LENNOX® CORE CONTROL SYSTEM FOR MODEL L INFORMATION GUIDE

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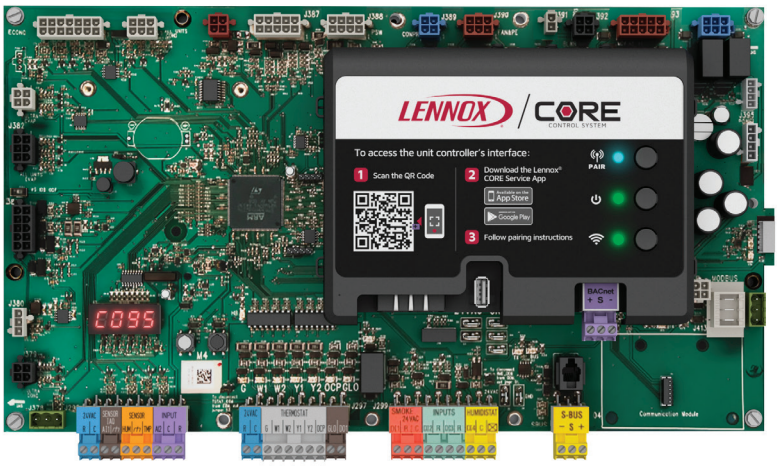


WARNING

Improper installation, adjustment, alteration, service or maintenance can cause property damage, personal injury or loss of life.

Installation and service must be performed by a licensed professional HVAC installer (or equivalent) or service agency

Table of Contents

1. CORE Unit Controller Overview

For all available CORE Control System documentation, go to the Lennox Commercial website.

www.lennoxcommercial.com

The Lennox Core Unit Controller is a multi-processor-based controller. Standard with all Model L™ rooftop units, integrates key technologies that lower installation costs, drive system efficiency, and protect your investments. The CORE Unit Controller is a microprocessor-based controller that provides flexible control of all unit functions.

Lennox® CORE Service App Connectivity

- Setup menu insures proper installation and simplified setup of the rooftop unit
- Detailed data readout updates sensor values in real time and allows trending
- Unit self-test verifies individual critical component and system performance
- Economizer test function ensures economizer is operating correctly

1.1. Lennox® CORE Service App - Android or IOS Device Minimum System Requirements

- Android hardware requires 2GB RAM and 2GHz Core processor. Tablets are supported.
- The service application is available for both IOS 11.0 or higher (App Store) and Android 9.0 or higher (Google Play).
- Scan the applicable QR code below to download the CORE Service App to your mobile device.

ANDROID APP ON Google play	Download on the App Store

1.2. Additional Features

- Built-In 7-segment display (four character positions) the unit status and active alarms for easy troubleshooting
- Buttons for test and clearing delays
- SmartWire™ System with keyed and removable screw terminals ensure correct field wiring
- Built-in BACnet IP and MS/TP allow open integration to building management systems
- Two-port Ethernet Switch enables daisy chaining for BACnet IP and automatic firmware updates

NOTE: *Unit Internet Connection required for firmware update only and not for BACnet IP.*

- Profile setup copies key settings between units with the same configuration to reduce setup time
- USB port allows a technician to download and transfer unit information to help verify service was performed
- USB software updates on the Lennox® CORE Unit Controller enhance functionality without the need to change components

1.3. Configurable Sequences of Operation

- Single-Zone VAV (Discharge Control) Cooling (With room sensor or 24V DDC)
- Three Cooling Stages (With compatible thermostat or DDC / additional relay)
- Four Heating Stages using a room sensor (up to two with thermostat / DDC Controls)
- Four stages in VAV/Discharge Air Control with thermostat input to W1
- Multi-Zone VAV (Discharge Control) Heating and Cooling
- Economizer Control Options (See Economizer / Exhaust Air / Outdoor Air sections)
- Exhaust Fan Control Modes for fresh air damper position
- Configurable morning warm-up and morning cool-down
- Night Setback Mode
- Fresh Air Tempering for improved space temperature control during ventilation'
- Demand Control Ventilation
- Low Ambient Controls for operation down to 0°F
- Humiditrol®+ Operation (Variable Capacity Hot-Gas Reheat)
- Enhanced Dehumidification (Latent Demand Control without reheat)

1.4. Component Protection / Unit Safeguards

- Compressor Time-Off Delay
- Adjustable Blower On/Off Delay
- Return Air Temperature Limit Control
- Safety Switch Input allows Controller to respond to a external safety switch trip
- Service Relay Output
- Thermostat Bounce Delay
- Smoke Alarm Mode has four choices (unit off, positive pressure, negative pressure, purge)
- "Strike Three" Protection
- Gas Valve Time Delay Between First and Second Stage
- Minimum Compressor Run Time

1.5. Control Methods / Interfaces

- DDC and 24V Thermostat
- BACnet (MS/TP) and IP
- LONTalk (Factory & Field Option)
- Lennox S-BUS
- Compatibility with Lennox Wireless Zone Sensors
- Zone Temperature Sensor input
- Dehumidistat & Humidity Sensor inputs
- Indoor Air Quality Inputs (2)
- One IAQ input is report only.
- Built-in Control Parameter Defaults
- Permanent Diagnostic Code Storage
- Field Adjustable Control Parameters (Over 200 settings)
- Dirty Filter Switch Input
- LED Indicators

NOTE: *CORE™ Control System features vary with the type of rooftop unit in which the control is installed.*

1.6. Cloud Firmware Updates

- Internet connection is required
- On-demand or automatic
- CORE Unit Controller connects to cloud via IP (Ethernet)
- Can check on demand or nightly
  - > Configurable via app
  - > Default: On demand
- Free updates
- Updates are also available via USB

2. Lennox CORE Unit Controller - Connections, Inputs / Outputs, Jumpers, and LEDs Locations

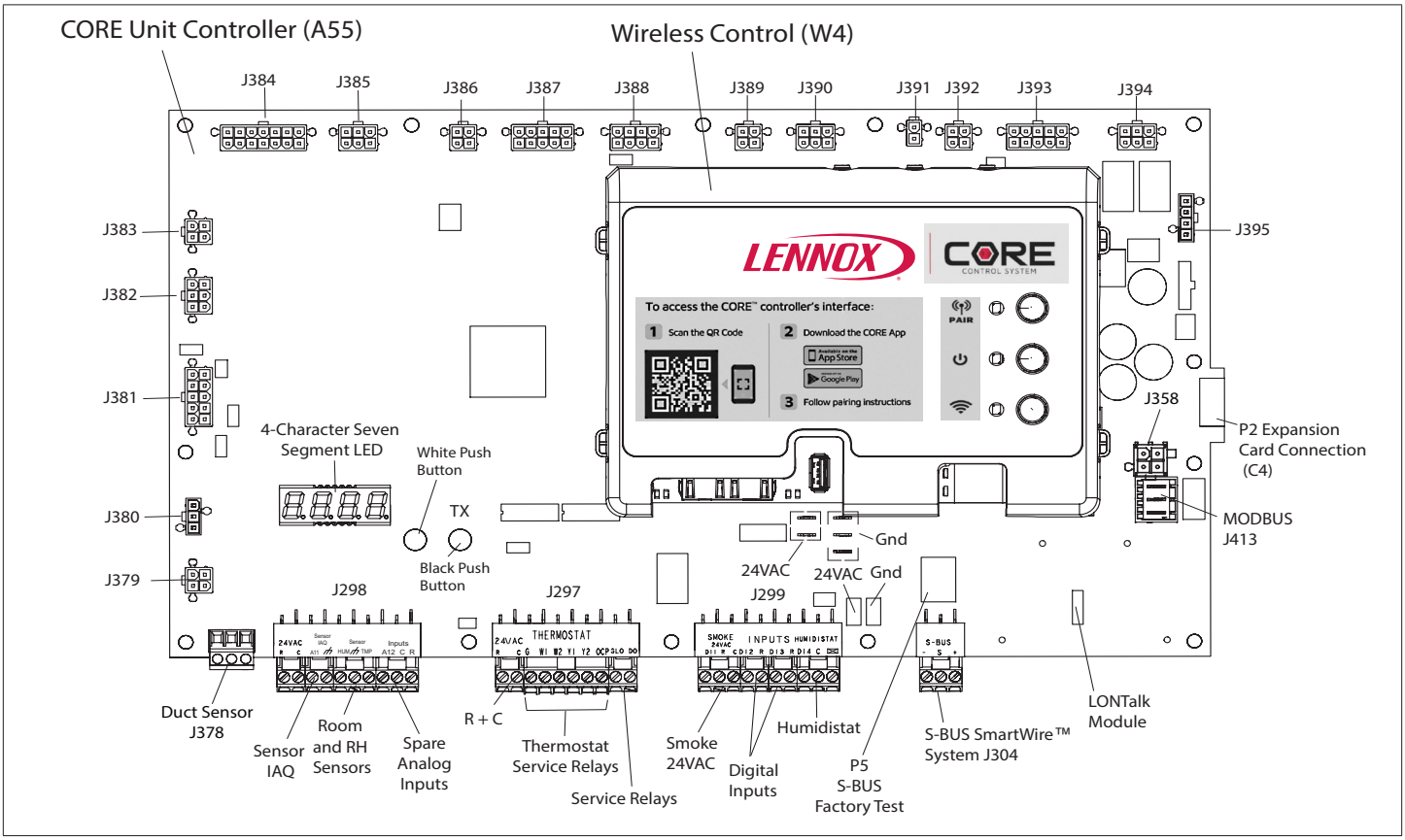


Figure 1. Lennox CORE Unit Controller Interfaces and LEDs Locations

2.1. Thermostat Common Isolation - TSTAT_COM Jumper

Thermostat (TSTAT) sensor commons are located on connector P298 and may be isolated if they are powered remotely. Remove jumper.

This jumper is located to the left of P297 connector. This jumper would be removed only in unique situations where the device supplying the thermostat signals to the CORE Unit Controller has its own power source and does not share a common reference voltage with the CORE unit controller. Otherwise the jumper would remain installed across both pins, as shipped from the factory.

2.2. Humidistat Common Isolation -: HMD_ COM Jumper

The humidity (HUM) sensor commons are located on connector P298 and may be isolated if they are powered remotely. Remove jumper. This jumper is located to the right of P299 connector. This jumper would be removed only in unique situations where the device supplying the thermostat/ humidistat signals to the CORE Unit Controller has its own power source and does not share a common reference voltage with the CORE Unit Controller. Otherwise the jumper would remain installed across both pins, as shipped from the factory.

2.3. W4 Control - USB Flash Drive Interface Usage

The W4 Control uses a USB type A interface. This USB port is used for verifying service, downloading reports, transferring unit profiles and performing firmware updates.

On-site data collection requires use of either a USB flash drive or download and shared from the CORE Service App. Data written to the drive includes date, time, serial number, catalog number, basic data, error code buffer, and unit configuration.

2.4. S-BUS (Smartwire™) (J304)

This is the L-connection interface. This is a R485 network connection with other devices (NCP, comfort sensors, other RTU, etc.).

2.5. MODBUS Connection (J413)

This is a TIA-485 serial line over MODBUS (messaging structure) communication. This connection is used for multiple components.

2.6. CORE Unit Controller LED Indicators

NOTE: *See "2.8. Local Interface - Four Character Seven Segment LED - Status Codes" on page 7 for further information.*

Table 1. LED Operation Indicators

LED	Status	Indication	Meaning
Heartbeat (HB) (D33)	Green	Slow Flash	Normal Operation
	Green	Fast Flash	Boot loader / firmware update mode
	No light	Steady Off	No voltage to M3 board or defective board
	Green	Steady On	Unit in configuration / test mode (not in normal mode)
S-BUS / PC Connection (D70 and D71)	BUS (green)	Flickering ON	Network traffic present
	TX (yellow)	Flickering ON	Unit controller is transmitting
Thermostat Input	Yellow	Indicates a thermostat demand	G - Blower on
			W1 - First-Stage Heating
			W2 - Second -Stage Heating
			Y1 - First-Stage Cooling
			Y2 - Second-Stage Cooling
			OCP - Occupied
			GLO - Global input
MODBUS	Two LEDs that indicate transmit (TX) and receive (RX) activity.		
Slow Flash = 1 second on; 1 second off. Fast Flash = ½ second on; ½ second off. A "flickering" LED flashes significantly faster than a "fast flash".			
NOTE: *LEDs are energized by 24VAC thermostat inputs.*			

2.7. Local Interface - Push Buttons and Heart Beat

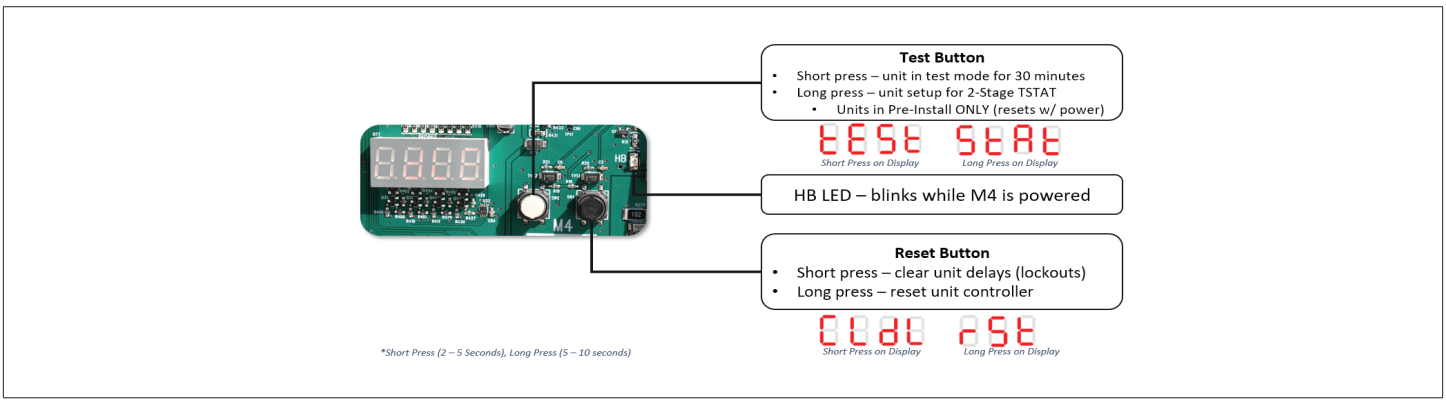


Figure 2. Push Buttons and Heart Beat

2.8. Local Interface - Four Character Seven Segment LED - Status Codes

Table 2. Status Codes

Status Code	Definition
PnSt	Pre-Install
A173	Smoke
LoUt	Controller Lockout
Eror	Off On Alarm
d300	Delay up to 5 minutes
d020	Delay up to 20 seconds
dhUM	Dehumidification
ShEd	Compressor Load Shedding
Prht	Morning Warmup
Strt	Start up
FAh	Fresh Air Heating
h050	Heating (50%)
PrCL	Pre-Cool
CEoP	Cool + Max Open Economizer
CE10	Cool + Modulate Economizer (10%)
FrCL	Free Cooling
FAC	Fresh Air Cooling
C078	Cooling (78%)
b71S	Blower On - (71%) OAS
b23	Blower On (23%)
ioAS	No Demand - OAS
idLE	No Demand

3. W4 Wireless Controller - Connections, Buttons and LEDs

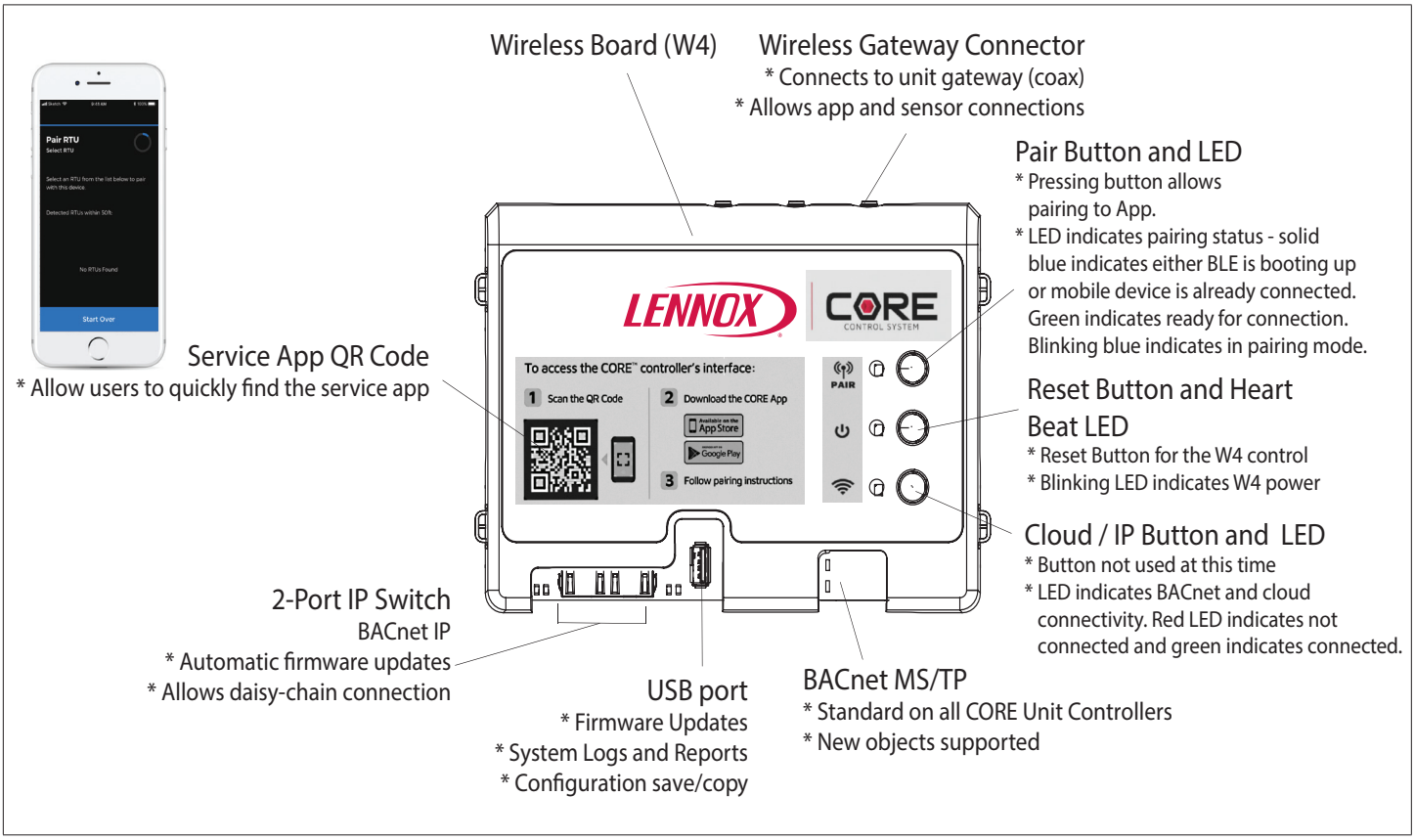


Figure 3. W4 Controller Interfaces

4. Network Types

The following are the types of communication network types supported.

Table 3. Network Types

Screen Label	Network Type
LON	LonTalk
BACNET	BACnet MS/TP and IP
LCONN	L-Connection
RTU	Rooftop Unit stand-alone mode status indicator

5. CORE Service App - Unit Operation

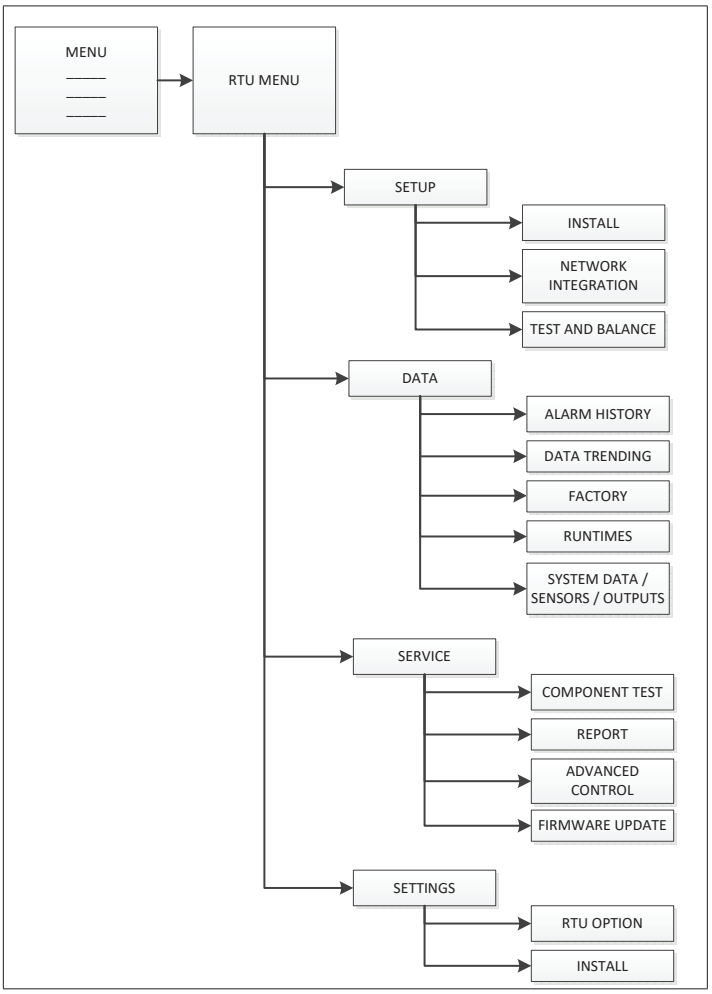
This section describes the display and control buttons, how to configure the unit, and how to read stored configuration data, status, and alarms.

The CORE Unit Controller is an input and output junction point. If in the thermostat mode, thermostat inputs at P297 result in an output to unit components. If the heartbeat LED is not flashing, see ”Table 1. LED Operation Indicators” on page 6 for heartbeat operation. If the display shows an alarm. If the thermostat input indicating lights are not responding appropriately, check the thermostat or a DDC control acting as thermostat inputs into P297.

Basic cooling and heating functions may be energized to test major unit components by using the CORE Unit Controller testing function or by using jumper wires on the Field Wiring Termination plug P297.

6. CORE Service App Menu Selection Overview

Refer to “11. CORE Service App RTU Menu” on page 10 for details for Setup, Data, Service and Settings options.



7. Pairing CORE Service App to CORE Unit Controller

Use this QR code to download the CORE service app. Follow the prompts to pair the app with the unit control system and configure the unit. The QR code is also available in the rooftop unit control area.

The mobile application is compatible with the CORE Unit Controller and can discover the CORE Unit Controller if within 50 feet of the mobile device being used.

a. The mobile application will list the units by signal strength and the unit friendly name will be displayed.

b. Select the desire unit from the discovery list. The four digit code desired on the unit will show the code listed in the discovery list. Once the unit has been selected, connection should be established to your device within 10 seconds.

c. Information displayed once pairing is completed will be RTU name, model number, serial number and firmware version.

8. System Overview - Room Sensor Mode

a. The system overview shall put emphasis on the zone temperature and RH.

- The zone temperature / rh indicates a “_ _” if out of range.
- The RH value will not appear if not configured.

b. The system overview in room sensor mode places emphasis on the current operating modes.

c. The system overview indicates all active operating modes with a priority on heating and cooling associated modes.

NOTE: *If dehumidification mode is active, this is displayed, and not cooling for example,*

d. The system overview lists the following parameters at the top of the screen:

- Return Temperature
- Discharge Temperature
- Setpoints (Heating and Cooling)
- Network Status
- The system overview shall also indicate:
- Occupancy
- RH setpoint (if applicable)
- Outdoor Air Temperature
- Damper Position (if equipped)
- Active Alerts

e. Additional Settings

- Pre-Install
- Test
- Smoke
- Off on Alarm
- Delay up to 5 minutes
- Delay up to 20 seconds
- Start up
- Low Ambient Lockout
- Morning Warm-Up
- Pre-Cool
- Free Cooling
- Cooling
- Heating
- Dehumidification
- Fresh Air Cooling
- Fresh Air Heating
- Cool + Max Open Economizer
- Cool + Modulate Economizer
- Compressor Load Shedding
- Blower On - OAS

- Blower On
- No Demand - OAS

9. Active Alarms

- The mobile app will display other alarm information such as time of occurrence, and troubleshooting information.
- The mobile application will indicate all alarm information per the active alarm requirements.
- The mobile application will indicate the number of occurrences of a past alarm in the past thirty (30) days.
- For alarm details, go to “15. Model L - CORE Service App - Alarms” on page 39.

10. CORE Service App General Menu + User Preference

- This screen allows the user to set the temperature units (ºF or ºC).
- Allows the user to set the screen mode, options are dark or light modes.

11. CORE Service App RTU Menu

The following options are available under this menu selection:

11.1. Setup

11.1.1. Install

This section includes the following:

- Date and time and the option to use the mobile device data and time setting.
- RTU Name
- Model Number (see “Figure 5. Configuration ID 1”) and serial number. Model , serial and catalog numbers are located on the RTU nameplate.
- RTU Information. Configuration ID 1 and 2 can be entered here. See figures “Figure 5. Configuration ID 1” on page 10 and “Figure 6. Configuration ID 2” on page 11 for further details.

This section addresses the requirement that specific configuration information must be completed using the SETUP / INSTALL feature if a new unit controller was being installed. Other requirements are the addition of accessories that were not factory-installed. Model number, configuration ID 1 and 2, catalog number, serial number and RTU description are all key items required to be completed for the system to operate correctly. Running the SETUP / INSTALL wizard allows the installer to verify that all fields have been completed as required.

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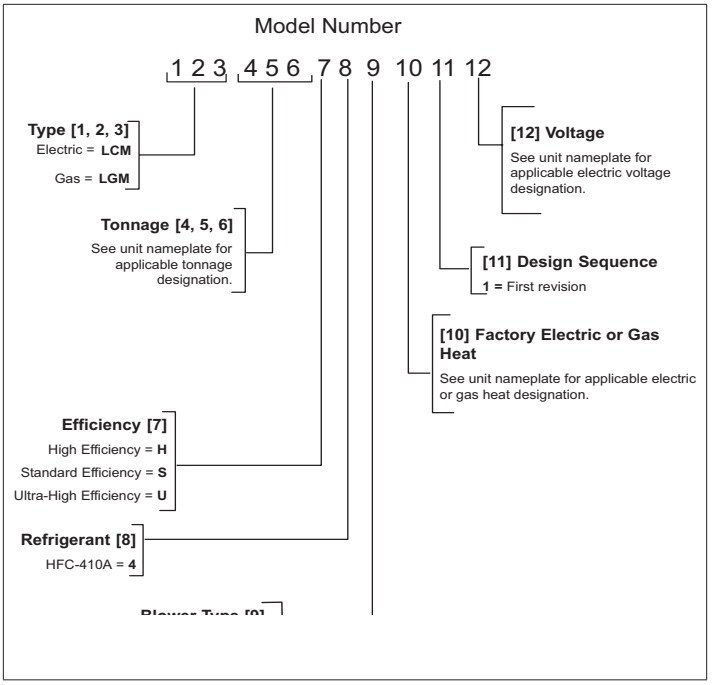


