Pioneer Gold Controller
Technical Guide

Pioneer Gold Controller Code: Version 1.09
Pioneer Gold Touch Screen Temp and Humidity Sensor: Version 2.02
Pioneer Gold Electric Heat Board Code: Version 1.0
Used with AAON WSHP WV Series Vertical and WH Series Horizontal
This manual is divided into three parts:
The Controller Technical Guide—Part 1,
the Operator Interface—Part 2, and
the Prism 2 Interface—Part 3.

WARNING

QUALIFIED INSTALLER

Improper installation, adjustment, alteration, service, or maintenance can cause property damage, personal injury, or loss of life. Installation and service must be performed by a trained, qualified installer. A copy of this manual should be kept with the unit at all times.

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

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

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

www.aaon.com

AAON Part Number: G011010, Rev. 01F
Copyright November 2019 © AAON. All rights reserved throughout the world.
AAON® and AAONAIRE® are registered trademarks of AAON, Inc., Tulsa, OK.
BACnet® is a registered trademark of ASHRAE Inc., Atlanta, GA.
AAON® assumes no responsibility for errors or omissions in this document.
This document is subject to change without notice.
TABLE OF CONTENTS

OVERVIEW .............................................................................................................................................. 1-6
  Safety ................................................................................................................................................. 1-6
  Applications ......................................................................................................................................... 1-7
  Features and Options .................................................................................................................. 1-7
  Pioneer Gold Part Numbers ......................................................................................................... 1-8
  WH & WV Series Harness Part Numbers ............................................................................................... 1-9

INSTALLATION & WIRING ....................................................................................................................... 1-10
  Important Wiring Considerations ........................................................................................................... 1-11
  Controller Connections, Jumpers & Switches ......................................................................................... 1-12
  Controller Terminals & Harnesses .......................................................................................................... 1-13
  Controller & Expansion Module Inputs & Outputs .................................................................................... 1-14
  Pioneer Gold Controller Wiring ............................................................................................................. 1-15
  Harness Wiring ....................................................................................................................................... 1-16
  Expansion Module Components & Wiring ............................................................................................... 1-18
  Pioneer Gold Touch Screen Space & Humidity Sensor Wiring ................................................................. 1-19

CONTROLLER INPUT & OUTPUT DESCRIPTIONS .................................................................................. 1-20

SPACE / ROOM SENSOR CONTROLLED SEQUENCE OF OPERATIONS ............................................. 1-22
  Random Start Delay ................................................................................................................................. 1-22
  Occupancy / Supply Fan Status ............................................................................................................... 1-22
    Building Occupancy Status ................................................................................................................... 1-22
    Occupied Mode ................................................................................................................................... 1-22
    Unoccupied Mode ................................................................................................................................. 1-22
  Supply Fan Operation ............................................................................................................................... 1-22
  Ventilation Mode ..................................................................................................................................... 1-22
  Supply Fan Motors Operation .................................................................................................................... 1-22
    Single Speed Permanent Split Capacitor (PSC) or Electronically Commutated Motor (ECM) .......... 1-22
    Two-Speed Electronically Commutated Motor (ECM) ......................................................................... 1-22
  Supply Fan Control Operation .................................................................................................................. 1-22
    Constant Air Volume (CAV) ................................................................................................................... 1-22
  Compressor Operation ............................................................................................................................... 1-23
    On/Off Compressor (Scroll or Rotary) ................................................................................................... 1-23
    Multiple Stage Compressors ................................................................................................................... 1-23
      Stage Up Sequence .............................................................................................................................. 1-23
      Stage Down Sequence.......................................................................................................................... 1-23
  Space-Supply Air Reset .............................................................................................................................. 1-24
    Cooling .................................................................................................................................................. 1-24
    Heating .................................................................................................................................................. 1-24
  Reversing Valve Operation ........................................................................................................................ 1-25
  Electric Heat Operation ............................................................................................................................ 1-25
    External Duct Heaters ............................................................................................................................. 1-25
  Waterside Economizer Operation ............................................................................................................ 1-25
    On/Off Waterside Economizer Coil Operation ....................................................................................... 1-25
      Cool Only Operation .......................................................................................................................... 1-25
      Heat Only Operation .......................................................................................................................... 1-25
      Dual Operation .................................................................................................................................... 1-26
TABLE OF CONTENTS

SPACE / ROOM SENSOR CONTROLLED SEQUENCE OF OPERATIONS, CONT. ............................................................................................................................... 1-26

Dehumidification Operation ................................................................. 1-26
Fan Speed Dehumidification ................................................................. 1-26
Hot Gas Reheat Dehumidification ......................................................... 1-26
Additional Features ........................................................................... 1-26
  Outdoor Air Damper Operation ......................................................... 1-26
  CO₂ Control Override ...................................................................... 1-26

THERMOSTAT CONTROLLED SEQUENCE OF OPERATIONS ................................................................................................................................. 1-27

Random Start Delay ........................................................................... 1-27
Occupancy / Supply Fan Status .......................................................... 1-27
  Building Occupancy Status ............................................................... 1-27
    Normal/Occupied Mode ................................................................. 1-27
    Night Setback Mode ...................................................................... 1-27
Supply Fan Operation ................................................................................ 1-27
  Single Speed Permanent Split Capacitor (PSC) or Electronically Commutated Motor (ECM) ................................................................. 1-27
  Two-Speed Electronically Commutated Motor (ECM) ....................... 1-27
  CFM Controlled Electronically Commutated Motor (ECM) ................... 1-27
Compressor Operation ........................................................................ 1-28
Reversing Valve Operation .................................................................. 1-28
Electric Heat Operation ...................................................................... 1-28
  External Duct Heater(s) .................................................................. 1-28
  Integral Heat (Electric Heat Board) .................................................... 1-28
Waterside Economizer (WSE) Operation ............................................. 1-28
  On/Off Water Side Economizer (WSE) Coil Operation ....................... 1-28
    Cool Only Operation .................................................................... 1-28
    Heat Only Operation .................................................................... 1-29
    Dual Operation ........................................................................... 1-29
Dehumidification Operation ................................................................. 1-29
  Fan Speed Dehumidification ............................................................. 1-29
  Hot Gas Reheat Dehumidification ....................................................... 1-29
Additional Features ........................................................................... 1-29
  Outdoor Air Damper Operation ......................................................... 1-29
  CO₂ Control Override ...................................................................... 1-29

ALARMS ........................................................................................................ 1-30

TROUBLESHOOTING .............................................................................. 1-32

Controller LED Diagnostics & Locations ............................................ 1-32
Pioneer Gold Electric Heat Board LED Diagnostics & Locations .......... 1-34
Suction Pressure Transducer Testing ................................................ 1-35
Discharge Pressure Transducer Testing ............................................... 1-35
Temperature Sensor Testing ............................................................... 1-36
Glycol Percentage Freeze Protection Setpoints ..................................... 1-36
Touch Screen Sensor Calibration ......................................................... 1-37
Increasing Data Signal Integrity on RS-485 Communications ............... 1-38

BACNET® ................................................................................................... 1-40

Connection to MS/TP Network ............................................................ 1-40
BACnet® Parameters ........................................................................... 1-41
INDEX OF FIGURES

Figure 1: Pioneer Gold Controller Components ................................................................. 1-12
Figure 2: Pioneer Gold Controller Terminal & Harness Components .............................. 1-13
Figure 3: Pioneer Gold Controller Wiring ........................................................................ 1-15
Figure 4: H4 Harness Wiring .............................................................................................. 1-16
Figure 5: H5 Harness Wiring .............................................................................................. 1-16
Figure 6: H7 Harness Wiring .............................................................................................. 1-16
Figure 7: H8 Harness Wiring .............................................................................................. 1-17
Figure 8: H13 Harness Wiring ............................................................................................ 1-17
Figure 9: Pioneer Gold Electric Heat Board Components & Wiring ................................. 1-18
Figure 10: Pioneer Gold Touch Screen Temperature & Humidity Sensor Wiring .............. 1-19
Figure 11: Pioneer Gold Controller LED Locations .......................................................... 1-33
Figure 12: Pioneer Gold Electric Heat Board LED Locations ........................................... 1-34
Figure 13: Touch Screen Sensor Dip Switch Values ......................................................... 1-37
Figure 14: Installing the Resistor in the Touch Screen Sensor ........................................ 1-38
Figure 15: Installing the Resistor on the PG Controller’s Main Board ............................. 1-39
Figure 16: BACnet® Connection ...................................................................................... 1-40

INDEX OF TABLES

Table 1: Pioneer Gold Features & Options ...................................................................... 1-7
Table 2: Pioneer Gold Part Numbers ............................................................................... 1-8
Table 3: WHA Series Harness Part Numbers .................................................................. 1-9
Table 4: WVA Series Harness Part Numbers .................................................................. 1-9
Table 5: Electrical & Environmental Requirements ....................................................... 1-10
Table 6: Pioneer Gold Controller Inputs & Outputs ....................................................... 1-14
Table 7: Suction Pressure Transducer Testing Chart ...................................................... 1-35
Table 8: Discharge Pressure Transducer Testing Chart .................................................. 1-35
Table 9: Temperature Sensor Testing Chart ................................................................... 1-36
Table 10: Factory-Set Default Setpoints - Glycol ............................................................. 1-36
Table 11: BACnet® Parameter Analog Values ................................................................. 1-41
Table 12: BACnet® Parameter Binary Values .................................................................. 1-43
OVERVIEW

Safety

Attention should be paid to the following statements:

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

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

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

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

---

**WARNING**

**ELECTRIC SHOCK, FIRE, OR EXPLOSION HAZARD**

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

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

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

**WARNING**

**GROUNDING REQUIRED**

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

**WARNING**

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

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

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

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

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

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

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

The Pioneer Gold is used for Constant Volume applications.

