AAON Touchscreen Mini Controller

User's Manual

⚠ WARNING

QUALIFIED INSTALLER

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 trained, qualified installer. A copy of this manual should be kept with the unit.

Table of Contents

V71810 · Rev. A · 160425

Index of Figures

Index of Tables

AAON® Touchscreen Mini Controller Features and Options

- User-Friendly, High-Contrast, 4.3" Touch Screen Interface
- Temperature and Humidity Control
- Simple Field Wiring - Five Wires Between Unit and Touchscreen Controller
- Up To Two Compressors
- On/Off, Two-Step, and Variable Capacity Compressor Control
- Single or Dual Variable Capacity Scroll Compressor Control
- Selectable Mode Enable Sensors
- Space-Supply Reset Functions
- Outside Air Flow Monitoring
- Constant Air Volume, Variable Air Volume, Single Zone VAV, and Makeup Air Control
- Hydronic Air Handling Unit
- Chilled Water and Hot Water Fully Modulating Valve Control
- Daily and Weekday/Weekend Scheduling
- Admin, Operator, and User Security Profiles
- Alarms
- BACnet MS/TP Network Connection (RS-485)
- Modbus RTU Network Connection (RS-485)
- Up to Four Stages of Gas or Electric Heat
- Modulating Gas/SCR Electric Heat
- Up to Four Stages of Auxiliary/Emergency Heat
- Modulating SCR Electric Preheat

Options Available

- Sensible, Enthalpy, or Comparative Enthalpy Controlled Fully Modulating Economizer
- CO_2 Override
- Outside Airflow Monitoring Control
- Condenser Fan Head Pressure Control
- Water-Cooled Condenser Control
- Exhaust Fan Building Pressure Control
- Energy Recovery Wheel Control
- Space Humidity Control
- Outside Air Humidity Control
- Fan Status
- Clogged Filter Switch

Safety

Attention should be paid to the following statements:

NOTE - Notes are intended to clarify the unit installation, operation and maintenance.

⚠ **CAUTION** - Caution statements are given to prevent actions that may result in equipment damage, property damage, or personal injury.

⚠ **WARNING** - Warning statements are given to prevent actions that could result in equipment damage, property damage, personal injury or death.

⚠ **DANGER** - Danger statements are given to prevent actions that will result in equipment damage, property damage, severe personal injury or death.

⚠ WARNING

ELECTRIC SHOCK, FIRE OR EXPLOSION HAZARD

Failure to follow safety warnings exactly could result in dangerous operation, serious injury, death or property damage.

Improper servicing of HVAC equipment could result in dangerous operation, serious injury, death or property damage.

- Before servicing, disconnect all electrical power to the equipment. More than one disconnect may be provided.
- When servicing controls, label all wires prior to disconnecting. Reconnect wires correctly.
- Verify proper operation after servicing. Secure all doors with key-lock or nut and bolt.

⚠ WARNING

Electric shock hazard. Before servicing, disconnect all electrical power to the equipment, including remote disconnects, to avoid shock hazard or injury from rotating parts. Follow proper Lockout-Tagout procedures.

⚠ WARNING

GROUNDING REQUIRED

All field installed wiring must be completed by qualified personnel. Field installed wiring must comply with NEC/CEC, local and state electrical code requirements. Failure to follow code requirements could result in serious injury or death. Provide proper unit ground in accordance with these code requirements.

⚠ WARNING

During installation, testing, servicing and troubleshooting of the equipment it may be necessary to work with live electrical components. Only a qualified licensed electrician or individual properly trained in handling live electrical components shall perform these tasks.

Standard NFPA-70E, an OSHA regulation requiring an Arc Flash Boundary to be field established and marked for identification of where appropriate Personal Protective Equipment (PPE) be worn, should be followed.

1. READ THE ENTIRE USER'S MANUAL. OTHER IMPORTANT SAFETY PRECAUTIONS ARE PROVIDED THROUGHOUT THIS MANUAL.

2. Keep this manual and all literature safeguarded near the equipment.

Installation

The AAON Touch Screen Mini Controller has been designed for simple HVAC system control.

⚠ 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 trained, qualified installer. A copy of this manual should be kept with the unit.

Codes and Ordinances
HVAC system should be sized in accordance with the American Society of Heating, Refrigeration and Air Conditioning Engineers Handbook.

Installation of equipment must conform to the ICC standards of the International Mechanical Code, the International Building Code, Installation of Air Conditioning and Ventilating Systems Standard, NFPA 90A, and local building, plumbing and waste water codes. All appliances must be electrically grounded in accordance with local codes, or in the absence of local codes, the current National Electric Code, ANSI/NFPA 70 or the current Canadian Electrical Code CSA C22.1.

Receiving Unit
When received, the controller should be located and checked for damage that might have occurred in transit. It should be stored in a safe place until installation.

AAON Touch Screen Mini Controller Specifications

Touchscreen Controller -
AAON Part Number: V62130
Unit Controller -
AAON Part Number: V62370

Supply Voltage: 24 VAC (+15%/-10%), Class-2

Supply Power: 10 VA

Connections: Wire clamp type terminal blocks; 14-22 AWG, copper; 4 pin EIA-485

Outputs: Analog outputs produce 0-10 VDC, 5 mA maximum

Relay Outputs: Maximum output current for individual relays is 5A @ 24 VAC. 10A maximum total for all relays. Relays are Normally Open, Single Pole Single Throw, Form A

Inputs:
Resistive Inputs: 10K Type 3 Thermistor
Voltage Inputs: 500 uA/0-10 VDC
Binary Inputs: 15 mA/24 VAC

Display: 480 x 272 pixel dot matrix LCD

Case Material:
White flame retardant ABS plastic

Dimensions:
4 x 5.25 x 1.2 inches (H x W x D)

Weight:
.4268 lbs (6.83 oz)

Approvals:
UL 916 Energy Management Equipment
FCC Class B, Part 15, Subpart B

Temperature Sensor:
Solid State
Accuracy:
+/-0.9°F (+/-0.5°C) from 0-70°C
Resolution:
+/- 0.1°F (+/-0.2°C)
Operating Range:
-4-158°F (-20-70°C)
Response Time:
2-30 seconds

Humidity Readings
Range:
0-95% RH
Accuracy:@ 30°C
+/-3% RH (20-80% RH)

Environmental Limits
Operating:
-4-158°F (-20-70°C)
Storage Temperature:
-22-176°F (-30-80°C)
Humidity:
0-95% RH non-condensing

⚠ WARNING

Disconnect all electrical power sources before servicing the unit. More than one power source may be provided. Failure to do so may result in injury or death from electrical shock or entanglement in moving parts.

Mounting the Controller
For optimum performance controller should be mounted on an interior wall 4-5 feet above the floor away from heat sources, sunlight, windows, air vents and air circulation obstructions.

1. Complete rough-in wiring at each location prior to controller installation.
2. Tabs must be pulled out to remove the front display from the backplate.
3. Route wiring through the backplate.
4. Fasten the backplate directly to a vertical 2x4 inch wall handy box.
5. Make the appropriate connections to the terminal block.
6. Snap controller cover over the backplate using the tabs on the top and bottom while being careful not to pinch or dislodge any wiring.

⚠ CAUTION

Prevent mounting screw heads from touching the circuit board in the controller Use only the mounting screws provided with the controller. Using screws other than the type supplied may damage the controller.

Electrical
Connection terminations are made to the main terminal block of the controller and the HVAC equipment.

A complete set of unit specific wiring diagrams, showing factory and field wiring are laminated in plastic and located inside the controls compartment door of the AAON HVAC equipment.

AAON Touchscreen Mini Controller Backplate Layout

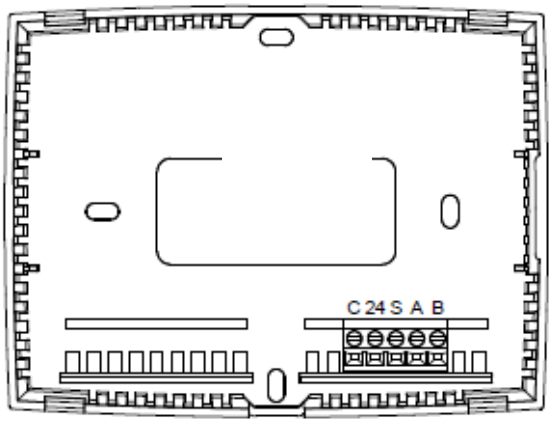


Figure 1 - Backplate Terminal Locations

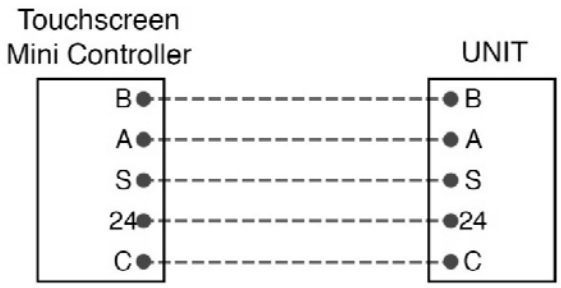


Figure 2 - Backplate Terminals and Field Wiring to the Unit

Touchscreen Mini Controller
C = Common
24 = 24 VAC
S = Shield
A = Communication
B = Communication

Control Wiring
Control wiring size must be large enough to prevent excess voltage drop and ensure proper operation. Control voltage returning from controller circuit must be a minimum of 21 VAC. If the voltage at the connectors is less than 21 VAC, isolation relays must be installed. If under external control 21 VAC must be field verified. To assure proper wiring use the following table to determine the allowable wiring distances.

Table 1 - Control Wiring

Wire Size (Stranded) - Copper Conductors Only	Total Wire Distance Allowable	Individual Wire Distance Allowable
20 AWG	200 ft	40 ft
18 AWG	350 ft	70 ft
16 AWG	500 ft	100 ft
14 AWG	750 ft	150 ft
12 AWG	1250 ft	250 ft

Total Wire Distance Allowable =
(Quantity of Control Wires) x
(Control Wire Distance)

Take the total wire distance allowable and divide by the quantity of wires to be connected. This indicates the distance allowable for that size wire. The wiring to the unit must not exceed the total wire distance allowable. Field wiring between the unit and space controller will always require 5 wires.

All external devices must be powered via a separate external power supply.

Example:
A total of 5 wires must be pulled 75 ft to space controller from the unit. What size wire should be used?

According to Table 1, 16 AWG allows for 100 ft and 18 AWG allows for 70 ft. Thus, 16 AWG wire should be used.

BACnet MS/TP EIA-485 Wiring
Connect the A terminals in parallel with all other A terminals on the network and the B terminals in parallel with all other B terminals. Connect the shields of the cable together at each device using a wire nut. Connect the cable shield to a good earth ground at one end only.

Controllers on the physical ends of the EIA-485 wiring segment must have end-of-line termination.

⚠ CAUTION

Relays are for Class-2 (24 VAC) only. Do not connect line voltage to the relays.

⚠ CAUTION

Do not mistakenly connect 24 VAC to an analog output ground. This is not the same as a relay's switched common. See the backplate terminal label for the correct terminal.

Power Connection

The Touchscreen Mini controller requires a 24 VAC power source. AAON requires powering the Touchscreen Mini controller with the transformer in the HVAC unit along with the communication wiring from the Unit Controller to the Touchscreen Mini Controller in the space.

Controller Specifications

Unit Controller
AAON Part Number: V62370

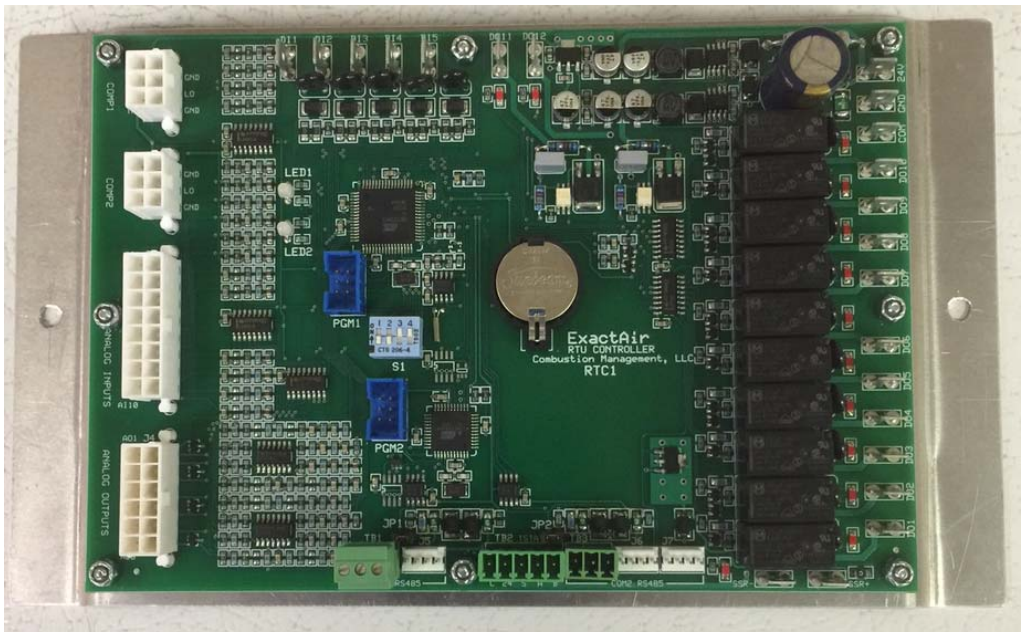


Figure 3 - Unit Controller located in the HVAC equipment

CR2032 3V battery on the controller is used for clock.

Space Controller
AAON Part Number: V62130

Figure 4 - Space Mounted Touchscreen Controller

Sensor Specifications

Refrigerant Pressure Sensors

Suction Pressure Transducer
Circuit 1
Terminal: LPRS1
Circuit 2
Terminal: LPRS2

AAON Part Number: V38400

Description: 1/4” SAE Female Flare fitting and Schrader valve. The pressure transducer has an output voltage of 0.5-4.5 VDC (ratio metric) and is also overvoltage protected in both positive and reverse polarity. Sensor range is 0-500 psig.

Figure 5 - Suction Pressure Transducer

Discharge Pressure Transducer
Circuit 1
Terminal: HPRS1
Circuit 2
Terminal: HPRS2

AAON Part Number: V38410

Description: 1/4” SAE Female Flare fitting and Schrader Valve. The pressure transducer has an output voltage of 0.5 to 4.5 VDC (ratio metric) and is also overvoltage protected in both positive and reverse polarity. Sensor range is 0-667 psig.

Figure 6 - Discharge Pressure Transducer

Temperature Sensors

Mixed Air Temperature Sensor
Terminal: AI1

AAON Part Numbers:
R38420 (8’)
R38410 (12’)
R38400 (24’)

Description:
Temperature sensor uses a 10K Ohm thermistor. This sensor comes encased in a 24’, 12’, or 8’ long bendable copper sheath.

Figure 7 - Mixed Air Temperature Sensor

Return Air Temperature Sensor
Terminal: AI2

Supply Air Temperature Sensor
Terminal: AI3

AAON Part Number: R38180

Description: Temperature sensor uses a 10K Ohm thermistor. Duct mount configuration with an 8” stainless steel probe. The unit should be mounted using the integral galvanized mounting flange. Supply air temperature sensor must be field installed in the supply ductwork 6-8 feet downstream from the unit to get an accurate reading.