Figure 4. Model Number

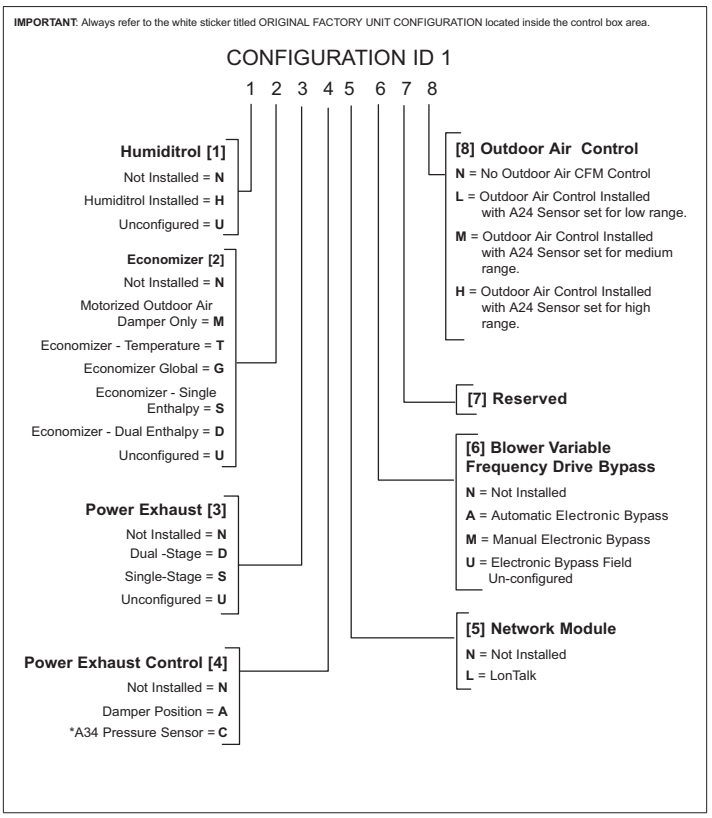


Figure 5. Configuration ID 1

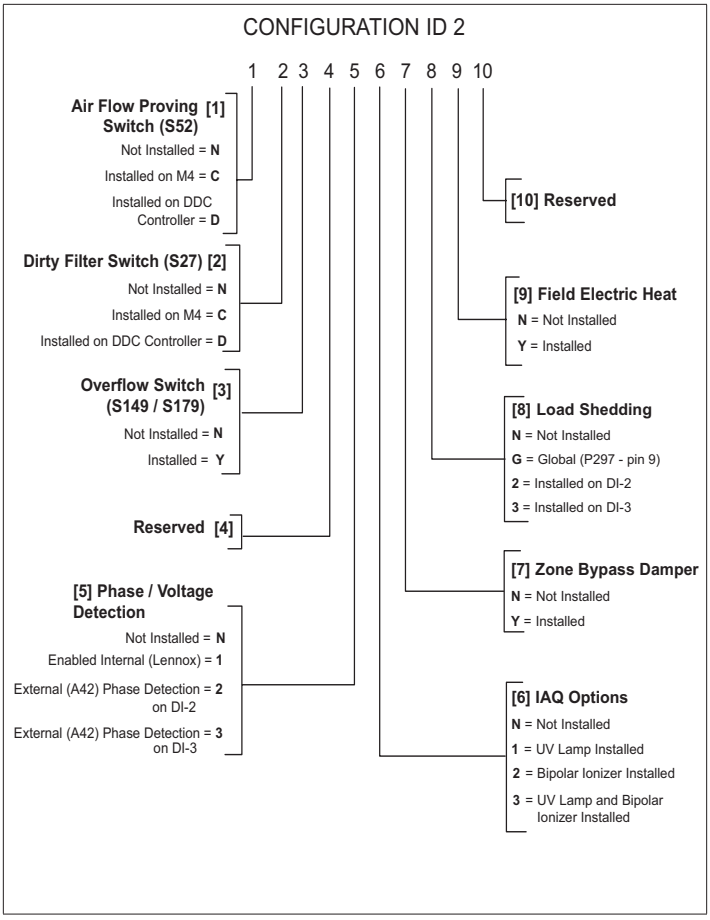


Figure 6. Configuration ID 2

11.1.2. Install Menu Navigation

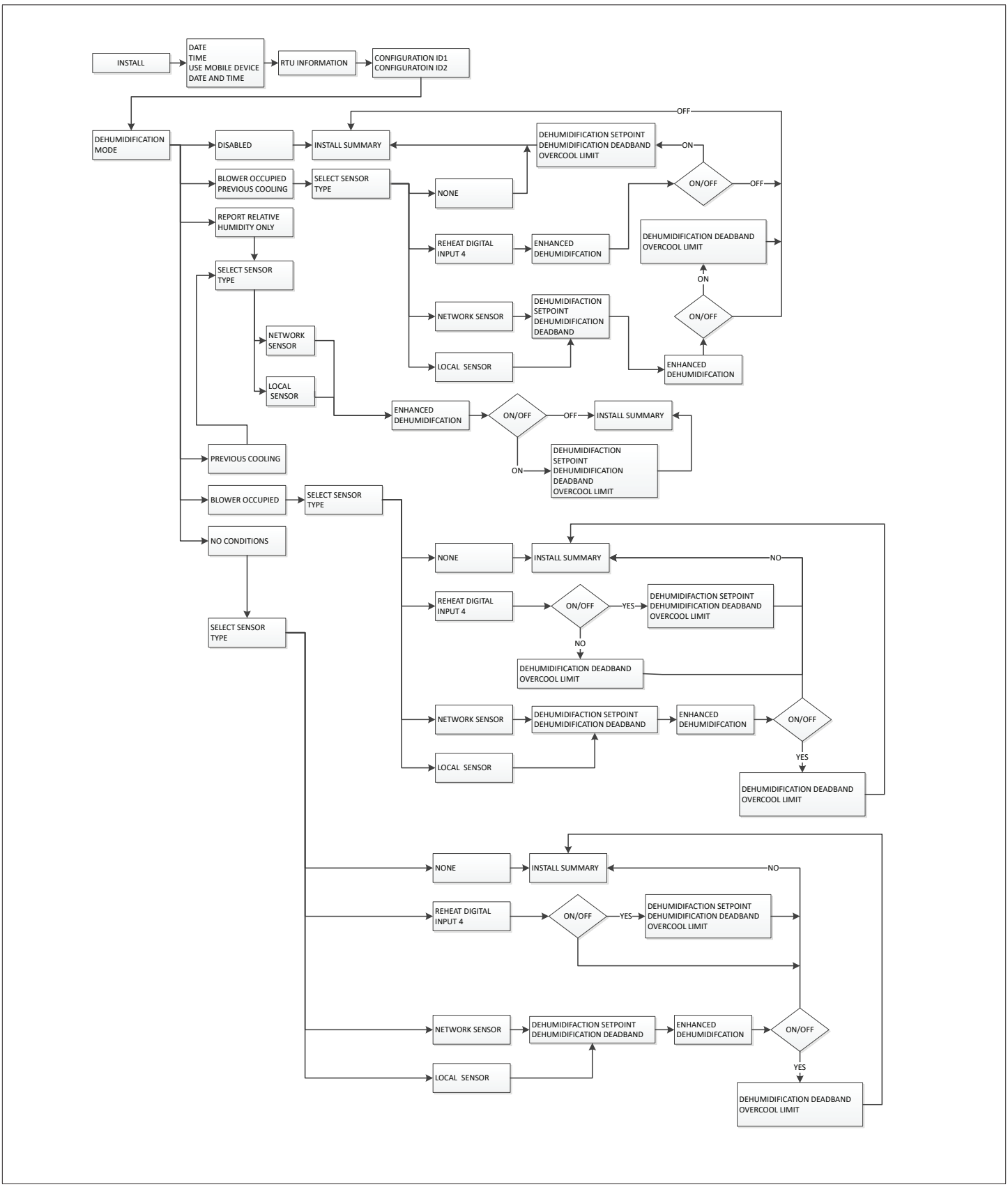


Figure 7. Install Menu Structure

11.1.3. Network Integration

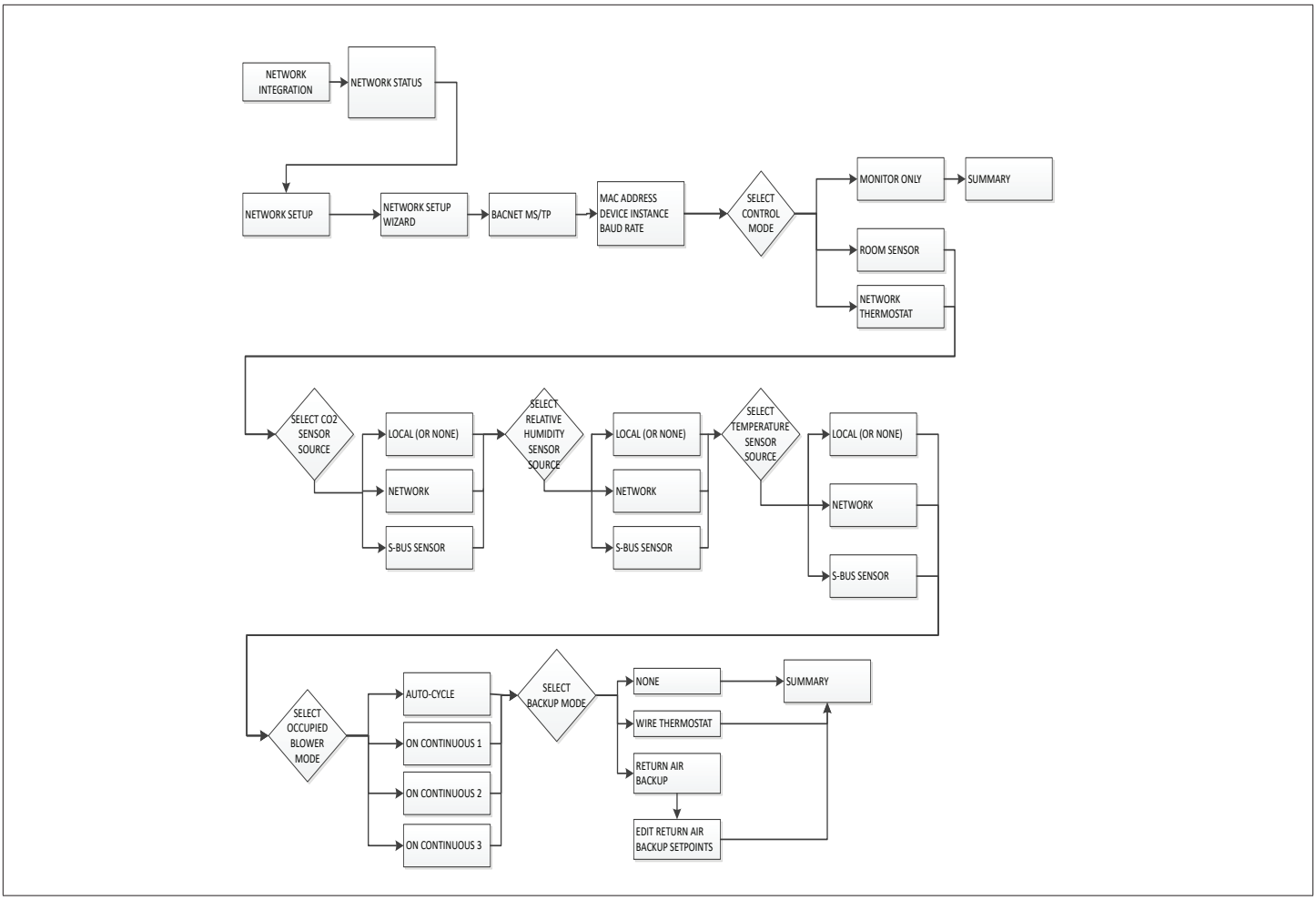


Figure 8. BACNet MS/TP Menu Structure

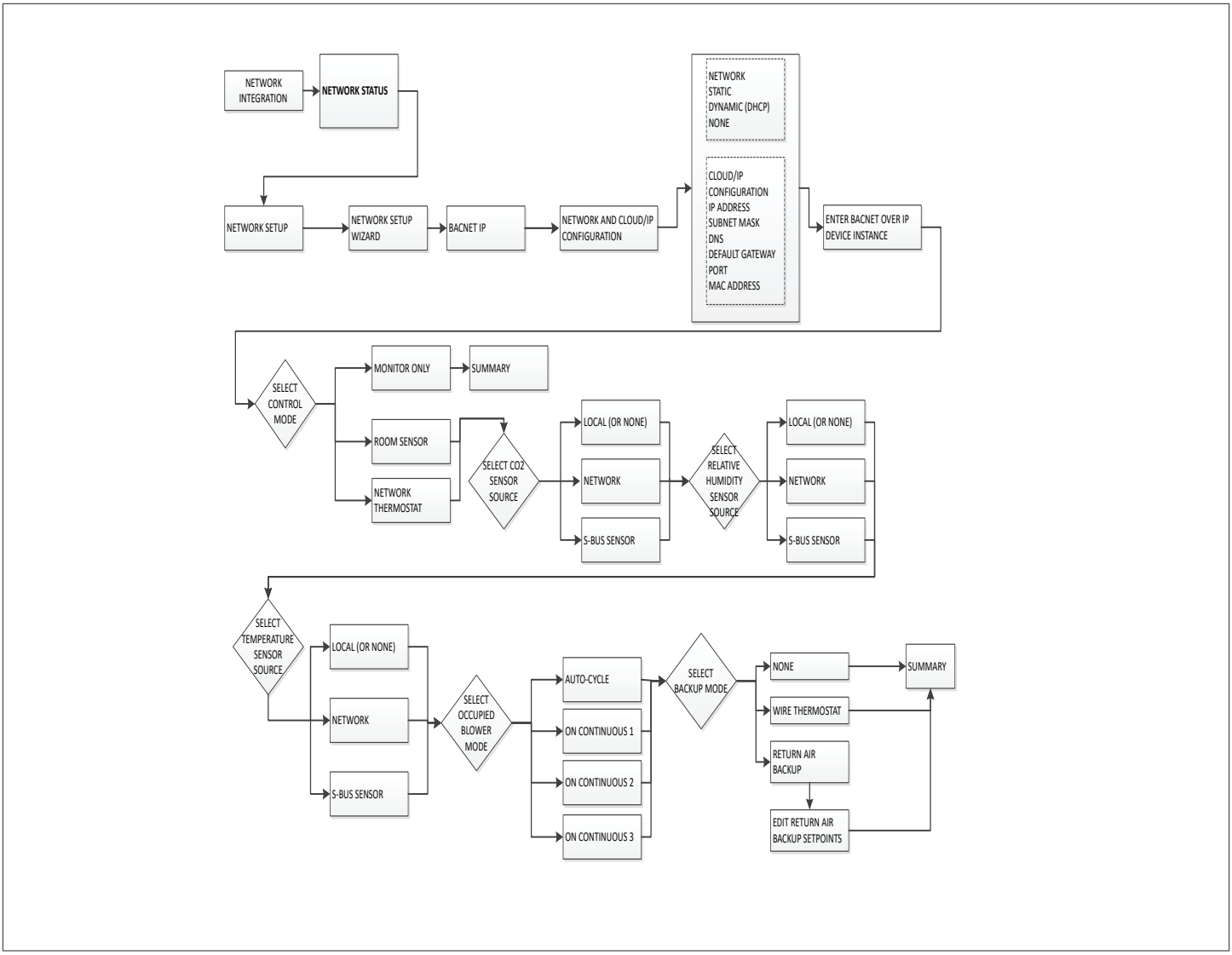


Figure 9. BACNet IP Menu Structure

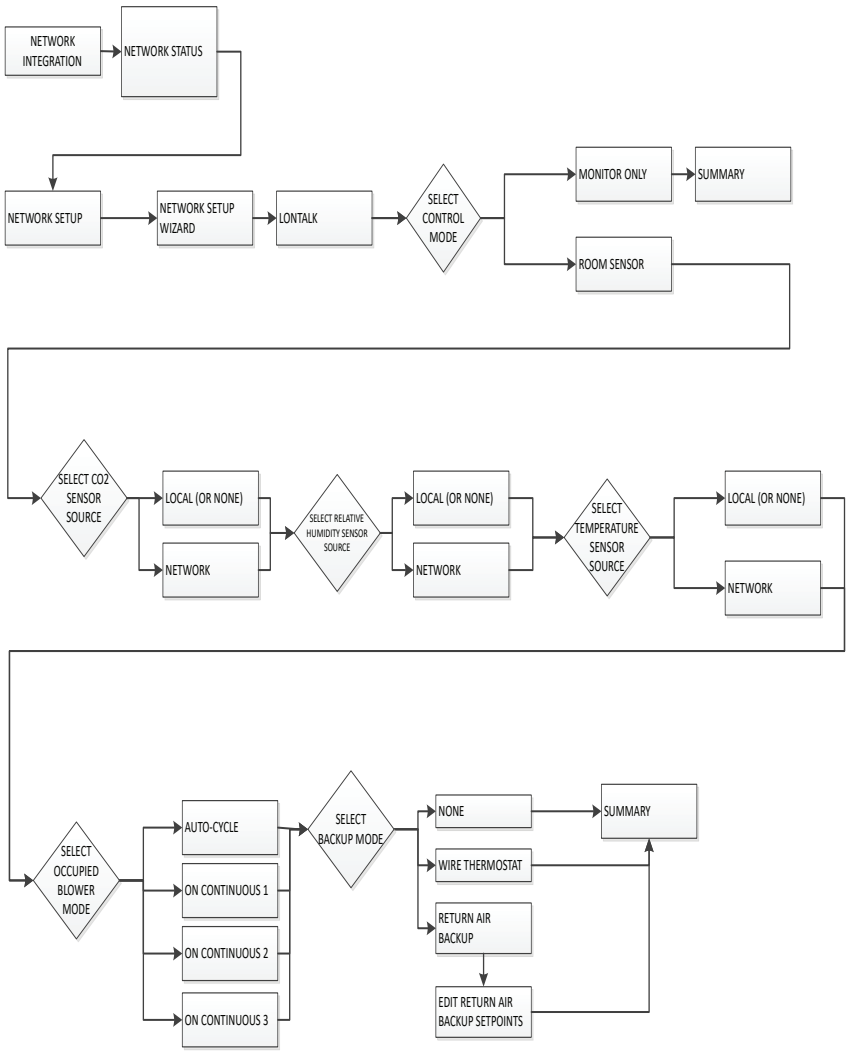


Figure 10. LonTalk Menu Structure

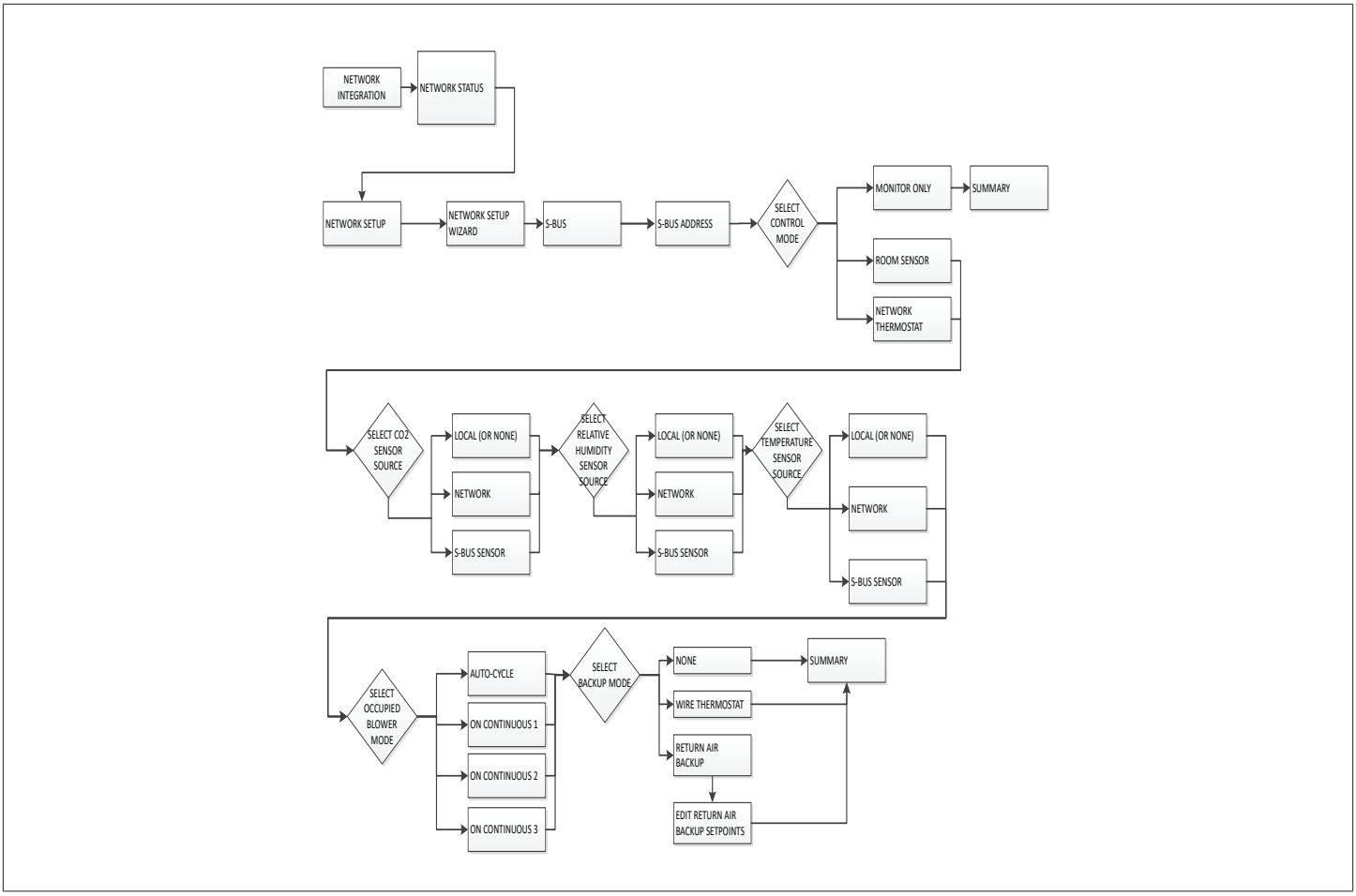


Figure 11. S-Bus Menu Structure

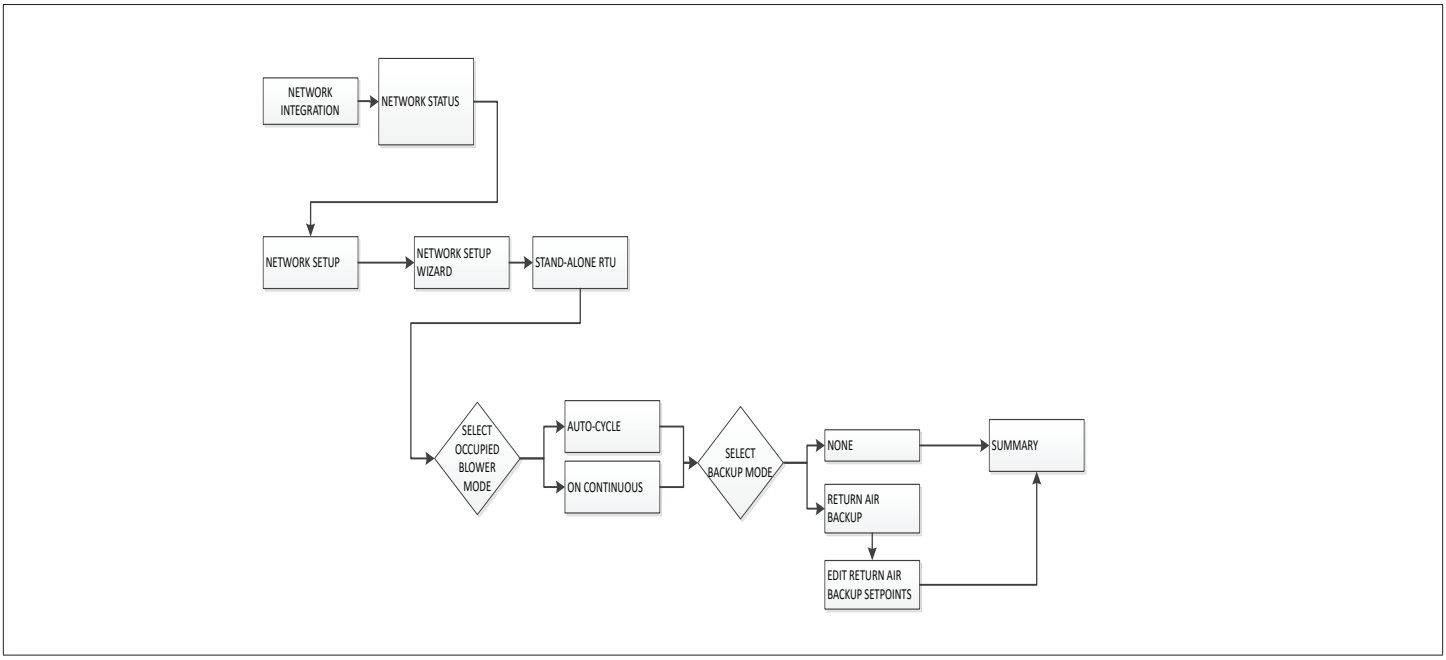


Figure 12. Stand-Alone RTU Menu Structure

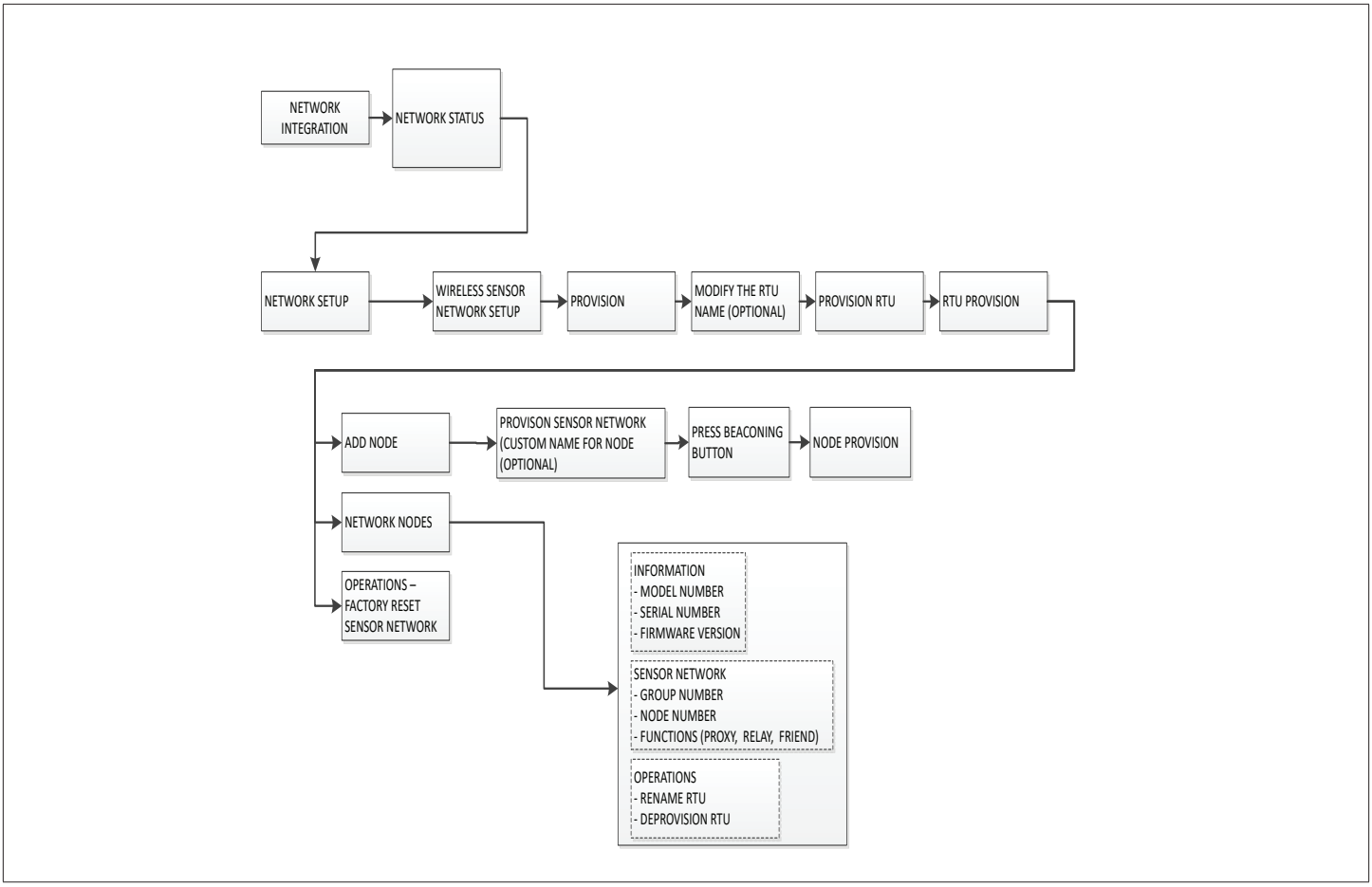


Figure 13. Wireless Sensor Network Setup Menu Structure

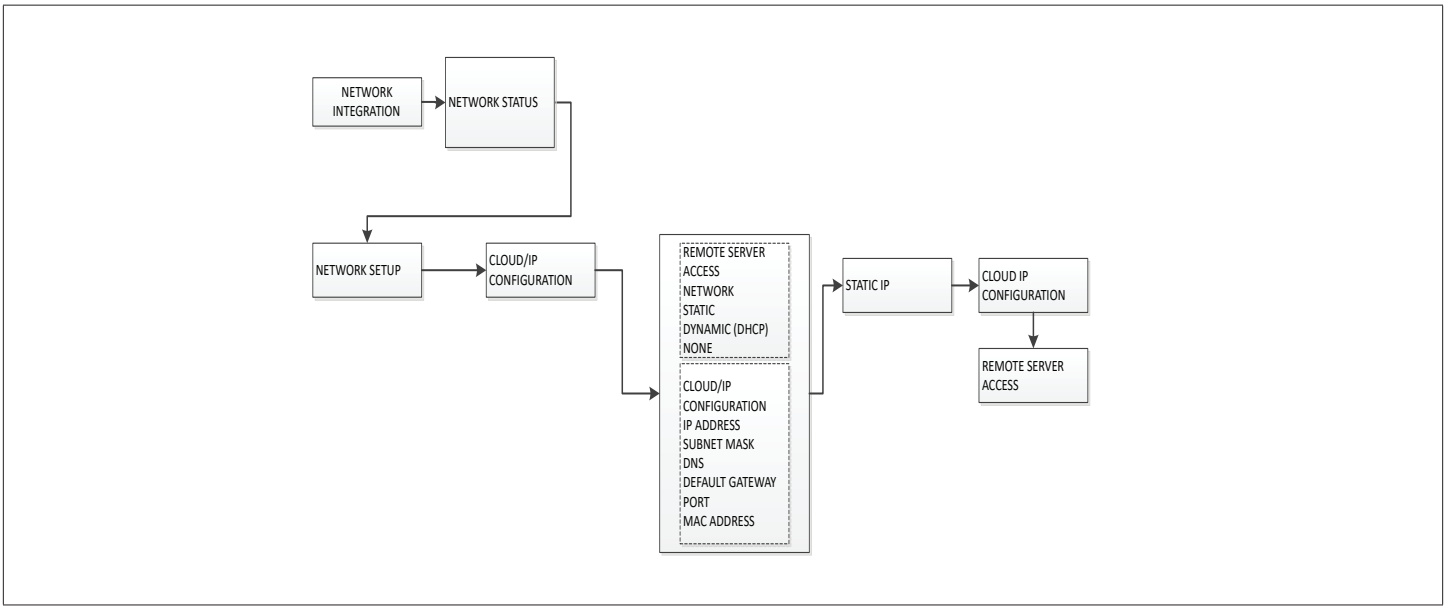


Figure 14. Cloud/IP Configuration Menu Structure

11.1.4. Test and Balance

- Blower: Includes Blower Calibration, MSAV Blower and VAV Calibration,
- Damper: Includes Economizer Options, Free Cooling, Damper Calibration (closed and open),

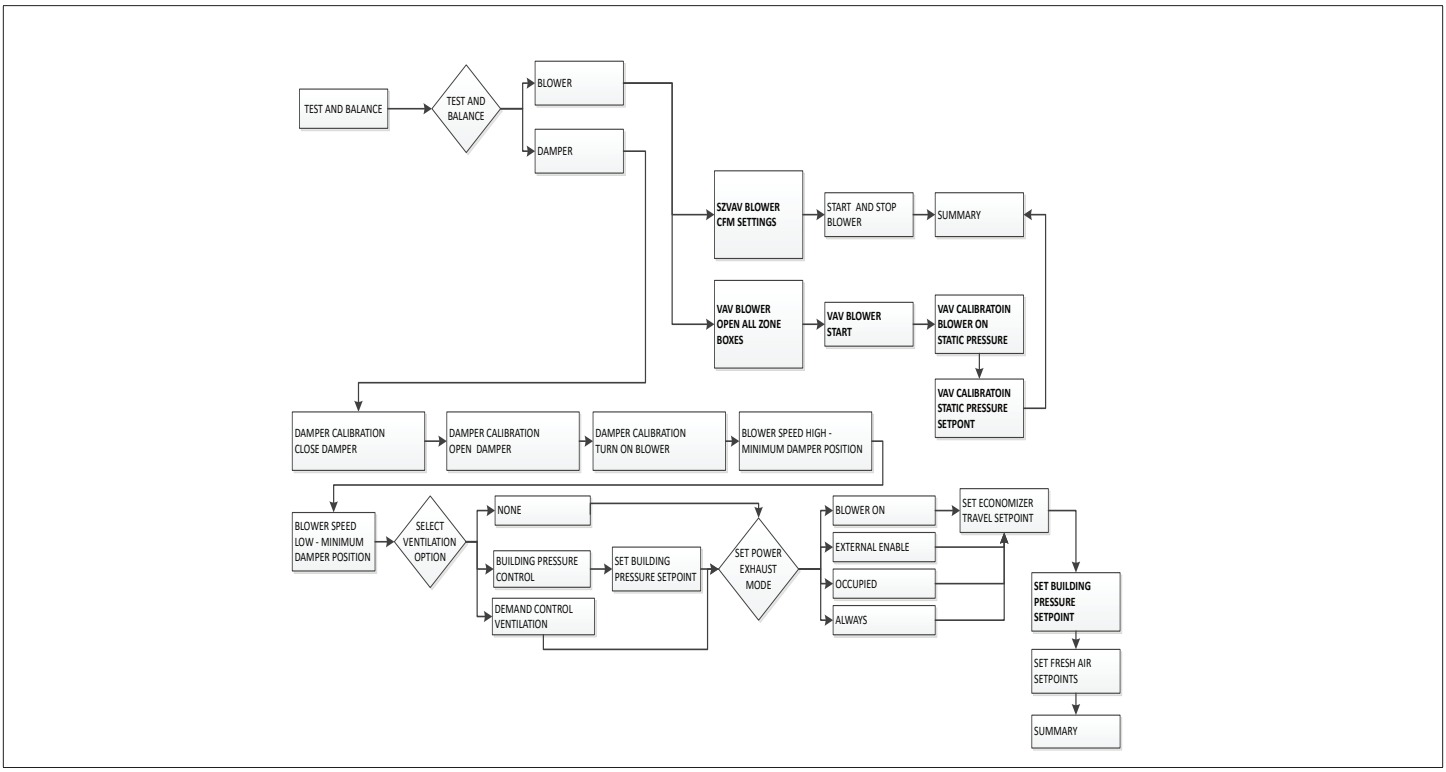


Figure 15. Motorized Outdoor Air Damper Only Menu Structure

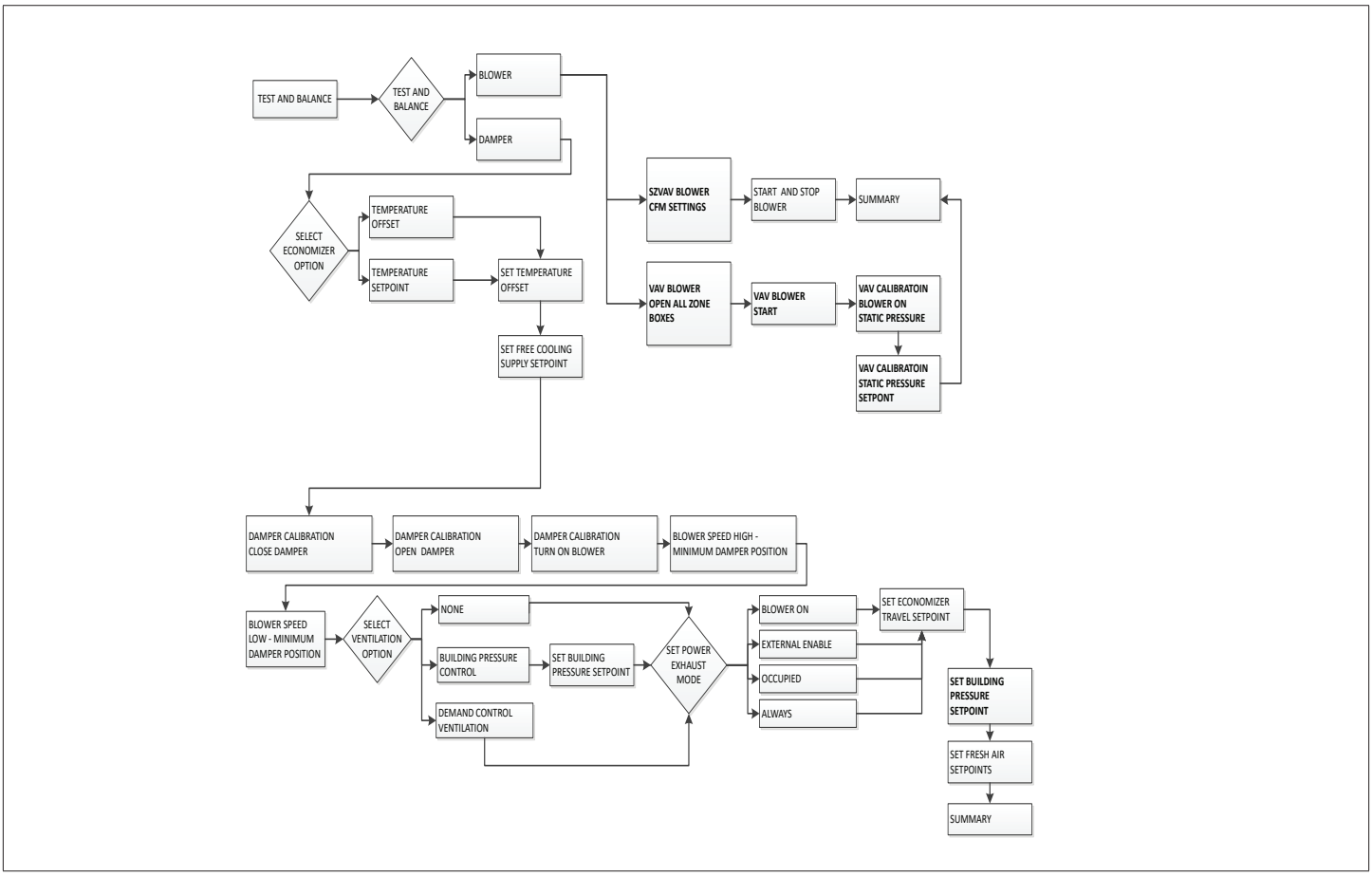


Figure 16. Economizer - Temperature Menu Structure

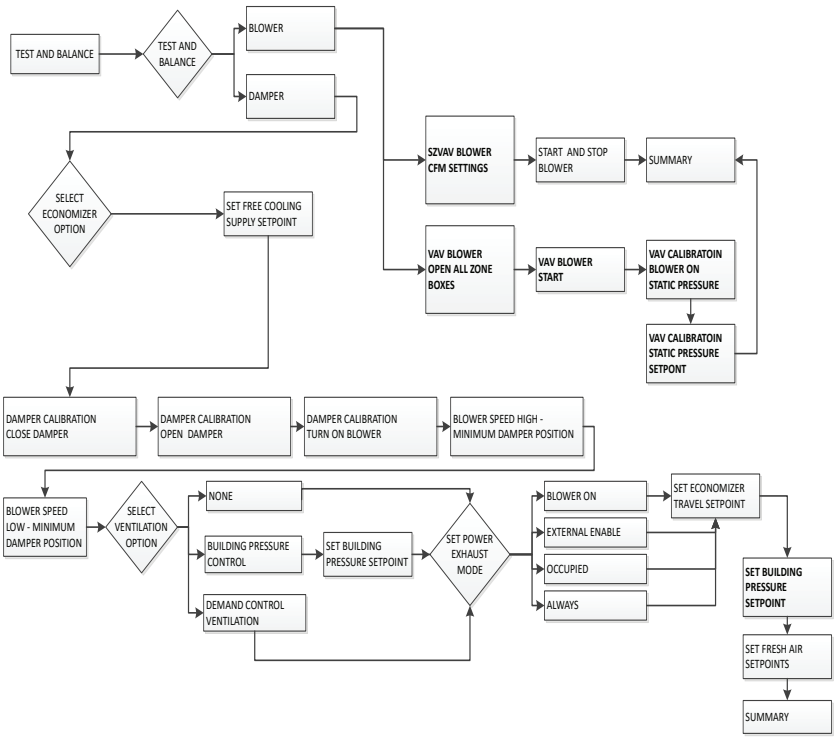


Figure 17. Economizer - Global Menu Structure

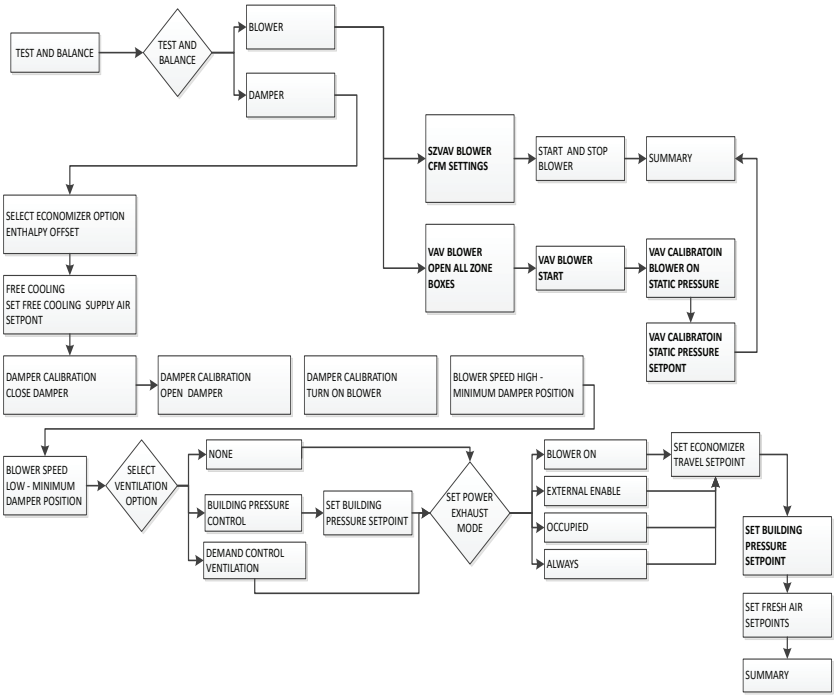


Figure 18. Economizer - Single or Dual Enthalpy Menu Structure

11.2. Data

11.2.1. Alarm History

The unitary controller will produce active and past alarm codes. As such, the mobile application will show all active alarm codes, and a limited history of formerly-active alarm codes, based upon the storage capacity of the unitary controller. The CORE Service application will:

- Display alarm information received from the unitary controller.
- Display action alerts. Alarms will be displayed in chronological order from most recent to last recent.
- Display other alarm information such as time of occurrence, and troubleshooting information.
- Indicate all alarm information per the active alarm requirements.
- Indicate the number of occurrences of an alarm in the past thirty (30) days.
- See “Table 11. CORE Control System Alarm and Event Codes” on page 39 for alarm details.

