



AireLogic

High Static FAS

Digital Control System

User Manual

Touchscreen Systems

Table of Contents

OVERVIEW	8
NETWORKING	9
DEFAULT SETTINGS	9
Unit Configuration.....	9
Unit Resets	10
Unit Setpoints	10
Unit Control & Operating Modes	13
Overview	13
UNIT Control Modes	13
UNIT Operation Modes.....	13
HEATING/VENTILATION Control Modes	13
MIXING BOX DAMPER Control Modes.....	13
SUPPLY FAN Control Modes.....	13
Unit Control Modes	14
MRT-Touch.....	14
MDT-Touch.....	14
Unit Operation Modes.....	15
UNIT OFF MODE	15
UNIT MANUAL MODE.....	15
UNIT AUTO MODE.....	15
Scheduling Time Clock	16
Creating Schedules.....	17
Continuous Schedules	17
24 Hour Schedules	17
Overlapped Schedules	18
Heating Night Setback.....	18
Auxiliary Unit Enable	18
BAS Network Enable	18
Heating/Ventilation Operating Modes	19
General Wing Face & Bypass Damper Control.....	19
Heating Mode (MRT-Touch).....	19
Overview í í í	19
Room Sensor Failsafe	19
Setpointsí í í	20
Occupied Modeí	20
Unoccupied / Night Setback Mode.....	20
Heating Mode (MDT-Touch).....	21
Overviewí í í	21
Setpointsí í í	21
Scheduled On Mode	21
Scheduled Off Mode.....	21
Ventilation Mode.....	22

Mixing Box Damper Control Modes	24
Overview	24
Minimum Ventilation	24
Mixing Box Damper Mode.....	24
Manual Mode	24
MRT-Touch Controls	24
Mixed Air Temperature Control.....	25
MDT-Touch Controls.....	25
MRT-Touch Controls	25
Building Pressure Control.....	26
MRT-Touch Controls	26
Supply Fan Control Modes	27
Overview	27
Supply Fan Control Mode.....	27
Run Conditions	27
Unit Off Mode.....	27
Unit Manual Mode	27
Unit Auto Mode	27
Manual Mode	28
MRT-Touch and MRT-Touch Controls	28
Building Pressure Control.....	29
MRT-Touch and MRT-Touch Controls	29
Constant Airflow Control (Piezo Ring)	29
MRT-Touch and MRT-Touch Controls	29
Building Pressure Control, w/Airflow Status (Piezo Ring)	30
MRT-Touch and MRT-Touch Controls	30
Fan Cut-Off Control.....	30
MRT-Touch and MRT-Touch Controls	30
Multiplexed Inputs	31
Auxiliary Unit On Status.....	32
Clogged Filter.....	32
Fan Status.....	32
Freeze Stat.....	32
100% Outside Air Mode.....	32
MRT-Touch Controls	32
Equipment Touch User Guide	33
Navigation	33
Overviewí í í	34
Changing Setpoints and Other Editable Values.....	34
Home Screení í	34
Symbol Legend Screení í	35
Login Screení í	35
Passwordsí í	35

Equipment Touch User Guide (cont.)

- Confirmation Information Screen í 36
- Menu Screen í 36
- Status Screen í 37
- Cycles and Runtimes Screen 38
- Setpoints Screen í 39
- Modes Screen í 40
- Unit Setup Screen..... 41
- Brand Configuration Screen..... 42
- Heating PIDs Screen..... 43
- Resets Screen í 44
- Alarms Reset í 45
- Fan Counter Reset í 48
- Archive Procedure Screen..... 49
- Factory Archive Screen í 51
- Field Archive Screen í 52
- Restoring Controller From Factory/Field Archive í 53

- IOM (Installation, Operation, and Maintenance Manual) Screen 54

- System Screens** 55
 - System Screen 55
 - Module Status (Modstat) Screen 55
 - Schedules Screen í 57
 - Alarms Screen í 57
 - Setup Screen í 58
 - Trends Screen í 59
 - Browser Screen í 60

- Setup Screens** 62
 - Module Setup Screen..... 62
 - Set Time and Date Screen..... 63
 - Communication (BACnet) Screen..... 64
 - IP Screen 65
 - Touchscreen Setup Screen 65
 - About Screen 65
 - Key Click Off/On Screen 65
 - Reload Firmware Screen 65
 - Passwords 65
 - Inactivity Timeout Screen 66
 - Clean Screen..... 66
 - Alarm Sound Off/On Screen..... 66
 - Language Screen..... 66
 - Calibrate Touch Panel Screen..... 66
 - Login Screen í 66

- Protocol Setup** 67
 - BACnet MS/TP 68
 - Modbus..... 69
 - N2 70
 - LonWorks (LonTalk) 71

- Diagnostics – Critical Alarm Codes** 72
 - ALARM CODE: Freeze Stat..... 72
 - SOLUTION: If heating coil was operating prior to shutdown (check prior alarm log) 72
 - SOLUTION: If heating coil was not operating prior to shutdown (check prior alarm log)..... 73

Diagnostics – Non-Critical Alarm Codes	74
ALARM CODE: <i>Unit Off/Fan On</i>	74
SOLUTION: If fan is running.....	74
SOLUTION: If fan is not running.....	74
ALARM CODE: <i>Unit On/Fan Off</i>	75
SOLUTION: If fan/motor is running.....	75
SOLUTION: If fan/motor is not running.....	75
ALARM CODE: <i>Fan Cut-Off</i>	76
SOLUTION: Investigate the fan cut-off setpoints.....	76
ALARM CODE: <i>Clogged Filters</i>	76
SOLUTION: If clogged filter switch is closed.....	76
ALARM CODE: <i>Discharge Air Temp High</i>	77
SOLUTION: Investigate the heating setpoints.....	77
ALARM CODE: <i>Discharge Air Temp Wiring Open</i>	78
SOLUTION: Investigate the discharge air sensor.....	78
ALARM CODE: <i>Discharge Air Temp Wiring Short</i>	78
SOLUTION: Investigate the discharge air sensor.....	78
ALARM CODE: <i>Outside Air Temp Wiring Open</i>	79
SOLUTION: Investigate the outside air sensor.....	79
ALARM CODE: <i>Outside Air Temp Wiring Short</i>	79
SOLUTION: Investigate the outside air sensor.....	79
ALARM CODE: <i>Room Sensor Failure</i>	80
SOLUTION: Investigate the room sensor.....	80
ALARM CODE: <i>Monthly/Quarterly/Yearly Maintenance Reminder (See IOM)</i>	80
SOLUTION: If an active maintenance reminder alarm is present.....	80
ALARM CODE: <i>Invalid Damper Control Mode</i>	81
SOLUTION: If the unit is configured for MRT or MRT-Touch controls.....	81
SOLUTION: If the unit is configured for MDT or MDT-Touch controls.....	81
ALARM CODE: <i>Invalid Fan Size</i>	81
SOLUTION: If the unit is configured for MRT or MRT-Touch controls.....	81
SOLUTION: If the unit is configured for MDT or MDT-Touch controls.....	81
Glossary	82
Appendix A	83
<i>High Static FAS Fan Information</i>	83
Appendix B	84
<i>10KΩ Thermistor Output Curve</i>	84
Appendix C	85
<i>I/O Zone 583 Controller Specifications</i>	85
Appendix D	86
<i>I/O Zone 583 Controller Battery Checkout</i>	86

Appendix E	87
Control System Field Conversion	87
Appendix F	88
Room Sensor Wiring.....	88
Appendix G	89
Equipment Touch Wiring.....	89
Portable / Using the Terminal Plug.....	89
Notes	90

OVERVIEW

A glossary has been provided to assist the reader in understanding distinctive terms and phrases. These terms and phrases appear in italics. The terms *unoccupied* and *night setback* are used interchangeably in this manual to refer to all time periods in the unit's operating schedule outside of the occupied period time range. The terms *supply air* and *discharge air* are used interchangeably in this manual to refer to the conditioned air that leaves the unit through the discharge opening.

L.J. Wing's Digital Control System, AireLogic, is designed to give the user the ultimate in unit performance and operational flexibility, adaptability, and reliability in a user-friendly package. The AireLogic DDC control system is a standard component on the High Static Fresh Air Supply (HSFAS) heating units. **Because the AireLogic system encompasses a wide variety of unit types, not all of the system's capabilities and functions are relevant to all units.** Where a function is similar but different between recirculating and non-recirculating units, the function is explained separately.

The AireLogic system can be networked as single or multiple unit controllers on a building automation system network. Each unit controller is provided with an *Equipment Touch* touchscreen interface. The *Equipment Touch* terminal connector is wired to the unit controller via terminal blocks in the unit's main control panel. The operating parameters (setpoints) for an individual unit controller may be input through the *Equipment Touch* touchscreen. A laptop or PC may also be connected to the network, to allow a user to configure each unit controller separately, or all unit controllers can be configured simultaneously. A controls contractor can provide assistance in networking.

The *Equipment Touch* touchscreen is connected using a terminal connector on the back of the *Equipment Touch*, which wires directly into terminal blocks in the unit's main control panel. The *Equipment Touch* touchscreen 24VAC power wires are paralleled with power wires of the unit controller. The *Equipment Touch* touchscreen Rnet + and Rnet - wires connect to the unit controller's Rnet port. All *Equipment Touch* touchscreen power and Rnet wiring connections must maintain polarity.

L.J. Wing's AireLogic system also includes operational modes such as time scheduling, filter monitoring, and multiple damper control and temperature control schemes. All of these modes provide the maximum in unit operational flexibility.

Air volume can vary because of changes in static pressure conditions due to loading filters, VAV boxes, and building dynamics. These varying conditions influence the ventilation air provided by the unit.

AireLogic diagnostic capabilities insure swift response to abnormal unit conditions. An alarm is generated anytime a discrepancy exists between operational parameters and actual unit operation. An alarm indication is displayed at the *Equipment Touch* as a red icon with a white exclamation mark (!) and at a system PC in text format. In the Diagnostics section of this manual is a list of all alarms and possible causes and solutions.

All of the features of the AireLogic system are designed to provide the user with real time information. At any time the user can display all of the operational parameters, make changes, if necessary, and observe the various temperature, pressure, and damper readings.

The system's diagnostic capabilities provide the user with up to the minute status reporting. (*Equipment Touch* touchscreen or *WebCTRL* Internet web browser connection is required for these features.)

NETWORKING

AireLogic is adaptable to a variety of different building automation system network architectures and protocols. Each unit controller has DIP switch selectable built-in protocol translation and can be configured for operation on either EIA-485 or ARC156 communication networks. See Appendix C (I/O Zone 583) for specific controller specifications.

The AireLogic system can be connected to most existing building automation systems (BAS). Some BAS systems may require the use of special controllers and network communication devices.

DEFAULT SETTINGS

The following is a list of L.J. Wing DDC controller default parameters (setpoints). These are the default operating parameters set at the factory prior to shipment.

UNIT Configuration

ITEM	DEFAULT	RANGE
Unit Module Network Address:	Varies	00 - 99, (2) Rotary dial switches
Building Pressure Option: (PT-13)	0	0 - Off, 1 - On
Control System:	*	0 - MRT (Modulating Room Temp Control) 1 - MDT (Modulating Discharge Temp Control)
Fan Motor Phase (Ø):	*	0 - 3 Phase, 1 - 1 Phase
Fan Motor Volts (V):	*	1 - 200V, 2 - 208V, 3 - 230V, 4 - 460V
FAS Fan Type:	*	0 - Rosenberg, 1 - Ebmpapst
Heat Source:	*	0 - Steam, 1 - Hot Water
Mixing Box Option:	*	0 - Off, 1 - On
Piezo Ring Pressure Option: (PT-17)	*	0 - Off, 1 - On
Unit Size:	*	13, 17, 19, 22, 24, 25, 27, 30 (Rosenberg Fan) 17, 19, 22, 24, 25, 27, 30, 33, 36 (Ebmpapst Fan)
Unit Enable:	1	0 - Auto (Schedule/Setback) 1 - Off 2 - Manual (Constant On)
WebCTRL Time Clock Schedule:	None	Configurable via WebCTRL, Equipment Touch, or BAS.

* - Set to match OAs Ordered unit.

DEFAULT SETTINGS (cont.)

UNIT Resets

ITEM	DEFAULT	RANGE
Alarm Reset: (Note: Always change back to Off, for next alarm)	0	0 - Off, 1 - On (2 sec, momentary)
Fan Counter Reset: (Note: Always change back to Off.)	0	0 - Off, 1 - On (Fan runtime hours)

UNIT Setpoints

ITEM	DEFAULT	RANGE
BAS Default Active: (Optional)	0	0 - No (Time Schedule) 1 - Yes (Stand Alone Mode, BAS communication is lost)
BAS Network Enable: (Optional, used to enable time schedule)	0	0 - Off (Occupied) 1 - On (Unoccupied)
Building Pressure Setpoint: Fan Operation Modes - 2, 4 Mixing Box Damper Mode - 2 (Optional)	0.01 ÷w.c.	-0.05 to +0.05 "w.c.
Building Pressure AI Smoothing Setpoint: (Optional)	5	1 - (None) 10 - (Max)
Design Static Pressure: (Fan Operation Modes - 1, 3, 4)	Varies	0.50 ÷w.c. - 2.50 ÷w.c.
Fan Airflow Setpoint: Rosenberg (250mm) Rosenberg (280mm) Rosenberg / Ebmpapst Rosenberg / Ebmpapst Rosenberg / Ebmpapst Rosenberg / Ebmpapst Rosenberg / Ebmpapst Rosenberg / Ebmpapst Rosenberg / Ebmpapst Ebmapst Ebmapst	* FAS-13 FAS-13 FAS-17 FAS-19 FAS-22 FAS-24 FAS-25 FAS-27 FAS-30 FAS-33 FAS-36	455 - 855 cfm 700 - 855 cfm 1,100 - 1,400 cfm 1,850 - 2,000 cfm 2,600 - 2,750 cfm 2,900 - 3,700 cfm 3,500 - 4,300 cfm 4,000 - 5,300 cfm 5,000 - 7,000 cfm 6,500 - 8,500 cfm 8,000 - 10,000 cfm
Fan Cut-Off Buffer Time Setpoint:	3 minutes	3 - 9 minutes
Fan Cut-Off Temperature Setpoint:	45°F	35°F - 80°F
Fan Operation Mode Setpoint:	1	1 - Manual Control 2 - Building Pressure Control 3 - Piezo Ring Pressure 4 - Building Pressure Control w/Piezo Ring Fan Airflow

* ÷ Set to match ÷As Ordered ÷ unit.

