REZNOR®

Applies to: **Models RCB, RDB, RECB, REDB, RDCB, RDDB**

Module Air Processing Systems (MAPS III) Manual for Option D21 Makeup Air Control

1.0 Digital Controller

The control system utilizes a factory installed remote display which allows for complete access to unit test features, schedules, discharge air setpoints, fan control, alarms, and other unit operational setpoints. The control features include:

- Local and remote alarming
- Integrated time clock
- Compressor anti-cycle protection and minimum "on/off" cycle rates
- Multiple protocol support [BACnet® (MSTP) or LonWorks®]

- Alarm shutdown feature
- Commissioning and test mode functions
- Optional wall mounted or handheld remote display
- Energy conscious applications
- TAB menu for creating a backup of setpoints

1.1 Display Function Keys

Example of Remote Controller Display (Option RB5 or RB6) Key Symbols

Function Key Identification	Alarm	Prg	Esc	Up	Enter	Down
Function Key Display on the Remote Controller	🔔	*Prg*	*Esc*	↑	↵	↓

1.0 Digital Controller (cont'd)

1.2 Thermostat Display

User Space Mounted Thermostat, Option CL78

The user display shall show space temperature, space humidity, unit status, and time in its normal state.

Mode Button: When pressed will allow a State Selection of Heat, Cool or Auto

Fan Button: When pressed will initiate the temporary occupied period.

On / Off Button: When pressed while the unit is in the Heat, Cool, or Auto State, will set the unit State to OFF. When Pressed while the unit is in the Off State, will set the Unit State to the previous Heat, Cool or Auto State.

Set Point Adjustment Dial: For temperature adjustments, press inward on the dial once and turn the dial clockwise to increase and counterclockwise to decrease the desired temperature setpoint. For humidity setpoint adjustments, press the dial inward twice and turn the dial clockwise to increase and counterclockwise to decrease the desired humidity setpoint.

Optional Space Temperature and Humidity Averaging Feature:
Up to 5 space sensors may be added to the control system in addition to the CL78 for a total of 6 space inputs. These devices are combination temperature and humidity sensors and operate on a RS-485 communication trunk.
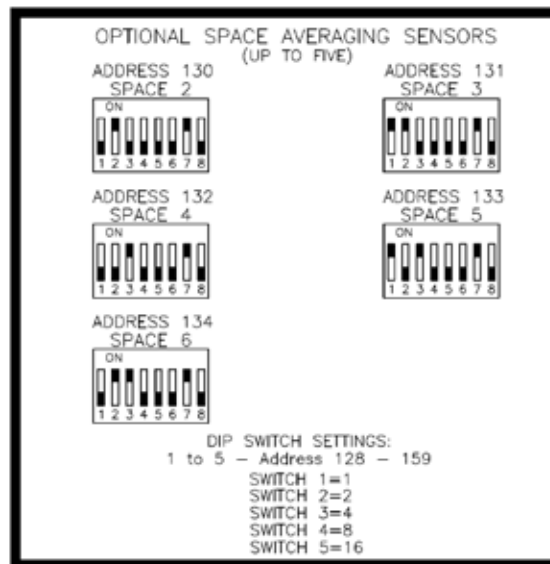
Space Averaging Sensor Addressable Dip Switch Settings: User must set the addresses accordingly in the field.

Note: Refer to the Installation manual and or unit wiring drawings for specific wiring information.

OPTIONAL SPACE AVERAGING SENSORS
(UP TO FIVE)

ADDRESS 130 SPACE 2

ADDRESS 131 SPACE 3

ADDRESS 132 SPACE 4

ADDRESS 133 SPACE 5

ADDRESS 134 SPACE 6

DIP SWITCH SETTINGS:
1 to 5 — Address 128 — 159
SWITCH 1=1
SWITCH 2=2
SWITCH 3=4
SWITCH 4=8
SWITCH 5=16

Optional Exhaust Air / Return Air Temp & Humidity Sensors:
These sensors are duct mount style and operate on a RS-485 communication trunk.

ADDRESS 128
RETURN AIR TEMP & HUMIDITY SENSOR

RETURN AIR DIP SWITCH

ON

1 2 3 4 5 6 7 8

POSITION 7 "ON"

ADDRESS 129
EXHAUST AIR TEMP & HUMIDITY SENSOR

EXHAUST DIP SWITCH

ON

1 2 3 4 5 6 7 8

POSITIONS 1 & 7 "ON"
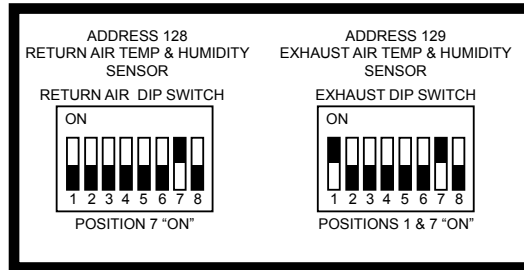
Exhaust Air / Return Air Temp & Humidity Sensor Addressable Dip Switch Settings: Factory set when ordered on new production units. For retrofits the user must set the addresses accordingly in the field.

Note: Refer to the Installation manual and or unit wiring drawings for specific wiring information.

1.3 Controller hardware input – output points

Input Terminal	Input Point Name	Input Description	Signal type	Signal Range	Always Active
J23	Spc_Temp	Space Temp - up to a total of 6 inputs	RS-485 Communication		
FB2	Spc_Humidity	Space Humidity - up to a total of 6 inputs			
U1	OA_Hum_Raw	Outside Air Humidity	0 -10 Vdc	0 to 100% RH	x
U2	OA_Temp_Raw	Outside Air Temp	Thermistor 10K-2	-35 °F to 240 °F (-37°C to 115°C)	x
U3	Ext_Dmpr_Cmd	External Unit Damper Command	0 -10 Vdc	0 to 100%	
U4	DA_Temp	Discharge Air Temp	Thermistor 10K-2	-35 °F to 240 °F (-37°C to 115°C)	x
U5	CC_Temp	Cooling Coil Discharge Air Temp	Thermistor 10K-2	-35 °F to 240 °F (-37°C to 115°C)	x
U6	MA_Temp	Mixed Air Temp	Thermistor 10K-2	-35 °F to 240 °F (-37°C to 115°C)	x
U7	Bldg_Pressure	Building Static Pressure	0 - 10 Vdc	-0.5" iwc thru + 0.5"iwc	
U8	Duct_Pressure	Duct Static Pressure	0 - 10 Vdc	0 - 2.5" iwc	
U9	Spc_CO2	Space CO_2	0 - 10 Vdc	0 - 2,000 ppm	
J26	RA_Temp	Return Air Temp	RS-485 Communication		
FB2	RA_Humidity	Return Air Humidity			
J26	EA_Temp	Exhaust Air Temp	RS-485 Communication		
FB2	EA_Humidity	Exhaust Air Humidity			
ID1	SF_Sts	Supply Fan Status	Dry Contact	Open = "OFF" / Close = "ON"	x
ID2	Filter_Sts	Main or ERV Dirty Filter Status	Dry Contact	Open = "OFF" / Close = "ON"	
ID3	Safety_Sts	Safety Input Status	Dry Contact	Open = "ALARM" / Close = "NORMAL"	x
ID4	Ext_OCC	Occupied Mode Input	Dry Contact	Open = "OFF" / Close = "ON"	
ID9	Ext_ Switch_1	External Damper Position Sw 1	Dry Contact	Open = "OFF" / Close = "ON"	
ID10	Ext_ Switch_2	External Damper Position Sw 2	Dry Contact	Open = "OFF" / Close = "ON"	
ID14	Phase_Alarm	Phase Protection Alarm	Dry Contact	Open = "OFF" / Close = "ON"	
ID15	Htr_1_Sts	Gas Heater 1 Status	Rib Relay N.O. Contact	Open = "OFF" / Close = "ON"	
ID16	Htr_2_Sts	Gas Heater 2 Status	Rib Relay N.O. Contact	Open = "OFF" / Close = "ON"	

Output Terminal	Output Point Name	Output Description	Signal / Range	Signal Range	Always Enabled
Y1	Damper_Cmd	Damper Output Command	0 – 10Vdc	0 – 100% Open	x
Y2	SF_VFD_Cmd	Supply Fan VFD Command	0 – 10Vdc	0 – 100% Flow	
Y3	HX1_Mod_Cmd	Gas Heating 1 Modulation Command	2 – 10Vdc	0 – 100% Capacity	
		Electric Heating Modulation Command	0 – 10Vdc	0 – 100% Capacity	
Y4	HX2_Mod_Cmd	Gas Heating 2 Modulation Command	2 – 10Vdc	0 – 100% Capacity	
Y5	RH_Mod_Cmd	Reheat Modulation Command	0 – 10Vdc	0 – 100% Capacity	
NO1	SF_Cmd	Supply Fan Command	24Vac Contact	Open = "OFF" / Close = "ON"	x
NO2	Comp_Stg1_Cmd	Compressor Stage 1 Command	24Vac Contact	Open = "OFF" / Close = "ON"	x
NO3	Comp_Stg2_Cmd	Compressor Stage 2 Command	24Vac Contact	Open = "OFF" / Close = "ON"	
NO4	Comp_Stg3_Cmd	Compressor Stage 3 Command	24Vac Contact	Open = "OFF" / Close = "ON"	
NO5	Comp_Stg4_Cmd	Compressor Stage 4 Command	24Vac Contact	Open = "OFF" / Close = "ON"	
NO7	Alm_Rly_Cmd	Unit General Alarm Relay Command	24Vac Contact	Open = "OFF" / Close = "ON"	x
NO8	HX_Stg1_Cmd	Heating Stage 1 Command	24Vac Contact	Open = "OFF" / Close = "ON"	
NO9	HX_Stg2_Cmd	Heating Stage 2 Command	24Vac Contact	Open = "OFF" / Close = "ON"	
NO10	HX_Stg3_Cmd	Heating Stage 3 Command	24Vac Contact	Open = "OFF" / Close = "ON"	
NO11	HX_Stg4_Cmd	Heating Stage 4 Command	24Vac Contact	Open = "OFF" / Close = "ON"	
NO12	HX_Stg5_Cmd	Heating Stage 5 Command	24Vac Contact	Open = "OFF" / Close = "ON	
NO13	HX_Stg6_Cmd	Heating Stage 6 Command	24Vac Contact	Open = "OFF" / Close = "ON"	
NO17	RH_Cmd	Reheat compressor Command	24Vac Contact	Open = "OFF" / Close = "ON"	

2.0 Sequence of Operation

The makeup air control system operates the supply fan, the intake dampers, DX cooling, and gas or electric heat to maintain a set of discharge air temperature control setpoints.

The unit discharge air temperatures fall within the following three categories:

1. Unit supplies neutral temperature air that does not affect space conditions.
2. Unit supplies cold temperature air to provide space cooling.
3. Unit supplies hot temperature air to provide space heating.
   NOTE: Heating applies only when a unit is ordered with a gas or electric heat section. Heating is included in all control instructions.

The sequence is broken into five primary states of operation.

2.1 States of Operation

The unit can switch between states based on the following:

- Controller Display
- th-tune Space Control Device (Option CL78)
- Building Automation Command (Option BHB7 or BHB8)
- Automatically based upon sequence of operation.

The unit state is the primary determination of individual component function.

1. Off

The unit supply fan and all associated mechanical equipment is OFF in this state. There are no associated sequences of operation in this state. The unit will only switch to the OFF state when the state is manually selected through the th-tune device (Option CL78), unit display, or building automation network communication point. Upon initial power, Unit OFF is the default state.

2. Off / Alarm

The Off / Alarm state can only occur from a sequence "failure". The unit will switch to this state from the heating, cooling, or auto state. The unit will stop all mechanical operation until the "failure" condition(s) are resolved. The unit will be OFF. Upon resolving the failure, the unit will return to heating, cooling, or auto state. Alarms can also be cleared by resetting power to the unit.

3. Heat (optional)

From the th-tune device (Option CL78), controller display, or BMS, the heat state can be selected. The supply fan will run and the mechanical heating and the dampers will be operated to maintain heating sequence of operation. The unit will not automatically switch to other states except Off / Alarm.

4. Auto

From the th-tune device (Option CL78), controller display, or BMS, the auto state can be selected. Upon initial selection of the auto state, the unit will be in the auto-heating state (if equipped) whenever the outdoor air temperature is below 65°F(18°C), otherwise the unit will be in the auto-cooling state. The unit will change to auto cooling/auto-heating state whenever the temperature crosses the changeover setpoint for more than 15 minutes or is more than 5°F(2.8°C) beyond the changeover setpoint.

The unit mechanical function is exactly the same in either cooling or heating state, other than the sequence's ability to change states. NOTE: The unit switches between heating and cooling based upon outside air temperature. Space temperature does not dictate heating or cooling mode.

5. Cool

From the th-tune device (Option CL78), controller display, or BMS, the cool state can be selected. The unit supply fan will run and the mechanical cooling and the dampers will be operated to maintain the cooling sequence of operation. The unit will not automatically switch to other states except Off / Alarm.
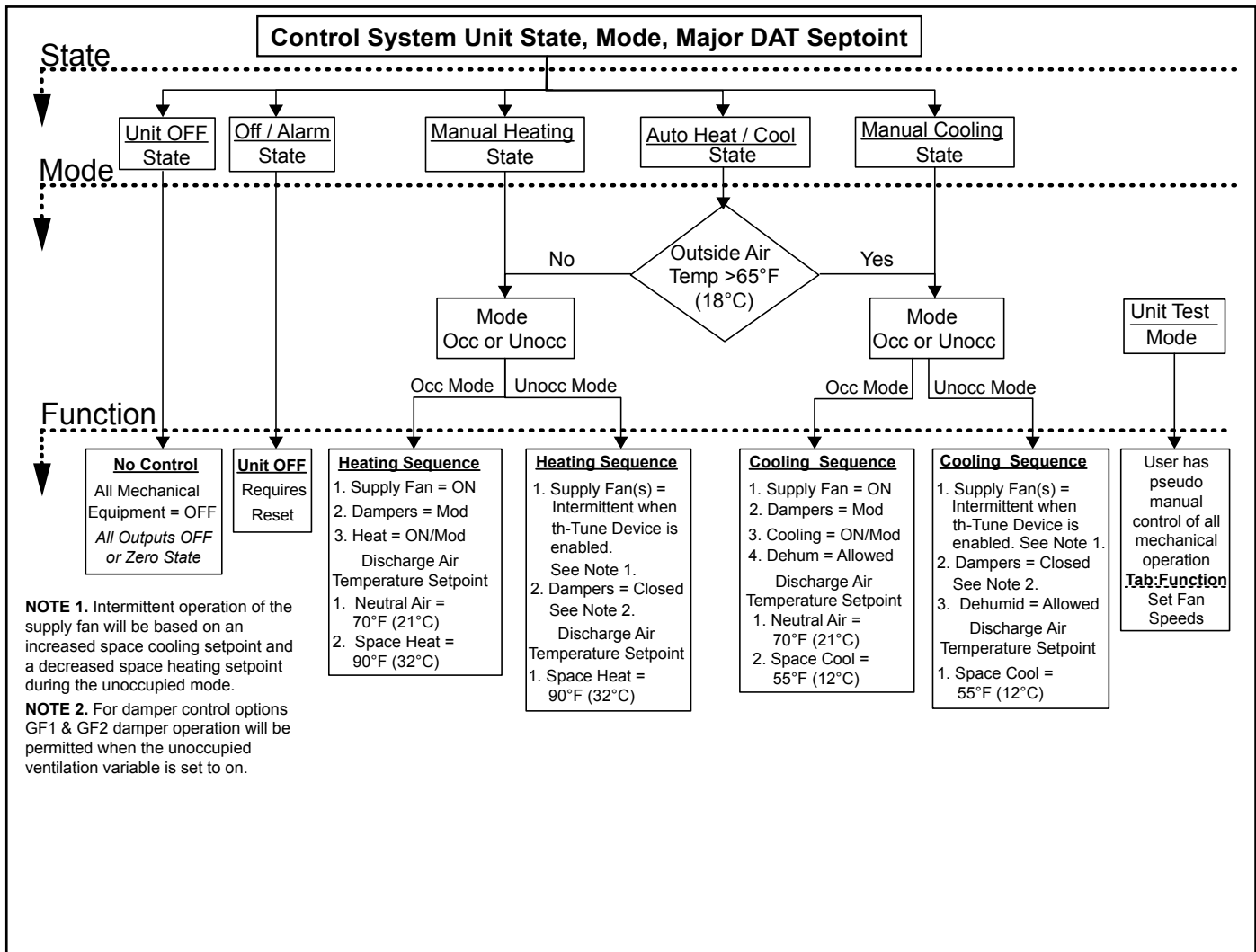
2.0 Sequence of Operation (Cont'd)

2.2 Modes of Operation

Occupied & Unoccupied

When the unit is called to operate in the auto, heating, or cooling state(s), the unit will function in one of two modes: occupied or unoccupied. The unit will run in occupied or unoccupied mode based upon one of the following three user selected commands:

1. Internal Time Clock Schedule Selects Occupied or Unoccupied Mode.

2. Physical input point (ID4) (Contact closed = Occupied)

3. Building Automation network variable (LonWorks® or BACnet®)

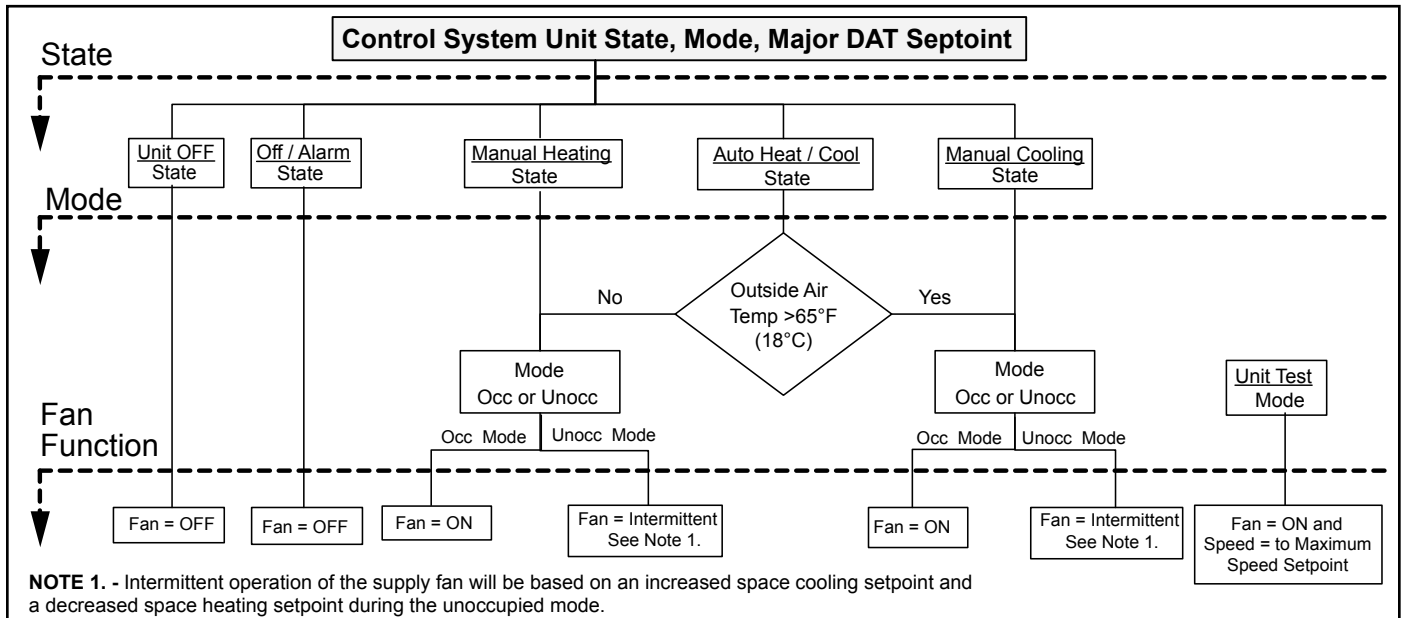From the display, the user will select the mode control type. All other input methods are ignored.

