
		D12E	0°F		
		D12F	0°F		
		D12G	0°F		
UOT	<u>Temporary Occupied Button Timer</u> Amount of time the system will remain in occupied mode when the occupancy override button is pressed with the system in an occupied condition.	D12B	60 min	0 to 240 min	
		D12C	60 min		
		D12D	60 min		
		D12E	60 min		
		D12F	60 min		
		D12G	60 min		
HHR	<u>Humidity High Range</u> This allows adjustment of the humidity sensor range. The default is 5 for a 0-5v sensor. Adjusting this value to 10 will allow a 0-10v humidity sensor to be used.	D12B	5	0 to 10	
		D12C	5		
		D12D	5		
		D12E	5		
		D12F	5		
		D12G	5		
HTGINTSTG DELAY	<u>Heating Interstage Delay</u> The amount of time required to expire before a stage of heating can turn on or off. (seconds)	D12B	8	30 to 300	
		D12C	120		
		D12D	8		
		D12E	8		
		D12F	120		
		D12G	8		
CLGINTSTG DELAY	<u>Cooling Interstage Delay</u> The amount of time required to expire before a stage of cooling can turn on or off (seconds)	D12B	120	30 to 300	
		D12C	120		
		D12D	120		
		D12E	120		
		D12F	120		
		D12G	120		
MIN CLG ON TIME	<u>Minimum Cooling Stage Time</u> The amount of time required to expire before a stage of cooling can turn off. (minutes)	D12B	1	0 to 5	
		D12C	1		
		D12D	1		
		D12E	1		
		D12F	1		
		D12G	1		

Menu 05		Sensor Calibration (DO NOT change these default values unless advised by the factory.)		
Display	Control Variable Description	Default Value		
RMTO	<u>Space Temperature Sensor Calibration</u> Allows a small sensor offset when space wires add significant resistance. Used to offset wire resistance.	D12 B, C, D, E, F, G 0		
DAO	<u>Discharge Air Temperature Sensor Calibration</u> Allows a small sensor offset when space wires add significant resistance. Used to offset wire resistance.	D12 B, C, D, E, F, G -1		

Menu 06		Controller Set-up: Time, Address, Date		
Display	Control Variable Description	Default Value		Range
Unit of Measure	Degree F or Degree C	°F		-
N2 Address	Network Communication Address	255		0 to 999
Year	4 digit Year code	-		
Month	2 Digit Month code	-		01 to 12
Day of Month	2 digit day code	-		01 to 31
Hour	24 hour time code	-		1 to 24
Minute	Standard Minute code	-		01 to 60
HTG POLARITY	Setting the Parameter allows the 0-100% analog heating output to be direct acting or reverse acting. The default setting is direct acting.	Direct Acting		REV or DIR
HTGOUTLOWLIMIT	Low limit for the heating output. This value should not be changed.	20%		0 to 30%
HTGOUTHIGHLIMIT	High limit for the heating output. This variable should only be changed on a Model PEH or REH.	D12B	100%	60 to 100%
		D12C	100%	
		D12D	100%	
		D12E	100%	
		D12F	100%	
		D12G	100%	

There is a 10-day battery backup to maintain the clock time during brief power outages. If the power is off for greater than ten days, the time and date must be reset.

Menu 07		Schedule (See “Time Schedule”, below.)		
Display	Control Variable Description	Default Value		Range
--01--	Occupancy Schedule 1	-		00:00 to 24:00
--02--	Occupancy Schedule 2	-		00:00 to 24:00
--03--	Occupancy Schedule 3	-		00:00 to 24:00
--04--	Occupancy Schedule 4	-		00:00 to 24:00
--05--	Occupancy Schedule 5	-		00:00 to 24:00
--06--	Occupancy Schedule 6	-		00:00 to 24:00
--07--	Occupancy Schedule 7	-		00:00 to 24:00
--08--	Occupancy Schedule 8	-		00:00 to 24:00
--09--	Occupancy Schedule 9	-		00:00 to 24:00
--10--	Occupancy Schedule 10	-		00:00 to 24:00
--11--	Occupancy Schedule 11	-		00:00 to 24:00
--12--	Occupancy Schedule 12	-		00:00 to 24:00
--13--	Occupancy Schedule 13	-		00:00 to 24:00
--14--	Occupancy Schedule 14	-		00:00 to 24:00
--15--	Occupancy Schedule 15	-		00:00 to 24:00
--16--	Occupancy Schedule 16	-		00:00 to 24:00
--17--	Occupancy Schedule 17	-		00:00 to 24:00
--18--	Occupancy Schedule 18	-		00:00 to 24:00
--19--	Occupancy Schedule 19	-		00:00 to 24:00
--20--	Occupancy Schedule 20	-		00:00 to 24:00
--21--	Occupancy Schedule 21	-		00:00 to 24:00

Time Schedule

If no schedule is provided, the unit will run in occupied mode. The schedule is a given time start/stop time assign to any day of a seven day week. (The holiday is not used.)

To access the schedule from the controller display, press the “C” key until the display shows “menu” in small letters. Press the up/down arrows until you reach Menu 07 with a scrolling “schedule” message.

Press the “OK” key to select the schedule menu

At this point you can choose from 1-21 time schedules. Each time schedule has a single starting and stopping time using standard 24 hour and 60 minute time increments. This time can be individually assigned to any day of a 7-day week plus a holiday.

Menu Pages (cont'd)

FX06 Commissioning Parameters Level (cont'd)

Time Schedule (cont'd)

1. Press the up/down arrows until you reach the time schedule that you want to view/set. Press "OK" to enter that time schedule.
2. Press the up/down arrows to view the setting. The unit scrolls from start time; end time; sun-sat; holiday.
3. At any point press the "OK" key to select the item to be changed. Use the up/down arrow to change the value. Press "OK" to accept the value. When assigning a time to a day, the display will show the day with or without an asterisk next to it (MON*, TUE, WED*....). Days with an asterisk have been assigned to use the given start/stop. Press "OK" to change. Upon selecting a value, the screen will show a start time or "FROM" time. Press OK to change that time. Press the up/down arrow to move to the end time or "TO" time. To change the time, press the OK button. The hours will flash as the up/down arrows change the hour settings; press OK to accept the hour setting. The unit will then allow the minutes to be changed. The minutes will flash as they are changed.

Menu 08	Events			
Display	Control Variable	Description	Default Value	Range
Event Summary	Shows all current Alarms			
Event History	Stores alarms that are no longer active			

Alarm Displays

When an alarm is triggered, one of the following codes will flash on the FX06 display window and the background will change from blue to red.

