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.
This manual is divided into two parts: The Controller Technical Guide—Part 1 and the Operator Interface—Part 2.

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.

<table>
<thead>
<tr>
<th>PART DESCRIPTION</th>
<th>AAON PART NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pioneer Gold Controller</td>
<td>V94730</td>
</tr>
<tr>
<td>Pioneer Gold Electric Heat Board</td>
<td>V98550</td>
</tr>
<tr>
<td>Pioneer Gold Touch Screen Space Temperature &amp; Humidity 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</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>
</tbody>
</table>
# TABLE OF CONTENTS

## OVERVIEW ................................................................................................................................. 6
- Safety ........................................................................................................................................... 6
- Applications ............................................................................................................................... 7
- Features and Options .................................................................................................................. 8
- Pioneer Gold Part Numbers ......................................................................................................... 9
- WH & WV Series Harness Part Numbers .................................................................................... 10

## INSTALLATION & WIRING ........................................................................................................... 11
- Important Wiring Considerations .................................................................................................. 11
- Controller Connections, Jumpers & Switches ............................................................................... 12
- Controller Terminals & Harnesses ................................................................................................ 13
- Controller & Expansion Module Inputs & Outputs ......................................................................... 14
- Pioneer Gold Controller Wiring .................................................................................................... 15
- Pioneer Gold Touch Screen Space & Humidity Sensor Wiring ....................................................... 16

## SPACE / ROOM SENSOR CONTROLLED SEQUENCE OF OPERATIONS ........................................ 17
- Random Start Delay .................................................................................................................... 17
- Occupancy / Supply Fan Status ................................................................................................... 17
  - Occupied Mode ......................................................................................................................... 17
  - Unoccupied Mode ...................................................................................................................... 17
- Supply Fan Operation .................................................................................................................. 17
  - Ventilation Mode ...................................................................................................................... 17
- Supply Fan Motors Operation ..................................................................................................... 17
  - Single Speed Permanent Split Capacitor (PSC) or Electronically Commutated Motor (ECM) ... 17
  - Two-Speed Electronically Commutated Motor (ECM) ............................................................. 17
  - Variable Speed Electronically Commutated Motor (ECM) ........................................................ 17
- Supply Fan Control Operation .................................................................................................... 18
  - Constant Air Volume (CAV) ...................................................................................................... 18
- Compressor Operation ................................................................................................................ 18
  - On/Off Compressor (Scroll or Rotary) ....................................................................................... 18
  - Stage Up Sequence .................................................................................................................... 18
  - Stage Down Sequence ............................................................................................................... 18
- Space Supply Reset ..................................................................................................................... 19
- Cooling .......................................................................................................................................... 19
- Heating ......................................................................................................................................... 19
- Reversing Valve Operation .......................................................................................................... 20
- Electric Heat Operation ............................................................................................................... 20
  - External Duct Heaters .............................................................................................................. 20
- Waterside Economizer Operation ................................................................................................. 20
  - On/Off Waterside Economizer Coil Operation ........................................................................ 20
- Cool Only Operation .................................................................................................................... 20
- Heat Only Operation ..................................................................................................................... 20
- Dual Operation ............................................................................................................................ 21
- Dehumidification Operation ........................................................................................................ 21
  - Fan Speed Dehumidification ..................................................................................................... 21
  - Hot Gas Reheat Dehumidification .............................................................................................. 21
- Additional Features ..................................................................................................................... 21
  - Outdoor Air Damper Operation ................................................................................................ 21
  - CO₂ Control Override ............................................................................................................... 21
TABLE OF CONTENTS

