Pioneer Gold Controller
Technical Guide

Pioneer Gold Controller Code: Version 1.07
Pioneer Gold Electric Heat Board Code: Version 1.0
Used with AAON WSHP WV Series Vertical and WH Series Horizontal
This manual is divided into two parts:

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 at all times.

AAON Factory Technical Support: 918-382-6450
techsupport@aaon.com

NOTE: Before calling Technical Support, please have the model and serial number of the unit available.

PARTS: For replacement parts please contact your local AAON Representative.

www.aaon.com

AAON Part Number: G011010, Rev. 01D
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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**

**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.
Applications

The V94730 / V94731 AAON® Pioneer Gold Controller with Touch Screen interface, BACnet® MS/TP, and Modbus communication protocols is designed for AAON® horizontal and vertical water-source heat pump units—WH & WV series. All of the energy saving features and options available on AAON® WH and WV Series water-source heat pumps can be controlled with the Pioneer Gold Controller.

The Water-Source Heat Pump (WSHP) Pioneer Gold Controller contains all the functionality required to operate basic and advanced configurations of AAON® WH and WV Series WSHP units. The controller can operate with a standard heat pump room thermostat (by others) or can operate as a stand-alone system with the Pioneer Gold Touchscreen Space & Humidity Sensor or Simple Space Temperature Sensor.

The controller also contains a terminal block for communication to the V98550 Pioneer Gold Electric Heat Board for additional heat stages.

**NOTE:** If the application currently uses an obsolete mercury bulb type thermostat, it must be upgraded to an electronic thermostat. The unit will not function properly when controlled via a mercury bulb thermostat.

The controller has outputs to control a supply fan, compressor, and reversing valve. It also provides I/O for additional functionality.

The Pioneer Gold is used for Constant Volume applications.

The Water-Source Heat Pump (WSHP) Pioneer Gold Controller contains all the functionality required to operate basic and advanced configurations of AAON® WH and WV Series WSHP units. The controller can operate with a standard heat pump room thermostat (by others) or can operate as a stand-alone system with the Pioneer Gold Touchscreen Space & Humidity Sensor or Simple Space Temperature Sensor.

Table 1: Pioneer Gold Features & Options

<table>
<thead>
<tr>
<th>PIONEER GOLD FEATURES &amp; OPTIONS</th>
<th>ADVANCED FEATURES</th>
<th>SERVICE AND RELIABILITY FEATURES</th>
<th>ADVANCED FEATURES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>UNIT CAPACITY CONTROL</strong></td>
<td>½ to 30 ton WSHPs</td>
<td><strong>ADVANCED ALARMS</strong></td>
<td><strong>ADVANCED FEATURES</strong></td>
</tr>
<tr>
<td><strong>USER INTERFACE</strong></td>
<td>2.8” Touchscreen LCD Color Interface with Two Levels of Security</td>
<td><strong>HIGH/Low Control Voltage Alarms</strong></td>
<td><strong>Waterside Economizer Operation</strong></td>
</tr>
<tr>
<td><strong>STAND-ALONE CAPABILITY</strong></td>
<td>Stand Alone with Space Sensors or Thermostat Terminals</td>
<td><strong>Firmware Update via USB Port</strong></td>
<td><strong>Two-Speed EC Fan Operation</strong></td>
</tr>
<tr>
<td><strong>NETWORKING CAPABILITY</strong></td>
<td>Built-In BACnet® MS/TP</td>
<td><strong>Fault and Status Indicator LED</strong></td>
<td><strong>PSC Fan Control</strong></td>
</tr>
<tr>
<td><strong>BASIC FEATURES</strong></td>
<td>• Thermostat Control</td>
<td><strong>Factory Wiring Harness Connectors</strong></td>
<td><strong>Reversing Valve</strong></td>
</tr>
<tr>
<td></td>
<td>• Random Start Delay</td>
<td><strong>High/Low Control Voltage Lockout (Auto Reset)</strong></td>
<td><strong>Control</strong></td>
</tr>
<tr>
<td></td>
<td>• Compressor Minimum On/Off Timers</td>
<td><strong>Alarm and Relay Status LEDs</strong></td>
<td><strong>Two-Step Compressor Operation</strong></td>
</tr>
<tr>
<td></td>
<td>• High Condensate Level Sensor</td>
<td><strong>Alarm Status - LCD Interface</strong></td>
<td><strong>Motorized Water Valve Control</strong></td>
</tr>
<tr>
<td></td>
<td>• High Refrigerant Pressure Protection</td>
<td></td>
<td><strong>CAV Operation</strong></td>
</tr>
<tr>
<td></td>
<td>• Loss of Refrigerant Charge Protection</td>
<td></td>
<td><strong>Externally Controlled EC Motor (0-10VDC)</strong></td>
</tr>
<tr>
<td></td>
<td>• Reversing Valve Default to Heating Mode</td>
<td></td>
<td><strong>Supply Air Temperature (SAT)</strong></td>
</tr>
<tr>
<td></td>
<td>• Dry Alarm Contacts</td>
<td></td>
<td><strong>Staging Control</strong></td>
</tr>
<tr>
<td></td>
<td>• Emergency Shutdown Input (not to be used as a fire/life safety device)</td>
<td></td>
<td><strong>Supply Air Reset Control</strong></td>
</tr>
<tr>
<td></td>
<td>• Night Setback Mode</td>
<td></td>
<td><strong>Two Stage Auxiliary/Emergency Heat Control</strong></td>
</tr>
<tr>
<td></td>
<td>• Night Setback Override Thermostat Input</td>
<td></td>
<td><strong>Compressor Signal LED</strong></td>
</tr>
<tr>
<td></td>
<td>• High Condensate Level Sensor</td>
<td></td>
<td><strong>Alarm Mode Indicator LED</strong></td>
</tr>
<tr>
<td></td>
<td>• Auxiliary Alarm Input</td>
<td></td>
<td><strong>2.8” Color Touchscreen LCD Interface</strong></td>
</tr>
<tr>
<td></td>
<td>• I/O Status LEDs</td>
<td></td>
<td><strong>Space Sensor Control</strong></td>
</tr>
<tr>
<td></td>
<td>• Occupancy Scheduling</td>
<td></td>
<td><strong>4.3” Color Pioneer Gold Touchscreen Space Temperature and Humidity Sensor (Optional)</strong></td>
</tr>
<tr>
<td></td>
<td>• 7-Day, 2-Event-Per-Day Scheduling</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Pioneer Gold Part Numbers

Refer to Table 2 for a list of Pioneer Gold part numbers.

<table>
<thead>
<tr>
<th>PIONEER GOLD PART DESCRIPTION</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pioneer Gold Controller</td>
<td>V94730 / V94731</td>
</tr>
<tr>
<td>Pioneer Gold Electric Heat Board</td>
<td>V98550</td>
</tr>
<tr>
<td>Pioneer Gold Touch Screen Space Temp &amp; RH Sensor</td>
<td>G000180</td>
</tr>
<tr>
<td>Simple Space Temperature Sensor</td>
<td>R38430</td>
</tr>
<tr>
<td>Heat Pump Thermostat</td>
<td>By Others or via AAON Parts</td>
</tr>
<tr>
<td>Horizontal Water-Source Heat Pump Unit</td>
<td>WHA-XXX</td>
</tr>
<tr>
<td>Vertical Water-Source Heat Pump Unit</td>
<td>WVA-XXX</td>
</tr>
<tr>
<td>H4 Water Harness</td>
<td>See Tables 3 &amp; 4</td>
</tr>
<tr>
<td>H5 Standard Output Harness</td>
<td>See Tables 3 &amp; 4</td>
</tr>
<tr>
<td>H7 Variable Capacity Harness</td>
<td>See Tables 3 &amp; 4</td>
</tr>
<tr>
<td>H8 Reheat Harness</td>
<td>See Tables 3 &amp; 4</td>
</tr>
<tr>
<td>H13 Standard Input Harness</td>
<td>See Tables 3 &amp; 4</td>
</tr>
</tbody>
</table>

### Table 2: Pioneer Gold Part Numbers
WH & WV Series Harness Part Numbers

Refer to Tables 3 & 4, below for WH & WV series harness part numbers.

### Table 3: WSHP WH Unit Harness Part Numbers

<table>
<thead>
<tr>
<th>HARNESS #</th>
<th>BOX SIZES</th>
<th>TONNAGE</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>H4</td>
<td>A,B,C,D,E Boxes</td>
<td>½ Ton - 5 Ton</td>
<td>V97310</td>
</tr>
<tr>
<td>H5 &amp; H13</td>
<td>A Box</td>
<td>½ Ton - 1 Ton</td>
<td>G003080</td>
</tr>
<tr>
<td></td>
<td>B Box</td>
<td>¼ Ton - 1½ Ton</td>
<td>G003120</td>
</tr>
<tr>
<td></td>
<td>C,D,E Boxes</td>
<td>2 Ton - 5 Ton</td>
<td>V97320</td>
</tr>
<tr>
<td>H7</td>
<td>A Box</td>
<td>½ Ton - 1 Ton</td>
<td>G003100</td>
</tr>
<tr>
<td></td>
<td>B Box</td>
<td>¼ Ton - 1½ Ton</td>
<td>G003140</td>
</tr>
<tr>
<td></td>
<td>C,D,E Boxes</td>
<td>2 Ton - 5 Ton</td>
<td>G003070</td>
</tr>
<tr>
<td>H8</td>
<td>A,B,C,D,E Boxes</td>
<td>½ Ton - 5 Ton</td>
<td>V97380</td>
</tr>
</tbody>
</table>

### Table 4: WSHP WV Unit Harness Part Numbers

<table>
<thead>
<tr>
<th>HARNESS #</th>
<th>BOX SIZES</th>
<th>TONNAGE</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>H4</td>
<td>A, B Boxes</td>
<td>½ Ton - 1½ Ton</td>
<td>G004030</td>
</tr>
<tr>
<td></td>
<td>C,D,E Boxes</td>
<td>2 Ton - 5 Ton</td>
<td>G004070</td>
</tr>
<tr>
<td>H5 &amp; H13</td>
<td>A, B Boxes</td>
<td>½ Ton - 1½ Ton</td>
<td>G004020</td>
</tr>
<tr>
<td></td>
<td>C,D,E Boxes</td>
<td>2 Ton - 5 Ton</td>
<td>G004060</td>
</tr>
<tr>
<td>H7</td>
<td>A, B Boxes</td>
<td>½ Ton - 1½ Ton</td>
<td>G004040</td>
</tr>
<tr>
<td></td>
<td>C,D,E Boxes</td>
<td>2 Ton - 5 Ton</td>
<td>G004080</td>
</tr>
<tr>
<td>H8</td>
<td>A, B Boxes</td>
<td>½ Ton - 1½ Ton</td>
<td>G004050</td>
</tr>
<tr>
<td></td>
<td>C,D,E Boxes</td>
<td>2 Ton - 5 Ton</td>
<td>G004090</td>
</tr>
</tbody>
</table>
## General

Correct wiring of the Pioneer Gold Controller and its Expansion Board, if applicable, is the most important factor in the overall success of the controller installation process. In general, most Pioneer Gold Controllers are factory installed and wired at the AAON® factory. Some of the following information may not apply to your installation if it was pre-wired at the factory. However, if troubleshooting of the controller is required, it is a good idea to be familiar with the system wiring.

The Pioneer Gold Controller dimensions are 8” x 5.5”. The Expansion Board dimensions are 3.5” x 3.5”.

## Electrical & Environmental Requirements

The Pioneer Gold Controller and electric heat board must be connected to a 24 VAC power source of the proper size for the calculated VA load requirements. All transformer sizing should be based on the VA rating listed in **Table 5**.

<table>
<thead>
<tr>
<th>Control Device</th>
<th>Voltage</th>
<th>VA Load</th>
<th>Operating Temperature</th>
<th>Humidity (Non-Condensing)</th>
<th>Storage Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pioneer Gold Controller</td>
<td>24VAC (25%/-15%), Class 2</td>
<td>75*</td>
<td>32°F to 158°F (0°C to 70°C)</td>
<td>0-95% RH</td>
<td>-4°F to 158°F (-20°C to 70°C)</td>
</tr>
</tbody>
</table>

**Inputs**
- Resistive Inputs require 10K Type 3 Thermistor
- 24VAC Inputs provide 4.7kΩ Load

**Outputs**
- Relay Outputs: 1 Amp maximum per output.
- All Outputs combined: 2.5 Amp maximum

*Note: Controller uses 15VA. Output Relays are rated at 60VA combined.

### WARNING:
When using a single transformer to power more than one controller or electric heat board, the correct polarity must always be maintained between the boards. Failure to observe correct polarity will result in damage to the Pioneer Gold Controller and electric heat board.
Important Wiring Considerations

Please carefully read and apply the following information when wiring the Controller and the Electric Heat Board.

1. All wiring is to be in accordance with local and national electrical codes and specifications.

2. All 24 V AC wiring must be connected so that all ground wires remain common. Failure to follow this procedure can result in damage to the controller and connected devices.

3. Minimum wire size for 24 V AC wiring should be 18-gauge.

4. Minimum wire size for all sensors should be 24-gauge. Some sensors require 2-conductor wire and some require 3-or 4-conductor wire.

5. Minimum wire size for 24 V AC thermostat wiring should be 22 gauge.

6. Be sure that all wiring connections are properly inserted and tightened into the terminal blocks. Do not allow wire strands to stick out and touch adjoining terminals which could potentially cause a short circuit.

7. When communication wiring is to be used to connect to other communication devices, all wiring must be plenum-rated, minimum 18-gauge, 2-conductor, twisted pair with shield. AAON can supply communication wire that meets this specification and is color coded for the network or local loop. Please consult your AAON distributor for information. If desired, Belden #82760 or equivalent wire may also be used.

8. Before applying power to the Pioneer Gold Controller, be sure to recheck all wiring connections and terminations thoroughly.

Powering Up

When the Controller and Electric Heat Board are first powered up, the POWER LEDs should light up and stay on continuously. If they do not light up, check to be sure that you have 24 V AC connected to the controller and electric heat board, that the wiring connections are tight, and that they are wired for the correct polarity. The 24 V AC power must be connected so that all ground wires remain common. If after making all these checks, the POWER LEDs do not light up, please contact AAON Technical Support for assistance—918-382-6450; techsupport@aaon.com.
Figure 1: Pioneer Gold Controller Connection Components, Jumpers, and Switches
Figure 2: Pioneer Gold Controller Terminal and Harness Components
# Pioneer Gold Controller & Electric Heat Board Input/Output Maps

## Input/Output Map

See Table 6 for Pioneer Gold Controller Inputs/Outputs. Future items are grayed out.