DEFAULT SETTINGS (cont.)

ITEM	DEFAULT	RANGE
Fixed Discharge Air Temp Setpoint: (MRT, RS Fail)	70°F	Adjustable
Heating Discharge Air Temp Setpoint: (MDT)	65°F	35°F - 80°F
Heating Night Setback Setpoint: (MRT, Unoccupied)	55°F	40°F - 130°F
Heating Occupied Setpoint (MRT, Occupied)	65°F	35°F - 80°F
Manual Ventilation Setpoint: (Optional)	50%	0 - 100% OA
Maximum Heating Discharge Temp Setpoint: (MRT)	80°F	40°F - 130°F

* ó Set to match õAs Orderedö unit.

DEFAULT SETTINGS (cont.)

ITEM	DEFAULT	RANGE
Minimum Heating Discharge Temp Setpoint: (MRT & MDT)	55°F	40°F - 130°F
Minimum Ventilation Setpoint: (Optional)	20%	0 - 100% OA
Mixed Air Temperature Setpoint: (Optional)	50°F	30°F - 90°F
Mixing Box Damper Mode Setpoint: (Optional)	3	1 - Mixed Air Temp Control 2 - Building Pressure Control 3 - Manual Control
Piezo Ring AI Smoothing Setpoint: (Optional)	2	1 - (None) 10 - (Max)

Unit Control & Operating Modes

Overview

See the *Equipment Touch User Guide* section of this manual for more information about navigating the *Equipment Touch* menus. Changing the unit setpoints requires the use of an *Equipment Touch* panel, or computer running the optional WebCTRL server software.

There are two different methods for controlling the operating modes:

- *Equipment Touch* touchscreen panel (MRT-Touch and MDT-Touch controls).
- Internet-based *WebCTRL* interface, or 3rd party building automation system (BAS).

UNIT Control Modes

There are two different temperature control modes that control unit operation:

- MRT-Touch
- MDT-Touch

UNIT Operation

There are three different modes that control the supply fan and unit operation:

- Auto
- Off
- Manual

MIXING BOX DAMPER Control Modes

There are three different modes that control the mixing box damper operation (optional):

- Manual
- Mixed Air Temperature
- Building Pressure

SUPPLY FAN Control Modes

There are four different modes that control the supply fan operation:

- Manual
- Building Pressure
- Constant Airflow (Piezo Ring)
- Building Pressure with Piezo Ring Airflow Status

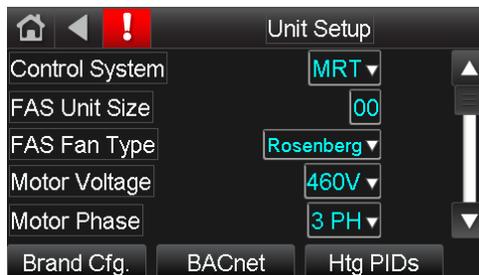
Unit Control Modes

MRT-Touch Controls

The MRT-Touch (Modulating Room Temperature) AireLogic DDC control system provides full information regarding unit operation and allows the user to adjust all operational parameters, using the *Equipment Touch* panel. The MRT-Touch control system requires a room temperature sensor (*ZS Standard*).

AireLogic units configured for MRT-Touch control will have a fixed discharge temperature of 70°F if the room temperature sensor is disconnected or otherwise fails to communicate with the unit control module.

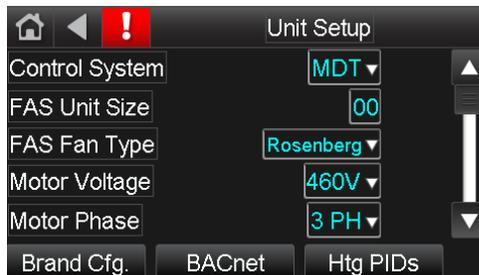
The Unit Control Mode setpoint is the AireLogic unit temperature control system mode, based on Modulating Room Temperature (MRT). To place unit in the MRT control mode on the touchscreen, navigate to the **Unit Setup** screen (Home > Menu > Unit Setup). Change the **Control Mode** enable setpoint dropdown to "MRT". The MRT control system is factory set.



MDT-Touch Controls

The MDT-Touch (Modulating Discharge Temperature) AireLogic DDC control system provides full information regarding unit operation and allows the user to adjust all operational parameters using the *Equipment Touch* panel.

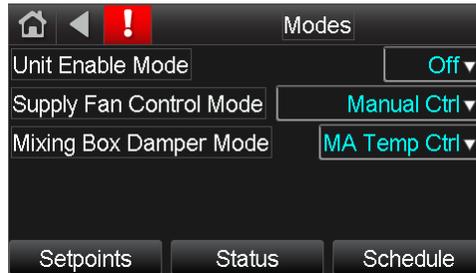
The Unit Control Mode setpoint is the AireLogic unit temperature control system mode, based on Modulating Discharge Temperature (MDT). To place unit in the MDT control mode on the touchscreen, navigate to the **Unit Setup** screen (Home > Menu > Unit Setup). Change the **Control Mode** enable setpoint dropdown to "MDT". The MDT control system is factory set.



Unit Operation Modes

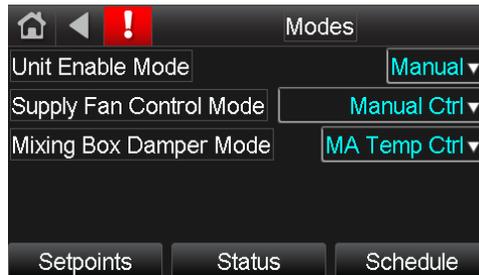
Unit Off Mode

Off Mode is the default unit operational mode. To place the unit in Off Mode on the touchscreen, navigate to the **Modes** screen (Home > Menu > Modes). Change the **Unit Mode** enable setpoint dropdown to "Off". This will place the unit in the OFF mode. The OFF mode prevents the fan, face & bypass damper, and mixed air damper (optional) outputs from starting. This mode will override the Time Clock and Night Setback functions.



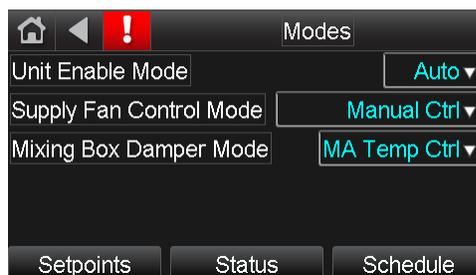
Unit Manual Mode

Manual Mode allows the supply fan to turn on regardless of the Time Clock or Night Setback functions. *Heating functions use the Occupied Setpoint.* To place the unit in Manual Mode on the touchscreen, navigate to the **Modes** screen (Home > Menu > Modes). Change the **Unit Mode** enable setpoint dropdown to "Manual".



Unit Auto Mode

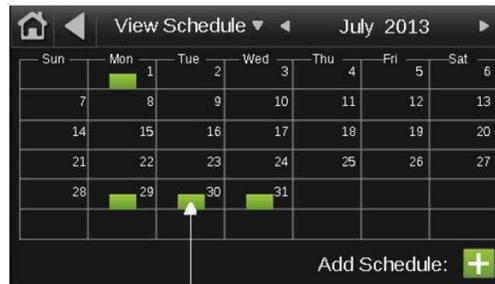
Auto Mode has three different functions that control the supply fan and unit operation. They are a time clock function, heating night setback, and a signal from an external source to an auxiliary digital input. To place the unit in Auto Mode on the touchscreen, navigate to the **Modes** screen (Home > Menu > Modes). Change the **Unit Mode** enable setpoint dropdown to "Auto". This activates the three Auto mode functions.



Scheduling Time Clock

The primary Auto Mode function is the Time Clock Schedule. The Time Clock function allows the user to set up the unit's Occupied and Unoccupied periods. There are two different schedules available: an ON schedule and an OFF schedule. The ON schedule sets the typical Occupied times for the unit. The OFF schedule sets the Unoccupied times for holidays and other shutdown periods. The AireLogic DDC system has no preset ON/OFF or Occupied/Unoccupied schedule.

To view a monthly schedule on the touchscreen, navigate to the **View Schedule** screen (Home > Menu > Schedules). Touch **View Schedule**, and touch either **Month View** or **Week View**. Month View shows which days of a current month have schedules, as indicated by green bars.



Touch day to see schedule(s).

Month View

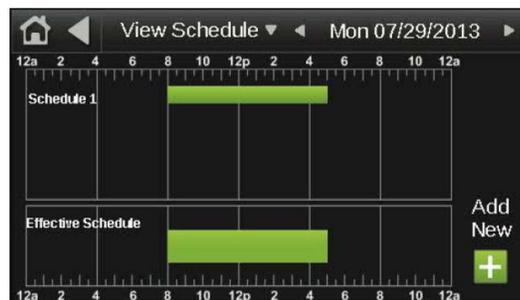
Week View shows which days of a current week have schedules, as indicated by green bars.



Touch day to see schedule(s).

Week View

Touch a day (Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, and Saturday) on the touchscreen, to see a schedule for that day. All schedules that affect that day will be listed on the top and the effective schedule will be shown on the bottom as in the screenshot below. The effective schedule is the combined result of the day's schedules (all ON and OFF schedules that affect that particular day).



Day View

Creating Schedules

To create a schedule on the touchscreen, navigate to **View Schedule** screen (Home > Menu > Schedules). Touch the plus sign (+) to the right of **Add Schedule**. Touch the **Schedule Name** field and enter a schedule. Select whether you want the schedule to be an **ON schedule** or an **OFF schedule**. ON schedules set the Occupied times of the unit and OFF schedules set the Unoccupied times of the unit that override an ON schedule. Only set OFF schedules if you want to override part or all of an ON schedule for a certain period of time. Select the schedule's priority. For ON schedules, select **Normal** for a typical Occupied period and **Override** for an Occupied period that is to override an OFF schedule. Touch the **Type** field and choose whether you want a Dated, Weekly or Continuous schedule.

A **Dated schedule** runs for a specific period of time between a start and end date. For example, 7:00am to 7:00pm every day between July 1st and July 22nd.

A **Weekly schedule** runs every week on the specified days. For example, every Monday through Friday, 9:00am to 5:00pm.

A **Continuous schedule** runs continuously between two specified dates and times. For example, a non-stop schedule that runs from June 1st at 12:00am to August 31st at 11:50pm. Touch **Next** to select the times and dates based on whether you selected Dated, Weekly, or Continuous for the schedule type. Touch **Save** when finished.

For a schedule that has already been created, the Type (Dated, Weekly, Continuous), Priority (Normal, Override), or whether it is an ON or OFF schedule cannot be changed. If you need to change any of these settings, delete the schedule and make a new one.

Continuous Schedules

To run unit continuously for 24 hours on certain days of a week, or on every day of the week:

1. Navigate to Home > Menu > Schedules
2. Touch the Schedule Name field and input a schedule name
3. Touch the ON Schedule (Occupied) checkbox
4. Change the type field to Weekly
5. Change the priority to Normal
6. Touch the Next button
7. Touch the time in the Starts field
8. Touch the All Day Event button
9. Touch the Done button
10. Touch the desired Days buttons (M, Tu, W, Th, F, Sa, Su) for the days you want the unit to run 24 hours (some or all days may be selected)
11. If you only want this schedule to apply for a certain date range, touch "Yes" after the "Does this schedule have a date range?" statement; otherwise touch "No"
12. Touch the Save button

24-Hour Schedules

To create a 24-hour schedule on the touchscreen, navigate to the **View Schedule** screen (Home > Menu > Schedules). Input the Schedule Name, select the ON schedule checkbox, select "Weekly" for type, select "Normal" for priority, and touch the Next button. Touch the time in the "Starts" field and press the "All Day Event" button. Press the Done button.

Overlapped Schedules

To prevent the unit from running during a period of time when an ON schedule is active, create an OFF schedule that overlaps part or all of the ON schedule, depending on what is required. For example, if you have a Weekly ON schedule that runs the unit on Monday through Friday from 9:00am to 5:00pm and you want the unit to be off on Wednesdays from 11:00am to 1:00pm, create an OFF schedule for Wednesdays from 11:00am to 1:00pm. The unit will then run on Monday through Friday, 9:00am to 5:00pm, except for on Wednesdays when the unit will run from 9:00am to 11:00am and 1:00pm to 5:00pm, with the unit not running during the 11:00am to 1:00pm period because of the OFF schedule.

Heating Night Setback

The Heating Night Setback function automatically cycles the unit *on* if the room temperature falls below the Heating Setback temperature setpoint, and the unit is scheduled to be *off*. If the unit is scheduled to be *off* and the Heating Setback function turns the unit *on*, the unit will be cycled *off* once the room air temperature has risen 2°F above the Heating Setback setpoint. The default for this setpoint is 55°F. To change the Heating Setback setpoint on the touchscreen, navigate to the **Setpoints** screen (Home > Menu > Setpoints), locate the Heating Setback setpoint and enter a new temperature. The allowable temperature range is 40°F - 130°F.

Auxiliary Unit Enable

The Auxiliary Unit Enable function overrides all other Auto Mode functions and automatically cycles the unit into operation. This function is activated whenever a contact is closed between the appropriate terminals on the unit's terminal strip located in the unit's main control panel. *Heating functions use the Night Setback Setpoints.* See the Typical Wiring Schematic and Multiplexed Input sections of this manual for more information. This function can be used with a twist timer, toggle switch, door switch, exhaust fan interlock, or any other dry contact to override the time clock schedule.

BAS Network Enable

The BAS Network Enable function overrides all other Auto Mode functions and automatically cycles the unit into operation. The building automation system (BAS) activates this function by changing the BAS Network Enable parameter (BACnet point) to "on", which is displayed on the touchscreen's **Status** screen (> Home, > Menu, > Status). *Heating functions use the Occupied Setpoints.*

Heating/Ventilation Operating Modes

The AireLogic DDC controller automatically switches between the heating and ventilation modes of operation. The previous section described the Heating Night Setback operation. Supply air and discharge air are interchangeable temperatures throughout this manual.

General Wing Face & Bypass Damper Control

The High Static Fresh Air Supply (FAS) unit will include a face and bypass coil, with alternating heating and bypass sections. Hot water or steam is circulated through the face section to warm the outside air. The air flowing through the bypass section will not be heated. Integral face & bypass dampers will blend outside and heated air into a single stream of uniform discharge air temperature. The face & bypass dampers will each have a spring return damper actuator for individual operation, and are setup as normally closed to act as a shut-off damper when off, to prevent the infiltration of outside air. The face & bypass dampers are 90° mechanically opposed to one another.