Figure 8 - Return and Supply Air Temperature Sensor

Outside Air Temperature Sensor
Terminal: AI4

AAON Part Number: R38190

Description: The temperature sensor uses a 10K Ohm (Type III) thermistor sensor. Weather proof configuration with a plastic tube. The unit should be mounted using the tabs on the enclosure with the plastic tube facing down.

Figure 9 - Outside Air Temperature Sensor

Temperature and Humidity Sensors

Return Air Temperature and Humidity Combo Sensor
Terminal: AI5

AAON Part Number: R38540

Figure 10 - Return Air Temperature and Humidity Combo Sensor

Outside Air Temperature and Humidity Combo Sensor
Terminal: AI6

AAON Part Number: R38530

Figure 11 - Return Air Temperature and Humidity Combo Sensor

Additional Sensors

Building Static Pressure Sensor
Terminal: AI10
AAON Part Number: R19440

Description: (0-10 VDC) Pressure Transmitter

Figure 12 - Building Static Pressure Transducer

Return Air CO_2 Sensor
Terminal: AI7
AAON Part Number: V57760

Figure 13 - Return Air CO_2 Sensor

Discharge Line Temperature Sensor
Terminal: TEMP1
Terminal: TEMP2

AAON Part Numbers:
R57800 (1/2 in. Tube)
R42680 (7/8 in. Tube)

Figure 14 - Discharge Line Temperature Sensor

Air Flow Proving Switch
Terminal" DI2
AAON Part Number: R62330

Figure 15 - Air Flow Switch

Water Flow Switch
Terminal: DI4
AAON Part Number: R70490

Figure 16 - Water Flow Switch

Clogged Filter Switch
Terminal: DI5
AAON Part Number: R64580

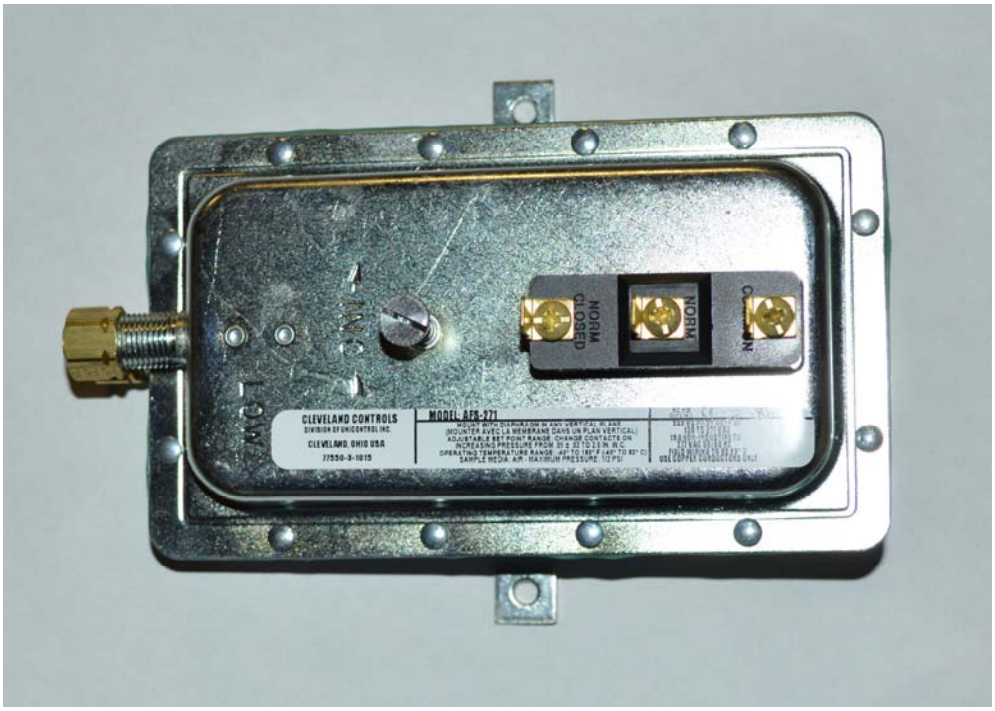


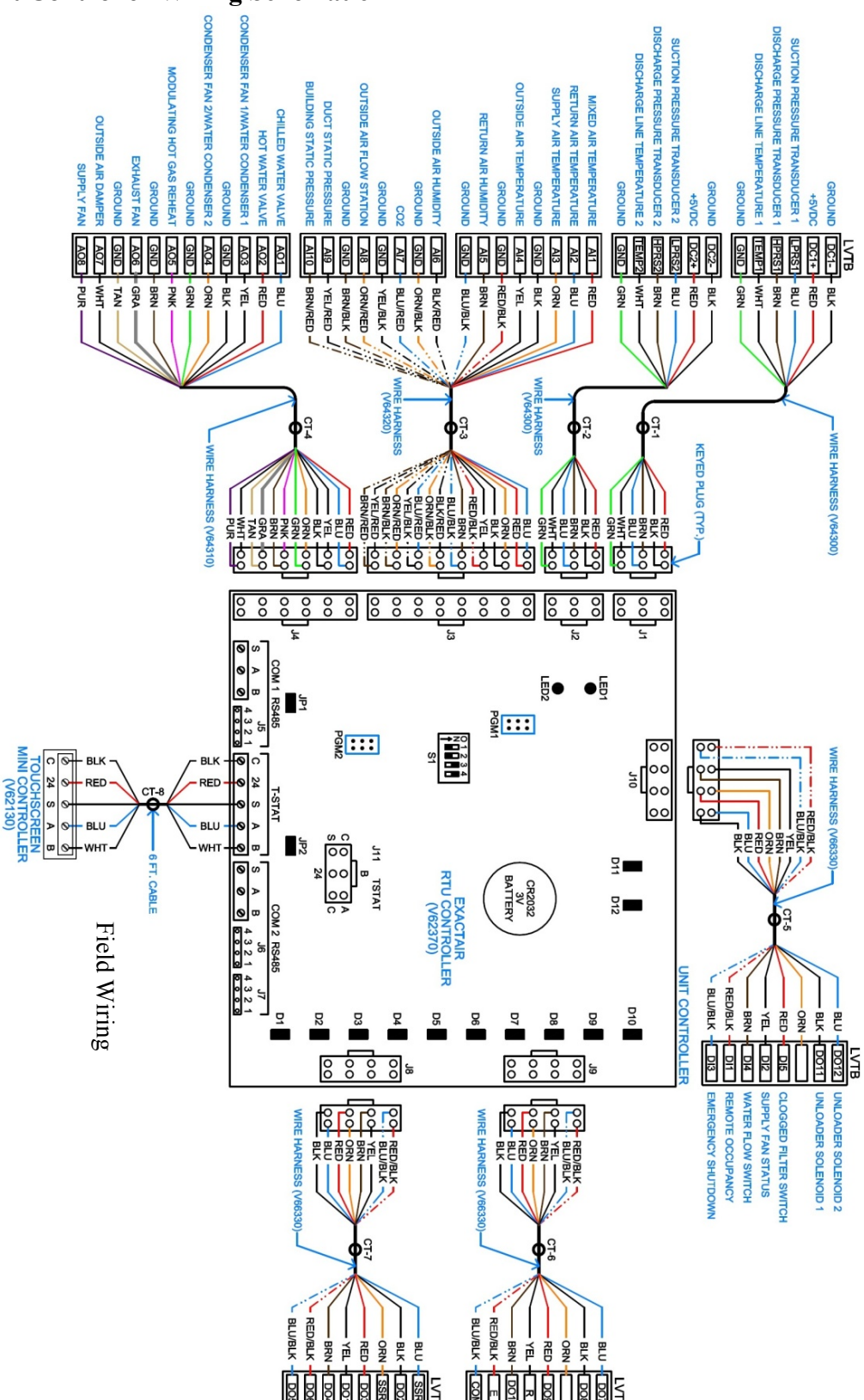
Figure 17 - Clogged Filter Switch

Duct Static Pressure Sensor
Terminal: AI9
AAON Part Number: R17050

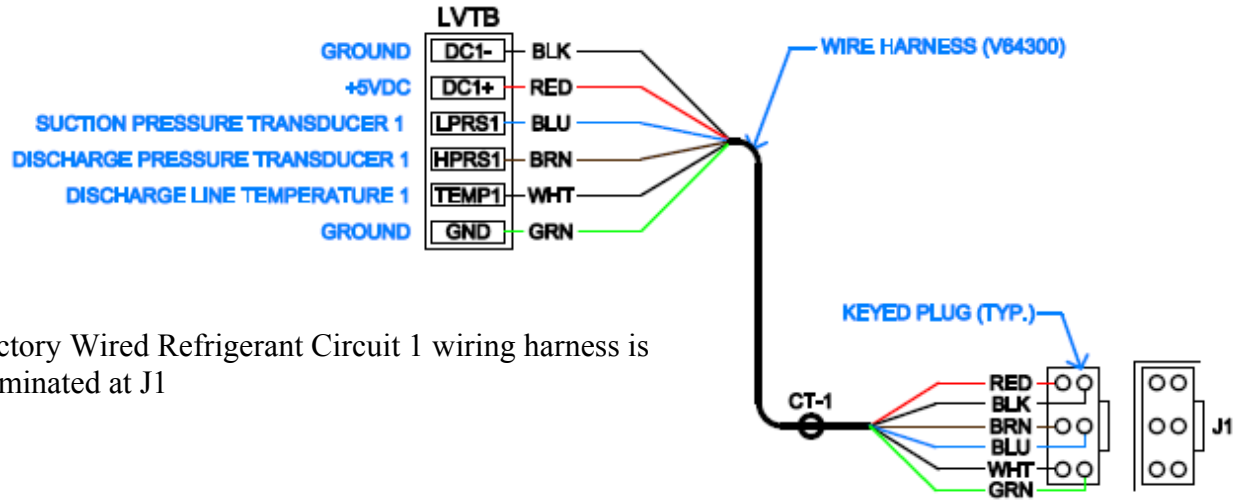
Description: (0-10VDC)

Figure 18 - Duct Static Pressure Sensor

Unit Controller Wiring Schematic

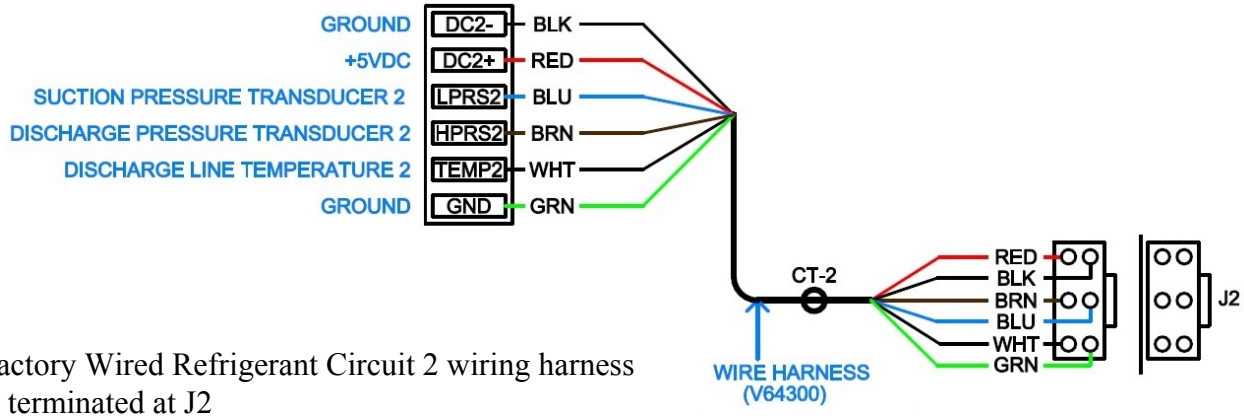


Refrigerant Circuit 1 Terminals



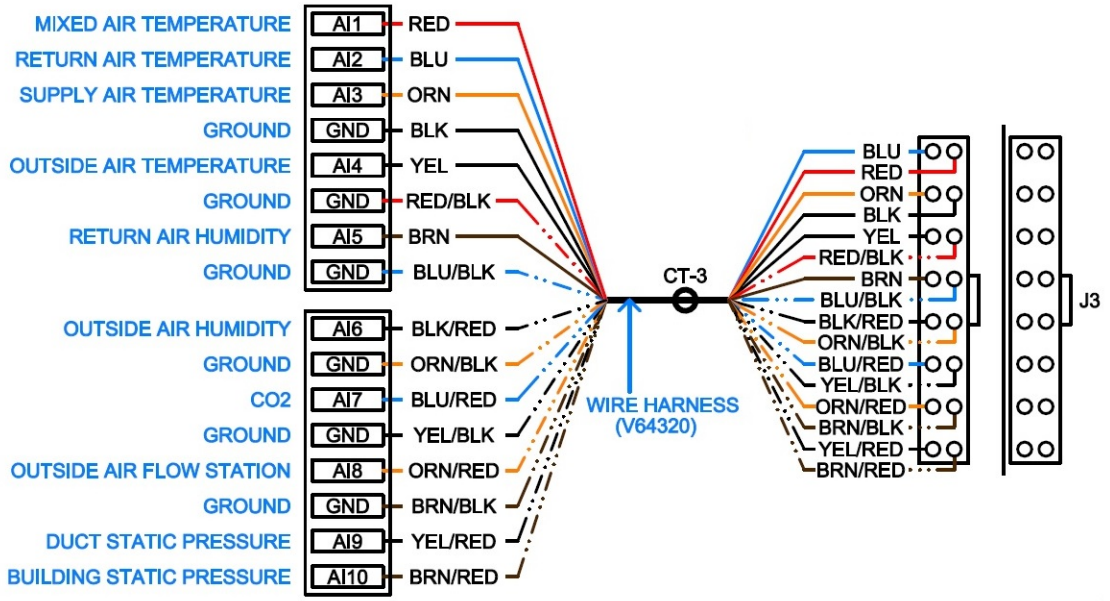
Factory Wired Refrigerant Circuit 1 wiring harness is terminated at J1

Refrigerant Circuit 2 Terminals



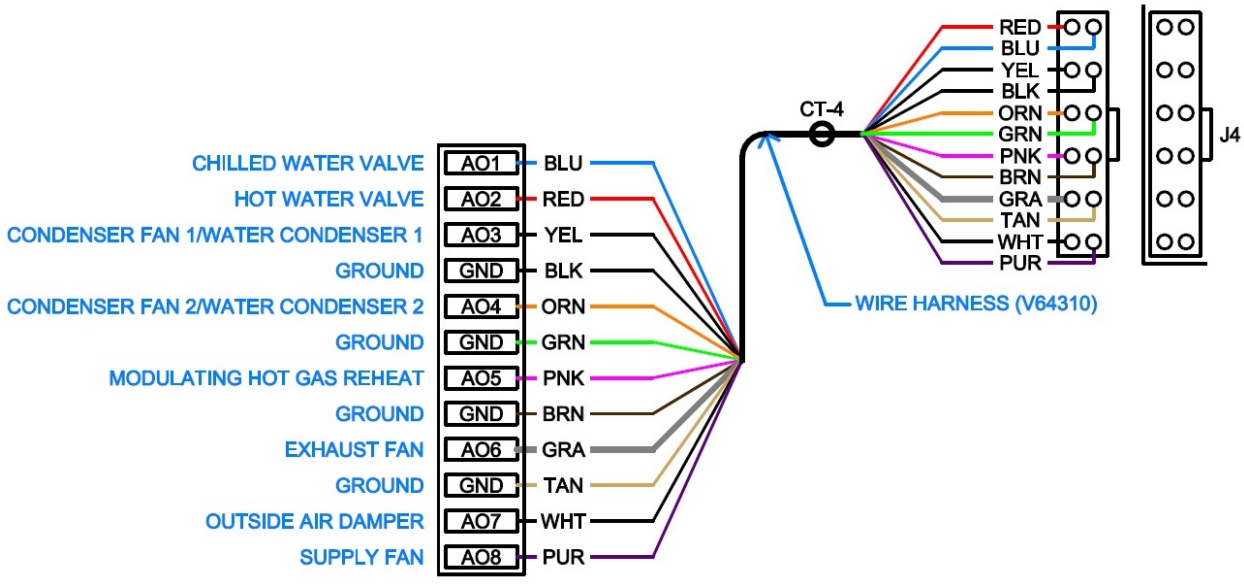
Factory Wired Refrigerant Circuit 2 wiring harness is terminated at J2