AP	Air Proving
FS	Low Limit Freeze Protection Lockout
ST	Discharge Air Temperature Sensor Failure
OT	Outdoor Air Temperature Sensor Failure
EE	FX06 Controller Low Voltage Lockout
Phase Loss Switch (optional) - Nothing Displayed (Lockout)	

AP – Air Proving - When the blower is called to be ON (point BO-1), the blower starts, and the blower status switch must close proving blower operation. If the blowers status does not show blower operation within 180 seconds, the unit shuts down. The unit must be restarted by cycling power to the FX06 controller or opening/closing the "Unit ON/OFF" switch (point BI-3).

During normal operation after initial blower startup, if the blower status input shows open for more than three seconds, the unit will shut down cooling and heating equipment. If the AP input continues to remain open for an additional 180 seconds, the blower is shutdown, and the FX06 controller will be in lockout mode. The controller can be reset by cycling power to the FX06 controller or toggling the BI-3 system on/off switch. If the blower status switch is made before the unit reaches lockout mode, cooling and heating operation will restart.

Troubleshooting - A flashing AP is caused due to an open circuit on Terminals 48 and 46. Check the air proving switch to ensure it is operational (be sure the blower cabinet door is closed). If equipped with an Option BF15 phase loss monitor (in the high voltage box), check the indicator light. The green light indicates the unit is in phase. Red light indicates out of phase. Recycle power to the unit to clear out the alarm.

FS – Low Limit Freeze Protection Lockout - When the blower is called to be ON and the discharge air temperature is below the low limit freeze setpoint (LSP = 36°F) for 600 seconds, the unit is shutdown (blower OFF). The display will flash "FS". When the discharge air rises above the low limit freeze setpoint plus 30°F, the low limit freeze lockout is disabled, allowing the unit to operate. Three (3) consecutive lockouts within one hour will result in a continuous lockout state. The FX06 power must be cycled before operation can continue. Toggling the BI-3 input will **not** reset the unit.

Troubleshooting - A flashing FS indicates the unit has encountered a low discharge air temperature (below 36°F) for over 7 minutes. Investigate the heating system and recycle the power to clear out the alarm. Verify that the gas valve is open and the heating board is operational.

Sensor Failures (flashing “OT” or “ST”) - If a temperature sensor value reads (999) or open circuit, the sensor is in a failed condition.

If the discharge air dry bulb sensor fails, the controller will lock out the unit. No mechanical equipment will be allowed to run. The display will flash “ST”. Installing or replacing the sensor will allow immediate restarting of the equipment.

A failed outdoor air sensor (flashing “OT”) will lock out cooling mode and heating operation. However, the blower will continue to operate.

Troubleshooting - A flashing ST means the discharge air sensor may not be connected (check for two white wires on terminals 54 and 57). To check the sensor for failure, remove the two wires and check resistance against temperature (See chart on page 26). Make sure that the sensor is properly located in the ductwork.

A flashing “ot” means the outdoor air sensor may not be connected or has failed. Check terminals 54 and 56 and sensor operation.

“EE” – Controller Low Voltage Lockout - If the FX06 controller power drops below the minimum level, the display will read EE and all controller functions will be OFF. The controller will restart when power level returns to normal.

Phase Loss Switch - No Display (Lockout) - (Option BF14 or BF15 is required.) - If the phase monitor detects a poor power condition, the phase loss switch will cut power to the control circuit. The phase loss switch will automatically reset when the poor power condition is no longer detected.

Test Mode Keys

Press both the up and down arrows for 2 seconds at the home page to force the unit into a test mode. The display will scroll “unit test.” If no other action is taken the unit will cycle through the outputs in 1 minute intervals.

1. Blower ON
2. Blower plus 1st stage Heating ON (display HTGSTG 1)
3. Blower plus ALL Heating ON (display HTGSTG 2)
4. Blower plus reheat pump ON (display Reheat Compressor)
5. Blower plus 1st stage compressor ON (display CLGSTG 1)
6. Blower plus 2nd stage compressor ON (display CLGSTG 2)

Using the following keys will change

1. Press the “Up” for 1 second to Extend Test Mode (15 minutes).
2. Press the “Down” key for 1 second to cancel the test mode.
3. Press the “C” key for 1 second to manual Jump test mode.

Sensor Data and Application

FIGURE 7 - Optional Wall-Mount Space Air Sensor, Option CL67, P/N 260599



Optional Space (Wall-Mounted) Sensors

Communication Space Temperature Sensor - The wall mounted sensor should be located on an interior wall (avoid direct placement in the sun), the wall opening should be insulated to prevent cold drafts and the sensor located for sampling representative space air.

The optional space sensor with setpoint adjust uses communication to transfer the data back to the unit controller. The sensor requires 24VAC power and two wiring communication. Please see unit wiring diagram for wiring details. The unit displays the current space temperature value.

When the dial is turned, the space cooling setpoint (SSP) will be displayed. The user can turn the dial to adjust the space cooling setpoint. The space heating setpoint is a given differential below the cooling setpoint. See variable HSO for details.

Room RH Input with Reheat Mode - Since reheat is already enabled based on outdoor dewpoint, a room RH control is typically not required for units that condition 100% outside air. A wall mounted RH control (**FIGURE 8**) is typically specified when internal latent loads vary considerably, the rooftop is applied with return air, or an unoccupied space RH control is desired. When applied with an RH input, reheat is

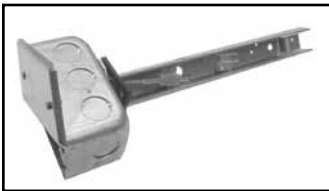
FIGURE 8 - Wall-Mounted Dehumidistat, Option CL47, P/N 177231



enabled if space RH is above setpoint and the space cooling load is satisfied. During unoccupied mode, a rise in room RH will enable the dehumidification and reheat circuit. If there is no call for space cooling, only the reheat pump is enabled (cooling compressors are locked out).

Discharge/Duct Sensor

FIGURE 9A - Discharge Air Sensor, P/N 206112, and Holder, P/N 115850, for Ductwork Installation



All makeup air controls have a discharge air sensor and require field installation of the discharge air sensor holder. The discharge air sensor holder (See **FIGURE 9A**) is shipped with all units ordered with makeup air controls. Indoor gas-fired units also include a mounting bracket. Digital makeup air controls are Option DG5, DG6, D12B, D12C, D12D, D12E, D12F (cooling only), and D12G.