The high static FAS unit can be controlled either by room temperature or discharge air temperature. When the unit is turned on the default position for the face dampers is normally closed, and the default position for the bypass dampers is normally open.

Heating Mode (MRT-Touch)

Overview

The face & bypass dampers will be controlled by a room thermostat. The controller will modulate the face & bypass damper positions, depending on the room temperature setpoint. When maximum heat is required (full face), the bypass dampers are completely closed, and all the outside air is directed through the heated face sections. As the outside air temperature rises near the room temperature setpoint, outside air is directed through both the face & bypass dampers. When no heat is required (full bypass) and the outside air is equal to or greater than the room temperature setpoint, outside air is directed through the bypass dampers only.

In the MRT control system heating mode, the face & bypass dampers will modulate accordingly to maintain a constant room air temperature. The controller maintains the supply air temperature between minimum and maximum heating discharge air temperature setpoints, using minimum and maximum heating discharge air temperature PID loops. It is important that a call for the unit to operate is present, for the heating to turn on.

If heating is enabled and the room setpoint is not yet satisfied, the unit will maintain the discharge air temperature at the maximum heating discharge air temperature setpoint. As the room temperature begins to rise, the unit will modulate the face & bypass dampers so as to ensure the room temperature setpoint is maintained.

Room Sensor Failsafe

AireLogic units configured for MRT-Touch controls will have a fixed discharge temperature setpoint of 70°F (adjustable) that will be used if the room temperature sensor is disconnected or otherwise fails to communicate with the controller. When the room temperature sensor fails to communicate with the controller, a room temperature of 0°F will display on the *Equipment Touch*.

Setpoints

Navigate to the **Setpoints** screen on the *Equipment Touch* to change the MRT-Touch heating setpoints (Home > - Menu > Setpoints). The controller compares the maximum heating discharge air temperature setpoint of 80°F (adjustable) to the discharge air temperature, to maintain a maximum face section temperature. The controller compares the minimum heating discharge air temperature setpoint of 55°F (adjustable) to the discharge air temperature, to maintain a minimum face section temperature.

Occupied Mode

The face & bypass damper control is **enabled** if the room temperature is more than 2°F below the heating occupied setpoint of 65°F (adjustable), with a $\pm 2^\circ\text{F}$ dead band. The controller modulates the face & bypass damper analog output, to increase the face damper position and decrease the bypass damper position.

The face & bypass damper control is **disabled** and goes to full bypass if the outside air temperature is more than 5°F above the minimum heating discharge air temperature setpoint, and the room temperature is above the heating occupied setpoint. The controller analog output is forced to 0VDC, which modulates the face & bypass damper to the full bypass position.

If the room temperature is more than 4°F above the heating occupied setpoint a flashing high room temperature message is activated, on the *Equipment Touch* **Home** screen.

Unoccupied / Night Setback Mode

The face & bypass damper control is **enabled** if the room temperature is more than 2°F below the heating night setback setpoint of 55°F (adjustable), with a $\pm 2^\circ\text{F}$ dead band. The controller modulates the face & bypass damper analog output, to increase the face damper position and decrease the bypass damper position.

The face & bypass damper control is **disabled** and goes to full bypass if the outside air temperature is more than 5°F above the minimum heating discharge air temperature setpoint, and the room temperature is above the heating night setback setpoint. The controller analog output is forced to 0VDC, which modulates the face & bypass dampers to the full bypass position.

Heating Mode (MDT-Touch)

Overview

The face & bypass dampers will be controlled by a discharge air temperature sensor. The controller will modulate the face & bypass damper positions, depending on the discharge air temperature sensor setpoint. When maximum heat is required (full face), the bypass dampers are completely closed, and all the outside air is directed through the heated face sections. As outside air temperature rises near the room temperature setpoint, outside air is directed through both face & bypass dampers. When no heat is required (full bypass) and the outside air is equal to or greater than the discharge air temperature setpoint, outside air is directed through the bypass dampers only.

In the MDT control system heating mode, the face & bypass dampers will modulate accordingly to maintain a constant supply air temperature. The controller maintains the supply air temperature at the heating discharge air temperature setpoint, using a discharge air temperature PID loop. It is important that a call for the unit to operate is present, for the heating to turn on.

If heating is enabled, the unit will maintain the supply air temperature at the heating discharge air temperature setpoint. As the supply air temperature begins to rise, the unit will modulate the face & bypass dampers so as to ensure the discharge air temperature setpoint is maintained.

Setpoints

Navigate to the **Setpoints** screen on the *Equipment Touch* to change the MDT-Touch heating setpoints (Home > Menu > Setpoints). The controller compares the heating discharge air temperature setpoint of 65°F (adjustable) to the discharge air temperature, to maintain the face section temperature.

Scheduled On Mode

Scheduled On mode refers to any time the unit is running based on an ON time clock schedule.

The face & bypass damper control is **enabled** if the discharge air temperature is more than 2°F below the heating night setback setpoint of 55°F (adjustable), with a ± 2°F dead band. The controller modulates the face & bypass damper analog output, to increase the face damper position and decrease the bypass damper position.

The face & bypass damper control is **disabled** and goes to full bypass if the outside air temperature is more than 5°F above the minimum heating discharge air temperature setpoint, and the discharge air temperature is above the heating occupied setpoint. The controller analog output is forced to 0VDC, which modulates the face & bypass dampers to the full bypass position.

Scheduled Off Mode

Scheduled Off mode refers to any time the unit is outside of the time ranges of any ON schedules. The face & bypass damper control is **disabled** in Scheduled Off mode, and fan is Off.

Ventilation Mode

Ventilation Mode occurs when the fan is running, but the AireLogic High Static FAS unit is not providing heat. The ventilation mode is dependent on either the room temperature relative to the heating room setpoint (MRT-Touch), or the outside air temperature relative to the heating discharge air temperature setpoint (MDT-Touch).

Mixing Box Damper Control Modes

Overview

The High Static FAS unit can be ordered with an optional mixing box. The mixed air damper actuators will be spring return, using a 0-10 VDC signal. The outside air damper is normally closed, and the return air damper is normally open. The return air damper and the outside air damper are interlocked to operate 90° opposed to one another. All damper control modes include an option, for a minimum outside air setpoint.

The outside air dampers will remain in the fully closed position and return air dampers will remain in the fully open position any time the fan is not running. A fan status signal must be present for the dampers to operate in manual, mixed air, or building pressure mode. The 100% outside air mode will function even if the fan is not running, driving the outside air dampers fully open and the return air dampers fully closed. If the fan is running, the 100% outside air mode will override the manual, mixed air, and building pressure modes. Manual mode is the default mixing box damper operation mode for all units.

Minimum Ventilation

The minimum ventilation function defines minimum outside air percentage, and automatically prevents the mixing dampers from modulating below the minimum ventilation setpoint. This function applies to both heating and ventilation modes. To specify the Minimum Ventilation setpoint on the touchscreen, navigate to the **Setpoints** screen (Home > Menu > Setpoints). Set the Minimum Ventilation SP setpoint to the desired minimum outside air percentage, in the 0 - 100% outside air range.

Mixing Box Damper Mode

There are three different damper modes that control the mixed air damper operation, on the High Static FAS unit: Mixed Air Temperature, Building Pressure, and Manual. Not all damper modes are available on all FAS high static units. The 100% Outside Air mode is enabled by a contact closure provided by others (SW-72). The 100% Outside Air mode is available for all three damper control modes. See the 100% Outside Air Mode section of this manual.

To select the unit mixing box damper mode on the touchscreen, navigate to the touchscreen **Modes** screen (Home > Menu > Modes). Change the Mixing Box Damper Mode setpoint dropdown to the desired damper mode, from the following choices: MA Temp Ctrl, Bldg Prs Ctrl, or Manual Ctrl.

Manual Mode (Default)

Manual mode sets the outside air and return air dampers to a fixed position. The mixing box dampers are controlled manually or by minimum ventilation for 0 - 100% outside air (whichever is ordered).

MRT-Touch Controls

To place the mixing damper operation in Manual Mode on the touchscreen, navigate to the **Modes** screen. (Home > Menu > Modes). Change the Damper Mode setpoint dropdown to Manual Ctrl. Next, navigate to the **Setpoints** screen (Home > Menu > Setpoints). Change the Manual Ventilation SP setpoint to the desired damper position expressed as a percentage of outside air, in a 0% to 100% range.

Mixed Air Temperature Control

The mixed air temperature control varies the percentages of outside air and return air to maintain a constant mixed air temperature.

The mixing dampers modulate to maintain the Mixed Air Temperature setpoint of 50°F (adjustable). The mixing dampers modulate to a percentage of outside air and return air that creates a mixed air temperature close to the setpoint. FAS high static units without a mixing box do not have mixed air temperature control. Mixed air temperature control requires that the MRT-Touch room temperature control option be ordered.

Mixed air temperature is a calculated value (not sensed). The controller computes the mixed air temperature using the outside air and return air temperatures, and the ratio of their respective airflows. The program will compare the outside air temperature and the room air temperature to determine where the cold air source is from, and modulate the mixed air dampers accordingly to maintain a constant mixed air temperature.

The mixed air temperature PID loops have a ± 2 dead band to prevent the mixed air dampers from changing position, unless the mixed air temperature is more than 2°F away from the mixed air temperature setpoint.

MDT-Touch Controls

The mixed air temperature control mode is not supported on MDT-Touch systems, because a room/return air temperature is not available with that system to allow the mixed air temperature to be calculated correctly.

MRT-Touch Controls

To place the damper operation in Mixed Air Mode on a MRT-Touch control system, navigate to the touchscreen **Modes** screen (Home > Menu > Modes). Change the Mixing Box Damper Mode setpoint dropdown to δ MA Temp Ctrlö. Next, navigate to the touchscreen **Setpoints** screen (Home > Menu > Setpoints). Change the Mixed Air Temp SP setpoint to the desired mixed air temperature, within a 30° - 90°F range.

In some cases, environmental conditions will not permit the mixed air temperature to reach set point. The mixing dampers will be in the 100% outside air or 100% return air position depending on which source has a temperature closer to the mixed air temperature setpoint.

If the room sensor fails to communicate with the controller, the room sensor failsafe mode will be enabled to maintain the discharge temperature at 70°F, and the damper mode will default to manual control. An Invalid Damper Control Mode alarm will be generated if the room sensor fails while the damper mode is in mixed air temperature control. The alarm will clear automatically once room sensor communications are restored, or if the damper mode is manually changed from mixed air temperature control, to another setting.

Building Pressure Control

The Building Pressure mode varies the percentages of outside air and return air, to maintain a constant pressure within the space.

In the building pressure mode, the building pressure will automatically be controlled by modulating the outside air and return air dampers, to maintain the indoor building pressure setpoint of 0.01 W.C. (adjustable). As the building pressure decreases below the setpoint, the outside air damper will open and the return air damper will close. As the building pressure increases above setpoint, the outside air damper will close and the return air damper will open.

A building pressure transducer compares the pressure outside the space to the pressure inside the space and transmits a corresponding signal to the controller. The controller uses a PID loop to modulate the outside air and return air dampers, to maintain the specified building pressure setpoint. The building pressure PID loop has a ± 0.01 dead band to prevent the supply fan from changing speed too often, unless the building pressure is more than 0.01 W.C. away from the building pressure setpoint.

Note: Mixed air building pressure control option is not available with the supply fan building pressure control option, nor the MDT-Touch control system.

MRT-Touch Controls

To place the mixing box damper operation in Building Pressure Mode on a MRT-Touch control system, navigate to the touchscreen **Modes** screen (Home > Menu > Modes). Change the Mixing Box Damper Mode setpoint dropdown to "Bldg Prs Ctrl". Next, navigate to the touchscreen **Setpoints** screen (Home > Menu > Setpoints). Change the Building Pressure SP setpoint to the desired building pressure, in a ± 0.05 to $+0.05$ W.C. range.

Supply Fan Control Modes

Overview

The supply fans for the High Static FAS units are electronically commutated (EC) fan motors, with integrated speed controls (VFD).

Supply Fan Control Mode

There are four different supply fan control modes that control the supply fan operation, on the High Static FAS unit: Manual, Building Pressure, Constant Airflow, and Building Pressure with Constant Airflow Status.

To select the unit supply fan control mode on the touchscreen, navigate to the touchscreen **Modes** screen (Home > Menu > Modes). Change the Supply Fan Control Mode setpoint dropdown to the desired fan mode, from the following choices: Manual Ctrl, Bldg Prs Ctrl, Constant AF Ctrl, or Bldg Prs Ctrl w/AF.

Run Conditions

When the controller energizes the unit enable relay, power is activated to the rest of the High Static FAS unit wiring circuits. There are several ways to enable the supply fan, thereby enabling the unit and initializing all other functions:

- Auxiliary Unit Enable contact provided by user (IN-4 multiplexed controller input).
- Run Command by a BACnet/Modbus/N2/LonWorks protocol signal sent over the network from the user's building automation system (BAS) to the DDC controller.
- User-programmed time-of-day schedule in the WebCTRL interface or the equipment touchscreen, while in Auto Mode.
- Unit Modes: Setting the Unit Enable to Auto Mode, Off Mode, or Manual Mode by either the touchscreen or by the user's building automation system (BAS).

Unit Off Mode

The Off Mode will be the default unit operation mode. Setting the unit to the Off Mode, will prevent the supply fan from running, the unit from turning on and all other functions from being initialized.

Unit Manual Mode

The Manual Mode allows the fan to turn on regardless of any Auto Mode functions such as automatic time scheduling.

Unit Auto Mode

The Auto Mode can be used for controlling the supply fan and all other unit operation functions by using the automatic time schedule function or auxiliary unit enable input.

The Supply fan will be disabled if:

- Auxiliary unit enable is off (Unit mode must be in auto mode).
- An off mode from the programmed time schedule is seen. (In auto mode).
- Unit mode is set to "off" mode.
- Either the Fan Cut-Off alarm, or Freeze Stat alarm are active.

Manual Mode (Default)

The manual mode will run the supply fan at a constant speed, based on the specified fan airflow setpoint, and the selected unit FAS fan size airflow range.

The supply fan runs at a constant voltage, within the FAS unit's CFM airflow range. The supply fan is idle at 0VDC, and full speed at 10VDC. The controller converts a 0-10VDC fan control voltage to a 0-100% fan speed signal. The FAS supply fan runs at a 0-100% fan speed signal.