State

Control System Unit State, Mode, Major DAT Septoint

Mode

| Unit OFF State | Off / Alarm State | Manual Heating State | Auto Heat / Cool State | Manual Cooling State |

Outside Air Temp >65°F (18°C)

No → Mode Occ or Unocc

Yes → Mode Occ or Unocc

Unit Test Mode

Function

No Control
All Mechanical Equipment = OFF
All Outputs OFF or Zero State

Unit OFF
Requires Reset

Heating Sequence
1. Supply Fan = ON
2. Dampers = Mod
3. Heat = ON/Mod
   Discharge Air Temperature Setpoint
1. Neutral Air = 70°F (21°C)
2. Space Heat = 90°F (32°C)

Heating Sequence
1. Supply Fan(s) = Intermittent when th-Tune Device is enabled. See Note 1.
2. Dampers = Closed See Note 2.
   Discharge Air Temperature Setpoint
1. Space Heat = 90°F (32°C)

Cooling Sequence
1. Supply Fan = ON
2. Dampers = Mod
3. Cooling = ON/Mod
4. Dehum = Allowed
   Discharge Air Temperature Setpoint
1. Neutral Air = 70°F (21°C)
2. Space Cool = 55°F (12°C)

Cooling Sequence
1. Supply Fan(s) = Intermittent when th-Tune Device is enabled. See Note 1.
2. Dampers = Closed See Note 2.
3. Dehumid = Allowed
   Discharge Air Temperature Setpoint
1. Space Cool = 55°F (12°C)

User has pseudo manual control of all mechanical operation
Tab:Function
Set Fan Speeds

NOTE 1. Intermittent operation of the supply fan will be based on an increased space cooling setpoint and a decreased space heating setpoint during the unoccupied mode.

NOTE 2. For damper control options GF1 & GF2 damper operation will be permitted when the unoccupied ventilation variable is set to on.

3.0 Controls

3.1 Supply Fan Control

The supply fan provides the total volume of conditioned air to the space at a given rate. The rate is controlled by unit state, mode, and the selection of one of the six sequences of operation.

1. High Low Volume Control (Option VFC1)
2. Duct Static Pressure (Option VFC3)
3. Building Static Pressure (Option VFC4)
4. Summer/Winter Constant Volume (Option VFC9)