Digital control inputs are low-current, resistance-based signals. The manufacturer recommends for optimum temperature control performance that the analog and digital inputs (zone sensors, discharge air sensors, etc.) that are connected to the main controller be routed to the unit in one of the following manners:

- In separate conduits, isolated from 24 VAC controls and line voltage power to the unit, **OR**
- If the main control sensor wires are to be run in the same conduit as the 24 VAC control wiring, the control wiring must be completed using shielded cable and bundled separately from the 24 VAC control wiring. The shield must be drained at the unit and taped on the opposite end.

See the table (top of next page) for wire gauge and length requirements of digital control signal wiring.

If the installation has supply ductwork, the sensor holder (**FIGURE 9A**) must be installed in the ductwork. If the installation is a Model SDH, PDH, PXH, or SHH without supply ductwork, the sensor holder must be installed at the unit discharge. A bracket is supplied to use when there is no ductwork

Instructions for Installing Discharge Air Sensor Holder in Ductwork - applies to all Models

1. Installation requires the discharge air sensor holder including the box cover. (The bracket will not be used.)
2. Determine a location in the ductwork to install the sensor. Select a location a sufficient distance from the outlet to provide a good mixture of discharge air temperature. The holder will extend 9-3/16" (233mm) into the ductwork.
3. The position of the sensor holder is important. Turn the holder so that the element will be shielded from direct airflow and will sense the air temperature as it flows through the holes in the holder. At the selected location in the ductwork, mark the

Maximum Sensor Wire Length for less than 1°F Error

Wire Gauge	Maximum Sensor Wire Length	
	Feet	Meters
14	800	244
16	500	152
18	310	94
20	200	61
22	124	38

IMPORTANT: All field-installed sensors MUST be run in shielded cable.

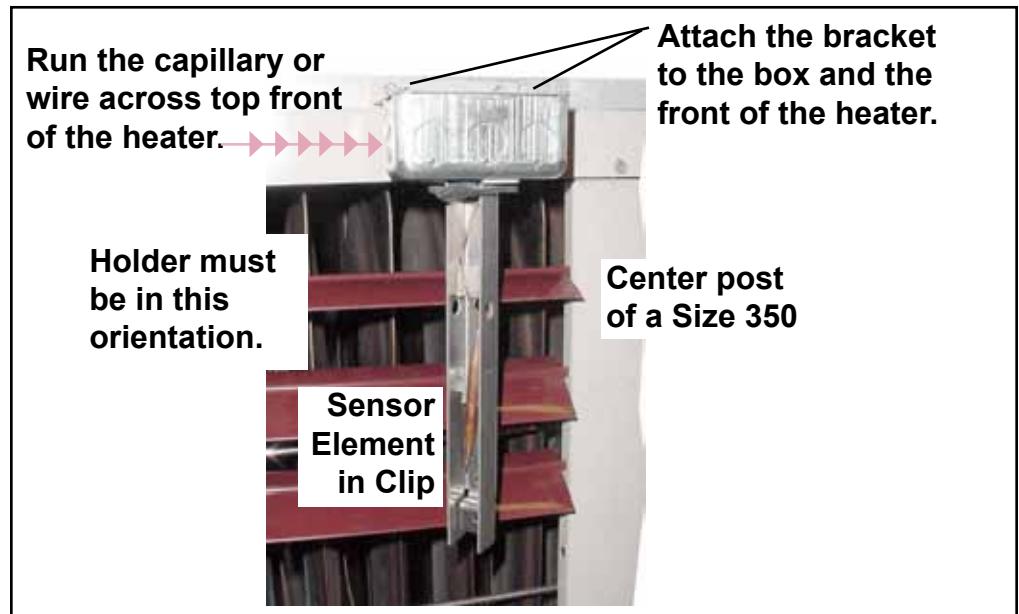
diamond-shaped hole required for the sensor holder. Cut the hole no larger than required, approximately 1" x 1" (25mm x 25mm).

4. Push the element into the clip in the holder. **NOTE:** Be sure that the element is not directly over an airflow hole. This is especially important with electric heat Model PEH or REH) Determine where the sensor wire should enter the box and remove the knockout. Slide the holder into the ductwork. Using four field-supplied No. 6 sheetmetal screws, attach the box portion of the holder to the ductwork. Attach a field-supplied cable connector to the box, connect the sensor wire, and attach the box cover.

Instructions for Installing Discharge Air Sensor Holder on Heater - applies only to indoor Models without ductwork

1. Installation requires the discharge air sensor holder and the bracket in **FIGURE 9B**. (If attached, remove box cover; it will not be used.)
2. Select a location for the box on the front near the center of the heater. Orientation of the sensor holder is important. Position the box so that the element will be sensing the air temperature as it flows through the holes in the holder.

FIGURE 9B - Discharge Air Sensor Holder, P/N 115850, and Bracket, P/N 213612 used with Model PDH, SDH, PXH, and SHH without ductwork



3. Push the element into the clip in the holder. **NOTE:** Be sure that the element is directly over an airflow hole. Determine where the sensor wire should go through the box and remove the knockout at that location. Attach a field-supplied cable connector to the box. Connect the sensor wire. Attach the bracket to the box. Attach the bracket to the front of the heater.

Sensor Data for Johnson A99 Series Temperature Sensors - Resistance vs Temperature (applies to both discharge and outside air sensor)

°F	°C	Ohms
-40	-40	613
-31	-35	640
-22	-30	668
-13	-25	697
-4	-20	727
5	-15	758
14	-10	789
23	-5	822
32	-0	855
41	5	889
50	10	924
59	15	960
68	20	997
77	25	1035
86	30	1074

°F	°C	Ohms
95	35	1113
104	40	1153
113	45	1195
122	50	1237
131	50	1279
140	60	1323
149	65	1368
158	70	1413
167	75	1459
176	80	1506
185	85	1554
194	90	1602
203	95	1652
212	100	1702
221	105	1753

°F	°C	Ohms
230	110	1804
239	115	1856
248	120	1908

Sensor Data and Application (cont'd)

Outside Air Sensors

Outside Air Dry Bulb Sensor and Dewpoint or Enthalpy Permissive Control

The outside air sensor (**FIGURE 10A**) is the same as the discharge sensor. The Johnson A99 Series Temperature Sensor Chart above applies to both the discharge and outside air sensors.