THERMOSTAT CONTROLLED SEQUENCE OF OPERATIONS ................................................................. 22
- Random Start Delay .......................................................................................................................... 22
- Occupancy / Supply Fan Status ........................................................................................................ 22
  - Normal/Occupied Mode .................................................................................................................. 22
  - Night Setback Mode ...................................................................................................................... 22
- Supply Fan Operation ........................................................................................................................ 22
  - Single Speed Permanent Split Capacitor (PSC) or Electronically Commutated Motor (ECM) .... 22
  - Two-Speed Electronically Commutated Motor (ECM) ................................................................. 22
  - CFM Controlled Electronically Commutated Motor (ECM) ......................................................... 22
- Compressor Operation ....................................................................................................................... 23
- Reversing Valve Operation ................................................................................................................ 23
- Electric Heat Operation .................................................................................................................... 23
  - External Duct Heater(s) ................................................................................................................ 23
  - Integral Heat (Expansion Module) ............................................................................................... 23
- Waterside Economizer Operation ..................................................................................................... 24
  - On/Off Water Side Economizer Coil Operation ............................................................................ 24
  - Cool Only Operation ..................................................................................................................... 24
  - Heat Only Operation ..................................................................................................................... 24
  - Dual Operation ............................................................................................................................... 24
- Dehumidification Operation ............................................................................................................. 25
  - Fan Speed Dehumidification ........................................................................................................ 25
  - Hot Gas Reheat Dehumidification ................................................................................................. 25
- Additional Features ........................................................................................................................... 25
  - Outdoor Air Damper Operation .................................................................................................... 25
  - CO₂ Control Override .................................................................................................................... 25

ALARMS ......................................................................................................................................... 26
- Automatic Reset Alarms ................................................................................................................... 26
- Lock Out Alarms ............................................................................................................................... 27

TROUBLESHOOTING ..................................................................................................................... 28
- LED Diagnostics ............................................................................................................................... 28
- Controller LED Locations ............................................................................................................... 29

BACNET® ....................................................................................................................................... 30
- Connection to MS/TP Network ......................................................................................................... 30
- BACnet® Parameters ....................................................................................................................... 31
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.

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**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 AAON® Pioneer Gold Controller with Touch Screen interface and 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 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.

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.

Pioneer Gold Controller advantages include:

- On-Board Configuration Touchscreen Interface with Two Levels of Security
- PSC or ECM Fan Control
- Rotary or Scroll Compressor Control
- Hot Gas Reheat Dehumidification Control
- Waterside Economizer Control
- Two Stage Fan Control
- Two-Step Compressor Control
- Two Stage Auxiliary or Emergency Heat Control
- Occupancy Scheduling
- Night Setback Operation
- High Condensate Level Sensor
- Motorized Water Valve Control
- Variable Speed Pump Control
- Status and Alarm LEDs
- Emergency Shutdown Input
- Hot Water Valve Control
- CO₂ Alarm
- CO₂ Setpoint Outside Air Damper Override
- 7-Day, 2-Event-per-Day Scheduling
- On-board BACnet® port for connection to an MS/TP network
## Features and Options

Refer to Table 1 for a list of Pioneer Gold features and options.