### Table 1: Pioneer Gold Features & Options

| UNIT CAPACITY CONTROL | ½ to 30 ton WSHPs | ADVANCED FEATURES | • Space Sensor Alarm  
| USER INTERFACE | 2.8" Touchscreen LCD Color Interface with Two Levels of Security | • Air Flow Alarm  
| STAND-ALONE CAPABILITY | Stand Alone with Space Sensors or Thermostat Terminals | SERVICE AND RELIABILITY FEATURES | • Firmware Update via USB Port  
| NETWORKING CAPABILITY | Built-In BACnet® MS/TP | • Fault and Status Indicator LED  
| BASIC FEATURES | • 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 (not to be used as a fire/life safety device)  
| | • Night Setback Mode  
| | • Night Setback Override Thermostat Input  
| | • High Condensate Level Sensor  
| | • Auxiliary Alarm Input  
| | • I/O Status LEDs  
| | • Occupancy Scheduling  
| | • 7-Day, 2-Event-Per-Day Scheduling  
| BASIC ALARMS | • High/Low Control Voltage Alarms (24 VAC)  
| | • Air Coil Low Refrigerant Temperature Alarm  
| | • Low Leaving Water Temperature Alarm  

| ADVANCED FEATURES | • Waterside Economizer Operation  
| | • Two-Speed EC Fan Operation  
| | • PSC Fan Control  
| | • Rotary or Scrolled Compressor Control  
| | • Hot Gas Reheat Dehumidification Control  
| | • Two-Step Compressor Operation  
| | • Motorized Water Valve Control  
| | • CAV Operation  
| | • Externally Controlled EC Motor (0-10VDC)  
| | • Supply Air Temperature (SAT) Staging Control  
| | • Supply Air Reset Control  
| | • Two Stage Auxiliary/Emergency Heat 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)  

Pioneer Gold 1.09 Controller Technical Guide
## Pioneer Gold Part Numbers

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

<table>
<thead>
<tr>
<th>PIONEER GOLD PART DESCRIPTION</th>
<th>PART NUMBER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pioneer Gold Controller</td>
<td>V94730 / V94731</td>
</tr>
<tr>
<td>Pioneer Gold Electric Heat Board</td>
<td>V98550</td>
</tr>
<tr>
<td>Pioneer Gold Touch Screen Space Temp &amp; RH Sensor</td>
<td>G000181</td>
</tr>
<tr>
<td>Simple Space Temperature Sensor</td>
<td>G051240</td>
</tr>
<tr>
<td>Heat Pump Thermostat</td>
<td>By Others or via AAON Parts</td>
</tr>
<tr>
<td>Horizontal Water-Source Heat Pump Unit</td>
<td>WHA-XXX</td>
</tr>
<tr>
<td>Vertical Water-Source Heat Pump Unit</td>
<td>WVA-XXX</td>
</tr>
<tr>
<td>H4 Water Harness</td>
<td>See Tables 3 &amp; 4</td>
</tr>
<tr>
<td>H5 Standard Output Harness</td>
<td>See Tables 3 &amp; 4</td>
</tr>
<tr>
<td>H7 Variable Capacity Harness</td>
<td>See Tables 3 &amp; 4</td>
</tr>
<tr>
<td>H8 Reheat Harness</td>
<td>See Tables 3 &amp; 4</td>
</tr>
<tr>
<td>H13 Standard Input Harness</td>
<td>See Tables 3 &amp; 4</td>
</tr>
<tr>
<td>Prism 2 Software</td>
<td>ASM02249</td>
</tr>
<tr>
<td>CommLink 5</td>
<td>ASM01874</td>
</tr>
<tr>
<td>IP Module Kit</td>
<td>ASM01902</td>
</tr>
<tr>
<td>USB-Link 2</td>
<td>ASM02244</td>
</tr>
</tbody>
</table>
WH & WV Series Harness Part Numbers

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

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

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

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

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

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

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

**Electrical & Environmental Requirements**

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

![Table 5: Electrical and Environmental Requirements](image)

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

---

**Table 5: Electrical and Environmental Requirements**

<table>
<thead>
<tr>
<th>Control Device</th>
<th>Voltage</th>
<th>VA Load</th>
<th>Operating Temperature</th>
<th>Humidity (Non-Condensing)</th>
<th>Storage Temperature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pioneer Gold Controller</td>
<td>24VAC (25%/-15%), Class 2</td>
<td>75*</td>
<td>32°F to 158°F (0°C to 70°C)</td>
<td>0-95% RH</td>
<td>-4°F to 158°F (-20°C to 70°C)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inputs</td>
<td>Resistive Inputs require 10K Type 3 Thermistor</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>24VAC Inputs provide 4.7kΩ Load</td>
<td></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.*
Important Wiring Considerations

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

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

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

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

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

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

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

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

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

Powering Up

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

## Input/Output Map

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

### Pioneer Gold Controller

#### Digital Inputs

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

* NOT A FIRE/LIFE SAFETY DEVICE

#### Analog Inputs

<table>
<thead>
<tr>
<th>Input</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPT</td>
<td>Suction Pressure</td>
</tr>
<tr>
<td>DPT</td>
<td>Discharge Pressure</td>
</tr>
<tr>
<td>EWT</td>
<td>Entering Water Temperature</td>
</tr>
<tr>
<td>LLT</td>
<td>Liquid Line Temperature</td>
</tr>
<tr>
<td>ECT</td>
<td>Evaporator Coil Temperature</td>
</tr>
<tr>
<td>HWT</td>
<td>Entering Hot Water Temperature (Future)</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>

#### Touch Screen Inputs

<table>
<thead>
<tr>
<th>Input</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPAT</td>
<td>Space Temperature</td>
</tr>
<tr>
<td>SPAH</td>
<td>Space Humidity</td>
</tr>
</tbody>
</table>

#### Universal Inputs

<table>
<thead>
<tr>
<th>Input</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>UI1</td>
<td>LWT - Leaving Water Temperature</td>
</tr>
<tr>
<td>UI2</td>
<td>Spare</td>
</tr>
<tr>
<td>UI3</td>
<td>Spare</td>
</tr>
<tr>
<td>UI4</td>
<td>Spare</td>
</tr>
</tbody>
</table>

### Digital Outputs (24 VAC)

<table>
<thead>
<tr>
<th>Output</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>R/C</td>
<td>Thermostat Power (TSTAT)</td>
</tr>
<tr>
<td>ALM</td>
<td>Alarm Output</td>
</tr>
<tr>
<td>ALM/ALM2</td>
<td>Alarm Dry Contact Output</td>
</tr>
<tr>
<td>Fan/Fan</td>
<td>Supply Fan Enable</td>
</tr>
<tr>
<td>Fan2/Fan</td>
<td>Supply Fan Stage 2 Enable</td>
</tr>
<tr>
<td>Y1/Y1</td>
<td>Compressor Stage 1</td>
</tr>
<tr>
<td>Y2/Y2</td>
<td>Compressor Stage 2</td>
</tr>
<tr>
<td>Y3/Y3</td>
<td>Compressor Stage 3 (Future)</td>
</tr>
<tr>
<td>RV/RV</td>
<td>Reversing Valve</td>
</tr>
<tr>
<td>W1/W</td>
<td>Electric Heat Stage 1</td>
</tr>
<tr>
<td>MV/MV</td>
<td>Motorized Water Valve/Pumps</td>
</tr>
<tr>
<td>HG/HG</td>
<td>HGRH Valve</td>
</tr>
<tr>
<td>WSE/WSE</td>
<td>WSE Valve</td>
</tr>
<tr>
<td>DO1</td>
<td>Spare</td>
</tr>
</tbody>
</table>

#### Analog Outputs (0-10 VDC)

<table>
<thead>
<tr>
<th>Output</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SFS</td>
<td>Supply Fan Speed</td>
</tr>
<tr>
<td>PUMP</td>
<td>Variable Speed Pump (Future)</td>
</tr>
<tr>
<td>MWV</td>
<td>Modulating Water Valve On/Off (Future)</td>
</tr>
<tr>
<td>DMPR OVR</td>
<td>CO2 Damper Override</td>
</tr>
<tr>
<td>AO1</td>
<td>Spare</td>
</tr>
<tr>
<td>AO2</td>
<td>Spare</td>
</tr>
</tbody>
</table>

#### Communication Terminals

<table>
<thead>
<tr>
<th>Terminal</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>R/C</td>
<td>Extra Power Terminals</td>
</tr>
<tr>
<td>BACNET</td>
<td>BAS MS/TP Terminal</td>
</tr>
<tr>
<td>TSTAT</td>
<td>Pioneer Gold Touch Screen Space / RH Temperature Sensor</td>
</tr>
<tr>
<td>3 MODBUS Ports</td>
<td>MODBUS Expansion Communication</td>
</tr>
</tbody>
</table>

### Electric Heat Board Inputs

<table>
<thead>
<tr>
<th>Input</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIMIT</td>
<td>Limit (Hi) Switch</td>
</tr>
</tbody>
</table>

### Electric Heat Board Outputs

<table>
<thead>
<tr>
<th>Output</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEAT 1</td>
<td>Electric Heat Stage 1 Relay</td>
</tr>
<tr>
<td>HEAT 2</td>
<td>Electric Heat Stage 2 Relay</td>
</tr>
</tbody>
</table>

Table 6, cont.: Pioneer Gold Inputs & Outputs
WIRING

Pioneer Gold Controller Wiring

PIONEER GOLD CONTROLLER

SUCTION PRESSURE
DISCHARGE PRESSURE
SPARE DIGITAL 1
SPARE DIGITAL 2
SUPPLY AIR TEMP
SPACE CO2
SPACE TEMP
CO2 DAMPER OVERRIDE
CONDENSATE OVERFLOW 2
CONDENSATE OVERFLOW 1
CONDENSATE OVERFLOW 0
EMERG SHUTDOWN
NIGHT SBK OVERRIDE
NIGHT SETBACK ENABLE
NIGHT SETBACK
ALARM DRY CONTACT OUT
ALARM DRY CONTACT OUT
ALARM DRY CONTACT OUT
ALARM DRY CONTACT OUT
ALARM DRY CONTACT OUT
ALARM OUTPUT WET (24VAC)
FAN CALL
COMP STG 1 CALL
COMP STG 2 CALL
COOLING CALL
DEHUM CALL
HEAT STG 1 CALL

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

NOTE:
GREEN PINS ARE GND
RED PINS ARE 24VAC

*NOTE:
HARNESS WIRING SHOWN SEPARATELY.