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                     ┌─────────────────────────────────────────────────────┐
State                │   Control System Unit State, Mode, Major DAT Septoint │
                     └─────────────────────────────────────────────────────┘
```

| Unit OFF State | Off / Alarm State | Manual Heating State | Auto Heat / Cool State | Manual Cooling State |

Mode

Outside Air Temp >65°F (18°C) — No / Yes

Mode Occ or Unocc

Mode Occ or Unocc

Unit Test Mode

Fan Function

| Fan = OFF | Fan = OFF | Fan = ON | Fan = Intermittent See Note 1. | Fan = ON | Fan = Intermittent See Note 1. | Fan = ON and Speed = to Maximum Speed Setpoint |

NOTE 1. - Intermittent operation of the supply fan will be based on an increased space cooling setpoint and a decreased space heating setpoint during the unoccupied mode.

Supply Fan Control: Occupied Mode

When the unit is called to be in occupied mode, the supply fan will start. If the unit is configured with a 100% outside air damper, the damper actuator is electrically inter-locked such that the supply fan cannot start until the damper is 80% open.

When the Supply fan is commanded OFF, any active heating or cooling operations will be shut down and the supply fan will stop after an adjustable time delay.

The rate is controlled by unit state, mode and the selection of one of the following sequences of operation:

1. **High - Low Fan Speed Control (VFC1)** The variable frequency drive is commanded ON from NO1. There are two fan speed states - active heating/cooling and fan only. When the fan is ON and the system is in either the space heating or space cooling mode, the unit will operate on high fan speed. When the fan is ON and the system is not in either the space cooling or space heating mode, the supply fan will operate on low fan speed.

2. **Duct Static Pressure Control (0.0" to 2.5" iwc) (Option VFC3)** The variable frequency drive is commanded ON from NO1. The fan modulates between the user adjustable minimum and maximum fan speed setpoints using a PI loop to maintain the duct static pressure setpoint, +0.5"iwc default.

3. **Building Static Pressure Control (-0.5" to 0.5" iwc) (Option VFC4)** The variable frequency drive is commanded ON from NO1. The fan modulates between the user adjustable minimum and maximum fan speed setpoints using a PI loop to maintain the building static pressure setpoint, +0.1"iwc default.

4. **Summer/Winter Constant Volume (Option VFC9)** The variable frequency drive is commanded ON from NO1. The unit ramps up to a user set supply fan speed setting. There are two individual supply fan speed % setpoints, one for heating and one for cooling. When the Unit is in Space or Neutral air Heating, the supply fan will use the heating speed % setpoint. When the unit is in any other mode, the supply fan will use cooling speed % setpoint.

A 30-second acceleration and deceleration rate for the supply fan to ramp between the minimum and maximum motor frequency is factory set via the unit variable frequency drive.

Supply Fan Control : Unoccupied Mode

When configured for space control, the supply fan operation will be intermittent based on the zone temperature. See Temperature and Humidity Control section, Paragraph 3.7, for space control and setpoint definitions.

3.0 Controls (Cont'd)
3.2 Intake Damper Control

The intake dampers operate based upon state, mode and one of the following user selected sequences. The dampers are normally open and operational in the occupied mode and closed to outside air in the unoccupied mode depending on the user selection.

1. **100% OA, (Option GF2A)**

   When the unit is to start, the outside air damper will modulate (point Y1 = 10Vdc) and the supply fan will be commanded ON (point NO1 = On). If the unit is equipped with an outside air damper, the damper actuator is electrically interlocked to the fan start/stop such that the supply fan cannot start until the damper is 80% open. Air inlet configuration Options AR8, AR2D, AR2L, and AR2Y are electrically interlocked with the supply fan.

   OFF and Alarm Modes - The damper will be closed. Y1 = 0%.

2. **External 0-10vdc Input, (Option GF1)**

   Occupied & Unoccupied Mode

   The dampers will modulate from 0-100% (point Y1 = 0 to 10 Vdc) based user supplied 0 - 10 Vdc input. 0 Volts input is 0% damper while 10V input is 100% damper position. This is not allowed with Options AR8, AR2D, AR2L & AR2Y. The software does not prevent the selection of this option. The fan status switch will handle the block flow condition. The damper is NOT electrically interlocked with the supply fan.

   Unoccupied OFF and Alarm Modes

   The damper will be closed (Y1 = 0%).

   NOTE: For unoccupied operation of this damper control option, set the unoccupied ventilation enable variable to ON.

3. **Two-Position Dampers (Option GF2)**

   Occupied Mode

   The damper will open to the user adjustable occupied damper position setpoint value (point Y1=10Vdc). For the damper options with only 100% outside air, the mechanical interlock of 80% will not allow the fan to start. Adjust the outside air setpoint to reach the minimum electrical interlock position.

   Unoccupied Mode

   With the unoccupied ventilation enable variable set to ON, the damper will open to the user adjustable unoccupied damper position setpoint value (point Y1=0Vdc). For the damper options with only 100% outside air, the mechanical interlock of 80% will not allow the fan to start. Adjust the outside air setpoint to reach the minimum electrical interlock position. With the unoccupied ventilation enable variable set to OFF, the damper will be commanded to 0%.

   OFF and Alarm Modes - The damper will be closed. Y1 = 0%.

4. **Four Positions based on 2 Digital Inputs (Option GF4)**

   Occupied Mode

   The damper will open to the user adjustable defined position based upon two hardware input switches (ID9 & ID10).

Variable Name	Input Switch		Default Damper Position	Display Range	Y1 Output Range
	ID9	ID10			
Aux_1_SP	Open	Open	20%	0-100%	0 – 10V
Aux_2_SP	Close	Open	40%	0-100%	0 – 10V
Aux_3_SP	Open	Close	60%	0-100%	0 – 10V
Aux_4_SP	Close	Close	80%	0-100%	0 – 10V

   This option is not allowed with AR8, AR2D, AR2L, and AR2Y. The software does not prevent the selection of this option. The fan status switch will handle the block flow condition.

   Unoccupied, OFF and Alarm Modes -The damper will be closed (Y1 = 0%).

5. **Building Pressure Control (Range -0.5 to 0.5" iwc) (Option GF5)**
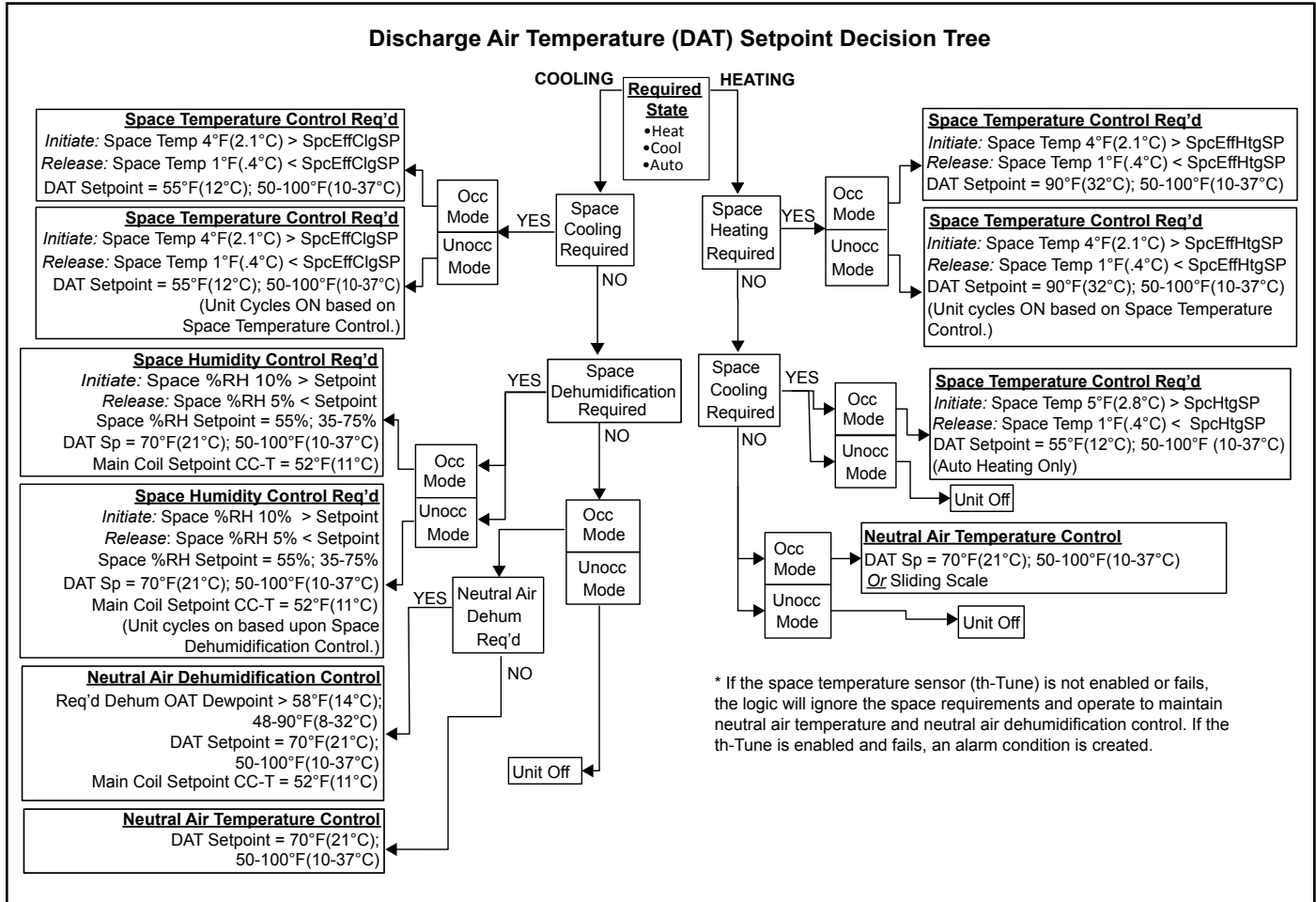
   Occupied Mode

   The dampers will modulate using a PI loop to maintain the building static pressure setpoint, default 0.1" iwc Y1 will modulate from 0-100% open, 0-10V.

   Unoccupied, OFF and Alarm Modes - The damper will be closed (Y1 = 0%).
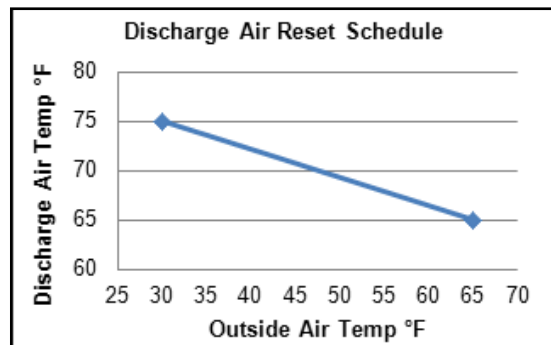
3.3 Temperature And Humidity Control

The unit is inherently a discharge air temperature control system. The unit will operate to maintain one of the following discharge air setpoints depending on the state and mode. Selected setpoints are user adjustable from the unit display and the wall mounted user interface.

Discharge Air Temperature (DAT) Setpoint Decision Tree

COOLING

HEATING

Required State
- Heat
- Cool
- Auto

Space Temperature Control Req'd (Cooling, Occ Mode)
Initiate: Space Temp 4°F(2.1°C) > SpcEffClgSP
Release: Space Temp 1°F(.4°C) < SpcEffClgSP
DAT Setpoint = 55°F(12°C); 50-100°F(10-37°C)

Space Temperature Control Req'd (Cooling, Unocc Mode)
Initiate: Space Temp 4°F(2.1°C) > SpcEffClgSP
Release: Space Temp 1°F(.4°C) < SpcEffClgSP
DAT Setpoint = 55°F(12°C); 50-100°F(10-37°C)
(Unit Cycles ON based on Space Temperature Control.)

Space Humidity Control Req'd (Occ Mode)
Initiate: Space %RH 10% > Setpoint
Release: Space %RH 5% < Setpoint
Space %RH Setpoint = 55%; 35-75%
DAT Sp = 70°F(21°C); 50-100°F(10-37°C)
Main Coil Setpoint CC-T = 52°F(11°C)

Space Humidity Control Req'd (Unocc Mode)
Initiate: Space %RH 10% > Setpoint
Release: Space %RH 5% < Setpoint
Space %RH Setpoint = 55%; 35-75%
DAT Sp = 70°F(21°C); 50-100°F(10-37°C)
Main Coil Setpoint CC-T = 52°F(11°C)
(Unit cycles on based upon Space Dehumidification Control.)

Neutral Air Dehumidification Control
Req'd Dehum OAT Dewpoint > 58°F(14°C);
48-90°F(8-32°C)
DAT Setpoint = 70°F(21°C);
50-100°F(10-37°C)
Main Coil Setpoint CC-T = 52°F(11°C)

Neutral Air Temperature Control
DAT Setpoint = 70°F(21°C);
50-100°F(10-37°C)

Space Cooling Required — YES → Occ Mode / Unocc Mode
Space Cooling Required — NO → Space Dehumidification Required
Space Dehumidification Required — YES → Occ Mode / Unocc Mode
Space Dehumidification Required — NO → Occ Mode / Unocc Mode → Neutral Air Dehum Req'd — YES → (Neutral Air Dehumidification Control) / NO → Unit Off

Space Temperature Control Req'd (Heating, Occ Mode)
Initiate: Space Temp 4°F(2.1°C) > SpcEffHtgSP
Release: Space Temp 1°F(.4°C) < SpcEffHtgSP
DAT Setpoint = 90°F(32°C); 50-100°F(10-37°C)

Space Temperature Control Req'd (Heating, Unocc Mode)
Initiate: Space Temp 4°F(2.1°C) > SpcEffHtgSP
Release: Space Temp 1°F(.4°C) < SpcEffHtgSP
DAT Setpoint = 90°F(32°C); 50-100°F(10-37°C)
(Unit cycles ON based on Space Temperature Control.)

Space Temperature Control Req'd
Initiate: Space Temp 5°F(2.8°C) > SpcHtgSP
Release: Space Temp 1°F(.4°C) < SpcHtgSP
DAT Setpoint = 55°F(12°C); 50-100°F (10-37°C)
(Auto Heating Only)

Neutral Air Temperature Control
DAT Sp = 70°F(21°C); 50-100°F(10-37°C)
Or Sliding Scale

Space Heating Required — YES → Occ Mode / Unocc Mode
Space Heating Required — NO → Space Cooling Required
Space Cooling Required — YES → Occ Mode / Unocc Mode → Unit Off
Space Cooling Required — NO → Occ Mode / Unocc Mode → Unit Off

* If the space temperature sensor (th-Tune) is not enabled or fails, the logic will ignore the space requirements and operate to maintain neutral air temperature and neutral air dehumidification control. If the th-Tune is enabled and fails, an alarm condition is created.

Sliding Scale: Temperature Reset Schedule Setpoint (heating Only)

The user can also select a reset schedule for the discharge setpoint used when in neutral air heating mode.

Reset Schedule	
Outside Air Temperature	Discharge Air Temperature
30°F (-1.1°C)	75°F (23.8°C)
65°F (18.3°C)	65°F (18.3°C)

Discharge Air Reset Schedule

3.0 Controls (Cont'd)
3.4 Heating Control

3.4.1 Electric Heat Staging
A call for heat will occur when the discharge air temperature is 5°F(2.8°C) below the active setpoint. When the OAT is below 65°F/18°C (Heating Lockout SP), the unit enables the electric heat to maintain the active setpoint. The unit will stage as shown in the staging chart and the PI loop will activate. Stages should be assumed cumulative from the previous stage.

Electric Heat Staging					
PI Loop Control: All Statements Must Be True To Activate or De-Activate. All stages will have an adjustable min ON and OFF time.					
Stage	Outputs	Increase Inter-Stg Timer	Activate	Decrease Inter-Stg Timer	De-activate
Stg 1	NO8 = ON		DAT 5°F (2.8°C) below setpoint (Y3 Modulates via Heating Demand)	15 min	Heating Demand < 2.5% & DAT 5°F (2.8°C) above setpoint
Stg 2	NO9 = ON	10 min	Heating Demand > 70% & DAT 5°F(2.8°C) below setpoint	2 min	Heating Demand < 5% & DAT 5°F(2.8°C) above setpoint
Stg 3	NO10 = ON	10 min	Heating Demand > 75% & DAT 5°F(2.8°C) below setpoint	2 min	Heating Demand < 10% & DAT 5°F(2.8°C) above setpoint
Stg 4	NO11 = ON	10 min	Heating Demand > 80% & DAT 5°F(2.8°C) below setpoint	2 min	Heating Demand < 20% & DAT 5°F(2.8°C) above setpoint
Stg 5	NO12 = ON	10 min	Heating Demand > 85% & DAT 5°F(2.8°C) below setpoint	2 min	Heating Demand < 30% & DAT 5°F(2.8°C) above setpoint
Stg 6	NO13 = ON	10 min	Heating Demand > 90% & DAT 5°F(2.8°C) below setpoint	2 min	Heating Demand < 40% & DAT 5°F(2.8°C) above setpoint
All parameters are factory level access.					

3.4.2 Gas Heat Staging
A call for heat will occur when the discharge air temperature is 5°F(2.8°C) below the active setpoint. When the OAT is below 65°F/18°C (Heating Lockout SP), the unit enables the gas heat to maintain the active setpoint. The unit will stage and modulate as shown in the staging chart and the PI loop will activate. Stages should be assumed cumulative from the previous stage.

Gas Heat Staging					
PI Loop Control: All Statements Must Be True To Activate or De-Activate. All stages will have an adjustable min ON and OFF time.					
Stage	Outputs	Increase Inter-Stg Timer	Activate	Decrease Inter-Stg Timer	De-activate
Stg 1	Y3 = 24% for 30 seconds & NO8 = ON		DAT 5°F (2.8°C) below setpoint (Y3 Modulates Heat Exchanger 1 via Heating Demand)	15 min	Heating Demand < 2.5% & DAT 5°F (2.8°C) above setpoint
Stg 2	Y4 = 24% for 30 seconds NO9 = ON	10 min	Heating Demand > 50% (Y3 Heat Exhanger 1 = 100%) & DAT 5°F(2.8°C) below setpoint (Y4 Modulates Heat Exchanger 2 via Heating Demand)	15 min	Heating Demand < 25% & DAT 5°F(2.8°C) above setpoint
All parameters are factory level access.					

3.5 Cooling Control

When the unit has a call for cooling from the th-tune device (Option CL78) in the space, it will use the unit U4 DAT input and the cooling demand to achieve the space cooling discharge air temperature setpoint. A call for space cooling takes priority over a call for space dehumidification.

3.5.1 Cooling Staging Control Y3 (with the Option CL78 th-tune device ENABLED and COMMUNICATING)

A call for mechanical cooling will occur when the discharge air temperature is 5°F(2.8°C) above the active setpoint. When the OAT is above 65°F/18°C (Cooling Lockout SP), the unit enables the mechanical cooling to maintain the active setpoint. Cooling capacity/staging will follow a PI loop to maintain the active setpoint. Space Cooling Active = Space dehumidification Y5 Reheat_Mod_Capacity and NO17 Reheat Compressor Command not permitted.

3.5.1 Cooling Staging Control Y3 (with the Option CL78 th-tune device ENABLED and COMMUNICATING) (Cont'd)

Space Cooling Inactive = Space dehumidification Y5 Reheat_Mod_Capacity and NO17 Reheat Compressor Command permitted. If the Space Cooling is inactive and the space humidity is above the space dehumidification setpoint, the unit will enter the space dehumidification mode. While in the space dehumidification mode, the main cooling compressors will be enabled to maintain a 52°F(11°C) cooling coil discharge setpoint and will use the U5 CC_Temp sensor.

See dehumidification commands section for details on the operation of the reheat compressor and modulating valve Y5 output in space dehumidification mode.

The unit will use the U4 DAT input and cooling demand to achieve the neutral discharge air temperature setpoint.

3.5.2 Cooling Staging Control Y3 (with the Option CL78 th-tune device DISABLED and NOT COMMUNICATING)

A call for mechanical cooling will occur when the discharge air temperature is 5°F(2.8°C) above the neutral air setpoint. When the OAT is above 65°F/18°C (Cooling Lockout SP), the unit enables the mechanical cooling to maintain the neutral air setpoint. Cooling capacity/staging will follow a PI loop to maintain the active setpoint.

When the OA dewpoint is greater than 58°F(14°C) the unit will enter the neutral air dehumidification mode. While in the neutral air dehumidification mode, the main cooling compressors will be enabled to maintain a 52°F(11°C) cooling coil discharge setpoint and will use the U5 CC_Temp sensor. See dehumidification commands section for details on the operation of the reheat compressor and modulating valve Y5 output in neutral air dehumidification mode.

3.7.1 <u>Occupied</u> Space Temperature Control and Setpoint

DX Mechanical Cooling Staging					
PI Loop Control: All Statements Must Be True To Activate or De-Activate *All stages will have an adjustable min ON and OFF time*					
Stage	Output	Increase Stage Timing	Activate	Decrease Stage Timing	De-activate
Stg 1	NO2	5 min	DAT 5°F(2.8°C) above setpoint	5 min	Cooling Demand < 10 % & DAT 5°F(2.8°C) below setpoint
Stg 2	NO3	5 min	Cooling Demand > 70% & DAT 5°F(2.8°C) above setpoint	5 min	Cooling Demand < 50% & DAT 5°F(2.8°C) below setpoint
Stg 3	NO4	5 min	Cooling Demand > 80% & DAT 5°F(2.8°C) above setpoint	5 min	Cooling Demand < 55% & DAT 5°F(2.8°C) below setpoint
Stg 4	NO5	5 min	Cooling Demand > 90% & DAT 5°F(2.8°C) above setpoint	5 min	Cooling Demand < 60% & DAT 5°F(2.8°C) below setpoint
All parameters are factory level access.					

3.6 Dehumidification

Dehumidification Commands

When either the space dehumidification mode or the neutral air dehumidification mode are active, the main evaporator compressor(s) will be enabled to maintain a 52°F(11°C) cooling coil discharge setpoint and will use the U5 CC_Temp sensor. The reheat compressor and the reheat valve output Y5 will be enabled to modulate to maintain the reheat setpoint 70°F(21°C) via the U4 DAT temp sensor.

Any of the following conditions will lockout the space dehumidification Mode:

1. The outdoor air temperature is below the reheat lockout setpoint, (58°F/14°C, reheat lockout, range 50-100°F/10-37°C) Drybulb.
2. The outdoor air temperature is above the reheat high lockout setpoint. (100°F/37°C, reheat high lockout, range 50-120°F/10-48°C) Drybulb
3. The space cooling mode is active.
4. Cooling Coil Sensor failure.

Any of the following conditions will lockout the neutral air dehumidification Mode:

1. The outdoor air temperature is below the reheat lockout setpoint, (58°F/14°C, reheat lockout, range 50-100°F/10-37°C) Drybulb
2. The outdoor air temperature is above the reheat high lockout setpoint. (100°F/37°C), reheat high lockout, range 50-120°F/10-48°C) Drybulb
3. Outside Air Humidity Sensor or Cooling Coil Sensor failure.
4. OA dewpoint less than 58°F(14°C).

3.0 Controls (Cont'd)

3.7 Space Temperature Control and Setpoint Definitions

Definitions

Heating

SpcTempSP: Base Space Temp Setpoint 72°F(22°C) minus the **SpcHtgDB:** Space Heating Dead Band 1°F(.4°C) = **SpcHtgSP:** Space Heating Setpoint 71°F(21°C)

When in the occupied mode, the **SpcHtgSP:** Space Heating Setpoint is the **SpcEffHtgSp:** Space Effective Heating Setpoint.

SpcEffHtgSp: Space Effective Heating Setpoint 71°F(21°C) minus the **SpcHtgOnDiff:** Space Heating on Differential 4°F(2.1°C) = 67°F(19°C)

Space Temp less than or equal to 67°F(19°C) = Space Heating Mode ON.

SpcEffHtgSp: Space Effective Heating Setpoint 71°F (21°C) plus the **SpcHtgOffDiff:** Space Heating off Differential 1°F(.4°C) = 72°F(22°C)

Space Temp greater than or equal to 72°F(22°C) = Space Heating Mode OFF.

Cooling