### Table 1: Pioneer Gold Features & Options

<table>
<thead>
<tr>
<th>Feature Category</th>
<th>Features/Options</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Unit Capacity Control</strong></td>
<td>½ to 30 ton WSHPs</td>
</tr>
<tr>
<td><strong>User Interface</strong></td>
<td>2.8” Touchscreen LCD Color Interface</td>
</tr>
<tr>
<td><strong>Stand-Alone Capability</strong></td>
<td>Stand Alone with Space Sensors or Thermostat Terminals</td>
</tr>
<tr>
<td><strong>Networking Capability</strong></td>
<td>Built-In BACnet® MS/TP</td>
</tr>
<tr>
<td><strong>Basic Features</strong></td>
<td>Thermostat Control, Random Start Delay, Compressor Minimum On/Off Timers, High Condensate Level Sensor, High Refrigerant Pressure Protection, Loss of Refrigerant Charge Protection, Reversing Valve Default to Heating Mode, Dry Alarm Contacts, Emergency Shutdown Input, Night Setback Mode, Night Setback Override, Thermostat Input, Auxiliary Alarm Input, I/O Status LEDs</td>
</tr>
<tr>
<td><strong>Basic Alarms</strong></td>
<td>High/Low Control Voltage Alarms (24 VAC), Air Coil Low Refrigerant Temperature Alarm, Low Leaving Water Temperature Alarm</td>
</tr>
<tr>
<td><strong>Advanced Alarms</strong></td>
<td>Space Sensor Alarm, Entering Hot Water Temperature Alarm, CO₂ Alarm, Water Flow Alarm, Air Flow Alarm</td>
</tr>
<tr>
<td><strong>Service and Reliability Features</strong></td>
<td>Fault and Status Indicator LED, Factory Wiring Harness Connectors, High/Low Control Voltage Lockout (Auto Reset), Alarm and Relay Status LEDs, Alarm Status - LCD Interface</td>
</tr>
<tr>
<td><strong>Advanced Features</strong></td>
<td>Waterside Economizer Operation, Two-Speed EC Fan Operation, Hot Gas Reheat Mode, Two-Step Compressor Operation, Motorized Water Valve Control, CAV Operation, Externally Controlled EC Motor (0-10VDC or PWM Signal), Supply Air Temperature (SAT) Staging Control, Supply Air Reset Control, Hot Water Coil Control, Modulating Motorized Hot Water Valve Control, Two Stage Auxiliary/Emergency Heat, CO₂ Setpoint Control of Outside Air Damper, Variable Speed Pump Control, BACnet® Compliant, Compressor Signal LED, Alarm Mode Indicator LED, 2.8” Color Touchscreen LCD Interface, Space Sensor Control, 4.3” Color Pioneer Gold Touchscreen Space Temperature and Humidity Sensor (Optional)</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</td>
</tr>
<tr>
<td>Pioneer Gold I/O Board</td>
<td>V88610</td>
</tr>
<tr>
<td>Pioneer Gold CPU Board</td>
<td>V89940</td>
</tr>
<tr>
<td>Pioneer Gold LCD Board</td>
<td>V89950</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</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 for WH & WV series harness part numbers.

### WH SERIES PIONEER GOLD 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 3: WSHP WH Unit Harness Part Numbers

### WV SERIES PIONEER GOLD 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>

Table 4: WSHP WV Unit Harness Part Numbers
**General**

Correct wiring of the Pioneer Gold Controller 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, no matter if it was factory or field wired.

**Controller Mounting & Dimensions**

When the controller is to be field mounted, it is important to mount the controller in a location that is free from extreme high or low temperatures, moisture, dust, and dirt. See Table 5 for a list of the required operating conditions for the Pioneer Gold Controller.

The Pioneer Gold Controller is designed to be mounted via the 4 shoulder eyelets located on the corners of the circuit board. Be careful not to damage the electronic components when mounting the controller. The Pioneer Gold Controller dimensions are 8” x 5.5”.

**Electrical & Environmental Requirements**

The Pioneer Gold Controller and electric heat expansion module 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></td>
<td>24VAC (25%/ -15%), Class 2</td>
<td>75*</td>
<td>32°F to 158°F (0°C to 70°C)</td>
<td>0-85% RH</td>
<td>-4°F to 158°F (-20°C to 70°C)</td>
</tr>
<tr>
<td>Inputs</td>
<td>Resistive Inputs require 10K Type 3 Thermistor</td>
<td>24VAC Inputs provide 4.7kΩ Load</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outputs</td>
<td>Relay Outputs: 1 Amp maximum per output. All Outputs combined: 2.5 Amp maximum</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

Table 5: Electrical and Environmental Requirements

**WARNING:** When using a single transformer to power more than one controller or expansion module, 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 expansion module.

Please carefully read and apply the following information when wiring the Controller and the Expansion Module.

1. All wiring is to be in accordance with local and national electrical codes and specifications.
2. All 24 VAC 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 VAC 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 VAC 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/WattMaster can supply communication wire that meets this specification and is color coded for the network or local loop. Please consult your AAON/WattMaster 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 first powered up, the POWER LED should light up and stay on continuously. If it does not light up, check to be sure that you have 24 VAC connected to the controller, that the wiring connections are tight, and that they are wired for the correct polarity. The 24 VAC power must be connected so that all ground wires remain common. If after making all these checks, the POWER LED does 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
## Input/Output Map

See Table 6 for Pioneer Gold Controller Input/Outputs.

