REZNOR®

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

Module Air Processing Systems (MAPS III) Manual for Option D19 Makeup Air Control
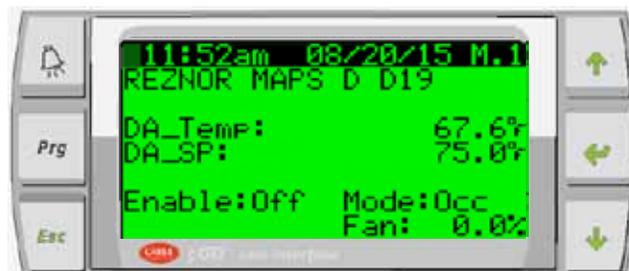
1.0 Digital Controller

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)

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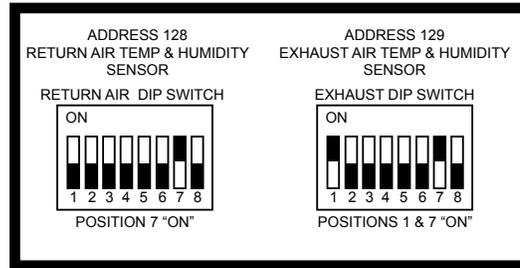
Exhaust Air / Return Air Temp & Humidity Sensor Addressable Dip Switch Settings: Factory set when ordered on new production units. For retrofits the user must set the addresses accordingly in the field.

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

1.2 Controller hardware input – output points

Input Terminal	Input Point Name	Input Description	Signal type	Signal Range	Always Active
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 FB2	RA_Temp RA_Humidity	Return Air Temp Return Air Humidity	RS-485 Communication		
J26 FB2	EA_Temp EA_Humidity	Exhaust Air Temp Exhaust Air Humidity	RS-485 Communication		
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"	
ID5	Ext_Call_Fan	External Fan Call Input (G)	Dry Contact	Open = "OFF" / Close = "ON"	
ID6	Ext_Call_Heat	External Heat Call Input (W1)	Dry Contact	Open = "OFF" / Close = "ON"	
ID7	Ext_Call_Cool	External Cool Call Input (Y1)	Dry Contact	Open = "OFF" / Close = "ON"	
ID8	Ext_Call_Dh	External Dehum Call 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 control system operates the supply fan, exhaust fan, intake dampers energy recovery, DX cooling, and gas/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 air temperature that does not affect space conditions.

2. Unit supplies Cold air temperature to provide space cooling.

3. Unit supplies Hot air temperature 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.

2.1 States of Operation

The unit operates in the following states of operation:

1. **Enable ON**

   The unit is permitted to operate based upon field supplied contact closures. The unit will only switch to the Enable ON state when the state is manually selected through the user interface device, unit display, or building automation network communication point.

2. **Enable 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 user interface device, unit display, or building automation network communication point.

   Mechanical System Selections are only permitted in the Enable OFF State.

3. **Enable OFF / Alarm**

   The Enable OFF / Alarm state can only occur from a sequence "failure". The unit will stop all mechanical operation until the "failure" condition(s) are resolved. Upon resolving the failure, the unit will return to its externally commanded condition. Alarms can also be cleared by resetting power to the unit.

The unit will operate based upon the following field-supplied contact closures:

2.2 External Contacts Description (ID4 Through ID8)

1. **Occupied Contacts (ID4)**

   When the occupied contacts are closed, the unit will be considered in the occupied mode. The Dampers, Exhaust Fan, and ERV will follow the occupied mode sequence. When the contacts are open, the Dampers, Exhaust Fan, and ERV will operate in the unoccupied mode sequence. There are no other time clock or schedule functions associated with the unit. (See the damper control section, Paragraph 3.2, for specific details.)

2. **Fan Contacts (ID5)**

   The unit supply fan will be on whenever the supply fan contacts are closed.

   The fan will also automatically start whenever the heating, cooling or dehumidification contacts are closed, otherwise the fan will be OFF. The auto sequence can be activated from the fan control when the mechanical cooling and heating contacts are open. For continuous supply fan operation the ID5 contacts need to remain closed.

3. **Heating Contacts (ID6)**

   Whenever the contacts are closed, the supply fan will start and the heating sequence will be enabled. Mechanical heat will operate to maintain the following heating discharge air temperature setpoint.

Unit Discharge Setpoints					
#	State	Discharge Air Control	Variable	Default Setpoint	Setpoint Range
1	Heating Contacts	Space Heating Air Temperature	**DA_SpcHtg_SP**	90°F (32°C)	50 -140°F (10 - 60°C)

   The unit will not automatically switch to other states except Unit Alarm. When the contacts are open, the heat and supply fan will turn OFF or operate in auto-sequence.

2.0 Sequence of Operation (Cont'd)

4. <u>**Cooling Contacts (ID7)**</u>

Whenever the cooling contacts are closed, the supply fan will start. The mechanical cooling will operate to maintain the unit discharge air temperature setpoint.

Unit Discharge Setpoints					
#	State	Discharge Air Control	Variable	Default Septoint	Range
1	Cooling Contacts	Space Cooling Air Temperature	**DA_SpcClg_SP**	55°F (12°C)	50 -100°F (10 - 37°C)

The unit will not automatically switch to other states except Unit alarm. When the contacts are open, the cool and supply fan will turn OFF or operate in auto-sequence.

5. <u>**Dehumidification Contacts (ID8)**</u>

When the contacts are closed and the cooling and heating contacts are open, the supply fan will start and the unit reheat system will be active.

6. <u>**Auto Sequence**</u>

When the Fan contacts are closed and the mechanical cooling, heating, and dehumidification contacts are open, the unit will operate in the auto sequence.

The unit will operate to maintain the following discharge air temperature setpoints.

If both heating and cooling contacts are enabled, the unit will not turn on any mechanical system until the condition is removed.