SpcTempSP: Base Space Temp Setpoint 72°F(22°C) plus the **SpcClgDB:** Space Cooling Dead Band 1°F(.4°C) = **SpcClgSP**: Space Cooling Setpoint 73°F(23°C)

When in the occupied mode, the **SpcClgSP:** Space Cooling Setpoint is the **SpcEffClgSp:** Space Effective Cooling Setpoint.

SpcEffClgSp: Space Effective Cooling Setpoint 73°F(23°C) plus the **SpcClgOnDiff:** Space Cooling on Differential 4°F(2.1°C) = 77°F(25°C)

Space Temp greater than or equal to 77°F(25°C) = Space Cooling Mode ON.

SpcEffHtgSp: Space Effective Cooling Setpoint 73°F(23°C) minus the **SpcClgOffDiff:** Space Cooling off Differential 1°F(.4°C) = 72°F(22°C)

Space Temp less than or equal to 72°F - Space Cooling Mode OFF.

3.7.2 Unoccupied Space Temperature Control and Setpoint Definitions

Heating

SpcTempSP: Base Space Temp Setpoint 72°F(22°C) minus the **SpcHtgDB:** Space Heating Dead Band 1°F(.4°C) = **SpcHtgSP:** Space Heating Setpoint 71°F(21°C)

SpcHtgSP: Space Heating Setpoint 71°F(21°C) minus the **SpcHtgUnoOs:** Space Heating Unoccupied Offset 5°F(2.8°C) = **SpcEffHtgSp:** Space Effective Heating Setpoint 66°F(18°C)

SpcEffHtgSp: Space Effective Heating Setpoint 66°F(18°C) minus the **SpcHtgOnDiff:** Space Heating on Differential 4°F(2.1°C) = 62°F(16°C)

Space Temp less than or equal to 62°F(16°C) = Unit ON for unoccupied heating.

SpcEffHtgSp: Space Effective Heating Setpoint 66°F(18°C) plus the **SpcHtgOffDiff:** Space Heating off Differential 1°F(.4°C) = 67°F(19°C)

Space Temp greater than or equal to 67°F(19°C) = Unit OFF.

Intermittent Unoccupied Heating operation will only be permitted in the unit heat state.

Cooling

SpcTempSP: Base Space Temp Setpoint 72°F(22°C) plus the **SpcClgDB:** Space Cooling Dead Band 1°F(.4°C) = **SpcClgSP**: Space Cooling Setpoint 73°F(23°C)

SpcClgSP: Space Cooling Setpoint 73°F(23°C) plus the **SpcClgUnoOs:** Space Cooling Unoccupied Offset 5°F(2.8°C) = **SpcEffClgSp:** Space Effective Cooling Setpoint 78°F(26°C)

SpcEffClgSp: Space Effective Cooling Setpoint 78°F(26°C) plus the **SpcClgOnDiff:** Space Cooling on Differential 4°F(2.1°C) = 82°F(28°C)

Space Temp greater than or equal to 82°F(28°C) = Unit ON for unoccupied cooling.

SpcEffClgSp: Space Effective Cooling Setpoint 78°F(26°C) minus the

SpcClgOffDiff: Space Cooling on Differential 1°F(.4°C) = 77°F(25°C)

Space Temp less than or equal to 77°F(25°C) = Unit OFF.

Intermittent Unoccupied Cooling operation will only be permitted in the unit cool state.

3.7.3 Space Dehumidification Control

SpcHumSP: Space Humidity Setpoint 55%

SpcHumSP: Space Humidity Setpoint 55% plus the SpcDhOnDiff: Space Dehum ON Differential 10% = 65%

Space Humidity greater than or equal to 65% = Space Dehumidification Mode ON.

SpcHumSP: Space Humidity Setpoint 55%

SpcHumSP: Space Humidity Setpoint 55% minus the **SpcDhOffDiff:** Space Dehum OFF Differential 5% = 50%

Space Humidity less than or equal to 50% = Space Dehumidification Mode OFF.

If the space temperature sensor (Option CL78 th-tune device) is not enabled or has failed, the logic will ignore the space requirements and operate to maintain neutral air temperature in the occupied mode.

If the space temperature sensor (Option CL78 th-tune device) is not enabled or has failed, the unit will remain OFF in the unoccupied mode.

If the th-tune is enabled and fails, an alarm condition is created.

4.0 Safeties and Alarms

4.1 Alarms

Selected safeties have an adjustable delay to prevent nuisance alarms. All alarms are time stamp logged. If a critical shutdown alarm occurs, the unit will not restart until the alarm is cleared via the display or power cycled.

Alarm ID: 1 Unit Safety Alarm (Critical Shutdown Alarm)

The unit is equipped with a safety status relay which is energized in the normal state. The coil of the safety relay is piloted by an optional firestat and/or a duct smoke detector. If at any time the status of the safety relay (ID3 = Alarm contact closure opens), the unit will immediately shut down. All mechanical equipment will be turned OFF. The unit alarm display shall show **"Unit Safety Alarm Unit OFF"**. The unit will not restart until the condition has cleared and the alarm is acknowledged via the unit controller or remote display.

Alarm ID: 2 Supply Fan Failure (Critical Shutdown Alarm)

If, at any time after an adjustable 120-second time delay from a supply fan start command, (NO1="ON") fan operation does not prove via airflow switch (ID1=OFF), the controller shuts down the system. The unit alarm display shall show **"Supply Fan Failure Unit OFF"**. The unit will not restart until the alarm is acknowledged via the unit controller or remote display.

Alarm ID: 4 Low Discharge Temperature Alarm (Critical Shutdown Alarm)

When the heat is called to be ON and the 1st stage is enabled, the low discharge temperature limit alarm will be allowed. If the Discharge air temperature (U4) falls below 33°F/1°C (Low Limit Alarm Setpoint) for more than 10 minutes, the controller shuts down the system. The unit alarm display shall show **"Low Discharge Air Temperature Alarm Unit OFF"**. The unit will not restart until the alarm is acknowledged via the unit controller or remote display.

Alarm ID: 6 Filter Status

When the main unit filter pressure switch activates ID2 = ON, the unit alarm display shall show **"Dirty Filter Status Check Filters"**. No other action will be taken by the control system

Alarm ID: 9 Phase Loss (Critical Shutdown Alarm)

If, at any time the phase loss input ID14 shows ON, the unit shuts down. All equipment will be turned OFF. The unit alarm display shall show **"Phase Loss Unit OFF"**. The unit will not restart until the condition has cleared and the alarm is acknowledged via the unit controller or remote display.

Alarm ID: 10 Outside Air Humidity Sensor Failure

4.0 Safeties and Alarms (cont'd)

4.1 Alarms (cont'd)

If the outdoor air humidity sensor reading (U1) is "invalid", the unit will turn off the OA dewpoint enabled dehumidification mode. The unit alarm display shall show **"Outdoor Air Humidity Sensor Failure"**. The unit will automatically return to normal operation when the humidity sensor value returns.

Alarm ID: 11 Outside Air Temperature Sensor Failure

If the outdoor air temperature sensor reading (U2) is "invalid", the unit will turn off heating and cooling functions. The unit alarm display shall show **"Outside Air Temperature Sensor Failure Blower Only"**. The unit will automatically return to normal operation when the temperature sensor value returns.

Alarm ID: 12 Discharge Air Temperature Sensor Failure (Critical Shutdown Alarm)

If the discharge air temperature sensor reading (U4) is "invalid", the unit will shut down. All equipment will be turned OFF. The unit alarm display shall show **"Discharge Air Temperature Sensor Failure Unit OFF"**. The unit will not restart until the condition has cleared and the alarm is acknowledged via the unit controller or remote display.

Alarm ID: 13 Cooling Coil Temp Sensor Failure

If the cooling coil temperature sensor reading (U5) is "invalid", the unit will turn off all dehumidification functions. The unit alarm display shall show **"Cooling Coil Temp Sensor Failure"**. The unit will automatically return to normal operation when the temperature sensor value returns.

Alarm ID: 14 Mixed Air Temp Sensor Failure

If the mixed air temperature sensor reading (U6) is "invalid", the unit alarm display shall show **"Mixed Air Temp Sensor Failure"**.

Alarm ID: 15 Building Pressure Sensor Failure

If the pressure sensor reading (U7) is "invalid", the unit alarm display shall show **"Building Pressure Sensor Failure"**.

Alarm ID: 16 Duct Pressure Sensor Failure

If the pressure sensor reading (U7) is "invalid", the unit alarm display shall show **"Duct Pressure Sensor Failure"**.

Alarm ID: 17 CO2 Sensor Failure

If the CO2 sensor reading (U9) is "invalid", the unit alarm display shall show **"CO2 Sensor Failure"**.

Alarm ID: 19 Gas Heater 1 Status Alarm

When the first stage of heating associated with Gas Heater 1 is enabled and proof of flame is not proven via the heater ignition control board within five minutes, the unit alarm display shall show **"Possible Failure Gas Heater 1 Check Ignition Control Board"**.

Alarm ID: 20 Gas Heater 2 Status Alarm

When the first stage of heating associated with Gas Heater 2 is enabled and proof of flame is not proven via the heater ignition control board within five minutes, the unit alarm display shall show **"Possible Failure Gas Heater 2 Check Ignition Control Board"**.

Alarm ID: 23 Return Air Probe Offline

When an optional return air probe is enabled and the serial communication fails, the unit alarm display shall show **"Serial Sensor Add 128 Return Air Probe Offline"**.

Alarm ID: 24 Return Air Temperature Probe Broken

When an optional return air probe is enabled and the temperature sensor fails, the unit alarm display shall show **"Serial Sensor Add 128 Return Air Temperature Probe Broken"**.

Alarm ID: 25 Return Air Humidity Probe Broken

When an optional return air probe is enabled and the humidity sensor fails, the unit alarm display shall show **"Serial Sensor Add 128 Return Air Humidity Probe Broken"**.

Alarm ID: 26 Exhaust Air Probe Offline

When an optional exhaust air probe is enabled and the serial communication fails, the unit alarm display shall show **"Serial Sensor Add 129 Exhaust Air Probe Offline"**.

Alarm ID: 27 Exhaust Air Temp Probe Broken

When an optional exhaust air probe is enabled and the temperature sensor fails, the unit alarm display shall show **"Serial Sensor Add 129 Exhaust Air Temperature Probe Broken"**.

Alarm ID: 28 Exhaust Air Humidity Probe Broken

When an optional exhaust air probe is enabled and the humidity sensor fails, the unit alarm display shall show **"Serial Sensor Add 129 Exhaust Air Humidity Probe Broken"**.

Alarm ID: 29 Space Sensor thTune (Option CL78) Offline

When an optional CL78 space sensor is enabled and the serial communication fails, the unit alarm display shall show **"CL78 thTune Serial Sensor Add 1 Space 1 Offline"**. The unit will continue to operate and revert to neutral discharge air temperature control.

Alarm ID: 30 Space Sensor thTune (Option CL78) Temperature Sensor Broken

When an optional CL78 space sensor is enabled and the space temp sensor fails, the unit alarm display shall show **"CL78 thTune Serial Sensor Add 1 Space 1 Temperature Probe broken"**. The unit will continue to operate and revert to neutral discharge air temperature control.

Alarm ID: 31 Space Sensor thTune (Option CL78) Humidity Sensor Broken

When an optional CL78 space sensor is enabled and the space humidity sensor fails, the unit alarm display shall show **"CL78 thTune Serial Sensor Add 1 Space 1 Humidity probe broken"**. The unit will continue to operate and revert to neutral discharge air temperature control.

Alarm ID: 32 Space 2 Sensor Offline

When an optional return air probe is enabled and the serial communication fails, the unit alarm display shall show **"Serial Sensor Add 130 Space 2 Probe Offline"**.

Alarm ID: 33 Space 2 Sensor Temperature Probe Broken

When an optional return air probe is enabled and the temperature sensor fails, the unit alarm display shall show **"Serial Sensor Add 130 Space 2 Temperature Probe Broken"**.

Alarm ID: 34 Space 2 Sensor Humidity Probe Broken

When an optional return air probe is enabled and the humidity sensor fails, the unit alarm display shall show **"Serial Sensor Add 130 Space 2 Humidity Probe Broken"**.

Alarm ID: 35 Space 3 Sensor Offline

When an optional return air probe is enabled and the serial communication fails, the unit alarm display shall show **"Serial Sensor Add 131 Space 3 Probe Offline"**.

Alarm ID: 36 Space 3 Sensor Temperature Probe Broken

When an optional return air probe is enabled and the temperature sensor fails, the unit alarm display shall show **"Serial Sensor Add 131 Space 3 Temperature Probe Broken"**.

Alarm ID: 37 Space 3 Sensor Humidity Probe Broken

When an optional return air probe is enabled and the humidity sensor fails, the unit alarm display shall show **"Serial Sensor Add 131 Space 3 Humidity Probe Broken"**.

Alarm ID: 38 Space 4 Sensor Offline

When an optional return air probe is enabled and the serial communication fails, the unit alarm display shall show **"Serial Sensor Add 132 Space 4 Probe Offline"**.

Alarm ID: 39 Space 4 Sensor Temperature Probe Broken

4.0 Safeties and Alarms (cont'd)

4.1 Alarms (cont'd)

When an optional return air probe is enabled and the temperature sensor fails, the unit alarm display shall show **"Serial Sensor Add 132 Space 4 Temperature Probe Broken"**.

Alarm ID: 40 Space 4 Sensor Humidity Probe Broken

When an optional return air probe is enabled and the humidity sensor fails, the unit alarm display shall show **"Serial Sensor Add 132 Space 4 Humidity Probe Broken"**.

Alarm ID: 41 Space 5 Sensor Offline

When an optional return air probe is enabled and the serial communication fails, the unit alarm display shall show **"Serial Sensor Add 133 Space 5 Probe Offline"**.

Alarm ID: 42 Space 5 Sensor Temperature Probe Broken

When an optional return air probe is enabled and the temperature sensor fails, the unit alarm display shall show **"Serial Sensor Add 133 Space 5 Temperature Probe Broken"**.

Alarm ID: 43 Space 5 Sensor Humidity Probe Broken

When an optional return air probe is enabled and the humidity sensor fails, the unit alarm display shall show **"Serial Sensor Add 133 Space 5 Humidity Probe Broken"**.

Alarm ID: 44 Space 6 Sensor Offline

When an optional return air probe is enabled and the serial communication fails, the unit alarm display shall show **"Serial Sensor Add 134 Space 6 Probe Offline"**.

Alarm ID: 45 Space 6 Sensor Temperature Probe Broken

When an optional return air probe is enabled and the temperature sensor fails, the unit alarm display shall show **"Serial Sensor Add 134 Space 6 Temperature Probe Broken"**.

Alarm ID: 46 Space 6 Sensor Humidity Probe Broken

When an optional return air probe is enabled and the humidity sensor fails, the unit alarm display shall show **"Serial Sensor Add 134 Space 6 Humidity Probe Broken"**.

4.2 Alarm Management

Alarm Satus Reporting

When the unit controller has an active or unacknowledged alarm, the alarm status will be reflected with the following devices / methods:
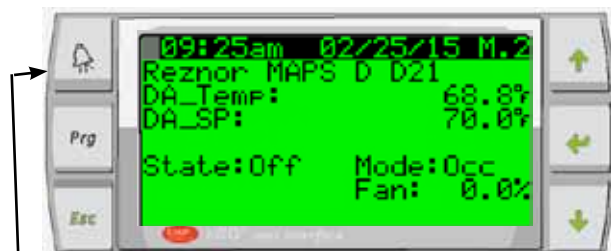
Option RB5 or RB6 Remote Display Flashing Alarm Key

Space Sensor Flashing Alarm Bell Symbol on the Option CL78 th-tune Device (mounted in the space)

The controller is also equipped with an output configured to energize a factory mounted Unit General Alarm Relay (NO7). The alarm relay has a set of normally open and normally closed contacts available for customer use. The status of the controller output (NO7) is also reported to the optional BAS communication cards Lon and BACnet.

The following active alarms will energize the unit general alarm relay:

Alarm ID: 1 Unit Safety Alarm (Critical Shutdown Alarm)

Alarm ID: 2 Supply Fan Failure (Critical Shutdown Alarm)

Alarm ID: 4 Low Discharge Temperature Alarm (Critical Shutdown Alarm)

Alarm ID: 9 Phase Loss (Critical Shutdown Alarm)

Alarm ID: 10 Outside Air Humidity Sensor Failure

Alarm ID: 11 Outside Air Temperature Sensor Failure

Alarm ID: 12 Discharge Air Temperature Sensor Failure (Critical Shutdown Alarm)

Alarm ID: 13 Cooling Coil Temp Sensor Failure

Alarm ID: 14 Mixed Air Temp Sensor Failure

Alarm ID: 15 Building Pressure Sensor Failure

Alarm ID: 16 Duct Pressure Sensor Failure

Alarm ID: 17 CO2 Sensor Failure

Alarm ID: 19 Gas Heater 1 Status Alarm

Alarm ID: 20 Gas Heater 2 Status Alarm

Alarm ID: 23 Return Air Probe Offline

Alarm ID: 24 Return Air Temperature Probe Broken°C

Alarm ID: 25 Return Air Humidity Probe Broken

Alarm ID: 26 Exhaust Air Probe Offline

Alarm ID: 27 Exhaust Air Temp Probe Broken

Alarm ID: 28 Exhaust Air Humidity Probe Broken

Alarm ID: 29 Space Sensor thTune (Option CL78) Offline

Alarm ID: 30 Space Sensor thTune (Option CL78) Temperature Sensor Broken

Alarm ID: 31 Space Sensor thTune (Option CL78) Humidity Sensor Broken

Alarm ID: 32 Space 2 Sensor Offline

Alarm ID: 33 Space 2 Sensor Temperature Probe Broken

Alarm ID: 34 Space 2 Sensor Humidity Probe Broken

Alarm ID: 35 Space 3 Sensor Offline

Alarm ID: 36 Space 3 Sensor Temperature Probe Broken

Alarm ID: 37 Space 3 Sensor Humidity Probe Broken

Alarm ID: 38 Space 4 Sensor Offline

Alarm ID: 39 Space 4 Sensor Temperature Probe Broken

Alarm ID: 40 Space 4 Sensor Humidity Probe Broken

Alarm ID: 41 Space 5 Sensor Offline

Alarm ID: 42 Space 5 Sensor Temperature Probe Broken

Alarm ID: 43 Space 5 Sensor Humidity Probe Broken

Alarm ID: 44 Space 6 Sensor Offline

Alarm ID: 45 Space 6 Sensor Temperature Probe Broken

Alarm ID: 46 Space 6 Sensor Humidity Probe Broken

4.2 Alarm Management (cont'd)

Acknowledging Unit Alarms and Viewing the Alarm Logger

When a unit has an active and or unacknowledged alarm, it needs to be managed locally from the unit controller display or from an optional PDG1 remote display.

.

Press the flashing alarm key. →

The most recently queued active and or unacknowledged alarm and message will be displayed.

Press the down key to scroll through the current list of active and or unacknowledged alarms.

When you reach the end of the queued alarm list, you will be prompted to either press the alarm key to clear the alarms or press the enter key to display the alarm logger.

Pressing the alarm key will perform the following two functions:

1. The controller will be prompted to attempt a reset of any critical shutdown alarms that have occurred. If the critical shutdown condition is no longer active, the controller will re-enable the unit.

2. The controller will clear any of the non-critical alarms that are no longer active.

**Alarm →
Key**

← Enter Key

Pressing the enter key will display the first page of the alarm logger. The first page of the alarm logger will contain the most recently logged alarm with a date, time, Alarm ID and a snapshot of the OA Temp, OA Humidity, DA Temp, CC Temp, and MA Temp sensors at the time the alarm was logged. Pressing the up key in succession will display any remaining logged alarms from the most recent to least recent entry.


← Up Key

5.0 Start Up

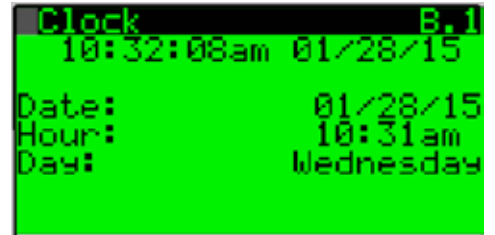### 5.1 Set the Date, Time on the controller Clock & unit time schedule

1. From the **Main Screen**, press the program key to access the main menu.