Figure 3: Pioneer Gold Controller Wiring
WIRING

Harness Wiring

**Figure 4:** H4 Water Harness Wiring

**Figure 5:** H5 Standard Output Harness Wiring

**Figure 6:** H7 Variable Capacity Harness Wiring

NOTE: Multicolored wires are represented by a dotted line.
WIRING
Harness Wiring

Figure 7: H8 Reheat Harness Wiring

Figure 8: H13 Standard Input Harness Wiring

NOTE: Multicolored wires are represented by a dotted line.
Figure 9: Pioneer Gold Electric Heat Board Components & Wiring

PIONEER GOLD ELECTRIC HEAT BOARD

G007090 Power Cable With Snap In Connector
Touch Screen Space & RH Sensor Wiring

Figure 10: Pioneer Gold Touch Screen Space and Humidity Sensor Wiring

T-STAT Terminal Block on Pioneer Gold Controller Board

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.

Troubleshooting:
1.) If you are having difficulty interacting with the touch screen, please see the Troubleshooting section in this manual.

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

### Pioneer Gold Controller I/Os

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

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

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

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

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

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

**AUX - Auxiliary Fault Switch**
When this input is energized, the Auxiliary Fault Alarm will occur. Once the compressor completes its Minimum Run Time, it will be de-energized and the fan will continue to run. This can either be a 24VAC wet input or a dry contact between COM and the input.

**ESD - Emergency Shutdown Input**
The Emergency Shutdown is a 24VAC wet input. If 24VAC is removed from this input, all outputs are de-energized.

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

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

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

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

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

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

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

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

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

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

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

---

**WARNING:** The Emergency Shutdown input is NOT to be used for Life Safety applications.
INPUTS & OUTPUTS

Controller Input and Output Descriptions

MWV - Hot Water Valve (Future)

HWT - Entering Hot Water Temperature
This input is a 10k Type 3 Thermistor input. It monitors the temperature of water entering the Hot Water Heat Coil. It is currently for monitoring only and not used for control.

WSE - Waterside Economizer Valve
This 24V AC relay output signal is used to energize the Water Side Economizer valve during Water Side Economizer operation.

EWT - Entering Water Temperature
This input is a 10k Type 3 Thermistor input. It is the temperature of water entering the unit. The only time it is used for control is to determine if the water temperature is sufficient for Water Side Economizer (WSE). If you do not have WSE configured, this input is for status only.

FAN 2 - Supply Fan High Speed
This 24V AC relay output signal is used to engage the Fan to run at high speed.

RV - Reversing Valve
This 24V AC relay output signal is used to energize the Reversing Valve (to cooling position).

FAN - Supply Fan Low Speed
This 24V AC relay output signal is used to engage the Fan to run at low speed.

Y1 - Compressor Stage 1
This 24V AC relay output signal is used to energize the Compressor contactor (i.e. step 1 of 2-step compressor).

SFS - Supply Fan Speed Analog
This 0-10VDC output signal is used to provide the speed command for an ECM motor. The VDC level outputted corresponds with the Supply Fan Minimum Percentage Setpoint value when the Supply Fan Low Speed command is active, and increases to the Supply Fan Maximum Percentage Setpoint value when the Supply Fan High Speed command is active.

Y2 - Compressor Stage 2
This 24V AC relay output signal is used to energize the solenoid for the 2nd step of the Compressor for full capacity.

Y3 - Compressor Stage 3 (Future)

PUMP - Variable Speed Pump (Future)

HGR - Hot Gas Reheat Valve
This 24VAC relay output signal is used to energize the HGRH valve during Dehumidification.

MV - Motorized Water Valve/Pump
This 24VAC relay output signal is used to energize the Water Valve/Pump during normal Compressor operation, unless the “Full Reheat” during Dehumidification option is enabled.

HPS - High Pressure Switch
This input is used to monitor the High Pressure Switch. If the Compressor is running and the signal is removed from this input, a High Pressure Switch Alarm will be generated. It will also immediately disable the Compressors and the Fan will remain running. The Compressor will not be allowed to start if this input signal is missing. This input is a 24VAC wet input.

LPS - Low Pressure Switch
This input is used to monitor the Low Pressure Switch. If the Compressor is running and the signal is removed from the input for more than 10 seconds, a Low Pressure Switch Alarm is generated. It will also disable the Compressors and the Fan will remain running. If this alarm is generated 2 times within 2 hours, the unit will “hard” lockout and require a power cycle to continue operation.

COF - Condensate Overflow 1
This is a factory wired Condensate Overflow Alarm input. An alarm will be generated any time this input is energized. This Alarm disables the Compressor outputs as well as the Main Fan. This is a dry input (contact closure to COM).

LLT - Liquid Line Temperature
This is a 10kΩ Type 3 Thermistor input. It is the temperature of the refrigerant liquid line. If the liquid line temperature drops below a dangerous level, the Low Leaving Water Temperature Alarm will be generated and the compressors will be disabled. When the liquid line temperature rises above the safe limit again, this alarm will be reset. The temperatures for triggering and clearing this alarm are based on the glycol % programmed into the board. See Table 10, page 37.

ECT - Evaporator Coil Temperature
This is a 10kΩ Type 3 Thermistor input. It is the temperature of the Suction Line. If the Suction line Temperature drops below 30 degrees, a Low Evaporator Coil Temperature Alarm will be generated. The Compressors will be disabled and the Fan will remain energized. The alarm will clear when the Suction Line Temperature rises above 45 degrees.

WFS - Flow Switch (Future)
**Space/Room Sensor Controlled**

Configuration must be set to Space Sensor Controlled.

**Random Start Delay**

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

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

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

**Occupancy/Supply Fan Operation**

**Building Occupancy Status**

Occupied Mode Operation Options:

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

**Occupied Mode Operation**

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

**Unoccupied Mode Operation**

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

**Supply Fan**

Any time the Supply Fan is requested to start, a 30 second minimum off timer must be satisfied. If the timer is satisfied, the Supply Fan will be energized. In Auto mode or when transitioning to Unoccupied Mode, the Supply Fan is held on for 15 seconds after the last stage of Cooling, Heating, or Dehumidification stages off.

The Supply Fan can be configured for three modes:

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

**Ventilation Mode**

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

**Supply Fan Motors**

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

With a single speed PSC or ECM, the Supply Fan will be enabled and will always run at full speed when called for.

**Two-Speed Electronically Commutated Motor (ECM)**

With a two-speed ECM, the Supply Fan will have two speed operations—low speed and high speed.

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

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

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

With a variable speed ECM, the Supply Fan will modulate based on a 0-10VDC signal.

**Supply Fan Control**

**Constant Air Volume (CAV)**

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

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

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

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

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

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

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

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

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

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

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

**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, nonadjustable), 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 Air Reset

Space-Supply Air Cooling Reset reads the Space Temperature and linearly calculates a Supply Air Temperature Setpoint. This is a selectable sequence that can be disabled.

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

Space-Supply Reset is subject to the following setpoints:

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

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

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

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

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

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

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

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

**Cooling**

The Supply Air Reset calculation will hold the Cooling Supply Temp High Reset Setpoint if the space temperature is below the Cooling Space Temperature Low Reset Setpoint. As the Space Temperature increases above the Cooling Space Temp Low Reset Setpoint and toward the Cooling Space Temp High Reset Setpoint, the Supply Air Temperature Cooling Setpoint calculation will decrease in a linear fashion toward the Cooling Supply Temp Low Setpoint. The calculated Supply Air Reset will hold the Cooling Supply Temp Low Reset Setpoint if the space temperature is above the Cooling Space Temp High Reset Setpoint.

In the example below, the Supply Air Temp Setpoint decreases linearly from 60°F to 50°F as the space temperature increases from 72°F to 76°F. When the space temperature is outside of those ranges, the Supply Air Temp Setpoint will remain at the High or Low values; at 70°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 Electronically Commutated Motor (ECM)
With a single speed PSC or ECM, the Supply Fan will be enabled and will always run at full speed when called for (through the “Fan” Relay Output terminal).

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

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

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

CFM Controlled Electronically Commutated Motor (ECM)
With a CFM controlled ECM, the Supply Fan will modulate to maintain a target CFM based on the operating functions through a 16-pin connector. (Target CFM settings for cooling, heating, and dehumidification modes to be selected through the display.)
Compressor Operation

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

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

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

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

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

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

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

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

Reversing Valve Operation

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

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

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

Electric Heat Operation

External Duct Heater(s)

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

Integral Electric Heat (Electric Heat Board)

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

Waterside Economizer Operation (WSE)

On/Off Waterside Economizer (WSE) Coil Operation

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

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

Cool Only Operation

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

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

For Freeze Protection, the Entering Water Temperature will be monitored.
**Heat Only Operation**

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

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

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

**Dual Operation**

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

**Dehumidification Operation**

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

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

**Fan Speed Dehumidification**

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

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

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

**Hot Gas Reheat Dehumidification**

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

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

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

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

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

**Additional Feature Sequences**

**Outdoor Air Damper Operation**

**CO₂ Control Override**

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

Pioneer Gold 1.09 Controller Technical Guide 1-29
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 high voltage alarm will release when the control voltage decreases to 30VAC +/-5%. Once the fault is cleared, the controller will activate a random start delay.