Unit Discharge Setpoints						
#	State	OAT Allowed	Discharge Air Control	Variable	Default Septoint	Range
1	Auto Sequence Cool	MAT > 65F	Neutral Air Temperature	DA_NAClg_SP	**75°F** (24°C)	50 -100**°F** (10 - 37°C)
2	Auto Sequence Heat	MAT < 65F	Neutral Air Temperature	DA_NAHtg_SP	**65°F** (18°C)	50 -140**°F** (20 - 60°C)

If both heating and cooling contacts are enabled, the unit will not turn on any mechanical system until the condition is removed.
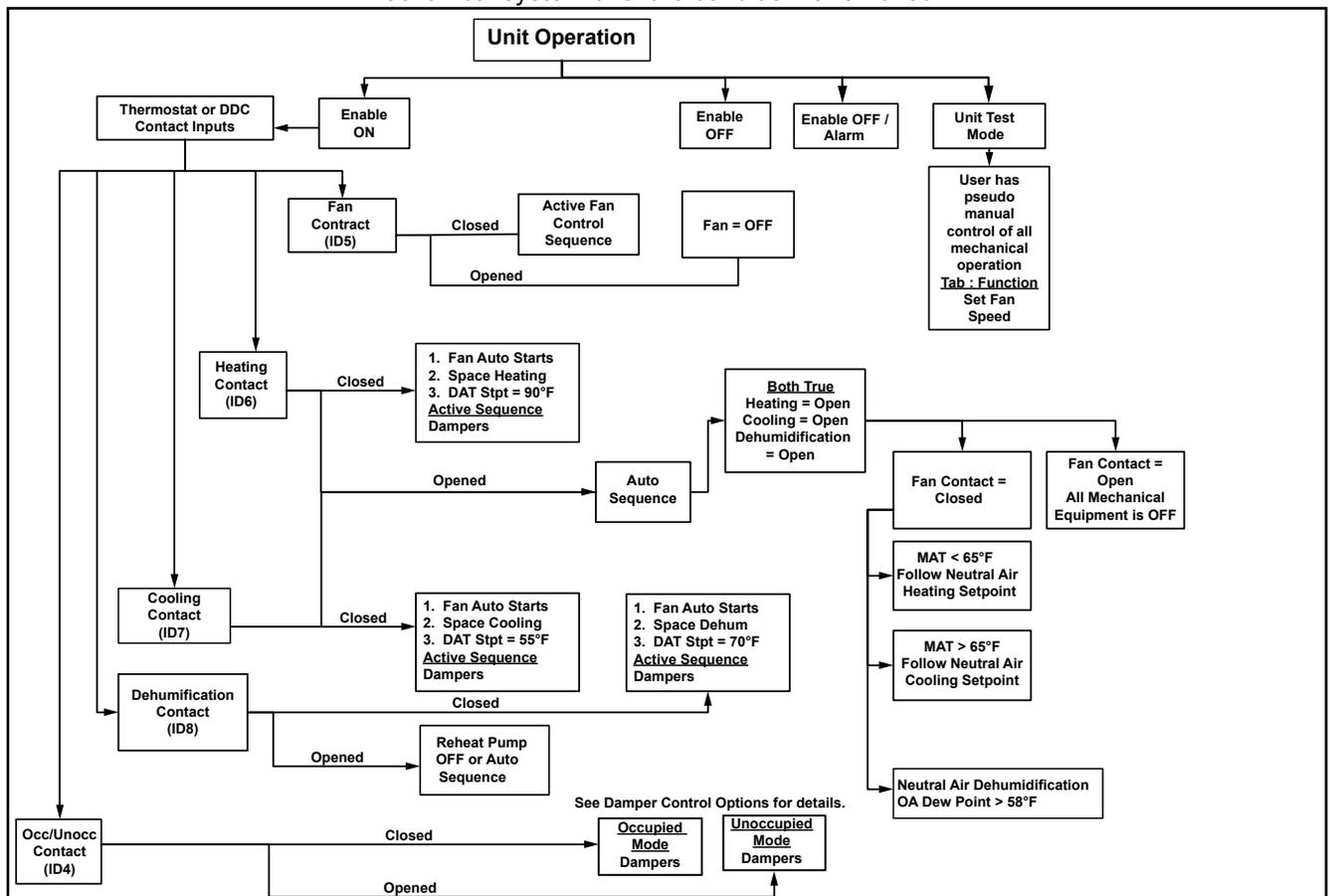
3.0 Controls

3.1 Supply Fan Control

Upon a call for the supply fan, the supply fan will start. If the unit is configured with a 100% outside air damper, the damper actuator is electrically interlocked 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 operation will be shut down and the supply fan will stop after an adjustable time delay.

When the supply fan, cooling, heating and dehumidification contacts are open the supply fan is OFF. No other functions can automatically turn the fan ON except test mode.

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.

The supply fan will operate in one of the following six conditions.

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 heating or cooling contacts are closed, the unit will operate to high fan speed. When the fan is ON and the cooling or heating contacts are open, 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"w.c. default).

3. **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.

3.2 Intake Damper Control

The intake dampers operate based upon state, mode, and one of six 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. 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 = 100%). 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 Dmpr 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. Economizer Package (Option GF8)

Occupied Mode

The dampers will modulate to the user adjustable minimum position setting when the unit is in occupied mode (**MinDmprSP**, Default = 10%). When the CO_2 sensor option is selected (input U9), the minimum damper position will be determined as follows: If the Space CO_2 level exceeds the (**SpcCO2SP**, default = 1000 ppm) with a 200 ppm differential (**SpcCO2Diff**, default = 200 ppm), the user adjustable (**CO2DmprOsSP**, Default = 10%) value will be added to the (**MinDmprSP**, Default = 10%)

CO_2 > 1000 ppm = Active Minimum Damper Position 20%

CO_2 < 800 ppm = Active Minimum Damper Position 10%

When cooling is required via the thermostat input ID7 and the outdoor air temperature is less than the economizer temperature lockout and the economizer dewpoint lockout, the dampers will modulate using a PID from the minimum position to the maximum position to maintain the mixed air temperature at the **DA_SpcClg_SP.**

When cooling is required via Auto Sequence Cool and the outdoor air temperature is less than the economizer temperature lockout and the economizer dewpoint lockout, the dampers will modulate using a PID from the minimum position to the maximum position to maintain the mixed air temperature at the **DA_NAClg_SP**.

When cooling is not required, the dampers will revert to the minimum position.

Unoccupied, OFF and Alarm Modes

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

3.2 Intake Damper Control (cont'd)

6. **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. All setpoints are user adjustable from the unit display and the wall mounted user interface.

The unit switches setpoints based upon states, mode, and space control requirements.