Analog Inputs Terminal



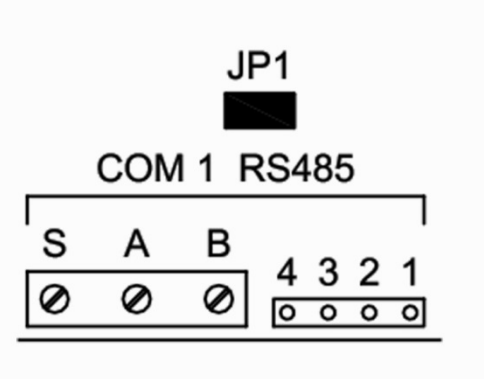
Factory Wired Analog Inputs wiring harness is terminated at J3

Analog Outputs Terminal



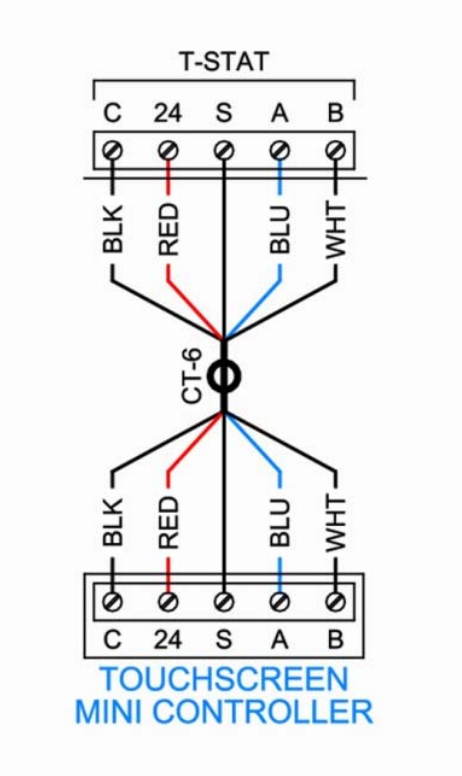
Analog Outputs Wiring Harness is located at J4

Communication Terminals



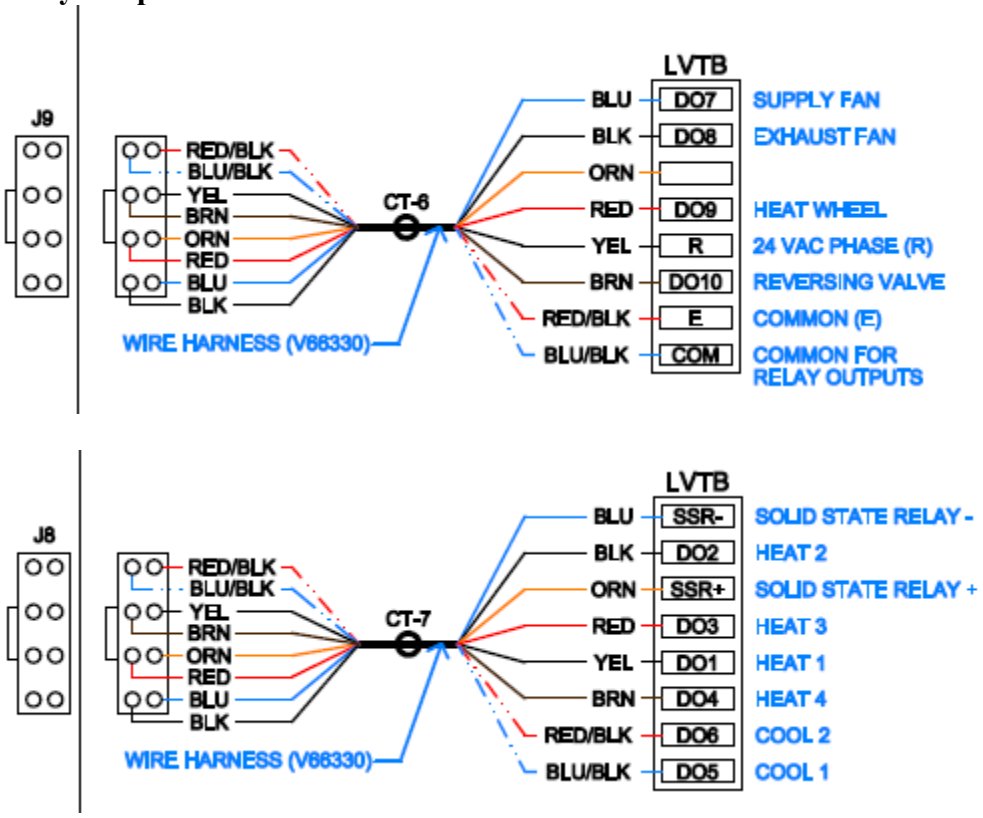
Field Wired Com 1 port is used for Building Management System Communications

Touchscreen Mini Controller Terminal



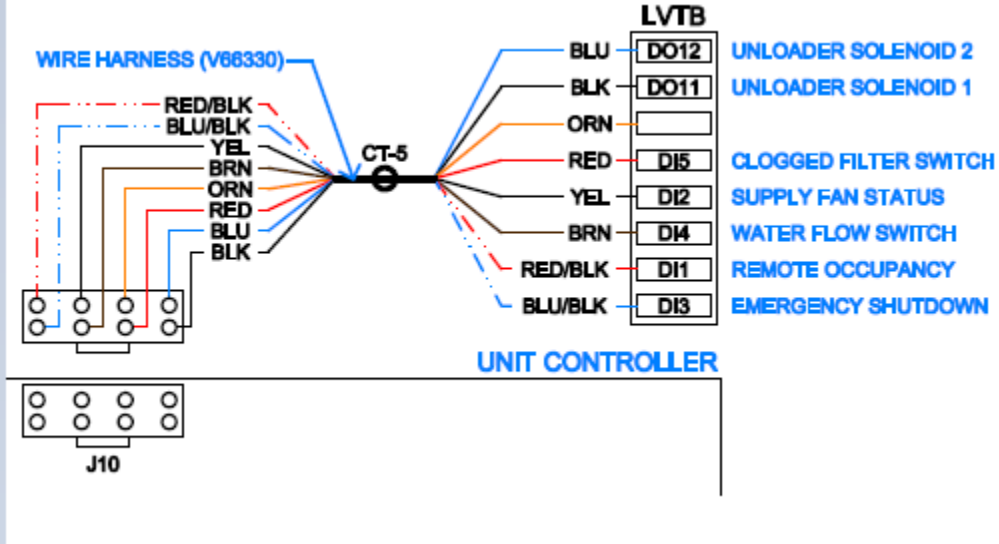
Field wired connection to the space mounted Touchscreen Mini Controller

Relay Outputs Terminal



Factory Wired Relay Outputs Wiring Harnesses are terminated at J8 and J9

Binary Inputs and Digital Outputs



Factory Wired Binary Inputs and Digital Outputs Wiring Harness is terminated at J10

Startup

⚠ 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 qualified installer. A copy of this IOM should be kept with the unit.

Home Screen Navigation

General

Fan - Indicates supply fan operation. Animated icon indicates the fan is operating. Motionless icon indicates fan is not operating.

Mode - Indicates the current Mode of Operation: Cooling, Heating, Dehumidification, Ventilation, Economizer, or Off.

Occupied/Unoccupied - Indicates the current occupancy status. Black icon indicates Occupied and gray icon indicates Unoccupied. During Unoccupied Mode if the icon is pressed the controller will override into Occupied Mode for 30 minutes.

Menu - Touch to open up Setpoints, I/O Alarms, Schedule, and Setup Menus

Temperature/Humidity - Space temperature, space relative humidity, supply air temperature, return air temperature, mixed air temperature, outside air temperature are displayed

Alarm - Yellow bell indicates a General Alarm and red bell indicates a Shutdown Alarm.

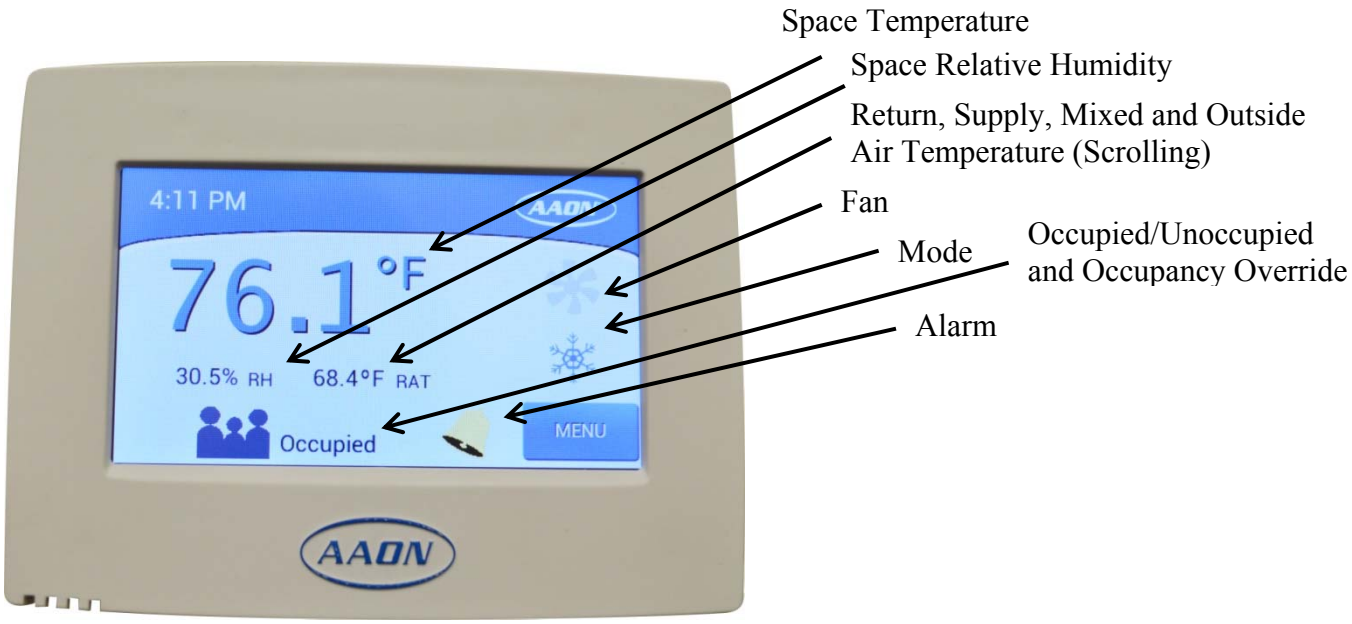


Figure 19 - AAON Touchscreen Mini Controller

Cooling Mode

Heating Mode

Dehumidification Mode

VENT

Ventilation Mode

Economizer Mode

OFF

Off Mode

Fan On (Animated)

Fan Off (Static)

General Alarm (Yellow)

Shutdown Alarm (Red)

Occupied

Unoccupied

Figure 20 - Home Screen Icons

Unit Configuration

Home Screen: This is the main home screen of the Touchscreen Mini Controller interface.

Clicking on Menu will navigate to the Menu screen.

During Unoccupied Mode if the Unoccupied icon is pressed the controller will override into Occupied Mode for 30 minutes.

Menu Screen: This screen gives access to Setpoints, Inputs/Outputs/Alarms, Schedule, and Setup. A password will be required to access these screens.

Menu → Setup

Setup Screen 1: This screen gives access to Application, Cooling Options, Heating Options, Condenser Fan Options, Water-Cooled Condenser Options, Outside Air Options, Heat Pump Options, and Dehumidification Options.

Clicking on Next will navigate to the second setup screen.

Menu → Setup → Next

Setup Screen 2: This screen gives access to Exhaust Fan Options, Network Configuration, Security Settings, System Information, Supply Fan Options, and Manual Test.

Clicking on Menu will navigate back to the Menu screen.

Menu → Setpoints

Setpoints Screen: This screen gives access to Cooling, Heating, Dehumidification, Economizer, CO_2, Supply Fan, Exhaust Fan, Condenser, Heat Pump, and Outside Airflow, Energy Recovery Wheel Setpoints, and Sensor Calibration.

Menu → Schedule

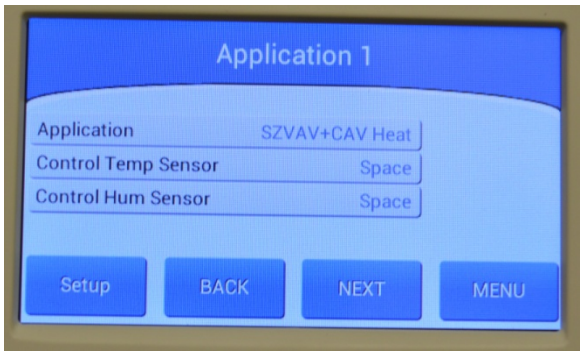
Schedule Screen: This screen gives access to the Occupied/Unoccupied schedule and setting the time and date.

Menu → Schedule

I/O - Alarms Screen: This screen gives access to viewing inputs, outputs, general alarms, and shutdown alarms.

Clicking on Menu from any of these screens will navigate back to the Menu screen.

Application Configuration 1



Menu → Setup → Application

Application =
CAV: Constant Air Volume application
MUA: Makeup Air application
SZVAV + CAV Heat: Single Zone VAV application with Single Zone VAV Cooling and CAV Heating
VAV: Variable Air Volume application with VAV Cooling

Control Temp Sensor =
Space: Heating/Cooling modes of operation based on Space Temperature
Return: Heating/Cooling modes of operation based on Return Air Temperature
Outside/Space: Heating/Cooling modes of operation in occupied mode based on Outside Air Temperature. Heating/Cooling modes of operation in unoccupied mode based on Space Temperature.
Outside/Return: Heating/Cooling modes of operation during occupied mode based on Outside Air Temperature. Heating/Cooling modes of operation in unoccupied mode based on Return Air Temperature.
Avg Space & Return: Heating/Cooling modes of operation based on average of Space Temperature and Return Air Temperature

Control Hum Sensor =
Space: Dehumidification mode of operation based on Space Relative Humidity
Return: Dehumidification mode of operation based on Return Relative Humidity
Outside/Space: Occupied Dehumidification mode of operation based on Outside Relative Humidity. Unoccupied Dehumidification mode of operation based on Space Relative Humidity
Outside/Return: Occupied Dehumidification mode of operation based on Outside Relative Humidity. Unoccupied Dehumidification mode of operation based on Return Relative Humidity

For VAV Application, Control Temp Sensor does not apply. During occupied mode, the system will always be in the Cooling or Dehumidification mode, except during Morning Warm-Up or Cool-Down.