Entering Water Temperature Alarm

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

Evaporator Coil Temperature Alarm

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

No Air Flow Alarm

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

Space Sensor Alarm

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

Entering Hot Water Temperature Alarm

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

CO₂ Override Alarm

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

Emergency Shutdown Alarm

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

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

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

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

**Auxiliary Input Alarm**

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

**Condensate Overflow Alarm**

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

**High Discharge Pressure Alarm**

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

**Leaving Water Temperature Alarm**

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

**Low Suction Pressure Alarm**

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

Using LEDs To Verify Operation

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

Operation LEDs

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

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

Communication LEDs

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

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

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

USB Port LED

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

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

Output LEDs

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

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

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

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

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

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

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

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

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

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

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

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

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

**Operation LEDs**

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

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

**MODBUS LEDs**

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

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

**Output LEDs**

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

**HEAT 2 - Electric Heat Stage 2 LED** — This green LED will light up when the Electric Heat Stage 2 relay is active.
Suction Pressure Transducer & Discharge Pressure Sensor Testing

Suction Pressure Transducer Testing for R410A Refrigerant 0-500 PSI

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

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

<p>|</p>
<table>
<thead>
<tr>
<th>Pressure PSI</th>
<th>Signal DC Volts</th>
<th>Pressure PSI</th>
<th>Signal DC Volts</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>0.66</td>
<td>280</td>
<td>2.74</td>
</tr>
<tr>
<td>40</td>
<td>0.82</td>
<td>300</td>
<td>2.9</td>
</tr>
<tr>
<td>60</td>
<td>0.98</td>
<td>320</td>
<td>3.06</td>
</tr>
<tr>
<td>80</td>
<td>1.14</td>
<td>340</td>
<td>3.22</td>
</tr>
<tr>
<td>100</td>
<td>1.3</td>
<td>360</td>
<td>3.38</td>
</tr>
<tr>
<td>120</td>
<td>1.46</td>
<td>380</td>
<td>3.54</td>
</tr>
<tr>
<td>140</td>
<td>1.62</td>
<td>400</td>
<td>3.7</td>
</tr>
<tr>
<td>160</td>
<td>1.78</td>
<td>420</td>
<td>3.86</td>
</tr>
<tr>
<td>180</td>
<td>1.94</td>
<td>440</td>
<td>4.02</td>
</tr>
<tr>
<td>200</td>
<td>2.1</td>
<td>460</td>
<td>4.18</td>
</tr>
<tr>
<td>220</td>
<td>2.26</td>
<td>480</td>
<td>4.34</td>
</tr>
<tr>
<td>240</td>
<td>2.42</td>
<td>500</td>
<td>4.5</td>
</tr>
<tr>
<td>260</td>
<td>2.58</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

Discharge Pressure Sensor Testing 0-667 PSI

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

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

<p>|</p>
<table>
<thead>
<tr>
<th>Pressure PSI</th>
<th>Signal DC Volts</th>
<th>Pressure PSI</th>
<th>Signal DC Volts</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>0.62</td>
<td>360</td>
<td>2.66</td>
</tr>
<tr>
<td>40</td>
<td>0.74</td>
<td>380</td>
<td>2.78</td>
</tr>
<tr>
<td>60</td>
<td>0.86</td>
<td>400</td>
<td>2.9</td>
</tr>
<tr>
<td>80</td>
<td>0.98</td>
<td>420</td>
<td>3.02</td>
</tr>
<tr>
<td>100</td>
<td>1.1</td>
<td>440</td>
<td>3.14</td>
</tr>
<tr>
<td>120</td>
<td>1.22</td>
<td>460</td>
<td>3.26</td>
</tr>
<tr>
<td>140</td>
<td>1.34</td>
<td>480</td>
<td>3.38</td>
</tr>
<tr>
<td>160</td>
<td>1.46</td>
<td>500</td>
<td>3.5</td>
</tr>
<tr>
<td>180</td>
<td>1.58</td>
<td>520</td>
<td>3.62</td>
</tr>
<tr>
<td>200</td>
<td>1.7</td>
<td>540</td>
<td>3.74</td>
</tr>
<tr>
<td>220</td>
<td>1.82</td>
<td>560</td>
<td>3.86</td>
</tr>
<tr>
<td>240</td>
<td>1.94</td>
<td>580</td>
<td>3.98</td>
</tr>
<tr>
<td>260</td>
<td>2.06</td>
<td>600</td>
<td>4.1</td>
</tr>
<tr>
<td>280</td>
<td>2.18</td>
<td>620</td>
<td>4.22</td>
</tr>
<tr>
<td>300</td>
<td>2.3</td>
<td>640</td>
<td>4.34</td>
</tr>
<tr>
<td>320</td>
<td>2.42</td>
<td>660</td>
<td>4.46</td>
</tr>
<tr>
<td>340</td>
<td>2.54</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 8: Discharge Pressure/Voltage for Discharge Pressure Sensors
**TROUBLESHOOTING**

**Temperature Sensor Testing & Glycol % Freeze Protection Setpoints**

**Type III 10K Ohm Temp Sensor Testing**

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

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

<table>
<thead>
<tr>
<th>Temp (°F)</th>
<th>Resistance (Ohms)</th>
<th>Voltage @ Input (VDC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>-10</td>
<td>93333</td>
<td>3.05</td>
</tr>
<tr>
<td>-5</td>
<td>80531</td>
<td>3</td>
</tr>
<tr>
<td>0</td>
<td>69822</td>
<td>2.97</td>
</tr>
<tr>
<td>5</td>
<td>60552</td>
<td>2.92</td>
</tr>
<tr>
<td>10</td>
<td>52500</td>
<td>2.87</td>
</tr>
<tr>
<td>15</td>
<td>45902</td>
<td>2.81</td>
</tr>
<tr>
<td>20</td>
<td>40147</td>
<td>2.76</td>
</tr>
<tr>
<td>25</td>
<td>35165</td>
<td>2.69</td>
</tr>
<tr>
<td>30</td>
<td>30805</td>
<td>2.62</td>
</tr>
<tr>
<td>35</td>
<td>27140</td>
<td>2.55</td>
</tr>
<tr>
<td>40</td>
<td>23874</td>
<td>2.47</td>
</tr>
<tr>
<td>45</td>
<td>21094</td>
<td>2.39</td>
</tr>
<tr>
<td>50</td>
<td>18655</td>
<td>2.3</td>
</tr>
<tr>
<td>52</td>
<td>17799</td>
<td>2.27</td>
</tr>
<tr>
<td>54</td>
<td>16956</td>
<td>2.24</td>
</tr>
<tr>
<td>56</td>
<td>16164</td>
<td>2.2</td>
</tr>
<tr>
<td>58</td>
<td>15385</td>
<td>2.17</td>
</tr>
<tr>
<td>60</td>
<td>14681</td>
<td>2.13</td>
</tr>
<tr>
<td>62</td>
<td>14014</td>
<td>2.1</td>
</tr>
<tr>
<td>64</td>
<td>13382</td>
<td>2.06</td>
</tr>
<tr>
<td>66</td>
<td>12758</td>
<td>2.02</td>
</tr>
<tr>
<td>68</td>
<td>12191</td>
<td>1.98</td>
</tr>
<tr>
<td>69</td>
<td>11906</td>
<td>1.97</td>
</tr>
<tr>
<td>70</td>
<td>11652</td>
<td>1.95</td>
</tr>
<tr>
<td>71</td>
<td>11379</td>
<td>1.93</td>
</tr>
<tr>
<td>72</td>
<td>11136</td>
<td>1.91</td>
</tr>
<tr>
<td>73</td>
<td>10878</td>
<td>1.9</td>
</tr>
<tr>
<td>74</td>
<td>10625</td>
<td>1.88</td>
</tr>
<tr>
<td>75</td>
<td>10398</td>
<td>1.86</td>
</tr>
<tr>
<td>76</td>
<td>10158</td>
<td>1.84</td>
</tr>
<tr>
<td>77</td>
<td>10000</td>
<td>1.82</td>
</tr>
</tbody>
</table>

Table 9: Temperature/Resistance for Type III 10K Ohm Thermistor Sensors

**Thermistor Sensor Testing Instructions**

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

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

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

**Glycol % Freeze Protection Setpoints**

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

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

Table 10: Factory-Set Default Setpoints - Glycol
Touch Screen Sensor Calibration

If it seems that your Touch Screen Sensor’s buttons and other menu options are not responding properly to your interaction with them, follow the instructions below to calibrate your touch screen sensor’s screen. Refer to Figure 13 below.

1. Remove the Touch Screen Sensor from its wall base.
2. Turn the Touch Screen Sensor over and turn off Dipswitch 1.
3. Return the Touch Screen Sensor to its wall base.
4. Using a stylus or your finger, touch the blue circle that appears on the screen. This blue circle will appear 3 times.
5. After touching this blue circle 3 times, the Home Screen will appear.
6. Test the calibration to see if the buttons, etc. are working properly.
7. If not, repeat steps 1-6. If yes, remove the Touch Screen Sensor from its wall base and turn Dipswitch 1 back on.

Figure 13: Touch Screen Sensor’s Dip Switch Values

DIP SWITCH VALUES

DIP SWITCH 1 - SCREEN TOUCH CALIBRATION
ON = Calibration Bypass - Default
OFF = Calibrate at Power Up

DIP SWITCH 2 - NOT USED - DEFAULT OFF

DIP SWITCH 3 - DISPLAY POWER SAVINGS
ON = Display Always On
OFF = Display Dimming - Default

DIP SWITCH 4 - DEFAULT ALWAYS ON
Increasing Data Signal Integrity

You can increase data signal integrity by installing a 120 Ohm termination resistor on either the the Touch Screen Sensor or the PG Controller’s main board.

On the Touch Screen Sensor, install the resistor between terminals A- and B+. See Figure 14, below.

On the PG Controller’s main board, install the resistor on connector “J8” between terminals A- & B+. See Figure 15, page 39.

Figure 14: Installing the Resistor in the Touch Screen Sensor
PIONEER GOLD CONTROLLER

AAON Resistor
120 OHM 1/4W 5%
P/N: G060090

Figure 15: Installing the Resistor on the PG Controller’s Main Board
BACNET® PARAMETERS

BACnet® Connection To MS/TP BAS Network

Programming Note:
Use Configurations Menu In LCD Display To Program The BACnet Settings.