Figure 19. Alarm Menu Structure

11.2.2. Data Trending

‘Trended data within the CORE controller is stored internally for up to two weeks and available in a user friendly format at X interval for help in troubleshooting previous operation with granular historical data.’

The main purpose of this feature is for troubleshooting a unit. Having granular, time-sensitive information is critical for this purpose. This is why having at least 5 minute intervals is set.

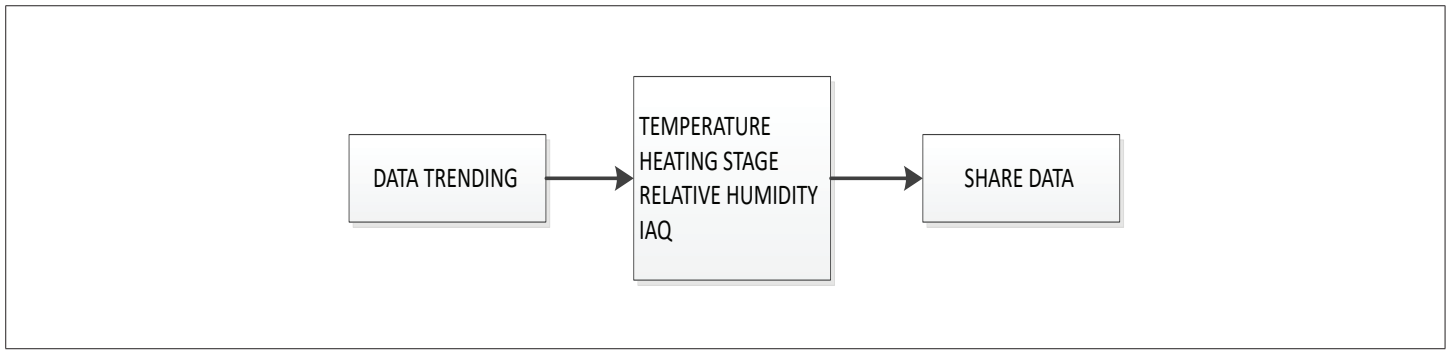


Figure 20. Data Trending Menu Structure

11.2.3. Factory

This section will display the software version, RTU description, catalog number, model number, serial number and configuration IDs 1 & 2.

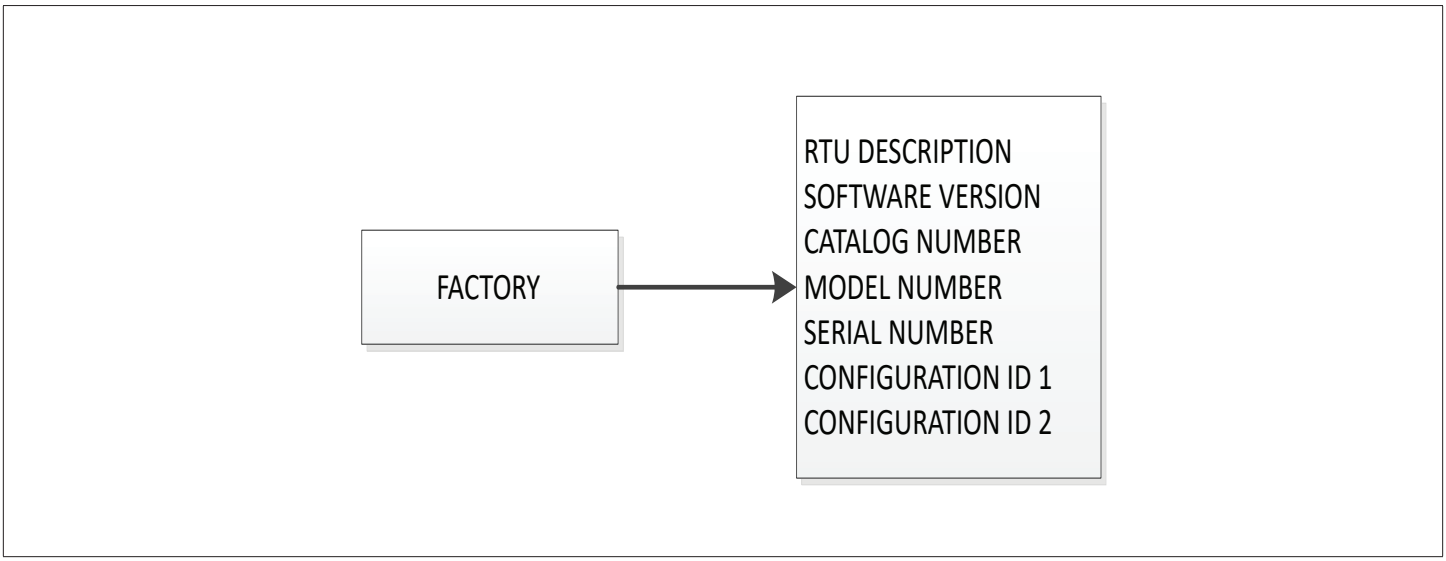


Figure 21. Factory Menu Structure

11.2.4. Runtimes

The mobile application allows the user to view the runtimes of the different system components.

- **Component Runtime** - The mobile application shall display hours of runtime for each component. The precision of the measurement shall be hours:minutes.
- **Runtime Cycles** - The mobile application shall display cycles of runtime by component.
- **Clearing of Runtime** - The mobile application shall support clearing of runtime on a component basis.

The available component runtimes are:

- Blower
- Compressor
- Condensing Fan
- Filter
- Heat State
- Power On
- Pre-Install
- Free Cooling Operation
- Power Exhaust Operation
- Dehumidification Operations

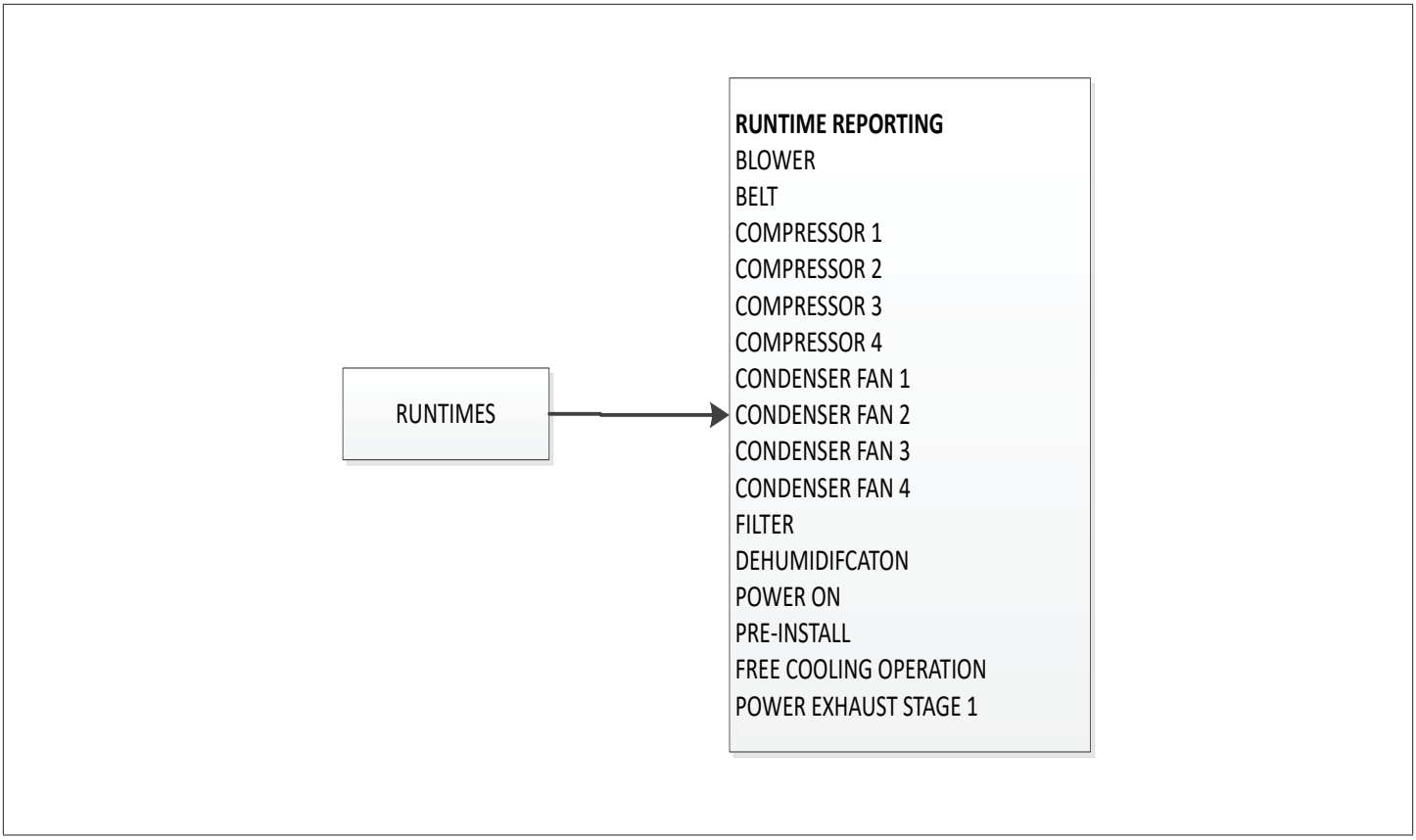


Figure 22. Runtimes Menu Structure

11.2.5. System Data / Sensor Data / Output

The follow inputs and outputs are as follows:

- Local Inputs. Examples are local thermostat inputs, sensors, digital inputs, setpoints and advanced.
- Network Inputs. Examples are BACnet MS/TP, BACnet IP, Lontalk and S-Bus
- Outputs. Examples are compressor, reheat coil, outdoor fans, heat status, damper, blower, power exhaust and other service relay output and Crankcase Heater 1 through 4.

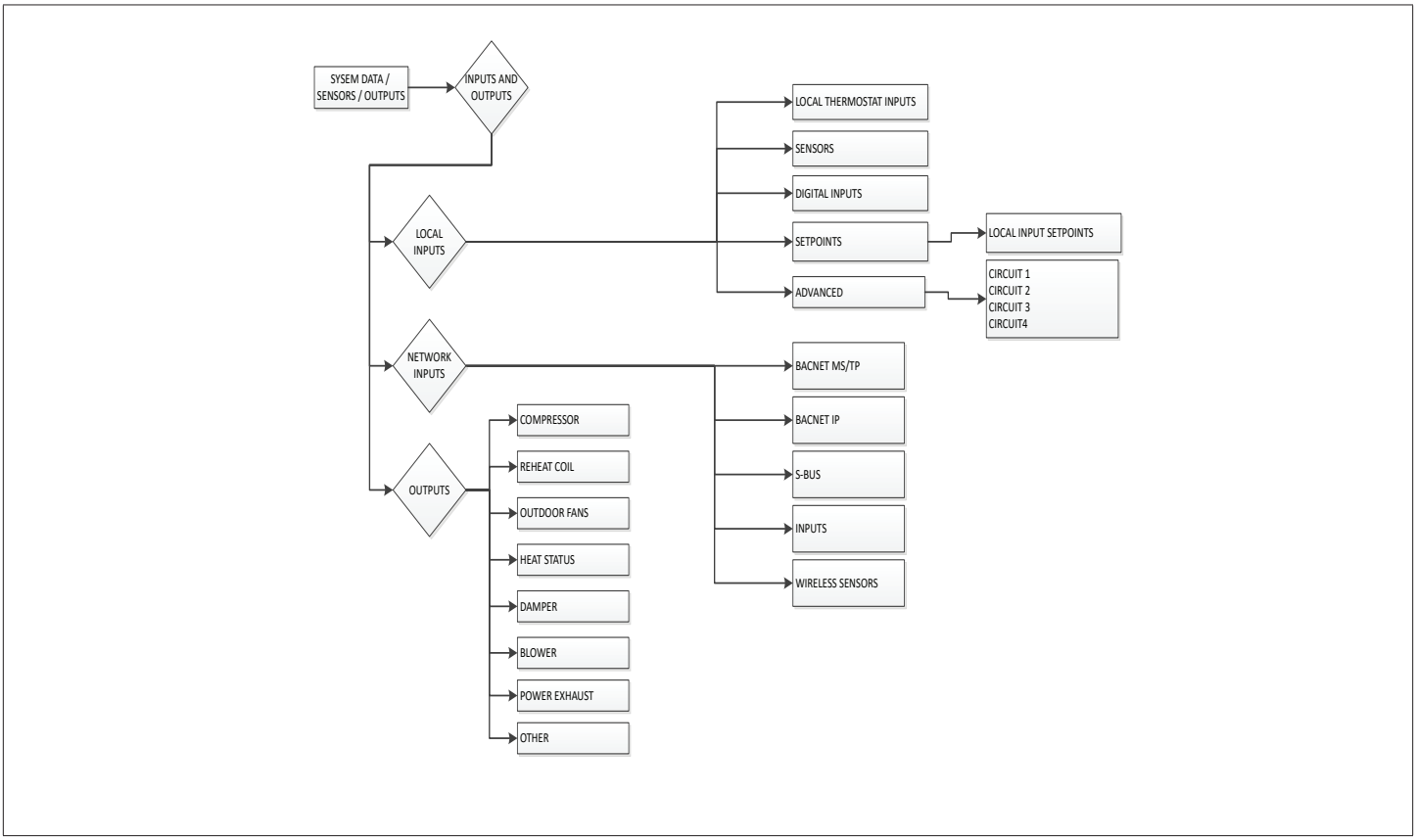


Figure 23. System Data / Sensors / Outputs Menu Structure

11.3. Service

11.3.1. Component Test

For cooling, the following tests can be run:

- Cooling Stages 1 through 4 - Tests are discharge and return air temperatures, compressor status and percent demand.
- Same tests listed above is available for all compressors present.

For heating, the following tests can be run:

- Heat Stages 1 through 4 - Tests are discharge and return air temperatures, and percent demand.

Other tests:

- Blower Speed
- Damper Position
- Power Exhaust
- Outdoor Fans 1 through 4

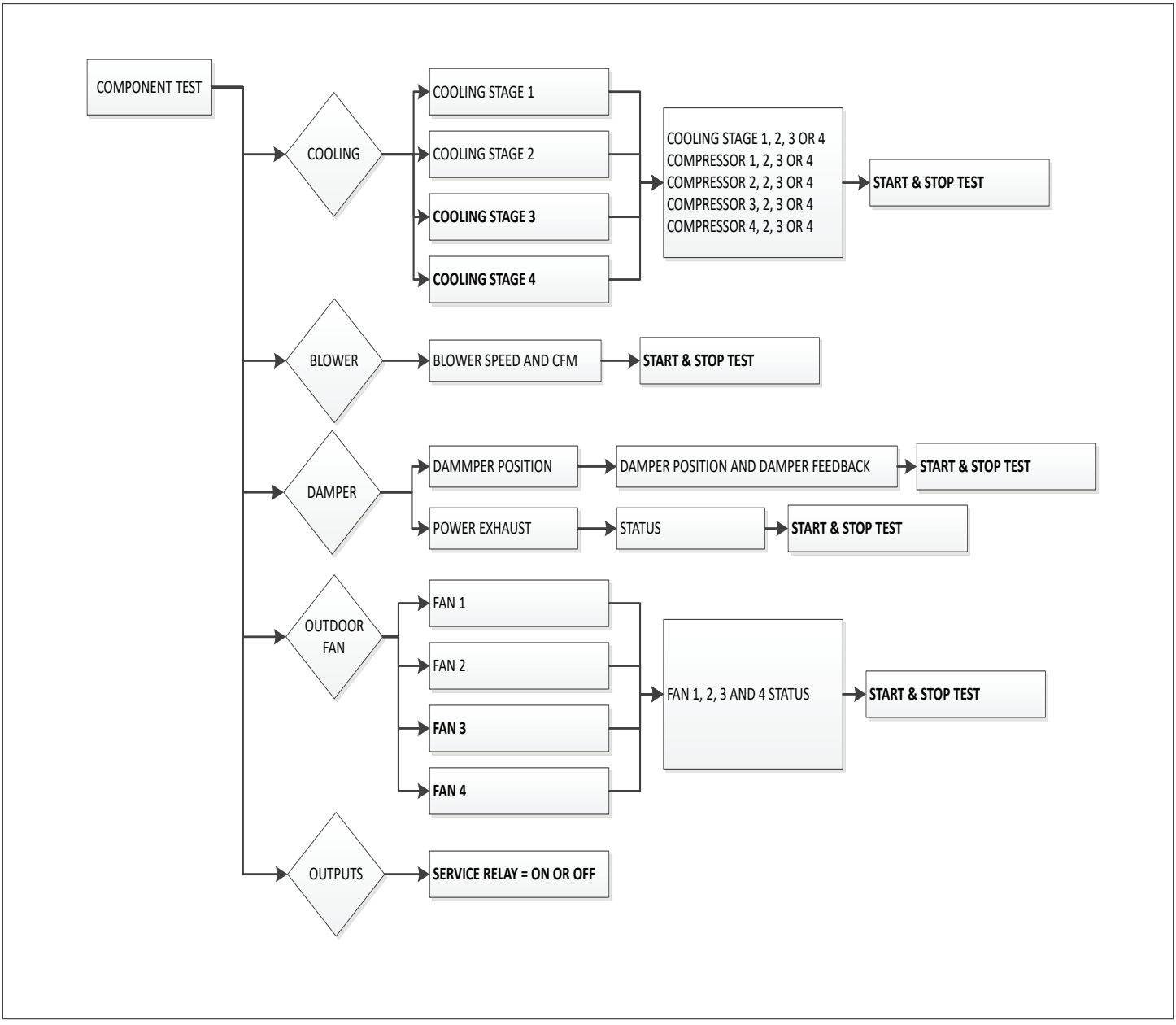


Figure 24. Component Test Menu Structure

11.3.2. Reports

This section provides service reports, system logs, system profile and user profile. All logs and reports and either be downloaded to the via the W4

- Service reports - These reports are saved to the root directory of the USB storage device. In addition you can save the report to the mobile device being used and either text or email.
- System Logs - These logs are saved to the root directory of the USB storage device. In addition you can save the report to the mobile device being used or either e-mailed or use the device's share feature. There is also an option for data analytic uploads as well.
- System and User Profile - The profile is saved to the root directory of the USB storage device. In addition you can save the report to the mobile device being used or e-mailed. There is also the option in this section to load a system profile from USB as well.

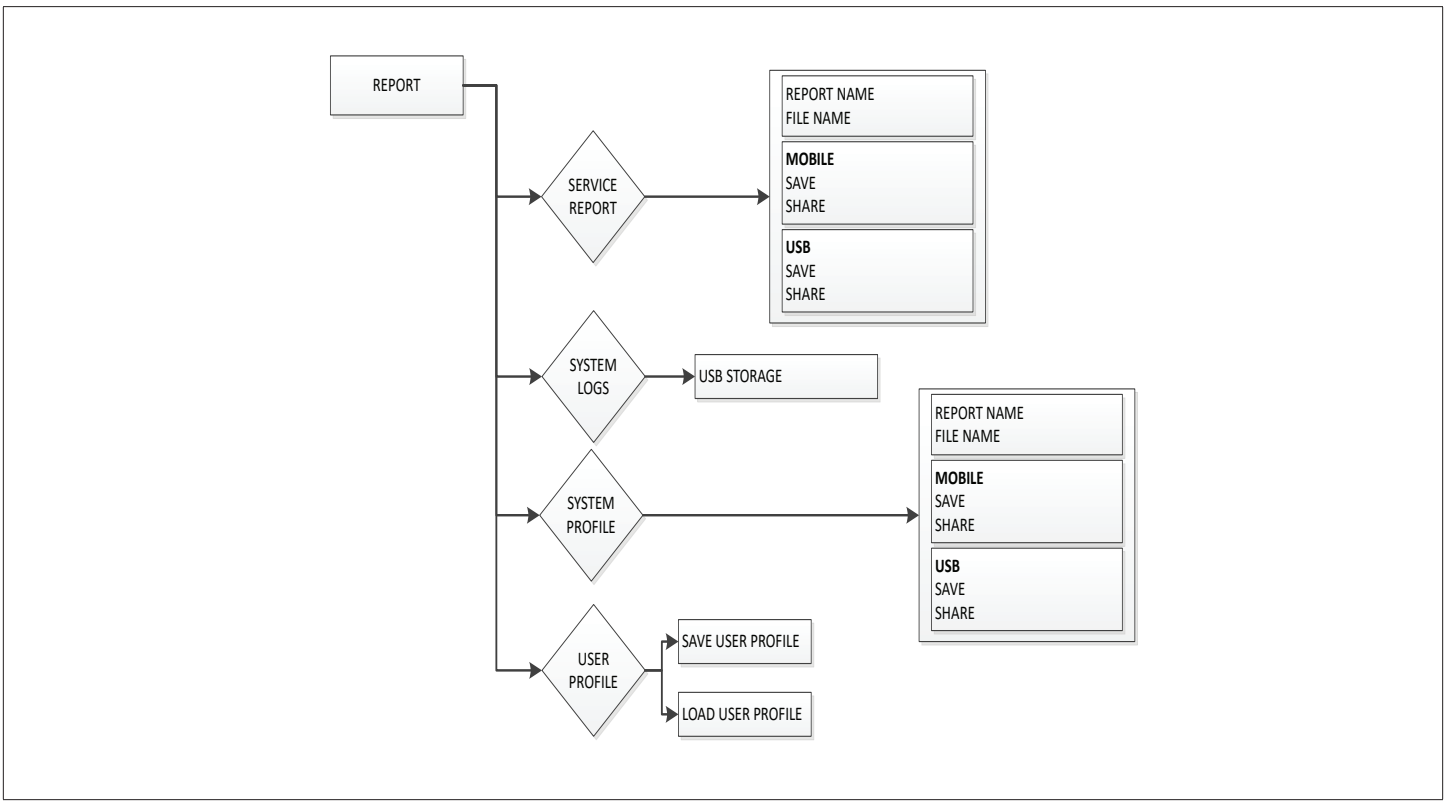


Figure 25. Report Menu Structure

11.3.3. Advanced Control

Features are:

- **Controller Reset** (Reboot) - : This button will ask for confirmation before performing a power reset on the M4 Controller.

NOTE: *The mobile app must be re-paired to the controller after reboot occurs.*

- **Clear Delays** - This functionality clears system delays and timers. This includes staging timers and safety delays.
- **Controller Lockout** - prevents the controller from operating the unit to meet any space comfort demands while it is Locked Out. In this locked out state, the unit can still be monitored on the network, but not operate the RTU.

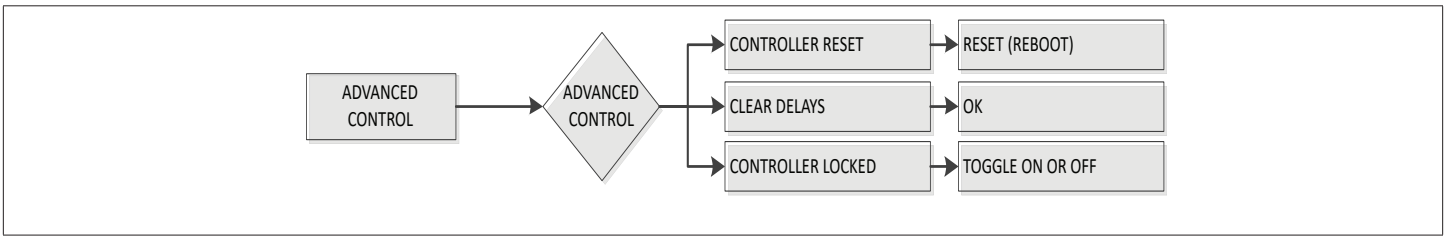


Figure 26. Advanced Control Menu Structure

11.3.4. Firmware Update

- The mobile application will update the firmware of the unitary controller.
- The mobile application will push any supported firmware image version to the unitary controller.
- Options are Automatic Cloud Update or upgrade from USB.

11.3.4.1 Updating Firmware

The mobile application shall pull the latest device supported firmware version from the cloud. The screen will list current firmware version, cloud firmware update set to on or off and upgrade from USB.

a. Search for Updates: The user has the ability to “search for updates” for new RTU firmware. If no updates are found, it will indicate so.

b. File List Available for Download: The user will be informed of the files found after query, and be allowed to start the firmware download.

c. Downloading Image Status: The user will be informed that the app is downloading the firmware from the cloud.

d. W4 USB Drive as Source of Controller Firmware Image: The mobile application will load a unitary controller firmware image from a W4 USB drive.

e. Version Selectable: The mobile application will allow the user to choose which version of the firmware in the USB drive shall be used.

f. Confirmation Dialog: The mobile application will present a confirmation dialog to the user before updating the CORE Unit Controller.

g. Upgrade Time: The mobile application should be able to upgrade the unitary controller firmware is approximately 60 minutes using USB. Cloud updates could be longer than 60 minutes.

h. Upgrade with HVAC Service: The mobile application will upgrade the unitary controller firmware without loss of HVAC service (excluding system reboot following upgrade).

i. Installing Firmware Upgrade Status: The mobile application shall update the firmware upgrade status every 5% of progress.

11.3.4.2 Updating Firmware from USB

The M4 Unit controller can be upgraded using a USB device.

Step 1. Recommended usb drive up to a maximum of 32GB capacity and formatted as FAT32.

Step 2. Firmware files must be placed in /firmware/m4/<firmware-file-name> to be detected by the unit controller. Insert in usb drive into w4 usb port.

Step 3. Go to **SERVICE** > **FIRMWARE UPDATE**. Choose update from usb. The m4 will search the usb device, and list all firmware versions found on the usb drive.

Step 4. Select the firmware version to be installed. The process will take approximately 10-15 minutes. The system will reboot after the firmware update process has completed.

Step 5. To verify that the process completed successfully, the firmware version can be checked from **DATA** > **FACTORY**.

11.3.4.3 Automatic Update

a. The user has the option to set automatic cloud updates to “On” for the RTU.

b. Firmware Install Completion Status: The user will be informed of the firmware update completion status from the RTU.

c. Options:

- Upgrade completed successfully
- FW hash value wrong
- Programming of flash on equipment failed
- Power cycle or other reset occurred during upgrade
- M4 comm failure during upgrade
- M4 comm failure on restart following upgrade

- M4 FW version did not change following upgrade
- M4 FW update aborted due to connection of technician device to bus

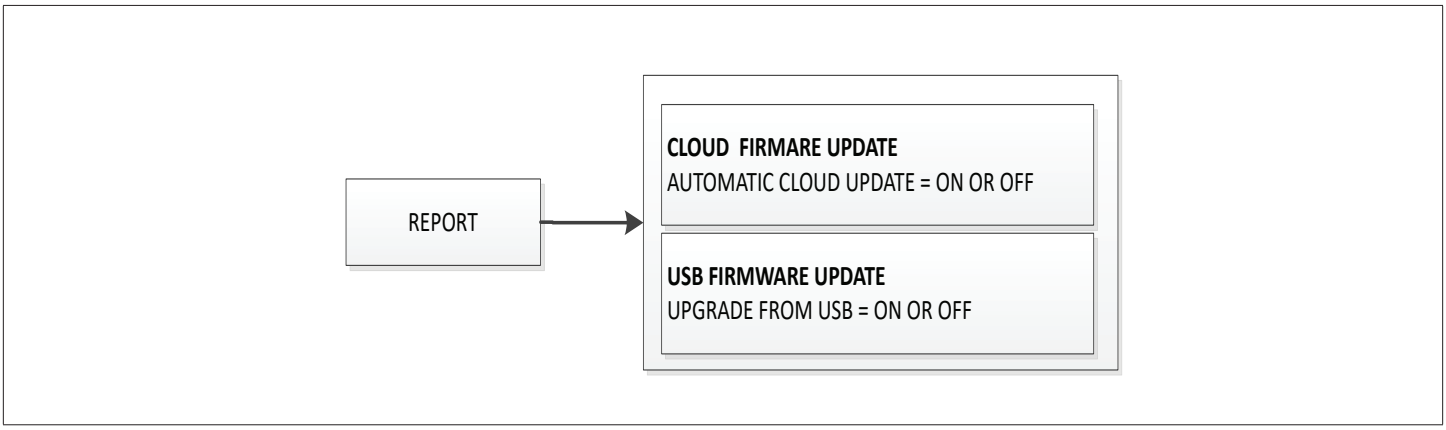


Figure 27. Firmware Update Menu Structure

11.4. Settings

11.4.1. RTU Options

Settings available are:

- Blower - Speed and VFD Bypass options
- Damper - Economizer Temperature and Economizer type with settings for Temperature offset and setpoint
- Dehumidifier
- Power Exhaust
- Edit Parameters - Categories are cooling, heating, air flow, VAV, economizer, control options and miscellaneous.

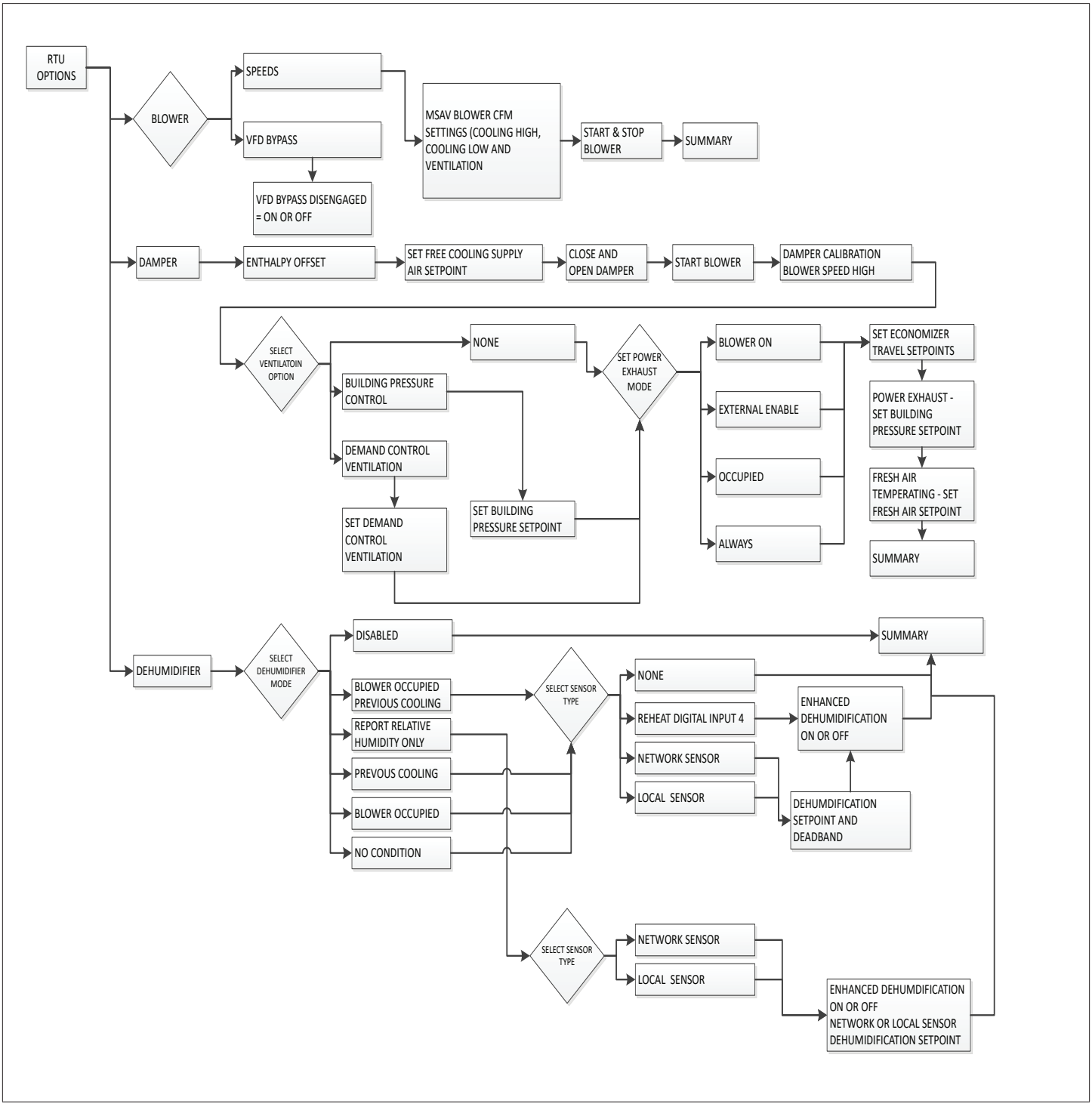


Figure 28. RTU Options - Blower, Damper and Dehumidifier

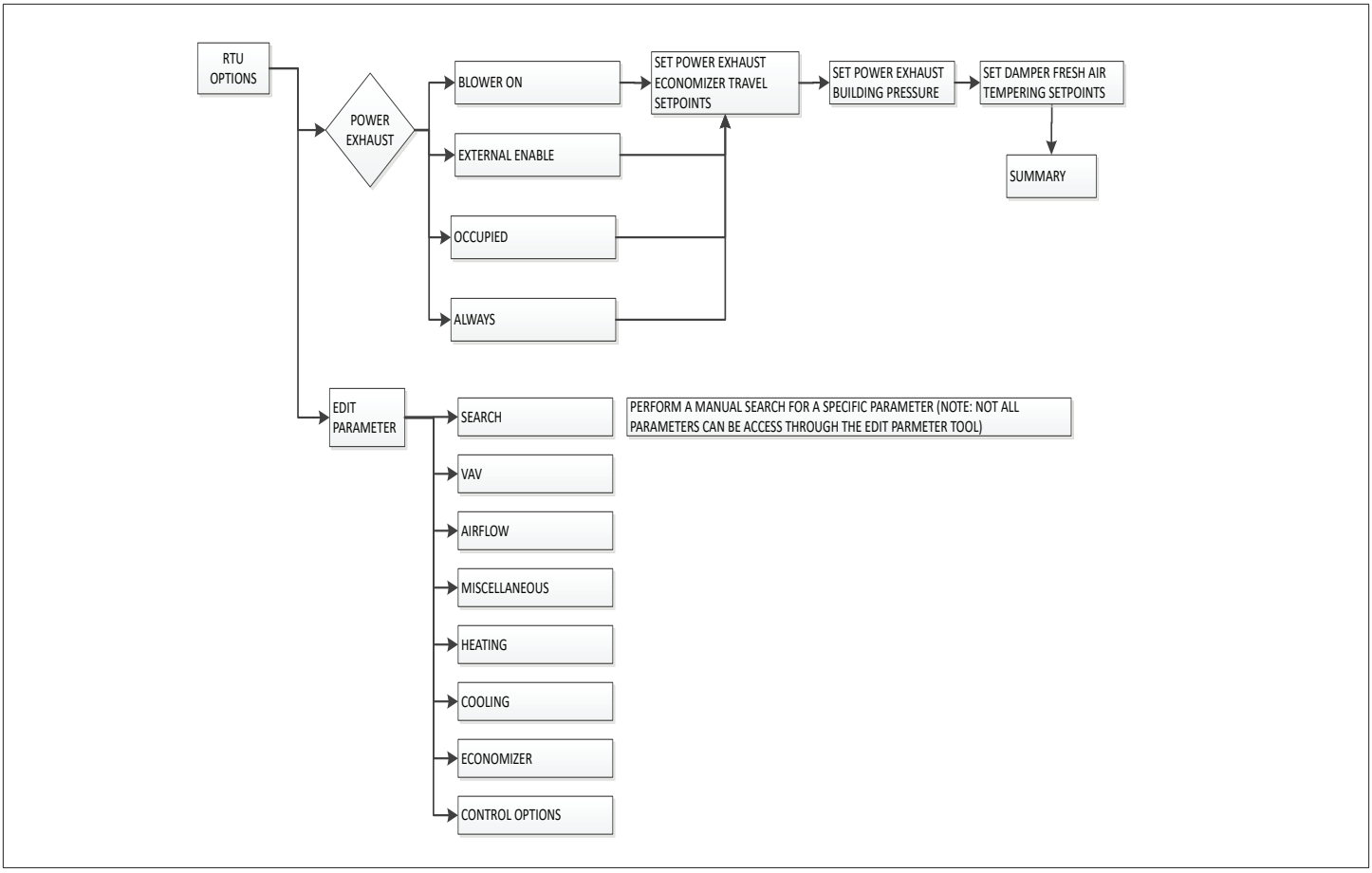


Figure 29. Settings - Power Exhaust and Edit Parameter

11.4.2. Install

The mobile application provides a menu to run “New Unit Setup”.