Application Configuration 2

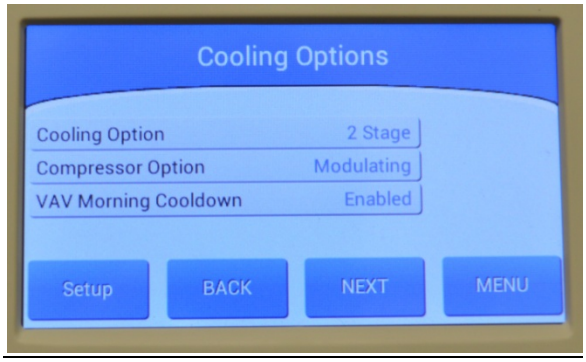
Menu → Setup → Application→ Next

Return Damper =
Yes: Return Air Damper/Economizer Control
No: No Motorized Return Air Damper or Economizer

Unoccupied Mode =
On: Unoccupied and Occupied Modes based on the Schedule, Network, or Remote Occupancy. During Unoccupied Mode unit will cycle to control to Unoccupied setpoints.
Off: Unit will always be off during Unoccupied Mode.

SAT Setpoints =
Fixed: No supply air temperature reset
Reset: Reset available for supply air temperature setpoints. See reset sequence in the sequence of operation section.

Cooling Configuration



Menu → Setup → Cooling Options

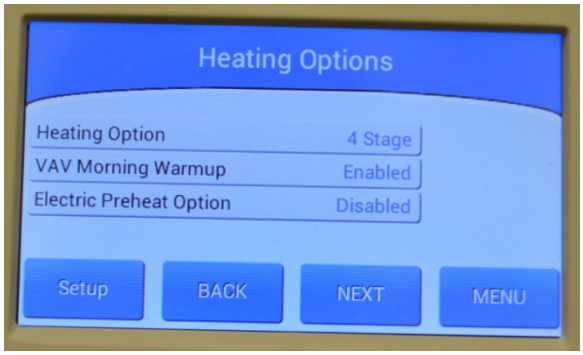
Cooling Option =
No Cool: No cooling
1 Stage: This Cooling option will operate 1 stage of cooling. Select with single compressor units.
2 Stage: This Cooling option will operate 2 stages of cooling. Select with two compressor units.
Chilled Water 0-10V: Modulating Chilled Water Coil Valve with a 0-10 VDC output signal.
Chilled Water 2-10V: Modulating Chilled Water Coil Valve with a 2-10 VDC output signal.

Compressor Option:
On-Off: 1 or 2 On/Off Compressors
Modulating: 1 or 2 Variable Capacity Compressors.
Mod/On-Off: 1 On/Off Compressor and 1 Variable Capacity Compressor
2-Step: 1 or 2 Two-Step Compressors

Compressor option does not apply when Cooling Option = No Cool or Chilled Water

VAV Morning Cool-Down =
Enable/Disable
Only for VAV applications. This enables the morning cool-down mode of operation. Return air temperature sensor required.

Heating Configuration



Menu → Setup → Heating Options

Heating Option =
None: No Heating
1 Stage: 1 stage of heating
2 Stage: 2 stages of heating
3 Stage: 3 stages of heating
4 Stage: 4 stages of heating

With SCR controlled modulating electric heat, select the number of on/off heat stages shown on the unit wiring diagram.

Mod Gas: This Heating option will operate modulating gas heating
Hot Water 0-10: Modulating Hot Water Coil Valve with a 0-10 VDC output signal.
Hot Water 2-10: Modulating Hot Water Coil Valve with a 2-10 VDC output signal.

VAV Morning Warm-Up =
Enable/Disable
Only for VAV applications. This enables the morning warm-up mode of operation. Return air temperature sensor required.

Electric Preheat Option =
Enable/Disable
This enables electric preheat control.

Condenser Fan Configuration

Menu → Setup → Condenser Fan

Condenser Fan =
None: No condenser fans. This includes a water-cooled condenser or chiller water cooling systems.
On/Off: Condenser fans will turn on and off with the compressors.
Head Pressure Control: Condenser fan speed will be based on discharge pressure.

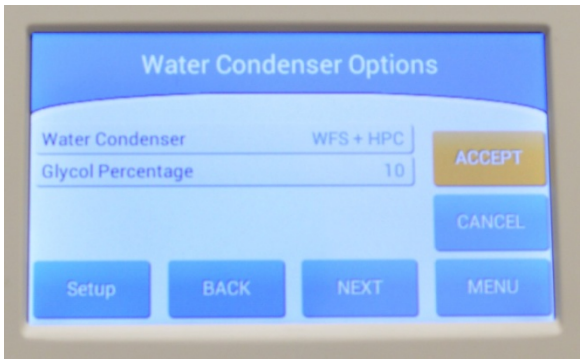
Fan Configuration =
Combined: This Fan Configuration will operate all of the Condenser Fans at the same speed.
Split: This Fan Configuration will operate the Condenser Fans based on the corresponding refrigeration circuit. Use with two circuit systems with a split condenser.

This option does not apply when Condenser Fan Option = None.

Fan Control =
On-Off: This Fan Configuration will operate all of the Condenser Fans at full speed.
Modulating: This Fan Configuration will operate the Condenser Fans based on the corresponding refrigeration circuit discharge pressure.

This option does not apply when Condenser Fan Option = None.

Water-Cooled Condenser Configuration



Menu → Setup → Water Condenser

Water Condenser =
None: No Water-Cooled Condenser. This includes an air-cooled condenser or chilled water cooling systems.
Water Flow Switch: This Water-Cooled Condenser Option will operate the compressors only if the water flow switch shows water flow.
Head Pressure Control: This Water-Cooled Condenser Option will operate the condenser water valve based on discharge pressure in Cooling Mode.
WFS + HPC: This Water-Cooled Condenser Option will operate the compressors only if the water flow switch shows water flow and will operate the condenser water valve based on discharge pressure in Cooling Mode.

Glycol Percentage = Percentage glycol in the system. See Glycol Freeze Protection table.

This option does not apply when Water Condenser = None.

Table 2 - Glycol Freeze Protection

R-410A - % Glycol	0%	5%	10%	15%	20%	25%	30%	35%	40%
Heat Low Suction	100 psig	93 psig	87 psig	82 psig	75 psig	65 psig	58 psig	49 psig	45 psig
Low Leaving Fluid Temp	37°F	34°F	30°F	27°F	20°F	15°F	9°F	2°F	0°F

Outside Air Control Configuration

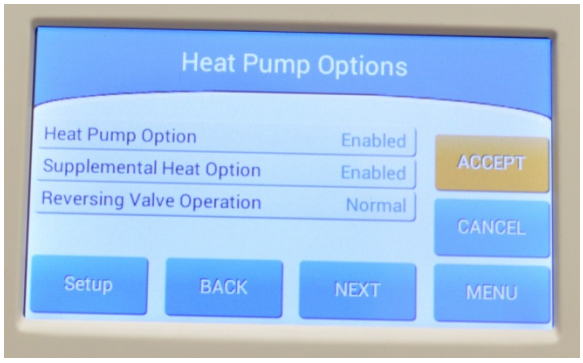
Menu → Setup → Outside Air Options

Economizer =
None: No Economizer
Sensible: This Economizer Option will operate the economizer based on outside air temperature.
Enthalpy: This Economizer Option will operate the economizer based on outside air enthalpy. Outside air temperature and humidity combo sensor required.
Comparative: This Economizer Option will operate the Economizer based on comparative enthalpy of outside and return air. Return air temperature and humidity combo sensor required.

Outside Air Flow Monitoring =
Enable/None: This will control the economizer for constant volume outside air flow. Outside air flow monitoring station required.

CO2 =
Enable/None: This will control the economizer for maximum CO_2 level. CO_2 sensor is required.

Heat Pump Configuration



Menu → Setup → Heat Pump Options

Heat Pump Option =
None/Enabled: This will allow operation as a Heat Pump.

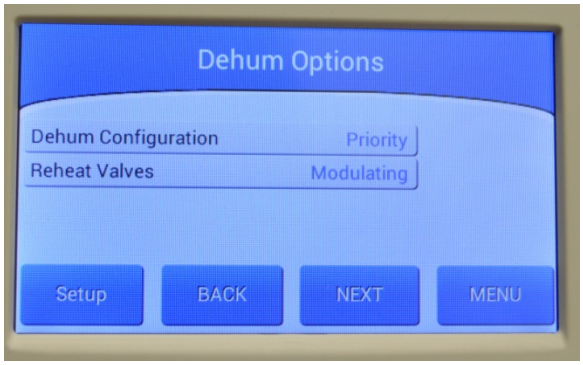
Supplemental Heat Option =
None/Enabled: This option allows supplemental auxiliary heat operation.

This option does not apply when Heat Pump = None.

Reversing Valve Operation =
Normal: Reversing valve is active during cooling. Valve is fail to heating.
Inverted: Reversing valve is active during heating. Valve is fail to cooling.

This option does not apply when Heat Pump = None.

Dehumidification Configuration



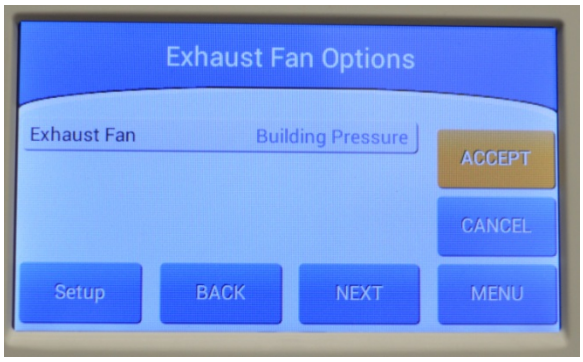
Menu → Setup → Dehumidification Options

Dehum Configuration =
None: No Reheat/Dehumidification
Priority: This will operate Dehumidification Mode as a priority over Cooling, Heating, and Economizer Modes.
Non-Priority: This Reheat Configuration will operate Cooling, Heating, and Economizer Modes as a priority over Dehumidification Mode.

Reheat Valves =
Modulating: Modulating Hot Gas Reheat Valve Operation
On-Off: On/Off Hot Gas Reheat Valve Operation

This option does not apply when Dehum Configuration = None.

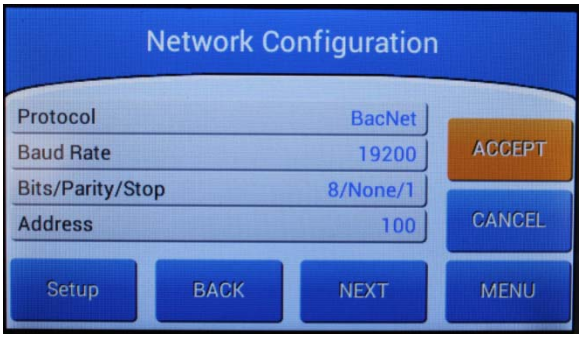
Exhaust Fan Configuration

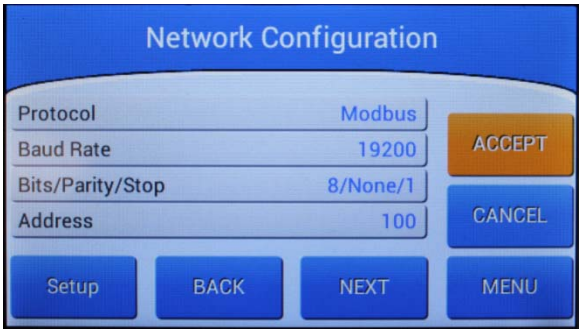


Menu → Setup → Next → Exhaust Fan Options

Exhaust Fan =
None: No Exhaust Fan
On/Off: This operates the Exhaust Fan as an On/Off Fan. Exhaust fan operates when economizer opens above minimum position.
Building Pressure: This operates the Exhaust Fan to maintain building static pressure. Variable speed exhaust fan required.

Network Configuration





Menu → Setup → Next → Network Config

Protocol =
BACnet/Modbus: This Protocol Option enables the BACnet or Modbus communications.
Baud Rate: This sets the bits per second on the RS-485 Com port 1.
Bits/Parity/Stop: This sets the configuration on the RS-485 Com port 1.
Address: This sets the unit network address.

Security Configuration

Menu → Setup → Next → Security

User Password: (0000) User has access to I/O Alarms

Manager Password: (1988) Manager has access to Setpoints, I/O Alarms, and Schedule

Administrator Password (2425) - Admin has access to all menu screens - Setpoints, I/O Alarms, Schedule, and Setup

Note: Administrator Password is required to set security passwords. If changed, keep a record of the new administrator password in a trusted location.

System Information

Menu → Setup → Next → System

Version: This is the running version of the firmware.
Build Date: This is the date when the firmware was released.

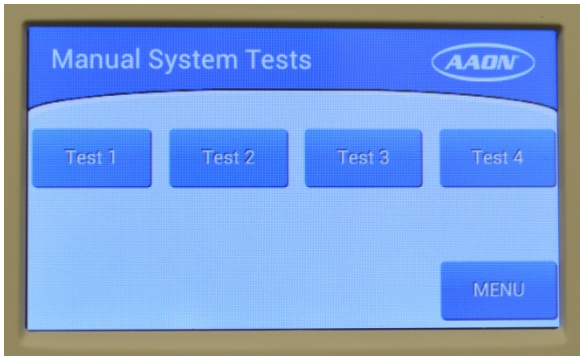
Supply Fan Configuration

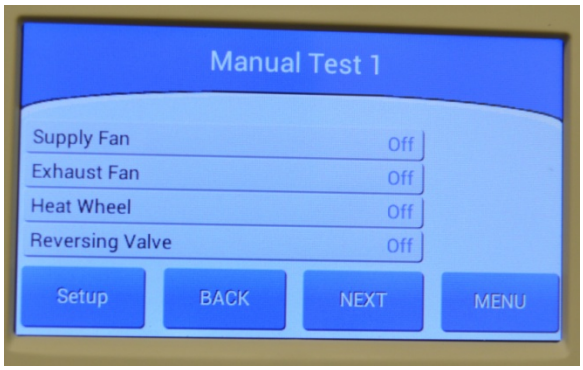
Menu → Setup → Next → Supply Fan Options

Occupied Fan Mode =
On: Supply fan is always on.
Off: Supply fan is always off.
Auto: Supply fan operates with heating, cooling, dehumidification modes.

Unoccupied Fan Mode =
On: Supply fan is always on.
Off: Supply fan is always off.
Auto: Supply fan operates with heating, cooling, dehumidification modes.

Manual System Tests





Menu → Setup → Next → Manual Test

Test 1 =
Supply Fan: Force fan to 100%. Supply fan must be active for heating and cooling to operate.
Exhaust Fan: Force fan to 100%
Heat Wheel: Energize wheel
Reversing Valve: Energize reversing valve

Test 2 =
Economizer: Force economizer open to 100%
Reheat: Force reheat to 100%
Hot Water Valve: Force open to 100%
Chilled Water Valve: Force open to 100%

Test 3 =
Condenser Fan 1: Force condenser fan to 100%
Compressor 1: Energize compressor or 95% capacity with variable capacity compressor. Supply fan must be active for compressor to operate.
Condenser Fan 2: Force condenser fan to 100%
Compressor 2: Energize compressor or 95% capacity with variable capacity compressor. Supply fan must be active for compressor to operate.