<table>
<thead>
<tr>
<th><strong>PIONEER GOLD CONTROLLER</strong></th>
<th><strong>INPUTS</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DIGITAL INPUTS</strong></td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>Fan Call (TSTAT)</td>
</tr>
<tr>
<td>Y1</td>
<td>Compressor Stage 1 Call (TSTAT)</td>
</tr>
<tr>
<td>Y2</td>
<td>Compressor Stage 2 Call (TSTAT)</td>
</tr>
<tr>
<td>O</td>
<td>Cooling Call (TSTAT)</td>
</tr>
<tr>
<td>DH</td>
<td>Dehumidification Call (TSTAT)</td>
</tr>
<tr>
<td>W1</td>
<td>Heat Stage 1 (TSTAT)</td>
</tr>
<tr>
<td>NSB</td>
<td>Night Setback (TSTAT)</td>
</tr>
<tr>
<td>NSB OVR</td>
<td>Night Setback Override Input (TSTAT)</td>
</tr>
<tr>
<td>ESD*</td>
<td>Emergency Shutdown* (TSTAT)</td>
</tr>
<tr>
<td>NSB TH</td>
<td>Night Setback TSTAT Input (TSTAT)</td>
</tr>
<tr>
<td>COF</td>
<td>Condensate Overflow</td>
</tr>
<tr>
<td>COF2</td>
<td>Secondary Condensate Overflow</td>
</tr>
<tr>
<td>AUX</td>
<td>Auxiliary Fault Switch</td>
</tr>
<tr>
<td>HPS</td>
<td>High Pressure Switch</td>
</tr>
<tr>
<td>LPS</td>
<td>Low Pressure Switch</td>
</tr>
<tr>
<td>WFS</td>
<td>Water Flow Switch (Future)</td>
</tr>
</tbody>
</table>

| **ANALOG INPUTS**           |            |
| SPT                         | Suction Pressure |
| DPT                         | Discharge Pressure |
| EWT                         | Entering Water Temperature |
| LLT                         | Liquid Line Temperature |
| ECT                         | Evaporator Coil Temperature |
| HWT                         | Entering Hot Water Temperature (Future) |
| SAT                         | Supply Air Temperature |
| SPAT                        | Space Temperature |
| CO2                         | Space CO2 |

| **TOUCH SCREEN INPUTS**     |            |
| SPAT                        | Space Temperature |
| SPAH                        | Space Humidity |

| **UNIVERSAL INPUTS**        |            |
| UI1                         | LWT - Leaving Water Temperature |
| UI2                         | Spare |
| UI3                         | Spare |
| UI4                         | Spare |

| **DIGITAL OUTPUTS (24 VAC)** |            |
| R/C                         | Thermostat Power (TSTAT) |
| ALM                         | Alarm Output |
| ALM/ALM2                    | Alarm Dry Contact Output |
| Fan/Fan                     | Supply Fan Enable |
| Fan2/Fan                    | Supply Fan Stage 2 Enable |
| Y1/Y1                       | Compressor Stage 1 |
| Y2/Y2                       | Compressor Stage 2 |
| Y3/Y3                       | Compressor Stage 3 (Future) |
| RV/RV                       | Reversing Valve |
| W1/W                        | Electric Heat Stage 1 |
| MV/MV                       | Motorized Water Valve/Pumps |
| HG/HG                       | HGRH Valve |
| WSE/WSE                     | WSE Valve |
| DO1                         | Spare |

| **ANALOG OUTPUTS (0-10 VDC)** |            |
| SFS                         | Supply Fan Speed |
| PUMP                        | Variable Speed Pump (Future) |
| MWV                         | Modulating Water Valve On/Off (Future) |
| DMPR OVR                    | CO2 Damper Override |
| AO1                         | Spare |
| AO2                         | Spare |

| **COMMUNICATION TERMINALS** |            |
| R/C                         | Extra Power Terminals |
| BACNET                      | BAS MS/TP Terminal |
| TSTAT                       | Pioneer Gold Touch Screen Space / RH Temperature Sensor |
| 3 MODBUS Ports              | MODBUS Expansion Communication |

| **ELECTRIC HEAT BOARD INPUTS** |            |
| LIMIT                        | Limit (Hi) Switch |

| **ELECTRIC HEAT BOARD OUTPUTS** |            |
| HEAT 1                       | Electric Heat Stage 1 Relay |
| HEAT 2                       | Electric Heat Stage 2 Relay |

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Table 6: Pioneer Gold Inputs & Outputs
WIRING

Figure 3: Pioneer Gold Controller Wiring

Wiring Notes:
1.) All wiring to be in accordance with local and national electrical codes and specifications.

2.) All communication wiring to be 18 gauge minimum, 2 conductor twisted pair with shield. Use Belden #82760 or equivalent.

NOTE:
GREEN PINS ARE GND
RED PINS ARE 24VAC

*NOTE:
HARNESS WIRING SHOWN SEPARATELY.
WIRING

Harness Wiring

Figure 4: H4 Water Harness Wiring

Figure 5: H5 Standard Output Harness Wiring

NOTE: Multicolored wires are represented by a dotted line.

Figure 6: H7 Variable Capacity Harness Wiring
Figure 7: H8 Reheat Harness Wiring

Figure 8: H13 Standard Input Harness Wiring

NOTE: Multicolored wires are represented by a dotted line.
Figure 9: Pioneer Gold Electric Heat Board Components & Wiring
Figure 10: Pioneer Gold Touch Screen Space and Humidity Sensor Wiring

Wiring Notes:
1.) All wiring to be in accordance with local and national electrical codes and specifications.

2.) All communication wiring to be 18 gauge minimum, 2 conductor twisted pair with shield. Use Belden #82760 or equivalent.

NOTE:
The A to B & B to A nomenclature in the drawing is correct. The labeling on the sensor board is non-standard.
**Controller Input and Output Descriptions**

**Pioneer Gold Controller I/Os**

**SPT - Suction Pressure Sensor**
The Suction Pressure Transducer is an optional sensor used to monitor the Suction Pressure (0-500 PSI sensor).

**DPT - Discharge Pressure Sensor**
The Discharge Pressure Transducer is an optional sensor used to monitor Discharge Pressure (0-667 PSI sensor).

**SAT - Supply Air Temperature Sensor**
The Supply Air Temperature Sensor is a 10k Type 3 Thermistor sensor used to measure the Supply (Discharge) Air Temperature.

**CO2 - Space CO2 Sensor**
This is an input for a field-installed CO2 Sensor. Sensor must output 0-10V and have a range of 0-2000 ppm.

**SPAT - Space Temperature Sensor**
The Space Temperature Sensor is a 10k Type 3 Thermistor sensor used to measure the Space Temperature. If also using the Pioneer Gold Digital Touch Screen Space Temperature and Humidity Sensor, the Controller will default to the digital sensor.

**DMPR OVR - CO2 Damper Override**
This output is used to signal an Outdoor Air Damper if the CO2 level goes above setpoint. Output is 0 volts when below setpoint and 10 volts when above setpoint.

**NSB OVR - Night Setback Override**
If the “Night Setback Enable” (see next Input) is energized and this input is momentarily energized, the unit will go into Occupied Mode for 2 hours and look at normal Thermostat inputs and then return back to the Unoccupied Mode. If the “Night Setback Enable” is removed, the 2 hour timer is reset. This is a 24VAC Wet input.

**NSB - Night Setback Enable**
If the unit is being controlled by Thermostat, this input can be used to force the unit into Unoccupied Mode. While in the Unoccupied Mode, the unit will look at the “Night Setback” input for a Heating call. All other Thermostat inputs are ignored. This is a 24VAC Wet Input.

**NSB TH - Night Setback Thermostat**
If the Night Setback Enable is energized, this input is used to put the unit into Heat mode while Occupied. Typically this signal would come from a separate Thermostat set at a different setpoint. This is a 24VAC Wet Input.

**R - 24 VAC - Thermostat**
This is the 24VAC output to Thermostat “R” connection.

**G - Fan Call - Thermostat**
This is the Fan call from a Thermostat. This is a 24VAC wet input.

**Y1 - Compressor Stage 1 Call - Thermostat**
This is the Stage 1 Call from a Thermostat. This is a 24VAC wet input.

**Y2 - Compressor Stage 2 Call - Thermostat**
This is the Compressor Stage 2 Call from a Thermostat. This is a 24VAC wet input.

**COM - Common or Ground - Thermostat**
This is the Common or Ground connection for the Thermostat.

**O - Reversing Valve Call - Thermostat**
This is the Reversing Valve Call from the Thermostat. When energized, the reversing valve will go into the Cool mode position. This is a 24VAC wet input.

**DH - Dehumidification Call - Thermostat**
This is the Dehumidification Call from a Thermostat. This is a 24VAC wet input.

**W1 - Auxiliary Heat Stage 1 Call - Thermostat**
This is the Aux Heat Call from the Thermostat. This is a 24VAC wet input.

**WARNING:** The Emergency Shutdown input is NOT to be used for Life Safety applications.
**Controller Input and Output Descriptions**

- **MWV - Hot Water Valve (Future)**
- **HWT - Entering Hot Water Temperature**
  This input is a 10k Type 3 Thermistor input. It monitors the temperature of water entering the Hot Water Heat Coil. It is currently for monitoring only and not used for control.
- **WSE - Waterside Economizer Valve**
  This 24V AC relay output signal is used to energize the Water Side Economizer valve during Water Side Economizer operation.
- **EWT - Entering Water Temperature**
  This input is a 10k Type 3 Thermistor input. It is the temperature of water entering the unit. The only time it is used for control is to determine if the water temperature is sufficient for Water Side Economizer (WSE). If you do not have WSE configured, this input is for status only.
- **FAN 2 - Supply Fan High Speed**
  This 24V AC relay output signal is used to engage the Fan to run at high speed.
- **RV - Reversing Valve**
  This 24V AC relay output signal is used to energize the Reversing Valve (to cooling position).
- **FAN - Supply Fan Low Speed**
  This 24V AC relay output signal is used to engage the Fan to run at low speed.
- **Y1 - Compressor Stage 1**
  This 24V AC relay output signal is used to energize the Compressor contactor (i.e. step 1 of 2-step compressor).
- **SFS - Supply Fan Speed Analog**
  This 0-10VDC output signal is used to provide the speed command for an ECM motor. The VDC level outputted corresponds with the Supply Fan Minimum Percentage Setpoint value when the Supply Fan Low Speed command is active, and increases to the Supply Fan Maximum Percentage Setpoint value when the Supply Fan High Speed command is active.
- **Y2 - Compressor Stage 2**
  This 24V AC relay output signal is used to energize the solenoid for the 2nd step of the Compressor for full capacity.
- **Y3 - Compressor Stage 3 (Future)**
- **PUMP - Variable Speed Pump (Future)**
- **HGR - Hot Gas Reheat Valve**
  This 24VAC relay output signal is used to energize the HGRH valve during Dehumidification.
- **MV - Motorized Water Valve/Pump**
  This 24VAC relay output signal is used to energize the Water Valve/Pump during normal Compressor operation, unless the “Full Reheat” during Dehumidification option is enabled.
- **HPS - High Pressure Switch**
  This input is used to monitor the High Pressure Switch. If the Compressor is running and the signal is removed from this input, a High Pressure Switch Alarm will be generated. It will also immediately disable the Compressors and the Fan will remain running. The Compressor will not be allowed to start if this input signal is missing. This input is a 24VAC wet input.
- **LPS - Low Pressure Switch**
  This input is used to monitor the Low Pressure Switch. If the Compressor is running and the signal is removed from the input for more than 10 seconds, a Low Pressure Switch Alarm is generated. It will also disable the Compressors and the Fan will remain running. If this alarm is generated 2 times within 2 hours, the unit will “hard” lockout and require a power cycle to continue operation.
- **COF - Condensate Overflow 1**
  This is a factory wired Condensate Overflow Alarm input. An alarm will be generated any time this input is energized. This Alarm disables the Compressor outputs as well as the Main Fan. This is a dry input (contact closure to COM).
- **LLT - Liquid Line Temperature**
  This is a 10kΩ Type 3 Thermistor input. It is the temperature of the refrigerant liquid line. If the liquid line temperature drops below a dangerous level, the Low Leaving Water Temperature Alarm will be generated and the compressors will be disabled. When the liquid line temperature rises above the safe limit again, this alarm will be reset. The temperatures for triggering and clearing this alarm are based on the glycol % programmed into the board. See Table 10, page 37.
- **ECT - Evaporator Coil Temperature**
  This is a 10k Type 3 Thermistor input. It is the temperature of the Suction Line. If the Suction line Temperature drops below 30 degrees, a Low Evaporator Coil Temperature Alarm will be generated. The Compressors will be disabled and the Fan will remain energized. The alarm will clear when the Suction Line Temperature rises above 45 degrees.
- **WFS - Flow Switch (Future)**
**SEQUENCE OF OPERATIONS**

**Space/Room Sensor Controlled Supply Fan**

**Space/Room Sensor Controlled**
Configuration must be set to Space Sensor Controlled.

**Random Start Delay**
The controller will enter a random start delay in these situations:

1. The unit powers up
2. Recovery from emergency shutdown alarm
3. Recovery from high voltage alarm
4. Recovery from low voltage alarm

The Random Start Delay will be between 3 and 60 seconds. The fan, compressor, and reversing valve will not be operational during this time.

**Occupancy/Supply Fan Operation**

**Building Occupancy Status**
Occupied Mode Operation Options:

1. Internal Schedule
2. Network Occupancy Point (BACnet)

**Occupied Mode Operation**
The controller will use Occupied Setpoints for Heating, Cooling, and Dehumidification modes of operation.

**Unoccupied Mode Operation**
While in Unoccupied Mode, the controller will use unoccupied setpoints for Heating and Cooling mode operations and the Occupied Dehumidification Mode Setpoint for Dehumidification mode.

**Supply Fan**
Any time the Supply Fan is requested to start, a 30 second 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 15 seconds after the last stage of Cooling, Heating, or Dehumidification stages off.

The Supply Fan can be configured for three modes:

- **On** – To run continuously.
- **Auto** – Default. Cycles on with cooling, heating, and dehumidification modes.
- **Off** – Unit will not run with cooling, heating, and dehumidification demands.

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

**Supply Fan Motors**

**Single Speed Permanent-Split Capacitor (PSC) or Electronically Commutated Motor (ECM)**
With a single speed PSC or ECM, the Supply Fan will be enabled and will always run at full speed when called for.

**Two-Speed Electronically Commutated Motor (ECM)**
With a two-speed ECM, the Supply Fan will have two speed operations—low speed and high speed.

The Supply Fan speeds will correspond to the below listed operating functions.

- **Ventilation Mode** – Low Speed
- **Compressor Low Capacity “Y1”** – Low Speed
- **Compressor Full Capacity “Y2”** – High Speed
- **Supplemental Heating** – High Speed
- **Dehumidification** – Low Speed
- **Waterside Economizer** – High Speed

**Variable Speed Electronically Commutated Motor (ECM)**
With a variable speed ECM, the Supply Fan will modulate based on a 0-10VDC signal.

**Supply Fan Control**

**Constant Air Volume (CAV)**
The Supply Fan will always run at a constant speed. If 2 speed ECM is selected, the Supply Fan will operate according to low or high speeds as defined previously.
**Compressor Operation**

Compressor(s) will only operate if the Supply Fan has been enabled for a minimum of 5 seconds.

Cooling Mode is enabled when the Space Temperature rises above the active Cooling Setpoint (default: 74°F) plus the deadband (default: 1°F, range: 1-5°F). Cooling Mode is disabled when the Space Temperature falls below the active Cooling Setpoint minus the deadband.

Heating Mode is enabled when the Space Temperature falls below the active Heating Setpoint (default: 70°F) minus the deadband (default: 1°F, range: 1-5°F). Heating Mode is disabled when the Space Temperature rises above the active Heating Setpoint plus the deadband.

Compressor staging up and staging down are subject to the following setpoints:

- **Compressor On Delay**
  5 seconds, non-adjustable

- **Compressor Minimum On Time**
  (default: 180 seconds; range: 120-255 seconds)

- **Compressor Minimum Off Time**
  (default: 120 seconds; range: 60-255 seconds)

- **Compressor Interstage On Delay**
  (default: 60 seconds; range: 30-255 seconds)

- **Compressor Interstage Off Delay**
  (default: 60 seconds; range: 30-255 seconds)

If the unit goes into an alarm, the minimum on time of the compressor(s) will be ignored and the compressor(s) will be disabled.

**Multiple Stage Compressors**

**Stage Up Sequence**

In Cooling Mode, as the Supply Air Temperature rises above the active Supply Air Temperature Cooling Setpoint (default: 55°F, range: 45-65°F) plus the deadband (2°F, non-adjustable), the compressor(s) will stage up. The compressors will operate on a PID loop function. Once the PID loop calls for the next stage to be on and the Compressor Interstage On Delay time has been met, the next stage of cooling will be enabled.

In Heating Mode, as the supply air temperature falls below the active Supply Air Temperature Heating Setpoint (default: 90°F, range: 55-120°F) minus the deadband (2°F, non-adjustable), the compressor(s) will stage up. The compressors will operate on a PID loop function. Once the PID loop calls for the next stage to be on and the Compressor Interstage On Delay time has been met, the next stage of Compressor will be enabled.

**Stage Down Sequence**

In Cooling Mode, as the Supply Air Temperature falls below the active Supply Air Temperature Cooling Setpoint (default: 55°F, range: 45-65°F) minus the deadband (2°F, non-adjustable), the compressor(s) will stage off as minimum run times and stage down delays allow.

In Heating Mode, as the Supply Air Temperature rises above the active Supply Air Temperature Heating Setpoint (default: 90°F, range: 55-120°F) plus the deadband (2°F, non-adjustable), the compressor(s) will stage off as minimum run times and stage down delays allow.