Heating Setpoint Selection

The unit will automatically switch between the two setpoints based on the following:

Unit Discharge Setpoints					
#	State	Discharge Air Control	Variable	Default Septoint	Range
1	Auto Sequence Heat	Neutral Air Temperature	DA_NAHtg_SP	65°F (18.3°C)	50 -120°F (10 - 48.9°C)
2	Heating Contacts	Space Heating Air Temperature	DA_SpcHtg_SP	90°F (32.2°C)	50 -140°F (10 - 60°C)

Sliding Scale: Neutral Air Heating Temperature Reset Schedule Setpoint

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
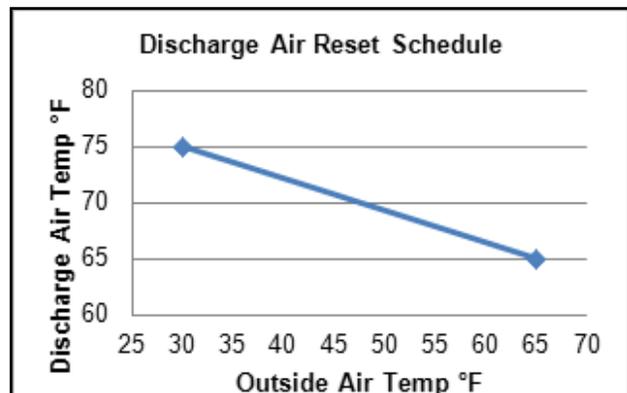
Sliding Scale: Space Heating Temperature Reset Schedule Setpoint

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

Reset Schedule	
Outside Air Temperature	Discharge Air Temperature
30°F (-1.1°C)	120°F (48.9°C)
65°F (18.3°C)	90°F (32.2°C)

Discharge Air Reset Schedule

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 60°F/16°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 60°F/16°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.

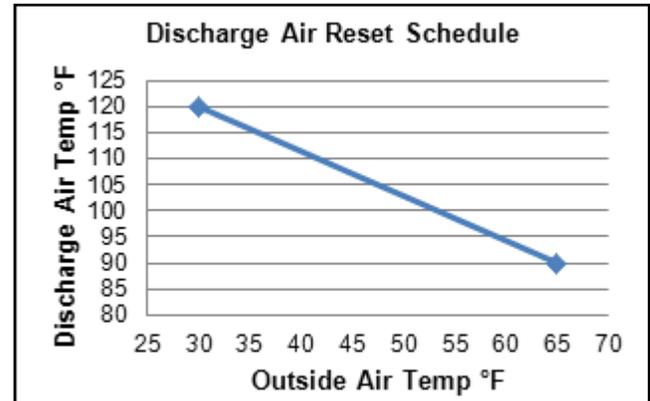| Gas Heat Staging					
PI Loop Control: All Statements Must Be True To Activate or De-Activate. All stages will have an adjustable min ON and OFF time.					
Stage	Outputs	Increase Inter-Stg Timer	Activate	Decrease Inter-Stg Timer	De-activate
Stg 1	Y3 = 24% for 30 seconds & NO8 = ON		DAT 5°F (2.8°C) 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.					

3.0 Controls (Cont'd)

3.5 Cooling Control

The unit will switch between the setpoints based on the following:

#	State	Occ / Unocc	Discharge Air Control	Variable	Default Septoint	Range
			Unit Discharge Setpoints			
1	Auto Sequence Cooling	Occ	Neutral Air Temperature	DA_NAClg_SP	75°F (24°C)	50 - 100°F (10 - 37°C)
2	Cooling Contacts	Occ	Space Cooling Air Temperature	DA_SpcClg_SP	55°F (12°C)	50 -100°F (10 - 37°C)

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 60°F/16°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 dehumidication Y5 Reheat_Mod_Capacity and NO17 Reheat Compressor Command not permitted.

Stage	Output	Increase Stage Timing	Activate	Decrease Stage Timing	De-activate
			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*		
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

There is a call for dehumidification if one of the following is true.

1. Space Dehumidificaction Mode - The dehum contact is closed.
2. Neutral Air Dehumidification Mode - The outdoor air dewpoint is above the dew point setpoint. (58°F/14°C) and the unit is in auto sequence cooling or heating.

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).

4.0 Safeties and Alarms

4.1 Alarms

Selected safeties have an adjustable delay to prevent nuisance alarms. All alarms are time 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

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"**.

4.0 Safeties and Alarms (cont'd)

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"**.

4.2 Alarm Management

Alarm Status 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

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
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

4.0 Safeties and Alarms (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 and Time on the Controller Clock

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

```
11:52am  08/20/15 M.1
REZNOR MAPS D D19

DA_Temp:          67.6°F
DA_SP:            75.0°F

Enable: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
```
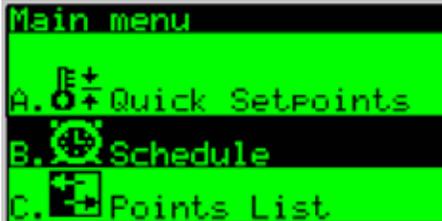
2. From **Screen B.1**, press the enter key to access the modifiable date and time fields and set them to the current dat and time.

```
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**.

```
Clock            B.2

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

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.

5.2 Setting the Unit for Operation with the D19 Control Sequence

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

```
11:52am  08/20/15 M.1
REZNOR MAPS D D19

DA_Temp:          67.6°F
DA_SP:            75.0°F

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

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.

```
Main menu

F.     Factory Settings

A.     Quick Setpoints

B.     Schedule
```
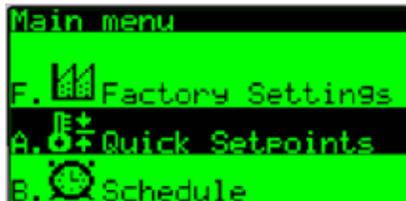
From the Quick Setpoints **Screen A.1,** press the enter key to access the **System Enable:** field and set the value to **ON**.

```
Quick Setpoints   A.1
Unit Setup
System Enable:      ON
DA_SpcClg_SP:    55.0°F
DA_SpcHSPSel:    Setpt
DA_SpcHtg_SP:    90.0°F
```
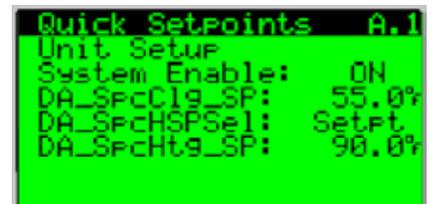
Press the escape key in succession to return to the main screen.

The unit will control according to the inputs provided by a conventional thermostat or other external source. The status of the unit contacts can be viewed from main **screen M.4**.