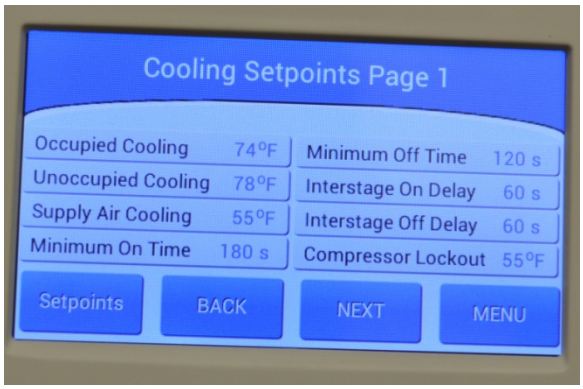
Test 4 =
Heat Stage 1: Energize heat stage 1.
Heat Stage 2: Energize heat stage 2.
Heat Stage 3: Energize heat stage 3.
Heat Stage 4: Energize heat stage 4.

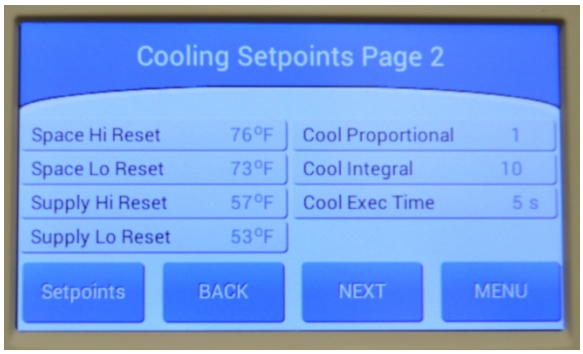
Supply fan must be active for heating and cooling to operate.

Manual override will automatically disable after 5 minutes on

Setpoint Adjustment

Cooling Setpoints





Menu → Setpoints → Cool

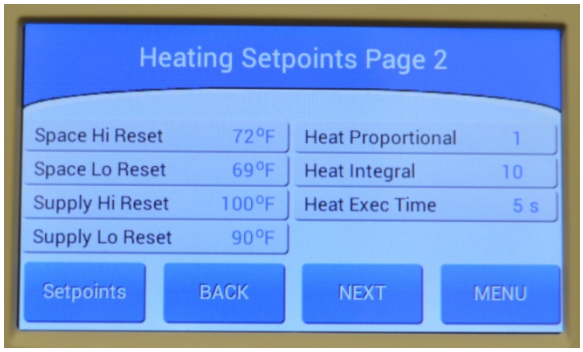
Cooling Setpoints 1: Default Values
Occupied Cooling = 74°F
(55-85°F Range)
Unoccupied Cooling = 78°F
(55-85°F Range)
Supply Air Temperature Cooling = 55°F
(45-65°F Range)
Compressor Minimum On Time = 180 sec
(120-255 sec Range)
Compressor Minimum Off Time = 120 sec
(60-255 sec Range)
Compressor Interstage On Delay = 60 sec
(30-255 sec Range)
Compressor Interstage Off Delay = 60 sec
(30-255 sec Range)
Outside Compressor Lockout Setpoint = 55°F
(-20-65°F Range)

Cooling operation below 35°F requires a low ambient option.

Cooling Setpoints 2: Default Values
Space Temperature High Reset = 76°F
(55-85°F Range)
Space Temperature Low Reset = 73°F
(55-85°F Range)
Supply Air Temperature High Reset = 57°F
(45-65°F Range)
Supply Air Temperature Low Reset = 53°F
(45-65°F Range)
Cooling Proportional = 1
Cooling Integral = 10
Cooling Execution Time = 5 sec

Cooling Setpoints 3: Default Values
Morning Cool-Down = 78°F
(55-85°F Range)
Morning Cool-Down Time = 30 min
(5-60 min Range)

Heating Setpoints



Menu → Setpoints → Heat

Heating Setpoints 1: Default Values
Occupied Heating = 70°F
(55-85°F Range)
Unoccupied Heating = 65°F
(55-85°F Range)
Supply Air Temperature Heating = 90°F
(55-120°F Range)
Heating Minimum On Time = 180 sec
(120-255 sec Range)
Heating Minimum Off Time = 180 sec
(120-255 sec Range)
Heating Interstage On Delay = 30 sec
(30-255 sec Range)
Heating Interstage Off Delay = 30 sec
(30-255 sec Range)
Heating Outside Air Temp Lockout = 75°F
(50-100°F Range)

Heating Setpoints 2: Default Values
Heating Space Temp High Reset = 72°F
(55-85°F Range)
Heating Space Temp Low Reset = 69°F
(55-85°F Range)
Heating Supply Temp High Reset = 100°F
(55-120°F Range)
Heating Supply Temp Low Reset = 90°F
(55-120°F Range)
Heating Proportional = 1
Heating Integral = 10
Heating Execution Time = 5 sec

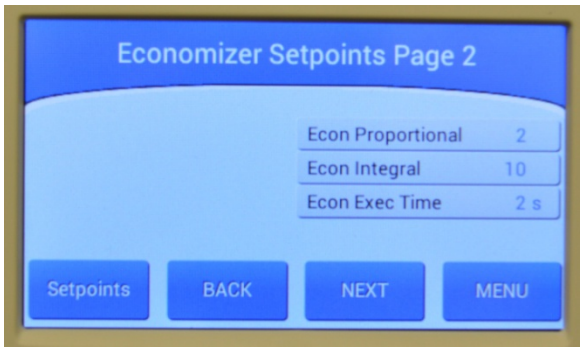
Heating Setpoints 3: Default Values
Morning Warm-Up = 65°F
(50-85°F Range)
Morning Warm-Up Time = 30 min
(5-60 min Range)
Preheat Outside Air Temperature = 35°F
(10-60°F Range)
Preheat Leaving Air Temperature = 50°F
(35-80°F Range)

Dehumidification Setpoints

Menu → Setpoints → Dehum

Dehumidification Setpoints: Default Values
Relative Humidity Enable = 50% RH
(40-60% RH Range)
Evaporator Suction Temperature = 42°F
(38-48°F Range)
MHGR Purge Time = 120 sec
(60-240 sec Range)
MHGR Purge Period = 60 min
(1-120 min Range)
Proportional = 2
Integral = 10
Execution Time = 5 sec
Dehumidification Lockout = 55°F
(35-75°F Range)

Economizer Setpoints



Menu → Setpoints → Econ/CO2

Economizer Setpoints Page 1: Default Values
Sensible Economizer Enable = 60°F
(40-80°F Range)
Enthalpy Economizer Enable = 20 btu/lb
(15-25 btu/lb Range)
Comparative Enthalpy Economizer = 1 btu/lb
(1-5 btu/lb Range)
Mixed Air Temperature = 52°F
(50-80°F Range)
Economizer Damper Minimum Position = 15%
(0-100% Range)
Economizer Cooling Lockout Time = 2 min
(1-20 min Range)
CO_2 = 900 ppm
(500-1500 ppm Range)

Economizer Setpoints Page 2: Default Values
Economizer Proportional = 2
Economizer Integral = 10
Economizer Execution Time = 2 sec

Supply Fan Setpoints

Menu → Setpoints → Supply Fan

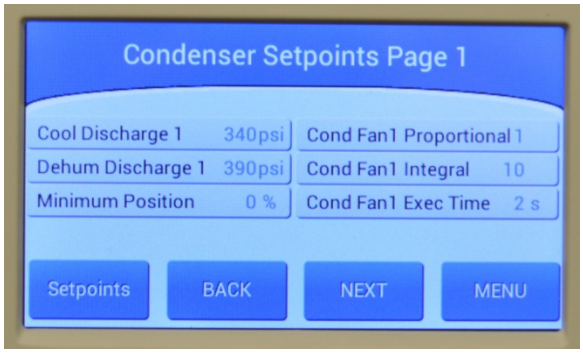
Supply Fan Setpoints: Default Values
Constant Air Volume Position = 100%
(33-100% Range)
Supply Fan Max Position = 100%
(33-100% Range)
Cooling Minimum Position = 33%
(33-100% Range)
Supply Fan Deadband = 4°F
(2-10°F Range)
Duct Static = 1 in. w.c.
(0.25-2.50 in. w.c. Range)
Supply Fan Proportional = 1
Supply Fan Integral = 10
Supply Fan Execution Time = 5 sec

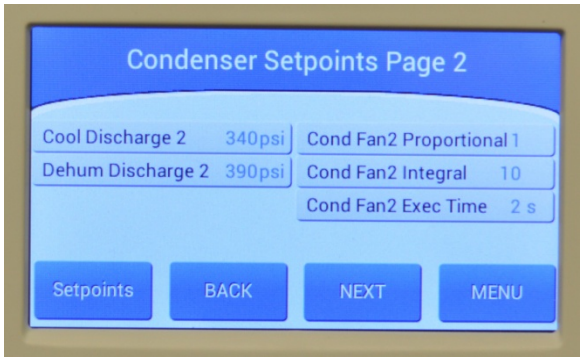
Exhaust Fan Setpoints

Menu → Setpoints → Exhaust Fan

Exhaust Fan Setpoints: Default Values
Exhaust Fan Minimum Position = 33%
(0-100% Range)
Building Static Pressure = 0.01 in. w.c.
(-0.1-0.1 in. w.c. Range)
Exhaust Fan Proportional = 1
Exhaust Fan Integral = 10
Exhaust Fan Execution Time = 2 sec

Condenser Setpoints



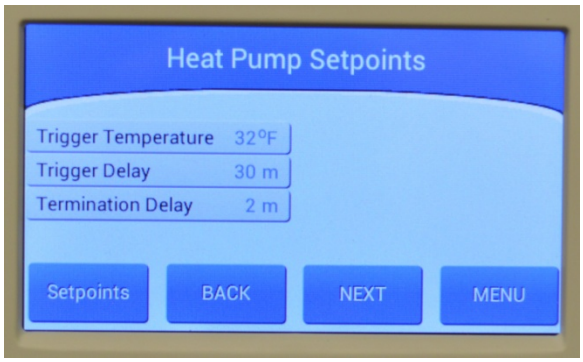


Menu → Setpoints → Condenser

Condenser Setpoints 1: Default Values
Cooling Head Pressure/Discharge Pressure 1 = 340 psig (250-475 psig Range)
Dehumidification Head Pressure/Discharge Pressure 1 = 390 psig (250-475 psig Range)
Condenser Water Valve Minimum Position = 0% (0-100% Range)
Condenser Fan 1 Proportional = 1
Condenser Fan 1 Integral = 10
Condenser Fan 1 Execution Time = 2 sec

Condenser Setpoints 2: Default Values
Cooling Head Pressure/Discharge Pressure 2 = 340 psig (250-475 psig Range)
Dehumidification Head Pressure/Discharge Pressure 2 = 390 psig (250-475 psig Range)
Condenser Fan 2 Proportional = 1
Condenser Fan 2 Integral = 10
Condenser Fan 2 Execution Time = 2 sec

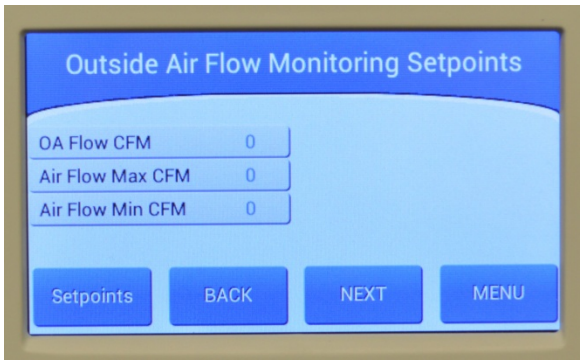
Heat Pump Setpoints



Menu → Setpoints → Heat Pump

Heat Pump Setpoints: Default Values
Defrost Trigger Temperature = 32°F
(0-40°F Range)
Defrost Trigger Delay = 30 min
(1-60 min Range)
Defrost Termination Delay = 2 min
(1-10 min Range)

Outside Air Flow Monitoring Setpoints



Menu → Setpoints → Outside Air Flow

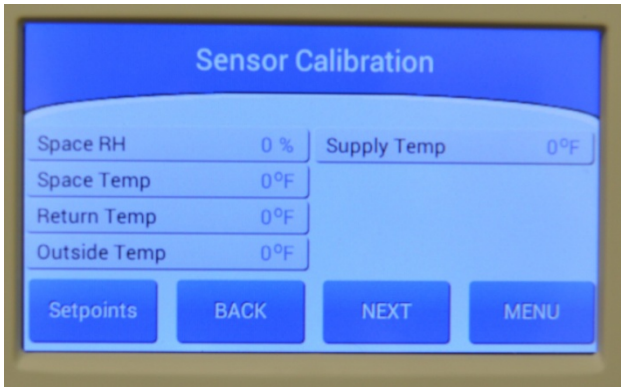
Outside Air Flow Monitoring Setpoints: Default Values
Outside Air Flow = 0 cfm
(0-15000 cfm Range)
Air Flow Scale Max = 0 cfm
(0-15000 cfm Range)
Air Flow Scale Min = 0 cfm
(0-15000 cfm Range)

Heat Wheel Setpoints

Menu → Setpoints → Heat Wheel

Heat Wheel Setpoints: Default Values
Energy Recovery Wheel Minimum Run Time = 1 sec (1-60 sec)
Energy Recovery Wheel Defrost = 25°F
(0-35 Range)
Energy Recovery Wheel Defrost Time = 120 sec
(15-255 sec Range)
Energy Recovery Wheel Defrost Period = 30 min (5-120 min Range)

Sensor Calibration



Menu → Setpoints → Sensor Calibration

Sensor Calibration
Space Relative Humidity, Space Temperature, Return Air Temperature, Return Air Temperature, Outside Air Temperature, and Supply Air Temperature Sensor input values can be adjusted from this screen.
(-20°F to +20°F Range and -20%RH to 20%RH Range)

Inputs, Outputs, and Alarms

I/O - Alarms: This allows access to Inputs, Outputs, General Alarms, and Shutdown Alarms.

Inputs

Inputs: Mixed Air Temperature, Return Air Temperature, Supply Air Temperature, Outside Air Temperature, Outside Air Humidity, Return Air Humidity Building Static Pressure, & CO_2.

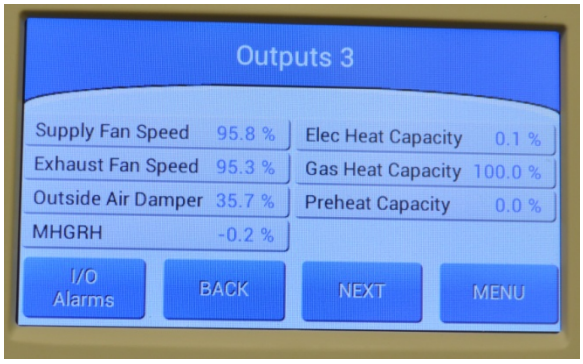
Inputs: Outside Air cfm, Duct Static Pressure, Suction Pressure 1, Discharge Pressure 1, Discharge Line Temperature 1, Suction Pressure 2, Discharge Pressure 2, & Discharge Line Temperature 2.