**On/Off Compressor (Scroll or Rotary)**

In Cooling or Heating Mode, the compressor will be enabled. There is no Supply Air Temperature Control.
Space-Supply Air Reset
Space-Supply Air Cooling Reset reads the Space Temperature and linearly calculates a Supply Air Temperature Setpoint. This is a selectable sequence that can be disabled.

**NOTE:** Space-Supply Reset is only allowed with 2 or more stages of capacity control.

Space-Supply Reset is subject to the following setpoints:

- **Cooling Space Temp High Reset**
  (default: 75°F; range: 55-85°F)

- **Cooling Space Temp Low Reset**
  (default: 72°F; range: 55-85°F)

- **Cooling Supply Temp High Reset**
  (default: 57°F; range: 45-65°F)

- **Cooling Supply Temp Low Reset**
  (default: 53°F; range: 45-65°F)

- **Heating Space Temp High Reset**
  (default: 72°F; range: 55-85°F)

- **Heating Space Temp Low Reset**
  (default: 69°F; range: 55-85°F)

- **Heating Supply Temp High Reset**
  (default: 100°F; range: 55-120°F)

- **Heating Supply Temp Low Reset**
  (default: 90°F; range: 55-120°F)

**Cooling**

The Supply Air Reset calculation will hold the Cooling Supply Temp High Reset Setpoint if the space temperature is below the Cooling Space Temperature Low Reset Setpoint. As the Space Temperature increases above the Cooling Space Temp Low Reset Setpoint and toward the Cooling Space Temp High Reset Setpoint, the Supply Air Temperature Cooling Setpoint calculation will decrease in a linear fashion toward the Cooling Supply Temp Low Setpoint. The calculated Supply Air Reset will hold the Cooling Supply Temp Low Reset Setpoint if the space temperature is above the Cooling Space Temp High Reset 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 High or Low values; at 66°F space temperature the Supply Air Temp Setpoint will remain at the Supply Temp Cool High Setpoint, 60°F, and at 78°F space temperature the Supply Air Temp setpoint will remain at the Supply Temp Cool Low Setpoint, 50°F.

**Heating**

The Supply Air Reset calculation will hold the Heating Supply Temp High Reset Setpoint if the space temperature is below the Heating Space Temperature Low Reset Setpoint. As the Space Temperature increases above the Heating Space Temp Low Reset Setpoint and toward the Heating Space Temp High Reset Setpoint, the calculated Supply Air Heating Setpoint will decrease in a linear fashion toward the Heating Supply Temp Low Setpoint. The Supply Air Reset calculation will hold the Heating Supply Temp Low Reset Setpoint if the space temperature is above the Heating Space Temp High Reset 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 High or Low values; at 66°F space temperature the Supply Air Temp Setpoint will remain at the Supply Temp Heat High Setpoint, 95°F, and at 74°F space temperature the Supply Air Temp Setpoint will remain at the Supply Temp Heat Low Setpoint, 85°F.
SEQUENCE OF OPERATIONS

Space/Room Sensor Controlled Electric Heat & WSE

Reversing Valve Operation

For a single stage compressor, the Reversing Valve will enable if the controller calls for compressor cooling and the compressor has been operational for a minimum of 5 seconds. This delay allows the difference in line pressures to assist the reversing valve in changing positions. Once the mode of operation has been satisfied, and there is no longer a need for compressor operation, the Reversing Valve will be reset, and (1 second later) the compressor will be disabled.

For a single compressor 2-stage application, when the first compressor stage “Y1” is called for, the compressor will first enable at full capacity “Y2”. After 5 seconds, the reversing valve will change positions, and following an additional 3 seconds, the compressor will stage down to “Y1” operation.

The default Reversing Valve position is for Heating operation.

Waterside Economizer Operation

On/Off Waterside Economizer (WSE) Coil Operation

In this operation, the Waterside Economizer (WSE) can be configured for four modes:

- **Off** – Default. No condenser water loop function.
- **Cool Only** – WSE Valve cycles On based on Cooling Entering Water Temperature Setpoints.
- **Heat Only** – WSE Valve cycles On based on Heating Entering Water Temperature Setpoints.
- **Dual** – WSE Valve cycles On based on Entering Water Temperature Setpoints of corresponding mode demand.

Cool Only Operation

The WSE will act as the unit’s first stage of Cooling. As the Entering Water Temperature drops below the Cooling Entering Water Temperature Setpoint (default: 45°F; range: 45-60°F), the call for the compressor, if enabled, will be removed once the minimum on time has been satisfied, and the WSE 24VAC output will be enabled, sending the cold loop water through the air coil to utilize “free cooling”. Once the Entering Water Temperature rises above the Cooling Entering Water Temperature Setpoint plus the deadband (2.5°F, non-adjustable), the WSE will be disabled, and compressor cooling will be utilized following a 60 second delay.

If the cooling call has not been satisfied within 10 minutes of operation, the WSE valve will disable. Following a 60 second delay, the unit will resume normal compressor cooling operation until the cooling input is removed. When this happens, the display will signify the WSE was unable to meet the cooling call.

For Freeze Protection, the Entering Water Temperature will be monitored.

Heat Only Operation

The WSE will act as the unit’s first stage of Heating. As the Entering Water Temperature rises above the Heating Entering Water Temperature Setpoint (default: 85°F; range: 80-90°F), if the compressor is enabled, the call for the compressor will be removed once the minimum on time has been satisfied, and the WSE 24VAC output will be enabled, sending the hot loop water through the air coil to utilize “free heating”. Once the Entering Water Temperature falls below the Heating Entering Water Temperature Setpoint minus the deadband (2.5°F, non-adjustable), the WSE will be disabled, and compressor heating will be utilized following a 60 second delay.

**NOTE:** The max allowable Entering Water Temperature as listed in the WH/WV operating limits is 90°F when the unit is in Heating Mode.

Electric Heat Operation

External Duct Heaters

The W1 Heat Output is designed to be used with duct heaters. It will be enabled based on the conditions listed below. The duct heaters will provide any staging, delays, and safety protections required.

If the Electric Heat Configuration is set to Off, then the W1 additional heat staging output will not be used for external duct heat.

If the Electric Heat Configuration is set to Auxiliary, then the W1 heat output will be used as a supplemental stage of heating to the compressors. It will be the last stage of heating enabled and the first stage disabled when maintaining the PID Heating Supply Air Temperature Setpoint. Auxiliary Heat is enabled when the Supply Air Temperature is below the active Supply Air Temperature Heat Setpoint (default: 90°F; range: 55-120°F) minus the Auxiliary Heat deadband (default: 5°F; range: 1-10°F) and the PID staging and interstage delays have been met. Additionally, if the compressor is locked out, the Electric Duct Heat will be used in attempt to maintain the active Supply Air Temperature Heat Setpoint.

If the Electric Heat Configuration is set to Emergency, then the W1 heat output will be enabled when compressor heating is locked out and there is a demand for heating. Emergency heat will not operate in addition to compressor heating. There is no supply air control.
If the heating call has not been satisfied within 10 minutes of operation, the WSE valve will disable. Following a 60 second delay, the unit will resume normal compressor heating operation until the heating input is removed. When this happens, the display will signify the WSE was unable to meet the heating call.

**Dual Operation**

The Entering Water Temperature is monitored according to the demand required (heating or cooling), as described in its corresponding mode above.

**Dehumidification Operation**

Dehumidification Mode is enabled when the Space Humidity Sensor value rises above the Dehumidification Enable Setpoint (default: 50% RH; range: 40-60% RH) plus the deadband (2%, non-adjustable). Dehumidification Mode is disabled when the Space Humidity Sensor value falls below the Dehumidification Enable Setpoint minus the deadband.

Dehumidification can be selected as a priority mode and will be active any time the Space Humidity is above the Dehumidification Enable Setpoint. Default is non-priority, where Dehumidification will only be available when the Cooling and Heating demands are satisfied.

**Fan Speed Dehumidification**

During Fan Speed Dehumidification, the unit operates according to the Cooling sequence of operation, with the exception that the Supply Fan low/dehumidification speed output is enabled in lieu of high/cooling speed (low speed for discrete speed ECMs and dehumidification for constant CFM ECM). Compressor(s) operates at full capacity (Y1 & Y2) during dehumidification.

If a WSE is present, and the Entering Water Temperature falls below the Cooling Entering Water Temperature Setpoint (default: 45°F; range: 45-60°F), the Waterside Economizer Coil will be enabled and operate as described in the Waterside Economizer Operation section.

For Freeze Protection, the Leaving Water Temperature and Evaporator Coil Temperature will be monitored, and the unit will be protected according to the selected setpoints.

**Hot Gas Reheat Dehumidification**

During Hot Gas Reheat Dehumidification, the compressor is enabled at full capacity “Y2” when Dehumidification mode is enabled. The supply fan low/dehumidification speed and reheat valve “HG” 24VAC outputs are enabled. If the unit is equipped with WSE, the Entering Water Temperature Setpoint for WSE transition is ignored, and freeze protection is still monitored. The Hot Gas Reheat Solenoid will stage on/off subject to the minimum on and off times being met (1 minute each).

For Freeze Protection, the Leaving Water Temperature and Evaporator Coil Temperature will be monitored, and the unit will be protected according to the selected setpoints.

If Dehumidification Mode is priority, and the controller is in Dehumidification Mode, but the Control Temperature Sensor also requires cooling or heating, the cooling or heating calls will be ignored until the Dehumidification call is satisfied.

If Dehumidification Mode is NOT priority, and the controller is in Dehumidification Mode, but the Control Temperature Sensor then requires Cooling Mode, the controller will disable reheat and transition to Cooling Mode. If Dehumidification Mode is NOT priority, and the controller is in Dehumidification Mode, but the Control Temperature Sensor then requires Heating Mode, the controller will disable reheat and disable the reversing valve, entering Heating Mode.

If the controller is transitioning from Cooling Mode directly to Dehumidification Mode, when Dehumidification Mode is NOT priority, the compressors will remain enabled, reheat will be enabled, and the Supply Fan will stage down.

**Additional Feature Sequences**

**Outdoor Air Damper Operation**

**CO₂ Control Override**

As the CO₂ (Space or Return Sensor) rises above the CO₂ Setpoint (default: 900ppm; range: 500-1500ppm), a (10VDC) signal will be sent to the outside air damper to modulate open, and a General Alarm will be displayed. As the CO₂ falls below the CO₂ Setpoint minus the deadband (20ppm, non-adjustable), the signal to the outside air damper will be removed.
**Thermostat Controlled**

Configuration must be set to Thermostat Controlled.

**Random Start Delay**

The controller will enter a random start delay in these situations:

1. The unit powers up
2. Recovery from emergency shutdown alarm
3. Recovery from high voltage alarm
4. Recovery from low voltage alarm
5. Night setback mode is disabled

The Random Start Delay will be between 3 and 60 seconds. The fan, compressor, and reversing valve will not be operational during this time. The Random Start Delay will be ignored if the unit is in test mode.

**Occupancy/Supply Fan Operation**

**Building Occupancy Status**

**Normal/Occupied Mode**

The controller will operate according to the thermostat inputs.

**Night Setback Mode**

Night Setback Mode is enabled upon receiving a 24VAC or 24VAC common input to the “NSB” terminal. While in Night Setback Mode, the controller will ignore all normal thermostat fan and compressor enable inputs on “G”, “Y1”, and “Y2” terminals. Instead, the controller will use the “NSB TH” input as the fan and compressor enabling signal, operating at full “Y2” compressor operation.

The Night Setback Mode can be overridden with a 24VAC input to the Night Setback override terminal “NSB OVR”. Once the override signal is received, Night Setback will be overridden for 2 hours, even if the signal is removed. While Night Setback is overridden, the controller will respond to the normal thermostat signals.

**Supply Fan Operation**

The Supply Fan will enable upon receiving a 24VAC input on the “G” terminal or upon a call for compressor operation, unless an alarm prevents the fan from operating. Any time the Supply Fan has a request to start, a 30 second minimum off timer must be satisfied. The Supply Fan is held on for 15 seconds after the last stage of cooling, heating, or dehumidification stages off.

**Single Speed Permanent-Split Capacitor (PSC) or Electronically Commutated Motor (ECM)**

With a single speed PSC or ECM, the Supply Fan will be enabled and will always run at full speed when called for (through the “Fan” Relay Output terminal).

**2 Speed Electronically Commutated Motor (ECM)**

With a 2 speed ECM, the Supply Fan will have 2 speed operations,—“low speed” and “high speed”. (Relay output “Fan” will correspond to “low speed” and “Fan2” will correspond to “high speed”.)

The Supply Fan speeds will correspond to the below listed operating functions.

- **Supply Fan “G” call only** – Low Speed
- **Compressor Low Capacity “Y1”** – Low Speed
- **Compressor Full Capacity “Y2”** – High Speed
- **Supplemental Heating** – High Speed
- **Dehumidification** – Low Speed
- **Waterside Economizer** – High Speed

**CFM Controlled Electronically Commutated Motor (ECM)**

With a CFM controlled ECM, the Supply Fan will modulate to maintain a target CFM based on the operating functions through a 16-pin connector. (Target CFM settings for cooling, heating, and dehumidification modes to be selected through the display.)
**SEQUENCE OF OPERATIONS**

**Thermostat Controlled Compressor, Reversing Valve, Electric Heat**

**Compressor Operation**

Unless an alarm is active, the compressor will enable upon receiving a 24VAC input on the “Y1” terminal or upon receiving a 24VAC input on the “TH_NS” terminal if in Night Setback Mode. The water valve/pump terminal will energize right away when the input is received into “Y1”. If the Supply Fan was not enabled prior to the compressor call, then the Supply Fan will enable for 5 seconds before the compressor is started.

Compressor staging up and staging down are subject to the following setpoints:

- **Compressor On Delay**
  (5 seconds, non-adjustable)

- **Compressor Minimum On Time**
  (default: 180 seconds; range: 120-255 seconds)

- **Compressor Minimum Off Time**
  (default: 120 seconds; range: 60-255 seconds)

- **Compressor Interstage On Delay**
  (default: 60 seconds; range: 30-255 seconds)

- **Compressor Interstage Off Delay**
  (default: 60 seconds; range: 30-255 seconds)

If the unit goes into an alarm, the minimum on time of the compressor(s) will be ignored and the compressor(s) will be disabled. All alarms will disable the compressor(s).

**Reversing Valve Operation**

For a single stage compressor, the Reversing Valve will enable if the controller receives a 24VAC input on the “O” terminal and the compressor has been operational for a minimum of 5 seconds. This delay allows the difference in line pressures to assist the Reversing Valve in changing positions. Once the compressor call is removed, the Reversing Valve will be reset, and (1 second later) the compressor will be disabled.

For a Single Compressor 2-stage application, when the first compressor stage “Y1” is called for and the reversing valve in the opposite state required, the compressor will first enable at full capacity “Y2”, and after 5 seconds, the reversing valve will change positions. Following an additional 3 seconds, the compressor will stage down to “Y1” operation.

The default Reversing Valve position is for heating operation, no 24VAC input on the “O” terminal. Therefore, in compressor cooling operation, 24VAC must be applied to the “O” terminal.

**Electric Heat Operation**

**External Duct Heater(s)**

The W1 Heat Output is designed to be used with duct heaters. The W1 heat output will be enabled whenever the W1 input has 24VAC applied to it. The duct heaters will provide any staging, delays, and safety protections required. The Electric Duct Heater Setpoint must be set to ON.

**Integral Electric Heat (Electric Heat Board)**

Integral Electric Heat Inputs and Outputs will be contained within the electric heat board. The Integral Electric Heat setpoint must be set to ON. Whenever the W1 input has 24VAC applied to it, the heat stages will enable and disable according to its interstage delays.

**Waterside Economizer Operation (WSE)**

**On/Off Waterside Economizer (WSE) Coil Operation**

In this operation, the Waterside Economizer (WSE) can be configured for four modes:

- **Off** – Default. No condenser water loop function.
- **Cool Only** – WSE Valve cycles ON based on Cooling Entering Water Temperature Setpoints.
- **Heat Only** – WSE Valve cycles ON based on Heating Entering Water Temperature Setpoints.
- **Dual** – WSE Valve cycles ON based on Entering Water Temperature Setpoints of corresponding mode demand.