A fan airflow setpoint, minimum/maximum fan airflow setpoints, fan airflow status, percent fan speed status, and fan control voltage status will be provided for each unit. The controller program has individual fan curve blocks for each FAS supply fan size. Each fan block calculates the fan output volts (VDC) and fan airflow (cfm), based on the selected FAS fan size airflow range (cfm) and total design static pressure. The FAS unit's total design static pressure (δ W.C) can be chosen from the following static pressures: (0.50", 0.75", 1.00", 1.25", 1.50", 1.75", 2.00", 2.25" and 2.50"W.C.).

The supply fan speed is set to a fixed VDC modulation signal, for each FAS unit size. The Supply Fan Airflow setpoint (cfm) specifies the supply fan speed within an airflow range, for each fan size. The airflow range is specified by the Minimum Fan Airflow and Maximum Fan Airflow setpoints, for each FAS fan size. The supply fan airflow is based on a section of the fan curve for each fan size (unit size airflow vs. total static pressure).

<u>Unit Size</u>	<u>Min Fan Airflow SP</u>	<u>Max Fan Airflow SP</u>
FAS-13 (250 mm)	455 cfm	855 cfm
FAS-13 (280 mm)	700 cfm	800 cfm
FAS-17	1,100 cfm	1,400 cfm
FAS-19	1,850 cfm	2,000 cfm
FAS-22	2,600 cfm	2,750 cfm
FAS-24	2,900 cfm	3,700 cfm
FAS-25	3,500 cfm	4,300 cfm
FAS-27	4,000 cfm	5,300 cfm
FAS-30	5,000 cfm	7,000 cfm
FAS-33	6,500 cfm	8,500 cfm
FAS-36	8,000 cfm	10,000 cfm

MRT-Touch and MDT-Touch Controls

To place the supply fan operation control in Manual Mode on the touchscreen, navigate to the **Modes** screen. (Home > Menu > Modes). Change the Fan Control Mode setpoint dropdown to "Manual Ctrl".

Building Pressure Control

This control mode will modulate supply fan speed to maintain building static pressure.

The building pressure mode will only modulate the fan speed, within the given FAS unit size airflow range. A building differential pressure transducer will measure the building static pressure. The controller uses a PID loop to modulate the supply fan speed, to maintain the building pressure at the building static pressure setpoint. The building pressure setpoint range will be from -0.05" to 0.05"W.C.

MRT-Touch and MDT-Touch Controls

To place the supply fan operation control in Building Pressure Control Mode on the touchscreen, navigate to the **Modes** screen. (Home > Menu > Modes). Change the Fan Control Mode setpoint dropdown to ðBldg Prs Ctrlö.

Constant Airflow Control (Piezo Ring)

This control mode will modulate supply fan speed, to maintain a constant airflow based on a piezo ring differential pressure transducer signal.

The fan airflow setpoint (cfm) is specified within the minimum/maximum fan airflow setpoints, for each FAS fan size. A differential pressure transducer is connected to a piezometer ring with tubing installed along the circumference of the fan inlet ring, to determine the amount of airflow. The controller calculates the fan airflow (cfm), based on an equation that uses the measured piezo ring differential pressure input (öW.C.) and a fan manufacturer k-factor (constant). The fan airflow status is displayed, when the supply fan is running.

This control mode uses a piezo ring differential pressure setpoint for each FAS fan size. The controller calculates a piezo ring differential pressure setpoint, which uses a fan airflow setpoint, and a pair of low/high differential pressure setpoints for each FAS fan size and fan type. The controller uses a PID loop to maintain a constant supply fan speed, at the piezo ring pressure setpoint. The supply fan speed remains constant, when the piezo ring pressure transducer input equals the differential pressure setpoint.

MRT-Touch and MDT-Touch Controls

To place the supply fan operation control in Constant Airflow Mode on the touchscreen, navigate to the **Modes** screen. (Home > Menu > Modes). Change the Fan Control Mode setpoint dropdown to ðConstant AF Ctrlö.

Building Pressure Control w/Airflow Status (Piezo Ring)

This control mode will modulate supply fan speed to maintain building static pressure, and display the calculated piezo ring fan airflow status. Building pressure mode can be selected as primary supply fan control when the piezo ring transducer is used. If building pressure mode is selected, the constant airflow mode control will be disabled. Unit airflow will continue to be calculated and displayed.

The building pressure mode will only modulate the fan speed, within the given FAS unit size airflow range. A building differential pressure transducer will measure the building static pressure. The controller uses a PID loop to modulate the supply fan speed, to maintain the building pressure at the building static pressure setpoint. The building pressure setpoint range will be from -0.05ö to 0.05öW.C.

The fan airflow setpoint (cfm) is specified within the minimum/maximum fan airflow setpoints, for each FAS fan size. A piezo ring differential pressure transducer will measure the differential pressure at the fan inlet ring. The controller calculates fan airflow (cfm), using the measured piezo ring pressure input. The fan airflow status is displayed, when the supply fan is running.

MRT-Touch and MDT-Touch Controls

To place the supply fan operation control in Building Pressure Control with Airflow Mode on the touchscreen, navigate to the **Modes** screen (Home > Menu > Modes). Change the Fan Control Mode setpoint dropdown to öBldg Prs Ctrl w/AFö.

Fan Cut-Off Control

The fan cut-off function automatically cycles the unit off and forces the face/bypass dampers to the closed position, if discharge air temperature drops below the fan cut-off temperature setpoint of 45°F (adjustable), longer than the cut-off buffer.

The fan cut-off function will be disabled during a 5 minute time delay, to allow the discharge air temperature to reach operating temperature setpoint after a cold start. A fan cut-off buffer setpoint of 3 minutes (adjustable), provides a normal time delay period. A 5 minute time delay begins once the fan is given a run command. The fan cut-off function is enabled anytime the fan is commanded to be on, after the initial 5 minute delay, and the discharge air temperature is below the fan cut-off temperature setpoint for longer than the duration set by the fan cut-off buffer setpoint. The fan cut-off function turns off the fan, closes the face damper, and opens the bypass damper (full bypass).

To change the Fan Cut-Off Temperature setpoint or the Fan Cut-Off Buffer Time setpoint on the touchscreen, navigate to the **Setpoints** screen (Home > Menu > Setpoints). Change the Fan Cut-Off setpoint to the desired temperature, in a 35°F - 80°F temperature range. Change the Fan Cut-Off Buffer Time setpoint to the desired duration, for a time range or duration of 3 - 9 minutes.

Multiplexed Inputs

Multiplexed inputs expand the functionality of the controller by allowing multiple devices to effectively share the same analog input. This is accomplished by connecting resistors, either in a series or parallel configuration to a controller analog input.

A switch (contact closure) is used in conjunction with each resistor. When a switch is closed, the resistance at the controller input changes. This allows the controller to identify which switch has closed. The controller is programmed to associate each different resistance with a specific control function.

For example, when the optional clogged filter switch is closed between the appropriate wire terminals 224 & 225 on the unit's terminal strip located in the unit's main control panel. This tells the controller that the filters are clogged, and it also notifies the user through the *Equipment Touch*.

See the tables below for a complete list of inputs in the multiplexed circuits and how their open and closed states relate to the resistance in the circuit and the voltage at controller inputs IN-3 and IN-4.

RESISTOR VALUE	RESISTOR ID	SWITCH CLOSED	OHMS IN CIRCUIT	ZN 583 VOLTS DC
1000	RS1	RS1,2,3,4	0	0
2000	RS2	RS2,3,4	1000	0.30
4020	RS3	RS1,3,4	2000	0.55
8060	RS4	RS3,4	3000	0.76
MULTIPLEXED VOLTAGE VALUES		RS1,2,4	4020	0.95
		RS2,4	5020	1.10
		RS1,4	6020	1.24
		RS4	7020	1.36
		RS1,2,3	8060	1.47
		RS2,3	9060	1.57
		RS1,3	10060	1.65
		RS3	11060	1.73
		RS1,2	12080	1.80
		RS2	13080	1.87
		RS1	14080	1.92
		NONE	15080	1.98
		UNPLUGGED	NA	3.30

INPUT	DEVICE	RESISTOR	DESCRIPTION
IN-3	N/C	RS-04	SPARE
	N/C	RS-03	SPARE
	N/C	RS-02	SPARE
	SW-72	RS-01	100% OUTSIDE AIR
IN-4	TC-08	RS-04	FREEZE STAT ALARM
	RE-65	RS-03	FAN STATUS
	PS-12	RS-02	CLOGGED FILTER STATUS
	SW-09	RS-01	AUXILIARY UNIT ENABLE

Note: See the Typical Wiring Schematic and Multiplexed Input sections of this manual for more information.

Auxiliary Unit Enable

An optional Auxiliary Unit On switch (SW-09) is required for this function. The Auxiliary Unit Enable function overrides all other Auto Mode functions and automatically cycles the unit into operation. This function can be used with a twist timer, toggle switch, door switch, exhaust fan interlock, or any other dry contact to override the time clock schedule. This function is activated whenever the Auxiliary Unit On switch contact is closed across wire terminals 221 & 222 (RS-01, controller input IN-4) on unit's terminal strip, located in the unit's main control panel.

Clogged Filter Status

An optional Clogged Filter switch (PS-12) is required for this function. The Clogged Filter function automatically notifies the user of a dirty filter condition. A Clogged Filter alarm will appear on the *Equipment Touch Alarms* screen. This function is activated whenever the Clogged Filter contact is closed across wire terminals 222 & 223 (RS-02, controller input IN-4) on unit's terminal strip, located in the unit's main control panel.

Fan Status

The Fan Status function enables the unit controller operation, if the supply fan is running. This function is activated when the fan status relay (RE-65) contact is closed across wire terminals 223 & 224 (RS-03, controller input IN-4) on the unit's terminal strip, located in the unit's main control panel. The Unit On/Fan Off alarm will appear on the *Equipment Touch Alarms* screen, if the controller has commanded the fan to start but the fan status input is off (fan failure). The Fan On/Unit Off alarm will appear on the *Equipment Touch Alarms* screen, if fan status input is on and the controller has not commanded the fan to start (fan hand). See the Diagnostics ó Non-Critical Alarm Codes section of this manual.

Freeze Stat Status

The Freeze Stat switch (TC-08) is required for this function. The Freeze Stat function automatically cycles the unit off and forces the face/bypass dampers to the full bypass position. A Freeze Stat alarm will appear on the *Equipment Touch Alarms* screen. This function is activated whenever the Freeze Stat (TC-08) contact is closed across wire terminals 224 & 225 (RS-04, controller input IN-4) on unit's terminal strip, located in the unit's main control panel.

100% Outside Air Mode

The 100% Outside Air switch (SW-72) is required for this mode. The 100% OA function automatically opens the outside air dampers, and closes the return air dampers. While in any mixing damper control mode, the 100% OA switch contact closure will force the controller to provide a 10VDC signal to the mixing dampers. This function is activated whenever the 100% outside air switch contact (provided by the user) is closed across the 1K resistor (RS-01, controller input IN-3) on unit's terminal strip, located in the unit's main control panel.

MRT-Touch and MRT-Touch Controls

This function is activated whenever a contact is closed between the appropriate terminals on the unit's terminal strip located in the unit's main control panel. See the Typical Wiring Schematic and Multiplexed Input sections of this manual for more information. The 100% Outside Air function overrides all other damper control functions.

Equipment Touch User Guide

This section will assist the user in navigating the *Equipment Touch* and its features for MRT-Touch and MDT-Touch control systems. Note that depending on program versions and equipment options ordered, the actual content of the screens may differ slightly from what is presented in this manual. Setpoints, statuses, and configuration options vary depending on the type of equipment, options ordered, and the control system selected on the Unit Setup screen.

Navigation

Overview

The following image of the touchscreen shows where the Home, Previous, and Alarms buttons are located on the screen.



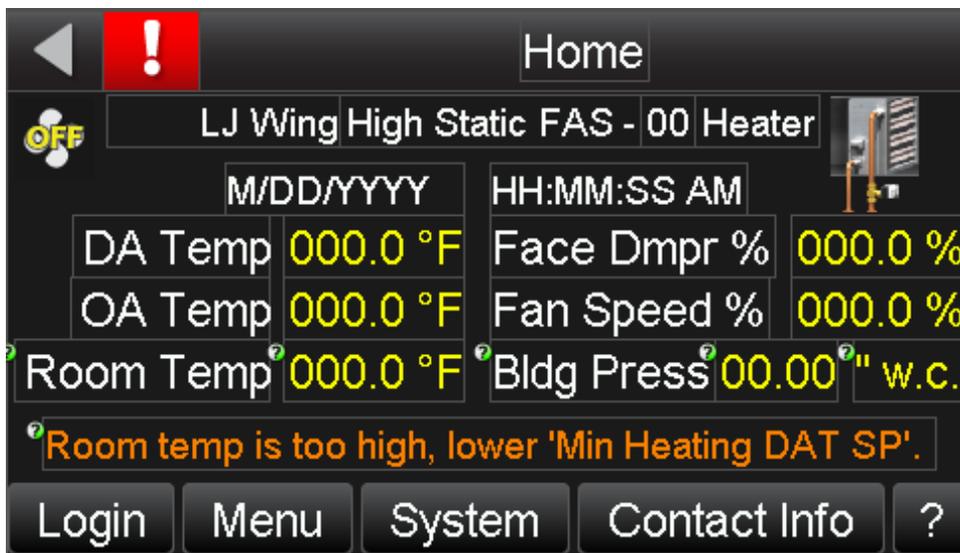
Changing Setpoints and Other Editable Values

To change a setpoint or any editable value on the *Equipment Touch*, touch the value on the screen. A keyboard with buttons or a menu with options will appear on the screen. Touch the buttons on the screen that correspond with the new values that you want to enter for a particular setting. Press the **Done** buttons to save the new setting. The value on the screen will update within a few seconds to show the new value. Status information is not editable and updates automatically as unit operating conditions change.

Home Screen

The Home screen shows the brand name LJ Wing, High Static FAS ó 13 to 36 (unit size), fan status (fan symbol), the current date and time, heating status (JL Wing coil symbol), discharge air temperature, outside air temperature, room temperature (MRT-Touch only), face damper percent, fan speed percent, and building pressure percent (optional).