```
09:25am   02/25/15  M.2
Reznor MAPS D D21
DA_Temp:           68.8%
DA_SP:             70.0%

State:Off    Mode:Occ
             Fan:  0.0%
```
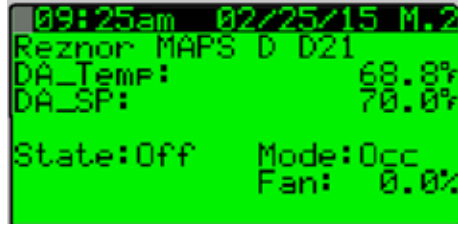
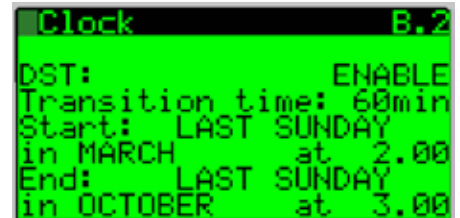Press the up or down arrow keys to navigate to the **B. Schedule** submenu and press the enter key to select.

```
Main menu

A. Quick Setpoints

B. Schedule

C. Points List
```
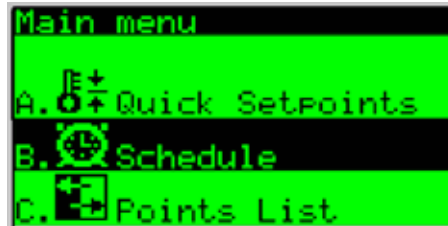
2. From **Screen B.1,** press the enter key to access the modifiable date and time fields and set them to the current date and time.

```
Clock                 B.1
  10:32:08am 01/28/15

Date:            01/28/15
Hour:            10:31am
Day:           Wednesday
```

3. Once set, press the enter key in succession until the cursor is blinking in the uppermost left hand corner of the screen and press the down arrow key to advance to **Screen B.2**.

From **Screen B.2,** press the enter key to access the modifiable DST fields and set the values accordingly.

Once set, press the escape key in succession to return to the main screen.

```
Clock                 B.2

DST:              ENABLE
Transition time: 60min
Start:    LAST SUNDAY
in MARCH       at  2.00
End:      LAST SUNDAY
in OCTOBER     at  3.00
```

5.2 Setting the Unit for Operation via the Digital Input Closure or Time Schedule - Option D21

From the **Main Menu**, press the up or down arrow keys to navigate to the **A. Quick Setpoints** submenu and press the enter key to select.
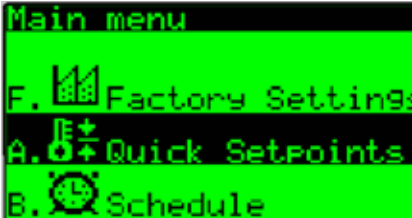
DIGITAL INPUT SELECTION - From **Screen A.1,** press the enter key to access the **State_Sel:** field and set the value to either the **Heat, Cool, or Auto** state. Press the enter key to select the **OccMode_Sel:** field and use the up or down arrow key to set the value to **Dig. In**.

The unit ships with a jumper wired on the occupied digital input. The unit will remain on until the occupied jumper is removed and replaced with an external field supplied contact.

SCHEDULE SELECTION - From **Screen A.1,** press the enter key to access the **State_Sel:** field and set the value to either the **Heat, Cool, or Auto** state. Press the enter key to select the **OccMode_Sel:** field and use the up or down arrow key to set the value to **Schedule**.


Press the escape to return to the main menu and select the B. Schedule sub menu. Press the enter key to enter the B. Schedule sub menu.
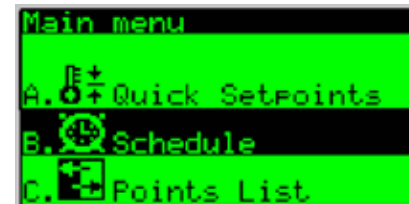
Press the down arrow to advance to **screen B.3**

From **Screen B.3** press the enter Key to access the modifiable Schedule fields and set the desired Time

From **Screen B.3** press the enter Key to access the modifiable Schedule fields and set the desired Time ON, Time OFF, and Days Enabled values. Press the program Key to return to the main menu.
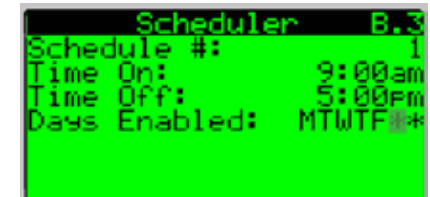
5.3 Unit Test Mode

NOTE: Any reference to supply fan speed control only applies if the unit is configured with Option VFD1, VFD2 or VFD3.

The test mode is accessed via the service menu (from the unit mounted display) and can only be entered when the unit is in the off state. Once the test mode is enabled, it remains active for a 2 hour time period adjustable from 0-4 hours. When the timer expires or test mode is disabled, the unit will return to the off state.

In the test mode, all sequences of operation stop. Upon the test mode being enabled the following devices shall be automatically commanded:

1. The Unit Damper Position Y1 shall be automatically be commanded to = 100%.

2. The Unit Supply Fan NO1 will be automatically commanded ON.

3. The Unit Supply Fan Speed Y2 will be automatically commanded to the supply fan maximum Speed% setpoint value.

Once supply airflow is proven via Supply Fan Status ID1, the user can manually select all of the remaining controller outputs to be commanded ON and OFF or modulated between 0-100%.
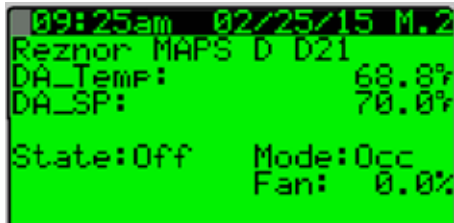
5.3 Unit Test Mode (Cont'd)

Test Mode Detailed Description

With the unit de-energized, open and secure the supply fan access door and the damper access door. Turn on the main unit disconnect to energize the unit. The unit digital controller will take two to three minutes to initialize.

1. From the **Main Screen** check to ensure that the unit is in the OFF state. If the unit is in the OFF state, proceed to **Step 4**.

If the unit is not in the OFF state, proceed to **Step 2.**

```
09:25am  02/25/15 M.2
Reznor MAPS D D21
DA_Temp:         68.8°
DA_SP:           70.0°

State:Off    Mode:Occ
             Fan:  0.0%
```

2. Press the Program Key to access the main menu and then press the up or down arrow keys to navigate to the **A. Quick Setpoints** submenu.

Press the enter key to select.

```
Main menu

F. Factory Settings
A. Quick Setpoints
B. Schedule
```
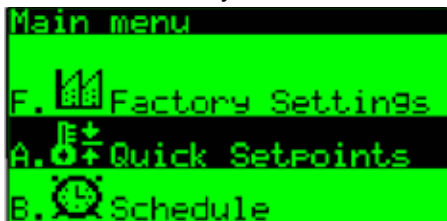
3. Press the enter key until the cursor is blinking on the **State_Sel:** field and press the down arrow key to set the unit to the OFF state.

```
Quick Setpoints   A.1
State_Sel:        Off
OccMode_Sel:   Dig. In
OAChgOv_SP:      65.0°
OAChgOvDiff:      5.0°
OAChgOvDel:       15m
TempOcc:          Off
TempOcc_Time:    240m
```

4. Press the escape key to access the main menu and use the up or down arrow keys to navigate to the **E. Service** submenu. Press the enter key to select.

```
Main menu

D. Alarms
E. Service
F. Factory Settings
```

When prompted to enter the Service Password, use the up or down arrow keys and enter the service password of 7125, and press the enter key.

```
Service Password


Insert service
password (PW1):    7125
```

5. Use the up or down arrow keys to navigate to the **a.Test Mode** menu and press the enter key to select.

```
Service menu

h.BMS config.
a.Test Mode
b.TAB
```
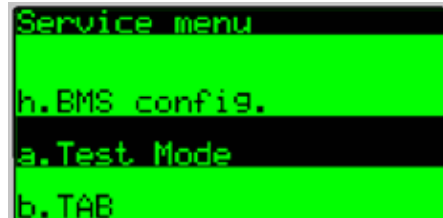
6. From the test mode **Screen E.a.1**, press the enter key to select the **Enable:** field, and press the up or down arrow key to turn the test mode ON.