MS/TP Connection To BACnet® Network

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

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

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

Figure 16: BACnet Connection to MS/TP BAS Network

Pioneer Gold 1.09 Controller Technical Guide

1-40
### BACnet Analog Values

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

**Table 12: BACnet Parameter Analog Values**
<table>
<thead>
<tr>
<th>BACnet® Point #</th>
<th>Default</th>
<th>Limit Range</th>
<th>BACnet® Point Name</th>
<th>BACnet® Description</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>AV: 23</td>
<td>60</td>
<td>30-255</td>
<td>Compressor Interstage On Delay</td>
<td>Interstage on delay setpoint when unit has more than one compressor stage</td>
<td>Seconds</td>
</tr>
<tr>
<td>AV: 24</td>
<td>60</td>
<td>30-255</td>
<td>Compressor Interstage Off Delay</td>
<td>Interstage off delay setpoint when unit has more than one compressor stage</td>
<td>Seconds</td>
</tr>
<tr>
<td>AV: 25</td>
<td>75</td>
<td>55-85</td>
<td>Space Cooling Hi Reset</td>
<td>High space temperature setpoint when using space/supply reset control in cooling mode</td>
<td>Fahrenheit</td>
</tr>
<tr>
<td>AV: 26</td>
<td>72</td>
<td>55-85</td>
<td>Space Cooling Lo Reset</td>
<td>Low space temperature setpoint when using space/supply reset control in cooling mode</td>
<td>Fahrenheit</td>
</tr>
<tr>
<td>AV: 27</td>
<td>57</td>
<td>45-65</td>
<td>Supply Cooling Hi Reset</td>
<td>High supply temperature setpoint when using space/supply reset control in cooling mode</td>
<td>Fahrenheit</td>
</tr>
<tr>
<td>AV: 28</td>
<td>53</td>
<td>45-65</td>
<td>Supply Cooling Lo Reset</td>
<td>Low supply temperature setpoint when using space/supply reset control in cooling mode</td>
<td>Fahrenheit</td>
</tr>
<tr>
<td>AV: 29</td>
<td>70</td>
<td>55-85</td>
<td>Occupied Heating Setpoint</td>
<td>Heating mode enable setpoint when space is occupied</td>
<td>Fahrenheit</td>
</tr>
<tr>
<td>AV: 30</td>
<td>65</td>
<td>55-85</td>
<td>Unoccupied Heating Setpoint</td>
<td>Heating mode enable setpoint when space is unoccupied</td>
<td>Fahrenheit</td>
</tr>
<tr>
<td>AV: 31</td>
<td>90</td>
<td>55-120</td>
<td>Supply Heating Setpoint</td>
<td>Temperature setpoint of the leaving discharge air while in heating mode</td>
<td>Fahrenheit</td>
</tr>
<tr>
<td>AV: 32</td>
<td>72</td>
<td>55-85</td>
<td>Space Heating Hi Reset</td>
<td>High space temperature setpoint when using space/supply reset control in heating mode</td>
<td>Fahrenheit</td>
</tr>
<tr>
<td>AV: 33</td>
<td>69</td>
<td>55-85</td>
<td>Space Heating Lo Reset</td>
<td>Low space temperature setpoint when using space/supply reset control in heating mode</td>
<td>Fahrenheit</td>
</tr>
<tr>
<td>AV: 34</td>
<td>100</td>
<td>55-120</td>
<td>Supply Heating Hi Reset</td>
<td>High supply temperature setpoint when using space/supply reset control in heating mode</td>
<td>Fahrenheit</td>
</tr>
<tr>
<td>AV: 35</td>
<td>90</td>
<td>55-120</td>
<td>Supply Heating Lo Reset</td>
<td>Low supply temperature setpoint when using space/supply reset control in heating mode</td>
<td>Fahrenheit</td>
</tr>
<tr>
<td>AV: 36</td>
<td>50</td>
<td>40-60</td>
<td>Dehum Enable Setpoint</td>
<td>Relative humidity setpoint for enabling dehumidification mode</td>
<td>Relative Humidity</td>
</tr>
<tr>
<td>AV: 37</td>
<td>5</td>
<td>1-10</td>
<td>Aux Heat Deadband</td>
<td>Degrees Fahrenheit that the supply air must be under setpoint for auxiliary heat to enable</td>
<td>Fahrenheit</td>
</tr>
<tr>
<td>AV: 38</td>
<td>100</td>
<td>35-100</td>
<td>Supply Fan Max Percentage</td>
<td>Maximum allowed output for a variable speed supply fan</td>
<td>Percent</td>
</tr>
<tr>
<td>AV: 39</td>
<td>40</td>
<td>40-100</td>
<td>Supply Fan Minimum Percentage</td>
<td>Minimum allowed output for a variable speed supply fan</td>
<td>Percent</td>
</tr>
<tr>
<td>AV: 40</td>
<td>0</td>
<td>-20 - 20</td>
<td>Space Temp Offset</td>
<td>Temperature offset for the space sensor</td>
<td>Fahrenheit</td>
</tr>
<tr>
<td>AV: 41</td>
<td>0</td>
<td>-20 - 20</td>
<td>Supply Temp Offset</td>
<td>Temperature offset for the supply temperature sensor</td>
<td>Fahrenheit</td>
</tr>
<tr>
<td>AV: 42</td>
<td>0</td>
<td>-20 - 20</td>
<td>Space RH Offset</td>
<td>Relative humidity offset for the space sensor</td>
<td>Fahrenheit</td>
</tr>
<tr>
<td>AV: 43</td>
<td>N/A</td>
<td>N/A</td>
<td>Leaving Water Temp</td>
<td>Temperature of the loop water leaving the water coil</td>
<td>Fahrenheit</td>
</tr>
</tbody>
</table>

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

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

Table 12: BACnet Parameter Analog Values, continued

### BACnet® Binary Values

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

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

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

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

Pioneer Gold Controller Code: Version 1.09
Used with AAON WSHP WV Series Vertical and WH Series Horizontal
# TABLE OF CONTENTS

## OVERVIEW

- Overview .......................................................................................................................... 2-3

## NAVIGATION

- Main Screen Icons and Functions .................................................................................. 2-4
- Manager Settings Screen Icons and Functions ............................................................... 2-4
- Administrator Settings Screen Icons and Functions ....................................................... 2-5
- Navigation Buttons ......................................................................................................... 2-5
- Configuration Buttons .................................................................................................... 2-5

## MAIN SCREEN

- Navigation .......................................................................................................................... 2-6

## ADMINISTRATOR STEP-BY-STEP GUIDE

- Administrator Step-by-Step Guide ................................................................................ 2-6

## SETTINGS SCREENS

- Settings Screens ............................................................................................................. 2-7
- Logging In ....................................................................................................................... 2-7
- Editing Passcodes .......................................................................................................... 2-8
- Setting The Date ............................................................................................................ 2-9
- Setting The Time and Daylight Savings Time ................................................................. 2-10
- Setting Schedules .......................................................................................................... 2-11

## CONFIGURATIONS

- Configurations .................................................................................................................. 2-12

## SETPOINTS

- Setpoints ........................................................................................................................... 2-14

## USB FUNCTIONS

- USB Functions .................................................................................................................. 2-16

## NETWORK SETTINGS

- Network Settings ............................................................................................................. 2-17

## INPUTS AND OUTPUTS STATUS

- Inputs and Outputs Status ............................................................................................... 2-18

## ALARM STATUS

- Alarm Status .................................................................................................................... 2-19

## TROUBLESHOOTING

- Troubleshooting .............................................................................................................. 2-20

## APPENDIX

- Appendix .......................................................................................................................... 2-21
- 24-Hour Time Conversion ............................................................................................... 2-21

---

**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.

---

AAON P/N:: G011010, Rev. 01F
Copyright November 2019 © AAON
All rights reserved throughout the world.
AAON, Inc.
2425 So. Yukon Ave • Tulsa, OK 74107-2728
Ph: (918) 583-2266 • Fax: (918) 583-6094

AAON® is a registered trademark of AAON, Inc., Tulsa, OK.
BACnet® is a registered trademark of ASHRAE Inc., Atlanta, GA.
AAON® assumes no responsibility for errors or omissions in this document.
This document is subject to change without notice.
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><img src="image" alt="Occupied/Unoccupied" /></td>
<td>The &lt;Occupied/Unoccupied&gt; icon is darkened to show Occupied and lightened to show Unoccupied.</td>
</tr>
<tr>
<td><img src="image" alt="Operation Mode" /></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, a fan for Vent Mode, or a no water droplet for Dehumidification Mode. It will display the word OFF when the unit is in Off Mode.</td>
</tr>
<tr>
<td><img src="image" alt="Inputs" /></td>
<td>The &lt;Inputs&gt; icon takes you to the Inputs Screens. The Input Screens display the status of all possible inputs connected to the board.</td>
</tr>
<tr>
<td><img src="image" alt="Outputs" /></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><img src="image" alt="Alarms" /></td>
<td>The &lt;Alarms&gt; icon takes you to the Alarm Screens. The Alarm Screens display the status of all possible alarms.</td>
</tr>
<tr>
<td><img src="image" alt="Settings" /></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><img src="image" alt="About" /></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><img src="image" alt="Clock" /></td>
<td>The &lt;Clock&gt; icon takes you to the Clock Screen. This screen allows you to do three things—set the current date and time and configure Daylight Savings Time. This is one of the first things you should do—set the correct date &amp; time—if you notice the time or date is wrong at the top of the Main Screen and Settings Screen.</td>
</tr>
<tr>
<td><img src="image" alt="Schedule" /></td>
<td>The &lt;Schedule&gt; icon takes you to the Set Schedule Screen. This screen allows you to set the desired schedule for the controller.</td>
</tr>
<tr>
<td><img src="image" alt="Setpoints" /></td>
<td>The &lt;Setpoints&gt; icon takes you to the Setpoint Screens where you can access and change setpoints.</td>
</tr>
<tr>
<td><img src="image" alt="USB" /></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 2: Manager Settings Screen Icons & Functions
**Settings Screen Icons and Button Functions**

### Administrator Settings Screen Icons

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

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

Table 3: Administrator Settings Screen Icons & Functions

### Navigation Buttons

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

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

Table 4: Navigation Button Functions

### Configuration Buttons

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

<table>
<thead>
<tr>
<th>Button</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ok</td>
<td>Use the &lt;OK&gt; button to save the data you just selected or entered.</td>
</tr>
<tr>
<td>Back</td>
<td>Use the &lt;Back&gt; button on the number keypad to delete data.</td>
</tr>
<tr>
<td>Apply Settings</td>
<td>Use the &lt;Apply Settings&gt; button to save your changes.</td>
</tr>
<tr>
<td>Enter</td>
<td>Use the &lt;Enter&gt; button to save the data you selected or entered.</td>
</tr>
<tr>
<td>Cancel</td>
<td>Use the &lt;Cancel&gt; button to exit the screen without saving changes.</td>
</tr>
<tr>
<td>Down</td>
<td>Touch the square selection box to make your selection. An empty square designates that the item is NOT selected. A check mark in the square designates that the item IS selected.</td>
</tr>
<tr>
<td>Up</td>
<td>Use the &lt;Up&gt; button to enter a higher value.</td>
</tr>
</tbody>
</table>

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 displays 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 Date & Time—From the Administrator Settings Screen, select <Clock> to change the date and time.