**Cool Only Operation**

The WSE will act as the unit’s first stage of cooling. As the Entering Water Temperature drops below the Cooling Entering Water Temperature Setpoint (default: 45°F, range: 45-60°F), the call for the compressor, if enabled, will be removed once the minimum on time has been satisfied, and the WSE 24VAC output will be enabled, sending the cold loop water through the air coil to utilize “free cooling”. Once the Entering Water Temperature rises above the Cooling Entering Water Temperature Setpoint plus the deadband (2.5°F, non-adjustable), the WSE will be disabled, and compressor cooling will be utilized following a 60 second delay.

If the cooling call has not been satisfied within 10 minutes of operation, the WSE Valve will disable. Following a 60 second delay, the unit will resume normal compressor cooling operation until the cooling input is removed. When this happens, the display will signify the WSE was unable to meet the cooling call.

For Freeze Protection, the Entering Water Temperature will be monitored.
Heat Only Operation
The WSE will act as the unit’s first stage of heating. As the Entering Water Temperature rises above the Heating Entering Water Temperature Setpoint (default: 85°F, range: 80-90°F), if the compressor is enabled, the call for the compressor will be removed once the minimum on time has been satisfied, and the WSE 24V AC output will be enabled, sending the hot loop water through the air coil to utilize “free heating”. Once the Entering Water Temperature falls below the Heating Entering Water Temperature Setpoint minus the deadband (2.5°F, non-adjustable), the WSE will be disabled, and compressor heating will be utilized.

**NOTE:** The max allowable Entering Water Temperature as listed in the WH/WV operating limits is 90°F when the unit is in heating mode.

If the heating call has not been satisfied within 10 minutes of operation, the WSE valve will disable. Following a 60 second delay, the unit will resume normal compressor heating operation until the heating input is removed. When this happens, the display will signify the WSE was unable to meet the heating call.

Dual Operation
The Entering Water Temperature is monitored according to the demand required (heating or cooling), as described in its corresponding mode above.

Dehumidification Operation
Dehumidification Mode is enabled when 24VAC is receiving into the “DH” input. Dehumidification Mode is disabled when 24VAC is removed.

Dehumidification can be selected as a priority mode and will be active anytime the “DH” input is receiving 24VAC, regardless of a demand for heating or cooling. Default is non-priority, where dehumidification will only be available when the Cooling and Heating demands are satisfied.

Fan Speed Dehumidification
When in Dehumidification Mode, the unit operates according to the cooling sequence of operation, with the exception that the supply fan low/dehumidification speed output is enabled in lieu of high/cooling speed (low speed for discrete speed ECMs, and dehumidification for constant CFM ECM). Compressor(s) operates at full capacity (Y1 & Y2) during dehumidification.

If a WSE is present, and the Entering Water Temperature falls below the Cooling Entering Water Temperature Setpoint (default: 45°F, range: 45-60°F), the WSE coil will be enabled and operate as described in the Waterside Economizer Operation section.

For Freeze Protection, the Leaving Water Temperature will be monitored, and unit will be protected according to the selected setpoints.

Hot Gas Reheat Dehumidification
The compressor is enabled at full capacity “Y2” when dehumidification mode is enabled. The supply fan low dehumidification speed and reheat valve “HG” 24VAC outputs are enabled. If the unit is equipped with WSE, the Entering Water Temperature Setpoint for WSE transition is ignored, and freeze protection is still monitored. The Hot Gas Reheat Solenoid will stage on/off subject to the minimum on and off times being met (1 minute each).

For Freeze Protection, the Leaving Water Temperature will be monitored, and the unit will be protected according to the selected setpoints.

If Dehumidification Mode is priority, and the controller is in Dehumidification Mode, but the Control Temperature Sensor also requires cooling or heating, the cooling or heating calls will be ignored until the Dehumidification call is satisfied.

If Dehumidification Mode is NOT priority, and the controller is in the Dehumidification Mode, but Control Temperature Sensor then requires Cooling Mode, the controller will disable reheat and transition to Cooling Mode. If Dehumidification Mode is NOT priority, and the controller is in Dehumidification Mode, but the Control Temperature Sensor then requires Heating Mode, the controller will disable reheat and disable the reversing valve, entering Heating Mode.

If the controller is transitioning from Cooling Mode directly to Dehumidification Mode when Dehumidification Mode is NOT priority, the compressors will remain enabled, reheat will be enabled, and the supply fan will stage down.

Additional Feature Sequences

Outdoor Air Damper Operation

CO2 Control Override
As the CO2 (Space or Return Sensor) rises above the CO2 Setpoint (default: 900ppm; range: 500-1500ppm), a (10VDC) signal will be sent to the outside air damper to modulate open, and a General Alarm will be displayed. As the CO2 falls below the CO2 Setpoint minus the deadband (20ppm, non-adjustable), the signal to the outside air damper will be removed.
SEQUENCE OF OPERATIONS

Automatic Reset Alarms

Alarms

All alarms will be monitored and displayed through the Pioneer Gold Controller, unless otherwise specified.

A Status LED at the top near center of the Pioneer Gold Controller board indicates the unit status. A green status light indicates that the unit is powered up. A flashing red status light indicates that the controller has detected a fault condition and is now in Alarm mode.

Automatic Reset Alarms

The following alarms will automatically reset themselves once the fault condition clears.

Low Control Voltage Alarm

The Low Control Voltage Alarm will trigger when the 24VAC control voltage drops to 18VAC +/-5%. Below this voltage, the onboard normally open relays are not guaranteed to close. This alarm will disable the compressor, the supply fan, and the reversing valve. The low voltage alarm will release when the voltage rises above 20VAC +/-5%. Once the fault is cleared, the controller will activate a random start delay.

High Control Voltage Alarm

The High Control Voltage Alarm will trigger when the 24VAC control voltage increases to 32VAC +/-5%. Any voltage higher than this risks damaging components on the control board. This alarm will disable the compressor, the supply fan, and the reversing valve. The alarm will release when the control voltage decreases to 30VAC +/-5%. Once the fault is cleared, the controller will activate a random start delay.

Entering Water Temperature Alarm

The Entering Water Temperature Alarm will trigger if the entering water temperature becomes too cold or becomes out of range. The alarm will trigger if the entering water temperature drops below 30°F for 2 minutes. This alarm will disable waterside economizer operation but allow operation of the compressor and supply fan. The alarm will release when the entering water temperature rises above 35°F.

Evaporator Coil Temperature Alarm

The Evaporator Coil Temperature Alarm will trigger if the suction line temperature drops below 30°F or becomes out of range. The alarm will release when the coil temperature increases to 45°F. This alarm will disable the compressor but allow operation of the supply fan.

No Air Flow Alarm

The No Air Flow Alarm will trigger if the unit is configured for an air flow switch and the air flow switch has not indicated airflow within 30 seconds. This alarm will disable the compressor(s) and electric heat but will allow operation of the supply fan. The alarm will release when the air flow switch has been made.

Space Sensor Alarm

The Space Sensor Alarm will trigger if the space temperature or humidity sensor readings are out of range, or communication is lost to the sensor. This alarm will disable the compressor but allow operation of the supply fan. The alarm will release when the space sensor reading is in the acceptable range. (Acceptable sensor range for space temp: 35-110°F. Acceptable sensor range for space humidity: 5-99%.)

Entering Hot Water Temperature Alarm

The Entering Hot Water Temperature Alarm will trigger if the entering hot water temperature becomes too cold or becomes out of range. The alarm will trigger if the entering hot water temperature drops below the space temperature or hot water temperature readings are out of range. This alarm will disable hot water coil operation but will allow operation of the compressor and supply fan. The alarm will release when the entering hot water temperature rises above the space temperature. Acceptable water temperature range is -10-212°F.

CO₂ Override Alarm

The CO₂ override alarm will trigger if the space CO₂ level reads above setpoint or becomes out of range. This alarm will allow operation of all functions, and will output a signal through the CO₂ Damper Override terminal. The alarm will release when the CO₂ level drops below the setpoint minus deadband.

Emergency Shutdown Alarm

The Emergency Shutdown input requires a constant connection to either 24VAC or 24VAC common for normal operation. If the 24VAC or 24VAC common signal is removed, then the controller will enter emergency shutdown mode. This alarm will disable the compressor and the supply fan. This alarm will release when the 24VAC input is restored.

**WARNING:** The Emergency Shutdown Alarm is not a Fire/Life Safety Device.
Lock-Out Alarms

The lock-out alarms will not automatically reset themselves once the fault condition clears. For these alarms to clear, one of the following conditions must be met:

1.) Controller is power cycled.
2.) Fault condition is corrected and the compressor call is removed.
3.) BACnet “Unit Lockout Remote Reset” (point BV:46) is set true.

Auxiliary Input Alarm

The Auxiliary Input Alarm will enable if the compressor has been operational for the minimum on time and a dry contact has been made between the “AUX” and “COM” quick disconnect terminals for 10 seconds. This alarm will disable the compressor but will allow the supply fan to operate.

Condensate Overflow Alarm

The Condensate Pan Overflow Alarm will enable if the resistance between the condensate overflow sensor(s) and 24VAC common is less than 100kΩ for more than 30 seconds. This alarm will disable both the compressor and the supply fan.

High Discharge Pressure Alarm

The High Discharge Pressure Alarm will enable if the high pressure switch opens. This alarm will immediately disable the compressor but will continue to allow the supply fan to operate.

Leaving Water Temperature Alarm

The Leaving Water Temperature Alarm will trigger if the refrigeration line temperature or the leaving water temperature drops below the freeze protection temperature. The glycol percentage will be configured through the Pioneer Gold interface, determining what temperature will trigger the alarm and what temperature will release the alarm. This alarm will disable the compressor but will allow operation of the supply fan. Acceptable water temperature range is -10-120°F. The alarm is released only if 3 minutes has expired and both the refrigeration line temperature and the leaving water temperature have risen 5° above the freeze protection temperature. If the refrigeration line temperature or the leaving water temperature drops below the freeze protection temperature again within 2 hours, then the alarm will be active until the refrigeration line temperature and the leaving water temperature have both risen 5° above the freeze protection temperature and either the unit is power cycled, the Y call is removed, or a reset is sent from the BMS (soft lockout).

Low Suction Pressure Alarm

The Low Suction Pressure Alarm will enable if the low pressure switch opens for a continuous 10 seconds. This alarm will disable the compressor but will continue to allow the supply fan to operate. The compressor will not start if the alarm is active. The alarm is released only if both 15 minutes has expired and the low pressure switch has closed. If the alarm is enabled 2 times within 2 hours, then the alarm is now active until the controller is power cycled (hard lockout).
Controller Diagnostics

Using LEDs To Verify Operation

The Pioneer Gold Controller is equipped with LEDs that can be used to verify operation and perform troubleshooting. See Figure 11, page 33 for the LED locations. The LEDs associated with these outputs allow you to see what is active without using a voltmeter. The LEDs and their uses are as follows:

**Operation LEDs**

**POWER** - These green LEDs will light up to indicate that 24 VAC power has been applied to the controller and that all boards are powered up. There are POWER LEDs on the Input/Output board and the CPU board.

**STATUS** - If solid green, this LED confirms that there is communication between the I/O board and the CPU board. If the LED turns red, then communication has been lost between the boards.

**Communication LEDs**

**MODBUS EXPANSION** - These orange and yellow LEDs will light up and blink continuously to indicate there is MODBUS Expansion communications.

**BACNET (BAS)** - These orange and yellow LEDs will light up and blink continuously to indicate BACnet®/BAS communications.

**T-STAT** - This yellow LED will light up and blink continuously to indicate communications with the Pioneer Gold Touch Screen Space and Humidity Sensor.

**USB Port LED**

**D7** - This LED, located directly above the User Manual Reset button, should blink red no more than 5 times total when the controller is powered on at start up as it checks the USB port. It will then turn off.

After inserting a USB flash drive with a firmware update and cycling power to the controller, the LED should turn solid green once the board detects the update and then should flash green to indicate the download is in process.

**Output LEDs**

**W1 - Electric Heat Stage 1 LED** — This green LED will light up when the Electric Heat Stage 1 relay is active.

**SFLO - Supply Fan Low Speed LED** — This green LED will light up when the Low Speed Supply Fan relay is active.

**SFHI - Supply Fan High Speed LED** — This green LED will light up when the High Speed Supply Fan relay is active.

**RV - Reversing Valve LED** — This green LED will light up when the Reversing Valve relay is active.

**Y1 - Compressor Stage 1 LED** — This green LED will light up when the Compressor Stage 1 relay is active.

**Y2 - Compressor Stage 2 LED** — This green LED will light up when the Compressor Stage 2 relay is active.

**Y3 - Compressor Stage 3 LED** — This green LED will light up when the Compressor Stage 3 relay is active.

**HGRH - Hot Gas Reheat Valve LED** — This green LED will light up when the Reheat Valve relay is active.

**WV/PUMP LED** — This green LED will light up when the Water Valve relay is active.

**WSE - Waterside Economizer LED** — This green LED will light up when the Waterside Economizer is active.

**DO1 - Spare Digital Output LED** — This green LED will light up when the Spare Digital Output is active.

**ALM - Alarm LED** — This red LED will light up when there is an active alarm.
Figure 11: Pioneer Gold Controller LED Locations
Using LEDs To Verify Operation

The Pioneer Gold Electric Heat Board is equipped with LEDs that can be used to verify operation and perform troubleshooting. See Figure 12, below for the LED locations. The LEDs associated with these outputs allow you to see what is active without using a voltmeter. The LEDs and their uses are as follows:

**Operation LEDs**

**POWER** - This green LED will light up and stay on solid to indicate that 24 VAC power has been applied to the board.

**STATUS** - If solid green, this LED confirms that there is communication between the Pioneer Gold Controller and the Expansion board. If the LED turns red, the Limit Switch input/safety is open.

**MODBUS LEDs**

**D2** - This yellow LED will light up and blink continuously to indicate there is MODBUS communications.

**D3** - This orange LED will light up and blink continuously to indicate there is MODBUS communications.

**Output LEDs**

**HEAT 1** - **Electric Heat Stage 1 LED** — This green LED will light up when the Electric Heat Stage 1 relay is active.

**HEAT 2** - **Electric Heat Stage 2 LED** — This green LED will light up when the Electric Heat Stage 2 relay is active.

---

Figure 12: Pioneer Gold Electric Heat Board LED Locations
Suction Pressure Transducer Testing for R410A Refrigerant 0-500 PSI

The Suction Pressure is obtained by using the Suction Pressure Transducer, which is connected into the Suction Line of the Compressor.

Use the voltage column to check the Suction Pressure Transducer while connected to the Pioneer Gold Controller. The Controller must be powered for this test. Read voltage with a meter set on DC volts. Place the positive lead from the meter on the SPT input terminal located on the Controller. Place the negative lead from the meter on the ground (COM) terminal located adjacent to the SPT terminal on the Controller. Use a refrigerant gauge set to measure the suction line pressure near where the Suction Pressure Transducer is connected to the suction line. Measure the Voltage at the terminals SPT and COM terminals and compare it to the appropriate chart depending on the refrigerant you are using. If the pressure/voltage readings do not align closely with the chart, your Suction Pressure Transducer is probably defective and will need to be replaced.