```
Test Mode       E.a.1
Manual Control

Enable:           On

Time Out:        120m
Countdown:       119m
```
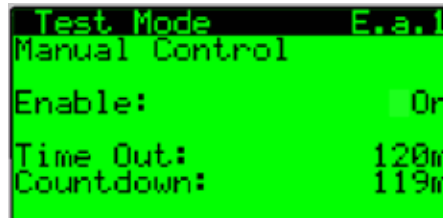
Once enabled ON, press the enter key in succession until the cursor is flashing in the uppermost left hand corner of the screen and use the down arrow key to navigate to the next Test Mode **Screen E.a.2**.

7. If applicable, visibly check that the optional unit dampers have actuated to the full open position (Outside Air) and full closed position (Return Air). The damper actuators will have up to a 120 second time period for full stroke.

NOTE: Damper operation is required in order to complete the Test Mode.

With proper damper operation, close the damper access door and resume the test at Step 8.

5.0 Start Up (Cont'd)
5.3 Unit Test Mode (Cont'd)

8. Visibly check for proper rotation of the unit supply fan. If the fan rotation is incorrect, the main unit electrical supply must be de-energized. Once de-energized, the electrical phasing will need to be switched at the main unit disconnect. After the unit phasing is corrected, re-verify the unit supply fan rotation.

With proper supply fan rotation, close the supply fan access door, and resume the test mode at Step 9.

9. From the Test Mode **Screen E.a.2**, verify that the **Supply Fan Airflow Status:** is reading ON.
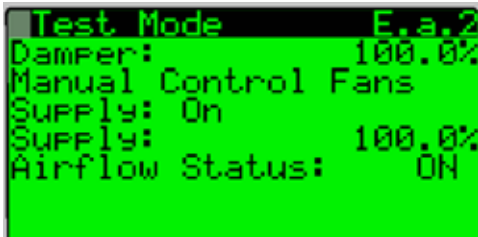

NOTE: Proof of supply fan airflow is required in order to complete the Test Mode.

10. Instructions for Setting Supply Fan to Test and Balance Airflow (Note: Applies to Options VFD1, VFD2 or VFD3 Only)

> Adjusting the unit fan speed to achieve the desired airflow volume is accomplished on test mode **screen E.a.2**. Reference an auxiliary air measuring device for setting the maximum fan speeds. If an adjustment is required use the **Supply**: % modifiable field and the up and down keys to increase or decrease the commanded fan speed until the desired air flow volume is achieved.
>
> If an adjustment is required, the adjusted value will need to be saved in the TAB Menu. Instructions for saving set point values are in Step 15 at the end of the Test Mode description instructions.
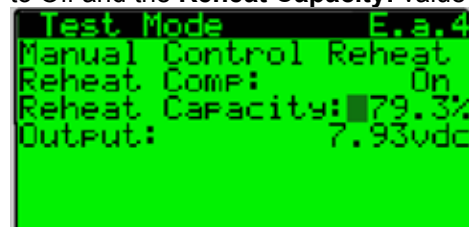
Press the enter key in succession until the cursor is flashing in the uppermost left hand corner of the screen and use the down arrow key to navigate to the next Test Mode **Screen E.a.3**.

11. From the Test Mode **Screen E.a.3**, press the enter key until the cursor is flashing on the **Stage 1:** field. Press the up arrow key to set the Stage 1 value to On. Verify the first stage compressor and associated condensor fan for operation. Repeat this step for stages 2 through 4. Once verified, turn all compressor stage values off.
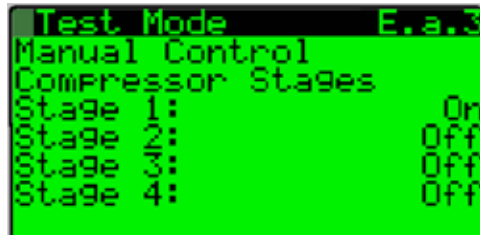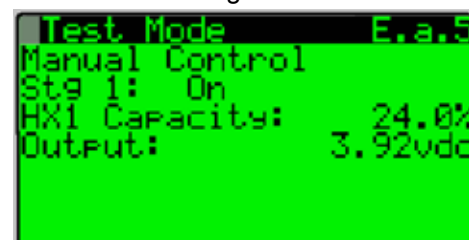

Press the enter key in succession until the cursor is flashing in the uppermost left hand corner of the screen and use the down arrow key to navigate to the next Test Mode Screen.

12. If the unit is equipped with an optional reheat pump circuit, from Test Mode **Screen E.a.4**, press the enter key until the cursor is flashing on the **Reheat Comp:** field. Press the up arrow key to set the **Reheat Comp:** value to On. Press the Enter Key until the cursor is flashing on the **Reheat Capacity:** field and use the Up Arrow Key to set the capacity to 100%. Verify that the Reheat Compressor is operating and that the refrigerant gas is now being diverted into the indoor condensor reheat coil. Once verified set the **Reheat Comp:** value to Off and the **Reheat Capacity:** value to 0%.
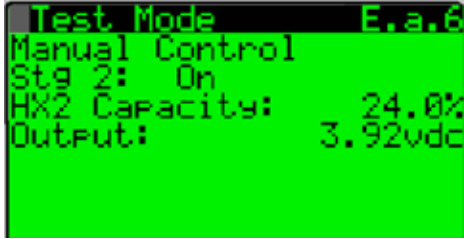

Press the enter key in succession until the cursor is flashing in the uppermost left hand corner of the screen and use the down arrow key to navigate to the next Test Mode **Screen E.a.5**.

13. <u>Gas Heat Only</u> - The unit is configurable with up to two modulating gas heat sections. The modulating gas valve(s) and their associated heat capacity value will need to be used to verify and (if required) adjust the manifold pressure settings. See Installation manual for manifold pressure adjustment instructions. To test staged flame proving, see the following instructions.

From the Test Mode **Screen E.a.5**, press the enter key until the cursor is flashing on the **HX1 Capacity:** field and press the up arrow key to set the **HX1 Capacity:** value to 24%. Press the enter key until the cursor is flashing on the **Stg 1:** field. Press the up arrow to set the Stg 1 value to ON.

5.3 Unit Test Mode (Cont'd)

If the unit is configured with two gas heating sections repeat this step on screen E.a.6


```
Test Mode          E.a.6
Manual Control
Stg 2:   On
HX2 Capacity:      24.0%
Output:          3.92vdc
```

Press the enter key in succession until the cursor is flashing in the uppermost left hand corner of the screen and use the down arrow key to advance to the Test Mode **Screen E.a.20**.


```
Digital Input E.a.20
DI15 Htr_1_Sts      ON
DI16 Htr_2_Sts      ON
```
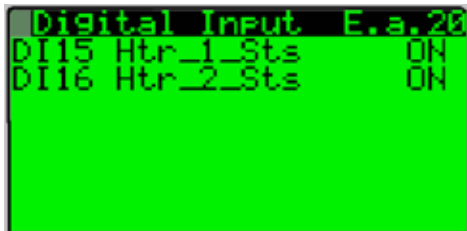
If the gas heating section(s) have proved flame, the associated D15 (and D16 if applicable) will show status ON.
NOTE: Allow a 3-minute period for flame proving. Once verified, return to the test mode **Screen E.a.5** and set the **Stg 1:** field to Off and set the **HX1 Capacity:** field to 0.0%. If the unit is equipped with two heat sections return to the test mode **Screen E.a.6** and set the **Stg 2:** field to Off and set the **HX2 Capacity:** field to 0.0%.
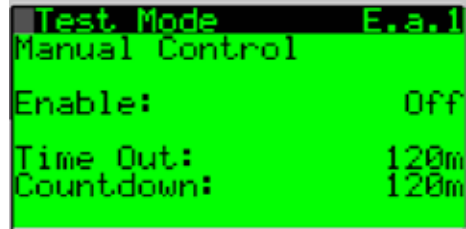
14. **Electric Heat Only** - From the Test Mode **Screen E.a.7,** press the enter key until the cursor is flashing on the **Heat Capacity:** field. Press the up arrow to set the **Heat Capacity:** value to 100% and press the enter key until the cursor is flashing on the **Stg 1:** field. Press the up arrow to set the **Stg 1:** value to ON and verify **Stg 1:** for operation, once verified press the down arrow key to the **Stg 1:** value back to OFF. Press the enter key until the cursor is flashing on the **Heat Capacity:** field and set the value to 0.0%.
NOTE: The heat capacity: field is only associated with the SCR for **Stg 1:**


```
Test Mode          E.a.7
Manual Control
Heat Capacity:    100.0%
Output:          10.00vdc
Heat Stages
Stg 1:  On  Stg 4:  Off
Stg 2: Off  Stg 5:  Off
Stg 3: Off  Stg 6:  Off
```

Depending upon configuration the unit may be equipped with up to 6 stages of electric heating. Perform the same procedure for the remaining applicable heating stages.

Press the enter key in succession until the cursor is flashing in the uppermost left hand corner of the screen and use the up arrow key to navigate to Test Mode **Screen E.a.1.** Press the enter key to select the **Enable:** field. Press the down arrow key to set the value to OFF.


```
Test Mode          E.a.1
Manual Control

Enable:             Off

Time Out:          120m
Countdown:         120m
```

15. **Saving Adjusted Maximum Fan Speed Values**
Press the escape key to return to the service menu and navigate to the TAB sub menu.


```
Service menu


a.Test Mode

b.TAB

c.Supply Fan
```
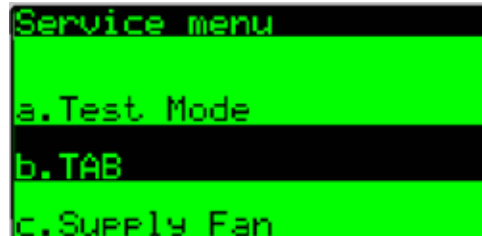
Press the enter key to access the **TAB menu screen E.b.1**
This screen is used to save all adjustable unit parameters. The Set Max SF Spd? modifiable field is used to set the optional Summer / Winter and High / Low fan speed setpoints for saving to the maximum fan speed values determined in Step 10.

Press the enter key to navigate to the **Set SF Max Spd?** modifiable field and press the up key to set the value to YES. After a two-second period, the value will automatically return to the NO state.

To save unit and fan speed parameters press the enter key to navigate to the **Save?** modifiable field and press the up key to set the value to YES. After a two-second period, the value will automatically return to the NO state.

Unit parameters have now been successfully saved to the controller permanent memory. From this point forward the **most recently saved** unit parameters can be restored using the **Restore?** modifiable field.


```
TAB:Service SaveE.b.1



Set Max SF Spd?      No

Save?                No
Restore?             No
```

The unit test and setting fan speed procedure is now complete. Press The escape key in succession to return to the main screen.

6.0 Controller History Log

Hardware Inputs, Outputs, and selected setpoints listed in the Setpoint History Log Table will be sampled in five-minute intervals. The history log will roll over when the data fills the available log space.

To access the controller history log:

Press the alarm and enter key simultaneously for 5 seconds and the system bios screen will appear. Use the down key to select LOG DATA and press enter.

```
  SYSTEM INFORMATION
>LOG DATA
  OTHER INFORMATION
  FLASH/USB MEMORY
```

The #1 DISPLAY LOG DATA screen will appear. Press the enter key to advance.

```
1    DISPLAY LOG DATA
      Which memory ?

INTERNAL MEMORY
```

The #2 DISPLAY LOG DATA screen will appear. Press the enter key to advance.

```
2    DISPLAY LOG DATA
      Which log ?
D21_Point_Log
```

The #3 record selection screen will appear. Use the up and down keys to select the desired record by date and time and press enter to view the data.

```
3    17- 8-13 8:12: 2
UP    : next  record
DOWN  : prev. record
ENTER : view data
```

Use the up and down keys to scroll through the history log point values for that date and time record.