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

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

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

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

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

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

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

![Settings Password Screen](image)

Press <Enter> once you have entered your password.

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

The touchscreen will stay in Administrator or Manager mode until you log out or until the passcode times out.

**NOTE:** Passcodes have a non-adjustable timeout of 5 minutes.
Changing Passcodes

Password Clearance Levels

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

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

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

**Manager Level—Default: 1988**

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

**Administrator Level—Default: 2425**

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

Edit Passcodes

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

**NOTE:** Only the 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.

**NOTE:** Do not use the same passcode for Administrator and Manager passcodes. If you do, each passcode will default to Level 0.
Changing Passcodes & Setting the Date

Set Date and Time

When you first power up your Touch Screen, you will need to change the time, 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 update the time and date, even though the time and date can maintain itself for several days. Only Managers and Administrators can change the time and date.

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

To Change the Date:

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

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

This screen displays the current settings for the date, month, and year. 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 date in the calendar itself.

When you have finished, press <Apply Settings> to save your settings and return to the Clock Screen or press <Cancel> to return to the Clock Screen.
To Change the Time:
From the Settings Screen, touch the <Clock> icon. The Clock Screen will appear. See Figure 9, page 9. From the Clock Screen, select <Set Time>. The Set Time Screen will appear. See Figure 11.

In the example above, the current time is 18:45:57. Use the up and down arrow keys to set the current time. The clock on the screen will show the time that you set.

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

NOTE: See Appendix for 24-Hour Time table.

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

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

When you have finished, press <Apply Settings> to save your settings and return to the Clock Screen or press <Cancel> to return to the Clock Screen.

Daylight Savings Configuration:
From the Settings Screen, touch the <Clock> icon. The Clock Screen will appear. See Figure 9, page 9. From the Clock Screen, select <Daylight Savings Config>. The Daylight Savings Screen will appear. There are two options on this screen—Daylight Savings Options and Daylight Savings Manual Dates.

Daylight Savings Options
In the Daily Savings Options Screen, touch the Square button to select the option you are using. Select one option. Press <OK> to save. The available selections are as follows:

- **Disable** — Default. Select this option if your system is installed in an area of the world that does not use daylight savings time.
- **Auto Adjust** — Select this option to use the current United States’ observance of Daylight Savings time which begins at 2 a.m. on the second Sunday in March and ends at 2 a.m. on the first Sunday in November.
- **Manual Adjust** — Select this option to manually set the begin date and end date.

Manually Adjust Daylight Savings Dates
If you have selected Manual Adjust in the Daylight Savings Options Screen, the Daily Savings Dates Screen allows you to manually select the start date and stop date for Daily Savings Time. See Figure 12.

The defaults are 0 in all fields. Use the up and down arrow keys to select the month and day for the Start Date and the month and day for the Stop Date. When you have finished, press <Apply Settings> to save the dates and return to the Daylight Savings Screen. Daylight Savings Time adjustments will take effect at 2 a.m. on the selected days.
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.

From the Settings Screen, touch the <Schedule> icon. The Schedule Options Screen will appear. See Figure 13.

The text at the bottom of the Schedule Options Screen will tell you if the unit is occupied or unoccupied. If the unit is unoccupied, “Unoccupied” will be displayed and there will be no second line of text. If the unit is occupied, “Occupied” will be displayed, and the second line of text will show what is causing occupancy. It will display “24/7 Occupancy” if 24/7 occupancy is selected, “Scheduled Occupancy” if the internal schedule is causing occupancy, “Network Occupancy” if occupancy is caused by the BAS, or “User Occupancy” if occupancy is caused by the remote occupancy input.

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. You can also set the Holiday schedule and Holiday periods from this screen.

Weekday Schedule:
Select <Weekdays>. The Weekdays Schedule Screen will appear. See Figure 14. 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:
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:
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:
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:
Select <Custom>. The Custom Schedule Screen will appear. The screen contains each day of the week. Select a day of the week from the menu and that day’s selection schedule will appear. The defaults are 0 in all fields. You can select two events per day. Select an hour and minute start time for Occupy 1 and an hour and minute stop time for Unoccupy 1. Repeat this for Occupy 2 and Unoccupy 2. All times are entered in military time format. When you have finished, press <Apply Settings> and then press <OK> to return to the Schedule Options Screen. When you have finished programming each desired weekday, press <Back> to return to the Schedule Options Screen.

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

Holidays Schedule:
Select <Holidays>. The Holidays Screen will appear. This screen has two entries—Holiday Time and Holiday Dates. For Holiday Time, follow the instructions for 7-Day Schedule above. For Holiday Dates, enter up to 14 Holiday periods and their start and end dates. For example, New Year’s Day start date is January 1 and end date is January 2. When you have finished, press <Apply Settings>.
Press the <Configuration> icon on the Administrator Settings Screen to access the Configuration Screens. See Figures 15 & 16. 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 17 for an example of what a selection screen looks like.

Application (Factory Set)

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

- **Tstat** — Thermostat Control—Standard 3rd Party Thermostat is used
- **CAV** — Constant Air Volume Space Sensor Control—On-Board Space Sensor or AAON Touch Screen Space & Humidity Sensor

Fan Control (Factory Set)

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

- **Single Speed** — Single speed permanent-split capacitor
- **2 Speed ECM** — Low speed and high speed electronically commutated motor

Touch the square button to select the additional option.

- **Fan Proving Switch** — Only select if using the Fan Proving Switch.

Fan Mode (Field Set)

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

- **Off** — Forces Fan off. Unit will not run with Cooling, Heating, and Dehumidification demands.
- **On** — Default. Forces Fan on during Occupied Mode.
- **Auto** — Fan Cycles on with Cooling, Heating, and Dehumidification modes. No Call = Fan Off.
- **Occ On/Unocc Auto** — During Occupied Mode, Fan will be on. During Unoccupied Mode, Fan will operate as in Auto, above.
Compressor Control (Factory Set)

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

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

Water Side Economizer (WSE) (Field Set)

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

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

Electric Heat Control (Field Wired)

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

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

Dehumidification

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

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

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

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

Space Supply Reset (Field Set)

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

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

Desuperheater Control

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

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

Water Flow Sensor for Desuperheater

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

- **No Sensor**
- **V97450**
- **V97460**
- **V97470**
- **V97480**
Accessing & Entering Setpoints

Accessing Setpoints

Press the <Setpoints> icon on the Settings Screen to access the Setpoints Screens. See Figure 18. There are two Setpoint Screens and ten setpoint categories. Each setpoint category can have many setpoints.

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 Setpoints Screen.

Press the setpoint category you wish to access. See Figure 19 for the Cooling Setpoints Screen as an example.

Select an individual setpoint from the setpoint category screen. The setpoint’s data entry screen will display. See Figure 20 for 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**—Sets the Cooling Setpoint.
  Default: 74°F; Range: 55-85°F
- **Unoccupied Cooling**—Sets the Unoccupied Cooling Setpoint. Default: 79°F; Range: 55-85°F
- **Cooling Enable Deadband**—How far away from Setpoint to generate or remove Call. Default: 1°F; Range: 1-5°F
- **Supply Air Cooling Setpoint**—Default: 55°F; Range: 45-65°F
- **Space Supply Cool Reset Setpoints**
  - **Space Hi Reset**—If Space is at or above this value, SAT is at High Reset Value. Default: 75°F; Range: 55-85°F
  - **Space Lo Reset**—If Space is at or below this value, SAT is at Low Reset Value. Default: 72°F; Range: 55-85°F
  - **Supply Hi Reset**—High Supply Air Setpoint. Default: 57°F; Range: 45-65°F
  - **Supply Lo Reset**—Low Supply Air Setpoint. Default: 53°F; Range: 45-65°F
Heating Setpoints

- **Occupied Heating**—Sets the Heating Setpoint. Default: 70°F; Range: 55-85°F
- **Unoccupied Heating**—Sets the Unoccupied Heating Setpoint. Default: 65°F; Range: 55-85°F
- **Heating Enable Deadband**—How far away from Setpoint to generate or remove Call. Default: 1°F; Range: 1-5°F
- **Supply Air Heating Setpoint**—Default: 90°F; Range: 55-120°F
- **Auxiliary Heat Deadband**—Space Temp has to be this far below setpoint before Aux Heat can energize. Default: 5°F; Range: 1-10°F

Dehumidification Setpoints

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

Economizer Setpoints

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

Compressor Setpoints

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

Supply Fan Setpoints

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

CO2 Setpoints

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

Glycol Percentage

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

Water Valve Opening Delay

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

Space Sensor Maximum Setpoint Offset

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

Sensor Calibrations

- **Space Temperature & Supply Temperature Sensor Calibrations**—You can adjust the offset temperature when the sensor is reading incorrectly. Enter a positive value to raise the reading or a negative value to lower the reading. Default: 0°F; Range: +/-20°F

User Occupancy Override Time

This setpoint allows the user to adjust the occupancy override time for the Touch Screen Temperature and Humidity Sensor. Default: 120 minutes; Range: 0-120 minutes. Entering a 0 will disable the override.
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 21. This screen provides you with options to update the controller’s firmware, upload setpoints, and download setpoints.

![USB Screen]

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

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

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 controller. Either way, the firmware will automatically update. Verify the firmware version in the About Screen by accessing the <About> icon. See page 20 for the About Screen. Follow the detailed instructions below to update the firmware:

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

2. Insert the USB flash drive into the USB port of the Pioneer Gold Controller and cycle power to the Controller or select <Firmware Update> from the USB Screen and this option will automatically cycle power to the controller.
Network Information

From the Administrator Setting Screen, press the <Network> icon. The Network Screen will appear. See Figure 22. This screen allows you to setup network information for ModBus, WattComm, BACnet®, and other network communications.

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

These screens contain the following categories—Protocol RS485, Protocol - IP, Baud Rate, Word Length, Parity, Stop Bits, MAC Address, Device ID, IP Address, Subnet Mask, Gateway, and Foreign Device configuration. It also displays the factory-generated MAC address. After making your selection from each category’s screen, press the <OK> button to return to the Network Screen(s).

Protocol (ModBus, WattComm, and BACnet® MS/TP applications)

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

- None
- ModBus RTU
- WattComm
- BACnet MS/TP

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

Word Length—For Technical Support use only.