- New Unit setup if chosen shall direct the user towards the install menu.
- The mobile application shall provide a menu to run “Install New M4” (CORE Unit Controller).
- Install new CORE Unit Controller will first confirm with the user if it is okay to “Clear all Configuration”.
- If the user confirms that it is okay to “Clear All Configuration”, the app shall ask the user if they are sure.
- If the user confirms, the menu directs the user towards the Setup >RTU Menu > INSTALL.
- If the user cancels at any point, they shall be taken back to the Setup >RTU Menu > INSTALL.

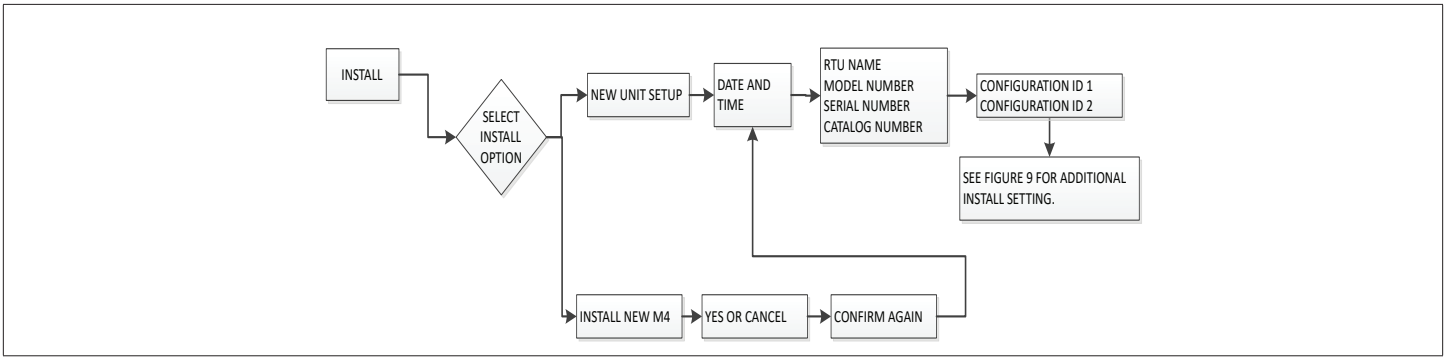


Figure 30. Settings - Install

12. Special Equipment Configurations

12.1. Blower Operation with Effective Occupancy

This section describes how network occupancy signals are combined to produce effective occupancy.

The blower runs to service heat and cool demands, regardless of the space occupancy. However when there is no heating or cooling demand there are options for how the blower should operate in conjunction with occupancy signals to keep the space ventilated, or the air stirred.

a. California Energy Commission Title 24 - The legacy option settings for OCC Blower Mode are AUTO CYCLES or ON-CONTINUOUS 1. These settings govern whether the blower runs continuously when the space is considered occupied, or cycles on/off with the heating and cooling demand.

To comply with the California Energy Commission Title 24 standard there are two additional values for OCC Blower Mode which are ON-CONTINUOUS 2 and ON-CONTINUOUS 3. See “Table 4. Blower Operation Description” for their descriptions.

b. LonTalk, BACnet and L Connection: These two new options are available when using these networks types that supplies a room occupancy signal (in addition to the scheduled occupancy).

NOTE: *For L Connection the same two options are also available when using an optional room occupancy sensor. If a room occupancy sensor is not physically installed and configured for the network, then the only options available for OCC Blower Mode are AUTO CYCLES or ON-CONTINUOUS 1.*

c. RTU Standalone: Since a room occupancy sensor cannot be used in this configuration, then the only options for OCC Blower Mode are AUTO CYCLES or ON-CONTINUOUS 1.

d. Enabling Network Type

To enable the network module, go to **SETUP > INSTALL** and run the setup wizard. When Configuration ID 1 appears on the screen, configure position 5 to one of the applicable network types. N = Not Installed, B = BACnet and L = LonTalk.

e. Menu Setup Procedure Method for OCC Blower Mode

These blower control options are handled by the OCC Blower Mode. These setting and be changed using the following menu path:

Go to **SETUP > NETWORK INTEGRATION > NETWORK SETUP WIZARD**. Depending on how Configuration ID 1, position 5 is set, different network types will be listed. Additional prompts concerning network configuration and sensor types will be asked) **CONTROL MODE = ROOM SENSOR > ROOM SENSOR OCC BLOWER MODE =** “Table 4. Blower Operation Description”

Table 4. Blower Operation Description

OCC Blower Mode	Description
AUTO CYCLES	Blower cycles on/off with demand. (Legacy usage.)
ON-CONTINUOUS 1	Blower runs when either the occupancy sensor or schedule, or both, indicates occupied. (Legacy usage.)
ON-CONTINUOUS 2	Blower runs when both the occupancy sensor and schedule indicate occupied.
ON-CONTINUOUS 3	The same as option 2, but blower runs for 30 minutes and is off for 90 minutes when schedule is occupied but the occupancy sensor is not occupied.

Table 5. BACnet Occupancy Objects

Input	BACnet	Value
Manual	Occupancy Override Control AO 103	0: space occupied 1: space unoccupied 2: refresh space occupied override timer 3255: auto; clear timer and return to scheduler
Schedule	Occupancy Scheduler Control AO 104	0: space occupied 1-255: space unoccupied
Sensor	Occupancy Sensor Input AO 107	0: space occupied 1: space unoccupied 2-255: auto; return to occupancy scheduler state
Effective Occupancy	Effective Occupancy AI 241	0: space occupied 1: space unoccupied 2: space occupied (timed override)

Table 6. LonTalk Occupancy Objects

Input	BACnet	Value
Manual	nviOccManCmd Index = 11	0: space occupied 1: space unoccupied 2: refresh space occupied override timer 3255: auto; clear timer and return to scheduler
Schedule	nviOccSched1 Index = 10	0: space occupied 1-255: space unoccupied
Sensor	nviOccSensor Index = 12	0: space occupied 1: space unoccupied 2-255: auto; return to occupancy scheduler state
Effective Occupancy	nviEffectOccup Index = 26	0: space occupied 1: space unoccupied 2: space occupied (timed override)

Table 7. Blower Operation Schedule

Manual	Schedule	Sensor	Effective Blower Occupancy	OCC Blower Mode	Blower Operation
0, 2	n/a	n/a	OCCUPIED	AUTO-CYCLES ON-CONTINOUS 1 ON-CONTINOUS 2 ON-CONTINOUS 3	Cycles On On On
1	n/a	n/a	UNOCCUPIED	AUTO-CYCLES ON-CONTINOUS 1 ON-CONTINOUS 2 ON-CONTINOUS 3	Cycles
3-255	0	0, 2-255	OCCUPIED	AUTO-CYCLES ON-CONTINOUS 1 ON-CONTINOUS 2 ON-CONTINOUS 3	Cycles On On On
3-255	0	1	OCCUPIED	AUTO-CYCLES ON-CONTINOUS 1 ON-CONTINOUS 2 ON-CONTINOUS 3	Cycles On Cycles Cycles w/Stir
3-255	1-255	n/a	UNOCCUPIED	AUTO-CYCLES ON-CONTINOUS 1 ON-CONTINOUS 2 ON-CONTINOUS 3	Cycles

12.2. Enabling Economizer and Settings

The economizer, when configured, controls:

- Damper position, which determines how much outdoor air is used to meet free cooling or indoor air quality requirements, and
- Optional power exhaust fans.

On a cooling demand, outdoor air is used for free cooling instead of first-stage compressor(s) when outdoor air is suitable.

To enable the economizer if installed:

Go to SETUP > INSTALL

When reaching Configuration ID 1, position 2 will need to be set to the applicable type of economizer. Valid types are:

- **M** = Motorized Outdoor Air Damper Only
- **T** = Economizer - Temperature (Note: Used for both set point and offset temperature control.)
- **G** = Economizer - Global
- **S** = Economizer - Single Enthalpy
- **D** = Economizer - Dual Enthalpy

12.2.1. Damper Feedback Calibration

Use the following procedure to perform a damper feedback calibration.

Go to SETUP > TEST & BALANCE > DAMPER > IS DAMPER CLOSED?

This drives the damper to the fully closed position. Visually inspect that the damper has stopped moving in the closed position, and answer **YES** to calibrate damper closed position feedback value.

Then the next screen will ask **IS DMPR FULL OPEN**?

This will drive the damper to fully open position. Visually inspect that the damper has stopped moving in the full open position, and answer **YES** to calibrate damper full open position feedback value.

12.2.2. Damper Operation During Free Cooling

These are operating profile options for the economizer damper (Parameter 164 - ECONOMIZER PROFILE) during free cooling when any compressor is on and can be selected as follows:

Damper opens to its max open position (Parameter 131 - FREE CL MAX DAMPER) when any compressors start.

NOTE: *When using Option 1 and after the compressor is stopped, the M3 shall resume damper modulation.*

12.3. Free Cooling Compressor Lockout Mode and Low Ambient Set Point

Go to SETTINGS > RTU OPTION > EDIT PARAMETER > COOLING = 285 (FRCL COMP LCKOUT MD).

Default value is 2. Range is 0 to 2.

- **0** = Disable Compressor Lockout
- **1** = Lockout Compressor if outdoor air is suitable regardless of outdoor air temperature.
- **2** = Lockout Compressor if outdoor air temperature is below Parameter 108 setting and Outdoor Air is Suitable (Default).

Go to SETTINGS > RTU OPTION > EDIT PARAMETER = 108 (FREE LO AMB LCKT SP).

Default value is 55.0°F. Range is 45.0 to 80.0°F.

12.3.1. Outdoor Air Suitable for Free Cooling

The CORE Unit Controller displays the outdoor air suitability information on the status screen.

The appropriate sensors are provided when the economizer is factory-configured. When the economizer is field-installed and configured, the single or dual enthalpy modes require additional field-provided sensor(s).

12.3.2. Enthalpy Set Point

This setting pertains to the single enthalpy free cooling mode only. The CORE Unit Controller will enable free cooling when outdoor air enthalpy (A7) is less than the enthalpy set point (Parameter 162 - ECON FREECL ENTH SP). Figure 6 shows the approximate enthalpy sensor output at various temperatures and percentage of relative humidity.

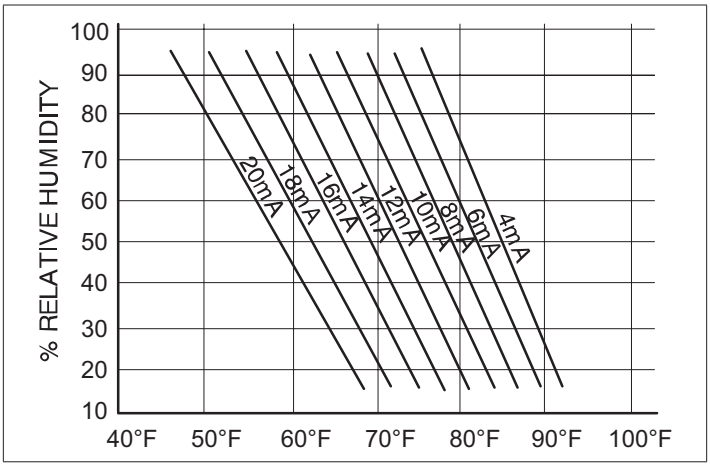


Figure 31. Enthalpy Sensor Output Current Honeywell C7400

12.3.3. Free Cooling Damper Maximum Position

Damper Maximum position for free cooling is by default set to 100%. To modify this settings, use the following path:

SETTINGS > RTU OPTION > EDIT PARAMETER > AIR FLOW > 131 (FREE CL MAX DAMPER)

12.3.4. Minimum Damper Position

Use the following menu path to modified the minimum damper positions for both high and low operations.

SETUP > TEST & BALANCE > DAMPER > CLOSING DAMPER > OPEN DAMPER > TURN BLOWER ON > MIN DAMPER POSITION BLOWER ON HIGH = .%

SETUP > TEST & BALANCE > DAMPER > CLOSING DAMPER > OPEN DAMPER > TURN BLOWER ON > MIN DAMPER POSITION BLOWER ON HIGH = .% > MIN DAMPER POSITION BLOWER ON LOW = .%

12.3.5. Motorized Outdoor Air Damper

Set damper position according to "Minimum Damper Position" section for normal operation, make sure the motorized outdoor air damper is set correctly in Configuration ID 1, position 2 needs to be set to M. The damper will open to the specified position during the occupied time period and close during the unoccupied time period.

NOTE: *When equipped with Motorized Outdoor damper Air Damper, Prodigy 2.0 provides only Demand Control Ventilation. Free Cooling/Economizer function is not available.*

12.3.6. Economizer Checkout

The following checkout procedures are completed with unit energized. Confirm proper operation of the heartbeat LED. Step 1 will determine whether the economizer is allowing full damper travel. Use step 2 when the damper does not respond to step 1.

Steps 3, 4, 5, and 6 checkout the operating modes; checkout only the mode that applies to the unit being worked on.

CAUTION

Power exhaust fans will be functional. To prevent operation of power exhaust fans, disconnect power to unit and then PED jack/plug P/J18.

Step 1. ECONOMIZER OUTPUT VOLTAGE

The CORE Unit Controller monitors P262 (DPOS) and operates as reference in Section Damper Diagnostics in the Prodigy 2.0 (CORE Unit Controller) Application Guide (Advance Features).

Go to SERVICE > COMPONENT TEST > DAMPER > POSITION > DAMPER POSITION > DAMPER POSITION: 0.0%

a. The motor will slowly modulate to the closed position.

b. Change DAMPER POSITION ACTUAL to 100.0%.The motor will slowly modulate to the fully opened position.

c. If the motor does not respond, go to **step 2**. If the motor does respond properly, go to the appropriate mode of operation checkout.

Step 2. OUTPUT VOLTAGE CHECK

Go to SERVICE > COMPONENT TEST > DAMPER > POSITION > DAMPER POSITION > DAMPER POSITION: 0.0%

a. Adjust the DAMPER POSITION ACTUAL to 0.0% position.

b. Measure the voltage on P262 between pin 3 (VOT damper control) and pin 2 (GND) using pin 1 as common. Voltage should read approximately 2 VDC.

c. Adjust the DAMPER POSITION ACTUAL to 100.0% position.

NOTE: *Allow approximately 90 seconds for actuator to react.*

d. Measure the voltage between P262 between pin 3 (VOT damper control) and pin 2 (GND) using pin 1 as common. Voltage should read approximately 10 volts DC. If not, check wiring and trouble shoot system.

Step 3. SINGLE ENTHALPY OPERATION (ODE)

In the single enthalpy mode, dampers open for free cooling when the outdoor enthalpy is less than the enthalpy set point (Parameter 162 - ECON FREECL ENTH SP); dampers will try to modulate discharge air temperature (RT6) to (Parameter 159 - FREE COOL SUPPLY SP) which has a default setting of 55.0°F (13°C).

a. Go to **SETUP** > **INSTALL** > press **SAVE** until you get to the Configuration ID 1, position 2 needs to be set to **S** for Economizer Single Enthalpy and press **SAVE**.

b. To simulate low outdoor enthalpy. Disconnect A7 outdoor enthalpy sensor jack/plugs J/P104. Connect a 750 ohm resistor across plug J104-1 and J104-2. J104 is located in the filter access area.

c. Check all connections and wiring between J104 and the control.

Step 4. DUAL ENTHALPY MODE OF OPERATION

In dual enthalpy mode, dampers open for free cooling when the outdoor air enthalpy is lower than the return air enthalpy by difference value of (Parameter 163 - ECN FRCL ENTH OFFST); dampers will modulate discharge air temperature (RT6) to (Parameter 159 - FREE COOL SUPPLY SP) which has a default setting of 55.0°F (13°C).

a. Go to **SETUP** > **INSTALL** > press **NEXT** until you get to the Configuration ID 1 position 2 needs to be set to D for Economizer Dual Enthalpy and press SAVE if performing an economizer field-install.

b. Use two resistors to simulate outdoor air enthalpy suitable.

c. Disconnect A62 return air enthalpy sensor jack/plug J/P105. Place a 1500 ohm resistor between J105-1 and J105-3. J/P105 is located in the filter access area.

d. Disconnect A7 outdoor enthalpy sensor jack/plugs J/P104. Connect a 750 ohm resistor across J104-1 and J104-2.

Step 5. ALL TEMPERATURE MODES OF OPERATION

In the Economizer – Temperature mode, the damper opens for free cooling when the outdoor air temperature is:

- Less than return air temperature by at least a difference of (Parameter 161 - ECON FRCL TMP OFFST) if Temperature Offset mode is selected
- Less than (Parameter 160 - ECON FREECL TEMP SP)

In all modes, dampers will try to modulate discharge air temperature (RT6) to (Parameter 159 - FREE COOL SUPPLY SP) which has a default setting of 55.0°F (13°C).

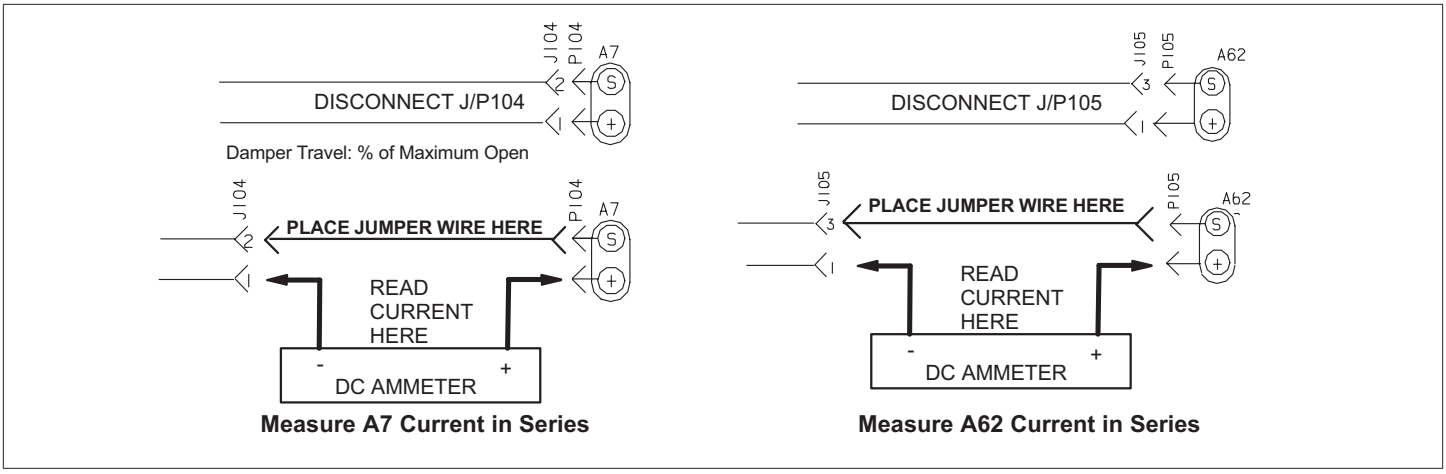


Figure 32. Measure A7 and A62 Current in Series

Table 8. TMP Mode Resistor Values

Temp. °F (°C)	Size Resistor	Temp. °F (°C)	Size Resistor	Temp. °F (°C)	Size Resistor	Temp. °F (°C)	Size Resistor
30 (-1)	34,566	50 (10)	19,904	70 (21)	11,884	90 (32)	7,332
40 (4)	26,106	60 (16)	15,313	80 (27)	9,298	100 (38)	5,826

Refer to the “Displaying Sensor Inputs” section to read return air (RT16) and outdoor air (RT17) temperatures. If outdoor air is not cooler than return air, simulate a colder outdoor air temperature with a resistor. Select a resistor value that corresponds to a temperature:

a. Locate RT17 sensor in unit. Disconnect 1/4” quick connect terminals on wires leading from sensor.

b. Jumper RT17 wires leading back to control with the appropriate resistor.

c. Check all connections and wiring between RT17 and the CORE Unit Controller, and between RT16 and the CORE Unit Controller.

Step 6. GLOBAL MODULATING (GLO) MODE OF OPERATION

In the GLO (modulating) mode, dampers modulate open for free cooling when the global input is energized; dampers will try to modulate discharge air temperature (RT6) to (Parameter 159 - FREE COOL SUPPLY SP) which has a default setting of 55.0°F (13°C).

NOTE: *The global input turns on the blower.*

a. Set global mode using the Configuration ID 1, position 2, and set to character G.

b. Connect a jumper between A55_P297-1 (24VAC) and A55_P297-9 (global). The blower is energized and the damper will slowly open if discharge air temperature (RT6) is greater than (Parameter 159 - FREE COOL SUPPLY SP) which has a default setting of 55.0°F (13°C).

c. Disconnect 24VAC to A55_P297-9. The blower will turn off and the damper will close.

d. If the damper does not actuate then check all connections and wiring between P262A and B.

Step 7. ENTHALPY SENSOR OPERATION (A7 and A62)

If enthalpy sensors are configured, current sensor reading by CORE Unit Controller can be verified through the user interface:

a. Connect a direct current ammeter as shown in figure 4 to measure current output of A7 or A62.

b. The reading will be between (4 and 20 ma.) and depends on outdoor temperature and humidity. Refer to figure 3 to approximate reading.

Go to DATA > SYSTEM DATA / SENSORS / OUTPUTS > LOCAL INPUTS > SENSORS > LOCAL (scroll down to INDOOR AND OUTDOOR ENTHALPY)

c. If the meter reads zero, check sensor wiring harness for continuity and/or check polarity of sensor wiring.

12.4. Demand Control Ventilation

A field-provided and installed indoor air quality (IAQ) sensor can be used with the modulating economizer or OADM to control carbon dioxide levels in the conditioned space. The carbon dioxide level in a space is an indicator of the number of people occupying a room. As the carbon dioxide level rises (indicating the occupancy of a room has increased), dampers modulate open - regardless of outdoor air suitability. Likewise, as the carbon dioxide level falls (indicating the occupancy has decreased), dampers modulate further closed.

Standard economizer installations have a minimum fresh air ventilation requirement based on maximum room occupancy. With standard economizer use, the amount of air required for maximum room occupancy is heated or cooled with each heating or cooling cycle. IAQ installations use the maximum amount of required ventilation air only with maximum room occupancy; less outdoor air needs to be heated or cooled when fewer people are in the conditioned space.

If the economizer is operating in the free cooling mode and

the indoor air quality control requires the damper to open further, the indoor air quality demand will override the free cooling demand.

The IAQ function is not energized during the unoccupied or night time period.

NOTE: *The IAQ sensor may also be used with systems containing a motorized outdoor air damper.*

12.4.1. Default Operation

The CORE Unit Controller has a 0-10VDC indoor air quality input for a standard 0 - 2000ppm carbon dioxide sensor. The economizer starts opening at a carbon dioxide level of 700 ppm (default) (start open set point) and reaches full open at a carbon dioxide level of 1200ppm (default) (full open set point).

The damper opens to a default position of 50% (see Parameter 117). Determine damper travel position using the following formula:

$$\%\ \text{Damper Travel} = \frac{\text{carbon dioxide ppm - Start Open ppm}}{5}$$

Example: At a carbon dioxide level of 750ppm, the damper will be approximately 50% open:

$$\%\ \text{Damper Travel} = \frac{750-500}{5} = 50\%$$

Use the menu interface to read carbon dioxide ppm.

Go to DATA > SYSTEM DATA / SENSORS / OUTPUTS > LOCAL INPUTS > SENSORS > LOCAL (scroll down to CO_2)

12.4.2. Maximum and Minimum Demand Control Ventilation Damper Settings

Maximum position is set using the following menu path:

Go to SETTINGS > RTU OPTIONS > DAMPER > SET ECONOMIZER OPTION > SET FREE COOLING SUPPLY AIR SETPOINT > CLOSE DAMPER > OPEN DAMPER > TURN ON BLOWER > MINIMUM DAMPER POSITION > and select DEMAND CONTROL VENTILATION.

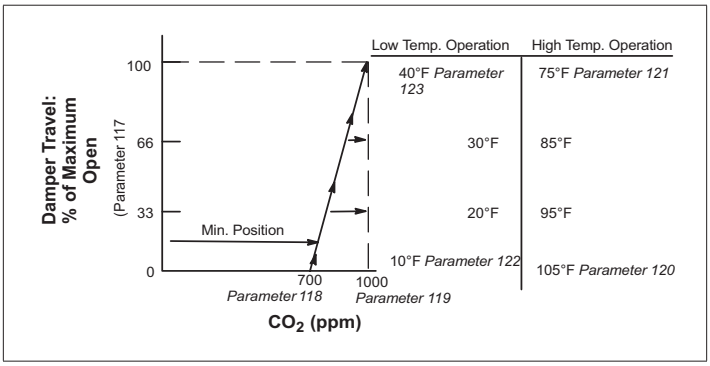


Figure 33. Default Demand Control Ventilation (DCV) Operation

Options are:

- DEMAND CONTROL VENT > DAMPER START OPEN = XXXX PPM
- DEMAND CONTROL VENT > DAMPER FULL OPEN = XXXX PPM
- DEMAND CONTROL VENT > DAMPER MAX OA CFM = X CFM (only visible if configuration id 1, position 2 is set correctly).
- DEMAND CONTROL VENT > DAMPER MAX OPEN = XXX.X %.

12.4.3. Parameter Adjustments

Default indoor air quality economizer operation is based on common or average applications. Adjustments may be made to the indoor air quality Parameters to alter operation or meet required specifications. Use the user interface to change Parameter 117 through 123.

Go to SETTINGS > RTU OPTIONS > EDIT PARAMETER > IAQ INPUT MODE

Select a demand control ventilation mode with Parameter 134. Modes 3 and 4 will bring on the unit blower when demand control ventilation calls for maximum damper open, and returns to auto-blower when demand control ventilation damper returns to 0. The other modes only operate when the unit blower is on, but will not bring it on themselves.

Some applications require a different carbon dioxide set point range than default settings. Damper start open (Parameter 118) and full open (Parameter 119) carbon dioxide set points may be adjusted from 0 to 2000 ppm. Use the following formula to determine damper travel.

NOTE: *When changing carbon dioxide set point range, "start open" set point should be less than "full-open" set point.*

$$\%\ \text{Damper Travel} = \frac{\text{carbon dioxide ppm - Start Open ppm}}{\text{Full Open - Start Open}} \times \text{Max Open (Parameter 117)}$$

Example: An application requires the dampers open at 800 CO2 ppm and reach full open at 1200. If the carbon dioxide level in the space reads 1000 ppm, calculate the damper percent open as follows.

$$\%\ \text{Damper Travel} = \frac{1000 - 800}{1200 - 800} \text{ or } \frac{200}{400} \text{ or } .5 = 0.5 \times 100 = 50\%$$

12.4.4. Set Point Control Option

Set point control mode is commonly used in areas with high occupancy and frequent change out such as classrooms or conference rooms.

In applications requiring this on/off damper response to airborne dioxide levels, set the start open (Parameter 118 - DCV DAMP START OPEN) set point higher than the full open (Parameter 119 - DCV DAMP FULL OPEN) set point. The dampers will drive to fully-open position immediately. Figure 6 shows the set point control option. Change Parameters 122 and 123 to set the minimum outdoor temperature limits.

Change Parameters 120 and 121 to set the maximum temperature limits.

IMPORTANT

Mixed air temperatures less than 45°F (7°C) on units with an aluminized heat exchanger or less than 30°F (-1°C) on stainless steel heat exchangers will void the manufacturer's warranty.

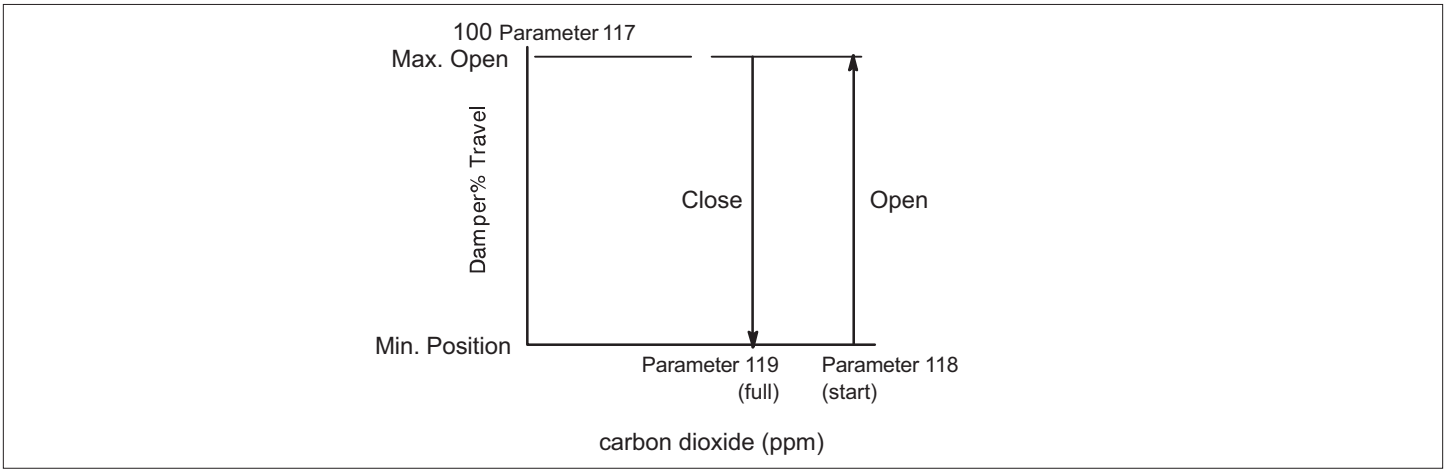


Figure 34. Set point Control Indoor Air Quality Option

12.5. Determining Indoor Air Quality Inputs

Selection from the CORE Unit Controller menu display.

Go to DATA > SYSTEM DATA / SENSORS / OUTPUTS > LOCAL INPUTS > SENSORS

12.6. BACNET

- The configuration shown in figure 37 has terminations on the CORE Unit Controller BACnet modules at both ends and ONLY at both ends of the chain.
- The configuration shown to the in figure 37 has a termination at the controller/router on one end and a termination at the CORE Unit Controller BACnet module on the other end; terminations are ONLY at the ends of the chain.
- Cable type - twisted pair with shield, 22 awg minimum, Belden #88761 or #8761 (Lennox 27M19, 94L63, 68M35).