Inputs: Preheat Leaving Air Temperature A, Preheat Leaving Air Temperature B, Preheat Leaving Air Temperature Average, Remote Occupancy, Supply Fan Status, Emergency Shutdown, Water Flow, & Main Filter.

Outputs

Outputs: Supply Fan, Compressor 1, Compressor 2, Exhaust Fan, Reversing Valve, Compressor 1 Capacity, Compressor 2 Capacity, & Heat Wheel.

Outputs: Heat Stage 1, Heat Stage 2, Heat Stage 3, Heat Stage 4, Condenser Fan 1, Condenser Fan 2, Chilled Water, & Hot Water Valve.



Outputs: Supply Fan Speed, Exhaust Fan Speed, Outside Air Damper, Modulating Hot Gas Reheat, Electric Heat Capacity, Gas Heat Capacity, & Preheat Capacity.

General Alarms

A Yellow Alarm Icon on the Home Screen, indicates a General Alarm.

General Alarms:

Mixed Air Temperature - Activated if the mixed air temperature sensor has failed (Shorted or Open).

Supply Fan - Activated when there is no fan status signal within 60 seconds on a call for the supply fan (Airflow switch).

Supply Air Temperature - Low Limit Alarm is activated when the supply air temperature is below 25°F. Cooling will be disabled until supply air temperature is 2°F above 25°F. High Limit Alarm is activated when the supply air temperature is above the 200°F.

Space CO_2 - Activated when the CO_2 ppm is above the CO_2 setpoint. This alarm will open the economizer to increase ventilation to the space. Alarm is only available with CO_2 control configured.

Main Filter - Activated when the Clogged Filter Switch closes due to high differential pressure across the filter. The Alarm message will disable when the Clogged Filter Switch opens. This alarm is for informational purposes only, no change in equipment operation will occur.

Outside Air Temperature Lockout - Activated when the outside air temperature is below the compressor lockout temperature.

Water Flow - Activated when there is no water flow status signal within 60 seconds (Water Flow Switch).

Shutdown Alarms

A Red Alarm Icon on the Home Screen indicates an Emergency Shutdown Alarm.

Shutdown Alarms:

Emergency Shutdown - Activated when a safety circuit in the unit opens. Alarm will disable in the event that the safety circuit closes and a 30 second delay expires. Alarm will affect the unit's operation by forcing the unit into the Off Mode and disabling the Supply Fan.

Space Temperature - Activated if the space temperature sensor has failed (Shorted or Open). If this is the mode enable temperature sensor the Alarm will force the unit into Off mode and disable the Supply Fan.

Supply Air Temperature - Activated if the supply air temperature sensor has failed (Shorted or Open). This Alarm will affect the unit's operation by forcing the unit into Off Mode and disabling the Supply Fan.

Return Air Temperature - Activated if the return temperature sensor has failed (Shorted or Open). If this is the mode enable temperature sensor the Alarm will force the unit into Off Mode and disable the Supply Fan.

Outside Air Temperature - Activated if the outside air temperature sensor has failed (Shorted or Open). If this is the mode enable temperature sensor the Alarm will force the unit into Off Mode and disable the Supply Fan.

Schedule Setup

Schedule Screen: The schedule screen allows schedule configuration for Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday, Weekdays, Weekends, as well as, Time and Date adjustment.

One weekly schedule can be setup. Up to two occupied periods can be scheduled per day.

Daily

Daily Occupancy:
1st Period Begin is the start time for the first occupied period.
1st Period End is the end time for the first occupied period.
2nd Period Begin is the start time for the second occupancy period.
2nd Period End is the end time for the second occupancy period.

Weekday and Weekend

Weekday/Weekend Occupancy:
1st Period Begin is the start time for the first occupancy period.
1st Period End is the end time for the first occupancy period.
2nd Period Begin is the start time for the second occupancy period.
2nd Period End is the end time for the second occupancy period.

Weekday/Weekend schedule has priority over all individual days.

Date/Time

Date and Time Screen: This screen allows time and day of the week configuration.

24 Hr Time (hh:mm): Set the hour and minutes.
Day of Week: Set the day of week.

Sequences of Operation

Note: All values listed are default values and some values are adjustable.

Cooling Operation

Cooling Mode will only operate if the Supply Fan Status is Normal (Proof of Flow has been made).

Cooling Mode is enabled when the temperature of the Control Temp Sensor rises 1°F above the active Cooling Setpoint. Cooling Mode is disabled when the temperature at the Control Temp Sensor falls 1°F below the active Cooling Setpoint.

Compressor staging up and staging down are subject to the following setpoints:
Compressor Minimum On Time
Compressor Minimum Off Time
Compressor Interstage On Delay
Compressor Interstage Off Delay

Compressors are locked out if the outside air temperature falls 1°F below the Compressor Lockout Setpoint and will remain locked out until the Outside Air Temperature rises 1°F above the Compressor Lockout Setpoint. If the Outside Air Temperature falls below the Compressor Lockout Setpoint while the compressors are operating, mechanical cooling will stage off as minimum run times and stage down delays allow.

If the economizer is enabled, it will function as the first stage of cooling.

1 On/Off Compressor
In Cooling Mode, the compressor will be enabled.

On/Off and Two-Step Scroll Compressors
Stage Up Sequence:
In Cooling Mode, as the supply air temperature rises above the active Supply Air Temperature Cooling setpoint, cooling will begin to stage on.

Stage Down Sequence:
In Cooling Mode, as the supply air temperature falls below the active Supply Air Temperature Cooling setpoint, cooling will begin to stage off.

1 Variable Capacity Scroll Compressor
Stage Up Sequence:
In Cooling Mode, as the supply air temperature rises above the active Supply Air Temperature Cooling setpoint, the variable capacity scroll compressor will stage on and begin to modulate to maintain the active Supply Air Temperature Cooling Setpoint.

Stage Down Sequence:
In Cooling Mode, as the supply air temperature falls below the active Supply Air Temperature Cooling setpoint, the variable capacity scroll compressor will modulate to maintain the active

Supply Air Temperature Cooling setpoint. If the variable capacity compressor is at minimum capacity, and the supply air temperature is still below the active Supply Air Temperature Cooling setpoint within the Cooling Interstage Delay, then the variable capacity compressor will stage off.

1 Variable Capacity Scroll Compressor and 1 On/Off Scroll Compressor

Stage Up Sequence:

In the Cooling Mode, as the supply air temperature rises above the active Supply Air Temperature Cooling setpoint, the variable capacity scroll compressor will stage on and begin to modulate to maintain the active Supply Air Temperature Cooling Setpoint. If the variable capacity compressor is at 100% and the active Supply Air Temperature Cooling Setpoint is not satisfied within the Cooling Interstage Delay, the additional on/off compressor will stage on and the variable capacity compressor will reset back to minimum capacity, then modulate to maintain the active Supply Air Temperature Cooling setpoint.

Stage Down Sequence:

In the Cooling Mode, as the supply air temperature falls below the active Supply Air Temperature Cooling setpoint, with the variable capacity compressor at 100% and the on/off compressor Enabled, the variable capacity scroll compressor will modulate to maintain the active Supply Air Temperature Cooling setpoint. If the variable capacity compressor is at minimum, and the supply air temperature is still below the active Supply Air Temperature Cooling setpoint within the Cooling Interstage Delay, the on/off compressor will stage off and the variable capacity compressor will reset back to 100%, then modulate as needed to maintain the active Supply Air Temperature Cooling setpoint. If the supply air temperature is still below the active Supply Air Temperature Cooling setpoint, and the variable capacity compressor is at minimum, then the variable capacity compressor will stage off.

All Variable Capacity Scroll Compressors

Stage Up Sequence:

In Cooling Mode, as the supply air temperature rises above the active Supply Air Temperature Cooling setpoint, the first variable capacity scroll compressor will stage on and begin to modulate to maintain the Supply Air Temperature Cooling setpoint. If the first variable capacity scroll compressor is at 100% and the active Supply Air Temperature Cooling setpoint is not satisfied within the Cooling Interstage Delay, the second variable capacity scroll compressor will stage on and both variable capacity compressors will modulate to maintain the active Supply Air Temperature Cooling setpoint.

Stage Down Sequence:

In Cooling Mode, as the supply air temperature falls below the active Supply Air Temperature setpoint, the variable capacity control compressors will modulate to maintain the active Supply Air Temperature Cooling setpoint. Once the demand falls below the need for the second compressor within the time of the Cooling Interstage Delay and the compressor's minimum on time has been satisfied, the second variable capacity scroll compressor will stage off, and the first variable capacity scroll compressor will continue to modulate as needed to maintain the Supply Air Temperature Cooling setpoint. Additionally, if the supply air temperature falls below the active Supply Air Temperature Cooling setpoint, the first variable capacity scroll compressor will stage off.

Modulating Chilled Water Coil
In Cooling Mode, as the supply air temperature rises above the Supply Air Temperature Cooling setpoint, the chilled water valve will begin to modulate to maintain the Supply Air Temperature Cooling setpoint.

Space-Supply Cooling Reset
Space-Supply Cooling Reset reads the Space Temperature and linearly calculates a Supply Air Temperature setpoint.

Space-Supply Cooling Reset is subject to the following setpoints:
Space Temp Cool Hi
Space Temp Cool Lo
Supply Temp Cool Hi
Supply Temp Cool Lo

The Supply Air reset calculation will hold the Supply Temp Hi setpoint if the space temperature is below the Space Temperature Lo setpoint. As the Space Temperature increases above the Space Temp Lo setpoint and toward the Space Temp Hi setpoint, the supply air setpoint calculation will decrease in a linear fashion toward the Supply Temp Lo setpoint. The Supply Air reset calculation will hold the Supply Temp Lo setpoint if the space temperature is above the Space Temp Hi setpoint.

In the example below, the Supply Air Temp setpoint decreases linearly from 60°F to 50°F as the space temperature increases from 72°F to 76°F. When the space temperature is outside of those ranges, the Supply Air Temp setpoint will remain at the Hi or Lo values; at 70°F space temperature the Supply Air Temp setpoint will remain at the Supply Temp Cool Hi setpoint, 60°F, and at 78°F space temperature the Supply Air Temp setpoint will remain at the Supply Temp Cool Lo setpoint, 50°F.

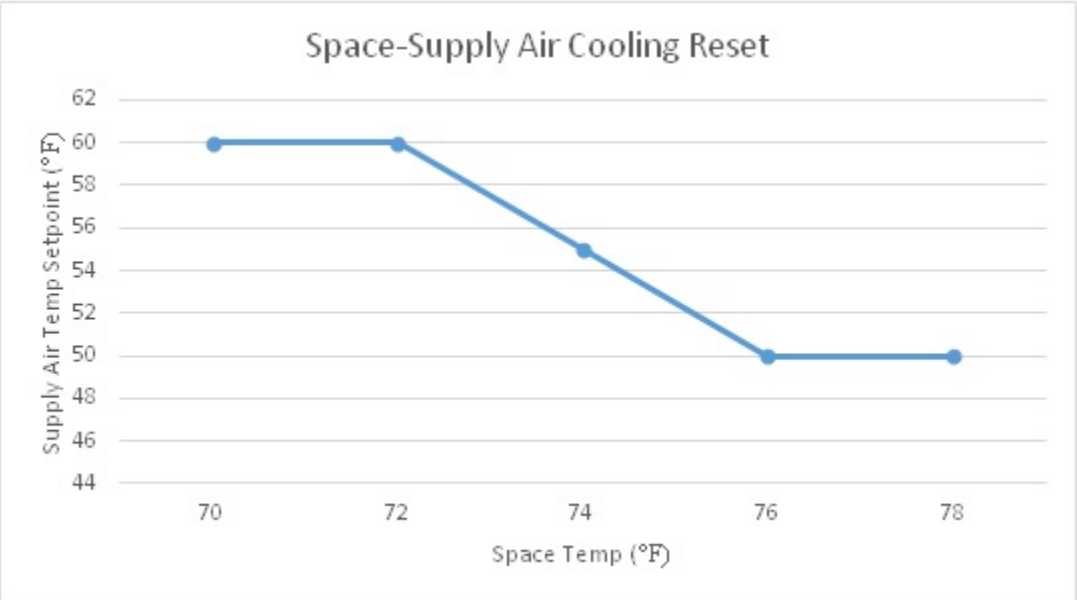


Figure 21 - Space-Supply Air Cooling Reset Example

Morning Cool-Down (VAV Only)
To enter Morning Cool-Down, the controller must transition from Unoccupied to Occupied Mode, the Supply Fan Status must be closed with the 30 sec air flow timer expired, and the return air temperature must be above the Morning Cool-Down setpoint.

During Morning Cool-Down, the outside air damper will remain closed, and the controller will enter cooling mode and maintain the Supply Cooling setpoint for the duration of the Cool-Down time, or until the return air temperature falls below the Morning Cool-Down setpoint.

Heating Operation

Heating Mode will only operate if the Supply Fan Status is Normal (Proof of Flow has been made).

Heating Mode is enabled when the temperature of the Control Temp Sensor falls 1°F below the active Heating setpoint. Heating Mode is disabled when the temperature at the Control Temp Sensor rises 1°F above the active Heating setpoint.

Heat staging up and staging down are subject to the following setpoints:
Heating Minimum On Time
Heating Minimum Off Time
Heating Interstage On Delay
Heating Interstage Off Delay

Staged Heating
In Heating Mode, as the supply air temperature falls below the active Supply Air Temperature Heating setpoint, the heating will begin to stage on. As the supply air temperature rises above the active Supply Air Temperature Heating setpoint, heating will begin to stage off.

Note: If the unit is set up for only one on/off stage of heating, the heating stage will be enabled in Heating Mode.

Modulating Gas Heat
In Heating Mode, the modulating gas heat control board will operate the heat exchangers to maintain the Supply Air Temperature Heating setpoint. The Supply Air Temperature Heating setpoint will be adjustable within the unit controller and communicated to the modulating gas control board.

Modulating Electric Heat
Stage Up Sequence:
In Heating Mode, as the supply air temperature falls below the Supply Air Temperature Heating setpoint, the modulating stage of heat will begin to modulate to maintain the Supply Air Temperature Heating setpoint. If the modulating stage of heat reaches 100% for the duration of the Heat Interstage Delay setpoint, the available subsequent heat stages will be staged on, and the modulating heat stage will continue to modulate with each heat stage to maintain the Supply Air Temperature Heating setpoint.

Stage Down Sequence:
As the supply air temperature rises above the Supply Air Temperature Heating setpoint, the modulating stage of heat will modulate to maintain the Supply Air Temperature Heating setpoint. If the modulating stage of heat reaches 0% for the duration of the Heat Interstage Delay setpoint, the currently active heating stages will begin to be staged off, and the modulating heat stage will continue to modulate with each stage to maintain the Supply Air Temperature Heating setpoint.

Modulating Hot Water
In Heating Mode, as the supply air temperature falls below the Supply Air Temperature Heating setpoint, the hot water valve will begin to modulate to maintain the Supply Air Temperature Heating setpoint.

Space–Supply Heating Reset
Space-Supply Heating Reset reads the Space Temperature and linearly calculates a Supply Temperature setpoint.