```
4    17- 8-13 8:12: 2
ERV_DA_Temp

      71.2
```

Press the escape key in succession to return to the previous screens.

7.0 Controller Display Menus
Option D21 Control Program - User and Service Menu Structure

Main Screen Mx	Main Screen M1 or M2 will be displayed depending upon unit configuration (Monitor Only)				
Name	**Description**	**Default**	**Unit**	**Min**	**Max**
Spc_Temp:	Space Temp - Current Space Temperature		Deg F		
SpcTempSP:	Space Temp SP - Base space temp setpoint value from the space thermostat or controller display adjustment	72	Deg F	65	85
DA_Temp:	Discharge Air Temp - Current Discharge Air Temperature		Deg F		
DA_SP:	Discharge Air Temp Active SP - Active Discharge Air Temperature Setpoint		Deg F		
State:	Current Unit State - 2=AUTO 3=COOL 4=HEAT 5=OFF	OFF		2	5
Mode:	Current Unit Mode - Occ or Unocc				
Fan:	Current Supply Fan Commanded Speed		%		

Main Screen Mx	Main Screen M3 or M4 will be displayed depending upon unit configuration (Monitor Only)				
Name	**Description**	**Default**	**Unit**	**Min**	**Max**
Spc_Humidity:	Space Humidity - Current Space Humidity		%rH		
SpcHumSP:	Space Humidity SP - Current Space Humidity Setpoint	55	%rH	35	75
Temperature:	Current Outside Air Temp		Deg F		
Humidity:	Current Outside Air Humidity		%rH		
Dew Point:	Current Outside Air Dew Point		Deg F		

Main Screen Mx	Main Screen M5, M6, M7 or M8 will be displayed depending upon unit configuration (Monitor Only)				
Name	**Description**	**Default**	**Unit**	**Min**	**Max**
Spc_Clg_Md:	Space Cooling Mode - Unit controls applicable cooling stages to maintain the **DA_SpcClg_SP**			Off	On
Spc_Dehum_Md:	Space Dehum Mode - Unit controls reheat compressor to maintain the **DA_Dh_SP** and applicable cooling stages to maintain the **CC_DA_SP**			Off	On
Spc_Htg_Md:	Space Heating Mode - Unit controls applicable heating stages to maintain the **DA_SpcHtg_SP**			Off	On
Spc_HtgClg_Md:	Space Heating Cooling Mode - Unit controls applicable heating stages to maintain the **DA_SpcHtCl_SP** (Auto Heating Only)			Off	On
NA_Clg_Md:	Neutral Air Cooling Mode - Unit controls applicable cooling stages to maintain the **DA_NAClg_SP**			Off	On
NA_Dehum_Md:	Neutral Air Dehum Mode - Unit controls reheat compressor to maintain the **DA_Dh_SP** and applicable cooling stages to maintain the **CC_DA_SP**			Off	On
NA_Htg_Md:	Neutral Air Heating Mode - Unit controls applicable heating stages to maintain the **DA_NAHtg_SP**			Off	On

Main Menu	

A Quick Setpoints	Quick Setpoints Menu

Quick Setpoints A1	Quick Setpoints Screen A1				
Name	**Description**	**Default**	**Unit**	**Min**	**Max**
State_Sel:	State Select 2=AUTO 3=COOL 4=HEAT 5=OFF - Sets Unit State	5		2	5
OccMode_Sel:	Occ Mode Select 0= Schedule 1= Digital Input 2= BMS - Sets desired unit occupancy method	1		0	2
OAChgOv_SP:	OA Change Over SP - OA temp setpoint used to enable heating and cooling when the unit is in the auto state	65	Deg F	45	80
OAChgOvDiff:	OA Change Over SP Differential - Differential for the **OAChgOv_SP**	5	Deg F	05	10
OAChgOvDel:	OA Change Over Delay Time - Delay period required to switch between heating and cooling when the unit is in the auto state	15	min	5	30
TempOcc:	Temporary Occupied Status from Space Thermostat - Indexed on when the thermostat fan button is pressed	Off		Off	On
TempOcc_Time:	Temporary Occupied Time Duration - Sets time duration for Temporary Occupancy	240	min	0	480

Quick Setpoints A2	Quick Setpoints Screen A2 Will be displayed when unit is configured for Space Control				
Name	**Description**	**Default**	**Unit**	**Min**	**Max**
Spc_Temp:	Space Temp - Current Space Temperature		Deg F		
SpcTempSP:	Space Temp SP - Base space temp setpoint value from the space thermostat or controller display adjustment	72	Deg F	65	85
SpcHtgSp:	Space Heating SP - Value is equal to the **SpcTempSP** minus the **SpcHtgDB** (Also used as control SP for **Spc_HtgClg_Md**)	71	Deg F		
SpcClgSp:	Space Cooling SP - Value is equal to the **SpcTempSP** plus the **SpcClgDB**	73	Deg F		
SpcHtgDB:	Space Heating Dead Band - Sets value subtracted from the **SpcTempSP** for the **SpcEffHtgSP** definition	1	Deg F	0	5
SpcClgDB:	Space Cooling Dead Band - Sets value added to the **SpcTempSP** for the **SpcEffClgSP** definition	1	Deg F	0	5

7.0 Controller Display Menus (cont'd)

A Quick Setpoints	Quick Setpoints Menu (Cont'd)				
Quick Setpoints A3	Quick Setpoints Screen A3 Will be displayed when unit is configured for Space Control				
Name	**Description**	**Default**	**Unit**	**Min**	**Max**
SpcEffClgSP:	Space Effective Cooling SP - Defined by the **SpcClgDB** and the **SpcClgUnoOs** setpoints		Deg F		
SpcClgOnDiff:	Space Cooling On Differential - Sets the differential required above the **SpcEffClgSP** for the space cooling call to turn on	4	Deg F	05	10
SpcClgOffDiff:	Space Cooling Off Differential - Sets the differential required below the **SpcEffClgSP** for the space cooling call to turn off	1	Deg F	05	10
SpcClgUnoOs:	Space Cooling Unoccupied Offset - Sets the value added to the **SpcTempSP** when in the unoccupied mode for the **SpcEffClgSP** definition	5	Deg F	0	15
DA_SpcClg_SP:	Discharge Air Temp Space Cooling SP - Sets the discharge setpoint used when in Space Cooling Mode	55	Deg F	50	100

Quick Setpoints A4	Quick Setpoints Screen A4 Will be displayed when unit is configured for Space Control				
Name	**Description**	**Default**	**Unit**	**Min**	**Max**
SpcEffHtgSP:	Space Effective Heating SP - Defined by the **SpcHtgDB** and the **SpcHtgUnoOs** setpoints		Deg F		
SpcHtgOnDiff:	Space Heating On Differential - Sets the differential required below the **SpcEffHtgSP** for the space heating call to turn on	4	Deg F	05	10
SpcHtgOffDiff:	Space Heating Off Differential - Sets the differential required above the **SpcEffHtgSP** for the space heating call to turn off	1	Deg F	05	10
SpcHtgUnoOs:	Space Heating Unoccupied Offset - Sets the value subtracted from the **SpcTempSP** when in the unoccupied mode for the **SpcEffHtgSP** definition	5	Deg F	0	15
DA_SpcHtg_SP:	Discharge Air Temp Space Heating SP - Sets the discharge setpoint used when in Space Heating Mode	90	Deg F	50	140

Quick Setpoints A5	Quick Setpoints Screen A5 Will be displayed when unit is configured for Space Control				
Name	**Description**	**Default**	**Unit**	**Min**	**Max**
SpcHtgSp:	Space Heating SP - Value is equal to the **SpcTempSP** minus the **SpcHtgDB** (Also used as control SP for **Spc_HtgClg_Md**)	71	Deg F		
SpcHCOnDiff:	Space Heating Cooling On Differential - Sets the differential required above the **SpcTempSP** for the space cooling call to turn on (Auto Heating Only)	5	Deg F	05	10
SpcHCOffDiff:	Space Heating Cooling Off Differential - Sets the differential required below the **SpcTempSP** for the space cooling call to turn off (Auto Heating Only)	1	Deg F	05	10
DA_SpcHtCl_SP:	Discharge Air Temp Space Heat Mode Cooling SP - Sets the discharge air setpoint used when in Space Heat Cooling Mode (Auto Heating Only)	55	Deg F	50	100

Quick Setpoints A6	Quick Setpoints Screen A6 Will be displayed when unit is configured for Space Control and Dehumidification				
Name	**Description**	**Default**	**Unit**	**Min**	**Max**
Spc_Humidity:	Space Humidity - Current Space Humidity		%rH		
SpcHumSP:	Space Humidity SP - Sets the Space Humidity Setpoint	55	%rH	35	75
SpcDhOnDiff:	Space Dehum On Differential - Sets the differential required above the **SpcHumSP** for the space dehum call to turn on	10	%rH	1	10
SpcDhOffDiff:	Space Dehum Off Differential - Sets the differential required below the **SpcHumSP** for the space dehum call to turn off	5	%rH	1	10

Quick Setpoints A7	Quick Setpoints Screen A7				
Name	**Description**	**Default**	**Unit**	**Min**	**Max**
DA_NAClg_SP:	Discharge Air Temp Neutral Cooling SP - Sets the discharge setpoint used when in Neutral Air Cooling Mode	70	Deg F	50	100
DA_NAHSPSel:	Neutral DA Heating SP Select - Used to select desired discharge setpoint for Neutral Air Heating Mode Single Setpoint or Reset Setpoint	Setpt		Setpt	Reset
DA_NAHtg_SP:	Discharge Air Temp Neutral Heating SP - Sets the discharge setpoint used when in Neutral Air Heating Mode	70	Deg F	50	140
DA_NAHRst_SP:	Discharge Air Temp Neutral Heat Reset SP - Display of optional calculated reset schedule setpoint used when in Neutral Air Heating Mode		Deg F	50	140

Quick Setpoints A8	Quick Setpoints Screen A8				
Name	**Description**	**Default**	**Unit**	**Min**	**Max**
OA_Temp:	Current Outside Air Temp		Deg F		
DA_NAHRst_SP:	Discharge Air Temp Neutral Heat Reset SP - Display of optional calculated reset schedule setpoint used when in Neutral Air Heating Mode		Deg F	50	140
NAHRDAMax:	Neutral Air Heat DA SP Reset DA Max - Sets the maximum neutral air heating discharge air temp reset setpoint	75	Deg F	50	140

Quick Setpoints A8	Quick Setpoints Screen A8 (Cont'd)				
Name	Description	Default	Unit	Min	Max
NAHRDAMin:	Neutral Air Heat DA SP Reset DA Min - Sets the minimum neutral air heating discharge air temp reset setpoint	65	Deg F	50	140
NAHROAMax:	Neutral Air Heat DA SP Reset OA Max - Sets the maximum neutral air heating outside air temp reset setpoint	65	Deg F	0	100
NAHROAMin:	Neutral Air Heat DA SP Reset OA Min - Sets the minimum neutral air heating outside air temp reset setpoint	30	Deg F	0	100

Quick Setpoints A9	Quick Setpoints Screen A9 Will Be displayed when the unit is configured for Dehumidification				
Name	Description	Default	Unit	Min	Max
DhOADP_SP:	Sets the Dehum OA Dew Point SP - Used to allow Neutral Air Dehumidification Mode when the OA dew point is greater than SP	58	Deg F	50	100
DhOADP_Diff:	Dehum OA Dew Point SP Differential - Sets the differential for the **DhOADP_SP**	2	Deg F	05	10

Quick Setpoints A10	Quick Setpoints Screen A10 Will Be displayed when the unit is configured for Building Pressure Control				
Name	Description	Default	Unit	Min	Max
Pressure Control	Factory Selection: Building				
Controlled Device	Factory Selection: Supply Fan - Exhaust Fan - Dampers				
Bldg_Pressure	Building Static Pressure				
Setpoint:	Building Static Pressure SP	0.1	iwc	-0.5	0.5

Quick Setpoints A11	Quick Setpoints Screen A11 Will Be displayed when the unit is configured for Duct Pressure Control				
Name	Description	Default	Unit	Min	Max
Pressure Control	Factory Selection: Duct				
Controlled Device	Factory Selection: Supply Fan				
Duct_Pressure	Duct Static Pressure				
Setpoint:	Duct Static Pressure SP	0.5	iwc	0	2.5

Main Menu					
B Schedule	**Schedule Menu**				

Schedule B1	Schedule Screen B1				
Name	Description	Default	Unit	Min	Max
Date:	Sets the current month day and year - Default Value: Factory Date				
Hour:	Sets the current time - Default Value: Factory Time				

Schedule B2	Schedule Screen B2				
Name	Description	Default	Unit	Min	Max
DST:	Set to enable DST - Default Value: Enable				
Transition Time:	Sets Transition Time - Default Value: 60 min				
Start:	Sets Start day , month and time - Default Value: Last Sunday in March at 2:00				
End:	Sets End day , month and time - Default Value: Last Sunday in October at 3:00				

Schedule B3	Schedule Screen B3 will be displayed if unit OccMode_Sel is set to Schedule				
Name	Description	Default	Unit	Min	Max
Schedule #:	Modifiable Field used to advance through 10 available Weekly Schedules				
Time On:	Sets the desired On time for selected Schedule #				
Time Off:	Sets the desired Off time for selected Schedule #				
Days Enabled:	Sets the desired days of the week for the selected Schedule #				

Schedule B4	Schedule Screen B4 will be displayed if unit OccMode_Sel is set to Schedule				
Name	Description	Default	Unit	Min	Max
1:	Sets the desired Holiday Range 1: For Extended Unoccupied Mode 0/0 - 0/0				
2:	Sets the desired Holiday Range 2: For Extended Unoccupied Mode 0/0 - 0/0				
3:	Sets the desired Holiday Range 3: For Extended Unoccupied Mode 0/0 - 0/0				
4:	Sets the desired Holiday Range 4: For Extended Unoccupied Mode 0/0 - 0/0				

Schedule B5	Schedule Screen B5 will be displayed if unit OccMode_Sel is set to Schedule				
Name	Description	Default	Unit	Min	Max
5:	Sets the desired Holiday Range 5: For Extended Unoccupied Mode 0/0 - 0/0				
6:	Sets the desired Holiday Range 6: For Extended Unoccupied Mode 0/0 - 0/0				
7:	Sets the desired Holiday Range 7: For Extended Unoccupied Mode 0/0 - 0/0				
8:	Sets the desired Holiday Range 8: For Extended Unoccupied Mode 0/0 - 0/0				

7.0 Controller Display Menus (cont'd)

Schedule B6	Schedule Screen B6 will be displayed if unit OccMode_Sel is set to Schedule				
Name	Description	Default	Unit	Min	Max
9:	Sets the desired Holiday Range 9: For Extended Unoccupied Mode 0/0 - 0/0				
10:	Sets the desired Holiday Range 10: For Extended Unoccupied Mode 0/0 - 0/0				
11:	Sets the desired Holiday Range 11: For Extended Unoccupied Mode 0/0 - 0/0				
12:	Sets the desired Holiday Range 12: For Extended Unoccupied Mode 0/0 - 0/0				

Schedule B7	Schedule Screen B7 will be displayed if unit OccMode_Sel is set to Schedule				
Name	Description	Default	Unit	Min	Max
13:	Sets the desired Holiday Range 13: For Extended Unoccupied Mode 0/0 - 0/0				
14:	Sets the desired Holiday Range 14: For Extended Unoccupied Mode 0/0 - 0/0				
15:	Sets the desired Holiday Range 15: For Extended Unoccupied Mode 0/0 - 0/0				
16:	Sets the desired Holiday Range 16: For Extended Unoccupied Mode 0/0 - 0/0				

Main Menu					
C Points List	Points List Menu - Applicable screens and content will be displayed depending upon unit configuration				
	See Hardware Point Table on page 4 for Complete List of IO Points and Serial Communication Connections				
Points List C1	**Points List Screen C1**				
	Applicable Analog Outputs for Unit Configuration				
Points List C2	**Points List Screen C2**				
	Applicable Relay Outputs for Unit Configuration				
Points List C3	**Points List Screen C3**				
	Applicable Relay Outputs for Unit Configuration				
Points List C4	**Points List Screen C4**				
	Applicable Relay Outputs for Unit Configuration				
Points List C5	**Points List Screen C5**				
	Applicable Analog Inputs for Unit Configuration				
Points List C6	**Points List Screen C6**				
	Applicable Analog Inputs for Unit Configuration				
Point Lists C7 thru C12	**Points List Screens C7 thru C12 contain the temp & humidity values for the optional space sensors 1 thru 6.**				
Points List C13	**Point List Screen C13 contains the temp & humidity values for the optional return air temp probe**				
Points List C14	**Point List Screen C14 contains the temp & humidity values for the optional exhaust air temp probe**				
Points List C15	**Points List Screen C15**				
	Applicable Digital Inputs for Unit Configuration				
Points List C16	**Points List Screen C16**				
	Applicable Digital Inputs for Unit Configuration				
Points List C17	**Points List Screen C17**				
	Applicable Digital Inputs for Unit Configuration				

Main Menu	
D Alarms	Alarms Menu - Active Alarms are displayed with the option of entering the Alarm Logger
	See Alarm Management Section paragraph 4.2 of this document for detailed information on Active and Logged alarms

Main Menu					
E Service	Service Menu				
a Test Mode	Test Mode Menu				
Test Mode Ea1	Test Mode Screen Ea1				
Name	Description	Default	Unit	Min	Max
Enable:	Modifiable Field Used to enable the Test Mode				
Time Out:	Modifiable Field Used to adjust the test mode time duration	120	min	0	240
Countdown:	Current status of the time remaining for Test Mode if active		min / s		
Test Mode Ea2	Test Mode Screen Ea2				
Name	Description	Default	Unit	Min	Max
Damper:	Automatically Commanded Percentage Output to unit Damper(s)	100	%	100	100
Supply:	Automatically Commanded Supply Fan Start Output				
Supply:	Supply Fan Speed Output Modifiable Field used to test unit Supply Fan VFD and set Air Balance fan speed adjustment	100	%	30	100
Airflow Status:	Status of Supply Fan Air Proving Switch			Off	On

Test Mode Ea3	Test Mode Screen Ea3				
Name	Description	Default	Unit	Min	Max
Stage 1:	Modifiable Field used to turn on Compressor Stage 1	Off		Off	On
Stage 2:	Modifiable Field used to turn on Compressor Stage 2	Off		Off	On
Stage 3:	Modifiable Field used to turn on Compressor Stage 3	Off		Off	On
Stage 4:	Modifiable Field used to turn on Compressor Stage 4	Off		Off	On

Test Mode Ea4	Test Mode Screen Ea4 will be displayed if unit is configured with a Reheat Compressor				
Name	Description	Default	Unit	Min	Max
Reheat Comp:	Modifiable Field used to turn on Reheat Compressor	Off		Off	On
Reheat Capacity:	Modifiable Field used to set percentage command to Reheat Valve	0	%	0	100
Output:	Output in vdc to Reheat Valve	0	vdc	0	10

Test Mode Ea5	Test Mode Screen Ea5				
Name	Description	Default	Unit	Min	Max
Stg 1:	Modifiable Field used to turn on Heating Stage 1	Off		Off	On
HX1 Capacity:	Modifiable Field used to set percentage command to HX1 modulation valve	0	%	0	100
Output:	Output in vdc to HX1 modulation Valve	0	vdc	2	10

Test Mode Ea6	Test Mode Screen Ea6 will be displayed if unit is configured with two Heat Engines				
Name	Description	Default	Unit	Min	Max
Stg 2:	Modifiable Field used to turn on Heating Stage 2	Off		Off	On
HX2 Capacity:	Modifiable Field used to set percentage command to HX2 modulation valve	0	%	0	100
Output:	Output in vdc to HX2 modulation Valve	0	vdc	2	10

Test Mode Ea7	Test Mode Screen Ea7				
Name	Description	Default	Unit	Min	Max
Heat Capacity:	Modifiable Field used to adjust the output to the SCR Controller	0	%	0	100
Output:	Output in vdc to modulated heating component: Electric = SCR 0-10;	0	vdc	0	10
Stg 1:	Modifiable Field used to turn on Heating Stage 1	Off		Off	On
Stg 2:	Modifiable Field used to turn on Heating Stage 2	Off		Off	On
Stg 3:	Modifiable Field used to turn on Heating Stage 3	Off		Off	On
Stg 4:	Modifiable Field used to turn on Heating Stage 4	Off		Off	On
Stg 5:	Modifiable Field used to turn on Heating Stage 5	Off		Off	On
Stg 6:	Modifiable Field used to turn on Heating Stage 6	Off		Off	On

Test Mode Screens Ea8 thru Ea20	Test Mode Screens Ea8 through Ea20 contain all applicable analog and binary hardware sensor inputs, including any serial communicated sensors depending upon unit configuration.

b TAB	TAB Menu - Used to perform a Service Save of controller setpoints and to perform a Service Restore of previously saved setpoints				
TAB Eb1	TAB Screen Eb1				
Name	Description	Default	Unit	Min	Max
Set Max SF Spd?	Modifiable Field used to set the optional **SFSpdClgSP** and **SFSpdHtgSP** to the **SFSpdMax_SP** for saving (this field will be shown if VFD options 1, 2 or 3 are selected)	No		No	Yes
Save?	Modifiable Field used to perform a Service Save of current setpoints	No		No	Yes
Restore?	Modifiable Field used to perform a Service Restore of current setpoints	No		No	Yes

Main Menu

c Supply Fan	Supply Fan Menu - Applicable screens and content will be displayed depending upon unit configuration				
Supply Fan Ec1	Supply Fan Screen Ec1				
Name	Description	Default	Unit	Min	Max
Control:	Selected Fan Control Strategy - Constant Vol, Bldg Pressure, Duct Pressure, 0-10vdc input or BMS source				
SFSpdClgSP:	Supply Fan Speed Cooling SP - Sets commanded speed for the supply fan when in cooling mode	100	%	30	100
SFSpdHtgSP:	Supply Fan Speed Heating SP - Sets commanded speed for the supply fan when in heating mode	100	%	30	100
SFSpdLoSP:	Supply Fan Speed Low SP - Sets commanded speed for the supply fan when the unit is not in either the heating or the cooling mode.	100	%	30	100
SFSpdHiSP:	Supply Fan Speed High SP - Sets commanded speed for the supply fan when the unit is in either the heating or the cooling mode.	100	%	30	100

7.0 Controller Display Menus (cont'd)

Supply Fan Ec2	Supply Fan Screen Ec2 will be displayed if Supply Fan is selected for Bldg Pressure Control				
Name	Description - Supply Fan Bldg Pressure Control Loop Monitoring	Default	Unit	Min	Max
Bldg Pressure	Current Building Static Pressure		iwc	-0.5	0.5
Setpoint:	Current Building Static Pressure SP	0.1	iwc	-0.5	0.5
PI Output:	Current output of the control loop		%	0	100
SF_VFD_Cmd	Current Supply Fan VFD Command in vdc		vdc	0	10

Supply Fan Ec3	Supply Fan Screen Ec3 will be displayed if Supply Fan is selected for Duct Pressure Control				
Name	Description - Supply Fan Duct Pressure Control Loop Monitoring	Default	Unit	Min	Max
Duct Pressure	Current Duct Static Pressure		iwc	0	2.5
Setpoint:	Current Duct Static Pressure SP	0.5	iwc	0	2.5
PI Output:	Current output of the control loop		%	0	100
SF_VFD_Cmd	Current Supply Fan VFD Command in vdc		vdc	0	10

d Capacity	Capacity Menu - Applicable screens and content will be displayed depending upon unit configuration				
Capacity Ed1	Capacity Screen Ed1 (Monitor Only)				
Name	Description	Default	Unit	Min	Max
Heat Type:	Selected Heating Type Gas or Electric				
Heating Stages:	Number of Heating Stages				
Cooling Stages:	Number of Cooling Stages				
Reheat:	Unit Reheat Selection - Enable or Disabled				

Capacity Ed2	Capacity Screen Ed2				
Name	Description	Default	Unit	Min	Max
th- Space Sens	th- Space Sens - Enables and disables option CL78 space sensor 1	Off			
Spc_Avg_Ena:	Spc_Avg_Ena - Enables averaging of multiple space sensors from 2 up to 6.	Off			
Num_Avg_Sens:	Num_Avg_Sens - Sets the number of sensors to average including the th-Tune	2		2	6

Capacity Ed3	Capacity Screen Ed3				
Name	Description	Default	Unit	Min	Max
OAHtgLo_SP	OA Heating Lockout SP - Sets OA setpoint used to disable heating	65	Deg F	0	150
OAHtgLoDiff	OA Heating Lockout SP Differential - Sets differential used for the OAHtgLo_SP	2	Deg F	05	10
OAClgLo_SP	OA Cooling Lockout SP - Sets OA setpoint used to disable mechanical cooling	65	Deg F	-10	150
OAClgLoDiff	OA Cooling Lockout SP Differential - Sets differential used for the OAClgLo_SP	2	Deg F	05	10

Capacity Ed4	Capacity Screen Ed4 will be displayed if the unit is configured with Heating				
Name	Description - Heating Demand Control Loop Monitoring	Default	Unit	Min	Max
DA_Temp	Current Discharge Air Temp		Deg F		
Setpoint:	Current Discharge Air SP		Deg F		
PI Output:	Current output of the control loop		%	0	100
HX1_Mod_Cmd	Heating Modulation 1 Command in vdc		vdc	0-2	10
HX2_Mod_Cmd	Heating Modulation 2 Command in vdc		vdc	0-2	10

Capacity Ed5	Capacity Screen Ed5 will be displayed if the unit is configured with Heating				
Name	Description - Heating Stages	Default	Unit	Min	Max
HX_Stg1_Cmd	Current Heating Stage 1 Command			Off	On
HX_Stg2_Cmd	Current Heating Stage 2 Command			Off	On
HX_Stg3_Cmd	Current Heating Stage 3 Command			Off	On
HX_Stg4_Cmd	Current Heating Stage 4 Command			Off	On
HX_Stg5_Cmd	Current Heating Stage 5 Command			Off	On
HX_Stg6_Cmd	Current Heating Stage 6 Command			Off	On

Capacity Ed6	Capacity Screen Ed6				
Name	Description - Cooling Demand Control Loop Monitoring	Default	Unit	Min	Max
Active Input:	Current controlling input for cooling - DA_Temp or (CC_Temp used in Dehumidification Mode)		Deg F		
Setpoint:	Current Discharge SP or (Cooling Coil SP used in Dehumidification Mode)		Deg F		
PI Output:	Current output of the control loop		%	0	100

Capacity Ed7	Capacity Screen Ed7				
Name	Description - Cooling Stages	Default	Unit	Min	Max
Comp_Stg1_Cmd	Current Compressor Stage 1 Command			Off	On
Comp_Stg2_Cmd	Current Compressor Stage 2 Command			Off	On
Comp_Stg3_Cmd	Current Compressor Stage 3 Command			Off	On
Comp_Stg4_Cmd	Current Compressor Stage 4 Command			Off	On

Capacity Ed8	Capacity Screen Ed8 will be displayed if the unit is configured with a Reheat Valve				
Name	Description - Reheat Valve Demand Control Loop Monitoring	Default	Unit	Min	Max
DA_Temp	Current Discharge Air Temp		Deg F		
Setpoint:	Current Reheat Discharge Air Temp SP		Deg F		
PI Output:	Current output of the control loop		%	0	100
RH_Mod_Cmd	Current Reheat Modulation Command in vdc		vdc	0	10

Capacity Ed9	Capacity Screen Ed9 will be displayed if the unit is configured with Reheat				
Name	Description	Default	Unit	Min	Max
OADhHLo_SP	OA Dehum High Lockout SP - Sets OA setpoint used to disable dehumidification	110	Deg F	0	110
OADhHLoDiff	OA Dehum High Lockout SP Differential - Sets differential used for the **OADhHLo_SP**	2	Deg F	0	10
OADhLLo_SP	OA Dehum Low Lockout SP - Sets OA setpoint used to disable dehumidification	58	Deg F	50	100
OADhLLoDiff	OA Dehum Low Lockout SP Differential - Sets differential used for the **OADhLLo_SP**	2	Deg F	05	10

Capacity Ed10	Capacity Screen Ed10 will be displayed if the unit is configured with Reheat				
Name	Description	Default	Unit	Min	Max
DA_Dh_SP	Discharge Air Temp Dehum SP - Sets the discharge air setpoint used to control the reheat compressor during dehumidification mode	70	Deg F	50	100
CC_DA_SP	Cooling Coil Dehum DA SP - Sets the discharge air setpoint used to control unit primary cooling when in dehumidification Mode	52	Deg F	45	80

Capacity Ed11	Capacity Screen Ed11				
Name	Description - Fixed Capacity Compressor 1	Default	Unit	Min	Max
Run Hours:	Accumulated Total Run Hours		hrs		
Num Starts:	Accumulated Total Number of Starts				
Reset to Zero?	Used to reset accumulators to zero				

Capacity Ed12	Capacity Screen Ed12				
Name	Description - Fixed Capacity Compressor 2	Default	Unit	Min	Max
Run Hours:	Accumulated Total Run Hours		hrs		
Num Starts:	Accumulated Total Number of Starts				
Reset to Zero?	Used to reset accumulators to zero				

Capacity Ed13	Capacity Screen Ed13				
Name	Description - Fixed Capacity Compressor 3	Default	Unit	Min	Max
Run Hours:	Accumulated Total Run Hours		hrs		
Num Starts:	Accumulated Total Number of Starts				
Reset to Zero?	Used to reset accumulators to zero				

Capacity Ed14	Capacity Screen Ed14				
Name	Description - Fixed Capacity Compressor 4	Default	Unit	Min	Max
Run Hours:	Accumulated Total Run Hours		hrs		
Num Starts:	Accumulated Total Number of Starts				
Reset to Zero?	Used to reset accumulators to zero				

Capacity Ed15	Capacity Screen Ed15 will be displayed if the unit is configured with a Reheat Compressor				
Name	Description - Reheat Compressor	Default	Unit	Min	Max
Run Hours:	Accumulated Total Run Hours		hrs		
Num Starts:	Accumulated Total Number of Starts				
Reset to Zero?	Used to reset accumulators to zero				

7.0 Controller Display Menus (cont'd)

e Dampers	Damper Menu - Applicable screens and content will be displayed depending upon unit configuration				
Dampers Ee1	**Dampers Screen Ee1**				
Name	**Description**	**Default**	**Unit**	**Min**	**Max**
Control:	Selected Damper Control Strategy - 100% OA, 0-10Vdc Input, Two Position, Four Position, Bldg Pressure				
UnoccVnt_Ena:	Unoccupied Ventilation Enable - Allows OA during the unoccupied mode for damper control option Two Position	Off			
Dmpr_SP_Occ:	Two Position Damper Occ SP - Sets the value that the unit dampers will be commanded to when the unit is occupied	100	%	0	100
Dmpr_SP_Unocc:	Two Position Damper Unocc SP - Sets the value that the unit dampers will be commanded to when the unit is unoccupied For an unoccupied setpoint above zero **UnoccVnt_Ena** must be turned on	0	%	0	100
Aux_1_SP:	Aux 1 Damper Position SP - Damper position setpoint based on Ext Switches 1 and 2	20	%	0	100
Aux_2_SP:	Aux 2 Damper Position SP - Damper position setpoint based on Ext Switches 1 and 2	40	%	0	100
Aux_3_SP:	Aux 3 Damper Position SP - Damper position setpoint based on Ext Switches 1 and 2	60	%	0	100
Aux_4_SP:	Aux 4 Damper Position SP - Damper position setpoint based on Ext Switches 1 and 2	80	%	0	100

Dampers Ee2	Dampers Screen Ee2 will be displayed if the Dampers are selected for Bldg Pressure Control				
Name	**Description - Dampers Bldg Pressure Control Loop Monitoring**	**Default**	**Unit**	**Min**	**Max**
Bldg Pressure	Current Building Static Pressure		iwc	-0.5	0.5
Setpoint:	Current Building Static Pressure SP	01	iwc	-0.5	0.5
PI Output:	Current output of the control loop		%	0	100
Damper_Cmd	Current Damper Output Command in vdc		vdc	0	10

f Exh Fan and ERV	Exh Fan and ERV Menu - Applicable screens and content will be displayed depending upon unit configuration
Exh Fan and ERV Ef1	**Exh Fan and ERV Screen Ef1 (reserved for future use)**

g Information	Information Menu				
Informatin Eg1	**Information Screen Eg1**				
Name	**Description**	**Default**	**Unit**	**Min**	**Max**
Control Program:	Program Option currently loaded into the controller				
Ver:	Current Software Version (number and date)				
Bios:	Current Bios Version (number and date)				
Boot:	Current Boot Version (number and date)				

h BMS Config	BMS Config Menu - Applicable screens and content will be displayed depending upon unit configuration				
BMS Config Eh1	**BMS Config Screen Eh1**				
Name	**Description**	**Default**	**Unit**	**Min**	**Max**
Protocol:	Sets BMS Protocol - BACnet MSTP, BACnet IP/Eth or Lon - Default = BACnet				

BMS Config Eh2	BMS Config Screen Eh2 will be shown when the BMS Protocol is set to BACnet MSTP or BACnet IP/Eth				
Name	**Description**	**Default**	**Unit**	**Min**	**Max**
Termconf PlugIn?	Sets the BACnet Plugin command	No			

BMS Config Eh4	BMS Config Screen Eh4 will be shown when the BMS Protocol is set to BACnet MSTP				
Name	**Description**	**Default**	**Unit**	**Min**	**Max**
Instance:	Sets the Instance	77000			
Baudrate:	Sets the Baudrate - 9600, 19200, 38400 or 76800	38400			
MAC Addr:	Sets the Mac Address	0		0	127
MaxMasters:	Sets the Max Masters	127		0	127
MaxInfoFrames:	Sets the Max Info Frames	20		0	255
BMS Config Eh5	**BMS Config Screen Eh5 will be shown when the BMS Protocol is set to BACnet IP/Eth**				
Name	**Description**	**Default**	**Unit**	**Min**	**Max**
Instance:	Sets the Instance				
STATIC IP:	Sets the Static IP Address - [0-255] [0-255] [0-255] [0-255]				
Subnet:	Sets the Subnet Address - 000.000.000.00 / 255.000.000.00 / 255.255.000.00 / 255.255.255.00				
Gatewy:	Sets the Gateway - [0-255] [0-255] [0-255] [0-255]				

BMS Config Eh6	BMS Config Screen Eh6 will be shown when the BMS Protocol is set to BACnet IP/Eth				
Name	Description	Default	Unit	Min	Max
DNS 1:	Sets DNS 1 - [0-255] [0-255] [0-255] [0-255]				
DNS 2:	Sets DNS 1 - [0-255] [0-255] [0-255] [0-255]				
Type:	Sets the Type IP/Eth				

BMS Config Eh7	BMS Config Screen Eh7 will be shown when the BMS Protocol is set to BacNet MSTP or BACnet IP/Eth				
Name	Description	Default	Unit	Min	Max
Function:	Sets Function - Read or Write	Read			
Update:	Sets Update - Yes or No	Yes			

BMS Config Eh8	BMS Config Screen Eh8				
Name	Description	Default	Unit	Min	Max
OA_Hum_Sel:	Share OA Humidity from BMS (0=Probe, 1=BMS) - Set value to BMS for OA humidity share from BMS	Probe		Probe	BMS
OA_Temp_Sel:	Share OA Temp from BMS (0=Probe, 1=BMS) - Set value to BMS for OA temp share from BMS	Probe			
Probe	BMS				
Occupied_BMS	Occupied Mode BMS - Used to determine unit occupancy when **OccMode_Sel** is set to BMS	Occ		Occ	Un-occ

Main Menu	
F Factory Settings	Factory Settings Menu is password protected Consult factory for access

8.0 Communication Cards

With the addition of an optional BMS Communication card, the building automation system can remotely adjust setpoints and view status points and alarms. The current supported building automation protocols are:

- **BACnet® MSTP (Option BHB8)**
- **LonWorks® (Option BHB7)**

Contact factory if additional protocol support is needed.

Communication Card (Option BHB7 or BHB8)
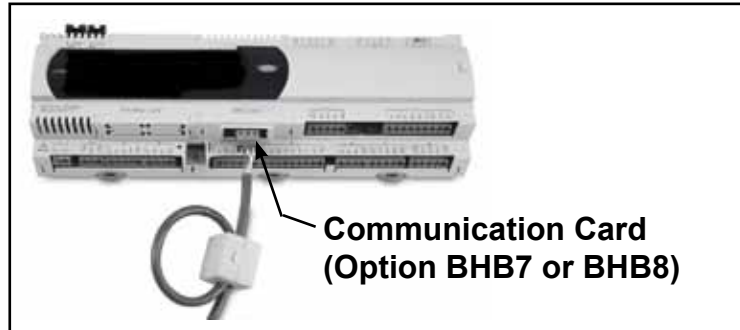
8.1 BACnet® MSTP (Option BHB8) Communication

The BACnet® MSTP (Option BHB8) communication allows access to selected unit function parameters. The standard communication protocol is identified as BACnet® over MS/TP (Master Slave / Token Passing). This protocol is used for communicating BACnet® over a network of BACnet® only controllers. The network is considered open communication, whereas any device on the network has the capability to receive input from any other controller on the network. In all MAPS Series units included on a BACnet® network, there are certain configuration parameters that need to be met before communication can be established with other devices. These settings and configuration parameters must be set properly or the device will not respond when prompted by other devices in the network. Follow the procedure below to modify the Bacnet MSTP parameters required by the BMS network.

1. From the main menu navigate to E. Service and press the enter key to access the service menu.

2. From the service menu navigate to the h. BMS Config submenu and press the enter key to select.

3. From the BMS Config screen E.h.1 verify that the Protocol: field is set to Bacnet MSTP. On a BAS card retrofit the Protocol: field may need to be set. To change the protocol press the enter key until the cursor is flashing on the Protocol: field and use the up or down key to scroll through the available choices and select Bacnet MSTP then press enter to confirm the protocol change.
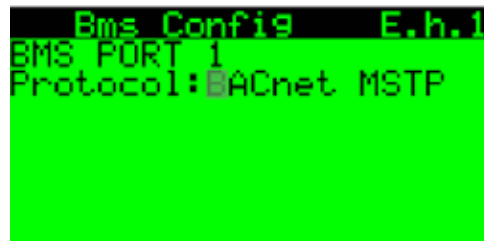
Press the enter key in succession until the cursor is flashing in the uppermost left hand corner of the screen and use the down arrow key to navigate to the next screen.

4. From the BMS Config screen E.h.2 Press the enter key to access the Termconf PlugIn? Field and set the value to yes.
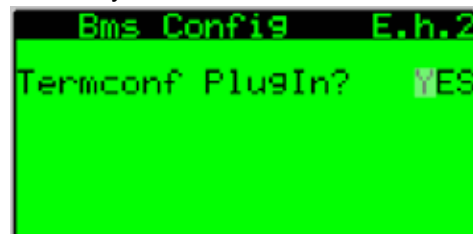
Press the enter key in succession until the cursor is flashing in the uppermost left hand corner of the screen and use the down arrow key to navigate to the next screen.

5. From Screen E.h.4 Set the desired values for the Instance:,Baudrate:, and Mac Addr:. typcally the MaxMasters: and MaxInfoFrames: do not need to be modified.