### PIONEER GOLD CONTROLLER

#### DIGITAL INPUTS

<table>
<thead>
<tr>
<th>G</th>
<th>Fan Call (TSTAT)</th>
</tr>
</thead>
<tbody>
<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</td>
</tr>
</tbody>
</table>

#### ANALOG INPUTS

<table>
<thead>
<tr>
<th>SPT</th>
<th>Suction Pressure</th>
</tr>
</thead>
<tbody>
<tr>
<td>DPT</td>
<td>Discharge Pressure</td>
</tr>
<tr>
<td>EWT</td>
<td>Entering Water Temperature</td>
</tr>
<tr>
<td>LWT</td>
<td>Leaving Water Temperature</td>
</tr>
<tr>
<td>ECT</td>
<td>Evaporator Coil Temperature</td>
</tr>
<tr>
<td>HWT</td>
<td>Entering Hot Water Temperature</td>
</tr>
<tr>
<td>SAT</td>
<td>Supply Air Temperature</td>
</tr>
<tr>
<td>SPAT</td>
<td>Space Temperature</td>
</tr>
<tr>
<td>CO2</td>
<td>Space CO2</td>
</tr>
</tbody>
</table>

#### MODBUS INPUTS

| SPAT | Space Temperature |
| SPAH | Space Humidity |

#### UNIVERSAL INPUTS

| SPARE | Spare |
| SPARE | Spare |
| SPARE | Spare |
| SPARE | Spare |

### DIGITAL OUTPUTS (24 VAC)

| R/C | Thermostat Power (TSTAT) |
| ALM | Alarm Output |
| ALM/ALM2 | Alarm Dry Contact Output |
| Fan/Fan_G | Supply Fan Enable |
| Fan2/Fan_G | Supply Fan Stage 2 Enable |
| Y1/Y1_G | Compressor Stage 1 |
| Y2/Y2_G | Compressor Stage 2 |
| Y3/Y3_G | Compressor Stage 3 |
| RV/RV_G | Reversing Valve |
| W1/W_G | Electric Heat Stage 1 |
| MV/MV_G | Motorized Water Valve/Pumps |
| HG/HG_G | HGRH Valve |
| WSE/WSE_G | WSE Valve |
| SPARE | Spare |

#### ANALOG OUTPUTS (0-10 VDC)

| SFS | Supply Fan Speed (SFS) |
| PUMP | Variable Speed Pump (PUMP) |
| MWV | Modulating Water Valve On/Off (MWV) |
| OVR | CO2 Damper Override (DMP OVR) |
| SPARE | Spare |

#### COMMUNICATION TERMINALS

| R/C | Extra Power Terminals |
| BACNET | BACnet MS/TP Terminal |
| TSTAT | Pioneer Gold Touch Screen Space / RH Temperature Sensor |

#### EXPANSION BOARD INPUTS

| AFS | Proof of Airflow Switch |

#### EXPANSION BOARD OUTPUTS

| W1 | Electric Heat Stage 1 |
| W2 | Electric Heat Stage 2 |

---

Table 6: Pioneer Gold Inputs & Outputs
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.

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**Figure 3: Pioneer Gold Controller Wiring**

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Pioneer Gold Controller Technical Guide
Figure 4: 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.
**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.) Remote Forced Occupied (normally open contact, NSB)
3.) 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** – Default. To run continuously.
- **Auto** – 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.
SEQEUNCE OF OPERATIONS

Space/Room Sensor Control Compressor Operation

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.

On/Off Compressor (Scroll or Rotary)

In Cooling or Heating Mode, the compressor will be enabled. There is no Supply Air Temperature Control.

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.
Space-Supply Reset

Space-Supply 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.
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 Random Start, Supply Fan

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 EC (Electronically Commutated) Motor
With a single speed PSC or EC motor, 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.)
**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 (Expansion Module)**

Integral Electric Heat Inputs and Outputs will be contained within an expansion module. 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.
SEQUENCE OF OPERATIONS
Thermostat Controlled Waterside Economizer

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 24V AC 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.

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.

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.
**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 the 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.

Leaving Water Temperature Alarm

The Leaving Water Temperature Alarm will trigger if the leaving water temperature becomes too cold or becomes out of range. 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.

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 airflow 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.