<table>
<thead>
<tr>
<th>Pressure PS</th>
<th>Signal DC Volts</th>
<th>Pressure PSI</th>
<th>Signal DC Volts</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>0.66</td>
<td>280</td>
<td>2.74</td>
</tr>
<tr>
<td>40</td>
<td>0.82</td>
<td>300</td>
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</tr>
<tr>
<td>60</td>
<td>0.98</td>
<td>320</td>
<td>3.06</td>
</tr>
<tr>
<td>80</td>
<td>1.14</td>
<td>340</td>
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</tr>
<tr>
<td>100</td>
<td>1.3</td>
<td>360</td>
<td>3.38</td>
</tr>
<tr>
<td>120</td>
<td>1.46</td>
<td>380</td>
<td>3.54</td>
</tr>
<tr>
<td>140</td>
<td>1.62</td>
<td>400</td>
<td>3.7</td>
</tr>
<tr>
<td>160</td>
<td>1.78</td>
<td>420</td>
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</tr>
<tr>
<td>180</td>
<td>1.94</td>
<td>440</td>
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</tr>
<tr>
<td>200</td>
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<td>460</td>
<td>4.18</td>
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<tr>
<td>220</td>
<td>2.26</td>
<td>480</td>
<td>4.34</td>
</tr>
<tr>
<td>240</td>
<td>2.42</td>
<td>500</td>
<td>4.5</td>
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<tr>
<td>260</td>
<td>2.58</td>
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</tr>
</tbody>
</table>

Table 7: Coil Pressure/Voltage for Suction Pressure Transducers - R410A Refrigerant

Discharge Pressure Sensor Testing 0-667 PSI

The Discharge Pressure is obtained by using the Discharge Pressure Sensor, which is connected into the Discharge Line of the Compressor.

Use the voltage column to check the Discharge Pressure Sensor while connected to the Pioneer Gold Controller. The Controller must be powered for this test. Read voltage with a meter set on DC volts. Place the positive lead from the meter on the DPT input terminal located on the Controller. Place the negative lead from the meter on the ground (COM) terminal located adjacent to the DPT terminal on the Controller. Use a refrigerant gauge set to measure the suction line pressure near where the Discharge Pressure Sensor is connected to the discharge line. Measure the Voltage at the terminals DPT and COM terminals and compare it to the appropriate chart depending on the refrigerant you are using. If the pressure/voltage readings do not align closely with the chart, your Discharge Pressure Sensor is probably defective and will need to be replaced.

<table>
<thead>
<tr>
<th>Pressure PS</th>
<th>Signal DC Volts</th>
<th>Pressure PSI</th>
<th>Signal DC Volts</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>0.62</td>
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<tr>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 8: Discharge Pressure/Voltage for Discharge Pressure Sensors
**Type III 10K Ohm Temperature Sensor Testing**

The following sensor voltage and resistance table is provided to aid in checking sensors that appear to be operating incorrectly. Many system operating problems can be traced to incorrect sensor wiring. Be sure all sensors are wired per the wiring diagrams in this manual.

If the sensors still do not appear to be operating or reading correctly, check voltage and/or resistance to confirm that the sensor is operating correctly per the tables. Please follow the notes and instructions that appear after the chart when checking sensors.

<table>
<thead>
<tr>
<th>Temp (°F)</th>
<th>Resistance (Ohms)</th>
<th>Voltage @ Input (VDC)</th>
</tr>
</thead>
<tbody>
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<td>93333</td>
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<tr>
<td>-5</td>
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<td>0</td>
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<td>5</td>
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</table>

**Table 9, cont.: Temperature/Resistance for Type III 10K Ohm Thermistor Sensors**

<table>
<thead>
<tr>
<th>Temp (°F)</th>
<th>Resistance (Ohms)</th>
<th>Voltage @ Input (VDC)</th>
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</thead>
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<td>69</td>
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<tr>
<td>84</td>
<td>8514</td>
<td>1.69</td>
</tr>
<tr>
<td>86</td>
<td>8153</td>
<td>1.66</td>
</tr>
<tr>
<td>88</td>
<td>7805</td>
<td>1.62</td>
</tr>
<tr>
<td>90</td>
<td>7472</td>
<td>1.59</td>
</tr>
<tr>
<td>95</td>
<td>6716</td>
<td>1.49</td>
</tr>
<tr>
<td>100</td>
<td>6047</td>
<td>1.41</td>
</tr>
</tbody>
</table>

**Thermistor Sensor Testing Instructions**

Use the resistance column to check the thermistor sensor while disconnected from the controllers (not powered).

Use the voltage column to check sensors while connected to powered controllers. Read voltage with meter set on DC volts. Place the “-” (minus) lead on GND terminal and the “+” (plus) lead on the sensor input terminal being investigated.

If the voltage is above 3.05 VDC, then the sensor or wiring is “open.” If the voltage is less than 0.18 VDC, then the sensor or wiring is shorted.
Glycol Percent Freeze Protection Setpoints

The Pioneer Gold setpoints are preset at AAON and are based on the unit’s design as well as the type of coolant being used in the water loop. See Table 10, below for default settings.

<table>
<thead>
<tr>
<th>Glycol %</th>
<th>Temp Setpoint (°F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>35°F</td>
</tr>
<tr>
<td>5</td>
<td>32°F</td>
</tr>
<tr>
<td>10</td>
<td>29°F</td>
</tr>
<tr>
<td>15</td>
<td>26°F</td>
</tr>
<tr>
<td>20</td>
<td>22°F</td>
</tr>
<tr>
<td>25</td>
<td>17°F</td>
</tr>
<tr>
<td>30</td>
<td>12°F</td>
</tr>
<tr>
<td>35</td>
<td>5°F</td>
</tr>
<tr>
<td>40</td>
<td>-3°F</td>
</tr>
</tbody>
</table>

Table 10: Factory-Set Default Setpoints - Glycol
Programming Note:
Use Configurations Menu In LCD Display To Program The BACnet Settings.

MS/TP Connection To BACnet® Network

Typical Terminal Blocks. All Wiring To Be S (G) To S (G), A - To A - & B+ To B+

Wiring Notes:
1.) All wiring to be in accordance with local and national electrical codes and specifications.
2.) All communication wiring to be 18 gauge minimum, 2 conductor twisted pair with shield. Use Belden #82760 or equivalent.

Figure 13: BACnet Connection to MS/TP BAS Network
## BACnet® Analog Values

<table>
<thead>
<tr>
<th>BACnet® Point #</th>
<th>Default</th>
<th>Limit Range</th>
<th>BACnet® Point Name</th>
<th>BACnet® Description</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>AV: 0</td>
<td>N/A</td>
<td>N/A</td>
<td>Entering Water Temp</td>
<td>Temperature of the loop water entering the water coil</td>
<td>Fahrenheit</td>
</tr>
<tr>
<td>AV: 1</td>
<td>N/A</td>
<td>N/A</td>
<td>Liquid Line Temp</td>
<td>Temperature of the refrigerant liquid line</td>
<td>Fahrenheit</td>
</tr>
<tr>
<td>AV: 2</td>
<td>N/A</td>
<td>N/A</td>
<td>Entering Hot Water Temp</td>
<td>Temperature of the water entering the hot water coil</td>
<td>Fahrenheit</td>
</tr>
<tr>
<td>AV: 3</td>
<td>N/A</td>
<td>N/A</td>
<td>Air Coil Temp</td>
<td>Temperature of the air coil</td>
<td>Fahrenheit</td>
</tr>
<tr>
<td>AV: 4</td>
<td>N/A</td>
<td>N/A</td>
<td>Supply Air Temp</td>
<td>Temperature of the leaving discharge air</td>
<td>Fahrenheit</td>
</tr>
<tr>
<td>AV: 5</td>
<td>N/A</td>
<td>N/A</td>
<td>Space Temperature</td>
<td>Temperature reading from the space sensor</td>
<td>Fahrenheit</td>
</tr>
<tr>
<td>AV: 6</td>
<td>N/A</td>
<td>N/A</td>
<td>Space Relative Humidity</td>
<td>Relative Humidity reading from the space sensor</td>
<td>Relative Humidity</td>
</tr>
<tr>
<td>AV: 7</td>
<td>N/A</td>
<td>N/A</td>
<td>CO₂</td>
<td>CO₂ level reading from the space sensor</td>
<td>PPM</td>
</tr>
<tr>
<td>AV: 8</td>
<td>N/A</td>
<td>N/A</td>
<td>Firmware Version</td>
<td>Version of the controllers firmware</td>
<td>No Units</td>
</tr>
<tr>
<td>AV: 9</td>
<td>N/A</td>
<td>N/A</td>
<td>Discharge Pressure</td>
<td>Pressure reading from the discharge pressure transducer</td>
<td>PSI</td>
</tr>
<tr>
<td>AV: 10</td>
<td>N/A</td>
<td>N/A</td>
<td>Suction Pressure</td>
<td>Pressure reading from the suction pressure transducer</td>
<td>PSI</td>
</tr>
<tr>
<td>AV: 11</td>
<td>N/A</td>
<td>N/A</td>
<td>Water Valve/ Pump Percentage</td>
<td>Percentage output to an analog water valve or pump</td>
<td>Percent</td>
</tr>
<tr>
<td>AV: 12</td>
<td>N/A</td>
<td>N/A</td>
<td>Hot Water Valve Percentage</td>
<td>Percentage output to the hot water heat coil valve</td>
<td>Percent</td>
</tr>
<tr>
<td>AV: 13</td>
<td>N/A</td>
<td>N/A</td>
<td>Supply Fan Percentage</td>
<td>Percentage output for a variable speed supply fan</td>
<td>Percent</td>
</tr>
<tr>
<td>AV: 14</td>
<td>N/A</td>
<td>N/A</td>
<td>Damper Override Percentage</td>
<td>Output percentage of the 0-10VDC damper override output</td>
<td>Percent</td>
</tr>
<tr>
<td>AV: 15</td>
<td>N/A</td>
<td>N/A</td>
<td>Compressor Percentage</td>
<td>Current value of the compressor PID control loop</td>
<td>Percent</td>
</tr>
<tr>
<td>AV: 16</td>
<td>N/A</td>
<td>N/A</td>
<td>Network Address</td>
<td>BACnet device ID currently assigned to the controller</td>
<td>No Units</td>
</tr>
<tr>
<td>AV: 17</td>
<td>900</td>
<td>500-1500</td>
<td>CO₂ Setpoint</td>
<td>CO₂ setpoint to control the damper override output</td>
<td>PPM</td>
</tr>
<tr>
<td>AV: 18</td>
<td>74</td>
<td>55-85</td>
<td>Occupied Cooling Setpoint</td>
<td>Cooling mode enable setpoint when space is occupied</td>
<td>Fahrenheit</td>
</tr>
<tr>
<td>AV: 19</td>
<td>79</td>
<td>55-85</td>
<td>Unoccupied Cooling Setpoint</td>
<td>Cooling mode enable setpoint when space is unoccupied</td>
<td>Fahrenheit</td>
</tr>
<tr>
<td>AV: 20</td>
<td>55</td>
<td>45-65</td>
<td>Supply Cooling Setpoint</td>
<td>Temperature setpoint of the leaving discharge air while in cooling mode</td>
<td>Fahrenheit</td>
</tr>
<tr>
<td>AV: 21</td>
<td>180</td>
<td>120-255</td>
<td>Compressor On Time</td>
<td>Minimum on time setpoint for compressor(s)</td>
<td>Seconds</td>
</tr>
<tr>
<td>AV: 22</td>
<td>120</td>
<td>60-255</td>
<td>Compressor Off Time</td>
<td>Minimum off time setpoint for compressor(s)</td>
<td>Seconds</td>
</tr>
</tbody>
</table>

### Table 12: BACnet Parameter Analog Values
## BACNET® Analog Values

<table>
<thead>
<tr>
<th>BACnet® Point #</th>
<th>Default</th>
<th>Limit Range</th>
<th>BACnet® Point Name</th>
<th>BACnet® Description</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>AV: 23</td>
<td>60</td>
<td>30-255</td>
<td>Compressor Interstage On Delay</td>
<td>Interstage on delay setpoint when unit has more than one compressor stage</td>
<td>Seconds</td>
</tr>
<tr>
<td>AV: 24</td>
<td>60</td>
<td>30-255</td>
<td>Compressor Interstage Off Delay</td>
<td>Interstage off delay setpoint when unit has more than one compressor stage</td>
<td>Seconds</td>
</tr>
<tr>
<td>AV: 25</td>
<td>75</td>
<td>55-85</td>
<td>Space Cooling Hi Reset</td>
<td>High space temperature setpoint when using space/supply reset control in cooling mode</td>
<td>Fahrenheit</td>
</tr>
<tr>
<td>AV: 26</td>
<td>72</td>
<td>55-85</td>
<td>Space Cooling Lo Reset</td>
<td>Low space temperature setpoint when using space/supply reset control in cooling mode</td>
<td>Fahrenheit</td>
</tr>
<tr>
<td>AV: 27</td>
<td>57</td>
<td>45-65</td>
<td>Supply Cooling Hi Reset</td>
<td>High supply temperature setpoint when using space/supply reset control in cooling mode</td>
<td>Fahrenheit</td>
</tr>
<tr>
<td>AV: 28</td>
<td>53</td>
<td>45-65</td>
<td>Supply Cooling Lo Reset</td>
<td>Low supply temperature setpoint when using space/supply reset control in cooling mode</td>
<td>Fahrenheit</td>
</tr>
<tr>
<td>AV: 29</td>
<td>70</td>
<td>55-85</td>
<td>Occupied Heating Setpoint</td>
<td>Heating mode enable setpoint when space is occupied</td>
<td>Fahrenheit</td>
</tr>
<tr>
<td>AV: 30</td>
<td>65</td>
<td>55-85</td>
<td>Unoccupied Heating Setpoint</td>
<td>Heating mode enable setpoint when space is unoccupied</td>
<td>Fahrenheit</td>
</tr>
<tr>
<td>AV: 31</td>
<td>90</td>
<td>55-120</td>
<td>Supply Heating Setpoint</td>
<td>Temperature setpoint of the leaving discharge air while in heating mode</td>
<td>Fahrenheit</td>
</tr>
<tr>
<td>AV: 32</td>
<td>72</td>
<td>55-85</td>
<td>Space Heating Hi Reset</td>
<td>High space temperature setpoint when using space/supply reset control in heating mode</td>
<td>Fahrenheit</td>
</tr>
<tr>
<td>AV: 33</td>
<td>69</td>
<td>55-85</td>
<td>Space Heating Lo Reset</td>
<td>Low space temperature setpoint when using space/supply reset control in heating mode</td>
<td>Fahrenheit</td>
</tr>
<tr>
<td>AV: 34</td>
<td>100</td>
<td>55-120</td>
<td>Supply Heating Hi Reset</td>
<td>High supply temperature setpoint when using space/supply reset control in heating mode</td>
<td>Fahrenheit</td>
</tr>
<tr>
<td>AV: 35</td>
<td>90</td>
<td>55-120</td>
<td>Supply Heating Lo Reset</td>
<td>Low supply temperature setpoint when using space/supply reset control in heating mode</td>
<td>Fahrenheit</td>
</tr>
<tr>
<td>AV: 36</td>
<td>50</td>
<td>40-60</td>
<td>Dehum Enable Setpoint</td>
<td>Relative humidity setpoint for enabling dehumidification mode</td>
<td>Relative Humidity</td>
</tr>
<tr>
<td>AV: 37</td>
<td>5</td>
<td>1-10</td>
<td>Aux Heat Deadband</td>
<td>Degrees Fahrenheit that the supply air must be under setpoint for auxiliary heat to enable</td>
<td>Fahrenheit</td>
</tr>
<tr>
<td>AV: 38</td>
<td>100</td>
<td>35-100</td>
<td>Supply Fan Max Percentage</td>
<td>Maximum allowed output for a variable speed supply fan</td>
<td>Percent</td>
</tr>
<tr>
<td>AV: 39</td>
<td>40</td>
<td>40-100</td>
<td>Supply Fan Minimum Percentage</td>
<td>Minimum allowed output for a variable speed supply fan</td>
<td>Percent</td>
</tr>
<tr>
<td>AV: 40</td>
<td>0</td>
<td>-20 - 20</td>
<td>Space Temp Offset</td>
<td>Temperature offset for the space sensor</td>
<td>Fahrenheit</td>
</tr>
<tr>
<td>AV: 41</td>
<td>0</td>
<td>-20 - 20</td>
<td>Supply Temp Offset</td>
<td>Temperature offset for the supply temperature sensor</td>
<td>Fahrenheit</td>
</tr>
<tr>
<td>AV: 42</td>
<td>0</td>
<td>-20 - 20</td>
<td>Space RH Offset</td>
<td>Relative humidity offset for the space sensor</td>
<td>Fahrenheit</td>
</tr>
<tr>
<td>AV: 43</td>
<td>N/A</td>
<td>N/A</td>
<td>Leaving Water Temp</td>
<td>Temperature of the loop water leaving the water coil</td>
<td>Fahrenheit</td>
</tr>
</tbody>
</table>