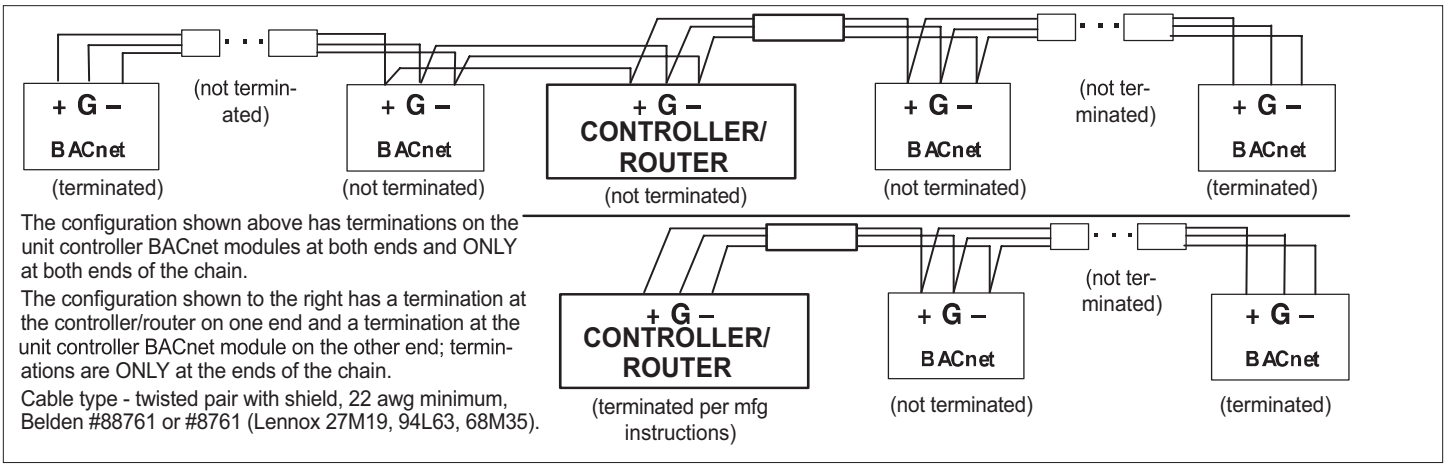


Figure 35. Terminating Ends of a Daisy-Chained Network

12.7. Abbreviations

Table 9. Abbreviations

Abbreviation	Definition
A55	M3 board. Main RTU control board
AI	Analog input
AO	Analog output
BL	Blower
C3	Add on board for third and fourth compressor and second-stage heat (A178).
C1	1st stage cooling
C2	2nd stage cooling
C3	3rd stage cooling
C4	4th stage cooling
CAI	Combustion air inducer
CAVB	Constant air volume with bypass damper
COM	Electrical common
CL	Cooling
CP1	Compressor 1
CP2	Compressor 2
CP3	Compressor 3
CP4	Compressor 4
CSP	Cooling setpoint
DAC	Discharge (supply) air control
DACC	Discharge (supply) air control cooling
DACH	Discharge (supply) air control heating
DAP	Discharge (supply) air pressure
DAT	Discharge (supply) air temperature
DB	Deadband
DCV	Demand controlled ventilation
DDC	Direct digital control
DI	Digital input
Diff	Differential
DO	Digital output
FAC	Fresh air cooling control
FAH	Fresh air heating control
FAT	Fresh air tempering control. See FAC & FAH
FC	Free cooling
G	Thermostat demand, blower
GLO	Global mode or input (economizer)
H1	1st stage heating
H2	2nd stage heating
H3	3rd stage heating
H4	4th stage heating
HP	High pressure
HSP	Heating setpoint
HT	Heating
IAQ	Indoor air quality. Often synonymous with CO2 level in ppm
IDE	Indoor enthalpy. Depends on temperature and humidity
“w.c.	Inches of water column

Table 9. Abbreviations

Abbreviation	Definition
LED	Light emitting diode. An indicator light, found either as individual elements or grouped together as segments to form characters
LP	Low pressure
LT	Limit
M4	CORE Unit Controller - main controller board (A55)
MGV	Modulating gas valve
MSAV	Multi Stage Air Volume
OAC	Outdoor air control
OAS	Outdoor air suitable for free cooling
OAT	Outdoor air temperature
OCP	Thermostat demand, occupied mode
ODE	Outdoor enthalpy. Depends on temperature and humidity
PID	Proportional, integral and derivative based control loop
PPM	Parts per million (mostly used for CO2 measurements)
RAP	Return air pressure
RAT	Return air temperature
RH	Relative humidity
RS	Reset
RTU	Roof top unit
RT6	Discharge air temperature sensor
RT16	Return air temperature sensor
RT17	Outdoor air temperature sensor
SMK	Smoke detection mode (alarm)
SP	Setpoint
Stg	Stage
TB	Terminal block
UnOCP	Unoccupied
W1	Thermostat demand, heat stage 1
W2	Thermostat demand, heat stage 2
W3	Thermostat demand, heat stage 3
W4	Thermostat demand, heat stage 4
VAC	Alternating current voltage
VAV	Variable air volume. Accomplished with a variable frequency drive (VFD)
VDC	Direct current voltage
VFD	Var. frequency drive. An AC inverter used to vary motor speed
VT	Ventilation
Y1	Thermostat demand, cooling stage one
Y2	Thermostat demand, cooling stage two
Y3	Thermostat demand, cooling stage three
Y4	Thermostat demand, cooling stage four
ZAT	Zone air temperature

13. Parts and Kits

Table 10. Parts and Kits Available for CORE Unit Controller

Description	Catalog number	Description	Catalog number	Description	Catalog number
CORE Unit Controller Replacement kit	21L14	USB service kit tube	59W52	SmartWire™ Field Termination kit	59W57
LCD Display Replacement Kit	10X85	CORE Unit Controller battery (10-pack)	59W53	Lennox Prodigy 2.0 USB Memory Stick (5-pack)	59W59
CORE Unit Controller cover	10X86	BACnet Replacement kit	59W51		

14. Service Report Example

```
================================================
USB SERVICE REPORT
================================================
Service Date         04:03:2014
Service Time         19:26:35
Serial No.
Software Version     08.00.0009
Hardware Version
Unit Number          UNIT 1
SBUS Address         2
BACnet Address       2
Catalogue Number
Model Number         LGH060H4EH1Y
CONFIGURATION ID 1   NTNNNNLN
CONFIGURATION ID 2   NNNNNNNNN
Status               IDLE
================================================
Runtime Data
   Total Power On        23 HRS            8 CYCLES
   Before Install         0 HRS      -------
   Filter                12 HRS      -------
   Belt                  11 HRS      -------
   Blower                12 HRS           50 CYCLES
   Compressor 1           3 HRS           40 CYCLES
   Compressor 2           4 HRS           27 CYCLES
   Compressor 3           0 HRS            2 CYCLES
   Compressor 4           0 HRS            3 CYCLES
   Outdoor Fan 1          7 HRS           28 CYCLES
   Outdoor Fan 2          2 HRS           22 CYCLES
   Outdoor Fan 3          0 HRS            2 CYCLES
   Outdoor Fan 4          0 HRS            3 CYCLES
   Outdoor Fan 5          0 HRS            3 CYCLES
   Outdoor Fan 6          0 HRS            3 CYCLES
   POWER EXHAUST          0 HRS            0 CYCLES
   Heat Stage 1           0 HRS            1 CYCLES
   Heat Stage 2           0 HRS            1 CYCLES
   Humiditrol             0 HRS            0 CYCLES
   Free Cooling           0 HRS            4 CYCLES
   UV Lamp                0 HRS      -------
================================================
Sensor Data
   OAT       66  degF
   RAT       72  degF
   DAT       73  degF
   ZAT       78  degF
   RH        50  %
   CO2      460  ppm
================================================
SmartAirFlow System Data

    Calibrated On 04/03/2014 19:12:56

    Supply Airflow Calibration Table
    ---------------------------------
   PWM(%)      Speed(rpm)      Airflow(cfm)
    ---------------------------------------
      20           480            1031
      30           570            1274
      40           660            1493
      50           750            1687
      60           840            1857
      70           930            2004
      80          1020            2126
      90          1110            2223
     100          1200             2297

    Supply Airflow Targets
    ------------------------------------------------
   Mode               Desired Airflow(cfm)     PWM(%)
    ------------------------------------------------
    Cool High                1800              57
    Cool Low                 1300              31
    Heat                     2000              70
    Ventilation              1200              27
    Smoke                    2000              70
Economizer Differential Pressure(@ 2000 Supply
Airflow(cfm))
-------------------------------------------------
    Damper Position (%)         Diff.Pressure(in.H20)
     ---------------------------------------------
                0                       0.39
               50                       0.23
              100                       0.06
  Outside Airflow Targets
   ---------------------------------------
    Minimum Outside Air/Minimum DCV:      200 cfm
    Maximum DCV:                            0 cfm
    Minimum CO2:                          700 ppm
    Maximum CO2:                         1200 ppm
================================================
Alarm/Status Log
   (143)  04:03:2014 19:26:13  RESET  DAMPER PRESSURE
   (141)  04:03:2014 19:26:13  RESET  CFM TARGET TOO
HIGH
   (143)  04:03:2014 19:06:19    SET  DAMPER PRESSURE
   (141)  04:03:2014 19:06:19    SET  CFM TARGET TOO
HIGH
   ( 82)  04:03:2014 19:06:18  RESET  CONTROLLER RESET
   ( 82)  04:03:2014 19:06:18    SET  CONTROLLER RESET
   (143)  04:03:2014 18:59:41    SET  DAMPER PRESSURE
   (141)  04:03:2014 18:59:41    SET  CFM TARGET TOO
HIGH
   ( 82)  04:03:2014 18:59:40  RESET  CONTROLLER RESET
   ( 82)  04:03:2014 18:59:40    SET  CONTROLLER RESET
   (143)  04:03:2014 18:35:19    SET  DAMPER PRESSURE
   (141)  04:03:2014 18:35:19    SET  CFM TARGET TOO
HIGH
   (148)  04:03:2014 18:21:36  RESET  SMART AIRFLOW
CONFIG ERROR
   (170)  04:03:2014 18:21:36  RESET  POWER EXHAUST
UNCONFIGURED
   (165)  04:03:2014 18:21:36  RESET  ECONOMIZER
UNCONFIGURED
   ( 85)  04:03:2014 18:21:36  RESET  INCORRECT
HUMIDITROL SETTINGS
   (132)  04:03:2014 18:21:24  RESET  VFD BYPASS
UNCONFIGURED
   (148)  04:03:2014 18:21:23    SET  SMART AIRFLOW
CONFIG ERROR
   (132)  04:03:2014 18:21:23    SET  VFD BYPASS
UNCONFIGURED
   (170)  04:03:2014 18:21:23    SET  POWER EXHAUST
UNCONFIGURED
   (165)  04:03:2014 18:21:23    SET  ECONOMIZER
UNCONFIGURED
   ( 85)  04:03:2014 18:21:23    SET  INCORRECT
HUMIDITROL SETTINGS
   ( 82)  04:03:2014 18:20:31  RESET  CONTROLLER RESET
   ( 82)  04:03:2014 18:20:31    SET  CONTROLLER RESET
   ( 82)  04:03:2014 18:16:32  RESET  CONTROLLER RESET
   ( 82)  04:03:2014 18:16:32    SET  CONTROLLER RESET
   ( 82)  04:03:2014 18:14:10  RESET  CONTROLLER RESET
   ( 82)  04:03:2014 18:14:10    SET  CONTROLLER RESET
   ( 82)  04:03:2014 18:14:09  RESET  CONTROLLER RESET
   ( 82)  04:03:2014 18:14:09    SET  CONTROLLER RESET

================================================
END OF REPORT
```

15. Model L - CORE Service App - Alarms

15.1. Phase - Voltage Detection

The CORE Unit Controller has the ability to detect that the rooftop unit power source has the correct frequency, phasing and voltage levels. When this feature is enabled, the detection of frequency and phasing is determined at power-on and the voltage level is continuously monitored. If any of these is out of range, then an alarm is logged and the rooftop unit operation is locked out.

a. Alarms Detected at Power-On Start up:

- 121 - LINE FREQ DOES NOT MATCH UNIT CONFIG
- 126 - LINE PHASING DOES NOT MATCH UNIT CONFIG

b. Alarms - Continuously Monitoring

- 122 - 24VAC PRIMARY VOLTAGE LOW
- 123 - 24VAC PRIMARY VOLTAGE HIGH
- 134 - 24VAC SECONDARY VOLTAGE LOW
- 125 - 24VAC SECONDARY VOLTAGE HIGH

Alarms 122 through 125 are auto-resetting. The rooftop operation will be restored five (5) minutes after the proper voltage levels are restored. Alarms 121 and 126 requires removing the power and correcting the issue before restoring the rooftop operation.

The frequency (60 or 50 Hz) and the phasing (single or three-phase) of the power source is determined by the model number stored in the CORE Unit Controller. This model number and enabling/disabling the Phase-Voltage Detection feature can be modified through the CORE Unit Controller user interface. See the Installation and Setup Guide for instructions on how to configure the CONFIGURATION ID 2, Position 5. Options are:

- N = NOT INSTALLED
- 1 = ENABLED INTERNAL (LENNOX)
- 2 = EXTERNAL (A42) PHASE DETECTION ON DI-2
- 3 = EXTERNAL (A42) PHASE DETECTION ON DI-3

When an event occurs, the CORE Unit Controller will display a code which corresponds to control function. Error codes are stored and can be recalled later.

NOTE: *Any references in the user interface referencing Advanced Airflow actually indicates SmartAirflow®.*

15.2. Service Relays

Selected alarms (marked with * in the following table result in the closure of the service relay contacts (DO1). The contacts remain closed until the CORE Unit Controller resets, or alarm condition is cleared and alarm status is read via explicit S-BUS command. Other modes of operation may be selected and are described in the CORE Unit Controller Application Guide (Advanced Features).

NOTE: *Any references in the user interface referencing Advance Airflow actually indicates SmartAirflow®.*

15.3. Alarm and Event Codes

Table 11. CORE Control System Alarm and Event Codes

SELECTED ALARMS (MARKED WITH * IN TABLE RESULT IN THE CLOSURE OF THE SERVICE RELAY CONTACTS (DO1).		
ALARM CODE	**DISPLAY MESSAGE**	**EVENT ACTION**
1	ERRATIC POWER (single phase units)	• Power loss for 50ms or raw voltage is below 15VAC.. This may indicate that the unit power is dirty or is of low quality. • Check power connections. • The CORE Unit Controller will set an alarm “Erratic Power” whenever service is turned off due to detection of power loss. The CORE Unit Controller will shut itself down during an erratic power detection to protect its internally components and reset.
2 - 3	RESERVED	
4*	SMOKE DETECTED	A173 input is sensed as closed. Will automatically clears once input is detected open. For smoke mode, check for source of smoke. While Smoke Alarm is active, the CORE Unit Controller will not service any cooling, heating or ventilation demands.

Table 11. CORE Control System Alarm and Event Codes

SELECTED ALARMS (MARKED WITH * IN TABLE RESULT IN THE CLOSURE OF THE SERVICE RELAY CONTACTS (DO1).		
ALARM CODE	**DISPLAY MESSAGE**	**EVENT ACTION**
5*	BLOWER - NO AIRFLOW DETECTED	Unit off. Air flow switch is normally closed. Monitoring starts 16 seconds after blower is started. If air flow switch is detected open after 16 second delay period, all compressors are de-energized, gas valves closed, electric heat turned off, economizer damper closed, and blower is stopped. Alarm will automatically clear once the error timed off delay has expired and system will resume. Check blower operation.
6*	DIRTY AIR FILTER	Dirty filter switch is detected as closed and will automatically clear once switch is detected open. Replace filter or check filter switch S27.
7	RESERVED	
8*	STRIKE 3 ON BLOWER NO AIRFLOW	Lockout is active with multiple alarm code 5 detected. Alarm can be manually cleared through the user interface. Check blower operation. Once problem is corrected, lockout alarm can be cleared by resetting the CORE Unit Controller.
9 - 11	RESERVED	
12	HIGH PRESSURE SWITCH COMPRESSOR 1	Compressor is off. Check charge, fans and coil. ***NOTE:*** *On Ultra-High Efficiency units - if only alarm 12 is present then issue could be high temperature S5 switch. If alarm 12 is accompanied with alarm 14 then most likely it is the high pressure S4 switch.* The unit controller will clear high pressure switch alarm when corresponding high pressure switch is detected as closed. Compressor will not restart until corresponding high pressure switch is closed and Minimum Off Delay (cooling or heating) has expired.
13*	HIGH PRESSURE STRIKE 3 COMPRESSOR 1	• Compressor is lockout. Check charge, fans and coil. Use service menu to clear lockouts. • User will be able to clear high pressure switch compressor lockout and alarm via user interface. High pressure switch compressor lockout and alarm will be cleared after the CORE Unit Controller reset. • High pressure switch compressor lockout and alarm will be cleared on termination of cooling demand. • Default is 3 occurrences and can be set between 1 and 7 occurrences.
14	HIGH PRESSURE SWITCH COMPRESSOR 2	Compress is off. Check charge, fans or coil. This feature is not support in Model L at this time. ***NOTE:*** *On Ultra-High efficiency units tandem alarms (14) compressor 2 high temperature S8 switch. If accompanied with alarm 15 then most likely the S4 high pressure switch is the issue.* The CORE Unit Controller will clear high pressure switch alarm when corresponding high pressure switch is detected as closed. Compressor will not be restarted until corresponding high pressure switch is closed and Minimum Off Delay (cooling or heating) has expired.
15*	HIGH PRESSURE STRIKE 3 - COMPRESSOR 2	• Compressor lockout. Check charge, fans and coil. Use service menu to clear lockouts. • User will be able to clear high pressure switch compressor lockout and alarm via user interface. High pressure switch compressor lockout and alarm will be cleared after the CORE Unit Controller reset. • High pressure switch compressor lockout and alarm will be cleared on removal of cooling demand. • Default is 3 occurrences and can be set between 1 and 7 occurrences.
16	HIGH PRESSURE SWITCH - COMPRESSOR 3	• Compressor is off. Check charge, fans and coil. • The CORE Unit Controller will clear high pressure switch alarm when corresponding high pressure switch is detected as closed. Compressor will not be restarted until corresponding high pressure switch is closed and Minimum Off Delay (cooling or heating) has expired.
17*	HIGH PRESSURE STRIKE 3 - COMPRESSOR 3	• Compressor lockout. Check charge, fans and coil. Use CORE Service application RTU > SERVICE menu to clear lockouts. • User will be able to clear high pressure switch compressor lockout and alarm through the user interface. High pressure switch compressor lockout and alarm will be cleared after the CORE Unit Controller reset. • High pressure switch compressor lockout and alarm is cleared on removal of cooling demand. Default is 3 occurrences and can be set between 1 and 7 occurrences.

Table 11. CORE Control System Alarm and Event Codes

SELECTED ALARMS (MARKED WITH * IN TABLE RESULT IN THE CLOSURE OF THE SERVICE RELAY CONTACTS (DO1).		
ALARM CODE	**DISPLAY MESSAGE**	**EVENT ACTION**
18	HIGH PRESSURE SWITCH - COMPRESSOR 4	• Compressor lockout. Check charge, fans and coil. • The CORE Unit Controller will clear high pressure switch alarm when corresponding high pressure switch is detected as closed. Compressor will not be restarted until corresponding high pressure switch is closed and Minimum Off Delay (cooling or heating) has expired.
19*	HIGH PRESSURE STRIKE 3 - COMPRESSOR 4	• Compressor lockout. Check charge, fans and coil. Use service menu to clear lockouts. • User will be able to clear high pressure switch compressor lockout and alarm via user interface. High pressure switch compressor lockout and alarm will be cleared after the CORE Unit Controller reset. • High pressure switch compressor lockout and alarm is cleared on removal of cooling demand. Default is 3 occurrences and can be set between 1 and 7 occurrences.
20	PHASE MONITOR FAULT	External phase monitor is indicating an issue.
21	RESERVED	
22	LOW PRESSURE SWITCH COMPRESSOR 1	Compressor is off. Check charge, fans and coil. Use service menu to clear lockouts.
23*	STRIKE 3 LOW PRESSURE COMPRESSOR 1	• Compressor is off. Check charge, fans and coil. Use service menu to clear lockouts. • Number of occurrences is set using Parameter 99 (max lo occurrences). Default is 3 occurrences.
24	LOW PRESSURE SWITCH COMPRESSOR 3	Compressor is off. Check charge, fans and coil.
25*	STRIKE 3 LOW PRESSURE COMPRESSOR 2	• Compressor is off. Check charge, fans and coil. Use service menu to clear lockouts. • Number of occurrences is set using Parameter 99 (max lo occurrences). Default is 3 occurrences.
26	LOW PRESSURE SWITCH COMPRESSOR 3	Compressor if off. Check charge, fans and coil.
27*	STRIKE 3 LOW PRESSURE COMPRESSOR 3	• Compressor is off. Check charge, fans and coil. Use service menu to clear lockouts. • Number of occurrences is set using Parameter 99 (max lo occurrences). Default is 3 occurrences.
28	LOW PRESSURE SWITCH COMPRESSOR 4	Compressor if off. Check charge, fans and coil.
29*	STRIKE 3 LOW PRESSURE COMPRESSOR 4	• Compressor is off. Check charge, fans and coil. Use service menu to clear lockouts. • Number of occurrences is set using Parameter 99 (max lo occurrences). Default is 3 occurrences.
30*	DRAIN PAN OVERFLOW SWITCH	• Check for block drain, condensate lines and drain pan overflow switch. • Alarm set if overflow switch is detected opened and compressor will be locked out. System will automatically clear alarm once switch is detected closed. System will resume operation (compressor lockout), after the Error Timed OFF Delay has expired following the Overflow switch alarm clear.
31	RESERVED	
32	EVAPORATOR FROZEN COMPRESSOR 1	Compressor is off. Check SST sensor, air flow, charge, coil, air filter and outside air temperature.
33*	STRIKE 3 EVAPORATOR FROZEN COMPRESSOR 1	• Compressor is locked out. Check SST sensor, air flow, charge, coil, air filter and outside air temperature. • Number of occurrences is set using Parameter 81 (max freeze stat occ). Default is 3 occurrences.
34	EVAPORATOR FROZEN COMPRESSOR 2	Compressor is off. Check SST sensor, air flow, charge, coil, air filter and outside air temperature.
35*	STRIKE 3 EVAPORATOR FROZEN COMPRESSOR 2	• Compressor is locked out. Check SST sensor, air flow, charge, coil, air filter and outside air temperature. • Number of occurrences is set using Parameter 81 (max freeze stat occ). Default is 3 occurrences.
36	EVAPORATOR FROZEN COMPRESSOR 3	Compressor is off. Check SST sensor, air flow, charge, coil, air filter and outside air temperature.

Table 11. CORE Control System Alarm and Event Codes

SELECTED ALARMS (MARKED WITH * IN TABLE RESULT IN THE CLOSURE OF THE SERVICE RELAY CONTACTS (DO1).		
ALARM CODE	**DISPLAY MESSAGE**	**EVENT ACTION**
37*	STRIKE 3 EVAPORATOR FROZEN COMPRESSOR 3	• Compressor is locked out. Check SST sensor, air flow, charge, coil, air filter and outside air temperature. • Number of occurrences is set using Parameter 81 (max freeze stat occ). Default is 3 occurrences.
38	EVAPORATOR FROZEN COMPRESSOR 4	Compressor is off. Check SST sensor, air flow, charge, coil, air filter and outside air temperature..
39*	STRIKE 3 EVAPORATOR FROZEN COMPRESSOR 4	• Compressor is locked out. Check SST sensor, air flow, charge, coil, air filter and outside air temperature. • Number of occurrences is set using Parameter 81 (max freeze stat occ). Default is 3 occurrences.
40	RETURN AIR OVER HEAT LIMIT	Heat is above set point as defined by parameter 115.
41	RETURN AIR UNDER COOL LIMIT	Cool is below set point as defined by parameter 114.
42 - 43	RESERVED	
44*	GAS VALVE ON NO DEMAND GV1	Unit is off. Gas valve 2 has power, but no demand. Check gas valve and wiring.
45*	GAS VALVE ON NO DEMAND GV2	No 24VAC relay power on A60 (E1) board, K9-5 input. (A60)
46 - 49	RESERVED	
50	PRIMARY HEAT 1 LIMIT OPEN S10	Heat section 1 primary gas heat limit switch is open. Check air flow, air filter, limit switch and wiring.
51*	STRIKE3 PRIMARY HEAT 1 LIMIT OPEN	Heat section 1 primary gas heat limit switch is open. Check air flow, air filter, limit switch and wiring. Number of occurrences is reached.
52	SECONDARY HEAT 1 LIMIT OPEN S21	Heat section 1 secondary gas heat limit switch is open. Check air flow, air filter, limit switch and wiring.
53	RESERVED	
54	HEAT 1 S15 LIMIT OR ROLLOUT OPEN	Heat section 1 primary electric heat limit switch is open. Check air flow, air filter, limit switch and wiring.
55*	STRIKE 3 HEAT 1 S15 LIMIT OR ROLLOUT	Heat section 1 flame roll out burner 1 switch is open. Check gas roll out switch S47.
56	HEAT 1 CAI SWITCH S18	Check heat section 1 combustion air motor and proof switch.
57*	STRIKE 3 HEAT 1 CAI SWITCH S18	Check heat section 1 combustion air motor and proof switch. Number of occurrences is reached.
58	RESERVED	
59*	STRIKE 3 HEAT 1 NO PROOF GV1	Check heat section 1 ignition control, flame proof, gas valve 1 and gas supply. Number of occurrences is reached.
60	PRIMARY HEAT 2 LIMIT OPEN S99	Check heat section 2 primary burner limit switch to see if it is open. Check air flow, limit switch and wiring.
61*	STRIKE 3 PRIMARY HEAT LIMIT OPEN	Check heat section 2 primary burner limit switch to see if it is open. Check air flow, limit switch and wiring. Number of occurrences is reached.
62	SECONDARY HEAT 2 LIMIT OPEN S100	Heat section 2 secondary heat limit switch is open. Check air flow, limit switch and wiring.
63	RESERVED	
64	HEAT 2 CAI SWITCH S45	Flames have been detected outside the gas heater’s fire box.
65*	STRIKE3 HEAT 2 ROLL OUT OPEN	Check roll out sensor and gas supply.
66	HEAT 2 CAI SWITCH S45	Check heat section 2 combustion air motor and proof switch.
67*	STRIKE 3 HEAT 2 CAI SWITCH S45	Check heat section 2 combustion air motor and proof switch. Number of occurrences is reached.
68	RESERVED	
69*	STRIKE 3 HEAT 2 NO PROOF GV3	Check heat section 2 ignition control, flame roof, gas valve 2 and gas supply. Number of occurrences is reached.
70 - 72	RESERVED	
73	NETWORK SENSOR	Check with integrator for refresh rate, network status lights and wiring.

Table 11. CORE Control System Alarm and Event Codes

SELECTED ALARMS (MARKED WITH * IN TABLE RESULT IN THE CLOSURE OF THE SERVICE RELAY CONTACTS (DO1).		
ALARM CODE	**DISPLAY MESSAGE**	**EVENT ACTION**
74*	ZONE SENSOR	• If measurement is out of specified range (including open/short detection) the system will ignore the Zone Temperature Sensor readings and set the alarm. • If measurement of Zone Temperature Sensor is out of specified range (including open/short detection) the system will change operating mode to the specified Backup mode (None, Local Thermistor or Return Air temp). • The system will clear the alarm, if zone temperature sensor measurement is detected in specified operating range and return the system to monitoring the A2 sensor as the primary sensor input. Check zone (room) sensor and wiring
75*	OUTDOOR TEMP SENSOR	• If measurement of the outdoor temperature sensor is out of specified range (including open / short detection, the alarm will be activated. Alarm will automatically clear once in range condition is detected. • Check sensor and wiring.
76*	HUMIDITY SENSOR	• If measurement is below specified range (<5 % RH) the system will ignore the Relative Humidity readings. If measurement is above the specified range(>100% RH) the system will limit the value to 100%. • If measurement of Relative Humidity Sensor is below specified range while the dehumidification mode using RH sensor is enabled, the system will set an alarm. The system will clear the alarm if Relative Humidity sensor measurement is detected in specified operating range OR dehumidification mode using RH sensor is disabled. • Check sensor and wiring.
77*	DISCHARGE AIR TEMP SENSOR	• If measurement of the discharge air temperature sensor is out of specified range (including open / short detection, the alarm will be activated. Alarm will automatically clear once in range condition is detected. • Check sensor and wiring.
78*	RETURN AIR TEMP SENSOR	• If measurement of the return air temperature sensor is out of specified range (including open / short detection, the alarm will be activated. Alarm will automatically clear once in range condition is detected. • Check sensor and wiring.
79*	ID ADD ON BOARD PROBLEM	Add-on board problem, reset CORE Unit Controller to clear. When the communication alarm 80 persists for more than 30 seconds even after several retries for establishing the communication this Alarm is logged. Alarm can only be cleared by CORE Unit Controller reset.
80	ID ADD ON BOARD PROBLEM	When the CORE Unit Controller is not able to communicate with any attached add-on boards (C3 and GP3) this alarm code is logged. The CORE Unit Controller will retry to establish the communication once every 5 second. Alarm is automatically cleared once communication is restored.
81	REHEAT SETUP ERROR	Check reheat settings. Alarm 81 is raised under these two conditions: 1. If the user sets up the unit to use supermarket reheat on a non-gas unit. 2. If the user sets up the unit to use Humiditrol+ reheat but the heater type is heat pump
82	CONTROLLER RESET	If set when CORE Unit Controller powers up. Will Indicated reason for reset if known.
83 - 84	RESERVED	
85	INCORRECT HUMIDITROL	Check Humiditrol+ settings. Check Configuration ID 1, position 1 and verify that the position is not set to U. Should be set to either N (not installed) or H (Humiditrol). Alarm will automatically clear once correct option is set.
86*	CONFLICTING TSTAT INPUT	Check thermostat inputs for simultaneous heat and cooling wiring. Once condition is corrected, unit controller will resume operation after error time off day has expired.
87 - 90	RESERVED	
91*	OUTDOOR ENTHALPY SENSOR	• If Enthalpy Sensor failure is detected, the system will disable ‘Free Cooling’ operation. ***NOTE:*** *Valid Outdoor Enthalpy Sensor reading is required for both ‘ODE’ (Outdoor Enthalpy) and ‘ODE differential’ (Outdoor differential). Valid Indoor Enthalpy Sensor reading is required for ‘ODE differential’ (Outdoor differential).* • Check economizer Parameters 160 and 161. Also check enthalpy Parameters 162 and 163. • Check sensor and wiring.

Table 11. CORE Control System Alarm and Event Codes

SELECTED ALARMS (MARKED WITH * IN TABLE RESULT IN THE CLOSURE OF THE SERVICE RELAY CONTACTS (DO1).		
ALARM CODE	**DISPLAY MESSAGE**	**EVENT ACTION**
92*	INDOOR ENTHALPY SENSOR	If Enthalpy Sensor failure is detected, the system will disable 'Free Cooling' operation. ***NOTE:*** *Valid Outdoor Enthalpy Sensor reading is required for both 'ODE' (Outdoor Enthalpy) and 'ODE differential' (Outdoor differential). Valid Indoor Enthalpy Sensor reading is required for 'ODE differential' (Outdoor differential).* Check wiring and test A62 sensor using specified method in M3 application guide, section titled economizer checkout.
93*	UNIT OPERATING IN BACKUP MODE	• Check communication loss with network sensor or if CORE Unit Controller If NETWORK INTEGRATION is set to RTU STANDALONE MODE and backup sensor is set to RETURN AIR BACKUP. • While running in backup mode the unit controller will set this alarm. The unit controller will return from Backup mode to Primary (Main) mode on a reset or after the Primary mode (room Sensor is not in error or OR network communication is re-established and available for 300 seconds. • Backup mode alarm will be cleared on the reset OR after the unit controller has returned to primary (main) system mode.
94*	ZONE SETPOINT ERROR	Ensure that the heating and cooling set points honor the auto-changeover deadband.
95 - 98	RESERVED	
99*	OUTSIDE AIR VELOCITY SENSOR ERROR	Check sensor and wiring. This alarm activates when the A24 sensor input signal is continuously above 25% of sensor measuring range for more than five minutes with blower stopped. The CORE Unit Controller will disable the Outdoor Air CFM control. The alarm automatically clears when the sensor reading is below 10% sensor measuring range for one minute.
100 - 102	RESERVED	
103*	ADVANCED CONTROL SETUP ERROR	Check CORE Unit Controller Configuration ID 1 settings.
104 - 105	RESERVED	
106*	BUILDING PRESSURE SENSOR PROBLEM	Check sensor and wiring.
107*	DUCT SUPPLY PRESS SENSOR PROBLEM	Check sensor and wiring. The unit controller will set Supply Air Static Pressure Sensor (A30) error status if: • Input signal is above 4.9" wc for more than 30 seconds. OR • Input signal is below 0.1"wc 20 seconds after the blower has started with setting at or above Blower Output Static Duct Alarm Check. The CORE Unit Controller will clear the Supply Air Static Pressure Sensor (A30) error status and alarm after the expiration of Error Time OFF delay.
108	SUPPLY DUCT PRESS LIMIT EXCEEDED	• Check sensor and wiring. • The CORE Unit Controller will shutdown operation for Error Off time (Parameter 110) if supply air static pressure exceeds supply static shutdown setpoint for 20 seconds (default) Parameter 42. • The CORE Unit Controller will clear High Supply Static (Duct) Pressure after Error Off Time has expired and static duct pressure is below Supply Static Set Point Shutdown.
109*	STRIKE 3 SUPPLY DUCT PRESSURE LIMIT	• Check sensor and wiring. • Unit controller shall "lockout" a unit operation after the Max Static Duct Pressure Occurrences have occurred of Supply Static Pressure Sensor Error (alarm 107) and/or High Supply Static (Duct) Pressure (alarm 108). • User shall be able to clear supply static pressure lockout and alarm via User Interface. Supply Static Pressure lockout and alarm shall be cleared after the unit controller reset. • The number of strikes is three by default. this can be changed using Parameter 43. Optional occurrence setting is 1 to 7.
110	WAITING ON SENSOR DATA	Check network or comfort sensor and wiring.
111	PROFILE ERROR	Configuration profile unrecoverable. Settings may have changed.
112 - 120	RESERVED	
121*	LINE FREQUENCY MISMATCH	Power source line frequency is determined by the entered model number. This alarm is enabled by the Phase Voltage Detection feature. The CORE Unit Controller does not have an automatic clearing method, unit power cycle or reset will be required to re-evaluate the phase sequence again.