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.

Low Suction Pressure Alarm
The Low Suction Pressure Alarm will enable if the low pressure switch opens at 30PSI for more than 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 switch is open. If the alarm is enabled 2 times within 2 hours there will be a 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 5, page 27 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** - This red LED will light up and blink continuously to indicate there is MODBUS communications.

**BACNET** - This red LED will light up and blink continuously to indicate BACnet® 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** - Hot Water Valve / Heat Pump LED — This green LED will light up when the Hot Water Valve relay is modulating.

**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 5: Pioneer Gold Controller LED Locations
PIONEER GOLD CONTROLLER

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 A- To A-, S (G) To S (G) & 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 6: BACnet Connection to MS/TP Network
<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>Leaving Water Temp</td>
<td>Temperature of the loop water leaving the water coil</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>
<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>
</tbody>
</table>
### 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: 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 2</td>
<td>Secondary temperature sensor of the loop water leaving the water coil</td>
<td>Fahrenheit</td>
</tr>
<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>
</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 input terminal</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>
<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>
</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: 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>
Pioneer Gold Touch Screen Operator Interface

Pioneer Gold Controller Code: Version 1.1
Used with AAON WSHP WV Series Vertical and WH Series Horizontal
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>OVERVIEW</td>
<td>3</td>
</tr>
<tr>
<td>NAVIGATION</td>
<td>4</td>
</tr>
<tr>
<td>- Main Screen Icons Functions</td>
<td>4</td>
</tr>
<tr>
<td>- Manager Settings Screens Icons and Functions</td>
<td>4</td>
</tr>
<tr>
<td>- Administrator Settings Screens Icons and Functions</td>
<td>5</td>
</tr>
<tr>
<td>- Navigation Buttons</td>
<td>5</td>
</tr>
<tr>
<td>- Configuration Buttons</td>
<td>5</td>
</tr>
<tr>
<td>MAIN SCREEN</td>
<td>6</td>
</tr>
<tr>
<td>ADMINISTRATOR STEP-BY-STEP GUIDE</td>
<td>6</td>
</tr>
<tr>
<td>SETTINGS SCREENS</td>
<td>7</td>
</tr>
<tr>
<td>- Logging In</td>
<td>7</td>
</tr>
<tr>
<td>- Editing Passcodes</td>
<td>8</td>
</tr>
<tr>
<td>- Setting The Time and Date</td>
<td>10</td>
</tr>
<tr>
<td>- Setting Schedules</td>
<td>11</td>
</tr>
<tr>
<td>CONFIGURATIONS</td>
<td>12</td>
</tr>
<tr>
<td>SETPOINTS</td>
<td>14</td>
</tr>
<tr>
<td>USB FUNCTIONS</td>
<td>1</td>
</tr>
<tr>
<td>NETWORK SETTINGS</td>
<td>17</td>
</tr>
<tr>
<td>INPUTS AND OUTPUTS STATUS</td>
<td>18</td>
</tr>
<tr>
<td>ALARM STATUS</td>
<td>19</td>
</tr>
<tr>
<td>TROUBLESHOOTING</td>
<td>20</td>
</tr>
<tr>
<td>APPENDIX</td>
<td>21</td>
</tr>
<tr>
<td>- Military Time Conversion</td>
<td>21</td>
</tr>
</tbody>
</table>

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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.

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AAON, Inc.
2425 So. Yukon Ave • Tulsa, OK 74107-2728
Ph: (918) 583-2266 • Fax: (918) 583-6094

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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
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>&lt;Occupied/Unoccupied&gt;</td>
<td>The &lt;Occupied/Unoccupied&gt; icon is darkened to show Occupied and lightened to show Unoccupied.</td>
</tr>
<tr>
<td>&lt;Operation Mode&gt;</td>
<td>The &lt;Operation Mode&gt; icon will display at the top right of the Main Screen. It will display a flame for Heating Mode, a snowflake for Cooling 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>&lt;Inputs&gt;</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>&lt;Outputs&gt;</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>&lt;Alarms&gt;</td>
<td>The &lt;Alarms&gt; icon takes you to the Alarms Screens. The Alarm Screens display the status of all possible alarms.</td>
</tr>
<tr>
<td>&lt;Settings&gt;</td>
<td>The &lt;Settings&gt; icon is password protected. Only a qualified user can access the Settings Screen. The Settings Screen categories are described in Table 2.</td>
</tr>
<tr>
<td>&lt;About&gt;</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>