This is the layout of the home screen:



A flashing "Room temp is too high, lower 'Min Heating DAT SP'" message appears on the bottom of the *Equipment Touch* screen, when the room temperature has exceeded the heating occupied setpoint by 4°F, on the MRT-Touch control systems. The user can navigate to the touchscreen **Setpoints** screen, to lower the Min Heating DAT SP setpoint.

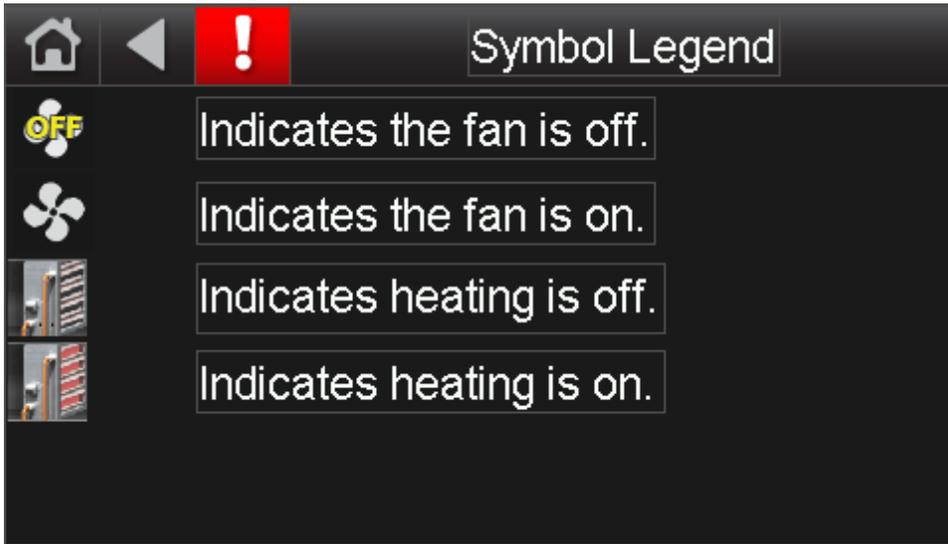
Room temp is too high, lower 'Min Heating DAT SP'.

Touch the **Login** button to log into the touchscreen. Touch the **Menu** button to access the main menu. Touch the **System** button to access the System screen. Touch the **Contact Info** button to view factory contact information.

Touch the question mark button to see a symbol legend screen the table of symbols that appears on the next page, in this section of the manual.

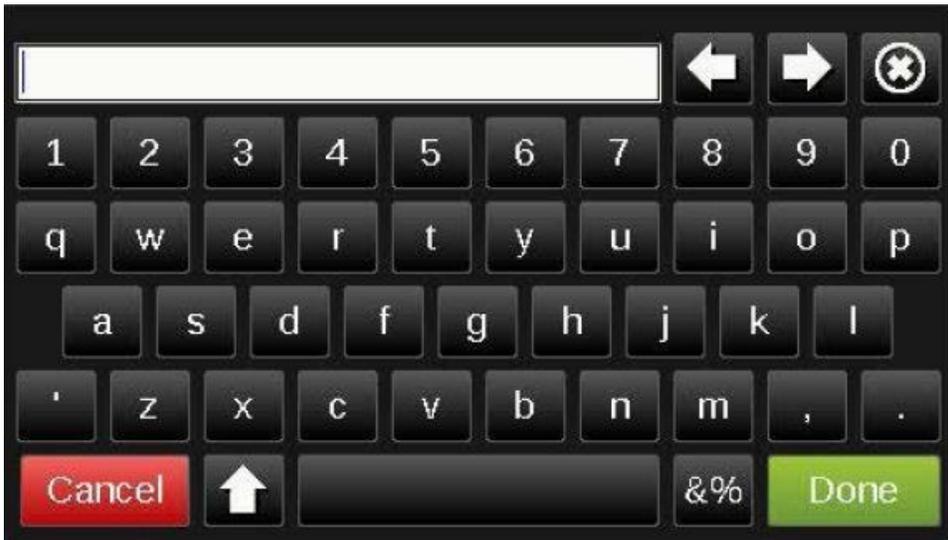
Symbol Legend Screen

The Home screen also shows various symbols depending on the operating modes of the unit. The following table is a symbol legend that shows what each symbol indicates:



Login Screen

The *Equipment Touch* requires users to log in, to access certain features of the control program. When asked to log in, the keyboard screen will appear:



Passwords

The default password for the user account is **0000**. The default password for the admin account is **1111**. The factory password is used for initial unit configuration, and is not available to the user. When you have finished entering the password, touch the **Done** button on the screen to complete the login process.

These screens require an operator to be logged into the User account for access:

- Archive Procedure
- Archive
- Modes
- Resets
- Schedule
- Setpoints

These screens require an operator to be logged into the Factory account for access:

- Unit Setup
- Brand Configuration
- Heating PID Gains

All other screens can be accessed without logging into the *Equipment Touch*.

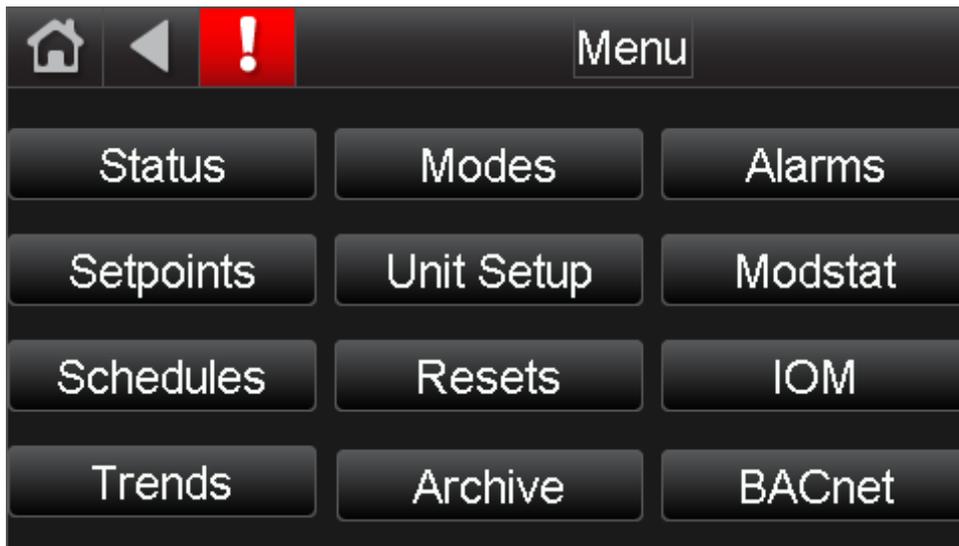
Contact Information Screen

The contact info screen provides the LJ Wing factory contact information, for the user.



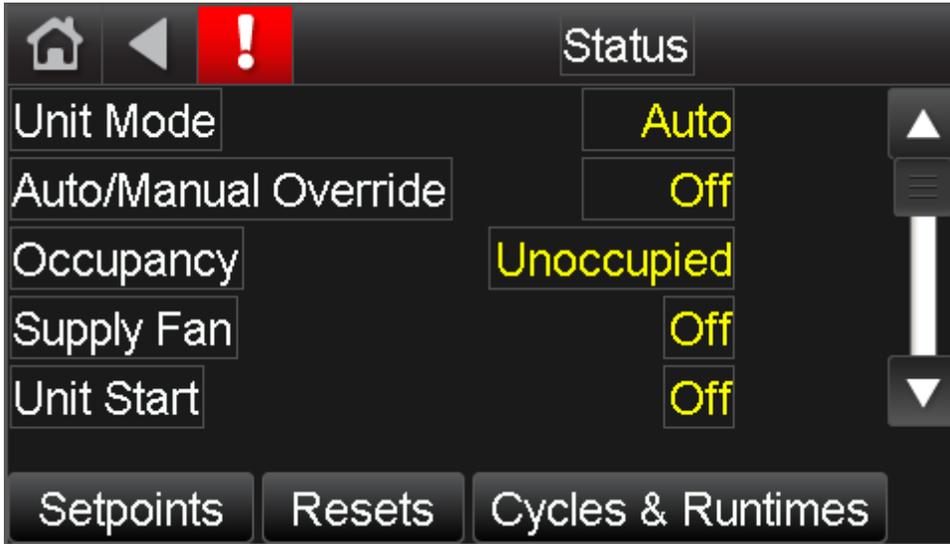
Menu Screen

The menu screen provides access to several different screens, through the buttons shown in the following image. Touch a button to go to the screen indicated by the text on the button.



Status Screen

The Status screen provides important unit status information. The user can touch each status point (white text), to open a screen that provides help information for that point. Optional status points are configured to appear if the corresponding control mode or option is enabled, on the **Unit Setup** screen. The slider bar is used for scrolling down to additional screen lines. The Status screen provides buttons to access the Cycles and Runtimes, Setpoints, and Resets screens.



The following points are available on this screen:

Point	Value	Point	Value
Unit Mode	Auto/Off/Manual	Return Air Damper	% Open
Auto/Manual Override	Off/Manual	Supply Fan Speed	%
Occupancy	Unoccupied / Occupied	Minimum Fan Airflow	cfm
Supply Fan	Off/On	Current Fan Airflow	cfm
Unit Start	Off/On	Maximum Fan Airflow	cfm
Run Command	Off/On	Building Pressure	ö w.c.
BAS Network Enable	Off/On	Piezo Ring Pressure	ö w.c.
Room Temp	°F	Face & Bypass Dmpr	V
Discharge Air Temp	°F	Mixing Box Dmpr Volts	V
Outside Air Temp	°F	Supply Fan Volts	V
Mixed Air Temp	°F	All Vent (100% OA)	Off/On
Face Damper	% Open	Auxiliary Unit On	Off/On
Bypass Damper	% Open	Clogged Filter	Clean/Dirty
Outside Air Damper	% Open		

Cycles and Runtimes Screen

The Cycles and Runtimes screen allows user to view fan cycles since last reset. The fan cycles since the initial program download are also monitored and function like the odometer in a car in that they cannot be reset. For example, "Fan Cycles" shows the number of times the fan has cycled on since the last reset, whereas "Fan Cycles (All)" shows the number of times the fan has cycled on since the program was downloaded to the module (typically at the factory). The user can touch each fan cycles and fan hours point (white text), to open a screen that provides help information for that point. The Cycles and Runtimes screen provides buttons to access the Status, and Resets screens.



The following points are available on this screen:

Point	Value
Fan Cycles	# of cycles since reset
Fan Cycles (All)	# of cycles since beginning
Fan Hours	# of run hours since reset
Fan Hours (All)	# of run hours since beginning

Setpoints Screen

The Setpoints screen allows the user to enter the desired unit setpoints that will determine when heating and ventilation will be enabled. Optional setpoints are configured to appear if the corresponding control mode or option is enabled, on the **Unit Setup** screen. The user can touch each setpoint (white text), to open a screen that provides a help screen for that setpoint. The slider bar is used for scrolling down to additional screen lines. The setpoints screen provides buttons to access the Status, Resets, and Schedules screens.



The following points are available on this screen:

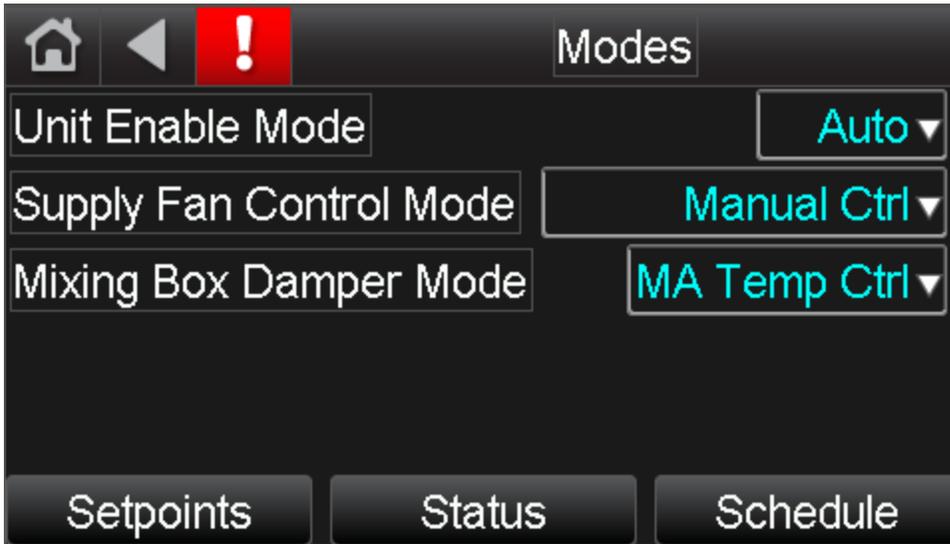
Point	Value	Optional Setpoints
Heating Occupied SP	35°F ó 80°F	MRT Control System
Heating Setback SP	40°F ó 130°F	MRT Control System
Min Heating DAT SP	40°F ó 130°F	MDT & MRT Control Systems
Max Heating DAT SP	40°F ó 130°F	MRT Control System
Heating MRT SP	40°F ó 130°F (status only)	MRT Control System
Heating DAT SP	40°F ó 130°F	MDT Control System
Fixed DAT SP	70°F	MRT Control System
Building Pressure SP	-0.05ö w.c. ó +0.05ö w.c.	Mixing Box Option, SF Bldg Prs Ctrl
Piezo Ring Pressure SP	0 ó 5ö w.c. (status only)	SF Constant AF Ctrl
Supply Fan Airflow SP	0 ó 10,000 cfm	SF Manual, SF Constant AF Ctrl
Mixed Air Temp SP	30°F ó 90°F	Mixing Box Option
Fan Cut-Off Temp SP	35°F ó 80°F	
Fan Cut-Off Buffer Time SP	3 ó 9 minutes	
Manual Ventilation SP	0% ó 100%	Mixing Box Option
Minimum Ventilation SP	0% ó 100%	Mixing Box Option

Schedules Screen

Navigate to the Schedules Screen, in the System Screens section of this manual, for more information.

Modes Screen

The Modes screen allows the user to select the Unit Enable, Supply Fan Control, and Mixing Box Damper Modes. The optional Mixing Box Enable Mode point is configured to appear if the mixing box option is enabled, on the touchscreen **Unit Setup** screen. The user can touch each mode (white text), to open a screen that provides a help screen for that mode. The Modes screen provides buttons to access the Setpoints, Status, and Schedule screens.