Table 11. CORE Control System Alarm and Event Codes

SELECTED ALARMS (MARKED WITH * IN TABLE RESULT IN THE CLOSURE OF THE SERVICE RELAY CONTACTS (DO1).		
ALARM CODE	**DISPLAY MESSAGE**	**EVENT ACTION**
122*	24VAC PRIMARY VOLTAGE LOW	• Low output voltage on T1 transformer. Alarm set when 24VAC voltage low if calculated RMS voltage is below low voltage alarm threshold for more than two seconds. System will stop unit operations (cooling, heating and ventilation). Low voltage threshold is 18VAC. • The CORE Unit Controller will clear alarm 24VAC Voltage Low if calculated RMS voltage is above Low Voltage Alarm Threshold + 1 VAC for more than two seconds. After the low 24VAC alarm has been cleared, the CORE Unit Controller will ignore all service demands until the Error Time Off Delay has expired.
123*	24VAC PRIMARY VOLTAGE HIGH	• High output voltage on T1 transformer. Alarm set when 24VAC voltage high if calculated RMS voltage is below low voltage alarm threshold for more than two seconds. System will stop unit operations (cooling, heating and ventilation). Low voltage threshold is 30VAC. • The CORE Unit Controller will clear alarm 24VAC Voltage high if calculated RMS voltage is above High Voltage Alarm Threshold + 1 VAC for more than two seconds. After the HIGH 24VAC alarm has been cleared, the CORE Unit Controller will ignore all service demands until the Error Time Off Delay has expired.
124*	24VAC SECONDARY VOLTAGE LOW	• Low output voltage on T1 transformer. alarm set when 24VAC voltage low if calculated RMS voltage is below low voltage alarm threshold for more than two seconds. System will stop unit operations (cooling, heating and ventilation). Low voltage threshold is 18VAC. • The CORE Unit Controller will clear alarm 24VAC Voltage Low if calculated RMS voltage is above Low Voltage Alarm Threshold + 1 VAC for more than two seconds. After the low 24VAC alarm has been cleared, the CORE Unit Controller will ignore all service demands until the Error Time Off Delay has expired.
125*	24VAC SECONDARY VOLTAGE HIGH	• High output voltage on T1 transformer. alarm set when 24VAC voltage high if calculated RMS voltage is below low voltage alarm threshold for more than two seconds. System will stop unit operations (cooling, heating and ventilation). Low voltage threshold is 30VAC. • The CORE Unit Controller will clear alarm 24VAC Voltage HIGH if calculated RMS voltage is above high voltage alarm Threshold + 1 VAC for more than two seconds. After the high 24VAC alarm has been cleared the CORE Unit Controller will ignore all service demands until the Error Time Off Delay has expired.
126*	LINE PHASING MISMATCH	During power up or reset of unit, Mismatch on single or 3 phase power, or reverse rotation on 3 phase detected. This alarm is enabled by the Phase Voltage Detection feature.
127	RESERVED	
128	RESERVED	
129*	VFD SHUTDOWN	Indoor blower VFD fault detected. The CORE Control System will start monitoring the motor status ten seconds after blower command is sent. The CORE Unit Controller will stop unit operation if fault conditions are detected. Check belt and for blower overload. Fix source of fault and cycle power to the RTU.
130	VFD BYPASS ENGAGED	VFD bypass mode. Mode is engaged. Blower may or may not be disengage.
131	RESERVED	
132	VFD BYPASS UNCONFIGURED	VFD bypass mode has not been selected. Unit operates as if bypass is not installed.
133 - 136	RESERVED	
137	DAMPER STUCK CLOSED	• The damper is not opening to the target percentage. Unit may be bringing in less than anticipated outdoor air. • Inspect damper and / or actuator for blockage. alarm is raised when damper actuator feedback exceeds 2v under target for 2 minutes. • Alarm will reset automatically when damper feedback falls to 1.8v within the target voltage.
138	RESERVED	
139	DAMPER STUCK OPEN	• The Damper is not closing to the target percentage. Unit may be bringing in more than anticipated outdoor air. • Inspect damper and / or actuator for blockage. alarm is raised when damper actuator feedback exceeds 2v under target for 2 minutes. • Alarm will reset automatically when damper feedback falls to 1.8v within the target voltage.
140 - 146	RESERVED	
147*	DAMPER FEEDBACK LOSS	During free cooling damper is not modulating.
148*	RESERVED	

Table 11. CORE Control System Alarm and Event Codes

SELECTED ALARMS (MARKED WITH * IN TABLE RESULT IN THE CLOSURE OF THE SERVICE RELAY CONTACTS (DO1).		
ALARM CODE	**DISPLAY MESSAGE**	**EVENT ACTION**
149*	OA DIFF PRESS SENSOR ERROR	Check outdoor air damper differential pressure sensor and wiring.
150*	NOT ECONOMIZING WHEN OAS	May be due to the damper motor being unplugged or disconnected.
151*	ECONOMIZING WHEN OANS	This may be due to damper motor being blocked or stuck open and therefore not closing.
152 - 164 RESERVED		
165	ECONOMIZER UNCONFIGURED	Configuration ID 1, position 2 is set to U. Select applicable option using setup/install wizard.
166	GAS CAB NO OPEN PROOF GV1	This alarm will occur when the combustion air pressure switch (S18) is detected as closed immediately after the furnace demand relay is energized and before the combustion air blower is energized. Gas valve 1.
167	GAS CAB NO OPEN PROOF GV2	This alarm will occur when the combustion air pressure switch (S45) is detected as closed immediately after the furnace demand relay is energized and before the combustion air blower is energized. Gas valve 2.
168 - 169	RESERVED	
170	POWER EXHAUST UNCONFIGURED	Configuration ID 1, position 3 is set as U (unconfigured).
171	POWER EXHAUST CONFIGURATION ERROR	Configuration ID 1, position 4 is set correctly. if position 3 is configured then position 4 must be also.
172	RESERVED	
173	AIRFLOW SWITCH CONFIGURATION ERROR	Verify that Configuration ID 2, position 1 is set correctly.
174	BYPASS DAMPER CONFIGURATION ERROR	Room bypass damper operation should only be used if blower is configured for CAV operation.. Unit Controller will only allow zone bypass unit operation if configuration ID1 is set correctly. Alarm will automatically clear when configuration conflict is corrected.
175	RESERVED	
176	SBUS OBSOLETE M2 COMMAND	This alarm occurs when a S-BUS primary device sends a M2 style command to the CORE Unit Controller. The alarm is immediately cleared and a history of the event is stored.
177	NO MODEL NUMBER	Missing model configuration data. Run setup > install and complete model number information.
178 - 185	RESERVED	
186*	BLOWER MOTOR FAULT	DirectPlus™ blower fault detected. The CORE Control System will start monitoring the motor status ten seconds after blower command is sent. The CORE Unit Controller will stop unit operation if fault conditions are detected. Fix source of fault and reset reboot CORE Unit Controller. ***NOTE:*** *For blowers connected via MODBUS, the alarming Value = any present motor alarms.* Sum of the error numbers equals the current fault, for example 48 means motor overheated (32 + 16): 1 - Phase failure (3-phase devices) or mains under voltage (1-phase devices) 4 - Power module overheated 8 - Communication error between M4 controller and blower 16 - Fan bad (general error, set with every error condition) 32 - Motor overheated 64 - Hall sensor error 128 - Locked motor 4096 - DC-link under voltage
187	INVERTER MINOR	• Alarming Value = Inverter error code • Possible alarming values for Alarm 187 are: > 12 - High Comp Current > 13 - High Heat sink temperature > 14 - High PFC input current • If the alarm continues after outdoor conditions have moderated, check the fan, charge and coil. Alarm 187 will automatically clear when minimum off time expires. • Refer to trouble shooting guide in service manual for more information.
	NOTE: *The inverter will automatically slow the compressor speed due to any of the above conditions and the condition drops below the time-based dependence of the system's output on present and past inputs.*	

Table 11. CORE Control System Alarm and Event Codes

SELECTED ALARMS (MARKED WITH * IN TABLE RESULT IN THE CLOSURE OF THE SERVICE RELAY CONTACTS (DO1).		
ALARM CODE	**DISPLAY MESSAGE**	**EVENT ACTION**
188	INVERTER MAJOR	• Alarming Value = Inverter error code • Possible alarming values for unit controller alarm 188 are: > 21 - Peak DC current > 22 - Maximum current reached lockout > 23 - DC Link low voltage > 26 - Locked Rotor > 28 - DC Link high voltage > 29 - Compressor over current > 61 - Low outdoor ambient inverter lockout > 62 - High Heat Sink Temperature lockout > 75 - Low Input Voltage • No action required. Compressor stops for the duration of the minimum run time. Unit shuts down after ten occurrences in one hour and Alarm 189 is initiated. Alarm 188 will automatically clear when inverter error clears. • Refer to trouble shooting guide in service manual for more information.
189	INVERTER FATAL	• Alarming Value = Inverter error code • Possible alarming values for alarm 189 are 21, 22, 23, 26, 28, 29, 61, 62 and 75. • Alarm 189 will clear upon manual reset. • Refer to trouble shooting guide in service manual for more information.
190	INVERTER COMMUNICATION ERROR	Unable to communicate with inverter. The unit controller will disable compressor operation. Replace communication cable between inverter and CORE Unit Controller. If alarm continues, replace CORE Unit Controller or inverter.
191	INVERTER VOLTAGE MISMATCH	The unit controller will disable compressor operation. Replace with correct inverter part.
192	HIGH TEMPERATURE (S7) COMPRESSOR 1	Check temperature trip switch. Compressor is off. Also check charge, fans and coil. The unit controller will clear the temperature trip alarm when corresponding compressor top cap temperature trip switch is detected as closed. Compressor will not restart until the corresponding temperature trip switch is closed and the minimum off delay has expired.
193	HIGH TEMPERATURE (S7) STRIKE 3 COMPRESSOR 1	The unit controller will disable compressor operation (lockout). Check switch, charge, fans and coil. Default is three occurrences. Alarm will be automatically cleared after removal of cooling demand.
194	CRITICAL LOSS CONDENSER AIRFLOW	Critical Loss of Condenser Airflow
195	CRITICAL LOSS OF CHARGE COMPRESSOR 1	Critical Loss of Charge Compressor 1. In Model L this is determined by temperature readings from sensors on the coils.
196	CRITICAL LOSS OF CHARGE COMPRESSOR 2	Critical Loss of Charge Compressor 2. In Model L this is determined by temperature readings from sensors on the coils.
197	CRITICAL LOSS OF CHARGE COMPRESSOR 3	Critical Loss of Charge Compressor 3. In Model L this is determined by temperature readings from sensors on the coils.
198	CRITICAL LOSS OF CHARGE COMPRESSOR 4	Critical Loss of Charge Compressor 4. In Model L this is determined by temperature readings from sensors on the coils.
199	CRITICAL LOSS OF EVAPORATOR AIRFLOW	Critical Loss of Evaporator Airflow.
200	COMPRESSOR 1 NOT OPERATING	Compressor 1 apparently not operating. Coil temperatures not changing as expected.
201	COMPRESSOR 2 NOT OPERATING	Compressor 2 apparently not operating. Coil temperatures not changing as expected.
202	COMPRESSOR 3 NOT OPERATING	Compressor 3 apparently not operating. Coil temperatures not changing as expected.
203	COMPRESSOR 4 NOT OPERATING	Compressor 4 apparently not operating. Coil temperatures not changing as expected.
204	COMPRESSOR 1 TXV FAILED CLOSED	Compressor 1 TXV Failed Closed.
205	COMPRESSOR 2 TXV FAILED CLOSED	Compressor 2 TXV Failed Closed.
206	COMPRESSOR 3 TXV FAILED CLOSED	Compressor 3 TXV Failed Closed.
207	COMPRESSOR 4 TXV FAILED CLOSED	Compressor 4 TXV Failed Closed.
208 - 217	RESERVED	

Table 11. CORE Control System Alarm and Event Codes

SELECTED ALARMS (MARKED WITH * IN TABLE RESULT IN THE CLOSURE OF THE SERVICE RELAY CONTACTS (DO1).		
ALARM CODE	**DISPLAY MESSAGE**	**EVENT ACTION**
218 219 220 221	SLT SENSOR FAILURE COMPRESSOR 1 SLT SENSOR FAILURE COMPRESSOR 2 SLT SENSOR FAILURE COMPRESSOR 3 SLT SENSOR FAILURE COMPRESSOR 4	Saturated Liquid Temperature sensor on the condenser coil is not giving expected values for the indicated compressor circuit. Alarming Values: 1 – Open Circuit: Less than or equal to -66°F (res >= 930kohms). 2 – Short Circuit: Greater than or equal to 500°F (res <= 24ohms). 3 – Out of Range: Less than -40°F or greater than 150°F. 4 – Dislodged (operational check) If alarm indicates “open”, “short” or “out of range” check sensor and wiring. Alarm clears when in-range condition is detected. If alarm indicates “dislodged”, check that the sensor is installed properly and is seated properly to the fitting and is not loose or improperly installed. Alarm clears on a controller reset.
222 223 224 225	LT SENSOR FAILURE COMPRESSOR 1 LT SENSOR FAILURE COMPRESSOR 2 LT SENSOR FAILURE COMPRESSOR 3 LT SENSOR FAILURE COMPRESSOR 4	Liquid Temperature sensor on the condenser coil is not giving expected values for the indicated compressor circuit. Alarming Values: 1 – Open Circuit: Less than or equal to -66°F (res >= 930kohms). 2 – Short Circuit: Greater than or equal to 500°F (res <= 24ohms). 3 – Out of Range: Less than -40°F or greater than 150°F. 4 – Dislodged (operational check) If alarm indicates “open”, “short” or “out of range” check sensor and wiring. Alarm clears when in-range condition is detected. If alarm indicates “dislodged”, check that the sensor is installed properly and is seated properly to the fitting and is not loose or improperly installed. Alarm clears on a controller reset.
226 227 228 229	SST SENSOR FAILURE COMPRESSOR 1 SST SENSOR FAILURE COMPRESSOR 2 SST SENSOR FAILURE COMPRESSOR 3 SST SENSOR FAILURE COMPRESSOR 4	Saturated Suction Temperature sensor on the evaporator coil is not giving expected values for the indicated compressor circuit. Alarming Values: 1 – Open Circuit: Less than or equal to -66°F (res >= 930kohms) 2 – Short Circuit: Greater than or equal to 500°F (res <= 24ohms) 3 – Out of Range: Less than -40°F or greater than 150°F 4 – Dislodged (operational check) If alarm indicates “open”, “short” or “out of range” check sensor and wiring. Alarm clears when in-range condition is detected. If alarm indicates “dislodged”, check that the sensor is installed properly and is seated properly to the fitting and is not loose or improperly installed. Alarm clears on a controller reset.
230 231 232 233	ST SENSOR FAILURE COMPRESSOR 1 ST SENSOR FAILURE COMPRESSOR 2 ST SENSOR FAILURE COMPRESSOR 3 ST SENSOR FAILURE COMPRESSOR 4	Suction Temperature sensor on the evaporator coil is not giving expected values for the indicated compressor circuit. Alarming Values: 1 – Open Circuit: Less than or equal to -66°F (res >= 930kohms) 2 – Short Circuit: Greater than or equal to 500°F (res <= 24ohms) 3 – Out of Range: Less than -40°F or greater than 150°F 4 – Dislodged (operational check) If alarm indicates “open”, “short” or “out of range” check sensor and wiring. Alarm clears when in-range condition is detected. If alarm indicates “dislodged”, check that the sensor is installed properly and is seated properly to the fitting and is not loose or improperly installed. Alarm clears on a controller reset.
234	DSI BOARD 1 ERROR	Direct Spark Ignition Board 1 Error. Restart DSI Board 1 and troubleshoot wiring. Replacement may be required.
235	DSI BOARD 2 ERROR	Direct Spark Ignition Board 2 Error. Restart DSI Board 2 and troubleshoot wiring. Replacement may be required.
236	DSI BOARD 1 FLAME LOSS	Direct Spark Ignition board 1 flame loss maximum reached. Board will be locked out for 1 hour. Check gas valve, ignition, and wiring. Lockout may be manually reset by removing power from the control for more than 1 second or removing the thermostat call for heat for more than 1 and less than 20 seconds.

Table 11. CORE Control System Alarm and Event Codes

SELECTED ALARMS (MARKED WITH * IN TABLE RESULT IN THE CLOSURE OF THE SERVICE RELAY CONTACTS (DO1).		
ALARM CODE	**DISPLAY MESSAGE**	**EVENT ACTION**
237	DSI BOARD 2 FLAME LOSS	Direct Spark Ignition board 2 flame loss maximum reached. Board will be locked out for 1 hour. Check gas valve, ignition, and wiring. Lockout may be manually reset by removing power from the control for more than 1 second or removing the thermostat call for heat for more than 1 and less than 20 seconds.
238	DSI BOARD 1 MODBUS ERROR	Direct Spark Ignition Board 1 Modbus Loss Error. Restart DSI Board 1 and troubleshoot wiring. Replacement may be required.
239	DSI BOARD 2 MODBUS ERROR	Direct Spark Ignition Board 2 Modbus Loss Error. Restart DSI Board 2 and troubleshoot wiring. Replacement may be required.
240	DSI BOARD 1 VALVE FAULT	Direct Spark Ignition board 1 loss of gas valve feedback detected. M4 will lockout gas valve 1 operation. Check gas valve and wiring.
241	DSI BOARD 2 VALVE FAULT	Direct Spark Ignition board 2 loss of gas valve feedback detected. 4 will lockout gas valve 2 operation. Check gas valve and wiring..
242	DSI BOARD 1 LOCKOUT	Direct Spark Ignition board 1 valve fault detected and is locked out. Multiple failures has occurred. Resolve ignition issues and restart unit. M4 will lock out gas valve 1 operation.
243	DSI BOARD 2 LOCKOUT	Direct Spark Ignition board 2 valve fault detected and is locked out. Multiple failures has occurred. Resolve ignition issues and restart unit. M4 will lock out gas valve 2 operation.
244	BLOWER DIFFERENTIAL PRESSURE SENSOR ERROR	A and B Box units equipped with ‘E’ type EBM blowers. - Blower differential pressure sensor error; replace sensor.
245 - 512	RESERVED	
513	ERROR READING USB DEVICE	Error Reading USB Device
514	USB DEVICE NOT MOUNTED	USB Device not Mounted
515	USB DEVICE FULL	USB Device Full
516	INVALID DIN NUMBER	Invalid DIN number received from M4 unit controller. Indicates DIN incompatibility
517	WCS LOW BATTERY CRITICAL	A paired wireless sensor has low battery - less than 2%
518	WCS LOW BATTERY HIGH	A paired wireless sensor has low battery - less than 10%
519	WCS LOW BATTER LOW	A paired wireless sensor has low battery - less than 20%
520	FWM SOFTWARE MISMATCH	Firmware Update Failed: Software Mismatch between M4 and W4
521	W4 STANDALONE	The W4 is unable to communicate to the M4 board.

16. Model L - CORE Service App - Unit Parameters

Table 12. CORE Control System Unit Parameters

Control Parameter No	Parameter Title	Control Value			Units	Description
		Min.	Default	Max.		
Power and Damper Parameters						
1 - 8	RESERVED					
9	Minimum Damper Position During High Speed Blower Operation	0	0	100	%	• Minimum damper position during low speed blower operation. • Use Parameter 132 during high speed blower operation
10	RESERVED					
11	Enabled Field Status Report		0 = OFF 1 = ON		Option	Enabled Field Status Report
12	Multi-Stage Air Volume Smoke Detection Mode (Alarm)	450	Default may be altered at factory test.	24000	CFM	Multi-Stage Air Volume Smoke Detection Mode (Alarm) ***NOTE:*** *In order for the SMOKE CFM change to take affect, go the* **SETUP > TEST & BALANCE > BLOWER** *and run the wizard. Performing this task will recalculate the output to the desired CFM. No adjustments are required during this procedure.*
13	RESERVED					
14	Multi-Stage Air Volume Cooling Hi CFM	450	5200	24000	COUNT	Increments of 25.
15	Multi-Stage Air Volume Cooling Medium CFM	450	3375	24000	COUNT	Increments of 25.
16	Multi-Stage Air Volume Cooling Medium Low CFM	450	3375	24000	COUNT	Increments of 25.
17	Multi-Stage Air Volume Cooling Low CFM	450	3375	24000	COUNT	Increments of 25.
18	RESERVED					
19	Maximum Cubic Feet Per Minute Revolutions Per Minute	445	Default may be altered at factory test.	1780	RPM	Maximum Cubic Feet Per Minute Revolutions Per Minute
20 - 26	RESERVED					
27	Minimum Output Cooling Vent Smoke Detection Mode (Alarm)	30	50	100	%	Minimum Output Cooling Vent Smoke Detection Mode (Alarm)
28	Minimum Output Heat	30	50	100	%	Minimum Output Heat
29	Minimum Damper Blower	0	Default may be altered at factory test.	101	%	Setting this Parameter to 101.0% will disable this feature.
30	Power Exhaust Stage 2 Minimum Blower	30	70	100	%	Power Exhaust Stage 2 Minimum Blower
31	Supply Proportional Base Control Loop for Variable Air Volume or Constant Air Volume with Bypass Damper	0	17	127	Counts	Variable Air Volume or Constant Air Volume with Bypass Damper supply PID Proportional constant.
32	Supply Integral Base Control Loop for Variable Air Volume or Constant Air Volume with Bypass Damper	0	12	127	Counts	Variable Air Volume or Constant Air Volume with Bypass Damper supply PID Integral constant.
33	Supply Derivative Base Control Loop for Variable Air Volume or Constant Air Volume with Bypass Damper	0	0	127	Counts	Variable Air Volume or Constant Air Volume with Bypass Damper supply PID derivative constant.

Table 12. CORE Control System Unit Parameters						
Control Parameter No	Parameter Title	Control Value			Units	Description
		Min.	Default	Max.		
34	Constant Air Volume with Bypass Damper Static Pressure Set Point During Smoke Alarm	0	1	5	in. w.c.	Constant air volume with bypass damper static pressure set point during smoke alarm.
35	Constant Air Volume with Bypass Damper Static Pressure Set Point for Ventilation	0	1	5	in. w.c.	Constant air volume with bypass damper static pressure set point for ventilation.
36	Constant Air Volume with Bypass Damper Static Pressure Set Point for Heating	0	1	5	in. w.c.	Constant air volume with bypass damper static pressure set point for heating
37	Constant Air Volume with Bypass Damper Static Pressure Set Point for Cooling	0	1	5	in. w.c.	Constant air volume with bypass damper static pressure set point for cooling
38	Constant Air Volume with Bypass Damper Minimum Output Percentage Set Point for Cooling, Ventilation and Smoke Alarms	20	20	100	%	• Constant air volume with bypass damper minimum output for cooling, ventilation and during smoke alarms. This sets the minimum air delivered. • Bypass damper motor is set to 10 to 2 volts with 10 volts being closed. • 20% setting = 2 volts or damper completely opened.
39	Constant Air Volume with Bypass Damper Minimum Output Percentage Set Point for Heating	20	20	100	%	• Constant air volume with bypass damper minimum output for heating. • This sets the minimum air delivered. • Bypass damper motor is set to 10 to 2 volts with 10 volts being closed. • 20% setting = 2 volts or damper completely opened.
40	Constant Air Volume with Bypass Damper Maximum Output Percentage Set Point	40	100	100	%	• Constant air volume with bypass damper maximum output. • This sets the maximum air delivered. • Bypass damper motor is set to 10 to 2 volts with 10 volts being closed. • 100% setting = 10 volts or damper completely closed.
41	Constant Air Volume with Bypass Damper Manual Reset Value Output Percentage Set Point	20	52	100	%	Constant air volume with bypass damper manual reset value output. This is the output when unit is off.
42	Air Supply Static Shutdown Set Point	0	2	5	in. w.c.	Supply static shutdown set point. Unit will shutdown for Parameter 110 minutes if duct pressure exceeds this value for 20 seconds.
43	Static Pressure Lockout Counter Set Point	1	3	7	Counts	The number of occurrences before permanent lockout. Counter resets when unit controller resets.
44	Supply Static Sensor (A30) Low Alarm Percentage Set Point	30	40	100	%	• Supply Static Pressure Sensor (A30) connected at (A133_P195_6) (TB18_6) alarm threshold. • Blower percent speed before checking sensor after a 20 second delay. • A value of 30% disables the low threshold or “open” alarm trap.
Electric Heating Parameters						
45 - 57	RESERVED					
58	Electric Heat Warm-up Time Delay for Economizer	0	3600	8160	Seconds	Warm-up time delay. The time that the economizer is forced closed during warm-up (first occupied + heat demand)
59	RESERVED					

Table 12. CORE Control System Unit Parameters

Control Parameter No	Parameter Title	Control Value			Units	Description
		Min.	Default	Max.		
60	Electric Heat Blower Off Delay Set Point.	0	System Dependent	300	Seconds	The time the blower stays off after the heating demand is satisfied.
61	Electric Heat Maximum Primary and Secondary	1	3	15	Counts	Service output activation. Maximum Primary and Secondary Limit occurrences stored before service relay is energized. ***NOTE:*** *Heating stage is not locked out.*
62	Electric Heat Time Delay Between Heat Stages	12	12	60	Seconds	Time delay between heat stages.
63	Electric Heat Maximum Lower Stage Run Time in Room Sensor Applications	0	912	3600	Seconds	• Stage up timer. The maximum time that lower stage runs before calling next heat stage. Used in room sensor applications. • Disabled if set to 0.
64	Electric Heat Time Delay for Lower Stage Termination Following Higher Stage Termination	0	0	3600	Seconds	• Time delay before a lower stage turns off following a higher stage termination. • Used in room sensor applications.
Gas Heating Parameters						
65	Gas Time Delay for Economizer Being Closed During Warm-up	0	3600	8160	Seconds	Warm-up time delay. The time that the economizer is forced closed during warm-up (first occupied + heat demand).
66	Gas Blower On Delay After Heating Demand	8	40	60	Seconds	The time before the blower turns on after a heating demand.
67	Gas Blower Off Delay After Heading Demand Termination	80	120	300	Seconds	The time the blower stays on after the heating demand is terminated.
69	Gas Minimum Low Fire Time Prior to High Fire	30	100	300	Seconds	The minimum low fire time before high fire is allowed.
70	Heating Off Delay Timer	30	100	300	Seconds	Heating off delay.
71	Maximum Combustion Air Inducer Proof Switch Occurrence Setting Prior To Service Output Energized.	1	3	5	Occurrences	Service relay activation. Maximum combustion air Inducer proof switch occurrences stored before service output is energized.
72	Maximum Combustion Air Inducer Proof Switch Occurrences	1	3	15	Occurrences	After the initial maximum combustion air Inducer proof switch closure, the system will continue to monitor the pressure switch and set alarm if three open occurrences are detected
73	Maximum Gas Valve Sense Occurrences Stored Prior to Service Output Is Energized	1	3	5	Occurrences	Service output activation. Maximum gas valve sense occurrences stored before service output is energized. ***NOTE:*** *Heating stage is not locked out.*
74	Gas Stage Up Timer	0	912	3600	Seconds	• Stage-up timer. The maximum time that lower stage runs before calling next heat stage. Used in room sensor applications. • Disabled if set to 0.
75	Gas Stage Down Timer	0	0	3600	Seconds	• Time delay before a lower stage turns off following a higher stage termination. • Used in room sensor applications.
Block 4 Cooling Parameters						
76 - 77	RESERVED					
78	Cool Down Time Delay	0	1792	8160	Seconds	• Cool down time delay. Time that Y2 is ignored during cool down period (when first occupied + cool demand) • This delay is only used if an economizer is used and the outdoor air is suitable.
79	Cooling Blower On Time Delay	0	0	60	Seconds	The time before the blower turns on after a cooling demand.
80	Cooling Blower Off Time Delay	0	60	240	Seconds	The time the blower stays on after the cooling demand is lost.

Table 12. CORE Control System Unit Parameters						
Control Parameter No	Parameter Title	Control Value			Units	Description
		Min.	Default	Max.		
81	Maximum Freeze Thermostat Occurrence	1	3	3	Occurrences	Service output activation and compressor lockout. Maximum freeze thermostat occurrences are stored before service relay is energized and compressor is locked-out.
82	Condenser Fan Restart Time Delay	0	6	16	Seconds	Low ambient anti-windmilling condenser fan delay. The time period that the last operating fan is turned off before starting the next fan.
83	Low Ambient Outdoor Air Limit Temperature 1 Set Point	10	40	60	ºF	• Low ambient outdoor air limit temp. 1. Parameters 83 and 84 are used to shed fans. • Temperature setting must be less than or equal to Parameter 84.
84	Low Ambient Outdoor Air Limit Temperature 2 Set Point	10	55	60	ºF	• Low ambient outdoor air limit temp. 2. Parameters 83 and 84 are used to shed fans. • Temperature setting must be greater than or equal to Parameter 83.
85	Low Ambient Temperature Lockout for Compressor 1	-31	0	80	ºF	• Low ambient lockout for compressor 1. • A value of (-31°F) will disable low ambient lockout function. • Temperature setting must be less than or equal to Parameter 86.
86	Low Ambient Temperature Lockout for Compressor 2	-31	0	80	ºF	• Low ambient lockout for compressor 2. • A value of (-31ºF) will disable low ambient lockout function. • Temperature setting must be greater than or equal to Parameter 85 and less than or equal to Parameter 87.
87	Low Ambient Temperature Lockout for Compressor 3	-31	0	80	ºF	• Low ambient lockout for compressor 3. • A value of (-31ºF) will disable low ambient lockout function. • Temperature setting must be greater than or equal to Parameter 86 and less than or equal to Parameter 88.
88	Low Ambient Temperature Lockout for Compressor 4	-31	0	80	ºF	• Low ambient lockout for compressor 4. • A value of (-31ºF) will disable low ambient lockout function. • Temperature setting must be greater than or equal to Parameter 87.
89	Compressor Minimum Off Delay	60	300	510	Seconds	Compressor minimum off delay.
90	RESERVED					
91	Compressor Minimum Run Time	60	240	510	Seconds	Compressor minimum run time.
92 - 93	RESERVED					
94	Compressor Staging Time	2	3	5	Seconds	Compressor staging time.
95 - 97	RESERVED					
98	Maximum High Pressure Occurrences	1	3	7	Occurrences	Maximum High Pressure occurrences that are stored before control locks off compressor stage and energizes the service output.
99	Maximum Low Pressure Occurrences	1	3	7	Occurrences	Maximum Low Pressure occurrences that are stored before control locks off compressor stage and energizes the service relay.
100	Low Pressure Switch Ignore Time	0	120	600	Seconds	Low Pressure Switch Ignore Time.
101	Maximum Stage 1 Cooling Time Before Call for Stage 2 Cooling	0	912	3600	Seconds	Stage 2 stage up timer. The maximum time that cooling stage 1 runs before calling cooling stage 2. Used in room sensor applications. Is disabled if set to 0.

Table 12. CORE Control System Unit Parameters						
Control Parameter No	**Parameter Title**	**Control Value**			**Units**	**Description**
		Min.	**Default**	**Max.**		
102	Maximum Stage 2 Cooling Time Before Call for Stage 3 Cooling	0	912	3600	Seconds	Stage 3 stage up timer. The maximum time that cooling stage 2 runs before calling cooling stage 3. Used in room sensor applications. Is disabled if set to 0.
103	Maximum Stage 3 Cooling Time Before Call for Stage 4 Cooling	0	912	3600	Seconds	Stage 4 stage up timer. The maximum time that cooling stage 3 runs before calling cooling stage 4. Used in room sensor applications. Is disabled if set to 0.
104	Cooling Stage Down Time	0	912	360	Seconds	Time delay before a lower stage turns off following a higher stage termination. Used in room sensor applications.
105	Dehumidification Mode	0	0 - No Humiditrol+ is installed 3 - All Others (Check Unit Parameter Label)	7	Option	Dehumidification Mode • **0** = No reheat (Default) • **4** = Relative Humidity measurement / display. No Humiditrol+ reheat. • **7** = Humiditrol+ reheat. Conditions: None • 8 = Humiditrol+ reheat. Conditions: Must be occupied
106	Dehumidification Set Point	0	60	99	% RH	• Percent relative humidity where supermarket or Humiditrol+ reheat demand is energized. Used of dehumid mode option 2, 3, 5, 6 or 7. Dehumidification is de-energized at set point – dead-band (Parameter 107)). • Digital Input 4 only. Energized input signal calls for dehumidification demand. L Connection Network Relative Humidity set point will override this set point. (Such as from NCP).
107	Dehumidification Dead Band (neutral zone)	1	3	10	% RH	Used of dehumidification Parameter 105, option 2, 3, 5, 6 or 7. Dehumidification is: • ON when relative humidity is equal to or greater than Parameter 106. • OFF when Relative Humidity is less than Parameter 106 minus Parameter 107.
108	Free Cooling Low Ambient Lockout Set Point	45	55	80	°F	When outdoor air is suitable for free cooling and an economizer is present, the compressor will not run when ambient is below this value.
109	Smoke Alarm Control	0	0	13	Option	Smoke alarm control options. • **0** = Blower off, exhaust fan off and fresh air damper closed. • **2** = Blower off, exhaust fan on and fresh air damper closed. • **9** = Blower on, exhaust fan off and fresh air damper opened. • **10** = Blower on, exhaust fan on and fresh air damper closed. • **11** = Blower on, exhaust fan on and fresh air damper opened.
110	Error Time Off Delay	64	300	1800	Seconds	Off time delay if a “no-run” error occurs.

Table 12. CORE Control System Unit Parameters						
Control Parameter No	Parameter Title	Control Value			Units	Description
		Min.	Default	Max.		
111	Cooling Staging Option	0	2	4	Option	Cooling staging options: • **0** = No cooling operation • **1** = Wired thermostat operation, Two cooling stages and units with Economizers > Y1 = Free Cooling, > Y2 = Adds all mechanical stages. • **2** = Wired thermostat operation. Two cooling stages and Units with Economizers > Y1 - Free Cooling > Y2 - adds first stage of mechanical. • **3** = Wired thermostat operation. Three cooling stages. > Y1 only - first stage, > Y2 only - second stage, > Y1+Y2 - third stage. ***NOTE:*** *Units with Economizers Y2 only adds first stage of mechanical, Y1+Y2 adds first and second stage of mechanical.* • 4 = Discharge air control. Up to four stages.
Block 5 Miscellaneous Parameters						
112	Heating Staging Option	0	0	1	Option	Heating staging options: • 0 = Disabled • 1 = Enabled.
113	Enable Return Air Temperature Limit	0	2	3	Option	Limit options: • 0 = Disabled • 1 = Cooling RAT Limit • 2 = Heating RAT Limit • 3 = Cooling and Heating RAT Limit
114	Cooling Return Air Limit	60	65	80	°F	• Return air limit for cooling. If the return air cooling limit is exceeded, the cooling demands are interrupted. • Parameter 113 must be set to 1 or 3 to be enabled.
115	Heating Return Air Limit	60	85	100	°F	• Return air limit for heating. If the return air heating limit is exceeded, the heating demands are interrupted. • Parameter 113 must be set to 2 or 3 to be enabled.
116	RESERVED					
117	Demand Control Ventilation Maximum Damper Open	0	50	100	%	Maximum allowed demand control ventilation damper open position.
118	Demand Control Ventilation Damper Start Open	0	700	2000	PPM	• Damper “start open” CO_2 set point for Demand Control Ventilation. • Level where fresh air damper begins to open.
119	Demand Control Ventilation Maximum Damper Full Open Set Point	0	1200	2000	PPM	• Damper “full open” CO_2 set point for Demand Control Ventilation. • Level where fresh air damper is opened to maximum.
120	Demand Control Ventilation Outdoor Air Control Hi Temperature Override Full Closed	-31	105	132	°F	High outdoor air temp. where fresh air damper is closed to minimum position.
121	Demand Control Ventilation Outdoor Air Control Hi Temperature Override Start Closing	-31	75	132	°F	High outdoor air temperature where fresh air damper begins to close.