If the application uses mixed air (return and outside air), the outside air temperature sensor and optional humidity transmitter (**FIGURE 10B**) must be mounted together to sense outdoor air conditions. On indoor units the sensor should be mounted near the inlet of the outdoor air duct. Verify that factory mounted positions provide acceptable performance.

FIGURE 10A - Outside Air Dry Bulb Sensor, P/N 206112



FIGURE 10B - Outside Air Relative Humidity Transmitter, Option DT5, P/N 206081



Sensor Accuracy and Outside Air Changeover Differential

Dry bulb sensor accuracy is within 1°F between 5° and 167°F. Outside air dewpoint is calculated based on a humidity transmitter (**FIGURE 10B**) input. Accuracy is rated as follows:

Humidity transmitter $\pm 3\%$ RH for 20 to 80% RH at 77°F and $\pm 5\%$ RH for 10 to 20% and 80 to 90% RH at 77°F. The dewpoint calculation is within 1% error at sea level. Hysteresis and the rate of moisture change also have an impact on sensor accuracy. Prolonged periods of high humidity (above 95% RH) can affect sensor accuracy (the bias is towards a higher RH reading than actual). *The calculated outdoor dewpoint should be verified on an annual basis to ensure proper changeover operation.*

Wall-Mounted Sensor and Communication Wire Installation

Before connecting or disconnecting any wires, ensure that all power supplies have been switched off and all wires are potential-free to prevent equipment damage and avoid electric shock.

IMPORTANT: The FX06 control wiring control inputs are low-current, resistance-based signals. The control manufacturer recommends for optimum temperature control performance that the analog and digital inputs (space sensor, discharge air sensors, etc.) that are connected to the FX06 controller be routed to the unit in one of the following manners:

- In separate conduits, isolated from 24VAC controls and line voltage power to the unit.

OR

- If the FX06 wires are to be run in the same conduit as the 24VAC control wiring, the FX06 wiring must be completed using shielded cable and bundled separately from 24VAC control wiring. The shield must be drained at the unit and taped on the opposite end.

Control Wiring

Wiring terminations in space sensor, Option CL67 (**FIGURE 7**), are made at the terminal blocks in the base of the module. Those terminal blocks will accept up to 1.5 mm² (AWG 16) wires. To access the terminals, remove the cover from the base of the module by inserting a pointed tool into the small hole at the center top of the cover. While pressing down gently, pry the cover away from the base. As the two parts separate, remove the tool and continue to pull the cover away from the base until the cover is free.

All wiring to the module is at extra low (safe) voltage and must be separated from line voltage wiring. All field-installed sensor wiring must be in shielded cable. Do not run wiring close to transformers or high frequency generating equipment such as a lighting ballast.

Complete and verify all wiring connections before applying power to the controller connected to the module. Under the lateral cover on the space sensor, service connector pins provide for serial connection if the optional serial card (N2Open or LON) is inserted in the FX06 controller and properly connected to the room command module pins 10, 11, and 12.

Physical Point List

When the FX06 controller is “on” and operational, the FX06 controller will operate the air handling equipment based upon the following physical points list and D12B, D12C, D12D, D12E, D12F, or D12G control sequence.

Controller Physical Points List						
Point Description	AI	AO	BI	BO	Elec Component	Comment
Occupied Override Switch (BI-1)			√		CL67 Push button	The wall-mounted temperature sensor with override push button.
Relative Humidity Switch (BI-2)			√		CL47 Humidistat	
On/Off Switch (BI-3)			√		External dry contact	Factory jumper wire installed
Occupied Switch (BI-4)			√		External dry contact	
Air Proving (BI-5)			√		Differential Pressure Switch	
Outdoor Air Humidity (AI-2)	√				Humidity Sensor	0-5V = 0-100% RH
Outdoor Air Temperature (AI-3)	√				A99 Thermistor	Resistance = -40 to 100°C
Discharge Air Temperature (AI-4)	√				A99 Thermistor	
Modulating Heat Control (AO-1)		√			Gas Valve / SCR Power Controller	Direct Acting Gas Valve/SCR Power Controller : Gas pressure/heat output increases with increase of signal voltage.
Reheat Start (AO-2)				√	Sensitive Relay converts AO to BO	10V = Activate relay to start reheat.
Fan Start/Stop (Damper) (BO-1)				√	Relay	OA Damper Interlock to Fan
1st Stage Heating (On/Off) (BO-2)				√	Relay	
2nd Stage Heating (On/Off) (BO-3)				√	Relay	
1st Stage Cooling (BO-4)				√	Relay	
2nd Stage Cooling (BO-5)				√	Relay	
3rd Stage Cooling (BO-6)				√	Relay	
NOTE: AI = Analog Input, AO = Analog Output, BI = Binary Input, BO = Binary Output.						

BAS Card Options

Lon Card, Option BHB3, P/N 255375

The LON Serial Card is a plug-in card that allows the FX06 control to be connected to a LON network. The connection to the network is made by means of the 3 pins on the plug-in connector. .

The network cable must be laid along a low voltage cable path. It must be placed at least 12" (30 cm) from cables carrying high voltages or currents (>230V or >30A). If strong interference fields are expected, the cable must be located at the greatest distance possible from the source. The TP/FT-10 network is designed to support free topology wiring, and will accommodate bus, star, loop or any combination of these topologies. FTT-10A transceivers can be located at any point along the network wiring.

LON Network: Doubly-Terminated Bus Topology; Free topology (single terminator required).

Pin	RS485
1	COM
2	RT-
3	RT+

Lon Card Network Variables:

LON View

Network Variables:

Name	Direction	SNVT Type	Unit of measure	COV apply to NVO	RCVHRTBT apply to NVI	Index	SISD
nviRequest	Input	92 - obj_request			False	0	@0 1
nvoStatus	Output	93 - obj_status		False		1	@0 2
nvoFileDirectory	Output	114 - address	#	False		2	@0 8
nviUnitEnable	Input	95 - switch			False	3	@1 1
nvoTempOccupiedStatus	Output	22 - lev_disc		False		4	@1 2
nvoSpaceTemp	Output	105 - temp_p	°F	False		5	@1 3
nvoDewPoint	Output	105 - temp_p	°F	False		6	@1 4
nvoEnthalpy	Output	51 - count_f	#	False		7	@1 5
nvoClgTimerStatus	Output	22 - lev_disc		False		8	@1 6
nvoRH_Status	Output	22 - lev_disc		False		9	@1 7
nvoTimeclockStatus	Output	22 - lev_disc		False		10	@1 8
nvoOA_Humidity	Output	81 - lev_percent	%	False		11	@1 9
nvoOA_Temperature	Output	105 - temp_p	°F	False		12	@1 10
nvoDA_Temperature	Output	105 - temp_p	°F	False		13	@1 11
nviUnitShutdown	Input	22 - lev_disc			False	14	@1 12
nvoWHSP	Output	105 - temp_p	°F	False		15	@1 13
nvoWCSP	Output	105 - temp_p	°F	False		16	@1 14
nvoRm_Clg_SP	Output	105 - temp_p	°F	False		17	@1 15
nvoRm_Htg_SP	Output	105 - temp_p	°F	False		18	@1 16
nvoRoomHumiditySwitch	Output	22 - lev_disc		False		19	@1 17
nvoOn_OffInputSwitch	Output	22 - lev_disc		False		20	@1 18
nvoOcc_UnoccSwitch	Output	22 - lev_disc		False		21	@1 19
nvoAirProvingSwitch	Output	22 - lev_disc		False		22	@1 20
nvoFan_DamperStatus	Output	22 - lev_disc		False		23	@1 21
nvoHtgStg1Status	Output	22 - lev_disc		False		24	@1 22
nvoHtgStg2Status	Output	22 - lev_disc		False		25	@1 23
nvoClgStg1Status	Output	22 - lev_disc		False		26	@1 24
nvoClgStg2Status	Output	22 - lev_disc		False		27	@1 25
nvoSpaceClgSetpt	Output	105 - temp_p	°F	False		28	@1 26
nviUnitOccupied	Input	95 - switch			False	29	@1 27
nvoHtgOutput	Output	81 - lev_percent	%	False		30	@1 28
nviOA_Hum_Sim	Input	81 - lev_percent	%		False	31	@1 29
nviOA_Temp_Sim	Input	105 - temp_p	°F		False	32	@1 30
nvoClgStg3Status	Output	22 - lev_disc		False		33	@1 31
nviSpaceTemp	Input	105 - temp_p	°F		False	34	@1 32
nviDischargeTemp	Input	105 - temp_p	°F		False	35	@1 33
nviAirflowSwitch	Input	95 - switch			False	36	@1 34
nvofiltered_dat	Output	105 - temp_p	°F	False		37	@1 35

Configuration Parameters:

Name	Default value	SNVT Type	Unit of measure	Index	SISD
cpSendHeartBeat	30	107 - time_sec	s	0	0,,0\80,49,2,1
cpOccOvrTimeMn	60	123 - time_min	min	1	1,1,6\80,1,2,1
cpHSPOffset	2.8	147 - temp_diff_p	°F [dif]	2	1,1,6\80,2,2,1
cpDaHtgDb	0	147 - temp_diff_p	°F [dif]	3	1,1,6\80,3,2,1
cpNightSetup	5	147 - temp_diff_p	°F [dif]	4	1,1,6\80,4,2,1
cpNightSetback	-5	147 - temp_diff_p	°F [dif]	5	1,1,6\80,5,2,1
cpZoneClgPb	1	147 - temp_diff_p	°F [dif]	6	1,1,6\80,6,2,1
cpZoneHtgPb	1	147 - temp_diff_p	°F [dif]	7	1,1,6\80,7,2,1
cpOaHtgLow	-1.1	105 - temp_p	°F	8	1,1,6\80,8,2,1
cpOaHtgHigh	15.56	105 - temp_p	°F	9	1,1,6\80,9,2,1
cpOaClgLow	-6.67	105 - temp_p	°F	10	1,1,6\80,10,2,1
cpOaClgHigh	15.56	105 - temp_p	°F	11	1,1,6\80,11,2,1
cpRmDaClgSp	12.8	105 - temp_p	°F	12	1,1,6\80,12,2,1
cpDAClgHigh	21.1	105 - temp_p	°F	13	1,1,6\80,13,2,1
cpDaClgLow	32.2	105 - temp_p	°F	14	1,1,6\80,14,2,1
cpDaHtgLow	21.1	105 - temp_p	°F	15	1,1,6\80,15,2,1
cpDaHtgHigh	10	105 - temp_p	°F	16	1,1,6\80,16,2,1
cpCalcBtu	7.68	51 - count_f	#	17	1,1,6\80,17,4,1
cpClgOaSetpt	20	105 - temp_p	°F	18	1,1,6\80,18,2,1
cpReheatDpSetpt	15.56	105 - temp_p	°F	19	1,1,6\80,19,2,1
cpHtgOaSetpt	16.67	105 - temp_p	°F	20	1,1,6\80,20,2,1
cpReheatSetptLoLow	18.33	105 - temp_p	°F	21	1,1,6\80,21,2,1
cpReheatSetptHiLow	48.9	105 - temp_p	°F	22	1,1,6\80,22,2,1
cpEnthalpySp	29	51 - count_f	#	23	1,1,6\80,23,4,1
cpEnthalpy2Diff	5	51 - count_f	#	24	1,1,6\80,24,4,1
cpEnthalpy3Diff	5	51 - count_f	#	25	1,1,6\80,25,4,1
cpRhtSpOffset	0	147 - temp_diff_p	°F [dif]	26	1,1,6\80,26,2,1
cpLowLimSetpt	2.2	105 - temp_p	°F	27	1,1,6\80,27,2,1
cpDaPropBand	22.2	147 - temp_diff_p	°F [dif]	28	1,1,6\80,28,2,1
cpDaDeadBand	1.1	147 - temp_diff_p	°F [dif]	29	1,1,6\80,29,2,1
cpDalntTime	40	107 - time_sec	s	30	1,1,6\80,30,2,1
cpDaLowSatTime	40	107 - time_sec	s	50	1,1,6\80,31,2,1
cpDaHighLimit	70	81 - lev_percent	%	31	1,1,6\80,32,2,1
cpDaLowLimit	25	81 - lev_percent	%	32	1,1,6\80,33,2,1
cpDaClgPropBand	5.6	147 - temp_diff_p	°F [dif]	33	1,1,6\80,34,2,1
cpClgLowLimSp	9.44	105 - temp_p	°F	34	1,1,6\80,35,2,1
cpClgBoost	-1.67	147 - temp_diff_p	°F [dif]	35	1,1,6\80,36,2,1
cpHtgBoost	2.2	147 - temp_diff_p	°F [dif]	36	1,1,6\80,37,2,1
cpRmDaHtgSp	26.67	105 - temp_p	°F	37	1,1,6\80,38,2,1
cpWrmupTmMin	15	123 - time_min	min	38	1,1,6\80,39,2,1
cpAlarmReset	0, LOG_OFF	10149 - UNVT_logic		39	1,1,6\80,40,1,1
cpnciOnOffSched	-	40060 - UNVT_OnOffSched		40	1,1,6\80,41,126,1
cpSpaceSetptHighLimit	25.56	105 - temp_p	°F	41	1,1,6\80,42,2,1
cpSpaceSetptLowLimit	22.2	105 - temp_p	°F	42	1,1,6\80,43,2,1
cpHum_Hi_Range	5	51 - count_f	#	43	1,1,6\80,44,4,1
cpHtgIntStgDelay	8	107 - time_sec	s	44	1,1,6\80,45,2,1
cpDaClgLowSatTime	60	107 - time_sec	s	45	1,1,6\80,46,2,1
cpClgIntStgDelay	120	107 - time_sec	s	46	1,1,6\80,47,2,1
cphtg_pid_ffset	50	81 - lev_percent	%	47	1,1,6\80,48,2,1
cpHtgIntStgDelayTmr1	0	107 - time_sec	s	48	1,1,6\80,49,2,1
cpDAHighSatTime	3	107 - time_sec	s	49	1,1,6\80,50,2,1