```
MSTP SETUP      E.h.4
Instance:        76000

Baudrate:        38400
MAC Addr:            0
MaxMasters:        127
MaxInfoFrames:      20
```

Press the enter key in succession until the cursor is flashing in the uppermost left hand corner of the screen and use the down arrow key to navigate to the next screen.

6. The modified values from the previous screen E.h.4 will need to be saved. From Screen E.h.7 press the enter key to access the Function: field and use the up arrow key to set the value to Write and then press the enter key to access the update field and use the up arrow key to set the value to yes. After a two second pulse the update value will return to the value of NO. the modified bacnet values are now saved.

```
BACnet R/W    E.h.7

Function:        Write

Update?            YES
```
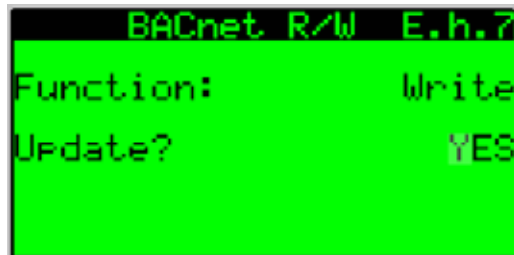
After saving the new setpoints, the controller must be power cycled to complete the process. Once the power has been restored and the bacnet card has initialized, return to the MSTP Setup screen E.h.4 to confirm the changes were accepted.

BACnet® Communication Card Layout

The BACnet® communication card has two sets of LEDs (Controller Status and MSTP Status), a push button, and three jumpers. **The controller status LED** indicates the status of communication between the card and the controller. It is located above the push button.

1) Serial port connection
2) Terminal block for BACnet® network (GND, +, -)
3) MSTP status LED
4) Controller status LED
5) Line resistance jumpers
6) Factory configuration push button
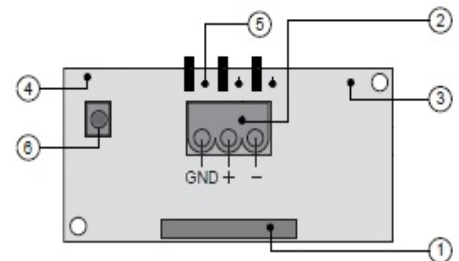
LED Lights (4 above)	Description	Troubleshooting
Quick green-off-green	Communication with controller is established and working.	-
Slow red-off-red	Communication is not established and no data is passing to card.	1. Confirm card is firmly plugged in. 2. Confirm BMS Protocol is set to BACnet MSTP

The MSTP status LED lights are located on the bottom side of the communication card below the controller status LED. The MSTP LED indicates the status of communication **between the card and the network**. Wait at least one minute after setting the communication parameters and plugging in the communication cable before determining the status of the network communication.

| LED Lights (3 above)	Description	Troubleshooting
Green with occasional red	Communication with network is established and working.	-
Green and red both on	Communication is not established and no data is passing to the card.	1. Confirm system and card baudrate are the same. 2. Confirm card Max Master is equal to or greater than the Station (MAC) Address of the Master with the highest address.

The push button on the communication card is used to return the card to factory configuration. Read and follow the procedure below to reset the card.

1. With controller OFF, depress and hold the push button located on the BACnet board while powering the controller back ON.
   Continue to hold the button, while watching the Status LEDs. Wait at least 20 seconds; the Status LED will flash SLOWLY 3 times, red-off.

8.1 BACnet® MSTP (Cont'd)

2. Once the flashing begins, release the push button. After the 3 red flashes, the LED comes on green. The LED then confirms recognition of the button by flashing QUICKLY 3 times red-off, and then comes on green again.

3. Wait for about one minute for the factory parameters to be loaded.

The jumpers are used to create built in end-of-line resistance for a BACnet® MSTP network.
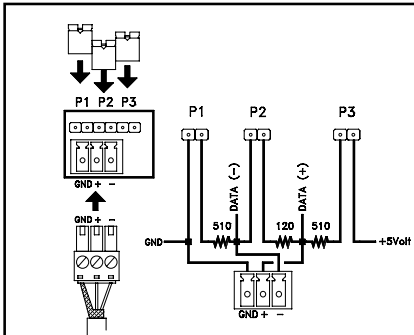
- Jumper P1 adds a 510 ohm polarization resistance between the negative data line (-) and GND;
- Jumper P2 adds a 120 ohm terminal resistance between the two data lines (+) and (-);
- Jumper P3 adds a 510 ohm polarization resistance between the positive data line (+) and the +5 Vdc internal voltage.

Insert all three jumpers on the unit at the start of network and the unit at the end of the network. DO NOT insert the jumpers on the intermediate units.

BACnet® MSTP Points List

R = Read   **AV** = Analog Variable

W = Write   **BV** = Binary Variable

Option D21 BACnet® Point List							
Analog Variables							
Name	**Description**	**R/W**	**BMS Address**	**Unit**	**Default**	**Min**	**Max**
CC_Temp	Cooling Coil Discharge Air Temp	R	AV1	Deg F			
DA_NAClg_SP	Discharge Air Temp Neutral Cooling SP	R/W	AV2	Deg F	70	50	100
DA_NAHtg_SP	Discharge Air Temp Neutral Heating SP	R/W	AV3	Deg F	70	50	140
DA_SP	Discharge Air Temp Active SP	R	AV4	Deg F			
DA_SpcClg_SP	Discharge Air Temp Space Cooling SP	R/W	AV5	Deg F	55	50	100
DA_SpcHtCl_SP	Discharge Air Temp Space Heat Mode Cooling SP	R/W	AV6	Deg F	55	50	100
DA_SpcHtg_SP	Discharge Air Temp Space Heating Sp	R/W	AV7	Deg F	90	50	140
DA_Temp	Discharge Air Temp	R	AV8	Deg F			
Damper_Cmd	Damper Output Command	R	AV9	%		0	100
DhOADP_SP	Dehum OA Dew Point SP	R/W	AV10	Deg F	58	50	100
Ext_Dmpr_Cmd	External Unit Damper Command	R	AV11	%		0	100
HX1_Mod_Cmd	Heating 1 Modulation Command	R	AV12	%		0	100
HX2_Mod_Cmd	Heating 2 Modulation Command	R	AV13	%		0	100
MA_Temp	Mixed Air Temp	R	AV14	Deg F			
OA_Dew_Point	Outside Air Dew Point	R	AV15	Deg F			
OA_Hum_BMS	Outside Air Humidity BMS -Sets OA Humidity when OA_Hum_Sel is set to 1=BMS	R/W	AV16	%rH			
OA_Hum_Raw	Outside Air Humidity	R	AV17	%rH			
OA_Temp_BMS	Outside Air Temp BMS - Sets OA Temp when OA_Temp_Sel is set to 1=BMS	R/W	AV18	Deg F			
OA_Temp_Raw	Outside Air Temp	R	AV19	Deg F			
OAChgOv_SP	OA Change Over SP	R/W	AV20	Deg F	65	45	80
RH_Mod_Out	Reheat Modulation Output %	R	AV21	%		0	100
SF_VFD_Cmd	Supply Fan VFD Command	R	AV22	%		0	100
SpcEffClgSP	Space Effective Cooling SP	R	AV23	Deg F			
SpcEffHtgSP	Space Effective Heating SP	R	AV24	Deg F			
Spc_Temp	Space Temp	R	AV25	Deg F			
SpcTempSP	Space Temp SP	R/W	AV26	Deg F	72	65	85
RA_Temp	Return Air Temperature	R	AV27	Deg F			
RA_Humidity	Return Air Humidity	R	AV28	% rH			
EA_Temp	Exhaust Air Temperature	R	AV29	Deg F			
EA_Humidity	Exhaust Air Humidity	R	AV30	% rH			

8.0 Communication Cards (Cont'd)

BACnet® MSTP Points List (Cont'd)

Integer Variables

Name	Description	R/W	BMS Address	Unit	Default	Min	Max
Bldg_Pressure*	Building Static Pressure	R	AV1001	iwc			
Bldg_Press_SP*	Building Static Pressure SP	R/W	AV1002	iwc	100	-500	500
Duct_Press_SP*	Duct Static Pressure SP	R/W	AV1003	iwc	500	0	2500
Spc_Hum	Space Humidity	R	AV1004	%rH			
SpcHumSP	Space Humidity SP	R/W	AV1005	%rH	55	35	75
State_Sel	State Select 2=AUTO 3=COOL 4=HEAT 5=OFF	R/W	AV1006		5	2	5
OccMode_Sel	Occ Mode Select 0= Schedule 1= Digital Input 2= BMS	R/W	AV1007		1	0	2
Spc_CO2	Space CO2	R	AV1008	ppm			
SpcCO2SP	Space CO2 SP	R/W	AV1009	ppm	1,000	0	2,000
Duct_Pressure*	Duct Static Pressure	R	AV1010	iwc			

*Note: Divide by 1000 with the supervisory system to reflect the appropriate decimal precision.

Digital Variables

Name	Description	R/W	BMS Address	Unit	Default	Min	Max
Alm_Rly_Cmd	Unit General Alarm Relay Command	R	BV1			Off	On
Comp_Stg1_Cmd	Compressor Stage 1 Command	R	BV2			Off	On
Comp_Stg2_Cmd	Compressor Stage 2 Command	R	BV3			Off	On
Comp_Stg3_Cmd	Compressor Stage 3 Command	R	BV4			Off	On
Comp_Stg4_Cmd	Compressor Stage 4 Command	R	BV5			Off	On
Ext_OCC	Occupied Mode Input	R	BV6			Off	On
Ext_Switch_1	External Damper Position Sw 1	R	BV7			Off	On
Ext_Switch_2	External Damper Position Sw 2	R	BV8			Off	On
HX_Stg1_Cmd	Heating Stage 1 Command	R	BV9			Off	On
HX_Stg2_Cmd	Heating Stage 2 Command	R	BV10			Off	On
HX_Stg3_Cmd	Heating Stage 3 Command	R	BV11			Off	On
HX_Stg4_Cmd	Heating Stage 4 Command	R	BV12			Off	On
HX_Stg5_Cmd	Heating Stage 5 Command	R	BV13			Off	On
HX_Stg6_Cmd	Heating Stage 6 Command	R	BV14			Off	On
NA_Clg_Md	Neutral Air Cooling Mode	R	BV15			Off	On
NA_Dehum_Md	Neutral Air Dehum Mode	R	BV16			Off	On
NA_Htg_Md	Neutral Air Heating Mode	R	BV17			Off	On
OA_Hum_Sel	Share OA Humidity from BMS (0=Probe 1=BMS)	R/W	BV18		Off	Off	On
OA_Temp_Sel	Share OA Temp from BMS (0=Probe 1=BMS)	R/W	BV19		Off	Off	On
Phase_Alarm	Phase Protection Alarm	R	BV20			Off	On
Safety_Sts	Safety Input Status	R	BV21			Normal	Alarm
Occupied	Occupied Mode Status	R	BV22			Off	On
Occupied_BMS	Occupied Mode BMS - Sets Unit Occupancy when OccMode_Sel is set to 2=BMS	R/W	BV23		Off	Off	On
SF_Cmd	Supply Fan Command	R	BV24			Off	On
SF_Sts	Supply Fan Status	R	BV25			Off	On
Spc_Clg_Md	Space Cooling Mode	R	BV26			Off	On
Spc_Dehum_Md	Space Dehum Mode	R	BV27			Off	On
Spc_Htg_Md	Space Heating Mode	R	BV28			Off	On
Filter_Sts	Main or ERV Dirty Filter Status	R	BV29			Off	On
RH_Cmd	Reheat Compressor Command	R	BV30			Off	On
Spc_HtgClg_Md	Space Heating Cooling Mode	R	BV31			Off	On
Htr_1_Sts	Gas Heater 1 Status	R	BV32			Off	On
Htr_2_Sts	Gas Heater 2 Status	R	BV33			Off	On

8.2 LonWorks® (Option BHB7) Communication

LonWorks® is an open protocol that was originally developed by Echelon Corporation. It is now maintained by Echelon in collaboration with members of the LonMark® Interoperability Association. It requires the use of Echelon's Neuron microprocessor to encode and decode the LonWorks® packets.

The LonWorks® protocol is based on the concept of using standardized functional profiles to control similar pieces of equipment. The LonWorks® (Option BHB7) communication allows access to selected unit function parameters. The network is considered open communication, whereas any device on the network has the capability to receive input from any other controller on the network. In all MAPS Series units included on a LonWorks® network, the unit protocol configuration parameters must be set before communication can be established with other devices.

Follow the procedure below to set the BMS protocol to LonWorks®.

1. From the main menu navigate to E. Service and press the enter key to access the service menu.

2. From the service menu navigate to the h. BMS Config submenu and press the enter key to select.

3. From the BMS Config screen E.h.1 verify that the Protocol: field is set to Lon. On a BAS card retrofit the Protocol: field may need to be set. To change the protocol press the enter key until the cursor is flashing on the Protocol: field and use the up or down key to scroll through the available choices and select Lon then press enter to confirm the protocol change.
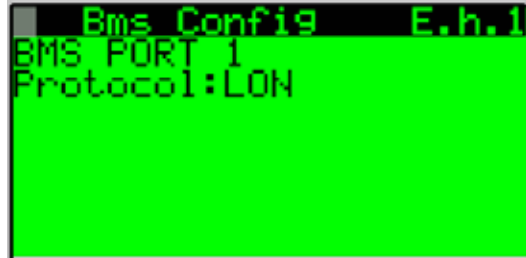
When complete press the escape key to return to the main menu.

The Lonworks communication card has the following components.

1. Serial port connection
2. Terminal block for LonWorks® network (GND, A, B)
3. Service pin
4. Service green LED
5. Anomaly red LED
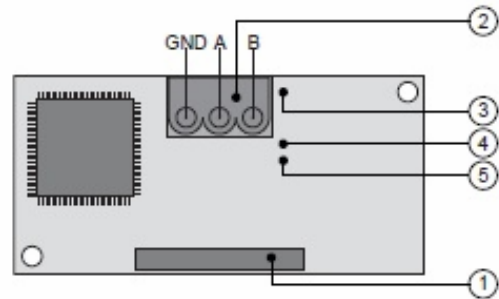
To activate the service pin, simply short-circuit the two pins for an instant using the tip of a screwdriver or similar tool. The activation is confirmed by the lighting of the service LED.

The service LED has several function listed below.

LED Light	Description	Troubleshooting
Green	1. Signals the status of the mode, as per the LonWorks protocol; 2. Remains ON during the activation of the service pin; 3. Remains ON for a second when receiving a WINK command from the network	

The anomaly LED indicates the status of communication between the card and the controller.

LED Light	Description	Troubleshooting
Off	Communication with controller is established and working.	
Red	Communication is not established and no data is passing to the card.	1. Confirm card is firmly plugged in. 2. Confirm BMS Protocol is set to LON.

Option D21 Lon Point List										
Analog Variables										
Name	**Description**	**R/W**	**Index**	**Name NV**	**Bit#**	**TypeNV**	**Unit**	**Default**	**Min**	**Max**
CC_Temp	Cooling Coil Discharge Air Temp	R	1	nvoCC_Temp		SNVT_temp_p	Deg F/C			
DA_NAClg_SP	Discharge Air Temp Neutral Cooling SP	R/W	2	nviDA_NAClg_SP		SNVT_temp_p	Deg F/C	70/21.1	50/10	100/37.7
DA_NAHtg_SP	Discharge Air Temp Neutral Heating SP	R/W	3	nviDA_NAHtg_SP		SNVT_temp_p	Deg F/C	70/21.1	50/10	140/60
DA_SP	Discharge Air Temp Active SP	R	4	nvoDA_SP		SNVT_temp_p	Deg F/C			
DA_SpcClg_SP	Discharge Air Temp Space Cooling SP	R/W	5	nviDA_SpcClg_SP		SNVT_temp_p	Deg F/C	55/12.7	50/10	100/37.7
DA_SpcHtCl_SP	Discharge Air Temp Space Heat Mode Cooling SP	R/W	6	nviDA_SpcHtCl_SP		SNVT_temp_p	Deg F/C	55/12.7	50/10	100/37.7
DA_SpcHtg_SP	Discharge Air Temp Space Heating Sp	R/W	7	nviDA_SpcHtg_SP		SNVT_temp_p	Deg F/C	90/32.2	50/10	140/60
DA_Temp	Discharge Air Temp	R	8	nvoDA_Temp		SNVT_temp_p	Deg F			
Damper_Cmd	Damper Output Command	R	9	nvoDamper_Cmd		SNVT_lev_percent	%		0	100
DhOADP_SP	Dehum OA Dew Point SP	R/W	10	nviDhOADP_SP		SNVT_temp_p	Deg F/C	58/14.4	50/10	100/37.7
Ext_Dmpr_Cmd	External Unit Damper Command	R	11	nvoExt_Dmpr_Cmd		SNVT_lev_percent	%		0	100
HX1_Mod_Cmd	Heating 1 Modulation Command	R	12	nvoHX1_Mod_Cmd		SNVT_lev_percent	%		0	100
HX2_Mod_Cmd	Heating 2 Modulation Command	R	13	nvoHX2_Mod_Cmd		SNVT_lev_percent	%		0	100
MA_Temp	Mixed Air Temp	R	14	nvoMA_Temp		SNVT_temp_p	Deg F/C			
OA_Dew_Point	Outside Air Dew Point	R	15	nvoOA_Dew_Point		SNVT_temp_p	Deg F/C			
OA_Hum_BMS[1]	Outside Air Humidity BMS -Sets OA Humidity when OA_Hum_Sel is set to 1=BMS	R/W	16	nviOA_Hum_BMS		SNVT_lev_percent	%rH			
OA_Hum_Raw	Outside Air Humidity	R	17	nvoOA_Hum_Raw		SNVT_lev_percent	%rH			
OA_Temp_BMS	Outside Air Temp BMS - Sets OA Temp when OA_Temp_Sel is set to 1=BMS	R/W	18	nviOA_Temp_BMS		SNVT_temp_p	Deg F/C			
OA_Temp_Raw	Outside Air Temp	R	19	nvoOA_Temp_Raw		SNVT_temp_p	Deg F/C			
OAChgOv_SP	OA Change Over SP	R/W	20	nviOAChgOv_SP		SNVT_temp_p	Deg F/C	65/18.3	45/7.2	80/26.6
RH_Mod_Out	Reheat Modulation Output %	R	21	nvoRH_Mod_Out		SNVT_lev_percent	%		0	100
SF_VFD_Cmd	Supply Fan VFD Command	R	22	nvoSF_VFD_Cmd		SNVT_lev_percent	%		0	100
SpcEffClgSP	Space Effective Cooling SP	R	23	nvoSpcEffClgSP		SNVT_temp_p	Deg F/C			
SpcEffHtgSP	Space Effective Heating SP	R	24	nvoSpcEffHtgSP		SNVT_temp_p	Deg F/C			
Spc_Temp	Space Temp	R	25	nvoSpc_Temp		SNVT_temp_p	Deg F/C			
SpcTempSP	Space Temp SP	R/W	26	nviSpcTempSP		SNVT_temp_p	Deg F/C	72/22.2	65/18.3	85/29.4
RA_Temp	Return Air Temperature	R	27	nvoRA_Temp		SNVT_temp_p	Deg F/C			
RA_Humidity	Return Air Humidity	R	28	nvoRA_Humidity		SNVT_lev_percent	%rH			
EA_Temp	Exhaust Air Temperature	R	29	nvoEA_Temp		SNVT_temp_p	Deg F/C			
EA_Humidity	Exhaust Air Humidity	R	30	nvoEA_Humidity		SNVT_lev_percent	%rH			

LONworks® Point List (Cont'd)

Integer Variables

Name	Description	R/W	Index	Name NV	Bit#	TypeNV	Unit	Default	Min	Max
Bldg_Pressure	Building Static Pressure	R	1	nvoBldg_Pressure		SNVT_press_p	Pa			
Bldg_Press_SP	Building Static Pressure SP	R/W	2	nviBldg_Press_SP		SNVT_press_p	Pa	24.9	-124	124
Duct_Press_SP	Duct Static Pressure SP	R/W	3	nviDuct_Press_SP		SNVT_press_p	Pa	124	0	622
Spc_Humidity[2]	Space Humidity	R	4	nvoSpc_Humidity		SNVT_lev_percent	%rH			
SpcHumSP[3]	Space Humidity SP	R/W	5	nviSpcHumSP		SNVT_lev_percent	%rH	55	35	75
State_Sel	State Select 2=AUTO 3=COOL 4=HEAT 5=OFF	R/W	6	nviState_Sel		SNVT_count		5	2	5
OccMode_Sel	Occ Mode Select 0= Schedule 1= Digital Input 2= BMS	R	7	nvoOccMode_Sel		SNVT_count		1	0	2
Spc_CO2	Space CO2	R	8	nvoSpc_CO2		SNVT_ppm	ppm			
SpcCO2SP	Space CO2 SP	R/W	9	nviSpcCO2SP		SNVT_ppm	ppm	1,000		
Duct_Pressure	Duct Static Pressure	R	10	nvoDuct_Pressure		SNVT_press_p	Pa			

Note 1: Divide the BMS humidity value by 20 before writing to the OA_Hum_BMS variable (scale 1=20%).

Note 2: Multiply the Spc_Humidity value by 10 (scale 1=10%).

Note 3: Divide the desired space humidity set point value by 10 before writing to the SpcHumSP variable (scale 1=10%).

Digital Variables

Name	Description	R/W	Index	Name NV	Bit#	TypeNV	Unit	Default	Min	Max
OA_Hum_Sel	Share OA Humidity from BMS (0=Probe 1=BMS)	R/W	18	nviOA_Hum_Sel		SNVT_switch		Off	Off	On
OA_Temp_Sel	Share OA Temp from BMS (0=Probe 1=BMS)	R/W	19	nviOA_Temp_Sel		SNVT_switch		Off	Off	On
Occupied	Occupied Mode Status	R	22	nvoOccupied		SNVT_switch			Off	On
Occupied_BMS	Occupied Mode BMS - Sets Unit Occupancy when OccMode_Sel is set to 2=BMS	R/W	23	nviOccupied_BMS		SNVT_switch		Off	Off	On

Digital Variables — Digital Outputs

Name	Description	R/W	Index	Name NV	Bit#	TypeNV	Unit	Default	Min	Max
Alm_Rly_Cmd	Unit General Alarm Relay Command	R		nvoDoStat1	0	SNVT_state			Off	On
Comp_Stg1_Cmd	Compressor Stage 1 Command	R		nvoDoStat1	1	SNVT_state			Off	On
Comp_Stg2_Cmd	Compressor Stage 2 Command	R		nvoDoStat1	2	SNVT_state			Off	On
Comp_Stg3_Cmd	Compressor Stage 3 Command	R		nvoDoStat1	3	SNVT_state			Off	On
Comp_Stg4_Cmd	Compressor Stage 4 Command	R		nvoDoStat1	4	SNVT_state			Off	On
HX_Stg1_Cmd	Heating Stage 1 Command	R		nvoDoStat1	5	SNVT_state			Off	On
HX_Stg2_Cmd	Heating Stage 2 Command	R		nvoDoStat1	6	SNVT_state			Off	On
HX_Stg3_Cmd	Heating Stage 3 Command	R		nvoDoStat1	7	SNVT_state			Off	On
HX_Stg4_Cmd	Heating Stage 4 Command	R		nvoDoStat1	8	SNVT_state			Off	On
HX_Stg5_Cmd	Heating Stage 5 Command	R		nvoDoStat1	9	SNVT_state			Off	On
HX_Stg6_Cmd	Heating Stage 6 Command	R		nvoDoStat1	10	SNVT_state			Off	On
RH_Cmd	Reheat Compressor Command	R		nvoDoStat1	11	SNVT_state			Off	On
SF_Cmd	Supply Fan Command	R		nvoDoStat1	12	SNVT_state			Off	On

8.0 Communication Cards (Cont'd)
8.2 LonWorks® (Option BHB7) Communication (Cont'd)
LONworks® Point List (Cont'd)

Digital Variables	Digital Inputs									
Name	Description	R/W	Index	Name NV	Bit#	TypeNV	Unit	Default	Min	Max
Ext_OCC	Occupied Mode Input	R		nvoDiStat1	0	SNVT_state			Off	On
Ext_Switch_1	External Damper Position Sw 1	R		nvoDiStat1	1	SNVT_state			Off	On
Ext_Switch_2	External Damper Position Sw 2	R		nvoDiStat1	2	SNVT_state			Off	On
Htr_1_Sts	Gas Heater 1 Status	R		nvoDiStat1	3	SNVT_state			Off	On
Htr_2_Sts	Gas Heater 2 Status	R		nvoDiStat1	4	SNVT_state			Off	On
Phase_Alarm	Phase Protection Alarm	R		nvoDiStat1	5	SNVT_state			Off	On
Safety_Sts	Safety Input Status	R		nvoDiStat1	6	SNVT_state			Normal	Alarm
SF_Sts	Supply Fan Status	R		nvoDiStat1	7	SNVT_state			Off	On
Filter_Sts	Main or ERV Dirty Filter Status	R		nvoDiStat1	8	SNVT_state			Off	On
Digital Variables	Unit Modes									
Name	Description	R/W	Index	Name NV	Bit#	TypeNV	Unit	Default	Min	Max
NA_Clg_Md	Neutral Air Cooling Mode	R		nvoMdStat1	0	SNVT_state			Off	On
NA_Dehum_Md	Neutral Air Dehum Mode	R		nvoMdStat1	1	SNVT_state			Off	On
NA_Htg_Md	Neutral Air Heating Mode	R		nvoMdStat1	2	SNVT_state			Off	On
Spc_Clg_Md	Space Cooling Mode	R		nvoMdStat1	3	SNVT_state			Off	On
Spc_Dehum_Md	Space Dehum Mode	R		nvoMdStat1	4	SNVT_state			Off	On
Spc_Htg_Md	Space Heating Mode	R		nvoMdStat1	5	SNVT_state			Off	On
Spc_HtgClg_Md	Space Heating Cooling Mode	R		nvoMdStat1	6	SNVT_state			Off	On

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NOTES:

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