```
11:05am  02/12/15 M.4
External Inputs
Occ:On          Clg:On
Fan:Off
Htg:Off
```
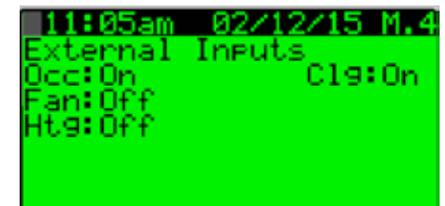
5.0 Start Up (Cont'd)

5.3 Unit Test Mode

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%.

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 enabled OFF. 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.**

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.

**3.** Press the enter key until the cursor is blinking on the **System Enable:** field and press the down arrow key to set the unit to the Enable OFF.

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.

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.

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

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 node ON.

NOTE: Any reference to supply fan speed control only applies if the unit is configured with Option VFD1, VFD2 or VFD3.
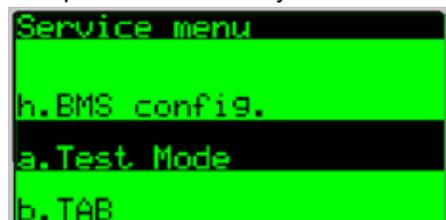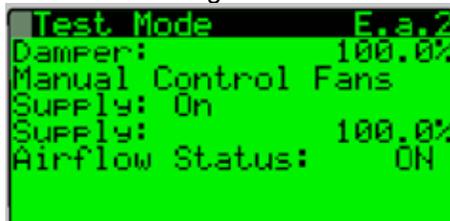
```
Test Mode          E.a.1
Manual Control

Enable:              On

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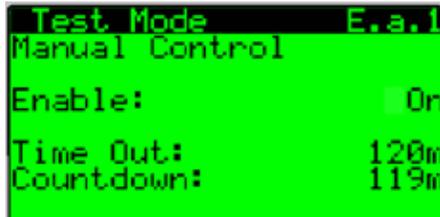
Once enabled ON, press the enter key in succession until the cursor is flashing in the uppermost left hand corner of the screen and use the down arrow key to navigate to the next Test Mode **Screen E.a.2**.

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.

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.

```
Test Mode          E.a.2
Damper:          100.0%
Manual Control Fans
Supply: On
Supply:          100.0%
Airflow Status:      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.
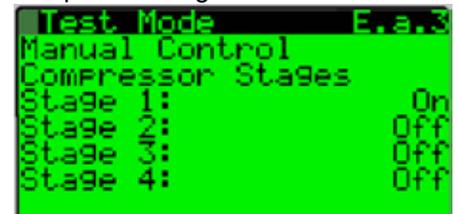
```
Test Mode          E.a.3
Manual Control
Compressor Stages
Stage 1:             On
Stage 2:            Off
Stage 3:            Off
Stage 4:            Off
```

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

5.0 Start Up (Cont'd)

5.3 Unit Test Mode (cont'd)

Reheat Comp: value to Off and the **Reheat Capacity:** value to 0%.

```
Test Mode        E.a.4
Manual Control Reheat
Reheat Comp:        On
Reheat Capacity:■79.3%
Output:        7.93vdc
```

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.

```
Test Mode        E.a.5
Manual Control
Stg 1:   On
HX1 Capacity:     24.0%
Output:         3.92vdc
```

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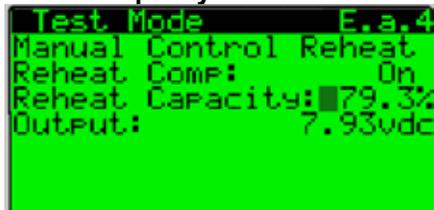
Press the enter key in succession until the cursor is flashing in the uppermost left hand corner of the screen and use the down arrow key to advance to the Test Mode **Screen E.a.20**.