N2 Open Card, Option BHB2, P/N 222054

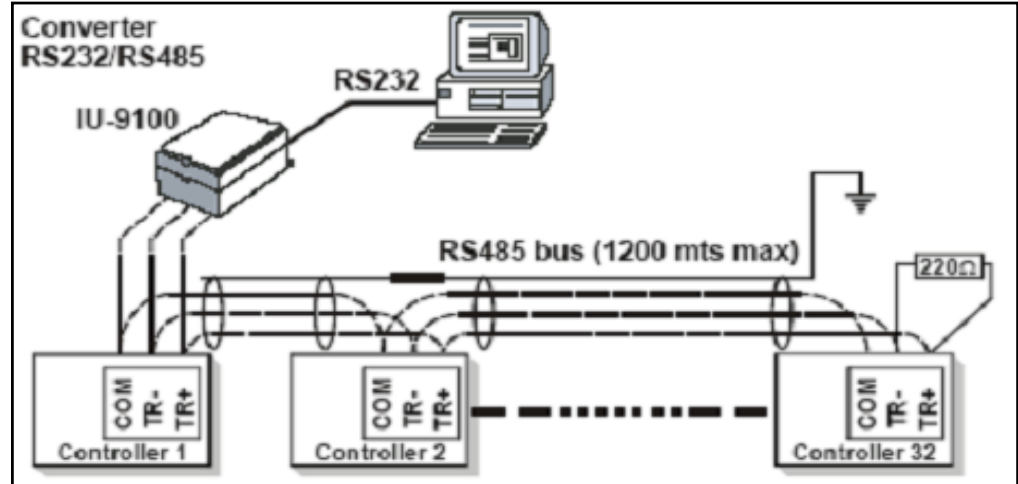
The N2Open serial card is a plug-in, optional card that allows the controllers of the FX06 line to be connected in an N2Open serial network through the RS485 standard. The connection to the network is made by means of 3 pins on the plug-in connector.

The network cable must be laid along a low voltage cable path. It must be placed at least at 12" (30 cm) from cables carrying high voltages or currents (>230V or >30A). If strong interference fields are expected, the cable must be located at the greatest distance possible from the source. The communication line must be laid out on the multi-drop line principle, i.e. from one controller to the next until the last controller has been connected. The line must be terminated at both ends with a 220 Ohm resistor between RT+ and RT-.

RS485 line: maximum length without repeater: 3937 ft (1200 M), AWG26 twisted pair with shield.

RS232C line: maximum length: 33 ft (10 m)

Devices: maximum of 32 per 3937 ft (1200 m) bus segment



N2 Network Points List

Points List Notes:

*When applied with N2open systems, the BD points are multistage and mapped as an Msi point.

Room Discharge air heating setpoint = Supply air temperature to offset heating losses in the space

Room Discharge Air Cooling Setpoint = Supply air temperature to offset heat gains in the space

Duct Discharge Air Cooling Setpoint = Supply air value when there is no call for cooling from the space (typically equals the space temperature)

Duct Discharge Air Heating Setpoint = Supply air value when there is no call for heat from the space (typically equals the space temperature)

N2Open View

Point Type	Point Address	Direction	Long name	Short name	Default value	Unit of measure
ADF	1	Input	Unit Enable Value	UNITENA-V	-	%
ADF	2	Output	Room Temperature	RM-T	-	°F
ADF	3	Output	OA Dewpoint Temp	OADEWPT-T	-	°F
ADF	4	Output	OA Enthalpy	OA-E	-	#
ADF	5	Output	OA Humidity	OA-H	-	%
ADF	6	Output	Outside Air Temp	OA-T	-	°F
ADF	7	Output	Discharge Air Temp	DA-T	-	°F
ADF	8	Output	Working Htg Sp	WRKHTG-SP	-	°F
ADF	9	Output	Working Clg Sp	WRKCLG-SP	-	°F
ADF	10	Output	Room Clg Sp	RMCLG-SP	-	°F
ADF	11	Output	Room Htg Sp	RMHTG-SP	-	°F
ADF	12	Input	Room Temp Offset	RMT-OS	-1.0	°F [dif]
ADF	13	Input	Disch Air Temp Offset	DAT-OS	-1.0	°F [dif]
ADF	14	Input	Room Htg Sp Offset	RMHTGSPPOS	5.0	°F [dif]
ADF	16	Input	Night Setup Sp	SETUP-SP	9.0	°F [dif]
ADF	17	Input	Night Setback Sp	SETBACK-SP	-9.0	°F [dif]
ADF	18	Input	Room Clg PB	RMCLGPB	1.8	°F [dif]
ADF	19	Input	Room Htg PB	RMHTGPB	1.8	°F [dif]
ADF	20	Input	OA Htg Low Sp	OAHTGLWSP	30.0	°F
ADF	21	Input	OA Htg High Sp	OAHTGHISP	60.0	°F
ADF	22	Input	OA Clg Low Sp	OACLGLWSP	20.0	°F
ADF	23	Input	OA Clg High Sp	OACLGHISP	60.0	°F
ADF	24	Input	RM DA Clg Sp	RMDACLGSP	55.0	°F
ADF	25	Input	DA Clg High Sp	DAACLGHISP	70.0	°F
ADF	26	Input	DA Clg Low Sp	DAACLLOW	90.0	°F
ADF	27	Input	DA Htg Low Sp	DAHTGLWSP	70.0	°F
ADF	28	Input	DA Htg High Sp	DAHTGHISP	50.0	°F
ADF	29	Input	OA Clg Sp	OACLSP	68.0	°F
ADF	30	Input	Reheat Dewpoint Sp	RHDP-SP	60.0	°F
ADF	31	Input	OA Htg Sp	OAHTGSP	62.0	°F