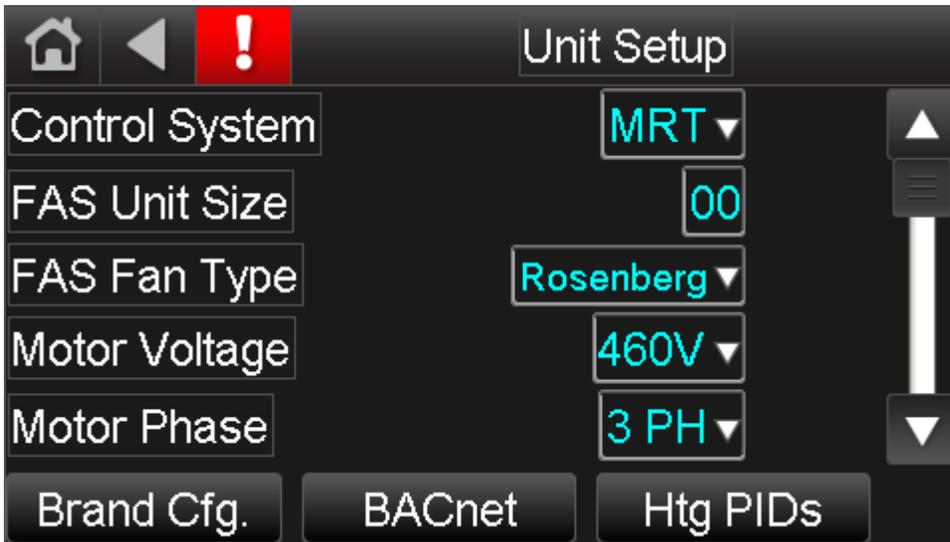


The following points are available on this screen:

Point	Value
Unit Enable Mode	Auto / Off / Manual
Supply Fan Control Mode	Manual Ctrl / Bldg Prs Ctrl / Constant AF Ctrl / Bldg Prs Ctrl w/AF
Damper Mode	MA Temp Ctrl / Bldg Prs Ctrl / Manual Ctrl

Unit Setup Screen

The Unit Setup screen allows the user to select the desired Control System, Unit Size, Fan specifications, Supply Fan Control, and Mixing Box options for a unit. These parameters are configured at the factory for each particular unit, using the factory password. Do not change any of these values without first contacting the factory as unit operation may be severely affected. The user can touch each setup point (white text), to open a screen that provides help information for that point. The slider bar is used for scrolling down to additional screen lines. The Unit Setup screen provides buttons to access the Brand Configuration, Communication (BACnet), and Heating PID setpoint screens.



The following points are available on this screen:

Point	Value
Control System	MRT / MDT
FAS Unit Size	13, 17, 19, 22, 24, 25, 27, 30, 33, 36 (13 ó 30 Rosenberg Fans / 17 ó 36 Ebmpapst Fans)
FAS Fan Type	Rosenberg / Ebmpapst
Motor Voltage	200V / 208V / 230V / 460V
Motor Phase	1 PH / 3 PH
Design Static Press SP	0.50ö w.c. ó 2.50ö w.c.
Rosenberg Low dP SP	0.60ö w.c. ó 2.73ö w.c. (See page 13)
Rosenberg High dP SP	1.41ö w.c. ó 4.78ö w.c. (See page 13)
Ebmpapst Low dP SP	1.50ö w.c. ó 3.10ö w.c. (See page 11)
Ebmpapst High dP SP	1.85ö w.c. ó 4.90ö w.c. (See page 11)
Minimum Fan Airflow SP	455 cfm ó 8,000 cfm (See page 13)
Maximum Fan Airflow SP	855 cfm ó 10,000 cfm (See page 12)
Building Press Option	Off /On
Building Press Smooth SP	1 ó 10, Default ó 5
Piezo Ring Option	Off /On
Piezo Ring Smooth SP	1 ó 10, Default ó 2
Manual F&B Dmpr SP	0 ó 100%
Manual F&B Dmpr Enbl	Off /On

Brand Configuration Screen

The Brand Configuration screen allows the user to select the desired brand name that is to be displayed on the Home screen. This parameter is configured at the factory and typically does not need to be changed in the field. It does not affect unit operation. The Brand Configuration screen provide a button to access the Unit Setup screen.

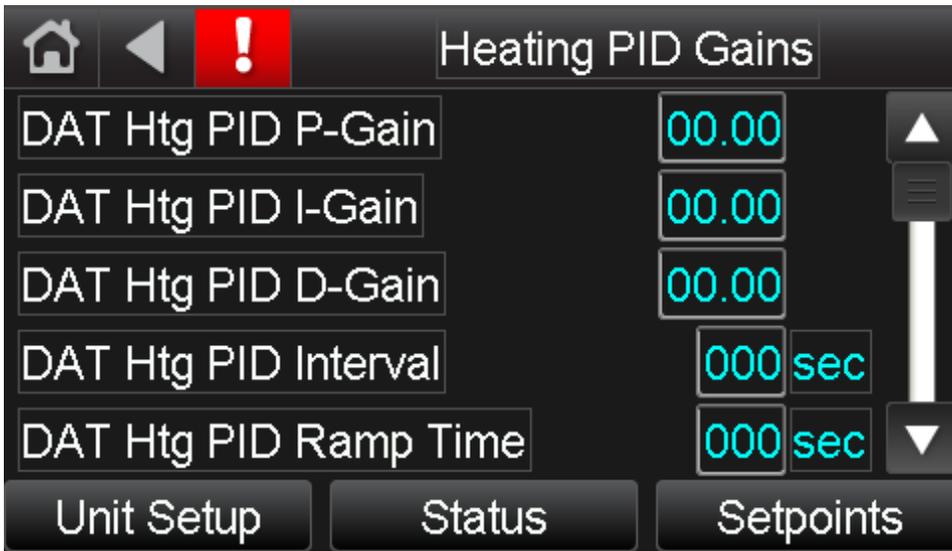


Touch the white radio button next to the appropriate brand name to select the brand. The radio button will fill in with a blue circle to indicate your selection. The following Brand Configuration option is available:

- LJ Wing

Heating PID Gains Screen

The Heating PID Gains screen allows the user to adjust the heating PID gains for tuning the MRT-Touch or MDT-Touch heating control, for the face & bypass damper. These parameters are configured at the factory for each unit, using the factory password. Do not change any of these values without first contacting the factory as unit operation may be severely affected. The Heating PID Gains are configured to appear if the corresponding MRT or MDT control mode enabled, on the **Unit Setup** screen. The slider bar is used for scrolling down to additional screen lines. The Heating PID Gains screen provides buttons to access the Unit Setup, Status, and Setpoints screens.



The following points are available on this screen:

Heating Discharge Air Temp Control		
Point	Value	Control System
DAT Htg PID P-Gain	5.0	MDT-Touch
DAT Htg PID I-Gain	1.2	
DAT Htg PID D-Gain	0.0	
DAT Htg PID Interval	5 sec	
DAT Htg PID Ramp Time	60 sec	
Heating Room Temp Control		
Point	Value	Control System
Max DAT Htg PID P-Gain	2.0	MRT-Touch
Max DAT Htg PID I-Gain	0.2	
Max DAT Htg PID D-Gain	0.0	
Max DAT Htg PID Interval	5 sec	
Max DAT Htg Ramp Time	60 sec	
Min DAT Htg PID P-Gain	2.0	
Min DAT Htg PID I-Gain	0.2	
Min DAT Htg PID D-Gain	0.0	
Min DAT Htg PID Interval	5 sec	
Min DAT Htg Ramp Time	60 sec	

Resets Screen

The Resets screen allows the user to reset alarms and the fan counter. The user can touch each reset point (white text), to open a screen that gives a description of that point. The Resets screen provides buttons to access the Status, Setpoints, and Setup screens.



The following points are available on this screen:

Point	Value
Alarms	Off / On
Fan Counter	Off / On

This section will assist the user in resetting alarms and the fan cycle counter, which have been displayed on the *Equipment Touch*.

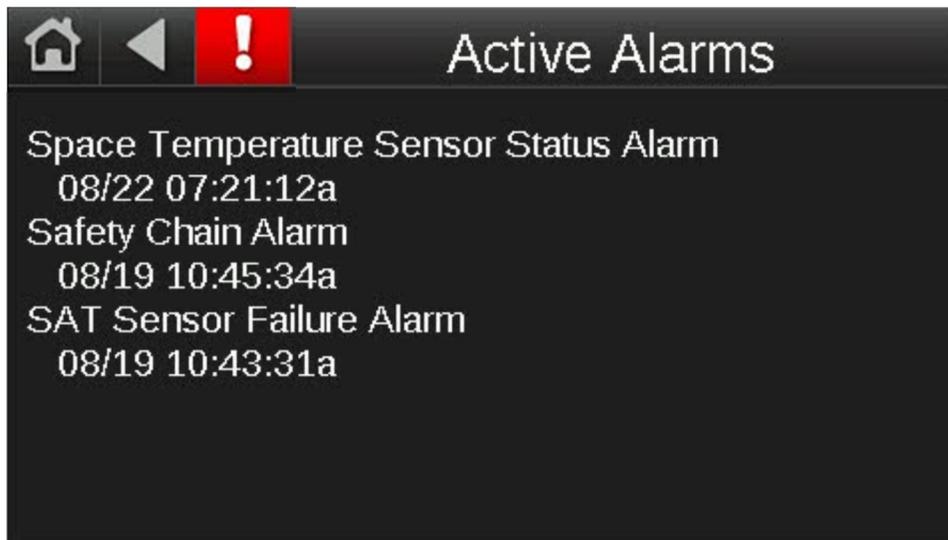
Alarms Reset

There are five methods available to the user, to reset alarms on an MRT-Touch system or MDT-Touch system. The first, second, and third methods require the *Equipment Touch*. The fourth and fifth methods can be used if an *Equipment Touch* is not immediately available at the unit, or the unit is configured for MRT and MDT control, and does not use the *Equipment Touch*.

All methods can be used on a unit that has an I/O Zone 583 controller.

1. The first method to reset alarms, is available from any *Equipment Touch* screen:

- a. Touch the Alarms button . The Active alarms will be displayed listing all active alarms, with a date and time stamp.



- b. Touch the back button .
- c. Touch the Clear Active button. All active alarms will be reset.

Alarms Reset (cont.)

- The second method to reset alarms, is available on the Alarms screen. Navigate to the Alarms screen on the *Equipment Touch* panel (Home > Menu > Alarms). Touch the **Clear Active** button to reset alarms.



- The third method to reset alarms, is available on the Resets screen. Navigate to the Resets screen on the *Equipment Touch* panel (Home > Menu > Resets). Touch the Alarms Reset 'Off' parameter, and change it to 'On'. Wait 5 seconds and then touch the Alarms Reset parameter to change it back to 'Off', so the Alarm Reset parameter is ready for the next alarm. Do not leave the Alarms Reset parameter set to 'On' for more than 5 seconds for any reason as doing so can interfere with alarm functionality.



If the Alarms Reset setpoint was left in the ON state continuously, the alarms can still trigger on alarm conditions. However, to reset the alarms from this state you must change the Alarm Reset parameter to OFF, then ON, then OFF again. Otherwise, the alarms will not reset and you will not be alerted if an alarm that was previously triggered happens to trigger again during the period the initial alarm remained active.

Note: Always change the Alarms Reset parameter to OFF, after resetting the alarms.

Alarms Reset (cont.)

4. The fourth method to reset alarms, applies only to I/O Zone 583 controllers. Remove the green 8-wire screw terminal connector on the left-hand side of the unit control module. Refer to Figure 4 below. This connector corresponds to controller inputs IN-1, IN-2, IN-3, IN-4, and their respective grounds. The plastic connector can be removed directly from the side of the module, without having to disconnect individual wires from the screw terminal connector. Leave the connector disconnected for three seconds before plugging it back into the controller. Do not leave the connector disconnected for longer than three seconds.

**Remove this
connector for
3 seconds to
reset alarms.**



Figure 4

5. The fifth method to reset alarms, is to turn off the unit's main disconnect switch, on the control panel. All active alarms will be reset. However, an alarm will regenerate if the condition that triggered the alarm is still present after power is restored, no matter which method was used to reset the alarms. For example, if the Room Sensor Failure alarm is active when the alarms are reset but the unit is still configured for MRT-Touch control and the room sensor is disconnected, the Room Sensor Failure alarm will regenerate.

Resetting alarms does not fix the underlying problem that resulted in the alarm being generated. Refer to the Diagnostics section of this manual for troubleshooting guidelines related to each potential alarm.

An *Equipment Touch* or Computer running the WebCTRL software is required to view alarms. A history of alarms that have been generated in the controller can be viewed by navigating to the Alarms screen (Home > Menu > Alarms) on the *Equipment Touch* panel, and then touching the Return-To-Normal or Manually Cleared buttons. Return-To-Normal shows alarm conditions that have reset automatically once the condition that caused the alarm has gone away. Manually Cleared shows alarms that the user has manually reset through any of the previously described methods.

Fan Counter Reset

The Fan Cycles status point records each fan start, since the last reset. The Fan Hours status point records the fan runtime, since the last reset. To reset these values, navigate to the Resets screen (Home > Menu > Resets) on the *Equipment Touch* panel. Change the Fan Counter parameter to “On” and wait 5 seconds. Change the Fan Counter parameter back to “Off”. The Fan Cycles and Fan Hours parameters will reset to zero and will resume normal operation. Leaving the Fan Counter parameter set to “On” will prevent the Fan Cycles and Fan Hours from incrementing.



Note: Always set the Fan Counter Reset parameter back to “Off”, after resetting the fan counter.

The Fan Cycles (All) status point records each fan start that has occurred, since the controller was programmed. The Fan Hours (All) status point records the duration of fan runtime, since the controller was programmed. The cycle and runtime functions are similar to the odometer display in a car in that they cannot be reset (the Fan Counter reset has no effect on these values). These values are intended to provide an indication of the total number of fan cycles and fan runtime hours that the unit has experienced.

Alarms Screen

Navigate to the Alarms Screen, in the System Screens section of this manual, for more information.

Modstat Screen

Navigate to the Trends Screen, in the System Screens section of this manual, for more information.

BACnet Screen

Navigate to the Communications Screen, in the System Screens section of this manual, for more information.