```
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. <u>Electric Heat Only</u> - 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
```
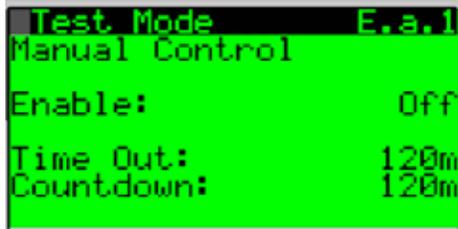
**15. <u>Saving Adjusted Maximum Fan
Speed Values</u>**

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 ?
D19_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 D19 Control Program - User and Service Menu Structure

Main Screen M.1	Main Screen M.1 (Monitor Only)				
Name	Description	Default	Unit	Min	Max
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		
Enable:	Unit Enable - Status unit enabled and available for operation	OFF		Off	On
Mode:	Current Unit Mode - Occ or Unocc				
Fan:	Current Supply Fan Commanded Speed		%		

Main Screen M.x	Main Screen M.2 or M.3 will be displayed depending upon unit configuration. (Monitor Only)				
Name	Description	Default	Unit	Min	Max
Temperature:	Current Outside Air Temp		Deg F		
Humidity:	Current Outside Air Humidity		%rH		
Dew Point:	Current Outside Air Dew Point		Deg F		
U09 Spc_CO2:	Space CO_2 - Current Space CO_2		ppm		
SpcCO2SP:	Space CO_2 SP - Current Space CO_2 Setpoint	1000	ppm	0	2000

Main Screen M.4	Main Screen M.4 (Monitor Only)				
Name	Description	Default	Unit	Min	Max
Occ:	Occupied Mode Input - Current status of the Occupied Mode Input			Off	On
Fan:	External Fan Call Input (G) - Current status of the External Fan Call Input (G)			Off	On
Htg:	External Heat Call Input (W1) - Current status of the External Heat Call Input (W1)			Off	On
Clg:	External Cool Call Input (Y1) - Current status of the External Cool Call Input (Y1)			Off	On
Dehum:	External Call Dehum Input - Current status of the External Call Dehum Input			Off	On

Main Screen M.x	Main Screen M.5 or M.6 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_Htg_Md:	Space Heating Mode - Unit controls applicable heating stages to maintain the **DA_SpcHtg_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
NA_Clg_Md:	Neutral Air Cooling Mode - Unit controls applicable cooling stages to maintain the **DA_NAClg_SP**.			Off	On
NA_Htg_Md:	Neutral Air Heating Mode - Unit controls applicable heating stages to maintain the **DA_NAHtg_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

Main Menu

A. Quick Setpoints	Quick Setpoints Menu				

Quick Setpoints A.1	Quick Setpoints Screen A.1				
Name	Description	Default	Unit	Min	Max
System Enable:	Unit Enable - Sets unit enabled and available for operation	5		2	5
DA_SpcClg_SP:	Discharge Air Temp Space Cooling SP - Sets the discharge setpoint used when in Space Cooling Mode.	55	Deg F	50	100
DA_SpcHSPSel:	Space DA Heating SP Select - Used to select desired discharge setpoint for Space Heating Mode. Single Setpoint or Reset Setpoint.	Setpt		Setpt	Reset
DA_SpcHtg_SP:	Discharge Air Temp Space Heating SP - Sets the discharge setpoint used when in Space Heating Mode.	90	Deg F	50	140
DA_SpcHRst_SP:	Discharge Air Temp Space Heating Reset SP - Display of optional calculated reset schedule setpoint used when in Space Heating Mode.		Deg F	50	140

Quick Setpoints A.2	Quick Setpoints Screen A.2 Will be displayed when unit is configured for Space Control				
Name	Description	Default	Unit	Min	Max
OA_Temp:	Current Outside Air Temp		Deg F		
DA_SpcHRst_SP:	Discharge Air Temp Space Heating Reset SP - Display of optional calculated reset schedule setpoint used when in Space Heating Mode.		Deg F	50	140
SpcHRDaMax:	Space Heat DA SP Reset OA Max - Sets the maximum space heating discharge air temp reset setpoint.	120	Deg F	50	140
SpcHRDaMin:	Space Heat DA SP Reset DA Min - Sets the minimum space heating discharge air temp reset setpoint.	90	Deg F	50	140
SpcHROaMax:	Space Heat DA SP Reset OA Max - Sets the maximum space heating outside air temp reset setpoint.	65	Deg F	0	100
SpcHROaMin:	Space Heat DA SP Reset OA Min - Sets the minimum space heating outside air temp reset setpoint.	30	Deg F	0	100

7.0 Controller Display Menus (cont'd)

A Quick Setpoints	Quick Setpoints Menu (Cont'd)				
Quick Setpoints A.3	**Quick Setpoints Screen A.3 Will be displayed when unit is configured for Space Control**				
Name	**Description**	**Default**	**Unit**	**Min**	**Max**
MA_ChgOvr_SP:	Mixed Air Temp Auto Change Over SP - Mixed air temp setpoint used to used to enable neutral air heating or neutral air cooling	65	Deg F	45	80
MA_ChgOvrDiff:	Mixed Air Temp Auto Change Over SP Differential - Differential for the **MA_ChgOvr_SP.**	5	Deg F	0.5	10
DA_NAClg_SP:	Discharge Air Temp Neutral Cooling SP - Sets the discharge setpoint used when in Neutral Air Cooling Mode.	80	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.	60	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 A.4	**Quick Setpoints Screen A.4 Will be displayed when unit is configured for Space Control**				
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
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 A.5	**Quick Setpoints Screen A.5 Will be displayed when unit is configured for Space Control**				
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	0.5	10

Quick Setpoints A.6	**Quick Setpoints Screen A.6 Will be displayed when unit is configured for Space Control and Dehumidification**				
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 A.7	**Quick Setpoints Screen A.7**				
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

Quick Setpoints A.8	**Quick Setpoints Screen A.8**				
Name	**Description**	**Default**	**Unit**	**Min**	**Max**
SpcCO2SP:	Space CO2 SP - Current Space CO2 Setpoint	1000	ppm	0	2000
SpcCO2Diff:	Space CO2 SP Differential - Differential for the **SpcCO2SP.**	200	ppm	10	500

7.0 Controller Display Menus (cont'd)

Main Menu					
B.Schedule	**Schedule Menu**				