Point Type	Point Address	Direction	Long name	Short name	Default value	Unit of measure
ADF	32	Input	Reheat Sp Low LO	PRHTSPLW	65.0	°F
ADF	33	Input	Reheat Sp High LO	RHTSPHIGH	120.0	°F
ADF	34	Input	Enthalpy Sp 1	ENTHLPY1	29.000000	#
ADF	35	Input	Enthalpy SP 2 Diff	ENTHLPY2D	5.000000	#
ADF	36	Input	Enthalpy Sp 3 Diff	ENTHLPY3D	5.000000	#
ADF	37	Input	Reheat Sp Offset	RHTSP-OS	0.0	°F [dif]
ADF	38	Input	DAT Low Limit Sp	DATLLSP	36.0	°F
ADF	39	Input	DAT Htg PB	DATHTGPB	40.0	°F [dif]
ADF	40	Input	Da Htg_DB	DATHTGDB	2.0	°F [dif]
ADF	41	Input	DA Htg lterm	DATHTGIT	40.0	s
ADF	42	Input	DA Htg Low SAT Time	DATLWSAT	40.0	s
ADF	43	Input	DA Htg High Limit	DAHTGHL	70.00	%
ADF	44	Input	DA Htg Low Limit	DAHTGLL	25.00	%
ADF	45	Input	DA Clg PB	DATCLGPB	10.1	°F [dif]
ADF	46	Input	Clg Low Lim Sp	CLGLOWLM	49.0	°F
ADF	47	Input	Clg Boost Sp	CLGBST-SP	-3.0	°F [dif]
ADF	48	Input	Htg Boost Sp	HTGBST-SP	4.0	°F [dif]
ADF	49	Input	RM DA Htg Sp	RMDAHTGSP	80.0	°F
ADF	50	Output	Space Clg Setpt	RMCLGSP	-	°F
ADF	51	Input	Space Setpt High Limit	SSPHL	78.0	°F
ADF	52	Input	Space Setpt Low Limit	SSPLL	72.0	°F
ADF	53	Input	Unit Occupied Value	UNITOCC-V	-	%
ADF	54	Output	Htg Output	HTG-OUT	-	%
ADF	55	Input	Hum_Hi_Range	PHM_H_RN	5.000000	#
ADF	56	Input	nviSpaceTemp	ISPCTSpa	-	°F
ADF	57	Input	HtgIntStgDelay	PHTGNTST	8.0	s
ADF	58	Input	DaClgLowSatTime	PDCLGLWS	60.0	s
ADF	59	Input	ClgIntStgDelay	PCLGNTST	120.0	s
ADF	63	Input	da_filter_timer	ID_FLTR	0.0	s
ADF	15	Input	Space_Htg_DB	PDaHtgDb	0.0	°F [dif]
ADF	60	Input	HtgIntStgDelayTmr1	PHADF_60	0.0	s
ADF	61	Input	htg_pid_ffset	PHTG_PD	50.00	%
ADF	62	Input	DAHighSatTime	PDHGHSTT	3.0	s
ADF	68	Input	htg_purg_tmr	PHTG_PRG	80.0	s
ADI	1	Input	Occ Ovr Time	OCCOVR-T	60	min
ADI	2	Input	Htg Warmup Time	HTGWARMUP	15	min
BD	1	Input	Unit Enable State	UNITENA-ST	-	
BD	2	Output	Temp Occupied	TEMP-OCC	-	
BD	3	Output	Clg Timer	CLG-TIMER	-	
BD	4	Output	Reheat Pump Output	RH-STATUS	-	
BD	5	Output	Timeclock Status	TIMECLOCK	-	
BD	6	Input	Unit Shutdown	UNITSHUTDN	-	
BD	7	Output	Htg-Clg State	HTGCLG-ST	-	
BD	8	Output	Room State	RM-STATE	-	
BD	9	Output	Occupied Status	OCCD-S	-	
BD	10	Output	Room Humidity Switch	RMHUM-SW	-	
BD	11	Output	On_Off Input Switch	ONOFF-S	-	
BD	12	Output	Occ_Unocc Switch	OCCD-SW	-	
BD	13	Output	Air Proving Switch	AIRPRV-S	-	
BD	14	Output	Fan Damper Status	FANDMP-S	-	
BD	15	Output	Htg Stage 1 Status	HTGSTG1-S	-	
BD	16	Output	Htg Stage 2 Status	HTGSTG2-S	-	
BD	17	Output	Clg Stage 1 Status	CLGSTG1-S	-	
BD	18	Output	Clg Stage 2 Status	CLGSTG2-S	-	
BD	19	Input	Test Start	TSTSTART	0, LOG_OFF	
BD	20	Input	Test Kill	TSTKILL	0, LOG_OFF	
BD	21	Input	Test Extend	TSTXTND	0, LOG_OFF	
BD	22	Input	Manual Jump	MANJUMP	0, LOG_OFF	
BD	23	Input	UnOcc Reheat Enable	UNCRHTENA	1, LOG_ON	
BD	24	Input	Alarm Reset	ALMRESET	0, LOG_OFF	
BD	25	Input	No Modulating Heat	NOMODHEAT	0, LOG_OFF	
BD	26	Input	Heat Polarity	HEACTACT	0, Direct	
BD	27	Input	Unit Occupied State	UNITOCC-ST	-	
BD	28	Output	ClgStage3Status	CLGSTG3	-	