Table 12. CORE Control System Unit Parameters						
Control Parameter No	Parameter Title	Control Value			Units	Description
		Min.	Default	Max.		
122	Demand Control Ventilation Outdoor Air Control Low Temperature Override Full Closed	-31	10	132	°F	Low outdoor air temperature where fresh air damper is closed to minimum position
123	Demand Control Ventilation Outdoor Air Control Low Temperature Override Start Closing	-31	40	132	°F	Low outdoor air temp. where fresh air damper begins to close.
124 - 126	RESERVED					
127	Outdoor Air Manual Reset	0	50	100	%	Manual reset value.
128	Outdoor Air Control PID P Constant	0	2	127	Counts	Outdoor Air Control PID P Constant
129	Outdoor Air Control PID I Constant	0	30	127	Counts	Outdoor Air Control PID I Constant
130	Outdoor Air Control PID D Constant	0	0	127	Counts	Outdoor Air Control PID D Constant
131	Free Cooling Maximum Damper	0	100	100	%	The maximum allowed fresh air damper opening for free cooling.
132	Minimum Damper Position	0	0	100	%	Minimum fresh air damper position during occupied operation.
133	Room Sensor Start-up Delay	120	120	1800	Seconds	• Suspends all unit operation room sensor and Constant Air Volume with bypass damper applications. • Suspends Fresh Air Heat Control-Reheat, Fresh Air Cooling Control, Fresh Air Heat Control options and all GP outputs. • May be used to stagger unit start-ups. Does NOT delay demands in thermostat mode.
134	Indoor Air Quality Input Mode	0	1	7	Option	Options are: • 0 = Ventilation is disabled. • 1 = Demand control ventilation with outdoor temperature limit and blower on. (Default) • 2 = Demand control ventilation without Outdoor Temperature Limit and Blower ON. • 3 = Demand control ventilation with Outdoor Temperature Limit and Blower AUTO / ON. • 4 = Demand control ventilation without Outdoor temperature Limit and no blower AUTO / ON. • 5 = Outdoor air control with outdoor temperature limit. • 6 = Outdoor air control without outdoor temperature limit • 7 = Building pressure control
System 1 Parameters						
136	RESERVED					
137	Occupied Heating Set Point	40	70	95	°F	• Backup occupied heating set point. • Used if the communications link is lost for 5 minutes between the M3 and NCP. Used only with room sensor applications. • Set point temperature must be less than or equal to (Parameter 139 minus Parameter 152).
138	Unoccupied Heating Set Point	40	60	95	°F	• Backup unoccupied heating set point. Used if the communications link is lost for 5 minutes between the unit controller and NCP. • Used only in room sensor applications. • Set point temperature must be less than or equal to (Parameter 140 minus Parameter 152).

Table 12. CORE Control System Unit Parameters						
Control Parameter No	Parameter Title	Control Value			Units	Description
		Min.	Default	Max.		
139	Occupied Cooling Set Point	40	75	95	°F	• Backup occupied cooling set point. • Used if the communications link is lost for 5 minutes between the unit controller and NCP. Used only in room sensor applications. • Set point temperature must be greater than or equal to Parameter 137 plus Parameter 152).
140	Unoccupied Cooling Set Point	40	85	95	°F	• Backup unoccupied cooling set point. • Used if the communications link is lost for 5 minutes between the CORE Unit Controller and network control panel. Used only in room sensor applications. • Set point temperature must be greater than or equal to Parameter 138 plus Parameter 152).
141	After Hours Override Time Delay	0	3600	28800	Seconds	• After hours override timer. • Only used on room sensor applications without a network control panel.
142	Heat Stage Deadband	1	1	3.75	°F	• Heating dead-band. Used only with CORE Unit Controller room sensor applications. • Dead band must be less than or equal to Parameter 152 minus Parameter 143.
143	Cool Stage Deadband	1	1	3.75	°F	• Cooling dead-band. Used only with room sensor applications. • Dead band must be less than or equal to parameter 152 minus parameter 142.
144	Cooling Stage 1 Differential	0	0.5	3	°F	• Cooling stage 1 differential. Used only with room sensor applications. • Differential temperature must be less than or equal to parameter 145.
145	Cooling Stage 2 Differential	0	1	3	°F	• Cooling stage 2 differential. Used only with room sensor applications. • Differential temperature must be greater than or equal to parameter 144 and less than or equal to parameter 146.
146	Cooling Stage 3 Differential	0	1.5	3	°F	• Cooling stage 3 differential. Used only with room sensor applications. • Differential temperature must be greater than or equal to parameter 145 and less than or equal to parameter 147.
147	Cooling Stage 4 Differential	0	2	3	°F	• Cooling stage 4 differential. Used only with room sensor applications. • Differential temperature must be greater than or equal to parameter 146.
148	Heating Stage 1 Differential	0	0.5	3	°F	• Heating stage 1 differential. Used only with room sensor applications. • Differential temperature must be less than or equal to Parameter 149.
149	Heating Stage 2 Differential	0	1	3	°F	• Heating stage 2 differential. Used only with room sensor applications. • Differential temperature must be greater or equal to Parameter 148.
150	Heating Stage 3 Differential	0	1.5	3	°F	• Heating stage 3 differential temperature. Used only with room sensor applications. • Differential temperature must be greater than or equal to Parameter 149.
151	Heating Stage 4 Differential	0	2	3	°F	• Heating stage 4 differential temperature. Used only with room sensor applications. • Differential temperature must greater than or equal to Parameter 150.

Table 12. CORE Control System Unit Parameters						
Control Parameter No	Parameter Title	Control Value			Units	Description
		Min.	Default	Max.		
152	Automatic Changeover Deadband	2	3	10	°F	• Minimum auto changeover dead-band temperature. Dead band must be greater than or equal to Parameter 142 plus Parameter 143. • Used in room sensor applications.
153	Automatic Changeover Delay	60	300	900	Seconds	Auto changeover time delay. Delay between heating and cooling modes.
154	Occupied Blower Mode	0	0	4	Option	Blower control option for room sensor applications during occupied periods. • **Auto Cycle**: Blower cycles with demand • **On-Continuous 1**: blower is on with either the occupancy sensor or occupancy schedule indicates occupied. • **On-Continuous 2**: Blower is on only when both the occupancy sensor and occupancy scheduler indicates occupied. • **On-Continuous 3**: lower is on only when both the occupancy sensor and occupancy scheduler indicates occupied. in addition, blower will be on a minimum of 25% of the time when occupancy scheduler indicates occupied by the occupancy sensor indicates not occupied. The 25% minimum is achieved by turning blower on for 30 minutes and off for 90 minutes.
155	Free Cooling Lockout Set Point	29	29	60	°F	• Locks out free cooling when outdoor temperature is below the set value. • Setting value to 29°F disables free cooling lockout.
156	Fresh Air Heating Setpoint	40	40	70	°F	Fresh air heating setpoint
157	Fresh Air Heating Stage Deadband	3	10	15	°F	Fresh Air Heating stage dead-band.
158	Fresh Air Heating Minimum Cycle Time	120	480	1800	Seconds	Fresh Air heating minimum cycle time.
159	Free Cooling Supply Set Point	45	55	65	°F	Economizer modulates dampers to maintain supply air temperature (RT6) at this set point during free cooling. DACC reset applies. See Parameter 207 - Parameter 201
160	Economizer Free Cooling Temperature Set Point	40	60	75	°F	Outdoor Air Temperature is less than Parameter Set Point between 41-75°F, or when Outdoor Air temperature is less than Return Air Temperature between 0-40°F.
161	Economizer Free Cooling Temperature Offset	0	10	40	°F	Economizer Free Cooling Temperature Offset
162	Economizer Free Cooling Enthalpy Set Point	10	12	19	mA	Economizer Free Cooling Enthalpy Set Point
163	Economizer Free Cooling Enthalpy Offset	0.2	1	5	mA	Economizer Free Cooling Enthalpy Offset

Table 12. CORE Control System Unit Parameters						
Control Parameter No	Parameter Title	Control Value			Units	Description
		Min.	Default	Max.		
164	Economizer Profile	0	2	3	Option	These are the operating profile options for the economizer damper during free cooling when any compressor is on and can be selected as follows: • **Option 0:** Damper continues to modulate while compressors are on, but the effect of mechanical cooling may force the damper closed to its minimum position. After compressor starts, the free cooling setpoint is lowered to a fixed temperature of 45°F. • **Option 1:** Damper opens to its max open position (Parameter 131 - FREE CL MAX DAMPER) when any compressors start. ***NOTE:*** *When using Option 1 and after the compressor is stopped, the M3 will resume damper modulation.* • **Option 2:** Damper continues to modulate while compressors are on, but the effect of mechanical cooling may force the damper closed to its minimum position. This is the factory default setting. > Holds off compressor on Y2 call until damper has modulated to maximum position (Parameter 131 - FREE CL MAX DAMPER) for three minutes. > After three minutes, compressor starts and the free cooling setpoint is lowered to 45°F. Damper is not locked at maximum open while compressor is on, but modulates to maintain 45°F discharge air temperature. > When Y2 is satisfied, compressor goes off and free cooling setpoint is restored to 55°F (Parameter 159 - FREE COOL SUPPLY SP). • **Option 3:** Same as Option 2, but with a 10 minute delay instead of a three minute delay.
System 2 Parameters						
165	Fresh Air Heating Stage Differential	0	2	20	°F	• Fresh Air Heating stage differential. • 0 value for first stage heating only for Fresh Air Heating.
166	Fresh Air Heating Control Reheat Outdoor Air Temperature Set Point	20	40	60	°F	Outdoor air temperature set point that enables fresh air heating for reheat demand and opens damper to parameter 167 when outdoor air is less than set point.
167	Fresh Air Heating Control Reheat Damper Position	5	40	100	%	Fresh air damper position during Fresh Air Heating reheat operation.
168	Fresh Air Heat Control Set Point	40	40	70	°F	Fresh Air Heating Reheat set point.
169	Fresh Air Tempering Automatic Changeover Delay	900	1800	7200	Seconds	Fresh Air Heating Control or Fresh Air Cooling Control air Tempering auto-changeover delay.
170	Fresh Air Cooling Setpoint	60	90	90	°F	Fresh air cooling setpoint.
171	Fresh Air Cooling Control Deadband	3	10	15	°F	Fresh Air Cooling stage dead-band.
172	Fresh Air Cooling Control Cycle Time	120	480	1800	Seconds	Fresh Air Cooling minimum cycle time.
173	Fresh Air Cooling Control Stage Differential	0	2	20	°F	• Fresh Air Cooling stage differential between stages. • Set to 0 for first stage cooling only for Fresh Air Cooling.
174	Discharge Air Control Heating Occupied Set Point	60	110	140	°F	Discharge Air Control Heating set point during occupied period.

Table 12. CORE Control System Unit Parameters						
Control Parameter No	Parameter Title	Control Value			Units	Description
		Min.	Default	Max.		
175	Discharge Air Control Heating Unoccupied Set Point	60	95	140	°F	Discharge Air Control Heating set point during unoccupied period.
176	Discharge Air Control Heating Stage Deadband	5	5	20	°F	Discharge Air Control Heating dead-band.
177	Discharge Air Control Heating Stage-Up Time Delay	0	180	900	Seconds	Discharge Air Control Heating and Fresh Air Heating stage-up time delay.
178	Discharge Air Control Heating and Fresh Air Heating Control Stage-Down Time Delay	0	120	600	Seconds	Discharge Air Control Heating and Fresh Air Heating stage-down time delay.
179	Discharge Air Control Heating Stage Differential	2	2	20	°F	Discharge Air Control Heating stage differential
180	Discharge Air Control Cooling Occupied Set Point	40	55	80	°F	Discharge Air Control Cooling set point during occupied period.
181	Discharge Air Control Cooling Unoccupied Set Point	40	65	100	°F	Discharge Air Control Cooling set point during unoccupied period.
182	Discharge Air Control Cooling Deadband Set Point	5	5	20	°F	Discharge Air Control Cooling stage dead-band.
183	Discharge Air Control Cooling and Fresh Air Cooling Stage-Up Delay	0	180	900	Seconds	Discharge Air Control Cooling and Fresh Air Cooling stage-up delay.
184	Discharge Air Control Cooling and Fresh Air Cooling Stage-Down Time Delay	0	120	600	Seconds	Discharge Air Control Cooling and Fresh Air Cooling stage-down time delay.
185	Discharge Air Cooling Stage Differential	2	2	20	°F	Discharge Air Cooling stage differential.

Table 12. CORE Control System Unit Parameters

Control Parameter No	Parameter Title	Control Value			Units	Description
		Min.	Default	Max.		
186	Service Output Control Mode	0	0	127	Option	A55 Service Output Control Mode = X + 32*Y + 16*Z **Input source = X:** • 0 = None • 1 = Compressor 1 duty cycle. (Compressor crankcase heater function.) > On when outdoor air temperature is less than or equal to Parameter 189 and greater than or equal to Parameter 192 seconds have passed with compressor 1 off. > Off when Outdoor Air temperature is greater than Parameter 189 plus 3°F (fixed dead-band) or is less than Parameter 192 seconds have passed with compressor 1 off • 2 = On when occupied. • 3 = On when blower on, • 4 = On when heating demand. • 5 = On when cooling demand. • 6 = On when heating or cooling demand. • 7 = System Relative Humidity (A55_P298_5 RH) • 8 = System Indoor Air Quality. (A55_P298_3 IAQ) • 9 = System Outdoor Air Temperature (A55_ P267_1/2 OAT) • 10 = Energy Recovery System • 11 = SCR Option for Electric Heat **Algorithm Y for input sources** 7 - 9: • 0 = Hysteresis loop (see sections 14.2 - 14.4) • 1 = Window - On when input is in range; (see sections 14.2 - 14.4) • 2 = Delayed-on. (see sections 14.2 - 14.4) • 3 = Delayed-off. (see sections 14.2 - 14.4) **Inversion Z:** • 0- Output not inverted. • 1- Output inverted.
187	Service Output Set Point for Carbon Dioxide	0	996	2000	ppm	A55 service relay output set point.
188	Service Output Set Point for Relative Humidity	0	100	100	%	Service Output Set Point for Relative Humidity
189	Service Output Set Point Temperature	-31	51	132	°F	Service Output Set Point Temperature
190	Service Output Deadband for Carbon Dioxide	16	102	2000	ppm	A55 service relay output dead-band or delay.
191	Service Output Deadband for Relative Humidity	2	13	100	%	Service Output Deadband for Relative Humidity
192	Service Output Deadband for Temperature	1	8	162	°F	Service Output Deadband for Temperature
193	Service Output Delay	64	416	8160	Seconds	Service Output Delay
194	Number of compressors to shed during load shedding	0	0	4	Option	Number of compressors to be turned off when load shedding is active. Applicable to Standard Efficiency 3- to 6-ton units only. Two-stage compressor, a value of one shuts off 2nd stage only and a value of 2 turns compressor completely off.
195 - 199	RESERVED					
System 3 Parameters						

Table 12. CORE Control System Unit Parameters						
Control Parameter No	Parameter Title	Control Value			Units	Description
		Min.	Default	Max.		
201	Discharge Air Control Cooling Outdoor Air Temperature Adjustment Band	0	0	30	°F	• Discharge Air Control Cooling outdoor temperature ambient cooling adjustment reset band. • Also used to reset free cooling set point (Parameter 159).
202	Discharge Air Control Cooling Outdoor Air Temperature Cooling Reset Set Point	40	80	100	°F	• Discharge Air Control Cooling outdoor air temperature cooling reset set point. • Also used to reset free cooling set point (Parameter 159).
203	Discharge Air Control Cooling Outdoor Ambient Air Temperature Cooling Proportional Band	1	20	60	°F	• Discharge Air Control Cooling outdoor ambient temperature cooling proportional band. • Also used to reset free cooling set point (Parameter 159).
204	Discharge Air Control Cooling Return Air Reset Adjustment Band	0	0	30	°F	• Discharge Air Control Cooling return air reset adjustment band. 0 disables return air cooling reset. • Also used to reset free cooling set point (Parameter 159).
205	Discharge Air Control Return Air Reset Adjustment Set Point	50	70	80	°F	• Discharge Air Control Cooling return air reset set point. • Also used to reset free cooling set point (Parameter 159).
206	Discharge Air Control Cooling Return Air Reset Proportional Band	1	10	30	°F	• Discharge Air Control Cooling return air reset proportional band. • Also used to reset free cooling set point (Parameter 159).
207	Discharge Air Control Cooling Reset Limit	5	10	20	°F	• Discharge Air Control Cooling total reset limit. This limits the total DACC reset allowed. • Also used to reset free cooling set point (Parameter 159).
208	Discharge Air Control Heating Outdoor Air Temperature Reset Adjustment Band	0	0	30	°F	Discharge Air Control Heating outdoor temperature reset adjustment band.
209	Discharge Air Control Heating Reset Adjustment Set Point	-31	40	60	°F	Discharge Air Control Heating outdoor temperature reset set point.
210	Discharge Air Control Heating Outdoor Air Temperature Reset Proportional Band	1	20	60	°F	Discharge Air Control Heating temperature reset proportional band.
211	Discharge Air Control Heating Return Air Temperature Adjustment Band	0	0	30	°F	Discharge Air Control Heating return reset adjustment band.
212	Discharge Air Control heating Return Air Heating Reset Set Point	50	70	80	°F	Discharge Air Control Heating return air heating reset set point.
213	Discharge Air Control Heating Return Air Heading Reset Proportional Band	1	10	30	°F	Discharge Air Control Heating return air heating reset proportional band.
214	Discharge Air Control Heating Return Air Heating Reset Limit	5	10	20	°F	Discharge Air Control Heating reset limit. This limits the total DACH reset allowed.
215	Exhaust Fan Stage 1 Damper Set Point	0	50	100	%	Exhaust fan stage 1 damper set point.
216	Exhaust Fan Stage 1 Damper Deadband	0	10	100	%	Exhaust Fan Stage 1 Damper Deadband

Table 12. CORE Control System Unit Parameters

Control Parameter No	Parameter Title	Control Value			Units	Description
		Min.	Default	Max.		
217	Stage 1 set point or VFD PE set point	-0.5	0.05	0.5	in w.c.	Exhaust Fan Stage 1 Pressure Set Point. or VFD Power Exhaust Building Pressure Set Point.
218	Stage 1 deadband	0	0.02	1	in w.c.	Exhaust Fan Stage 1 Pressure Deadband.
219	Exhaust Fan Stage 2 Damper Set Point	0	75	100	%	Exhaust Fan Stage 2 Damper Set Point
220	Exhaust Fan Stage 2 Damper Deadband	0	10	100	%	Exhaust Fan Stage 2 Damper Deadband
221	Stage 2 setpoint	-0.5	0.05	0.5	in w.c.	Exhaust Fan Stage 2 Pressure Set Point
222	Stage 2 deadband	0	0.05	1	in w.c.	Exhaust Fan Stage 2 Pressure Deadband.
223	Exhaust Fan Stage Up Delay	0	100	300	Seconds	Exhaust Fan Stage Up Delay
224	Exhaust Fan Stage Down Delay	0	100	200	Seconds	Stage 1 off-delay. (Only used for 2 stage operation)
225 - 257	RESERVED					
258	Display Unit (Fahrenheit or Celsius)		FAHRENHEIT or CELSIUS		Option	Temperature unit of measurement.
259 - 284	RESERVED					
285	Free Cooling Compressor Lockout Mode	0	2	2	Option	• 0 = Disable Free Cooling Low Ambient Compressor Lockout (default). • 1 = Lockout Compressor whenever the outdoor air is suitable regardless of outdoor air temperature. • 2 = Enable Free Cooling Low Ambient Compressor Lockout.
286	RESERVED					
287	Algorithms Enabled	Here is an example of the selection options for Algorithms Enable via the Lennox UC Software: **Set Bit Description** 0x00000002 Enable Fresh Air Heating (ALGO_FAH) 0x00000004 Enable Fresh Air Cooling (ALGO_FAC) 0x00000008 Enable DACC Return Air Reset (ALGO_DACC_RAT_RESET) 0x00000010 Enable DACC Outdoor Air Reset (ALGO_DACC_OAT_RESET) 0x00000020 Enable DACH Return Air Reset (ALGO_DACH_RAT_RESET) 0x00000040 Enable DACH Outdoor Air Reset (ALGO_DACH_OAT_RESET) 0x00000080 Enable Supply Static Pressure Sensor Alarm (ALGO_LO_STATIC_PRESSURE_ALARM) 0x00000100 Enable Low Outdoor Temp override of DCV/OAC operation (ALGO_LO_OAT_DCV_OAC_ OVERRIDE) 0x00000200 Enable High Outdoor Temp override of DCV/OAC operation (ALGO_HI_OAT_DCV_OAC_ OVERRIDE) 0x00000800 Enable Free Cooling Blower Stage Up .				
288 - 312	RESERVED					
313	Fresh Air Reheat Mode	0	0	3	Option	• 0 Disabled • 1 Allowed, must be occupied • 2 Allowed, blower must be energized and in occupied mode. • 3 Allow. No conditions apply.
314	MSAV Minimum VFD Drive Output	10	33	50	%	The CORE Unit Controller will ensure that active VFD drive output is equal or greater than Minimum VFD drive output. If conversion from CFM setting to VFD drive yields lower value. The system will use Minimum VFD drive output instead output.
315 - 316	RESERVED					
317	Outdoor Air Unit Options	0	0	2	Option	This Parameter is applicable in Zone Sensor mode (i.e. not applicable for local/remote thermostat mode).

Table 12. CORE Control System Unit Parameters						
Control Parameter No	Parameter Title	Control Value			Units	Description
		Min.	Default	Max.		
318 - 320	RESERVED					
321	Enthalpy High Temperature Limit	45	75	85	°F	When in Enthalpy mode, the outdoor air suitability (OAS) will be set only if the outdoor air temperature is lesser than this Parameter set point.
322	RESERVED					
323	Zone Sensor Calibration Offset	-5	0	5	°F	This setting is applicable to local temperature sensor only.
324 - 326	RESERVED					
327	Building Pressure Control Manual Reset	0	50	100	%	Manual reset value. This Parameter defines the default outdoor air damper position
328	Building Pressure Control PID P Constant	0	100	127	Count	BPC PID Proportional Constant
329	Building Pressure Control PID I Constant	0	30	127	Count	BPC PID Integral Constant
330 - 374	RESERVED					
375	Discharge Air Cooling Set Point	45	55	65	°F	Set point used by the compressor / DAT PI in room sensor mode to determine the compressor speed.
376	Discharge Air Cooling Enhanced Dehumidification Setpoint.	45	50	55	°F	Discharge Air Cooling Enhanced Dehumidification Setpoint. Set point used by the compressor / DAT PI in room sensor mode to determine the compressor speed in Enhanced Dehumidification mode.
377 - 385	RESERVED					
386	VAV supply static pressure set point	0	1	5	in w.c.	VAV supply static pressure set point during smoke operation.
387	VAV supply static pressure set point during ventilation	0	1	5	in w.c.	VAV supply static pressure set point during ventilation
388	VAV Heat Pressure Switch	0	1	5	in w.c.	VAV supply static pressure set point during heating
389	VAV Cooling Pressure Set point	0	1	5	in w.c.	VAV supply static pressure set point during cooling.
390	VAV Maximum Output	40	100	100	%	VAV PID loop max speed
391	VAV Manual Reset	0	60	100	%	VAV PID loop manual reset value.
392 -400	RESERVED					
401	Power Exhaust Mode	0	0	4	Options	• 0 Blower • 1 Always • 2 Occupied • 3 Exhaust Fan Digital Enable
402	Low Speed Cycling.		0	1	Options	• 0 = Disabled • 1 - Enables Low Speed Cycling.
403	Speed for stage 1 when using a VFD for controlling exhaust fan in staged mode.	0	50	100	%	Speed for stage 1 when using a VFD for controlling exhaust fan in staged mode.
404	Speed for stage 2 when using a VFD for controlling exhaust fan in staged mode.	0	100	100	%	Speed for stage 2 when using a VFD for controlling exhaust fan in staged mode.
405	Exhaust Fan set point for PID control	-0.50	-0.50	0.50	in w.c.	Exhaust Fan set point for PID control
406	Exhaust Fan PID loop min speed	0	50	100	%	Exhaust Fan PID loop min speed
407	Exhaust Fan PID loop max speed	0	100	100	%	Exhaust Fan PID loop max speed
408	Exhaust Fan PID loop manual reset value	0	100	100	%	Exhaust Fan PID loop manual reset value.

Table 12. CORE Control System Unit Parameters						
Control Parameter No	Parameter Title	Control Value			Units	Description
		Min.	Default	Max.		
409	Exhaust Fan PID loop proportional constant	0	20	127	Counts	Exhaust Fan PID loop proportional constant.
410	Exhaust Fan PID loop integral constant	0	64	127	Counts	Exhaust Fan PID loop integral constant
411	Exhaust Fan PID loop derivative constant	0	0	127	Counts	Exhaust Fan PID loop derivative constant
412 - 420	RESERVED					
421	Local Zone Sensor Type	0	0	1	Options	Local Zone Sensor Type. 0 = 11K 1 = 10K
422 - 450	RESERVED					
451	Enhanced Dehumidification Maximum Setpoint	50	50	55	°F	• The discharge air target used for zone temperature-based enhanced dehumidification (EDH-ZAT) operation when Zone Temperature setpoint is > 80F. • To configure EDH, use the RTU MENU > SETUP > INSTALL wizard.
452	Enhanced Dehumidification Minimum Setpoint	45	45	50	°F	• The discharge air target used for zone-temperature-based enhanced dehumidification (EDH-ZAT) operation when Zone Temperature setpoint is < 70F. • To configure EDH, use the RTU MENU > SETUP > INSTALL wizard.
453 - 462	RESERVED					
463	SST Minimum Setpoint	35	40	50	°F	Minimum Saturated Suction Temperature (SST) target for the RTU coil, used in Humiditrol+ operations.
464	SST Maximum Setpoint	40	45	50	°F	Maximum Saturated Suction Temperature (SST) target for the RTU coil, used in Humiditrol+ operations.
465 - 466	RESERVED					
467	Reheat Fan DAT Target TSTAT	50	70	100	°F	Discharge Air Temperature (DAT) target for reheat (Humiditrol+) operation. Condenser fans will attempt to control exiting air temperature to this value. This is used only in TSTAT applications.
468	Reheat Blower SST Target TSTAT	30	46	60	°F	Saturated Suction Temperature (SST) target for reheat (Humiditrol+) operation. This is only used in TSTAT Applications
469 - 476	RESERVED					
477	Free Cooling High Blower Error	10	60	90	%	Free Cooling threshold for high blower PI error. Used for determining when to add or remove mechanical cooling in Room Sensor Mode.
478	RESERVED					
479	Free Cooling Low Blower Error	0	15	50	%	Free Cooling threshold for minimum blower PI error. Used for determining when to enter free cooling in Room Sensor Mode.
480 - 510	RESERVED					
511	Freezestat SST Temperature	0	32	40	°F	Saturated Suction Temperature (SST) target for freezestat operation. The unit will register a freezestat trip when the SST falls below this setpoint for Parameter 514 seconds.
512 - 513	RESERVED					

Table 12. CORE Control System Unit Parameters						
Control Parameter No	Parameter Title	Control Value			Units	Description
		Min.	Default	Max.		
514	Freezestat SST Persistence Time	0	180	1800	Seconds	Saturated Suction Temperature (SST) persistence time for freezestat operation. The unit will register a freezestat trip when the SST falls below the setpoint listed in Parameter 511 for greater than this amount of time. *NOTE: Compressor staging, Blower staging, or transitions into free cooling will delay this response to allow refrigerant temperature stabilization.*

17. CORE Control System Inputs and Outputs

17.1. CORE Unit Controller (A55) Input/Outputs

Table 13. J304 (S-Bus)

P304	LABEL	SIGNAL DESCRIPTION	SIGNAL TYPE
-	B	RS485, B(-) inverting	0-5VDC
S	G	Ground, Current Limiting	GND
+	A	RS485, A(+) non-inverting	0-5VDC

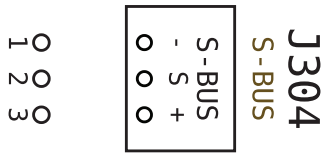


Table 14. J299 (Digital Input)

P299	LABEL	SIGNAL DESCRIPTION	SIGNAL TYPE
DI1	A173-SMOKE	Smoke Sensor	SW 24VAC IN
R	T1	Smoke 24VAC Power	24VAC OUT
C	GND	Ground	GND
DI2	DI2	Digital Input 2	SW 24VAC IN
R	T1	24VAC Power	24VAC OUT
DI3	DI3	Digital Input 3	SW 24VAC IN
R	T1	24VAC Power	24VAC OUT
DI4	HUMD_ST	Humidistat	SW 24VAC IN
C	COM	Ground	GND
		Not Used	

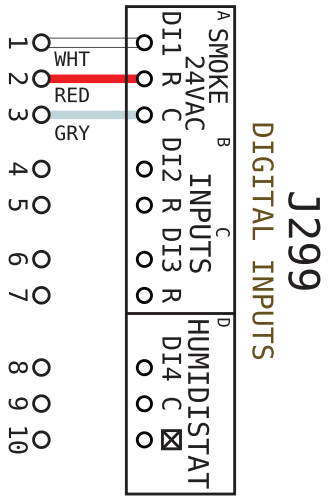


Table 15. J297 (TSTAT Inputs and Service Relays)

P297	LABEL	SIGNAL DESCRIPTION	SIGNAL TYPE
R	T1	24VAC Power	24VAC OUT
C	COM	Ground, T1	GND
G	G	G TSTAT Input	SW 24VAC IN
W1	W1	W1 Tstat Input	SW 24VAC IN
W2	W2	W2 Tstat Input	SW 24VAC IN
Y1	Y1	Y1 Tstat Input	SW 24VAC IN
Y2	Y2	Y2 Tstat Input	SW 24VAC IN
OCP	OCP	Occupancy Sensor	SW 24VAC IN
GLO	GLO	Global Input	SW 24VAC IN
DO1	DO1	Service Relay	24VAC OUT

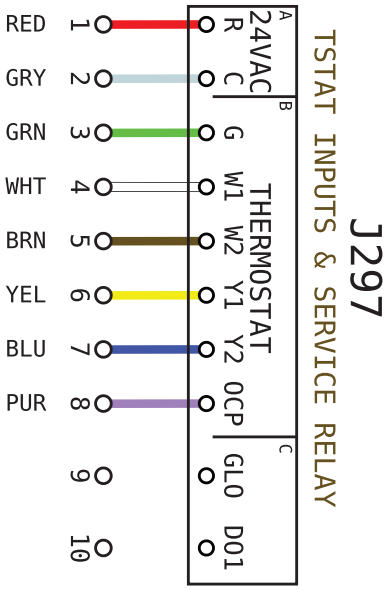


Table 16. J298 (Analog Sensors)

P298	LABEL	SIGNAL DESCRIPTION	SIGNAL TYPE
R	T1	24 VAC Power	24VAC OUT
C	GND	Ground	GND
AI1	A63-IAQ	ID Air Quality Sens	0-10VDC IN
GND	GND	Digital Ground	GND
HUM	A91-RH_SENS	Humidity Sensor	0-10VDC IN
GND	GND	Ground	GND
TMP	A2-ROOM_SENS	Room/Zone Temp Sens	THERM 3.3VDC
AI2	SPARE_AIN	Not Used	0-10VDC IN
C	GND	Digital Ground	GND
R	T1	24VAC Power	24VAC OUT

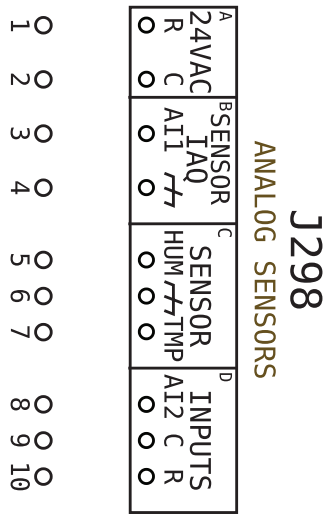


Table 17. J378 (Duct Sensors)

P378	LABEL	SIGNAL DESCRIPTION	SIGNAL TYPE
3	GND	Ground	GND
2	T1	24VAC Power	24VAC Power
1	A30	Static Duct Press Sensor	0-10VDC IN

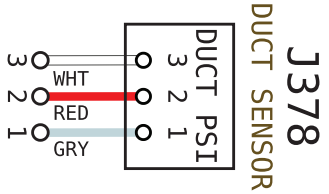


Table 18. J379 (Ultra Condenser)

P379 CAV#	LABEL	SIGNAL DESCRIPTION	SIGNAL TYPE
1	RT44	Comp 1 Liquid Temp Sens	THERM 3.3VDC
3	GND	Ground, RT44	GND
2	RT45	Comp 2 Liquid Temp Sens	THERM 3.3VDC
4	GND	Ground, RT45	GND

Table 19. J380 (Smart Air)

P380 CAV#	LABEL	SIGNAL DESCRIPTION	SIGNAL TYPE
1	5VDC	5VDC Supply	5VDC OUT
2		Damper Pressure Sensor	0-5VDC IN
3	GND	Ground, Damper PSI	GND

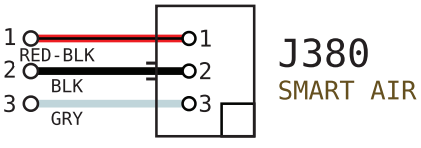


Table 20. J381 (Indoor Blower and Outdoor Fan Variable Speed)