Schedule B.1	**Schedule Screen B.1**				
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 B.2	Schedule Screen B.2				
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				

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 C.1	**Points List Screen C.1**				
	Applicable Analog Outputs for Unit Configuration				
Points List C.2	**Points List Screen C.2**				
	Applicable Relay Outputs for Unit Configuration				
Points List C.3	**Points List Screen C.3**				
	Applicable Relay Outputs for Unit Configuration				
Points List C.4	**Points List Screen C.4**				
	Applicable Relay Outputs for Unit Configuration				
Points List C.5	**Points List Screen C.5**				
	Applicable Analog Inputs for Unit Configuration				
Points List C.6	**Points List Screen C.6**				
	Applicable Analog Inputs for Unit Configuration				
Points List C.7	**Point List Screen C.7 contains the temp & humidity values for the optional return air temp probe**				
Points List C.8	**Point List Screen C.8 contains the temp & humidity values for the optional exhaust air temp probe**				
Points List C.9	**Points List Screen C.9**				
	Applicable Digital Inputs for Unit Configuration				
Points List C.10	**Points List Screen C.10**				
	Applicable Digital Inputs for Unit Configuration				
Points List C.11	**Points List Screen C.11**				
	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 E.a.1	**Test Mode Screen E.a.1**				
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 E.a.2	**Test Mode Screen E.a.2**				
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 E.a.3	Test Mode Screen E.a.3				
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 E.a.4	Test Mode Screen E.a.4 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 E.a.5	Test Mode Screen E.a.5				
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 E.a.6	Test Mode Screen E.a.6 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 E.a.7	Test Mode Screen E.a.7				
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 E.a.8 thru E.a.20	Test Mode Screens E.a.8 through E.a.20 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 E.b.1	TAB Screen E.b.1				
Name	Description	Default	Unit	Min	Max
Set Max SF Spd?	Modifiable Field used to set the optional **SFSpdClgSP, SFSpdHtgSP** and **SFSpdLoSP SFSpdHiSP** to the **SFSpdMax_SP** for saving.	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 E.c.1	Supply Fan Screen E.c.1				
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 E.c.2	Supply Fan Screen E.c.2 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

Supply Fan E.c.3	Supply Fan Screen E.c.3 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

d. Capacity	Capacity Menu - Applicable screens and content will be displayed depending upon unit configuration				

Capacity E.d.1	Capacity Screen E.d.1 (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 E.d.2	Capacity Screen E.d.2				
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 E.d.3	Capacity Screen E.d.3 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 E.d.4	Capacity Screen E.d.4 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 E.d.5	Capacity Screen E.d.5				
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 E.d.6	Capacity Screen E.d.6				
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 E.d.7	Capacity Screen E.d.7 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 E.d.8	Capacity Screen E.d.8 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 E.d.9	Capacity Screen E.d.9 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 E.d.10	Capacity Screen E.d.10				
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 E.d.11	Capacity Screen E.d.11				
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 E.d.12	Capacity Screen E.d.12				
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 E.d.13	Capacity Screen E.d.13				
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 E.d.14	Capacity Screen E.d.14 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 E.e.1	**Dampers Screen E.e.1**				
Name	**Description**	**Default**	**Unit**	**Min**	**Max**
Control:	Selected Damper Control Strategy - 100% OA, 0-10Vdc Input, Two Position, Four Position, Economizer or 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 E.e.2	**Dampers Screen E.e.2 will be displayed if the Dampers are selected for Economizer Control.**				
Name	**Description - Dampers Econ Demand Control Loop Monitoring**	**Default**	**Unit**	**Min**	**Max**
MA_Temp	Current Mixed Air Temp		Deg F		
Setpoint:	Current Mixed Air Temp SP - **DA_SpcClg_SP =** 55 Deg F when in space cooling - **DA_NAClg_SP** = 75 Deg F when in neutral air cooling.		Deg F		
PI Output:	Current output of the control loop		%	0	100
Damper_Cmd	Current Damper Output Command in vdc		vdc	0	10
Dampers E.e.3	**Dampers Screen E.e.3 will be displayed if the Dampers are selected for Economizer Control.**				
Name	**Description - Dampers Econ Demand Control Loop Monitoring**	**Default**	**Unit**	**Min**	**Max**
Ec_OALO_SP:	Economizer OA Temp Lockout SP - OA Temp setpoint value that economizer is enabled.	60	Deg F	0	120
Ec_OALODiff:	Economizer OA Temp Lockout Diff - Differential for the **Ec_OALO_SP**	2	Deg F	0.5	10
Ec_OADPLO_SP:	Economizer OA Dew Point Lockout SP - OA Dew Point setpoint value that economizer is enabled.	58	Deg F	0	120
Ec_OADPLODiff:	Economizer OA Dew Point Lockout Diff - Differential for the **Ec_OADPLO_SP**	2	Deg F	0.5	10
MinDmprSP:	Minimum Damper SP - Sets the unit minimum damper position.	10	%	0	100
CO2DmprOsSP	CO_2 Minimum Damper Offset SP - Value added to the **MinDmprSP** when CO_2 is above setpoint.	10	%	0	100