Space-Supply Heating Reset is subject to the following setpoints:
Space Temp Heat Hi
Space Temp Heat Lo
Supply Temp Heat Hi
Supply Temp Heat Lo

The Supply Air reset calculation will hold the Supply Temp Hi setpoint if the space temperature is below the Space Temperature Lo setpoint. As the Space Temperature increases above the Space Temp Lo setpoint and toward the Space Temp Hi setpoint, the Supply Air setpoint calculation will decrease in a linear fashion toward the Supply Temp Lo setpoint. The Supply Air reset calculation will hold the Supply Temp Lo if the space temperature is above the Space Temp Hi setpoint.

In the example below, the Supply Air Temp setpoint decreases linearly from 95°F to 85°F as the space temperature increases from 68°F to 72°F. When the space temperature is outside of those ranges, the Supply Air Temp setpoint will remain at the Hi or Lo values; at 66°F space temperature the Supply Air Temp setpoint will remain at the Supply Temp Cool Hi setpoint, 95°F, and at 74°F space temperature the Supply Air Temp setpoint will remain at the Supply Temp Cool Lo setpoint, 85°F.

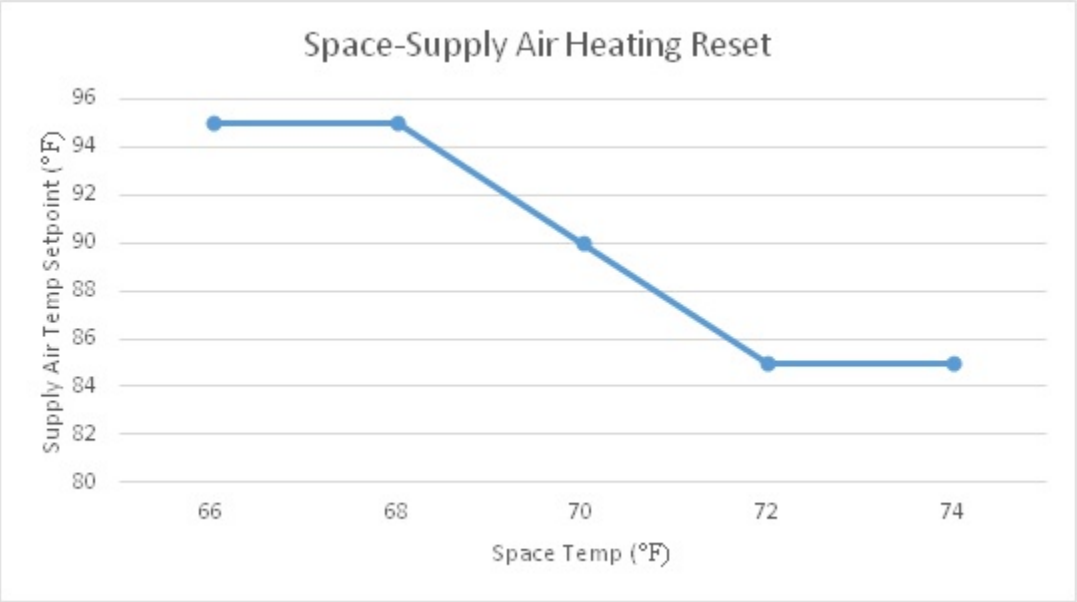


Figure 22 - Space-Supply Air Heating Reset Example

Daytime Heat (VAV Only)
Daytime Heat can only be initialized via the BACnet protocol (VAV Daytime Heat).

Once the BACnet point is set to true, the unit will index Heating Mode. Heating Mode will operate to maintain the active Heating Supply Air Temperature setpoint.

Morning Warm-Up (VAV Only)
To enter Morning Warm-Up, the controller must transition from Unoccupied to Occupied Mode, the Supply Fan Status must be closed with the 30 sec air flow timer expired, and the return air temperature must be below the Morning Warm-Up setpoint.

During Morning Warm-Up, the outside air damper will remain closed, and the controller will enter Heating Mode and maintain the Supply Heating setpoint for the duration of the Warm-Up time, or until the return air temperature rises above the Morning Warm-Up setpoint.

Dehumidification Operation

Dehumidification Mode will only operate if the Supply Fan Status is Normal (Proof of Flow has been made).

Dehumidification Mode is enabled based on the Dehumidification Enable setpoint. The Control Humidity Sensor configuration will be the controlling sensor for Dehumidification Mode.

Dehumidification can be selected as a priority mode and will be active anytime the humidity is above the Dehumidification Enable setpoint. Otherwise, it is only available when the Cooling and Heating demands are satisfied.

Compressor staging up and staging down are subject to the following setpoints:
Compressor Minimum On Time
Compressor Minimum Off Time
Compressor Interstage On Delay
Compressor Interstage Off Delay

Compressors are locked out if the outside air temperature falls 1°F below the Compressor Lockout Setpoint and will remain locked out until the Outside Air Temperature rises 1°F above the Compressor Lockout Setpoint. If the Outside Air Temperature falls below the Compressor Lockout Setpoint while the compressors are operating, mechanical cooling will stage off as minimum run times and stage down delays allow.

On/Off and Two-Step Scroll Compressors
Stage Up Sequence:
In Dehumidification Mode, as the first stage suction pressure rises above the Evaporator Coil Suction Temperature setpoint, the compressors will begin to stage on.

Stage Down Sequence:
In Dehumidification Mode, as the first stage suction pressure falls below the Evaporator Coil Suction Temperature setpoint, the compressors will begin to stage off.

1 Variable Capacity Scroll Compressor
Stage Up Sequence:
In Dehumidification Mode, as the first stage suction pressure rises above the Evaporator Coil Suction Temperature setpoint, the variable capacity scroll compressor will stage on and begin to modulate to maintain the Evaporator Coil Suction Temperature setpoint.

Stage Down Sequence:
In Dehumidification Mode, as the first stage suction pressure falls below Evaporator Coil Suction Temperature setpoint, the variable capacity scroll compressor will modulate to maintain the Evaporator Coil Suction Temperature setpoint. If the variable capacity compressor is at minimum, and the supply air temperature is still below the Evaporator Coil Suction Temperature setpoint within the Cooling Interstage Delay, then the variable capacity compressor will stage off.

1 Variable Capacity Scroll Compressor and 1 On/Off Scroll Compressor
Stage Up Sequence:
In Dehumidification Mode, as the first stage suction pressure rises above the Evaporator Coil Suction Temperature setpoint, the variable capacity scroll compressor will stage on and begin to modulate to maintain the active Evaporator Coil Suction Temperature setpoint. If the variable capacity compressor is at 100% and the Evaporator Coil Suction Temperature setpoint is not satisfied within the Cooling Interstage Delay, the additional on/off compressor will stage on and the variable capacity compressor will then modulate to maintain the Evaporator Coil Suction Temperature setpoint.

Stage Down Sequence:
In Dehumidification Mode, as the first stage suction pressure falls below the Evaporator Coil Suction Temperature setpoint, with the variable capacity compressor at 100% and the on/off compressor Enabled, the variable capacity scroll compressor will modulate to maintain the Evaporator Coil Suction Temperature setpoint. If the variable capacity compressor is at minimum, and the supply air temperature is still below the Evaporator Coil Suction Temperature setpoint within the Cooling Interstage Delay, the on/off compressor will stage off and the variable capacity compressor will reset back to 100%, then modulate as needed to maintain the Evaporator Coil Suction Temperature setpoint. If the supply air temperature is still below the Evaporator Coil Suction Temperature setpoint, and the variable capacity compressor is at minimum, then the variable capacity compressor will stage off.

All Variable Capacity Scroll Compressors
Stage Up Sequence:
In Dehumidification Mode, as the first stage suction pressure rises above the Evaporator Coil Suction Temperature setpoint, the first variable capacity scroll compressor will stage on and begin to modulate to maintain the Evaporator Coil Suction Temperature setpoint. If the first variable capacity scroll compressor is at 100% and the Evaporator Coil Suction Temperature setpoint is not satisfied within the time of the Cooling Interstage Delay, the second variable capacity scroll compressor will stage on and both variable capacity compressors will modulate to maintain the Evaporator Coil Suction Temperature setpoint.

Stage Down Sequence:
In Dehumidification Mode, as the first stage suction pressure falls below the Evaporator Coil Suction Temperature setpoint, the variable capacity control compressors will modulate to maintain the Evaporator Coil Suction Temperature setpoint. Once the demand falls below the need for the second compressor within the time of the Cooling Interstage Delay and the compressor's minimum on time has been satisfied, the second variable capacity scroll compressor will stage off, and the first variable capacity scroll compressor will continue to modulate as needed to maintain the Evaporator Coil Suction Temperature setpoint. Additionally, if the supply air temperature falls below the Evaporator Coil Suction Temperature setpoint, the first variable capacity scroll compressor will stage off.

Hot Gas Reheat
Hot Gas Reheat will operate only during Dehumidification Mode.

Stage Up Sequence:
As the Mode Enable temperature rises 1°F above the Occupied Cooling setpoint, the Hot Gas Reheat Solenoid will stage on.

Stage Down Sequence:
As the Mode Enable temperature falls 1°F below the Occupied Cooling setpoint, the Hot Gas Reheat Solenoid will stage off.

Modulating Hot Gas Reheat
Modulating Hot Gas Reheat (MHGR) will operate only during Dehumidification Mode.

As the Mode Enable temperature rises above the Occupied Cooling setpoint, the MHGR will modulate to maintain the Occupied Cooling setpoint.

Reheat Purge Mode
After dehumidification has been operating for one hour, the purge cycle will fully open the reheat valves for two minutes every sixty minutes if the reheat valve position is less than thirty percent. This cycle will continue to operate for the entirety of Dehumidification Mode, and at the star-up of each compressor.

Occupancy/Supply Fan Operation

Building Occupancy Status
Occupied Mode Operation Options:
Internal Schedule
Remote Forced Occupied (Normally Open Contact, DI1)
Network Occupancy Point (BACnet)

Occupied Mode Operation
The controller will use occupied setpoints for heating cooling and dehumidification modes of operation.

Unoccupied Mod Operation
If the Unoccupied Mode setpoint is set to ON, the controller will use unoccupied setpoints for heating and cooling mode operations, the controller will use the occupied dehumidification mode setpoint for dehumidification mode, the outside air damper will be closed, and calls for heating, cooling, or dehumidification will operate based on the unoccupied Supply Fan mode selection. If the Unoccupied Mode setpoint is set to OFF, the unit will be off.

Supply Fan
Anytime the supply fan is request to start, a 30 sec minimum off timer must be satisfied. If the timer is satisfied the Supply Fan will be energized. In Auto mode or when transitioning to Unoccupied Mode the supply fan is held on for 1 minute after the last stage of cooling, heating, or dehumidification stages off.

Occupied Mode
The Supply Fan can be configured for three modes:
(On) – To run continuously,
(Auto) – Cycles on with cooling, heating, and dehumidification modes, or
(Off) – Unit will not run with cooling, heating, and dehumidification demands.

Unoccupied Mode
The Supply Fan can be configured for three modes:
(On) – To run continuously,
(Auto) – Cycles on with cooling, heating, and dehumidification modes, or
(Off) – Unit will not run with cooling, heating, and dehumidification demands.

Ventilation Mode
This mode occurs during the Occupied or Unoccupied Mode of operation when there is no demand for cooling, heating, or dehumidification. The Supply Fan must be configured for continuous (ON) operation.

Single Zone VAV
Cooling
In Cooling Mode, as the control temperature sensor rises above the Occupied Cooling setpoint, the supply fan shall modulate up linearly based on the supply fan deadband. As the control temperature sensor falls toward the Occupied Cooling Setpoint, the supply fan shall modulate down.
Heating
The supply fan shall run at a constant speed.

Dehumidification
The supply fan shall run at a constant speed.

Constant Volume and Makeup Air
Cooling, Heating, and Dehumidification
The supply fan shall run at a constant speed.

Variable Air Volume
During Occupied Mode, the supply fan will modulate to maintain Duct Static Pressure Setpoint.

Additional Feature Sequences

Economizer Operation
Note: For Title 24 compliance, unit must be selected with Fault Detection and Diagnostics Controller

Sensible Economizer operation is enabled when the outside air temperature falls below the Sensible Economizer Enable setpoint by 1°F. Economizer operation is disabled when the outside air temperature rises 1°F above the Sensible Economizer Enable setpoint.

Enthalpy Economizer is enabled when the outside air enthalpy falls below the Enthalpy Economizer Enable setpoint by 1 Btu/lb and the outside air temperature falls below the Sensible Economizer Enable setpoint by 1°F. Economizer operation is disabled when the outside air enthalpy rises 1 Btu/lb above the Enthalpy Economizer Enable setpoint or the outside air temperature rises 1°F above the Sensible Economizer Enable setpoint.

Comparative Enthalpy Economizer is enabled when the difference between the return air enthalpy and outside air enthalpy rises 1 Btu/lb above the Comparative Enthalpy Economizer Enable setpoint, and the outside air temperature falls below the Sensible Economizer Enable setpoint by 1°F. Economizer operation is disabled when the difference between the return air enthalpy and the outside air enthalpy falls 1 Btu/lb below the Comparative Enthalpy Economizer Enable setpoint or the outside air temperature rises 1°F above the Sensible Economizer Enable setpoint. (Comparative Enthalpy = Outside Air Enthalpy – Return Air Enthalpy)

Economizer acts as the first stage of cooling and modulates the outside air damper to maintain the Supply Air Temperature setpoint. If the Economizer reaches 100%, the Economizer Cooling

Lockout Time has expired, and the supply air temperature is higher than 1°F of the Supply Air Cooling setpoint, mechanical cooling is allowed to stage up.

Economizer Damper Minimum Position setpoint can be adjusted in the controller.

The Economizer Damper is closed during Unoccupied Mode.

CO_2 Control Operation

During Occupied Mode, as the CO_2 (Space or Return sensor) rises above the CO_2 setpoint, the outside air damper will modulate open. The outside air damper will take the maximum of the CO_2, Economizer, or Outside Air Flow Monitoring Control signals.

Outside Air Flow Monitoring

The scale of the Air Flow Monitoring Station must be configured to ensure accurate control. The Minimum and Maximum Scale settings will be coordinated with a 0-10VDC input.

During Occupied Mode, as the Outside Air Flow falls below the Outside Air Flow setpoint, the outside air damper will modulate open within a range of the Outside Air Minimum Position to 100%. As the Outside Air Flow rises above the Outside Air Flow setpoint, the outside air damper will modulate closed with a range of 100% to the Outside Air Minimum Position.

Head Pressure Control

Combined Condenser Head Pressure Control

The condenser fan is commanded on when the compressor is enabled.

In Cooling Mode, as the controlling discharge pressure rises above the Cool Discharge 1 setpoint, the condenser fan will modulate to maintain the Cool Discharge 1 setpoint. If there are two refrigerant circuits, the controlling discharge pressure is the highest of the two circuits.

In Dehumidification Mode, as the controlling discharge pressure rises above the Dehum Discharge 1 setpoint, the condenser fan will modulate to maintain the Dehum Discharge 1 setpoint. If there are two refrigerant circuits, the controlling discharge pressure is the highest of the two circuits.

Split Condenser Head Pressure Control

Each condenser fan is commanded on when its corresponding compressor is enabled.

In Cooling Mode, as the discharge pressure for circuit 1 rises above the Cool Discharge 1 setpoint, the condenser fan will modulate to maintain the Cool Discharge 1 setpoint.

In Cooling Mode, as the discharge pressure for circuit 2 rises above the Cool Discharge 2 setpoint, the condenser fan will modulate to maintain the Cool Discharge 2 setpoint.