Archive Procedure Screen

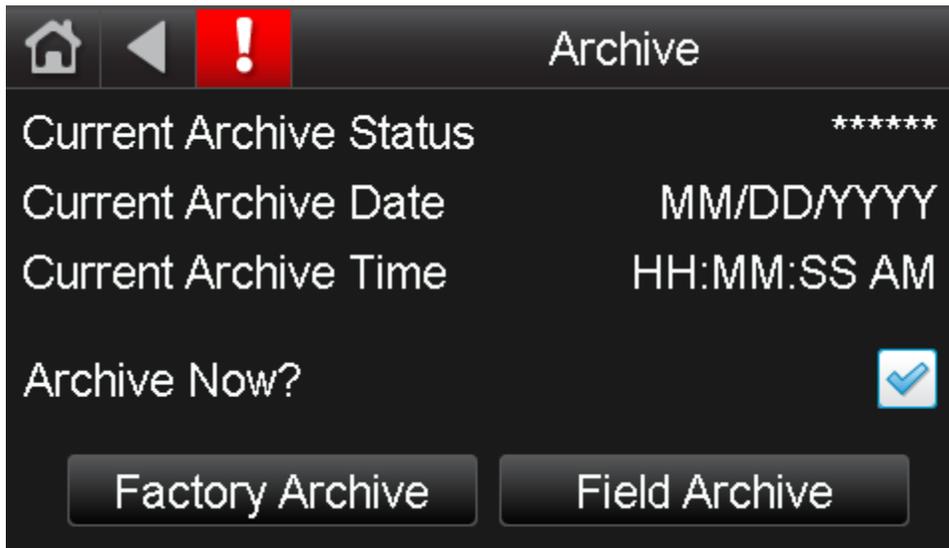
The Archive Procedure screen documents the procedure for archiving the control program in the controller. Use the archive function to create a backup of the current controller settings and setpoints. A snapshot of all parameter overrides gets stored and can be retrieved by formatting the controller. This is a useful feature for restoring to a specific set of known good setpoints if they were changed at some point, and you want to go back to what they were before. Use the slider bar to scroll down, and read the Archive Procedure. Click the Continue button on the Archive Procedure screen, to go to the Archive screen.



factory or field archive. On the next page, touch the checkbox to begin the archive. Once the archive status reads "Valid", click the Factory Archive or Field Archive button to see the steps for restoring the factory or field archive. Click the "Continue" button when you are ready to proceed.

Archive Screen

The Archive screen is an *Equipment Touch* system screen that allows the operator to complete the archive process.



The Current Archive Status, Date, and Time are displayed on this Archive screen. If the Current Archive Status is Invalid, or you want to create a new Archive, touch the checkbox to the right of "Archive Now?" to begin the archive. The archive may take a minute or two to complete.

If the Current Archive Status is "Valid", click the Factory Archive or Field Archive button to see the steps for restoring the factory or field archive. Click the "Continue" button when you are ready to proceed.

Factory Archive

The **Factory Archive** is created at the factory when the program and touchscreen files are downloaded to the controller. The factory archive cannot be overwritten in the field.

Factory Archive Help Screen

Touch the Factory Archive button to open the Factory Archive Help screen. Use the slider bar to scroll down, and read the Factory Archive Help screen.



initiated.

To restore factory archive:

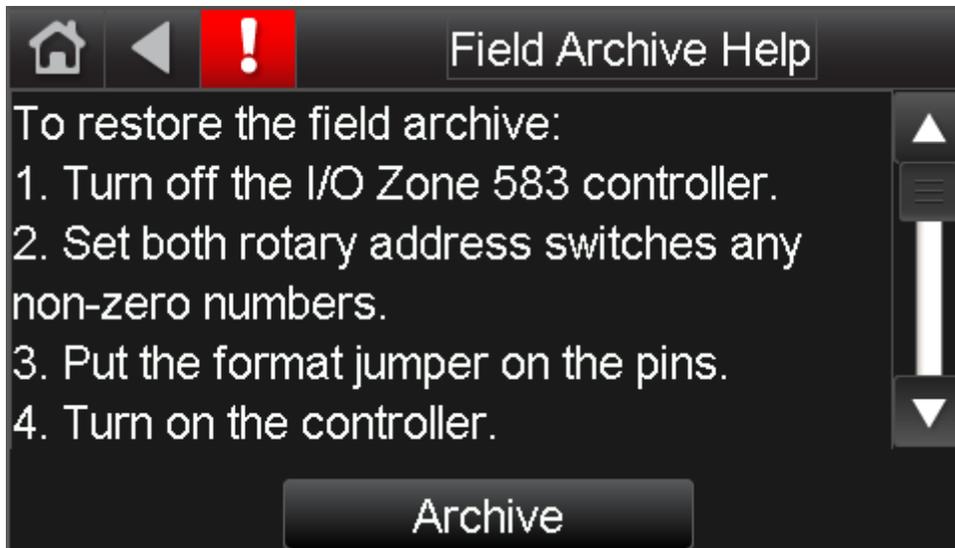
1. Turn off the I/O Zone 583 controller.
 2. Set both rotary address switches to zero (0).
 3. Put the format jumper on the pins.
 4. Turn on the controller.
 5. Run and Error LEDs cycle 3 times opposite of each other, the return to normal operation once the process is complete.
- The Run LED flashes once per second during normal operation. Navigate to Home > System > Setup > Module Setup > Set Time and Date to set the time and date.

Field Archive

The **Field Archive** is created whenever an archive is initiated from the touchscreen. The old field archive is overwritten any time a new field archive is performed. See the following steps to restore from a factory or field archive. Restore from a factory archive when you want to restore the controller to the factory default settings. Restore from a field archive when you want to restore the controller to a default set of field settings.

Field Archive Help Screen

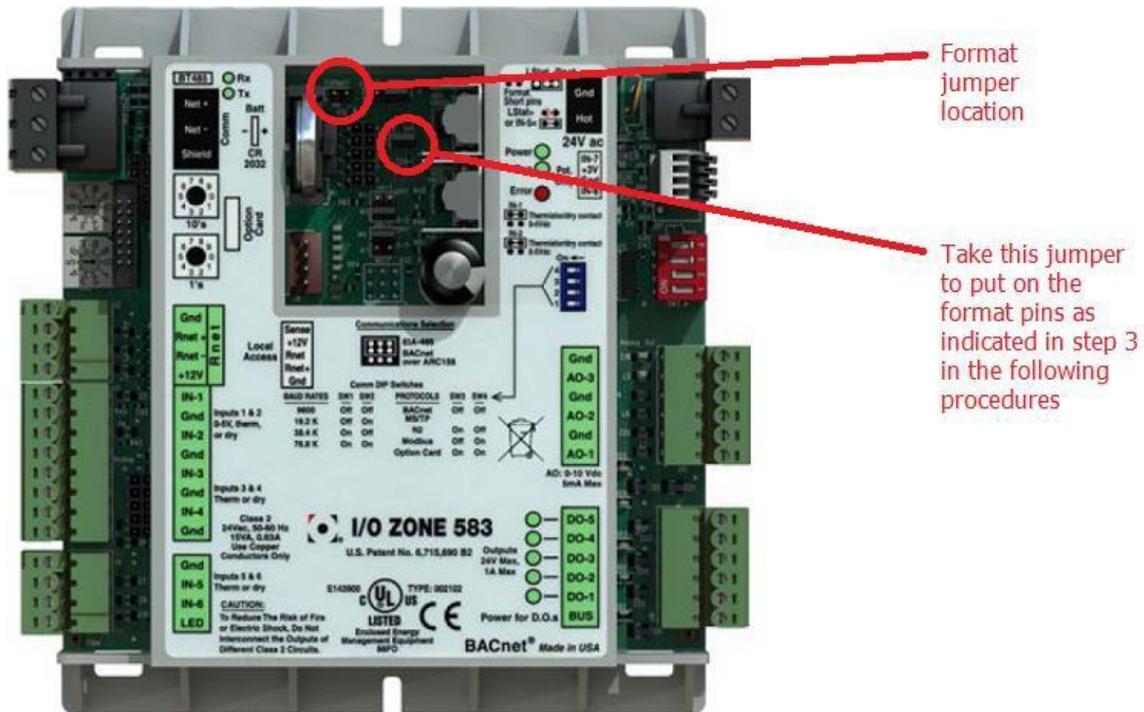
Touch the Field Archive button to open the Field Archive Help screen. Use the slider bar to scroll down, and read the Field Archive Help screen.



5. Run and Error LEDs cycle 3 times opposite of each other, the return to normal operation once the process is complete. The Run LED flashes once per second during normal operation. Navigate to Home > System > Setup > Module Setup > Set Time and Date to set the time and date.

Restoring Controller From Factory/Field Archive

Restoring from a factory or field archive requires putting a jumper on the I/O Zone 583 format pin. The picture below should aid in located this jumper.



To restore from a factory archive:

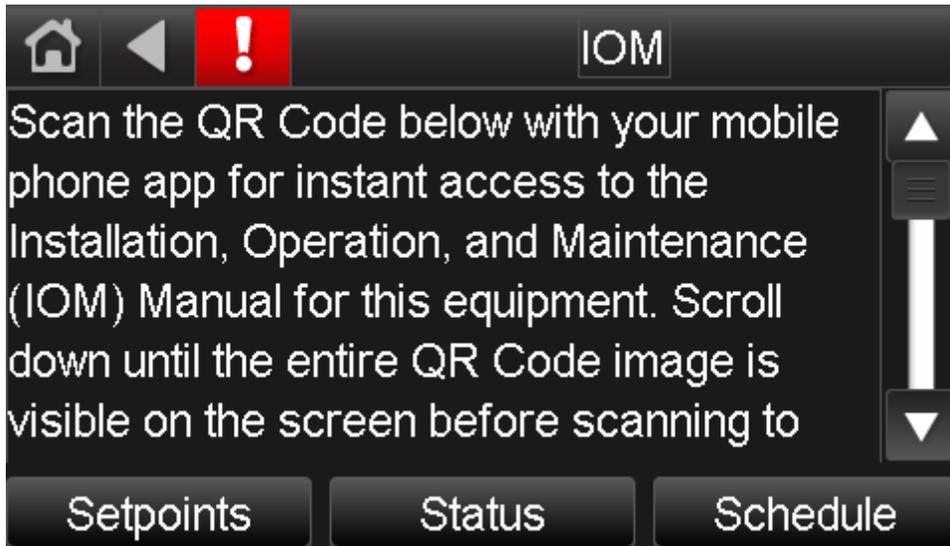
1. Turn off the I/O Zone 583 controller.
2. Set both rotary address switches to zero (0).
3. Take the jumper from the GAIN=1 pins and put it on the format pins.
4. Turn on the controller.
5. Run and Error LEDs cycle 3 times opposite of each other, the return to normal operation once the process is complete. The Run LED flashes once per second during normal operation. Navigate to the Set Time and Date screen (Home > System > Setup > Module Setup > Set Time and Date) to set the time and date.
6. Move the jumper from the format pins back to the GAIN=1 pins.

To restore from a field archive:

1. Turn off the I/O Zone 583 controller.
2. Set both rotary address switches any non-zero numbers.
3. Take the jumper from the GAIN=1 pins and put it on the format pins.
4. Turn on the controller.
5. Run and Error LEDs cycle 3 times opposite of each other, the return to normal operation once the process is complete. The Run LED flashes once per second during normal operation. Navigate to the Set Time and Date screen (Home > System > Setup > Module Setup > Set Time and Date) to set the time and date.
6. Move the jumper from the format pins back to the GAIN=1 pins.

IOM (Installation, Operation, and Maintenance Manual) Screen

The IOM screen allows the operator to scan a QR code with their smartphone or other mobile device to access an electronic version of the equipment's Installation, Operation, and Maintenance manual and this Digital Control System Manual. Follow the on-screen instructions to access the manuals. This function requires an active Internet connection on the mobile device. The IOM screen provides buttons to access the Setpoints, Status, and Schedule screens. Use the slider bar to scroll down, and read the IOM screen.



The following image shows an example of a QR code. The entire image must be visible on the touchscreen for the code to scan properly on a mobile device. Touch the scrollbar to adjust the position of the QR code so the whole QR code is visible on the screen before scanning. After scanning the QR code successfully, the QR code scanning app on your mobile device will automatically direct you to the electronic version of the manual.



System Screens

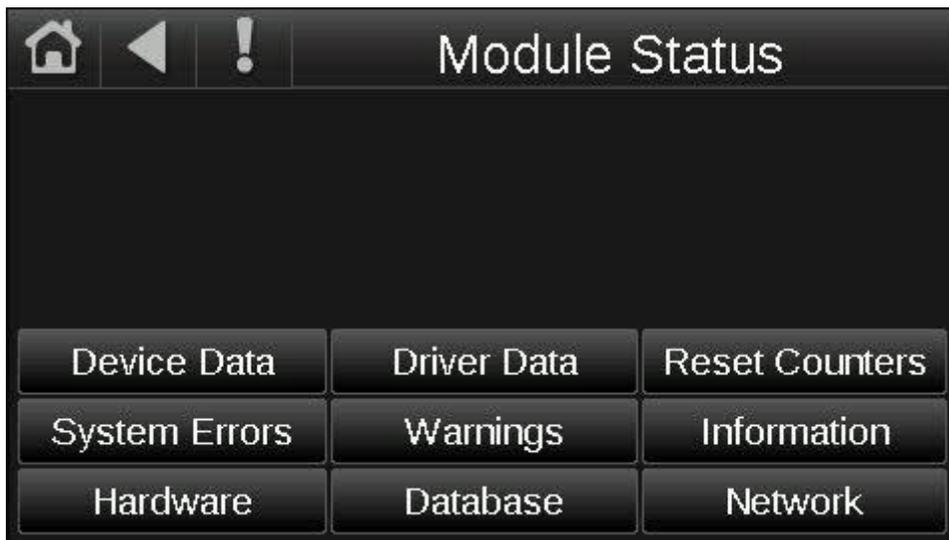
System Screen

The System screen is an *Equipment Touch* system screen that shows the controller's BACnet device instance number, controller's time, the room temperature (MRT-Touch) or the discharge air temperature (MDT-Touch) systems, and provides buttons to access the Module Status, Alarms, Trends, Schedules, Setup, and Browser screens. Touch a button to go to the screen indicated by the text on the button. Navigate to the System screen on the touchscreen, from the Home screen (Home > System).