Table 1, cont.: Main Screen Categories & Functions

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>&lt;Clock&gt;</td>
<td>The &lt;Clock&gt; icon takes you to the Set Clock Screen. This is one of the first things you should do—set the correct time—if you notice the time display is wrong at the top of the Main Screen and Settings Screen.</td>
</tr>
<tr>
<td>&lt;Schedule&gt;</td>
<td>The &lt;Schedule&gt; icon takes you to the Set Schedule Screen. This screen allows you to do two things—set the current date and set the desired schedule for the controller.</td>
</tr>
<tr>
<td>&lt;Setpoints&gt;</td>
<td>The &lt;Setpoints&gt; icon takes you to the Setpoints Screen where you can access and change setpoints.</td>
</tr>
<tr>
<td>&lt;USB&gt;</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 <code>&lt;Security&gt;</code> 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 <code>&lt;Configuration&gt;</code> icon takes you to the Configuration Screens where you can access and change configurations.</td>
</tr>
<tr>
<td>Network</td>
<td>The <code>&lt;Network&gt;</code> icon displays Network information where you can access and change network configurations</td>
</tr>
</tbody>
</table>

**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 <code>&lt;Home&gt;</code> key to return to the Main Screen.</td>
</tr>
<tr>
<td>Menu</td>
<td>Use the <code>&lt;Menu&gt;</code> key to return to the Settings Screen.</td>
</tr>
<tr>
<td>Back</td>
<td>Use the <code>&lt;Back&gt;</code> button to return to the previous screen.</td>
</tr>
<tr>
<td>Next</td>
<td>Use the <code>&lt;Next&gt;</code> button to advance to the next screen.</td>
</tr>
<tr>
<td>Cancel</td>
<td>Use the <code>&lt;Cancel&gt;</code> 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 <code>&lt;OK&gt;</code> key to save the data you just selected or entered.</td>
</tr>
<tr>
<td>Back</td>
<td>Use the <code>&lt;Back&gt;</code> button on a number keypad to delete data - back up.</td>
</tr>
<tr>
<td>Apply settings</td>
<td>Use the <code>&lt;Apply Settings&gt;</code> button to save your changes.</td>
</tr>
<tr>
<td>Enter</td>
<td>Use the <code>&lt;Enter&gt;</code> key to save the data you selected or entered.</td>
</tr>
<tr>
<td>Cancel</td>
<td>Use the <code>&lt;Cancel&gt;</code> button to exit the screen without saving changes.</td>
</tr>
<tr>
<td>Touch</td>
<td>Use the <code>&lt;Down&gt;</code> key to enter a lower value.</td>
</tr>
<tr>
<td>Touch</td>
<td>Use the <code>&lt;UP&gt;</code> key to enter a higher value.</td>
</tr>
</tbody>
</table>

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

**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.

Figure 2: Main Screen

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 Time & Date—From the Administrator Settings Screen, select <Calendar> to change the date and select <Clock> to change the 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.
LOGGING IN

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 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*

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.

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

*Figure 4: Manager Settings Screen*

*Figure 5: Administrator Settings Screen*
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. 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.
**TIME & DATE**

**Setting the Time and Date**

---

**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 Time:**

From the Settings Screen, touch the <Clock> icon. The Set Clock Screen will appear. See Figure 9.

In the example above, the current time is 10:23:39 AM. 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 military format. Valid entries are from 0-23.

**NOTE:** See Appendix for Military Time Conversion 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.

When you are finished, press <Apply Settings> and then press <OK> to return to the Settings Screen.

---

**To Change the Date:**

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

From the Schedule Screen, select <Set Date>. The Set Date Screen will appear. See Figure 11.

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.
**Setting the 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.

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 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 Custom Schedule 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 Figure 14. 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.