In Dehumidification Mode, as the discharge pressure for circuit 1 rises above the Dehum Discharge 1 setpoint, the condenser fan will modulate to maintain the Dehum Discharge 1 setpoint.

In Dehumidification Mode, as the discharge pressure for circuit 2 rises above the Dehum Discharge 2 setpoint, the condenser fan will modulate to maintain the Dehum Discharge 2 setpoint.

Each condenser fan will operate independently and control to maintain its own Head Pressure setpoint.

Water-Cooled Condenser with Head Pressure Control
Condenser Water Flow Status must be confirmed before mechanical cooling will start (Water Flow Switch must be made).

The condenser valve modulates to the Condenser Water Valve Minimum Position setpoint when Cooling Mode is disabled.

In Cooling Mode, as the maximum of all discharge pressures rises above the Head Pressure setpoint, the condenser valve will modulate to maintain the Head Pressure setpoint.

Exhaust Fan Operation
Exhaust Fan without VFD or ECM
The Exhaust Fan shall operate when the Supply Fan Proof of Flow is confirmed, and only during Occupied Mode when the outside air damper rises above the outside air damper minimum position.

Exhaust Fan with VFD
The Exhaust Fan shall operate when the Supply Fan Proof of Flow is confirmed, and only during Occupied Mode. As the Building Static Pressure rises above the Building Static Pressure setpoint, the Exhaust Fan will modulate to maintain the Building Static Pressure setpoint.

Heat Pump Operation
During Heating Mode, the Outdoor Fan or Water Valve will be held at 100%

Heat Pump Auxiliary Heat is defined as supplemental heat to the compressor heating.

In Heating Mode, Auxiliary Heat is allowed to operate during the compressor operation. During

Defrost Mode, Auxiliary heat will be used in attempt to maintain the active Supply Air Heating setpoint.

Heat Pump Emergency Heat is defined as heat that is only allowed to operate when compressor heating is locked out.

Energy Recovery Wheel Operation
The Energy Recovery Wheel shall operate when the Supply Fan Proof of flow is confirmed, and only during Occupied Mode. The Energy Recovery Wheel shall not operate during Economizer Mode.

Energy Recovery Wheel Defrost
If the Energy Recovery Wheel has been on for a time greater than the Energy Recovery Wheel Minimum Run Time setpoint, and the outside air temperature is less than the Energy Recovery Wheel Defrost Setpoint, the defrost cycle will initiate.

The Energy Recovery Wheel will be turned off for the Energy Recovery Wheel Defrost Time; once expired, the Energy Recovery Wheel will be turned on again. The Energy Recovery Wheel Defrost Cycle will repeat after the Energy Recovery Wheel Defrost Period expires.

Modulating Electric Preheat
The outside air temperature must be below the Preheat OAT setpoint, the unit must be in Occupied Mode, and the Supply Fan Status must be closed.

The preheat controller will modulate the electric preheat to maintain the Preheat Leaving Air Temperature setpoint.

Network Points List

Table 3 - BACnet Points List (Analog Values 1)

Object	Description	Read/Write	Unit	Default	Min	Max
AV0	Discharge Press 1	R	psig			
AV1	Discharge Press 2	R	psig			
AV2	Suction Press 1	R	psig			
AV3	Suction Press 2	R	psig			
AV4	Discharge Temp 1	R	°F			
AV5	Discharge Temp 2	R	°F			
AV6	Mixed Air Temp	R	°F			
AV7	Return Air Temp	R	°F			
AV8	Supply Air Temp	R	°F			
AV9	Outside Air Temp	R	°F			
AV10	Return RH	R	% RH			
AV11	Outside RH	R	% RH			
AV12	CO2	R	ppm			
AV13	OA Airflow	R	cfm			
AV14	Duct Press	R	in. w.c.			
AV15	Building Press	R	in. w.c.			
AV16	Hot Water Valve	R	%			
AV17	Chilled Water Valve	R	%			
AV18	Condenser Fan 1	R	%			
AV19	Condenser Fan 2	R	%			
AV20	MHGRH	R	%			
AV21	Exhaust Fan	R	%			
AV22	Outside Air Damper	R	%			
AV23	Supply Fan	R	%			
AV24	Control Temp	R	°F			
AV25	Control RH	R	% RH			
AV26	Working Clg Spt	R	°F			
AV27	Working Htg Spt	R	°F			
AV28	Clg PID Count	R				
AV29	Digital Comp 1	R	%			
AV30	Digital Comp 2	R	%			
AV31	Cool PID	R				
AV32	Heat PID	R	%			
AV33	Clg Supply Reset	R	°F			
AV34	Htg Supply Reset	R	°F			
AV35	Econ PID	R				
AV36	Econ Ramp Count	R	min			
AV37	Econ Lockout Timer	R	min			
AV38	Combustion Blower RPM	R	rpm			
AV39	Raw Mod Gas Valve	R	%			
AV40	Mod Gas Valve	R	%			
AV41	Raw Mod Gas Valve 2	R	%			
AV42	Mod Gas PID	R				
AV43	Electric Preheat PID	R				
AV44	Preheat LAT Probe A	R	°F			
AV45	Preheat LAT Probe B	R	°F			
AV46	Preheat LAT Average	R	°F			
AV47	Network Address	R				

Table 4 - BACnet Points List (Analog Values 2)

Object	Description	Read/Write	Unit	Default	Min	Max
AV48	Morning Cool-Down Spt	R/W	°F	78	55	85
AV49	Morning Warm-Up Spt	R/W	°F	65	50	85
AV50	Preheat OAT Setpoint	R/W	°F	35	10	60
AV51	Preheat LAT Setpoint	R/W	°F	50	35	80
AV52	Duct Static Setpoint	R/W	in. w.c.	1	0.25	5
AV53	Supply Fan Unoccupied Config	R/W		0	0	2
AV54	Supply Fan Occupied Config	R/W		0	0	2
AV55	CO2 Spt	R/W	ppm	900	500	1500
AV56	Defrost Trigger Spt	R/W	°F	32	0	40
AV57	Defrost Trigger Delay	R/W	min	30	1	60
AV58	Defrost Termination Delay	R/W	min	2	1	10
AV59	Occupied Cooling Spt	R/W	°F	74	55	85
AV60	Unoccupied Cooling Spt	R/W	°F	78	55	85
AV61	Supply Cooling Spt	R/W	°F	55	45	65
AV62	Compressor On Time	R/W	sec	180	120	255
AV63	Compressor Off Time	R/W	sec	180	60	255
AV64	Compressor Interstage On Delay	R/W	sec	60	30	255
AV65	Compressor Interstage Off Delay	R/W	sec	60	30	255
AV66	Outside Air Temp Lockout	R/W	°F	55	0	65
AV67	Space Cooling Hi Reset	R/W	°F	76	55	85
AV68	Space Cooling Lo Reset	R/W	°F	73	55	85
AV69	Supply Cooling Hi Reset	R/W	°F	57	45	65
AV70	Supply Cooling Lo Reset	R/W	°F	53	45	65
AV71	Sensible Econ Spt	R/W	°F	60	40	80
AV72	Econ Lockout Time	R/W	min	2	1	20
AV73	Econ Min Position	R/W	%	15	0	100
AV74	Enthalpy Econ Spt	R/W	Btu/lb.	20	15	25
AV75	Comparative Econ Spt	R/W	Btu/lb.	1	1	5
AV76	Mixed Air Spt	R/W	°F	52	50	80
AV77	Occupied Heating Spt	R/W	°F	70	55	85
AV78	Unoccupied Heating Spt	R/W	°F	65	55	85
AV79	Supply Heating Spt	R/W	°F	90	55	120
AV80	Heating On Time	R/W	sec	180	120	255
AV81	Heating Off Time	R/W	sec	180	120	255
AV82	Heating Interstage On Delay	R/W	sec	30	30	255
AV83	Heating Interstage Off Delay	R/W	sec	30	30	255
AV84	OA Heating Lockout	R/W	°F	75	50	100
AV85	Space Heating Hi Reset	R/W	°F	72	55	85
AV86	Space Heating Lo Reset	R/W	°F	69	55	85
AV87	Supply Heating Hi Reset	R/W	°F	100	55	120
AV88	Supply Heating Lo Reset	R/W	°F	90	5	120
AV89	Dehum Enable Spt	R/W	% RH	50	40	60
AV90	Suction Temp Spt	R/W	°F	42	38	48
AV91	MHGRH Purge Time	R/W	sec	120	60	240
AV92	MHGRH Purge Period	R/W	min	60	1	120
AV93	Cooling Head Pressure 1 Spt	R/W	psig	340	250	475
AV94	Cooling Head Pressure 1 Spt	R/W	psig	340	250	475
AV95	Dehum Head Pressure 1 Spt	R/W	psig	390	250	475
AV96	Dehum Head Pressure 2 Spt	R/W	psig	390	250	475
AV97	Condenser Valve Min Position	R/W	%	0	0	100
AV98	Exhaust Fan Min Position	R/W	%	33	0	100
AV99	Building Pressure Spt	R/W	in. w.c.	0.01	-.1	.1

Table 5 - BACnet Points List (Analog Values 3)

Object	Description	Read/Write	Unit	Default	Min	Max
AV100	Heat Wheel Min Run	R/W	sec	1	1	60
AV101	Heat Wheel Defrost Spt	R/W	°F	25	0	35
AV102	Heat Wheel Defrost Time	R/W	sec	120	15	255
AV103	Heat Wheel Defrost Period	R/W	min	30	5	120
AV104	Outside Air Flow Spt	R/W	cfm	0	0	15000
AV105	Outside Air Flow Max Spt	R/W	cfm	0	0	15000
AV106	Outside Air Flow Min Spt	R/W	cfm	0	0	15000
AV107	Dehum Lockout Temp	R/W	°F	55	35	75
AV108	CAV Fan Position	R/W	%	100	33	100
AV109	Supply Fan Max	R/W	%	100	33	100
AV110	SF Cool Min Position	R/W	%	33	33	100
AV111	SF Deadband	R/W	°F	4	2	10
AV112	VAV MCD Time	R/W	min	30	5	60
AV113	VAV MWU Time	R/W	min	30	5	60
AV114	Space Temperature	R	°F			
AV115	Space Relative Humidity	R	% RH			

Table 6 - BACnet Points List (Binary/Relay Values 1)

Object	Description	Read/Write	Default	Min	Max
BV0	Economizer	R		False	True
BV1	Heat Wheel	R		False	True
BV2	Exhaust Fan	R		False	True
BV3	Comp 2	R		False	True
BV4	Comp 1	R		False	True
BV5	Supply Fan Command	R		False	True
BV6	Occupancy Status	R		False	True
BV7	Supply Fan Status	R		False	True
BV8	Emergency Shutdown Status	R		False	True
BV9	Water Flow Status	R		False	True
BV10	Clogged Filter Status	R		False	True
BV11	Comp 2 2nd Step	R		False	True
BV12	Comp 1 2nd Step	R		False	True
BV13	Heat Stage 4	R		False	True
BV14	Heat Stage 3	R		False	True
BV15	Heat Stage 2	R		False	True
BV16	Heat Stage 1	R		False	True
BV17	Dehum	R		False	True
BV18	Cool	R		False	True
BV19	Heat Mode	R		False	True
BV20	Vent Mode	R		False	True
BV21	On Off Mode	R		False	True
BV22	Reversing Valve	R		False	True
BV23	Emergency Shutdown Alarm	R		False	True
BV24	Clogged Filter Alarm	R		False	True
BV25	Supply Fan Alarm	R		False	True
BV26	CO2 Alarm	R		False	True
BV27	Supply Air Temp High Limit	R		False	True
BV28	Supply Air Temp Low Limit	R		False	True
BV29	Outside Air Open	R		False	True
BV30	Outside Air Shorted	R		False	True
BV31	Supply Air Open	R		False	True

Table 7 - BACnet Points List (Binary/Relay Values 2)

Object	Description	Read/Write	Default	Min	Max
BV32	Supply Air Shorted	R		False	True
BV33	Return Air Open	R		False	True
BV34	Return Air Shorted	R		False	True
BV35	Mixed Air Open	R		False	True
BV36	Mixed Air Shorted	R		False	True
BV37	OA Temp Lockout	R		False	True
BV38	Water Flow	R		False	True
BV39	Network Occupy	R/W	False	False	True
BV40	VAV Daytime Heat	R/W	False	False	True
BV41	Network Emergency Shutdown	R/W	False	False	True

Maintenance and Support

At least once each year, a qualified service technician should check out the HVAC equipment. Supply fans, evaporator coils and air filters should be inspected monthly.

⚠ 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 qualified installer. A copy of this IOM should be kept with the unit.

Periodically during operation, it is necessary to perform routine service checks on the performance of the unit. This includes checking of the airflow, the air filters, condenser water flow and refrigerant charge.

Replacement Parts
Parts for AAON equipment may be obtained from your local AAON representative. Reference the unit serial number and part number when ordering parts.

AAON
Warranty, Service and Parts Department
2424 S. Yukon Ave.
Tulsa, OK 74107
Ph: 918-583-2266
Fax: 918-382-6364
www.aaon.com

Note: Before calling, technician should have model and serial number of the unit available for the service department to help answer questions regarding the unit and controller.

Glossary

Occupied Cooling: [Occupied Cooling Spt] Space temperature cooling setpoint for the occupied mode of operation. Default setpoint is 74°F and range is 55-85°F.

Unoccupied Cooling: [Unoccupied Cooling Spt] Space temperature cooling setpoint for the unoccupied mode of operation. Default setpoint is 78°F and range is 55-85°F.

AAON Touchscreen Mini Controller Startup Form

Date:_____

Job Name:_____

Address:_____

Model Number:_____

_____

Serial Number:_____ Tag:_____

Startup Contractor:_____

Address:_____ Phone_____

Pre Startup Checklist		
Installing contractor should verify the following items:		
1. Is there any visible shipping damage? _____	Yes ☐	No ☐
2. Are the clearances adequate for service and operation? _____	Yes ☐	No ☐
3. Have all electrical connections been tested for tightness? _____	Yes ☐	No ☐

Unit Configuration			
Water-Cooled Condenser _____	☐	Air-Cooled Condenser _____	☐
Water-Source Heat Pump_____	☐	Air-Source Heat Pump_____	☐
Constant Volume Cooling_____	☐	Single Zone VAV Cooling_____	☐
Constant Volume Heating_____	☐	VAV Cooling_____	☐
		Makeup Air_____	☐
Supply Fan Control - VFD ☐ ECM ☐			
Supply Fan Cooling Max Speed_____		Supply Fan Heating Max Speed_____	
Supply Fan Cooling Min Speed_____		Supply Fan Heating Min Speed_____	

Maintenance Log

This log must be kept with the unit. It is the responsibility of the owner and/or maintenance/service contractor to document any service, repair or adjustments. AAON Service and Warranty Departments are available to advise and provide phone help for proper operation and replacement parts. The responsibility for proper start-up, maintenance and servicing of the equipment falls to the owner and qualified licensed technician.

Entry Date	Action Taken	Name/Tel.

Literature Change History

April 2016 - First Revision

AAON
2425 South Yukon Ave.
Tulsa, OK 74107-2728
Phone: 918-583-2266
Fax: 918-583-6094
www.aaon.com

AAON Touchscreen Mini Controller
User's Manual
V71810 · Rev. A · 160425