Dampers E.e.4	**Dampers Screen E.e.4 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	0.1	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 E.f.1	**Exh Fan and ERV Screen E.f.1 (reserved for future use)**

g. Information	Information Menu				
Informatin E.g.1	**Information Screen E.g.1**				
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 E.h.1	**BMS Config Screen E.h.1**

Name	Description	Default	Unit	Min	Max
Protocol:	Sets BMS Protocol - BACnet MSTP, BACnet IP/Eth or Lon - Default = BACnet				

BMS Config E.h.2	**BMS Config Screen E.h.2 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 E.h.4	**BMS Config Screen E.h.4 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 E.h.5	**BMS Config Screen E.h.5 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 E.h.6	**BMS Config Screen E.h.6 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 E.h.7	**BMS Config Screen E.h.7 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 E.h.8	**BMS Config Screen E.h.8**

| 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)
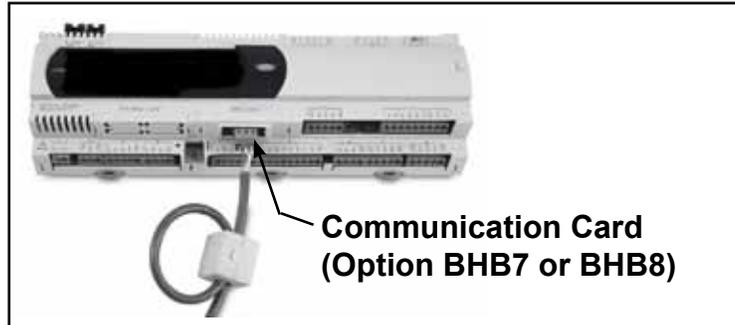
8.1 BACnet® MSTP (Option BHB8) Communication

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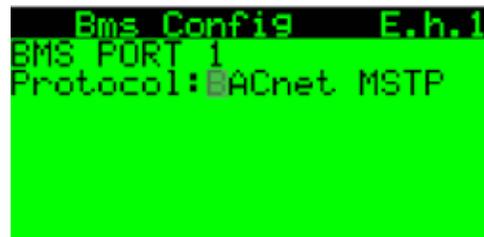
Press the enter key in succession until the cursor is flashing in the uppermost left hand corner of the screen and use the down arrow key to navigate to the next screen.

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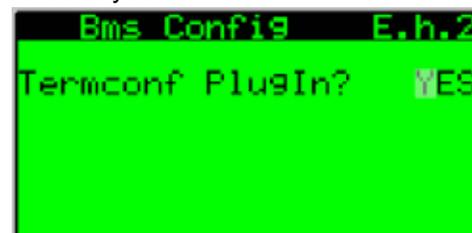
Press the enter key in succession until the cursor is flashing in the uppermost left hand corner of the screen and use the down arrow key to navigate to the next screen.

8.0 Communication Cards (Cont'd)
## 8.1 BACnet® MSTP (cont'd)

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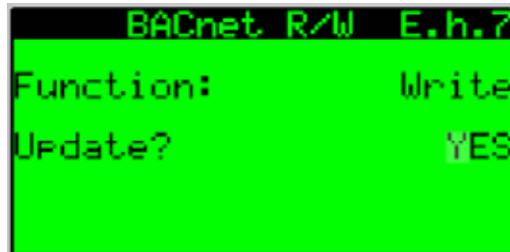
After saving the new setpoints, the controller must be power cycled to complete the process. Once the power has been restored and the bacnet card has initialized, return to the MSTP Setup screen E.h.4 to confirm the changes were accepted.

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
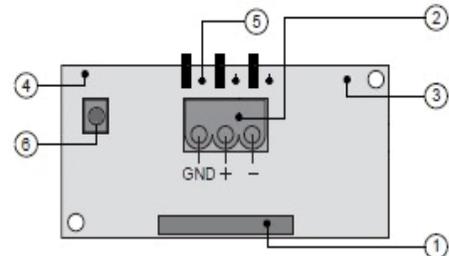
LED Lights (4 above)	Description	Troubleshooting
Quick green-off-green	Communication with controller is established and working.	-
Slow red-off-red	Communication is not established and no data is passing to card.	1. Confirm card is firmly plugged in. 2. Confirm BMS Protocol is set to BACnet MSTP

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.
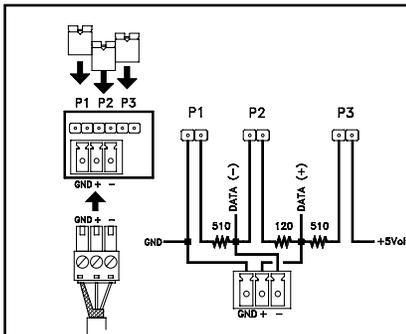
- Jumper P1 adds a 510 ohm polarization resistance between the negative data line (-) and GND;
- Jumper P2 adds a 120 ohm terminal resistance between the two data lines (+) and (-);
- Jumper P3 adds a 510 ohm polarization resistance between the positive data line (+) and the +5 Vdc internal voltage.

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 D19 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			
CO2DmprOsSP	CO2 Minimum Damper Offset SP	R/W	AV2	%	10	0	100
DA_NAClg_SP	Discharge Air Temp Neutral Cooling SP	R/W	AV3	Deg F	75	50	100
DA_NAHtg_SP	Discharge Air Temp Neutral Heating SP	R/W	AV4	Deg F	65	50	140
DA_SP	Discharge Air Temp Active SP	R	AV5	Deg F			
DA_SpcClg_SP	Discharge Air Temp Space 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
Ec_OADPLO_SP	Economizer OA Dew Point Lockout SP	R/W	AV11	Deg F	58	0	120
Ec_OALO_SP	Economizer OA Temp Lockout SP	R/W	AV12	Deg F	60	0	120
Ext_Dmpr_Cmd	External Unit Damper Command	R	AV13	%		0	100
HX1_Mod_Cmd	Heating 1 Modulation Command	R	AV14	%		0	100
HX2_Mod_Cmd	Heating 2 Modulation Command	R	AV15	%		0	100
MA_ChgOvr_SP	Mixed Air Temp Auto Change Over SP	R/W	AV16	Deg F	65	45	80
MA_Temp	Mixed Air Temp	R	AV17	Deg F			
MinDmprSP	Minimum Damper SP	R/W	AV18	%	10	0	100
OA_Dew_Point	Outside Air Dew Point	R	AV19	Deg F			
OA_Hum_BMS	Outside Air Humidity BMS -Sets OA Humidity when OA_Hum_Sel is set to 1=BMS	R/W	AV20	%rH			
OA_Hum_Raw	Outside Air Humidity	R	AV21	%rH			
OA_Temp_BMS	Outside Air Temp BMS - Sets OA Temp when OA_Temp_Sel is set to 1=BMS	R/W	AV22	Deg F			
OA_Temp_Raw	Outside Air Temp	R	AV23	Deg F			
RH_Mod_Out	Reheat Modulation Output %	R	AV24	%		0	100
SF_VFD_Cmd	Supply Fan VFD Command	R	AV25	%		0	100
RA_Temp	Return Air Temperature	R	AV26	Deg F			
RA_Humidity	Return Air Humidity	R	AV27	% rH			
EA_Temp	Exhaust Air Temperature	R	AV28	Deg F			
EA_Humidity	Exhaust Air Humidity	R	AV29	% 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_Press_SP*	Building Static Pressure SP	R/W	AV1001	iwc	100	-500	500
Duct_Press_SP*	Duct Static Pressure SP	R/W	AV1002	iwc	500	0	2500
Bldg_Pressure*	Building Static Pressure	R	AV1003	iwc			
Spc_CO2	Space CO2	R	AV1004	ppm			
SpcCO2SP	Space CO2 SP	R/W	AV1005	ppm	1,000	0	2,000
Duct_Pressure*	Duct Static Pressure	R	AV1006	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**
Unit_Enable	Unit Enable	R/W	BV1		Off	Off	On
Alm_Rly_Cmd	Unit General Alarm Relay Command	R	BV2			Off	On
Comp_Stg1_Cmd	Compressor Stage 1 Command	R	BV3			Off	On
Comp_Stg2_Cmd	Compressor Stage 2 Command	R	BV4			Off	On
Comp_Stg3_Cmd	Compressor Stage 3 Command	R	BV5			Off	On
Comp_Stg4_Cmd	Compressor Stage 4 Command	R	BV6			Off	On
Ext_Call_Cool	External Cool Call Input (Y1)	R	BV7			Off	On
Ext_Call_Dh	External Call Dehum Input	R	BV8			Off	On
Ext_Call_Fan	External Fan Call Input (G)	R	BV9			Off	On
Ext_Call_Heat	External Heat Call Input (W1)	R	BV10			Off	On
Ext_OCC	Occupied Mode Input	R	BV11			Off	On
Ext_Switch_1	External Damper Position Sw 1	R	BV12			Off	On
Ext_Switch_2	External Damper Position Sw 2	R	BV13			Off	On
HX_Stg1_Cmd	Heating Stage 1 Command	R	BV14			Off	On
HX_Stg2_Cmd	Heating Stage 2 Command	R	BV15			Off	On
HX_Stg3_Cmd	Heating Stage 3 Command	R	BV16			Off	On
HX_Stg4_Cmd	Heating Stage 4 Command	R	BV17			Off	On