P381 CAV#	LABEL	SIGNAL DESCRIPTION	SIGNAL TYPE
1	IDB	ID Blower ECM PWM1	PWM OUT 0-15V
6	GND	Ground, IDB	GND
2	IDB_RPM	ID Blower RPM Feedback	PWM IN 0-5V
7	GND	Ground, IDB_RPM	GND
3	BLWR_VO	Modulating Power Exhaust	0-10VDC OUT
8	GND	Ground, A137	GND
4	ODF1	Outdoor Fan PWM2	PWM OUT 0-18V
9	GND	Ground, ODF1	GND
5	ODF2	Outdoor Fan PWM3	PWM OUT 0-18V
10	GND	Ground, ODF2	GND

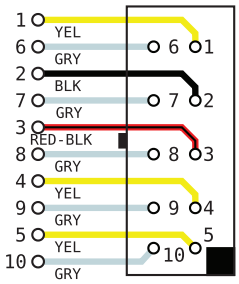


Table 21. J382 (All Evaporators)

P382 CAV#	LABEL	SIGNAL DESCRIPTION	SIGNAL TYPE
1	RT6-DAT	Discharge Air Temp Sensor	THERM 3.3VDC
4	GND	Ground, DAT RT6	GND
2	RT46	Comp 1 Sat Suct Temp Sensor	THERM 3.3VDC
5	GND	Ground, RT46	GND
3	RT47	Comp 2 Sat Suct Temp Sensor	THERM 3.3VDC
6	GND	Ground, RT47	GND

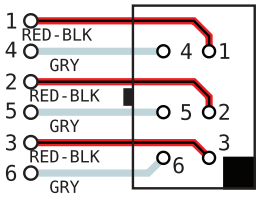


Table 22. J383 (Ultra Evaporators)

P383 CAV#	LABEL	SIGNAL DESCRIPTION	SIGNAL TYPE
1	RT42	Comp 1 Suct Temp Sensor	THERM 3.3VDC
3	GND	Ground, RT42	GND
2	RT43	Comp 2 Suct Temp Sensor	THERM 3.3VDC
4	GND	Ground, RT43	GND

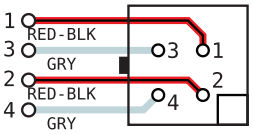
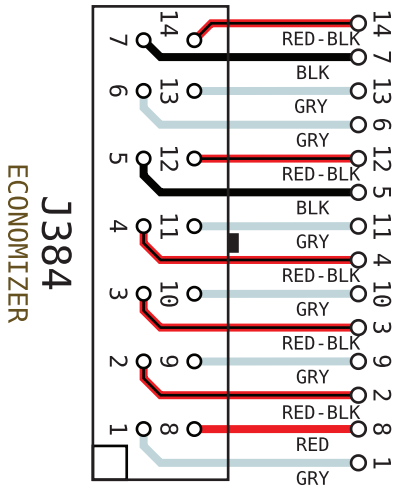
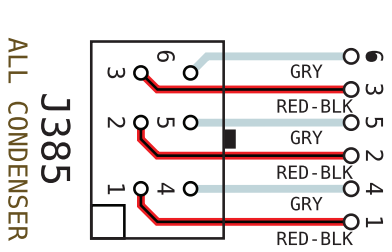


Table 23. J384 (Economizer)



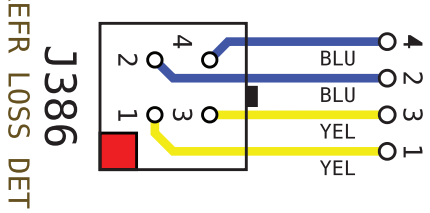
P384 CAV#	LABEL	SIGNAL DESCRIPTION	SIGNAL TYPE
14	18V	18VDC ID Enthalpy	18VDC
7	A62	ID Enthalpy Sensor	4-20mA IN
13	GND	Ground	GND
6	GND	Ground	GND
12	18V	18VDC OD Enthalpy	18VDC
5	A7	OD Enthalpy Sensor	4-20mA IN
11	GND	Ground, RAT	GND
4	RT16-RAT	RA Temp Sensor	THERM 3.3VDC
10	GND	Ground, DPOS	GND
3	DPOS	Econo, Act Pos Feedback	0-10VDC IN
9	GND	Ground, VOT	GND
2	VOT	Econo, Act Position	0-10VDC OUT
8	T1	24 VAC Power	24VAC OUT
1	GND	Ground	GND

Table 24. J385 (All Condensers)



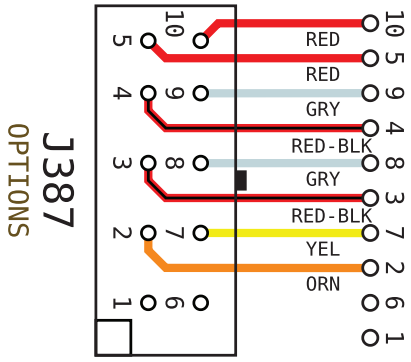
P385 CAV#	LABEL	SIGNAL DESCRIPTION	SIGNAL TYPE
6	GND	Ground, RT49	GND
3	RT49	Comp 2 Sat Liq Temp Sens	THERM 3.3VDC
5	GND	Ground, RT48	GND
2	RT48	Comp 1 Sat Liq Temp Sens	THERM 3.3VDC
4	GND	Ground, RT17	GND
1	RT17	OD Air Temp Sensor	THERM 3.3VDC

Table 25. J386 (Refrigerant Loss Detection)



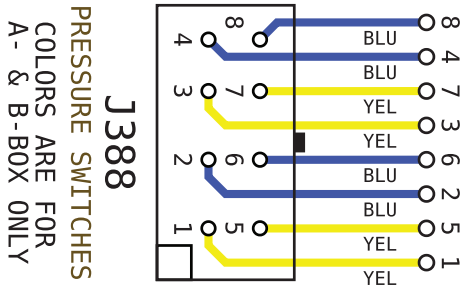
P386 CAV#	LABEL	SIGNAL DESCRIPTION	SIGNAL TYPE
4			
2			
3			
1			

Table 26. J387 (Options)



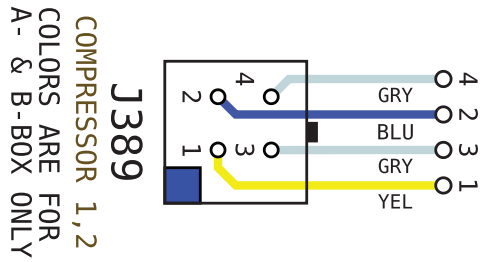
P387 CAV#	LABEL	SIGNAL DESCRIPTION	SIGNAL TYPE
10	T1	24 VAC Pwr, Overfl Sw	24VAC OUT
5	OVERFLOW	Overflow Switch	SW 24VAC
9	GND	Ground, Dirty Fltr Sw	GND
4	S27	Dirty Filter Switch	SW 5VDC
8	GND	Ground, Air Flow Sw	GND
3	S52	Air Flow Switch	SW 5VDC
7	GND	Ground, Ionizer BAS	GND
2	ION	Ionizer BAS	5VDC
6	GND	Ground, SPARE_1	GND
1	SPARE_1	Spare1	SW 5VDC

Table 27. J388 (Pressure Switches)



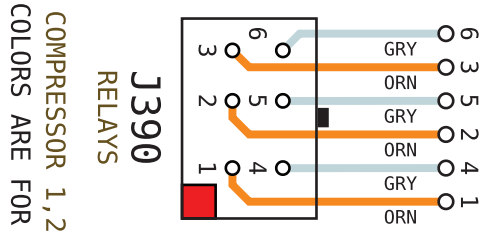
P388 CAV#	LABEL	SIGNAL DESCRIPTION	SW 24VAC
8	T1	24 VAC Power, LPSW2	24VAC OUT
4	S88-LPSW2	Low Press Sw Comp 2	SW 24VAC
7	T1	24 VAC Power, LPSW1	24VAC OUT
3	S87-LPSW1	Low Pres Sw Comp 1	SW 24VAC
6	T1	24 VAC Power, HPSW2	24VAC OUT
2	S7-HPSW2	High Press Sw Comp 2	SW 24VAC
5	T1	24 VAC Power, HPSW1	24VAC OUT
1	S4-HPSW1	High Press Sw Comp 1	SW 24VAC

Table 28. J389 (Compressors 1 and 2)



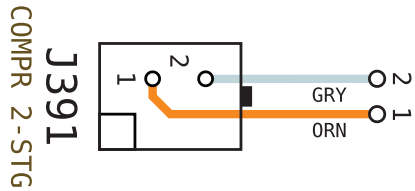
P389 CAV#	LABEL	SIGNAL DESCRIPTION	SIGNAL TYPE
4	GND	Ground, COMP2	GND
2	COMP2	Compressor 2	24VAC OUT
3	GND	Ground, COMP1	GND
1	COMP1	Compressor 1	24VAC OUT

Table 29. J390 (Relays)



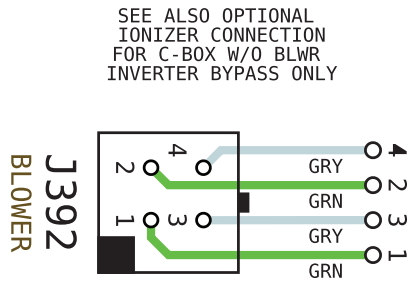
P390 CAV#	LABEL	SIGNAL DESCRIPTION	SIGNAL TYPE
6	GND	Ground, K65	GND
3	K65	Power Exhaust Stage 1	24VAC OUT
5	GND	Ground, K68	GND
2	K68	Outdoor Fan 2	24VAC OUT
4	GND	Ground, K10	GND
1	K10	Outdoor Fan 1	24VAC OUT

Table 30. J391 (Compressor 2-Stage)



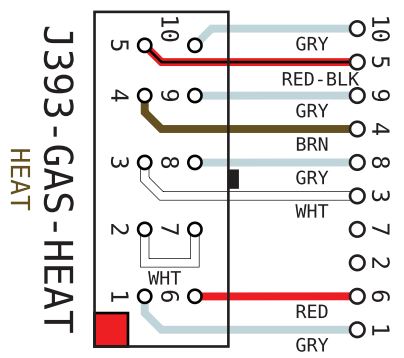
P391 CAV#	LABEL	SIGNAL DESCRIPTION	SIGNAL TYPE
2	GND	Ground, L34	GND
1	L34	Comp 1 stage 2 solenoid	24VAC OUT

Table 31. J392 (Blower)



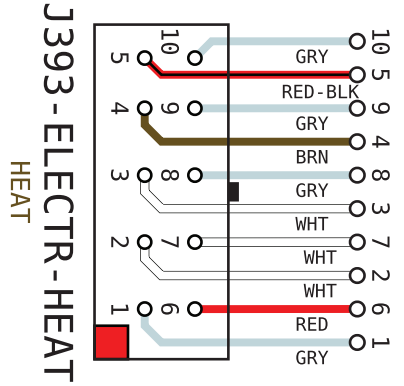
P392 CAV#	LABEL	SIGNAL DESCRIPTION	SIGNAL TYPE
4	GND	Ground, VFD Bypass	GND
2	BYPS	VFD Bypass	24VAC OUT
3	GND	Ground, Blower	GND
1	BLWR	Blower	24VAC OUT

Table 32. J393 (Gas Heat)



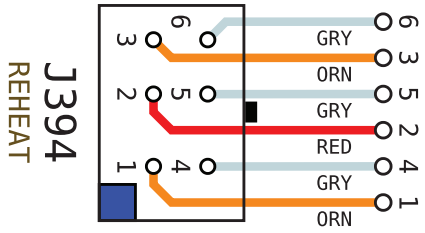
P393 CAV#	LABEL	SIGNAL DESCRIPTION	SIGNAL TYPE
10	GND	Ground, MGV	GND
5	MGV	Modul Gas Valve 0-10V	0-10VDC OUT
9	GND	Ground, HEAT2	GND
4	HEAT2-K16	Heat 2, Elec Heat 2	24VAC OUT
8	GND	Ground, HEAT1	GND
3	HEAT1-K15	Heat 1, Elec Heat 1	24VAC OUT
7	EH_LIMIT	Elec Ht Limit Sw Return	SW 24VAC OUT
2	EH_LIMIT	Elec Ht Limit Sw	24VAC OUT
6	T18	24 VAC Power	24VAC OUT
1	GND	Ground	GND

Table 33. J393 (Electric Heat)



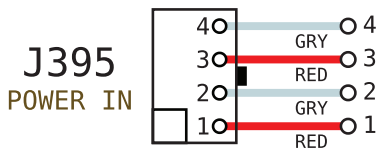
P393 CAV#	LABEL	SIGNAL DESCRIPTION	SIGNAL TYPE
10	GND	Ground, MGV	GND
5	MGV	Modul Gas Valve 0-10V	0-10VDC OUT
9	GND	Ground, HEAT2	GND
4	HEAT2-K16	Heat 2, Elec Heat 2	24VAC OUT
8	GND	Ground, HEAT1	GND
3	HEAT1-K15	Heat 1, Elec Heat 1	24VAC OUT
7	EH_LIMIT	Elec Ht Limit Sw Return	SW 24VAC OUT
2	EH_LIMIT	Elec Ht Limit Sw	24VAC OUT
6	T18	24 VAC Power	24VAC OUT
1	GND	Ground	GND

Table 34. J394 (ReHeat)



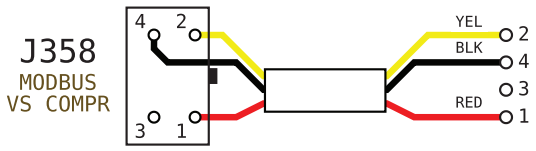
P394 CAV#	LABEL	SIGNAL DESCRIPTION	SIGNAL TYPE
6	GND	Ground, REHEAT2	GND
3	L30	Humiditrol (Reheat) 2	24VAC OUT
5	GND	Ground, T43	GND
2	T43	24 VAC Power	24VAC IN
4	GND	Ground, REHEAT1	GND
1	L14	Humiditrol (Reheat) 1	24VAC OUT

Table 35. J395 (Power In)



P395 CAV#	LABEL	SIGNAL DESCRIPTION	SIGNAL TYPE
4	GND	Transformer T18, 24VAC return	GND
3	T18	Transformer T18, 24VAC	24VAC IN
2	GND	Transformer T1, 24VAC return	GND
1	T1	Transformer T1, 24VAC	24VAC IN

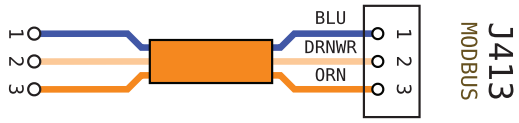
Table 36. J358 (MODUS Variable Speed Compressor)



P395 CAV#	LABEL	SIGNAL DESCRIPTION	SIGNAL TYPE
2	B	RS485, B (-) inverting	0-5VDC
4	G	Ground, Current limited	GND
3		Not Used	
1	A	RS485, A (+) non-inverting	0-5VDC

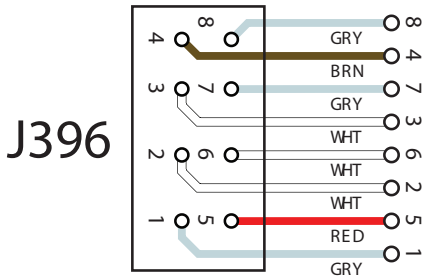
Table 37. J413 (Modbus)

P413	LABEL	SIGNAL DESCRIPTION	SIGNAL TYPE
1	A	RS485, A(+) non-inverting	0-5VDC
2	G	Ground, Current Limiting	DRAINWIRE
3	B	RS485, B(-) inverting	0-5VDC



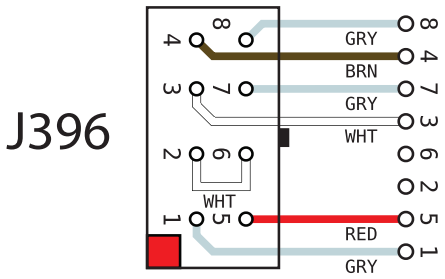
17.2. C4 Control (A178)

Table 38. J396 (Electric Heat)



P396 CAV#	LABEL	DESCRIPTION	TYPE
8	GND	Ground, HEAT4	GND
4	HEAT4	Heat 4	24VAC OUT
7	GND	Ground, HEAT3	GND
3	HEAT3	Heat 3	24VAC OUT
6	EH_LIMIT	Elec Ht Limit Sw Rtrn	SW 24VAC
2	EH_LIMIT	Elec Ht Limit Sw	24VAC OUT
5	24VAC_EXT	24 VAC Power	24VAC OUT
1	GND	Ground, 24VAC_EXT	GND

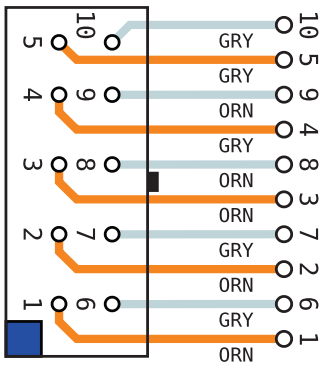
Table 39. J396 (Gas Heat)



P396 CAV#	LABEL	DESCRIPTION	TYPE
8	GND	Ground, HEAT4	GND
4	HEAT4	Heat 4	24VAC OUT
7	GND	Ground, HEAT3	GND
3	HEAT3	Heat 3	24VAC OUT
6	EH_LIMIT	Elec Ht Limit Sw Rtrn	SW 24VAC
2	EH_LIMIT	Elec Ht Limit Sw	24VAC OUT
5	24VAC_EXT	24 VAC Power	24VAC OUT
1	GND	Ground, 24VAC_EXT	GND

Table 40. J397 (Compressor Fans)

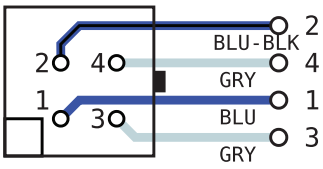
J397



P397 CAV#	LABEL	DESCRIPTION	TYPE
10	GND	Ground, PE2	GND
5	PE2	Power Exhaust Stg 2	24VAC OUT
9	GND	Ground, ODF6	GND
4	ODF6	Outdoor Fan 6	24VAC OUT
8	GND	Ground, ODF5	GND
3	ODF5	Outdoor Fan 5	24VAC OUT
7	GND	Ground, ODF4	GND
2	ODF4	Outdoor Fan 4	24VAC OUT
6	GND	Ground, ODF3	GND
1	ODF3	Outdoor Fan 3	24VAC OUT

Table 41. J398 (Compressors 3 and 4)

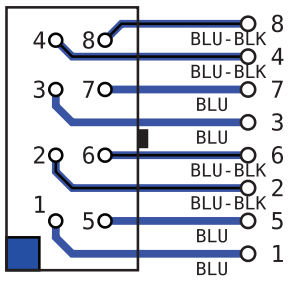
J398



P398 CAV#	LABEL	DESCRIPTION	TYPE
2	COMPR4	Compressor 4	24VAC OUT
4	GND	Ground, COMPR4	GND
1	COMPR3	Compressor 3	24VAC OUT
3	GND	Ground, COMPR3	GND

Table 42. J399 (Pressure Switches 3 and 4)

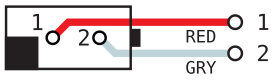
J399



P399 CAV#	LABEL	DESCRIPTION	TYPE
8	24VAC_EXT	24 VAC Power, HPSW4	24VAC OUT
4	S96-HPSW4	High Press Sw Comp 4	SW 24VAC
7	24VAC_EXT	24 VAC Power, HPSW3	24VAC OUT
3	S28-HPSW3	High Press Sw Comp 3	SW 24VAC
6	24VAC_EXT	24 VAC Power, LPSW4	24VAC OUT
2	S97-LPSW4	Low Press Sw Comp 4	SW 24VAC
5	24VAC_EXT	24 VAC Power, LPSW3	24VAC OUT
1	S98-LPSW3	Low Press Sw Comp 3	SW 24VAC

Table 43. J400 (24VAC)

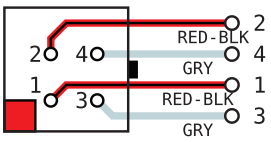
J400



P400 CAV#	LABEL	DESCRIPTION	TYPE
1	24VAC_IN	External 24VAC Power	24VAC IN
2	GND	Ground, 24VAC Power Return	GND

Table 44. J401 (All Evaporators)

J401



P401 CAV#	LABEL	DESCRIPTION	TYPE
2	RT51	Comp 4 Sat Suct Temp Sensor	THERM 3.3VDC
4	GND	Ground, RT51	GND
1	RT50	Comp 3 Sat Suct Temp Sensor	THERM 3.3VDC
3	GND	Ground, RT50	GND

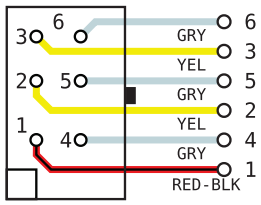
Table 45. J402 (Ultra Evaporators)

J402

P402 CAV#	LABEL	DESCRIPTION	TYPE
4	GND	Ground, RT55	GND
3	RT55	Comp 4 Suct Temp Sensor	THERM 3.3VDC
2	GND	Ground, RT54	GND
1	RT54	Comp 3 Suct Temp Sensor	THERM 3.3VDC

Table 46. J403 (Options)

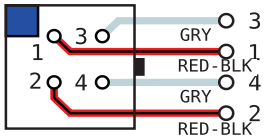
J403



P403 CAV#	LABEL	DESCRIPTION	TYPE
6	GND	Ground, ODF3	GND
3	ODF3	Outdoor Fan PWM4	PWM OUT 0-18V
5	GND	Ground, ODF4	GND
2	ODF4	Outdoor Fan PWM5	PWM OUT 0-18V
4	GND	Ground, PE_VFD	Ground, PE_VFD
1	PE_VFD	Power Exhaust VFD Control	0-10VDC OUT

Table 47. J404 (All Condensors)

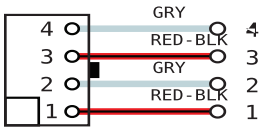
J404



P404 CAV#	LABEL	DESCRIPTION	TYPE
3	GND	Ground, RT52	GND
1	RT52	Comp 3 Sat Liq Temp Sens	THERM 3.3VDC
4	GND	Ground, RT53	GND
2	RT53	Comp 4 Sat Liq Temp Sens	THERM 3.3VDC

Table 48. J404 (Ultra Condensers)

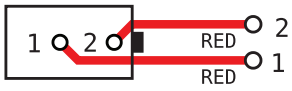
J405



P405 CAV#	LABEL	DESCRIPTION	TYPE
1	RT56	Comp 3 Liq Temp Sens	THERM 3.3VDC
2	GND	Ground, RT56	GND
3	RT57	Comp 4 Liq Temp Sens	THERM 3.3VDC
4	GND	Ground, RT57	GND

Table 49. J410 (GV1) (S18)

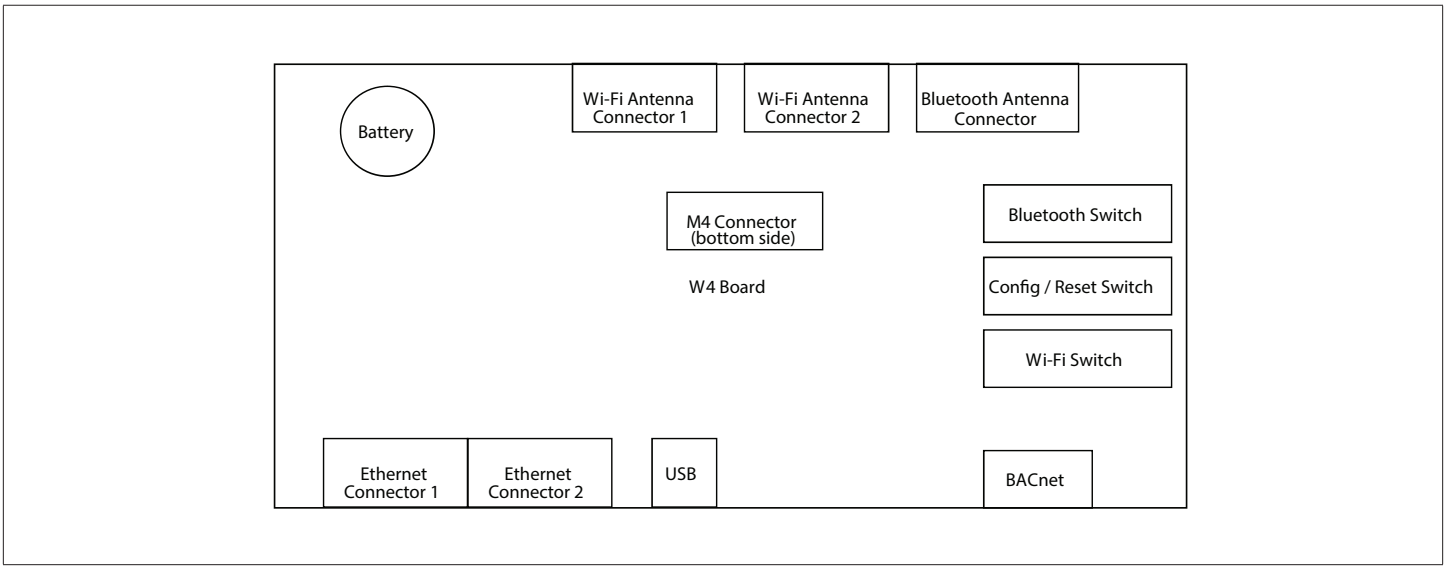
J10 (S18)



P410 CAV#	LABEL	DESCRIPTION
2	S18, S45 OUT	24VAC DIGITAL ON/OFF
1	S18, S45 IN	24VAC

17.3. W4 Control

Table 50. W4 Control



18. Quick Start Guide

CAUTION

Check rooftop unit electrical power for proper voltage and phasing. Check gas train components.

a. Turn on unit and dismiss alarm messages as necessary.

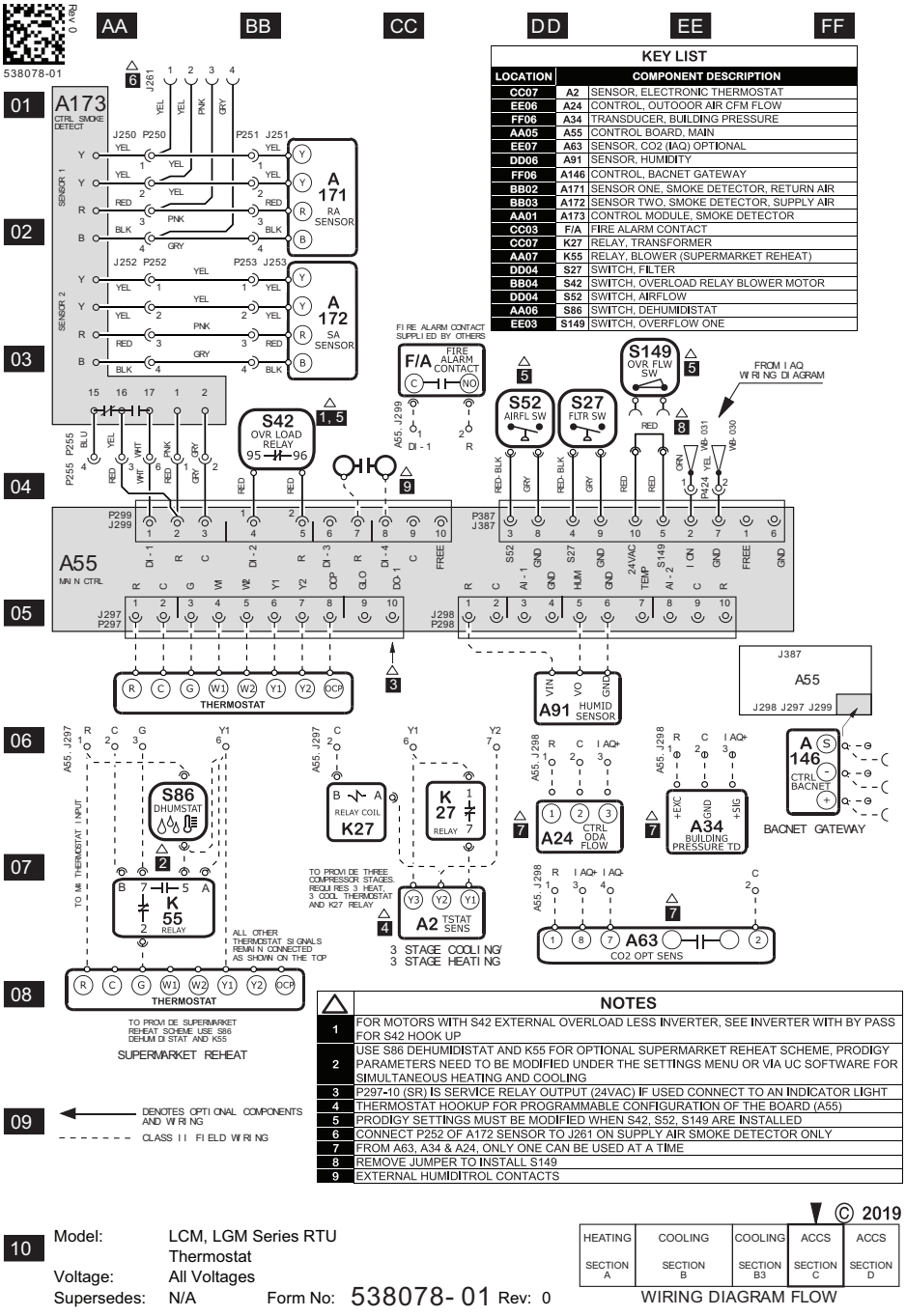
b. Follow SETUP > INSTALL menu to properly configure unit

c. Be sure unit is in normal operating mode as seen in display (COOLING, HEATING, IDLE, etc).

d. To verify operation use SERVICE > TEST menu.

Control Mode	Menu Setup Needed	Tips
THERMOSTAT	(Factory set for 2-stage thermostat)	Check LEDs for signals.
BACnet	SETUP > NETWORK INTEGRATION > NETWORK WIZARD > NETWORK TYPE = BACNET MS/TP	• Setup information to be verified with integrator. • Follow wiring instructions including network termination • Remember to set MAC address 0-127 • Expert level BACnet service manual available.
LonTalk	SETUP > NETWORK INTEGRATION > NETWORK WIZARD > = LONTALK	• Setup information to be verified with integrator. • Follow wiring instructions including network termination • XIF file available. Neuron ID on sticker. • Expert level LonTalk service manual available.
Damper	SETUP > TEST & BALANCE > DAMPER	• Verify damper minimum positions • Refer to Economizer section of manual for more detail
Local Mode	SETUP > NETWORK INTEGRATION > NETWORK WIZARD > RTU STANDALONE	• Give unit time to start-up. • Humidity control requires sensor or error code 7649
Dehumidifier	Dehumidifier setup will be done during the SETUP >INSTALL wizard. It's the last part of that wizard.	• Three possible connections, LOCAL SENSOR, NETWORK SENSOR and REHEAT DI4. • Analog sensor wiring is polarity sensitive
Blower	Change motor torque; see SETUP > TEST & BALANCE > BLOWER	• Final motor CFM should be set by Test and Balance technician • Blower charts are located in the unit installation instruction.

19. Wiring Diagrams



KEY LIST		
LOCATION		COMPONENT DESCRIPTION
CC07	A2	SENSOR, ELECTRONIC THERMOSTAT
EE06	A24	CONTROL, OUTOOOR AIR CFM FLOW
FF06	A34	TRANSDUCER, BUILDING PRESSURE
AA05	A55	CONTROL BOARD, MAIN
EE07	A63	SENSOR, CO2 (IAQ) OPTIONAL
DD06	A91	SENSOR, HUMIDITY
FF06	A146	CONTROL, BACNET GATEWAY
BB02	A171	SENSOR ONE, SMOKE DETECTOR, RETURN AIR
BB03	A172	SENSOR TWO, SMOKE DETECTOR, SUPPLY AIR
AA01	A173	CONTROL MODULE, SMOKE DETECTOR
CC03	F/A	FIRE ALARM CONTACT
CC07	K27	RELAY, TRANSFORMER
AA07	K55	RELAY, BLOWER (SUPERMARKET REHEAT)
DD04	S27	SWITCH, FILTER
BB04	S42	SWITCH, OVERLOAD RELAY BLOWER MOTOR
DD04	S52	SWITCH, AIRFLOW
AA06	S86	SWITCH, DEHUMIDISTAT
EE03	S149	SWITCH, OVERFLOW ONE

	NOTES
1	FOR MOTORS WITH S42 EXTERNAL OVERLOAD LESS INVERTER, SEE INVERTER WITH BY PASS FOR S42 HOOK UP
2	USE S86 DEHUMIDISTAT AND K55 FOR OPTIONAL SUPERMARKET REHEAT SCHEME, PRODIGY PARAMETERS NEED TO BE MODIFIED UNDER THE SETTINGS MENU OR VIA UC SOFTWARE FOR SIMULTANEOUS HEATING AND COOLING
3	P297-10 (SR) IS SERVICE RELAY OUTPUT (24VAC) IF USED CONNECT TO AN INDICATOR LIGHT
4	THERMOSTAT HOOKUP FOR PROGRAMMABLE CONFIGURATION OF THE BOARD (A55)
5	PRODIGY SETTINGS MUST BE MODIFIED WHEN S42, S52, S149 ARE INSTALLED
6	CONNECT P252 OF A172 SENSOR TO J261 ON SUPPLY AIR SMOKE DETECTOR ONLY
7	FROM A63, A34 & A24, ONLY ONE CAN BE USED AT A TIME
8	REMOVE JUMPER TO INSTALL S149
9	EXTERNAL HUMIDITROL CONTACTS

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Model: LCM, LGM Series RTU
Thermostat
Voltage: All Voltages
Supersedes: N/A Form No: 538078- 01 Rev: 0

HEATING	COOLING	COOLING	ACCS	ACCS
SECTION A	SECTION B	SECTION B3	SECTION C	SECTION D

WIRING DIAGRAM FLOW

7x10 CUT SIZE

REV	EC NO.	DATE	BY	APVD	REVISION NOTE
---	CN-008594	10/15/2020	RV	MXR6	ORIGINATED AT PD&R CARROLLTON, TX

Figure 36. Wiring Diagram - Part 1

20. FCC Compliance Statement

PART 15.19 This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: 1. This device may not cause harmful interference, and 2. This device must accept any interference received, including interference that may cause undesired operation. FCC Interference Statement — PART 15.105 (B) This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures: • Reorient or relocate the receiving antenna. • Increase the separation between the equipment and receiver. • Connect the equipment into an outlet on a circuit different from that to which the receiver is connected. • Consult the dealer or an experienced radio/TV technician for help. RF Exposure Information This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. In order to avoid the possibility of exceeding the FCC radio frequency exposure limits, human proximity to the antenna shall not be less than 20cm during normal operation.

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