Press the configuration category you wish to access. See the Application Selection Screen in Figure 15 for an example of what a selection screen looks like.

Application

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
- CAV—Constant Air Volume Space Sensor Control

Fan Control

Touch the square button to select the fan control you are using. Select one option. Press <OK> to save. The available selections are as follows:

- PSC—Single speed permanent-split capacitor
- 2 Speed ECM—Low speed and high speed electronically commutated motor
- Variable Speed ECM—Electronically commutated motor will modulate based on 0-10VDC signal
- Fan Proving Switch—Select if using the Fan Proving Switch

Fan Mode

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—Unit will not run with Cooling, Heating, and Dehumidification demands.
- ON—Default. To run continuously.
- AUTO—Cycles on with Cooling, Heating, and Dehumidification modes

Compressor Control

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 On/Off Compressor
- 2 Step—This option is only for a single Two-Step Compressor

Press <OK> to save your selection and return to the Configuration Screen, press <Cancel> to return to the Configuration Screen without saving your selection.
Water Side Economizer (WSE)

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 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.

Dehumidification

Touch the square button to select the type of Dehumidification control you are using. Select one option. Press <OK> to save. 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.
- **Dehum Priority**—Dehumidification will operate as a priority over Cooling, Heating, and Economizer modes.

Electric Heat Control

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.
- **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.

Space Supply Reset

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.
## Accessing & Entering Setpoints

### Accessing Setpoints

Press the `<Setpoints>` icon on the Settings Screen to access the Setpoints Screens. See Figure 16. There is one Setpoint Screen and ten setpoint categories. Each setpoint category can have many setpoints. Press the `<Menu>` button to return to the Settings Screen.

![Setpoints Screen](image1.png)

Figure 16: Setpoints Screen

Press the setpoint category you wish to access. See Figure 17 for the Cooling Setpoints Screen as an example.

![Cooling Setpoints Screen](image2.png)

Figure 17: Cooling Setpoints Screen

Select an individual setpoint from the setpoint category screen. The setpoint’s data entry screen will display. See Figure 18 as an example. 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** — Default: 74°F; Range: 55-85°F
- **Unoccupied Cooling** — Default: 79°F; Range: 55-85°F
- **Cooling Enable Deadband** — 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** — Default: 75°F; Range: 55-85°F
  - **Space Lo Reset** — Default: 72°F; Range: 55-85°F
  - **Supply Hi Reset** — Default: 57°F; Range: 45-65°F
  - **Supply Lo Reset** — Default: 53°F; Range: 45-65°F

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.
Heating Setpoints

- **Occupied Heating**—Default: 70°F; Range: 55-85°F
- **Unoccupied Heating**—Default: 65°F; Range: 55-85°F
- **Heating Enable Deadband**—Default: 1°F; Range: 1-5°F
- **Supply Air Heating Setpoint**—Default: 90°F; Range: 55-120°F
- **Auxiliary Heat Deadband**—Default: 5°F; Range: 1-10°F
- **Space Supply Heat Reset Setpoints**
  - **Space Hi Reset**—Default: 72°F; Range: 55-85°F
  - **Space Lo Reset**—Default: 69°F; Range: 55-85°F
  - **Supply Hi Reset**—Default: 100°F; Range: 55-120°F
  - **Supply Lo Reset**—Default: 90°F; Range: 55-120°F

Dehumidification Setpoints

- **Dehumidification Enable**—Default: 50%; Range: 40-60%
- **Dehumidification Lockout**—Default: 55%; Range: 35-75%
- **Suction Temperature Setpoint**—Default: 45°F; Range: 40-60°F

Economizer Setpoints

- **Economizer Cooling Enable**—Default: 45°F; Range: 45-60°F
- **Economizer Heating Enable**—Default: 85°F; Range: 75-90°F

Compressor Setpoints

- **Minimum On Time**—Default: 180 seconds; Range: 120-255 seconds
- **Minimum Off Time**—Default: 120 seconds; Range: 60-255 seconds
- **Interstage On Delay**—Default: 60 seconds; Range: 30-255 seconds
- **Interstage Off Delay**—Default: 60 seconds; Range: 30-255 seconds