WORKSHEET

Display	Parameter	Range	Default Value by Option						Field Value
			D12B	D12C	D12D	D12E	D12F	D12G	
MENU 02 - Temperature Setpoints									
SSPHI	The maximum value that the space setpoint dial can be set	55° to 90°F	78°F	78°F	78°F	78°F	78°F	78°F	
SSPLO	The minimum value that the space setpoint dial can be set	55° to 90°F	72°F	72°F	72°F	72°F	72°F	72°F	
HSO	Space Heating Setpoint Offset	1° to 30°F	5°F	5°F	5°F	5°F	5°F	5°F	
DP1	Reheat Enabled Setpoint – Ambient Dewpoint	52° to 80°F	60°F	60°F	60°F	60°F	60°F	60°F	
DCH	Standard Cooling (Neutral) Discharge Air Temperature Setpoint (Primary Setpoint)	50° to 115°F	70° F	70° F	70° F	70° F	70° F	70° F	
DHL	Standard (Neutral) Heating Discharge Air Temperature Setpoint (Primary Setpoint).	50° to 115°F	70° F	70° F	70° F	70° F	70° F	70° F	
RCP	Room (space) Discharge Air Cooling Temperature Setpoint	49° to 115°F	55°F	55°F	55°F	55°F	55°F	55°F	
RHP	Room Discharge Air Temperature Heating Setpoint	45° to 120°F	80°F	80°F	80°F	80°F	80°F	80°F	
MENU 03 - OA Reset Schedule									
DCL	Outside Air Reset Option	49° to 115°F	90°F	90°F	90°F	90°F	90°F	90°F	
DCH	Standard (Neutral) Cooling Discharge Air Temperature Setpoint (Primary Setpoint).	50° to 115°F	70°F	70°F	70°F	70°F	70°F	70°F	
DHL	Standard (Neutral) Heating Discharge Air Temperature Setpoint (Primary Setpoint)	50° to 115°F	70°F	70°F	70°F	70°F	70°F	70°F	
DHH	Outdoor Reset Option – Duct Discharge Air Temperature Heating Setpoint	45° to 120°F	50°F	50°F	50°F	50°F	50°F	50°F	
OH2	Outdoor Reset Dry Bulb Heating – High Setting	20° to 70°F	60°F	60°F	60°F	60°F	60°F	60°F	
OH3	Outdoor Reset Dry Bulb Heating – Low Setting	-45° to 65°F	30°F	30°F	30°F	30°F	30°F	30°F	
OC2	Outdoor Reset Dry Bulb Cooling – High Setting	20° to 70°F	60°F	60°F	60°F	60°F	60°F	60°F	
OC3	Outdoor Reset Dry Bulb Cooling – Low Setting	-40° to 65°F	20°F	20°F	20°F	20°F	20°F	20°F	
MENU 04 - Commissioning Parameters									
SCP	Space Cooling Proportional Band	1° to 8°F	1.8°F	1.8°F	1.8°F	1.8°F	1.8°F	1.8°F	
SHP	Space Heating Proportional Band	1° to 8°F	1.8°F	1.8°F	1.8°F	1.8°F	1.8°F	1.8°F	
CPP	CPP - Cooling Discharge Air Prop Band	2° to 40°F	10°F	10°F	10°F	10°F	10°F	10°F	
HPP	Heating Discharge Air Proportional Band	4° to 30°F	4°F	5°F	20°F	5°F	5°F	4°F	
ICT	Heating Integration Constant	0 to 999 seconds	40	1	40	0	1	40	
HDB	Space Heating Dead Band	0° to 9°F	2°F	0°F	2°F	0°F	0°F	2°F	
EN1	1st Stage Enthalpy Cooling Reference Lockout	15 to 40	29°F	29°F	29°F	29°F	29°F	29°F	
EN2	2nd Stage Enthalpy Cooling Lockout	0 to 20	5°F	5°F	5°F	5°F	5°F	5°F	
EN3	3rd Stage Enthalpy Cooling Lockout	0 to 20	5°F	5°F	5°F	5°F	5°F	5°F	
NSU	Night Setup - Cooling	0° to 35°F	9°F	9°F	9°F	9°F	9°F	9°F	
NSB	Night Set Back – Heating	-35° to 0°F	-9°F	-9°F	-9°F	-9°F	-9°F	-9°F	
RCP	Room (space) Discharge Air Cooling Temperature Setpoint	49° to 115°F	55°F	55°F	55°F	55°F	55°F	55°F	
RHP	Reheat Enabled or Disabled during Unoccupied Mode	45° to 120°F	80°F	80°F	80°F	80°F	80°F	80°F	
RSP	Reheat Setpoint Offset	0° to 30°F	0°F	0°F	0°F	0°F	0°F	0°F	
UOT	Temporary Occupied Button Timer	0 to 240 minutes	60	60	60	60	60	60	

Display	Parameter	Range	Default Value by Option						Field Value
			D12B	D12C	D12D	D12E	D12F	D12G	
MENU 04 (cont'd) - Commissioning Parameters									
HHR	Humidity High Range	0 to 10	5	5	5	5	5	5	
HTGINTSTG DELAY	Heating Interstage Delay	30 to 300 seconds	8	120	8	8	120	8	
CLGINTSTG DELAY	Cooling Interstage Delay	30 to 300 seconds	120	120	120	120	120	120	
MIN CLG ON TIME	Minimum Cooling Stage Time	0 to 5 minutes	1	1	1	1	1	1	
MENU 05 - Calibration Page (DO NOT change these default values unless advised by the factory.)									
RMTO	Space Temperature Sensor Calibration		0	0	0	0	0	0	
DAO	Discharge Air Temperature Sensor Calibration		-1	-1	-1	-1	-1	-1	

Display	Parameter	Range	Default Value by Option						Field Value
			D12B	D12C	D12D	D12E	D12F	D12G	
MENU 06 - Controller Set-up									
Unit of Measure	°F or °C	-	°F	°F	°F	°F	°F	°F	
N2 Address	Network Communication Address	0 to 999	255	255	255	255	255	255	
Year	4 digit Year code	-	-	-	-	-	-	-	
Month	2 Digit Month code	01 to 12	-	-	-	-	-	-	
Day of Month	2 digit day code	01 to 31	-	-	-	-	-	-	
Hour	24 hour time code	01 to 24	-	-	-	-	-	-	
Minute	Standard Minute code	01 to 60	-	-	-	-	-	-	
HTG POLARITY	Setting the Parameter allows the 0-100% analog heating output to be direct acting or reverse acting. The default setting is direct acting.	DIR or REV	Direct Acting	Direct Acting	Direct Acting	Direct Acting	Direct Acting	Direct Acting	
HTGOUTLOWLIMIT	Low limit for the heating output. This value should not be changed.	0 to 30	20	20	20	20	20	20	
HTGOUTHIGHLIMIT	High limit for the heating output. This variable should only be changed on a Model PEH or REH.	60 to 100	70	100	100	100	100	70	

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Keep all manuals for future reference.

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