Parity—For Technical Support use only.

Stop Bits—For Technical Support use only.

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

Device ID—Valid range is 0 to 4194302. Default is 27.

ModBus Slave Address—Valid range is 1 to 254. Default is 100.
INPUTS & OUTPUTS

Viewing Inputs & Outputs

Input Status

From the Main Screen, press the <Inputs> icon. The Input 1 Status Screen will appear. See Figure 23.

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

There are four Input Status Screens. See Figures 23-26. 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 23: Input 1 Status Screen

Figure 24: Input 2 Status Screen

Figure 25: Input 3 Status Screen

Figure 26: Input 4 Status Screen
Output Status

From the Main Screen, press the <Outputs> icon. The Output 1 Status Screen will appear. See Figure 27. See Figure 28 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.

Alarms Status

From the Main Screen, press the <Alarms> icon. The Alarm Status Screen will appear. See Figures 29 & 30. There are three Alarm Status Screens. Press the <Next> button to access each screen. Press the <Back> button to access the previous screen. Press the <Menu> button to return to the Main Screen.

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

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.

From the Main Screen, press the <About> icon. The About Screen will appear. See Figure 31. This screen provides you with manufacturer information, the name of the board, the password reset key, and the firmware, bootloader, and I/O board versions.

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

Figure 31: About Screen
The main difference between regular and 24-hour time is how hours are expressed. Regular time uses numbers 1 to 12 and a.m. and p.m. to identify each of the 24 hours in a day. In 24-Hour time, the hours are numbered from 0000 to 2300.

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

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

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

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

<table>
<thead>
<tr>
<th>Regular Time</th>
<th>24-Hour Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>12:00 a.m.</td>
<td>0000</td>
</tr>
<tr>
<td>12:30 a.m.</td>
<td>0030</td>
</tr>
<tr>
<td>1:00 a.m.</td>
<td>0100</td>
</tr>
<tr>
<td>1:30 a.m.</td>
<td>0130</td>
</tr>
<tr>
<td>2:00 a.m.</td>
<td>0200</td>
</tr>
<tr>
<td>2:30 a.m.</td>
<td>0230</td>
</tr>
<tr>
<td>3:00 a.m.</td>
<td>0300</td>
</tr>
<tr>
<td>3:30 a.m.</td>
<td>0330</td>
</tr>
<tr>
<td>4:00 a.m.</td>
<td>0400</td>
</tr>
<tr>
<td>4:30 a.m.</td>
<td>0430</td>
</tr>
<tr>
<td>5:00 a.m.</td>
<td>0500</td>
</tr>
<tr>
<td>5:30 a.m.</td>
<td>0530</td>
</tr>
<tr>
<td>6:00 a.m.</td>
<td>0600</td>
</tr>
<tr>
<td>6:30 a.m.</td>
<td>0630</td>
</tr>
<tr>
<td>7:00 a.m.</td>
<td>0700</td>
</tr>
<tr>
<td>7:30 a.m.</td>
<td>0730</td>
</tr>
<tr>
<td>8:00 a.m.</td>
<td>0800</td>
</tr>
<tr>
<td>8:30 a.m.</td>
<td>0830</td>
</tr>
<tr>
<td>9:00 a.m.</td>
<td>0900</td>
</tr>
<tr>
<td>9:30 a.m.</td>
<td>0930</td>
</tr>
<tr>
<td>10:00 a.m.</td>
<td>1000</td>
</tr>
<tr>
<td>10:30 a.m.</td>
<td>1030</td>
</tr>
<tr>
<td>11:00 a.m.</td>
<td>1100</td>
</tr>
<tr>
<td>11:30 a.m.</td>
<td>1130</td>
</tr>
<tr>
<td>12:00 p.m.</td>
<td>1200</td>
</tr>
<tr>
<td>12:30 p.m.</td>
<td>1230</td>
</tr>
<tr>
<td>1:00 p.m.</td>
<td>1300</td>
</tr>
<tr>
<td>1:30 p.m.</td>
<td>1330</td>
</tr>
<tr>
<td>2:00 p.m.</td>
<td>1400</td>
</tr>
<tr>
<td>2:30 p.m.</td>
<td>1430</td>
</tr>
<tr>
<td>3:00 p.m.</td>
<td>1500</td>
</tr>
<tr>
<td>3:30 p.m.</td>
<td>1530</td>
</tr>
<tr>
<td>4:00 p.m.</td>
<td>1600</td>
</tr>
<tr>
<td>4:30 p.m.</td>
<td>1630</td>
</tr>
<tr>
<td>5:00 p.m.</td>
<td>1700</td>
</tr>
<tr>
<td>5:30 p.m.</td>
<td>1730</td>
</tr>
<tr>
<td>6:00 p.m.</td>
<td>1800</td>
</tr>
<tr>
<td>6:30 p.m.</td>
<td>1830</td>
</tr>
<tr>
<td>7:00 p.m.</td>
<td>1900</td>
</tr>
<tr>
<td>7:30 p.m.</td>
<td>1930</td>
</tr>
<tr>
<td>8:00 p.m.</td>
<td>2000</td>
</tr>
<tr>
<td>8:30 p.m.</td>
<td>2030</td>
</tr>
<tr>
<td>9:00 p.m.</td>
<td>2100</td>
</tr>
<tr>
<td>9:30 p.m.</td>
<td>2130</td>
</tr>
<tr>
<td>10:00 p.m.</td>
<td>2200</td>
</tr>
<tr>
<td>10:30 p.m.</td>
<td>2230</td>
</tr>
<tr>
<td>11:00 p.m.</td>
<td>2300</td>
</tr>
<tr>
<td>11:30 p.m.</td>
<td>2330</td>
</tr>
</tbody>
</table>

Table 6, cont.: 24-Hour Time Conversion
AAON Factory Technical Support:  918-382-6450
techsupport@aaon.com

AAON Controls Support:  866-918-1100
Monday through Friday, 7:00 AM to 5:00 PM
central standard time

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.
Prism 2 Software: Version 4.8.8 and later
Pioneer Gold Controller Code: Version 1.09

Operator Interface Overview
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRISM 2 FEATURES &amp; REQUIREMENTS</td>
<td>3-3</td>
</tr>
<tr>
<td>PRISM 2 MANUAL OVERVIEW</td>
<td>3-4</td>
</tr>
<tr>
<td>PIONEER GOLD CONTROLLER STATUS SCREEN</td>
<td>3-5</td>
</tr>
<tr>
<td>PIONEER GOLD SETPOINT &amp; CONFIGURATION SCREENS</td>
<td>3-6</td>
</tr>
<tr>
<td>ADMINISTRATIVE FUNCTIONS</td>
<td>3-8</td>
</tr>
<tr>
<td>FORCE OCCUPIED MODE</td>
<td>3-8</td>
</tr>
<tr>
<td>SCHEDULES &amp; HOLIDAYS</td>
<td>3-9</td>
</tr>
<tr>
<td>ALARMS</td>
<td>3-10</td>
</tr>
<tr>
<td>PRISM 2 COMPUTER CONNECTIONS</td>
<td>3-11</td>
</tr>
</tbody>
</table>

**PLEASE NOTE**

This document gives a brief overview of the Prism 2 software. For more information, please refer to the *Prism 2 Technical Guide*, the *CommLink 5 Technical Guide*, the *IP Module Technical Guide*, the *USB-Link 2 Technical Guide*, and/or the *MiniLink PD 5 Technical Guide*. All can be found on the AAON website under Controls documentation—www.aaon.com/controlsmanuals
Prism 2 is a complete Windows®-based graphical interface controls and management program that allows you to interact with your digital controls. The program provides standard, easy-to-understand status, setpoint, and configuration screens for the Pioneer Gold Controller and other controllers in your system.

Prism 2 allows you to access and control schedules, trend logs, and alarm conditions. The program can be configured for direct on-site installation or TCP/IP Internet connection.

Feature Summary

Prism 2 provides a broad set of features:

- Easy to use
- Easily downloaded from our website, www.aaon.com/Prism
- On-site or TCP/IP communications
- User programmable description for every piece of equipment and user-defined custom screens
- Automatic retrieval of trend logs and export capability to spreadsheet and database programs
- Alarm Logs maintained on disk
- Alarm E-mail/texting capability when using a CommLink
- Encrypted History Logs

System Requirements

To use Prism 2 you must have a computer that meets or exceeds the following requirements:

Operating System

- Microsoft® Windows® 10
  
  **NOTE:** Prism 2 is not intended for a server/client environment nor for any version of Windows Server.

Minimum Hardware

- Windows® compatible computer
- CommLink 5 or USB Link 2 for direct, on-site connection
- IP Module for remote connection
- Prism is NOT supported in a server environment. It does not support client/server systems. Prism is a LAPTOP/DESKTOP ONLY system.

Software License

Prism 2 does not require any license agreement and may be freely copied and distributed.

**WARNING:** Older operating systems, while they still might be capable of running Prism, are not recommended due to security updates being obsoleted by Microsoft®. We also do not support troubleshooting of any version of Windows® operating the Prism program. Some new models of laptops running the latest release of Windows® 10 have also experienced issues running Prism, and we cannot troubleshoot customer computer issues.

Support Information

AAON provides Prism 2 installation and configuration support. Call (866) 918-1100 for free, direct telephone support or (816) 505-1100 to talk to a Controls Support Representative. Support for all telephone services is available Monday through Friday, 7:00 AM to 5:00 PM central standard time.

**NOTE:** AAON Controls Support cannot troubleshoot internal PC and/or Windows®-based operating system problems.

**NOTE:** AAON Controls Support cannot troubleshoot firewalls, routers, and/or problems on a customer's internal or external network. An IT professional may need to be consulted.

Additional Information

In order to successfully establish Prism 2 communications with your controls system, you will want to refer to one or more of the following technical guides, all downloadable from our website, www.aaon.com/controlsmanuals

- Prism 2 Technical Guide
- CommLink 5 Technical Guide
- IP Module Technical Guide
- USB-Link 2 Technical Guide
- MiniLink PD 5 Technical Guide
Prism 2 Technical Guide Overview

The Prism 2 Technical Guide will lead you through each step in configuring Prism 2—from entering passcodes to searching and selecting units for troubleshooting. Below is a quick overview of each step of the guide that pertains to the Pioneer Gold Controller.