Supply Fan Setpoints

- **Supply Fan Minimum Speed**—Default: 40%; Range: 40-100%
- **Supply Fan Maximum Speed**—Default: 100%; Range: 35-100%

CO2 Setpoints

- **CO2 Override**—Default: 900ppm; Range: 500-1500ppm

Glycol Percentage

- **Glycol Percentage**—Default: 0%; Range: 0-40%
USB FUNCTIONS

Updating Firmware & Setpoints Using USB

USB Screen

From the Administrator Settings Screen, press the <USB> icon. The USB Screen will appear. See Figure 19. This screen provides you with options to update the controller’s firmware, upload setpoints, and download setpoints.

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 <Firmware Update> from the USB Screen OR (2) Plug the USB Flash Drive into the USB port and cycle power to the board. Either way, the firmware will automatically update. Verify the firmware version in the About Screen by accessing the <About> icon.

Follow the detailed instructions below:

1. To install the new firmware, copy the firmware update file from AAON Technical Support directly onto the root directory of a USB jump drive.

2. Insert the USB jump drive into the USB port of the Pioneer Gold Controller and cycle power to the Controller.

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 reboot itself and will 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 <About> 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 <Setpoints to USB>. 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 <USB Setpoint Upload>.
Network Information

Network Information

From the Administrator Setting Screen, press the <Network> icon. The Network Screen will appear. See Figure 20.

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.

Protocol—Select BACnet, Modbus, or None. Default is Modus.

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

Word Length—8 bit or 9 bit. Default is 8 bit.

Parity—Odd, Even, or None. Default is None.

Stop Bits—1 Bit, 2 Bits. Default is 1 Bit.

MAC Address—Use the up and down buttons to enter the BACnet MAC address. Default is 27.0. Valid range is 0 to 127. Default is 1.

Device ID—Valid range is 0 to 127. Default is 1.
INPUTS & OUTPUTS

Viewing Inputs & Outputs

Input Status

From the Main Screen, press the <Inputs> icon. The Input 1 Status Screen will appear. See Figure 21.

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. See Figure 22.

There are four Input 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.

Output Status

From the Main Screen, press the <Outputs> icon. The Output 1 Status Screen will appear. See Figure 23. See Figure 24 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 21: Input 1 Status Screen

Figure 22: Input 4 Status Screen

Figure 23: Output 1 Status Screen

Figure 24: Output 2 Status Screen
Alarms Status

From the Main Screen, press the <Alarms> icon. The Alarm 1 Status Screen will appear. See Figure 25. The status for each alarm should be Ready or Normal. If there is an alarm, the word Alarm will appear in red. See Figure 26.

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.

Figure 25: Alarms 1 Status Screen

Figure 26: 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 27. 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 27: About Screen
Military Time Conversion

The main difference between regular and military 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 military time, the hours are numbered from 0000 to 2300.

Military 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. Military 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 military time express minutes and seconds in exactly the same way. When converting from regular to military 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 military 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 military time.

<table>
<thead>
<tr>
<th>Regular Time</th>
<th>Military 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>
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<td>0300</td>
</tr>
<tr>
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<td>0330</td>
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<tr>
<td>4:00 a.m.</td>
<td>0400</td>
</tr>
<tr>
<td>4:30 a.m.</td>
<td>0430</td>
</tr>
<tr>
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<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>
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<td>1030</td>
</tr>
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<td>1100</td>
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</table>

<table>
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<th>Military Time</th>
</tr>
</thead>
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<td>1230</td>
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<tr>
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</tr>
<tr>
<td>1:30 a.m.</td>
<td>1330</td>
</tr>
<tr>
<td>2:00 p.m.</td>
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<tr>
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<td>1430</td>
</tr>
<tr>
<td>3:00 p.m.</td>
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<td>1530</td>
</tr>
<tr>
<td>4:00 p.m.</td>
<td>1600</td>
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<tr>
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<td>1900</td>
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<tr>
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<tr>
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</tr>
<tr>
<td>11:30 p.m.</td>
<td>2330</td>
</tr>
</tbody>
</table>

Table 6, cont.: Military Time Conversion