Table 12: BACnet Parameter Analog Values, continued
### BACnet® Analog Values

<table>
<thead>
<tr>
<th>BACnet® Point #</th>
<th>Default</th>
<th>Limit Range</th>
<th>BACnet® Point Name</th>
<th>BACnet® Description</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>AV: 44</td>
<td>45</td>
<td>40-60</td>
<td>Suction Temp Setpoint</td>
<td>Temperature setpoint of the suction line while in dehum</td>
<td>Fahrenheit</td>
</tr>
<tr>
<td>AV: 45</td>
<td>50</td>
<td>50-100</td>
<td>Compressor Minimum Percentage</td>
<td>Minimum compressor capacity with modulating or digital</td>
<td>Percent</td>
</tr>
<tr>
<td>AV: 46</td>
<td>N/A</td>
<td>N/A</td>
<td>Water Flow</td>
<td>GPM reading from the water flow sensor</td>
<td>GPM</td>
</tr>
<tr>
<td>AV: 47</td>
<td>0</td>
<td>0 - 10</td>
<td>Space Sensor Maximum Setpoint Offset</td>
<td>Maximum allowed user setpoint adjustment on the</td>
<td>Fahrenheit</td>
</tr>
<tr>
<td>AV: 48</td>
<td>N/A</td>
<td>N/A</td>
<td>Occupied Cooling Setpoint with Offset</td>
<td>Occupied cooling setpoint with the user adjustment from</td>
<td>Fahrenheit</td>
</tr>
<tr>
<td>AV: 49</td>
<td>N/A</td>
<td>N/A</td>
<td>Occupied Heating Setpoint with Offset</td>
<td>Occupied heating setpoint with the user adjustment from</td>
<td>Fahrenheit</td>
</tr>
<tr>
<td>AV: 50</td>
<td>30</td>
<td>5 - 75</td>
<td>Water Valve Opening Delay Time</td>
<td>Amount of time given for the water valve to open before</td>
<td>Seconds</td>
</tr>
<tr>
<td>AV: 51</td>
<td>30 - 120</td>
<td></td>
<td>User Occupancy Override Time</td>
<td>Amount of time unit stays in user occupancy override</td>
<td>Minutes</td>
</tr>
</tbody>
</table>

### BACnet® Binary Values

<table>
<thead>
<tr>
<th>BACnet® Point #</th>
<th>Default</th>
<th>BACnet® Point Name</th>
<th>BACnet® Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BV: 0</td>
<td>N/A</td>
<td>G Thermostat Call</td>
<td>Status of the G input terminal</td>
</tr>
<tr>
<td>BV: 1</td>
<td>N/A</td>
<td>Y1 Thermostat Call</td>
<td>Status of the Y1 input terminal</td>
</tr>
<tr>
<td>BV: 2</td>
<td>N/A</td>
<td>Y2 Thermostat Call</td>
<td>Status of the Y2 input terminal</td>
</tr>
<tr>
<td>BV: 3</td>
<td>N/A</td>
<td>O Thermostat Call</td>
<td>Status of the O input terminal</td>
</tr>
<tr>
<td>BV: 4</td>
<td>N/A</td>
<td>W1 Thermostat Call</td>
<td>Status of the W1 input terminal</td>
</tr>
<tr>
<td>BV: 5</td>
<td>N/A</td>
<td>Dehumidistat Call</td>
<td>Status of the DH input terminal</td>
</tr>
<tr>
<td>BV: 6</td>
<td>N/A</td>
<td>Night Setback Enable</td>
<td>Status of the night setback enable input terminal</td>
</tr>
<tr>
<td>BV: 7</td>
<td>N/A</td>
<td>Night Setback Override</td>
<td>Status of the night setback override input terminal</td>
</tr>
<tr>
<td>BV: 8</td>
<td>N/A</td>
<td>Night Setback Tstat</td>
<td>Status of the night setback thermostat input terminal</td>
</tr>
<tr>
<td>BV: 9</td>
<td>N/A</td>
<td>Emergency Shutdown Status</td>
<td>Status of the emergency shutdown input terminal</td>
</tr>
<tr>
<td>BV: 10</td>
<td>N/A</td>
<td>Waterside Economizer</td>
<td>Status of the waterside economizer relay output</td>
</tr>
<tr>
<td>BV: 11</td>
<td>N/A</td>
<td>Compressor 1 Output</td>
<td>Status of the compressor 1 relay output</td>
</tr>
<tr>
<td>BV: 12</td>
<td>N/A</td>
<td>Compressor 1 2nd Step</td>
<td>Status of the compressor 1 second step relay output for a 2 stage compressor</td>
</tr>
<tr>
<td>BV: 13</td>
<td>N/A</td>
<td>Compressor 2 Output</td>
<td>Status of the compressor 2 relay output for a unit with 2 compressors</td>
</tr>
<tr>
<td>BV: 14</td>
<td>N/A</td>
<td>Supply Fan Low Speed</td>
<td>Status of the low speed supply fan relay output</td>
</tr>
</tbody>
</table>

Table 12: BACnet Parameter Analog Values, continued

Table 13: BACnet Parameter Binary Values
### BACnet® Binary Values

<table>
<thead>
<tr>
<th>BACnet® Point #</th>
<th>Default</th>
<th>BACnet® Point Name</th>
<th>BACnet® Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>BV: 15</td>
<td>N/A</td>
<td>Supply Fan High Speed</td>
<td>Status of the high speed supply fan relay output</td>
</tr>
<tr>
<td>BV: 16</td>
<td>N/A</td>
<td>Electric Heat</td>
<td>Status of the electric heat relay output</td>
</tr>
<tr>
<td>BV: 17</td>
<td>N/A</td>
<td>Reversing Valve</td>
<td>Status of the reversing valve relay output</td>
</tr>
<tr>
<td>BV: 18</td>
<td>N/A</td>
<td>Water Valve/Pump</td>
<td>Status of the water valve or pump relay output</td>
</tr>
<tr>
<td>BV: 19</td>
<td>N/A</td>
<td>HGRH</td>
<td>Status of the hot gas reheat relay output</td>
</tr>
<tr>
<td>BV: 20</td>
<td>N/A</td>
<td>Alarm</td>
<td>Status of the alarm relay output and indicates if any alarm is present</td>
</tr>
<tr>
<td>BV: 21</td>
<td>N/A</td>
<td>Occupancy Status</td>
<td>Indication of space occupancy</td>
</tr>
<tr>
<td>BV: 22</td>
<td>N/A</td>
<td>Water Flow Status</td>
<td>Indication of loop water flow if unit is equipped with a water flow switch</td>
</tr>
<tr>
<td>BV: 23</td>
<td>N/A</td>
<td>Dehum Mode</td>
<td>Indicates if unit is in Dehumidification mode</td>
</tr>
<tr>
<td>BV: 24</td>
<td>N/A</td>
<td>Cool Mode</td>
<td>Indicates if unit is in Cooling mode</td>
</tr>
<tr>
<td>BV: 25</td>
<td>N/A</td>
<td>Heat Mode</td>
<td>Indicates if unit is in Heating mode</td>
</tr>
<tr>
<td>BV: 26</td>
<td>N/A</td>
<td>Vent Mode</td>
<td>Indicates if unit is in Vent mode</td>
</tr>
<tr>
<td>BV: 27</td>
<td>N/A</td>
<td>Water Economizer Failed</td>
<td>Indicates if waterside economizer has failed to meet Cooling setpoint within allotted time</td>
</tr>
<tr>
<td>BV: 28</td>
<td>N/A</td>
<td>High Discharge Pressure Alarm</td>
<td>Status of the high discharge pressure alarm</td>
</tr>
<tr>
<td>BV: 29</td>
<td>N/A</td>
<td>Emergency Shutdown Alarm</td>
<td>Status of the emergency shutdown alarm</td>
</tr>
<tr>
<td>BV: 30</td>
<td>N/A</td>
<td>Auxiliary Alarm</td>
<td>Status of the auxiliary alarm</td>
</tr>
<tr>
<td>BV: 31</td>
<td>N/A</td>
<td>Condensate Overflow Alarm</td>
<td>Status of the condensate overflow alarm</td>
</tr>
<tr>
<td>BV: 32</td>
<td>N/A</td>
<td>Low Control Voltage Alarm</td>
<td>Status of the low control voltage alarm</td>
</tr>
<tr>
<td>BV: 33</td>
<td>N/A</td>
<td>High Control Voltage Alarm</td>
<td>Status of the high control voltage alarm</td>
</tr>
<tr>
<td>BV: 34</td>
<td>N/A</td>
<td>Low Suction Pressure Alarm</td>
<td>Status of the low suction pressure alarm</td>
</tr>
<tr>
<td>BV: 35</td>
<td>N/A</td>
<td>Water Leaving Temp Alarm</td>
<td>Status of the water leaving temperature alarm</td>
</tr>
<tr>
<td>BV: 36</td>
<td>N/A</td>
<td>Water Flow Alarm</td>
<td>Status of the water flow alarm if unit is equipped with a water flow switch</td>
</tr>
<tr>
<td>BV: 37</td>
<td>N/A</td>
<td>Air Coil Temp Alarm</td>
<td>Status of the air coil temperature alarm</td>
</tr>
<tr>
<td>BV: 38</td>
<td>N/A</td>
<td>Water Entering Temp Alarm</td>
<td>Status of the water entering temperature alarm</td>
</tr>
<tr>
<td>BV: 39</td>
<td>False</td>
<td>Network Occupy</td>
<td>Allows building management system to force occupancy</td>
</tr>
<tr>
<td>BV: 40</td>
<td>False</td>
<td>Network Emergency Shutdown</td>
<td>Allows building management system to force the emergency shutdown</td>
</tr>
<tr>
<td>BV: 41</td>
<td>False</td>
<td>Dehum Priority</td>
<td>Allows dehumidification to have priority over any other unit mode</td>
</tr>
<tr>
<td>BV: 42</td>
<td>False</td>
<td>Space/Supply Cooling Reset Enable</td>
<td>Enables space/supply setpoint reset control while in cooling mode</td>
</tr>
<tr>
<td>BV: 43</td>
<td>False</td>
<td>Space/Supply Heating Reset Enable</td>
<td>Enables space/supply setpoint reset control while in heating mode</td>
</tr>
<tr>
<td>BV: 44</td>
<td>N/A</td>
<td>Supply Fan Amp Status</td>
<td>Proof of supply fan operation via current switch</td>
</tr>
<tr>
<td>BV: 45</td>
<td>N/A</td>
<td>Occupancy Sensor</td>
<td>Status of occupancy sensor which will force the unit into occupancy</td>
</tr>
<tr>
<td>BV: 46</td>
<td>False</td>
<td>Unit Lockout Remote Reset</td>
<td>Allows building management system to remotely release a unit from an alarm lockout</td>
</tr>
<tr>
<td>BV: 47</td>
<td>False</td>
<td>Password Reset</td>
<td>Resets the manager and admin passwords back to factory defaults</td>
</tr>
</tbody>
</table>

Table 13: BACnet Parameter Binary Values, continued
Pioneer Gold Touch Screen Operator Interface

Pioneer Gold Controller Code: Version 1.07
Used with AAON WSHP WV Series Vertical and WH Series Horizontal
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PLEASE NOTE
This technical guide does not include a depiction of every Pioneer Gold Touch Screen screen. Additionally, screens that are depicted are subject to change.
Overview & Features

The AAON Pioneer Gold Controller Touch Screen provides a direct, graphic-enhanced, menu-driven link to enable you to view the status and adjust the setpoints and configurations of the Pioneer Gold Controller (See Figure 1.)

Easy to configure and easy to use, the AAON Pioneer Gold Controller Touch Screen has many features, including the following:

- User-friendly, high-contrast, 2.8 inch color touchscreen interface
- Graphic programming screens provide easy setup and operation without the need for specialized training
- Provides protection from unauthorized users through integral two-level password authorization programming
- Multiple built-in alarms enhance system monitoring
- USB port on the board provides the ability to update firmware and upload and download job-site configurations and setpoints
- Comes equipped with real-time clock backup power supply for short power losses

![Figure 1: Pioneer Gold Touch Screen Main Screen](image)
**Main Screen Icons and Settings Screen Icons**

**Icons and Button Functions**

System settings and screens are easily accessible by simply touching one of the five icons on the **Main Screen**. The subscreens contain data entry boxes with accessible number keypads for data entry and screen maneuvering buttons such as <Next>, <Back>, and <OK>.

**Main Screen Icons**

There are 7 **Main Screen** icons. See **Table 1** for a list of the **Main Screen** icons and their functions.

<table>
<thead>
<tr>
<th>Icon</th>
<th>Main Screen Icons</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Occupied/Unoccupied icon]</td>
<td>The &lt;Occupied/Unoccupied&gt; icon is darkened to show Occupied and lightened to show Unoccupied.</td>
</tr>
<tr>
<td>![Operation Mode icon]</td>
<td>The &lt;Operation Mode&gt; icon will display at the top right of the <strong>Main Screen</strong>. It will display a flame for Heating Mode, a snowflake for Cooling Mode, a fan for Vent Mode, or a no water droplet for Dehumidification Mode. It will display the word OFF when the unit is in Off Mode.</td>
</tr>
<tr>
<td>![Inputs icon]</td>
<td>The &lt;Inputs&gt; icon takes you to the Inputs Screens. The Inputs Screens display the status of all possible inputs connected to the board.</td>
</tr>
<tr>
<td>![Outputs icon]</td>
<td>The &lt;Outputs&gt; icon takes you to the Outputs Screens. The Output Screens display the status of all possible outputs connected to the board.</td>
</tr>
<tr>
<td>![About icon]</td>
<td>The &lt;About&gt; icon takes you to the About Screen. The About Screen displays the firmware version and provides other information about the board.</td>
</tr>
</tbody>
</table>

**Manager Settings Screen Icons**

The **Manager Settings Screen** is password protected. Only a qualified user can access this screen. There are seven Manager Settings Screen icons. Three of them—Inputs, Outputs, and Alarms—are repeated on this screen. The other four are described below. See **Table 2** for a list of these icons and their functions.

<table>
<thead>
<tr>
<th>Icon</th>
<th>Settings Screen Icons</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Clock icon]</td>
<td>The &lt;Clock&gt; icon takes you to the Clock Screen. This screen allows you to do two things—set the current date and time. This is one of the first things you should do—set the correct date &amp; time—if you notice the time or date is wrong at the top of the <strong>Main Screen</strong> and Settings Screen.</td>
</tr>
<tr>
<td>![Schedule icon]</td>
<td>The &lt;Schedule&gt; icon takes you to the Set Schedule Screen. This screen allows you to set the desired schedule for the controller.</td>
</tr>
<tr>
<td>![Setpoints icon]</td>
<td>The &lt;Setpoints&gt; icon takes you to the Setpoints Screen where you can access and change setpoints.</td>
</tr>
<tr>
<td>![USB icon]</td>
<td>The &lt;USB&gt; icon takes you to the USB Screen where you can update firmware, download setpoints to USB, and upload setpoints from USB.</td>
</tr>
</tbody>
</table>

**Table 1:** Main Screen Icons & Functions

**Table 2:** Manager Settings Screen Icons & Functions
**Administrator Settings Screen Icons**

The Administrator Settings Screen is password protected. Only a qualified user can access this screen. There are ten Administrator Settings Screen icons. Seven of them—Inputs, Outputs, Alarms, Clock, Schedule, USB, and Setpoints—are repeated on this screen. The other three are described below. See Table 3 for a list of these icons and their functions.

<table>
<thead>
<tr>
<th>Icon</th>
<th>Settings Screen Icons</th>
</tr>
</thead>
<tbody>
<tr>
<td>Security</td>
<td>The &lt;Security&gt; icon takes you to the Security Screen. This screen allows you to set the Manager’s passcode and the Administrator’s passcode.</td>
</tr>
<tr>
<td>Configuration</td>
<td>The &lt;Configuration&gt; icon takes you to the Configuration Screens where you can access and change configurations.</td>
</tr>
<tr>
<td>Network</td>
<td>The &lt;Network&gt; icon displays Network information where you can access and change network configurations</td>
</tr>
</tbody>
</table>

**Table 3: Administrator Settings Screen Icons & Functions**

**Navigation Buttons**

See Table 4 for a list of Navigation buttons and their functions.