**Step 1: Installing Prism 2**—This section explains how to install the Prism 2 software, initiate communications, navigate the program, and enter and edit passcodes.

**Step 2: Setting Up Job Sites**—This section provides instructions for setting up each job site’s name, port, or IP address, CommLink type and configuration, alarm notification, and custom screen designation.

**Step 3: Configuring Prism 2**—This section describes how to have Prism 2 automatically restart after a power failure and broadcast time to all controllers. It also explains how to set up the main screen display picture.

**Step 4: Setting Up Communications**—This section explains how to establish communications via TCP/IP connection through your CommLink.

**Step 5: Searching for Installed Units**—This section explains how to perform a unit search per job-site.

**Step 6: Selecting and Renaming Loops and Units**—This section explains how to select and rename loops and units.

**Step 7: Configuring Units**—This section describes how to configure controller setpoints, schedules, and holidays. It also explains how to configure units while off-line.

**Appendices**—The appendices include examples of status and setpoint screens, instructions for DEMOMODE, and a list of controllers, E-BUS modules, and other devices that can be updated using Prism 2.
Controller Status Screen

After successful Prism 2 installation and job-site setup, you will be able to access the Pioneer Gold Status Screen. See Figure 1 below.

Besides displaying the current operating status and inputs and outputs, from this screen you can force occupancy, set schedules, view alarms, and access and change setpoints.

The following status points are displayed in the Pioneer Gold Controller Status Screen shown above:

- Mode of Operation
- Space Temp
- Supply Air Temp
- Indoor Humidity
- CO₂ Level
- Evap Coil Pressure
- Suction Pressure
- Discharge Pressure
- Water Valve Status
- Active Heating Setpoint
- Active Cooling Setpoint
- Leaving Water Temp 1
- Leaving Water Temp 2
- Entering Hot Water Temp
- Reversing Valve Status
- Occupancy Status
- Hot Water Valve Position
- Entering Water Temp
- Waterside Economizer
- Heat Stage On/Off
- Thermostat Calls
- Force Mode
- Alarm Indicator
- Low Speed Fan
- Compressor Stage 1
- Compressor Stage 2
- Compressor Stage 3
- Compressor Percentage
- Outdoor Air Airflow
- Condensate Overflow 1
- Condensate Overflow 2
- Low Pressure Switch
- Auxiliary Alarm
- 24 Hour Operation
- Reheat On/Off
- Airflow Proving
- Damper Override
- Fan Signal
- High Speed Fan
- Compressor Stage 2
- Compressor Stage 1
- Condensate Overflow 1
- High Pressure Switch
- Auxiliary Alarm
- 24 Hour Operation

NOTE: Only the Administrator and top level users can access and change setpoints and schedules.
Controller Setpoint Screens

Setpoints are accessed by clicking on <Setpoints> at the top left of Pioneer Gold Status Screen (Figure 1, page 5). The Temperature & Ratios Setpoints Screen will display. See Figure 2.

At the bottom of any Setpoints Screen, you can access all other Setpoint Screens by clicking the icons, Temperatures, Staging Delays, Miscellaneous, Calibration, Configuration, and Administrative.

The figures that follow show the rest of the screens available under Setpoints.
## PRISM 2 OVERVIEW

### Controller Setpoint Screens

### Configurations

- **Unit Application**
  - TStat
  - CA/
  - SZ/AV

- **Supply Fan**
  - Single Speed
  - Two Speed
  - 0 - 10V Analog

- **Supply Fan Operation**
  - Off (Unit Disable)
  - Always On
  - Auto
  - Occupied On / Unoccupied Auto

- **Compressor Configuration**
  - Single Stage On/Off
  - Single Two Step
  - Two Stage On/Off
  - Five Stage

- **Waterside Economizer**
  - Disabled
  - Cooling Only
  - Heating Only
  - Dual (Heat and Cool)

- **Dehumidification**
  - Disabled
  - Fan Speed Dehum
  - HGRH (On/Off)

- **Water Flow Sensor**
  - No Flow Sensor
  - V97450
  - V97460
  - V97470
  - V97480

- **Desuperheater Enabled**

- **Has Fan Proving Switch**

- **Has Dehumidification Priority**

- **Space/Supply Cooling Reset Enabled**

- **Space/Supply Heating Reset Enabled**

- **24/7 Occupied Operations**

### Figure 3: Configuration Setpoints Screen

### Figure 4: Staging Delays Setpoints Screen

### Figure 5: Miscellaneous Setpoints Screen

### Figure 6: Calibration Setpoints Screen
Administrative Functions

The Administrative Functions Screen has three functions—Alarm Lockout Reset, Password Reset, and Emergency Shutdown.

### Alarm Lockout Reset

Selecting this option will immediately reset any alarm(s) that has been cleared. It will also restore operation after an emergency shutdown.

### Password Reset

Selecting this option will reset the Pioneer Gold Touch Screen system passwords to their defaults.

### Emergency Shutdown

This will immediately shut the controller’s relays down. To restore operation, select **<Alarm Lockout Reset>**.

Changing Setpoints

If you position the cursor over the top of a setpoint box, a *Help Window* will pop up indicating how that setpoint is used by the controller.

If you enter a setpoint that is either too high or too low or if you don’t have Level 3 access, Prism 2 will not accept the new value and will restore the previous value in that field. When you enter a value, you must *press* **<Enter>** to have Prism 2 save the value.

Saving and Restoring Setpoints

At the top of each setpoint screen, you can *select* **<Save>** or **<Restore>**. These two functions save and copy over ALL of the setpoints for a controller, not only those on a single setpoint screen.

*Saving all setpoints from the controller to a file on your computer for use in restoring the setpoints or for copying to another specific controller will save time in configuring your controller and save valuable time in having to reenter setpoints for another controller.*

**NOTE:** Saving and restoring setpoints in Prism 2 to a flash drive is not the same as saving and restoring setpoints using the Pioneer Gold Touch Screen USB function.

Force Occupied

You can override the schedule mode of operations to go occupied by *clicking* on the **<Not Forced>** button. The button will change to **<Force Occupied>** and the Occupancy Status button will turn green.

A forced occupied will remain in effect until cancelled. To cancel the override, *click* on the **<Force Occupied>** button to turn it off.
Schedules & Holidays

When you select the <Schedules> icon found on the Controller Status Screen (Figure 1, page 5), the Schedules Menu will appear.

Select <Load Schedule Setup> and the Schedules Screen will appear. See Figure 8.

NOTE: 24 Hour operation must be cleared in order for the Schedules Screen to load.

Figure 8: Schedules Screen

The Controller has two event start and stop times per day and two event start and stop times for holidays. The holiday start and stop times will override the standard operating hours.

When you enter a time in any field, you must designate AM or PM and press <ENTER>.

To schedule holidays, press the <Holidays> button. The Holiday Schedule Screen will appear. See Figure 9.

Click on the date to highlight it and tag it as a holiday. Days selected as holidays are indicated with a green background and white text.

There are 14 holiday periods available for each year. These holiday periods can span a single day or they can span weeks or even months.

If your job-site has days during the year when you need to override the standard operating hours to accommodate holidays or other special events, you can use this window to select the holidays.

You cannot program holidays for next year and holidays do not automatically adjust for the new year, so you will need to access this screen after the new year and make necessary adjustments to the days that float, such as Memorial Day.

Saving and Restoring Schedules & Holidays

While at the Schedules Screen (Figure 8), select <Save> to save your schedule. Select <Restore> to restore a previously saved schedule. Select <Erase Schedules> to completely erase the schedule appearing in the window.

WARNING: <Erase Schedules> will clear ALL entered stop/start times, so use with caution.

While at the Holiday Schedule Screen (Figure 9), select <Save> to save the Holidays. Select <Restore> to restore previously saved Holidays. Select <Erase> to completely erase the holidays appearing in the window.

Saving all schedules from the controller to a file on your computer for use in restoring the schedules or for copying to another specific controller will save time in configuring your controller and save valuable time in having to reenter schedules for another controller.

Set and Clear 24 Hour Operation

From the Schedules Menu, select <Set 24 Hour Operation>. After a brief pause, the 24 Hour Operation signifier will appear on the screen to the right of the Schedules icon.

To cancel 24 hour operation, from the Schedules Menu, select <Clear 24 Hour Operation>. After a brief pause, the 24 Hour Operation signifier will disappear from the screen.
Alarms

Viewing Alarm Status

The Unit Alarm Screen is accessed from each controller’s status screen by clicking the <ALARM> button. This button will be a dull red and display <No Alarms> when there are no alarms present or will be bright red and display <ALARM> if active alarms exist.

Click the <ALARM> button when bright red or the <No Alarms> button when dull red. The Unit Alarm Status Screen will appear. See Figure 10.

Each individual <ALARM> button will be bright red if an alarm exists and will be gray if no alarm exists.

Click the blue <Reset Lockout> button at the bottom right of the screen to immediately reset an alarm once it has cleared.

Figure 10: Unit Alarm Status Screen
Optional Computer Connection Diagram Using CommLink 5

Figure 11: CommLink 5 Connection
Figure 12: IP Module Connection
USB-Link 2 Connection Diagram

Connect Mini-DIN Cable End To Mini-DIN Port On USB-Link.

Communication Speed Switch Must Be Set To High Speed

Configure Switch Must Be Set To Standalone Or Network Depending On Your Installation.

Connect Type B Cable End To USB Port On USB-Link 2.

USB Cable Supplied With USB-Link 2

ASM01963 Adapter Supplied With USB-Link 2

Mini-DIN Cable

Use The Adapter And Wire To A Terminal Block To Connect The USB-Link 2 To The Local Communications Loop

NOTE: This Allows Communications With All Controllers That Are Connected To The System. See Note 1.

Job-Site Computer (By Others) with Prism 2 Software Installed

NOTE: WattComm must be selected as the Protocol in the Pioneer Gold Touch Screen’s Network screen in order to establish a connection with Prism 2.

Figure 13: USB-Link 2 Connection
AAON Factory Technical Support: 918-382-6450
techsupport@aaon.com

AAON Controls Support: 866-918-1100
Monday through Friday, 7:00 AM to 5:00 PM
central standard time

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.