HX_Stg5_Cmd	Heating Stage 5 Command	R	BV18			Off	On
HX_Stg6_Cmd	Heating Stage 6 Command	R	BV19			Off	On
NA_Clg_Md	Neutral Air Cooling Mode	R	BV20			Off	On
NA_Dehum_Md	Neutral Air Dehum Mode	R	BV21			Off	On
NA_Htg_Md	Neutral Air Heating Mode	R	BV22			Off	On
OA_Hum_Sel	Share OA Humidity from BMS (0=Probe 1=BMS)	R/W	BV23		Off	Off	On
OA_Temp_Sel	Share OA Temp from BMS (0=Probe 1=BMS)	R/W	BV24		Off	Off	On
Phase_Alarm	Phase Protection Alarm	R	BV25			Off	On
Safety_Sts	Safety Input Status	R	BV26			Normal	Alarm
SF_Cmd	Supply Fan Command	R	BV27			Off	On
SF_Sts	Supply Fan Status	R	BV28			Off	On
Spc_Clg_Md	Space Cooling Mode	R	BV29			Off	On
Spc_Dehum_Md	Space Dehum Mode	R	BV30			Off	On
Spc_Htg_Md	Space Heating Mode	R	BV31			Off	On
Filter_Sts	Main or ERV Dirty Filter Status	R	BV32			Off	On
RH_Cmd	Reheat Compressor Command	R	BV33			Off	On
Htr_1_Sts	Gas Heater 1 Status	R	BV34			Off	On
Htr_2_Sts	Gas Heater 2 Status	R	BV35			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
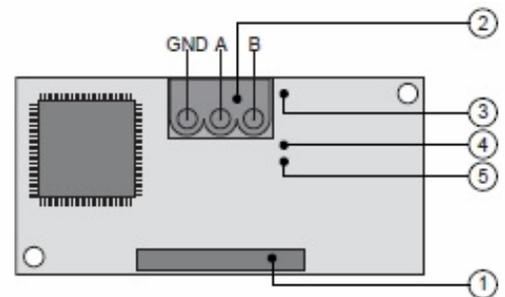
To activate the service pin, simply short-circuit the two pins for an instant using the tip of a screwdriver or similar tool. The activation is confirmed by the lighting of the service LED.

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 D19 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			
CO2DmprOsSP	CO2 Minimum Damper Offset SP	R/W	2	nviCO2DmprOsSP		SNVT_lev_ percent	%	10	0	100
DA_NAClg_SP	Discharge Air Temp Neutral Cooling SP	R/W	3	nviDA_NAClg_SP		SNVT_temp_p	Deg F/C	75/23.9	50/10	100/37.7
DA_NAHtg_SP	Discharge Air Temp Neutral Heating SP	R/W	4	nviDA_NAHtg_SP		SNVT_temp_p	Deg F/C	65/18.3	50/10	140/60
DA_SP	Discharge Air Temp Active SP	R	5	nvoDA_SP		SNVT_temp_p	Deg F/C			
DA_SpcClg_SP	Discharge Air Temp Space Cooling SP	R/W	6	nviDA_SpcClg_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
Ec_OADPLO_SP	Economizer OA Dew Point Lockout SP	R/W	11	nviEc_OADPLO_SP		SNVT_temp_p	Deg F/C	58/14.4	0	120/48.8
Ec_OALO_SP	Economizer OA Temp Lockout SP	R/W	12	nviEc_OALO_SP		SNVT_temp_p	Deg F/C	60/15.5	0	120/48.8
Ext_Dmpr_Cmd	External Unit Damper Command	R	13	nvoExt_Dmpr_Cmd		SNVT_lev_ percent	%		0	100
HX1_Mod_Cmd	Heating 1 Modulation Command	R	14	nvoHX1_Mod_Cmd		SNVT_lev_ percent	%		0	100
HX2_Mod_Cmd	Heating 2 Modulation Command	R	15	nvoHX2_Mod_Cmd		SNVT_lev_ percent	%		0	100
MA_ChgOvr_SP	Mixed Air Temp Auto Change Over SP	R/W	16	nviMA_ChgOvr_SP		SNVT_temp_p	Deg F/C	65/18.3	45/7.2	80/26.6
MA_Temp	Mixed Air Temp	R	17	nvoMA_Temp		SNVT_temp_p	Deg F/C			
MinDmprSP	Minimum Damper SP	R/W	18	nviMinDmprSP		SNVT_lev_ percent	%	10	0	100
OA_Dew_Point	Outside Air Dew Point	R	19	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	20	nviOA_Hum_BMS		SNVT_lev_ percent	%rH			
OA_Hum_Raw	Outside Air Humidity	R	21	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	22	nviOA_Temp_BMS		SNVT_temp_p	Deg F/C			
OA_Temp_Raw	Outside Air Temp	R	23	nvoOA_Temp_Raw		SNVT_temp_p	Deg F/C			
RH_Mod_Out	Reheat Modulation Output %	R	24	nvoRH_Mod_Out		SNVT_lev_ percent	%		0	100
SF_VFD_Cmd	Supply Fan VFD Command	R	25	nvoSF_VFD_Cmd		SNVT_lev_ percent	%		0	100
RA_Temp	Return Air Temperature	R	26	nvoRA_Temp		SNVT_temp_p	Deg F/C			
RA_Humidity	Return Air Humidity	R	27	nvoRA_Humidity		SNVT_lev_ percent	%rH			
EA_Temp	Exhaust Air Temperature	R	28	nvoEA_Temp		SNVT_temp_p	Deg F/C			
EA_Humidity	Exhaust Air Humidity	R	29	nvoEA_Humidity		SNVT_lev_ percent	%rH			
Note 1: Divide the BMS humidity value by 20 before writing to the OA_Hum_BMS variable (scale 1=20%).										

LONworks® Point List (Cont'd)

Integer Variables										
Name	Description	R/W	Index	Name NV	Bit#	TypeNV	Unit	Default	Min	Max
Bldg_Press_SP	Building Static Pressure SP	R/W	1	nviBldg_Press_SP		SNVT_press_p	Pa	24.9	-124	124
Duct_Press_SP	Duct Static Pressure SP	R/W	2	nviDuct_Press_SP		SNVT_press_p	Pa	124	0	622
Bldg_Pressure	Building Static Pressure	R	3	nvoBldg_Pressure		SNVT_press_p	Pa			
Spc_CO2	Space CO2	R	4	nvoSpc_CO2		SNVT_ppm	ppm			
SpcCO2SP	Space CO2 SP	R/W	5	nviSpcCO2SP		SNVT_ppm	ppm	1000	0	2000
Duct_Pressure	Duct Static Pressure	R	6	nvoDuct_Pressure		SNVT_press_p	Pa			

Digital Variables										
Name	Description	R/W	Index	Name NV	Bit#	TypeNV	Unit	Default	Min	Max
Unit_Enable	Unit Enable	R/W	1	nviUnit_Enable		SNVT_switch		Off	Off	On
OA_Hum_Sel	Share OA Humidity from BMS (0=Probe 1=BMS)	R/W	23	nviOA_Hum_Sel		SNVT_switch		Off	Off	On
OA_Temp_Sel	Share OA Temp from BMS (0=Probe 1=BMS)	R/W	24	nviOA_Temp_Sel		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

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_Call_Fan	External Fan Call Input (G)	R		nvoDiStat1	1	SNVT_state			Off	On
Ext_Call_Heat	External Heat Call Input (W1)	R		nvoDiStat1	2	SNVT_state			Off	On
Ext_Call_Cool	External Cool Call Input (Y1)	R		nvoDiStat1	3	SNVT_state			Off	On
Ext_Call_Dh	External Dehum Call Input	R		nvoDiStat1	4	SNVT_state			Off	On

Digital Variables	Digital Inputs									
Name	Description	R/W	Index	Name NV	Bit#	TypeNV	Unit	Default	Min	Max
Ext_OCC	Occupied Mode Input	R		nvoDiStat2	2	SNVT_state			Off	On
Ext_Switch_1	External Damper Position Sw 1	R		nvoDiStat2	3	SNVT_state			Off	On
Ext_Switch_2	External Damper Position Sw 2	R		nvoDiStat2	4	SNVT_state			Off	On
Htr_1_Sts	Gas Heater 1 Status	R		nvoDiStat2	5	SNVT_state			Off	On
Htr_2_Sts	Gas Heater 2 Status	R		nvoDiStat2	6	SNVT_state			Off	On
Phase_Alarm	Phase Protection Alarm	R		nvoDiStat2	7	SNVT_state			Off	On
Safety_Sts	Safety Input Status	R		nvoDiStat2	9	SNVT_state			Normal	Alarm
SF_Sts	Supply Fan Status	R		nvoDiStat2	10	SNVT_state			Off	On
Filter_Sts	Main or ERV Dirty Filter Status	R		nvoDiStat2	11	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

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