<table>
<thead>
<tr>
<th>Button</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home</td>
<td>Use the &lt;Home&gt; key to return to the Main Screen.</td>
</tr>
<tr>
<td>Menu</td>
<td>Use the &lt;Menu&gt; key to return to the Settings Screen.</td>
</tr>
<tr>
<td>Back</td>
<td>Use the &lt;Back&gt; button to return to the previous screen.</td>
</tr>
<tr>
<td>Next</td>
<td>Use the &lt;Next&gt; button to advance to the next screen.</td>
</tr>
<tr>
<td>Cancel</td>
<td>Use the &lt;Cancel&gt; button to exit the screen without saving changes.</td>
</tr>
</tbody>
</table>

**Configuration Buttons**

See Table 5 for a list of Configuration buttons and their functions.

<table>
<thead>
<tr>
<th>Button</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ok</td>
<td>Use the &lt;OK&gt; key to save the data you just selected or entered.</td>
</tr>
<tr>
<td>Back</td>
<td>Use the &lt;Back&gt; button on a number keypad to delete data - back up.</td>
</tr>
<tr>
<td>Apply Settings</td>
<td>Use the &lt;Apply Settings&gt; button to save your changes.</td>
</tr>
<tr>
<td>Enter</td>
<td>Use the &lt;Enter&gt; key to save the data you selected or entered.</td>
</tr>
<tr>
<td>Cancel</td>
<td>Use the &lt;Cancel&gt; button to exit the screen without saving changes.</td>
</tr>
<tr>
<td>Touch Down</td>
<td>Use the &lt;Down&gt; key to enter a lower value.</td>
</tr>
<tr>
<td>Touch Up</td>
<td>Use the &lt;UP&gt; key to enter a higher value.</td>
</tr>
</tbody>
</table>

**Table 4: Navigation Button Functions**

**Table 5: Configuration Buttons**
First Things First

The first thing you need to do when setting up your Touch Screen is to Login. The second thing you need to do is establish user passcodes. The third thing you need to do is set the time and date. After you complete these simple tasks, you are ready to set your system’s schedule(s) and set setpoints and configurations.

Main Screen

Once you have powered up the Pioneer Gold Controller with the proper power supply, the Main Screen will appear. See Figure 2. The top of the screen display the Time of Day and the Date. The current Operation Mode is displayed underneath those items and whether the unit is in Occupied or Unoccupied Mode. Underneath those items, the screen displays the icons Alarms, Inputs, Outputs, About, and Settings.

Administrator Step By Step Guide

In order to operate the Pioneer Gold Controller successfully, you should read this entire guide. This guide will lead you through each step in configuring the Pioneer Gold Controller using its on-board touch screen operator interface. Below is a quick overview of each step.

Step 1: Login using your Administrator Passcode—From the Main Screen, select <Settings> and enter your Administrator Passcode.

Step 2: Change the Passcodes —From the Administrator Settings Screen, select <Security> to change both your Administrator Passcode and the Manager Passcode.

Step 3: Set the Correct Date & Time—From the Administrator Settings Screen, select <Clock> to change the date and time.

Step 4: Set the Schedules—From the Administrator Settings Screen, select <Schedule> and set up the controller schedule.

Step 5: Verify Controller Configuration—From the Administrator Settings Screen, select <Configuration> and verify the controller’s configurations.

Step 6: Set the Setpoints—From the Administrator Settings Screen, select <Setpoints> and set up all of the setpoints.

Step 7: Download Setpoints to USB—From the Administrator Settings Screen, select <USB> and download the Setpoints and Configurations you just created to a USB flash drive.

Step 8: Set the Network Settings—From the Administrator Settings Screen, select <Network> and set up the network settings.

Figure 2: Main Screen
Logging into the Settings Screens

**NOTE:** There are two passcode levels—Manager and Administrator. The Administrator sets the Manager’s passcode.

Touch the `<Settings>` icon found on the bottom right of the Main Screen and enter your manager or administrator passcode using the number keypad to gain access to the setpoint and configuration items. See Figure 3.

![Figure 3: Settings Password Screen](image)

Press `<Enter>` once you have entered your password.

The **Password Screen** will automatically close, and the **Settings Screen** will display. See Figure 4 for the Manager Settings Screen and Figure 5 for the Administrator Settings Screen.

![Figure 4: Manager Settings Screen](image)

**NOTE:** Passcodes have a default timeout of 5 minutes.

![Figure 5: Administrator Settings Screen](image)
## PASSCODES

### Changing Passcodes

#### Password Clearance Levels

Below is a list of the passcode levels, default codes, and actions that can be performed at the various levels.

**Level 0—No Passcode Needed, System Secured**

Level 0 users can view alarms and input and output status points. No changes to schedules or other settings can be made.

**Manager Level—Default: 1988**

Manager Level users can view alarms and input and output status points. They can change Setpoint values. They can also change the system date and time, but no changes to any controller configurations can be made. They can also update firmware, download setpoints to USB, and upload setpoints from USB.

**Administrator Level—Default: 2425**

Administrator Level users have system administration access and can change the date and time, schedules, and all setpoints and configurations, including default passcodes. They can also update firmware, download setpoints to USB, and upload setpoints from USB. They can change network configurations and can run system tests and logs. This Level is normally reserved for qualified HVAC service personnel.

#### Edit Passcodes

**WARNING:** MAKE SURE YOU CHANGE THE PASSCODES AS SOON AS POSSIBLE TO SECURE THE SYSTEM!

**NOTE:** Only an Administrator Level can change passcodes.

From the Administrator Settings Screen, touch the `<Security>` icon. The Security Screen will appear. See Figure 6. Press `<Menu>` to return to the Settings Screen.

On this screen, you have two options—Change Manager Password and Change Administrator Password. Press your menu selection and either the Manager Password Screen, Figure 7, or Admin Password Screen, Figure 8, will appear.

Enter a 4 digit password using the keypad. The numbers appear in bold at the top of the screen.

**NOTE:** Do not use the same passcode for Administrator and Manager passcodes. If you do, each passcode will default to Level 0.
Use the <Back> key if you make a mistake. Press <Cancel> to return to the previous screen without changing the password. When you have successfully typed in the new password, press <Enter>.

**NOTE:** When you change a password, make sure to write it down. If you should happen to forget the password, contact AAON Technical Support. The password can also be reset through BACnet point BV: 47.
Setting the Date and Time

Set Time and Date

When you first power up your Touch Screen, you will need to change the time and the month, day, and year to the current time and date. If your system has been turned off or has been down for a long time, you may have to do the same, although the time and date can maintain itself for several days. Only Managers and Administrators can change the time and date.

The time and the date appear at the top right of the Main Screen and the Settings Screens.

To Change the Date:
From the Settings Screen, touch the <Clock> icon. The Clock Screen will appear. See Figure 9.

From the Clock Screen, select <Set Date>. The Set Date Screen will appear. See Figure 10.

This screen displays current setting for the month, year, and date. Use the arrow keys at the top right and left of the calendar to change the month and year. When you have arrived at the current month and year, press the current day of the week and date in the calendar itself. When you have finished, press <Apply Settings> and then press <OK> to return to the Schedule Screen.

To Change the Time:
From the Settings Screen, touch the <Clock> icon. The Clock Screen will appear. See Figure 9. From the Clock Screen, select <Set Time>. The Set Time Screen will appear. See Figure 11.

In the example above, the current time is 18:45:57. Use the up and down arrow keys to set the current time.

Set Clock Hour: Use the up and down arrow keys to select the current hour in 24 hour format. Valid entries are from 0-23.

NOTE: See Appendix for 24-Hour Time table.

Set Clock Minutes: Use the up and down arrow keys to select the current minutes. Valid entries are from 0-59.

Set Clock Seconds: Use the up and down arrow keys to select the current seconds. Valid entries are from 0-59.
Set Operating Schedule

When you first power up your Touch Screen, you will need to change the operation schedule. Only Managers and Administrators can change the Operation Schedule. NOTE: The default schedule is 24/7 operation.

From the Settings Screen, touch the <Calendar> icon. The Schedule Screen will appear. See Figure 10.

From the Schedule Screen, select <Local Schedule>, The Schedule Options Screen will appear. See Figure 12.

Figure 12: Schedule Options Screen

You can set separate schedules for weekdays and weekends, set schedules for the entire week, set a 24 hour a day 7 day a week schedule, or create a custom day by day week schedule.

Weekday Schedule:

From the Schedule Options Screen, select <Weekdays>. The Weekdays Schedule Screen will appear. See Figure 13. The defaults are 0 in all fields. You can select two events per day. Select an hour and minute start time for Occupy 1 and an hour and minute stop time for Unoccupy 1. Repeat this for Occupy 2 and Unoccupy 2. All times are entered in military time format. When you have finished, press <Apply Settings> and then press <OK> to return to the Schedule Options Screen.

Weekend Schedule:

From the Schedule Options Screen, select <Weekend>. The Weekend Schedule Screen will appear. The defaults are 0 in all fields. You can select two events per day. Select an hour and minute start time for Occupy 1 and an hour and minute stop time for Unoccupy 1. Repeat this for Occupy 2 and Unoccupy 2. All times are entered in military time format. When you have finished, press <Apply Settings> and then press <OK> to return to the Schedule Options Screen.

7-Day Schedule:

From the Schedule Options Screen, select <7 Day>. The 7-Day Schedule Screen will appear. The defaults are 0 in all fields. You can select two events per day. Select an hour and minute start time for Occupy 1 and an hour and minute stop time for Unoccupy 1. Repeat this for Occupy 2 and Unoccupy 2. All times are entered in military time format. When you have finished, press <Apply Settings> and then press <OK> to return to the Schedule Options Screen.

24-7 Schedule:

From the Schedule Options Screen, select <24-7>. The 24-7 Schedule Screen will appear. Select the 24-7 schedule by touching the selection box to display a check mark. De-select the 24-7 schedule by leaving the selection box blank. When you have finished your selection, press <OK> to return to the Schedule Options Screen.

Custom Schedule:

From the Schedule Options Screen, select <Custom>. The Custom Schedule Screen will appear. The screen contains each day of the week. Select a day of the week from the menu and that day’s selection schedule will appear. The defaults are 0 in all fields. You can select two events per day. Select an hour and minute start time for Occupy 1 and an hour and minute stop time for Unoccupy 1. Repeat this for Occupy 2 and Unoccupy 2. All times are entered in military time format. When you have finished, press <Apply Settings> and then press <OK> to return to the Schedule Options Screen. When you have finished programming each desired weekday, press <Back> to return to the Schedule Options Screen.

If you don’t set a schedule for a certain day of the week, the equipment will not operate on that day.
**Configuration**

Press the `<Configuration>` icon on the Administrator Settings Screen to access the Configuration Screens. See Figures 14 & 15. There are two Configuration Screens and ten configuration categories.

Press the `<Next>` button to access the second screen. Press the `<Back>` button to access the previous screen. Press the `<Menu>` button to return to the Administrator Settings Screen.

![Configuration Screen 1](image1)

**Figure 14: Configuration Screen 1**

Press the configuration category you wish to access. See the Application Selection Screen in Figure 16 for an example of what a selection screen looks like.

![Configuration Screen 2](image2)

**Figure 15: Configuration Screen 2**

- **Application (Factory Set)**
  Touch the Square button to select the application you are using. Select one option. Press `<OK>` to save. The available selections are as follows:
    - Tstat — Thermostat Control — Standard 3rd Party Thermostat is used
    - CAV — Constant Air Volume Space Sensor Control — On-Board Space Sensor or AAON Touch Screen Space & Humidity Sensor

- **Fan Control (Factory Set)**
  Touch the square button to select the fan control you are using. Press `<OK>` to save. The available selections are as follows:
    - Single Speed — Single speed permanent-split capacitor
    - 2 Speed ECM — Low speed and high speed electronically commutated motor
    - Fan Proving Switch — Only select if using the Fan Proving Switch.

- **Fan Mode (Field Set)**
  Touch the Square button to select the fan mode you are using. Select one option. Press `<OK>` to save. The available selections are as follows:
    - OFF — Forces Fan off. Unit will not run with Cooling, Heating, and Dehumidification demands.
    - ON — Default. Forces Fan on during Occupied Mode.
    - AUTO — Fan Cycles on with Cooling, Heating, and Dehumidification modes. No Call = Fan Off.
CONFIGURATION SCREENS

Compressor Control (Factory Set)
Touch the Square button to select the type of compressor control you are using. Select one option. Press <OK> to save. The available selections are as follows:

- **Single ON/OFF** — This option is only for a single speed On/Off Compressor
- **2 Step** — This option is only for a single Two-Speed Compressor (uses Unloader technology)

Water Side Economizer (WSE) (Field Set)
Touch the square button to select the type of Water Side Economizer (WSE) control you are using. Select one option. Press <OK> to save. The available selections are as follows:

- **OFF** — Default. No Economizer. No Condenser Water Loop function.
- **COOL** — WSE Valve cycles on based on Cooling Entering Water Temperature Setpoints.
- **HEAT** — WSE Valve cycles on based on Heating Entering Water Temperature Setpoints.
- **COOL/HEAT** — Dual. WSE Valve cycles on based on Entering Water Temperature Setpoints of corresponding mode demand.

Electric Heat Control (Field Wired)
Touch the Square button to select the type of electric heat control you are using. Select one option. Press <OK> to save. The available selections are as follows:

- **OFF** — The W1 additional Heat Stage will not be used for external duct heat.
- **Auxiliary Heat** — The W1 heat output will be used as a supplemental stage of heating to the compressors. Duct Mounted Electric Aux Heat. Used to augment Compressor Heat
- **Emergency Heat** — The W1 heat output will be enabled when compressor heating is locked out and there is a demand for heating. There is no supply air control. Duct mounted Electric Emergency Heat. Used to replace Compressor Heat.

Dehumidification
Touch the square button to select the type of Dehumidification control you are using. Select one option. The available selections are as follows:

- **OFF** — No Reheat/Dehumidification
- **Fan Speed Dehum** — Runs compressor at full capacity and fan at low speed while in Dehumidification mode. Unit must be equipped with a two-step Compressor to use this feature.
- **Hot Gas Reheat** — Reheat will operate Cooling, Heating, and Economizer modes as a priority over Dehumidification Mode.

Touch the square button to select additional options. When you are finished, press <OK> to save. The available selections are as follows:

- **Dehum Priority** — Dehumidification will operate as a priority over Cooling, Heating, and Economizer modes.
- **Full Reheat** — For use when a Hot Gas Reheat coil is present in the unit. Should only be used for units in which the reheat coil is piped in series with the coaxial heat exchanger. Not for use in very early production units designed with the piping in parallel.
- **Parallel Reheat Piping** — This option applies only to very early production units ordered with Hot Gas Reheat, in which the reheat coil was piped in parallel with the coaxial heat exchanger.

Space Supply Reset (Field Set)
Touch the Square button to select Space Supply Reset. Select one or both options or neither option. Press <OK> to save. The available selections are as follows:

- **Cool Reset Enable** — Enables Space Supply Reset while in Cooling Mode.
- **Heat Reset Enable** — Enables Space Supply Reset while in Heating Mode.

Desuperheater Control
Touch the Square button to select Desuperheater control. Check the box to have Desuperheater On. Uncheck the box to leave Desuperheater Off. Press <OK> to save. The available selections are as follows:

- **Desuperheater On** — Check this box if using a Desuperheater Control Valve. Desuperheater uses Hot Leaving Water from the unit to heat domestic hot water tank.

Water Flow Sensor for Desuperheater
Touch the square button to select the type of water flow sensor you are using for Desuperheater. The AAON part number will be printed on the sensor or wiring diagram. Select one option. Press <OK> to save. The available selections are as follows:

- **No Sensor**
- **V97450**
- **V97460**
- **V97470**
- **V97480**
### SETPOINTS

#### Accessing & Entering Setpoints

### Accessing Setpoints

*Press the *<Setpoints>* icon on the *Settings Screen* to access the *Setpoints Screens*. See Figure 17. There are two Setpoint Screens and ten setpoint categories. Each setpoint category can have many setpoints.*

*Press the *<Menu>* button to return to the *Settings Screen*. Press the setpoint category you wish to access. See Figure 18 for the *Cooling Setpoints Screen* as an example.*

Select an individual setpoint from the setpoint category screen. The setpoint’s data entry screen will display. See Figure 19 for an example. *Press *<Back>* to return to the *Setpoints Screen*. The name of the setpoint will be displayed at the top of the screen. *Press the *<UP>* and/or *<Down>* arrows to change the value. *Press *<OK>* to save the value. *Press *<Cancel>* to exit without saving.* The system will return to the *Setpoint Category Screen*. Press *<Back>* to return to the *Setpoints Screen*. *

### Setpoint Values

Refer to the following for setpoint names and their min/max and defaults.

#### Cooling Setpoints

- **Occupied Cooling**—Sets the Cooling Setpoint. Default: 74°F; Range: 55-85°F
- **Unoccupied Cooling**—Sets the Unoccupied Cooling Setpoint. Default: 79°F; Range: 55-85°F
- **Cooling Enable Deadband**—How far away from Setpoint to generate or remove Call. Default: 1°F; Range: 1-5°F
- **Supply Air Cooling Setpoint**—Default: 55°F; Range: 45-65°F
- **Space Supply Cool Reset Setpoints**
  - **Space Hi Reset**—If Space is at or above this value, SAT is at High Reset Value. Default: 75°F; Range: 55-85°F
  - **Space Lo Reset**—If Space is at or below this value, SAT is at Low Reset Value. Default: 72°F; Range: 55-85°F
  - **Supply Hi Reset**—High Supply Air Setpoint. Default: 57°F; Range: 45-65°F
  - **Supply Lo Reset**—Low Supply Air Setpoint. Default: 53°F; Range: 45-65°F
Heating Setpoints

- **Occupied Heating**—Sets the Heating Setpoint. Default: 70°F; Range: 55-85°F
- **Unoccupied Heating**—Sets the Unoccupied Heating Setpoint. Default: 65°F; Range: 55-85°F
- **Heating Enable Deadband**—How far away from Setpoint to generate or remove Call. Default: 1°F; Range: 1-5°F
- **Supply Air Heating Setpoint**—Default: 90°F; Range: 55-120°F
- **Auxiliary Heat Deadband**—Space Temp has to be this far below setpoint before Aux Heat can energize. Default: 5°F; Range: 1-10°F
- **Space Supply Heat Reset Setpoints**
  - **Space Hi Reset**—If Space is at or above this value, SAT is at High Reset Value. Default: 72°F; Range: 55-85°F
  - **Space Lo Reset**—If Space is at or below this value, SAT is at Low Reset Value. Default: 69°F; Range: 55-85°F
  - **Supply Hi Reset**—High Supply Air Setpoint. Default: 100°F; Range: 55-120°F
  - **Supply Lo Reset**—Low Supply Air Setpoint. Default: 90°F; Range: 55-120°F

Dehumidification Setpoints

- **Dehumidification Enable**—If Space RH is above this value, Unit will go into Dehumidification Mode. Default: 50%; Range: 40-100%
- **Dehumidification Lockout**—If the Space Temp is below this value, the Dehumidification will be locked out. Default: 55°F; Range: 35-75°F
- **Suction Temperature Setpoint**—In the Dehum mode, the controller will try to maintain this Suction Temperature. Default: 45°F; Range: 40-60°F

Economizer Setpoints

- **Economizer Cooling Enable**—If Entering Water Temperature is Below this value, the Economizer can be used for “Free” Cooling. Default: 45°F; Range: 45-60°F
- **Economizer Heating Enable**—If the Entering Water Temperature is Above this value, the Economizer can be used for “Free” Heating. Default: 85°F; Range: 75-90°F

Compressor Setpoints

- **Minimum On Time**—Compressor must run this much time before it can turn off. Default: 180 seconds; Range: 120-255 seconds
- **Minimum Off Time**—Compressor must remain off this much time before it can turn on. Default: 120 seconds; Range: 60-255 seconds
- **Interstage On Delay**—If Stage 1 is energized, the controller must wait this much time before turning on Stage 2. Default: 60 seconds; Range: 30-255 seconds
- **Interstage Off Delay**—If Stage 2 is energized, the controller must wait this much time before turning off Stage 2. Default: 60 seconds; Range: 30-255 seconds

Supply Fan Setpoints

- **Supply Fan Minimum Speed**—This is the Low Fan Speed setting for a 2 Speed ECM Fan. Default: 40%; Range: 40-100%
- **Supply Fan Maximum Speed**—This is the High Fan Speed setting for a 2 Speed ECM Fan. Default: 100%; Range: 35-100%

CO2 Setpoints

- **CO2 Override**—If CO2 is above this value, the OA damper will be opened. Default: 900ppm; Range: 500-1500ppm

Glycol Percentage

- **Glycol Percentage**—This is the percentage of Glycol mixed in the Loop water. It is needed to calculate Lockout setpoints. Default: 0%; Range: 0-40%

Water Valve Opening Delay

This is the amount of time that the Water Valve needs to be open before Compressor operation is allowed. Default: 30 seconds; Range: 5-75 seconds

Space Sensor Maximum Setpoint Offset

This setpoint limits how much the user can adjust the Cooling and Heating setpoints above and below the Room Sensor temperature. Default: 0°F; Range: +/-10°F
USB FUNCTIONS

Updating Firmware & Setpoints Using USB

USB Screen

From the Administrator Settings Screen, press the &lt;USB&gt; icon. The USB Screen will appear. See Figure 20. This screen provides you with options to update the controller’s firmware, upload setpoints, and download setpoints.

Figure 20: USB Screen

3. Once power is restored, the LED (D7) located above the User Reset button should blink red no more than 5 times total as it checks the USB port at startup. If it is detected, the LED should turn solid green and then after several moments should flash green to indicate the download is in process.

4. Once complete, the controller should be running the new version, at which time you can remove the jump drive.

5. Verify the firmware version in the About Screen by accessing the &lt;About&gt; icon.

Download Setpoints to USB:

Once you have all of your setpoints and configurations set up for your jobsite, it’s a good idea to save them in a file. Plug your USB flash drive into the USB port of the controller and select &lt;Setpoints to USB&gt;. You can then use the file created to restore setpoints or copy setpoints from one controller to another.

Upload Setpoints:

Once you have your setpoints saved to USB, you can upload the setpoints to another controller or restore setpoints to a replacement controller. Plug your USB flash drive containing the setpoint file into the USB port of the controller and select &lt;USB Setpoint Upload&gt;.

To Update the Firmware:

Once you obtain the firmware update from AAON Technical Support, download it onto a USB flash drive. There are two ways to update the firmware—(1) Plug the USB flash drive into the USB port on the board and select &lt;Firmware Update&gt; from the USB Screen OR (2) Plug the USB Flash Drive into the USB port and cycle power to the controller. Either way, the firmware will automatically update. Verify the firmware version in the About Screen by accessing the &lt;About&gt; icon. See page 20 for the About Screen. Follow the detailed instructions below to update the firmware:

1. To install the new firmware, copy the firmware update file from AAON Technical Support directly onto the root directory of a totally empty USB jump drive. The name of the firmware file will always include the version number and will have a *.bin extension. **NOTE:** Do not rename the file.

2. Insert the USB jump drive into the USB port of the Pioneer Gold Controller and cycle power to the Controller or select &lt;Firmware Update&gt; from the USB Screen and this option will automatically cycle power to the controller.
Network Information

From the Administrator Setting Screen, press the <Network> icon. The Network Screen will appear. See Figure 21.

This screen allows you to setup network information for MODBUS, BACnet, and other network communications.

This information can be obtained from your BAS Administrator and can be useful when contacting AAON Technical Support.

This screen contains the following categories—Protocol, Baud Rate, Word Length, Parity, Stop Bits, MAC Address, and Device ID. After making your selection from each category’s screen, press the <OK> button to return to the Network Screen.

**Figure 21: Network Information Screen**

**Protocol**—Select BACnet MS/TP, Modbus RTU, or None. Default is Modus.

**Baud Rate**—9600, 19200, 38400, 57600, 76800. Default is 19200.

**Word Length**—For Technical Support use only.

**Parity**—For Technical Support use only.

**Stop Bits**—For Technical Support use only.

**MAC Address**—Use the up and down buttons to enter the BACnet® MAC address. Default is 27.0. Valid range is 0 to 127.

**Device ID**—Valid range is 0 to 4194302. Default is 27.
INPUTS & OUTPUTS

Viewing Inputs & Outputs

Input Status

From the Main Screen, press the <Inputs> icon. The Input 1 Status Screen will appear. See Figure 22.

The setpoint values are displayed on each screen. For digital inputs, the status should be Normal unless there is an alarm. If there is an alarm, the word Alarm will appear in red.

There are four Input Status Screens. See Figures 22-25. Press the <Next> button to access each screen. Press the <Back> button to access the previous screen. Press the <Menu> button to return to the Main Screen.

Figure 22: Input 1 Status Screen

Figure 23: Input 2 Status Screen

Figure 24: Input 3 Status Screen

Figure 25: Input 4 Status Screen
Output Status

From the Main Screen, press the Outputs icon. The Output 1 Status Screen will appear. See Figure 26. See Figure 27 for Output 2 Status Screen. The output values or status are displayed on each screen.

Press the Next button to access the second screen. Press the Back button to access the first screen. Press the Menu button to return to the Main Screen.

Figure 26: Output 1 Status Screen

Figure 27: Output 2 Status Screen

Alarms Status

From the Main Screen, press the Alarms icon. The Alarm 1 Status Screen will appear. See Figure 28. There are three Alarm Status Screens. Press the Next button to access each screen. Press the Back button to access the previous screen. Press the Menu button to return to the Main Screen.

The status for each alarm should be Ready or Normal. If there is an alarm, the word Alarm will appear in red. The abbreviation L.O. in red stands for “Locked Out”. This means that there is currently 1 or more alarms active, and any item that shows L.O. is conveying that this particular item(s) is/are being affected by the particular alarm. Continue scrolling through the ALARMS pages until you see the item that shows “ALARM” to identify which item is in alarm state causing associated items to be Locked Out.

Figure 28: Alarms 1 Status Screen

Figure 29: Alarms 2 Status Screen
**Troubleshooting**

### Care

The Pioneer Gold Touch Screen comes equipped with a thin protective film over the LCD screen. You can remove this protective cover if you so desire. The LCD display should be cleaned with a soft, dust-free cloth. Do not use any liquid to clean your touch screen.

### Technical Support

Call (918) 382-6450 to talk to an AAON Factory Technical Support Representative or email techsupport@aaon.com. Support is available Monday through Friday, 7:00 AM to 6:00 PM, central standard time.

**NOTE:** Before calling or emailing Technical Support, please have the model and serial number of the unit available.

### About

From the **Main Screen**, press the `<About>` icon. The **About Screen** will appear. See **Figure 30**. This screen provides you with manufacturer information, the name of the board, the processor information, the CPU speed, the password reset key, and the firmware version.

This information may be useful when contacting AAON Technical Support for help with your touch screen or the controller.

**Figure 30: About Screen**
24-Hour Conversion Time Table

The main difference between regular and 24-hour time is how hours are expressed. Regular time uses numbers 1 to 12 and a.m. and p.m. to identify each of the 24 hours in a day. In 24-Hour time, the hours are numbered from 0000 to 2300.

24-hour time is based on a 24-hour day. Hours are numbered 0000 through 2300 and are recorded first. The last two digits indicate the minute after the hour. 24-hour time does not exceed 2359 hours. For example, midnight is recorded as 0000; one minute past midnight is 0001; 1 a.m. is 0100, 1 p.m. is 1300, and so on.

Regular and 24-hour time express minutes and seconds in exactly the same way. When converting from regular to 24-hour time and vice versa, the minutes and seconds do not change.

Regular time requires the use of a.m. and p.m. to clearly identify the time of day. Since 24-hour time uses a unique two-digit number to identify each of the 24 hours in a day, a.m. and p.m. are unnecessary.

The following table summarizes the relationship between regular and 24-hour time.

<table>
<thead>
<tr>
<th>Regular Time</th>
<th>24-Hour Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>12:00 a.m.</td>
<td>0000</td>
</tr>
<tr>
<td>12:30 a.m.</td>
<td>0030</td>
</tr>
<tr>
<td>1:00 a.m.</td>
<td>0100</td>
</tr>
<tr>
<td>1:30 a.m.</td>
<td>0130</td>
</tr>
<tr>
<td>2:00 a.m.</td>
<td>0200</td>
</tr>
<tr>
<td>2:30 a.m.</td>
<td>0230</td>
</tr>
<tr>
<td>3:00 a.m.</td>
<td>0300</td>
</tr>
<tr>
<td>3:30 a.m.</td>
<td>0330</td>
</tr>
<tr>
<td>4:00 a.m.</td>
<td>0400</td>
</tr>
<tr>
<td>4:30 a.m.</td>
<td>0430</td>
</tr>
<tr>
<td>5:00 a.m.</td>
<td>0500</td>
</tr>
<tr>
<td>5:30 a.m.</td>
<td>0530</td>
</tr>
<tr>
<td>6:00 a.m.</td>
<td>0600</td>
</tr>
<tr>
<td>6:30 a.m.</td>
<td>0630</td>
</tr>
<tr>
<td>7:00 a.m.</td>
<td>0700</td>
</tr>
<tr>
<td>7:30 a.m.</td>
<td>0730</td>
</tr>
<tr>
<td>8:00 a.m.</td>
<td>0800</td>
</tr>
<tr>
<td>8:30 a.m.</td>
<td>0830</td>
</tr>
<tr>
<td>9:00 a.m.</td>
<td>0900</td>
</tr>
<tr>
<td>9:30 a.m.</td>
<td>0930</td>
</tr>
<tr>
<td>10:00 a.m.</td>
<td>1000</td>
</tr>
<tr>
<td>10:30 a.m.</td>
<td>1030</td>
</tr>
<tr>
<td>11:00 a.m.</td>
<td>1100</td>
</tr>
</tbody>
</table>

Table 6, cont.: 24-Hour Time Conversion

<table>
<thead>
<tr>
<th>Regular Time</th>
<th>24-Hour Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>11:30 a.m.</td>
<td>1130</td>
</tr>
<tr>
<td>12:00 p.m.</td>
<td>1200</td>
</tr>
<tr>
<td>12:30 p.m.</td>
<td>1230</td>
</tr>
<tr>
<td>1:00 p.m.</td>
<td>1300</td>
</tr>
<tr>
<td>1:30 p.m.</td>
<td>1330</td>
</tr>
<tr>
<td>2:00 p.m.</td>
<td>1400</td>
</tr>
<tr>
<td>2:30 p.m.</td>
<td>1430</td>
</tr>
<tr>
<td>3:00 p.m.</td>
<td>1500</td>
</tr>
<tr>
<td>3:30 p.m.</td>
<td>1530</td>
</tr>
<tr>
<td>4:00 p.m.</td>
<td>1600</td>
</tr>
<tr>
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<td>1630</td>
</tr>
<tr>
<td>5:00 p.m.</td>
<td>1700</td>
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<tr>
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<td>1730</td>
</tr>
<tr>
<td>6:00 p.m.</td>
<td>1800</td>
</tr>
<tr>
<td>6:30 p.m.</td>
<td>1830</td>
</tr>
<tr>
<td>7:00 p.m.</td>
<td>1900</td>
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<tr>
<td>7:30 p.m.</td>
<td>1930</td>
</tr>
<tr>
<td>8:00 p.m.</td>
<td>2000</td>
</tr>
<tr>
<td>8:30 p.m.</td>
<td>2030</td>
</tr>
<tr>
<td>9:00 p.m.</td>
<td>2100</td>
</tr>
<tr>
<td>9:30 p.m.</td>
<td>2130</td>
</tr>
<tr>
<td>10:00 p.m.</td>
<td>2200</td>
</tr>
<tr>
<td>10:30 p.m.</td>
<td>2230</td>
</tr>
<tr>
<td>11:00 p.m.</td>
<td>2300</td>
</tr>
<tr>
<td>11:30 p.m.</td>
<td>2330</td>
</tr>
</tbody>
</table>