Module Status (Modstat) Screen

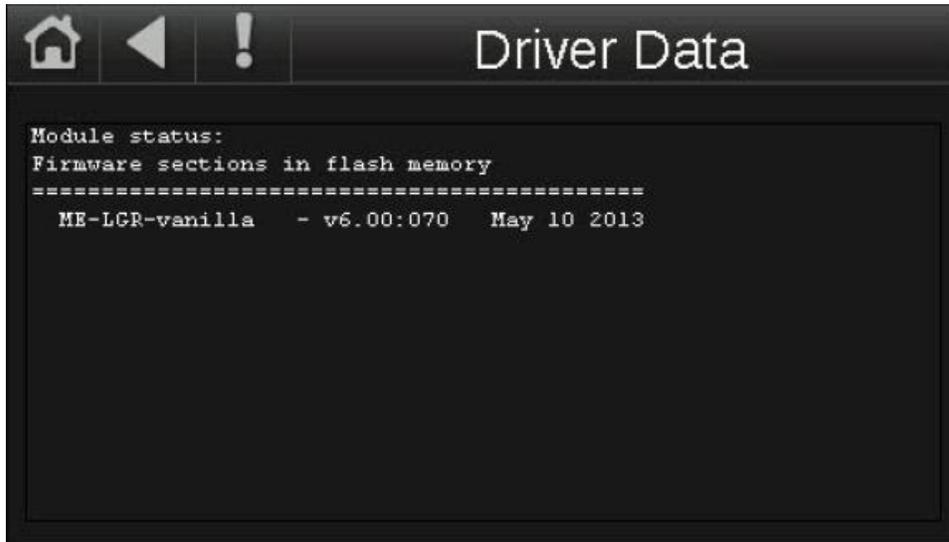
The Module Status screen is an *Equipment Touch* system screen that allows the user to select a section of the controller Module Status (Modstat) report to view. Touch a button to see one of the following sections of the Module Status report: Device Data, Driver Data, Reset Counters, System Errors, Warnings, Information, Hardware, Database, or Network. Touch a button to go to the screen indicated by the text on the button.



Module Status (Modstat) Screen (cont.)

A factory support person will typically ask the operator to navigate through the Module Status report if a problem with the controls/controller is suspected to determine the version of the control program the unit is running. If the number of programs (PRGs) initialized does not match the number of PRGs running on the Module Status screen (Module Status > Device Data), contact the factory. The Device Data screen will also display the program name and date, in the Application Software Version field.

For example, the screen below shows an example of the Driver Data information.

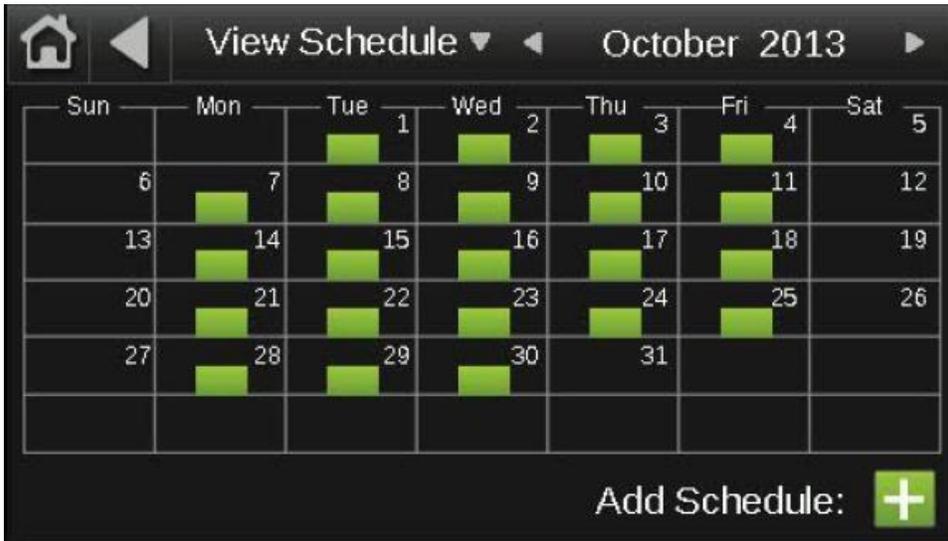


For example, the screen below shows an example of the Reset Counters information.



Schedules Screen

The Schedules screen lets the user view, add, edit, or delete BACnet schedules in the controller. See the Unit Operation > Scheduling Time Clock section in this manual for information about viewing and configuring schedules for the unit.



Alarms Screen

The Alarms Screen is an *Equipment Touch* system screen that displays buttons that allow the operator to access the following screens and functions: Active Alarms, Active Faults, Return-to-Normal, Manually Cleared, and Clear Active.



Touch **Active Alarms** to see all alarms that are currently active in the control program. There are no active fault conditions defined in the control program so the **Active Faults** screen should remain unavailable. Contact the factory if you receive an active fault message. Touch **Return-to-Normal** to see alarms that returned to a normal state automatically. Touch **Manually Cleared** to see alarms that were cleared using the **Clear Active** button. Touch the **Clear Active** button to clear all active alarms.

The *Equipment Touch* can store the 100 most recent alarms.

Setup Screen

The Setup screen is an *Equipment Touch* system screen that provides access to the Module Setup, Touchscreen Setup, and Login screens. Touch a button to go to the screen indicated by the text on the button. Navigate to the Setup screen on the touchscreen, from the Home screen (Home > System > Setup).



Trends Screen

The Trends screen allows the operator to view trends, for up to 4 points on a trend graph. The points must have trending enabled in the controller program. To view trends, touch the **Trends** button. The **Trend Selector** screen allows the operator to view trends for points that have trending enabled. Select up to four points to view at a time and select whether that point is analog/numerical (49°F, 0.2ö w.c.) or digital (off/on). The slider bar is used for scrolling down to additional screen lines. Touch the **Next** button.

The **Trend Scaling** screen displays the Date/Time of the oldest and newest trend samples in the controller for the selected point(s). Touch a field to enter a new date or time. For analog points, The **Min Y** and **Min X** fields show the range of the Y axis based on the lowest and highest trend sample values for the selected point(s). Touch either field and edit the value to define a new range for the Y axis. Touch **Display Trends**. A trend graph will display on the screen.



Browser Screen

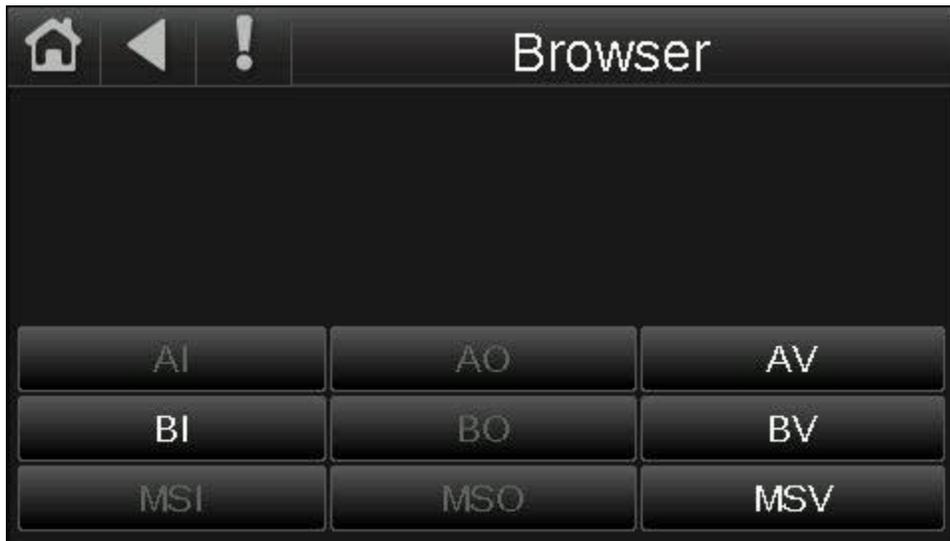
The Browser screen allows a user to see the BACnet objects in the controller, sorted by type. The abbreviations on the buttons are decoded as follows:

AI = Analog Input, AO = Analog Output, AV = Analog Value

BI = Binary Input, BO = Binary Output, BV = Binary Value

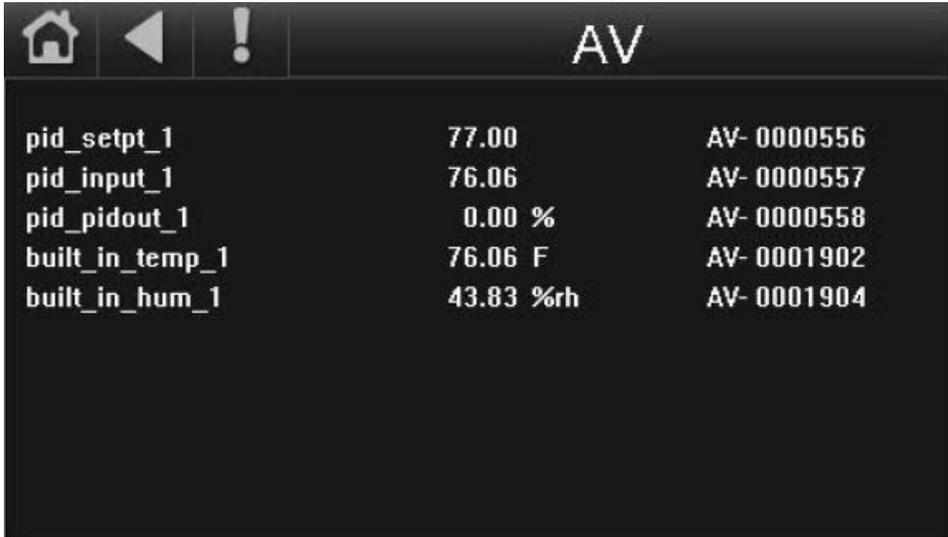
MSI = Multistate Input, MSO = Multistate Output, MSV = Multistate Value

If a controller has a certain type of BACnet object, the button for that type of BACnet object will be enabled (white text). Not all controllers will have all types of BACnet objects. If a controller does not have a certain type of BACnet object, the button for that type of BACnet object will be disabled (grayed out text).



Browser Screen (cont.)

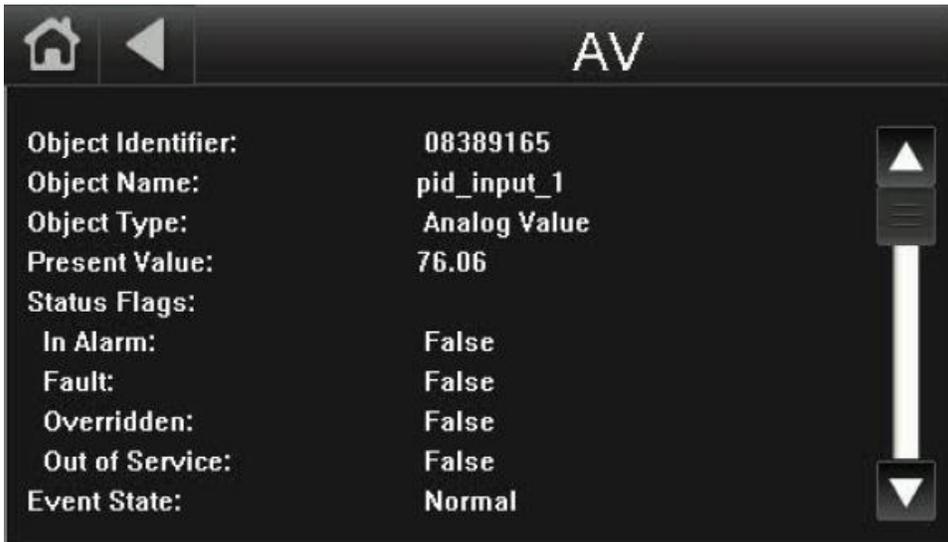
Each screen shows a list of network-visible BACnet objects with BACnet Object Name, Current Value, and BACnet Object Instance number. The following image shows an example list of AV BACnet objects in a controller.



The screenshot shows a mobile application interface for an AV controller. At the top, there is a navigation bar with a home icon, a back arrow, and an exclamation mark icon. The title 'AV' is displayed on the right. Below the navigation bar is a list of five BACnet objects, each with its name, current value, and instance number.

Object Name	Current Value	BACnet Object Instance Number
pid_setpt_1	77.00	AV- 0000556
pid_input_1	76.06	AV- 0000557
pid_pidout_1	0.00 %	AV- 0000558
built_in_temp_1	76.06 F	AV- 0001902
built_in_hum_1	43.83 %rh	AV- 0001904

Touch an object in the above screen to see the details shown below.



The screenshot shows the details for a selected BACnet object. The navigation bar is the same as in the previous screenshot. The details are displayed in a list format. On the right side, there is a vertical scrollbar with up and down arrow buttons.

Object Identifier:	08389165
Object Name:	pid_input_1
Object Type:	Analog Value
Present Value:	76.06
Status Flags:	
In Alarm:	False
Fault:	False
Overridden:	False
Out of Service:	False
Event State:	Normal

Setup Screens

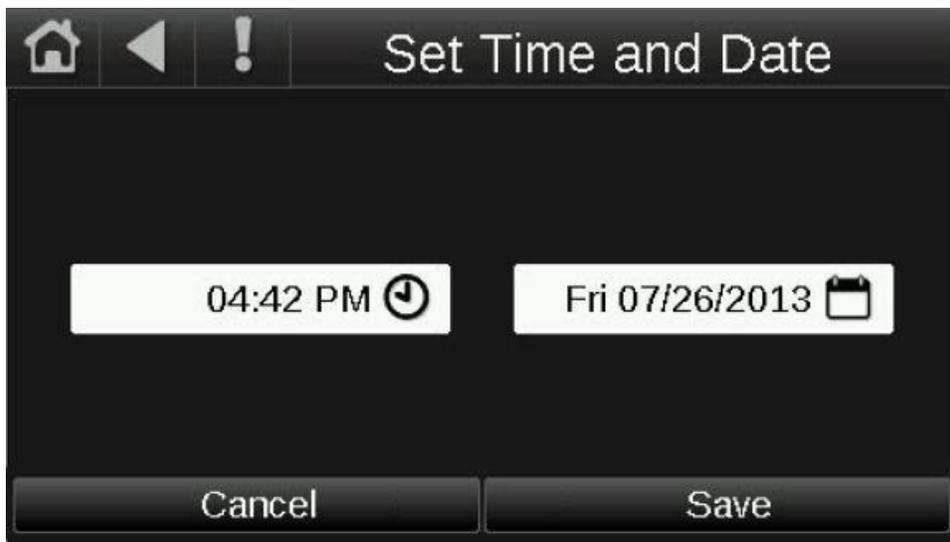
Module Setup Screen

The Module Setup screen is an *Equipment Touch* system screen that provides access to the Set Time and Date, Communication, Router, IP, and Time Master screens. Touch a button to go to the screen indicated by the text on the button.



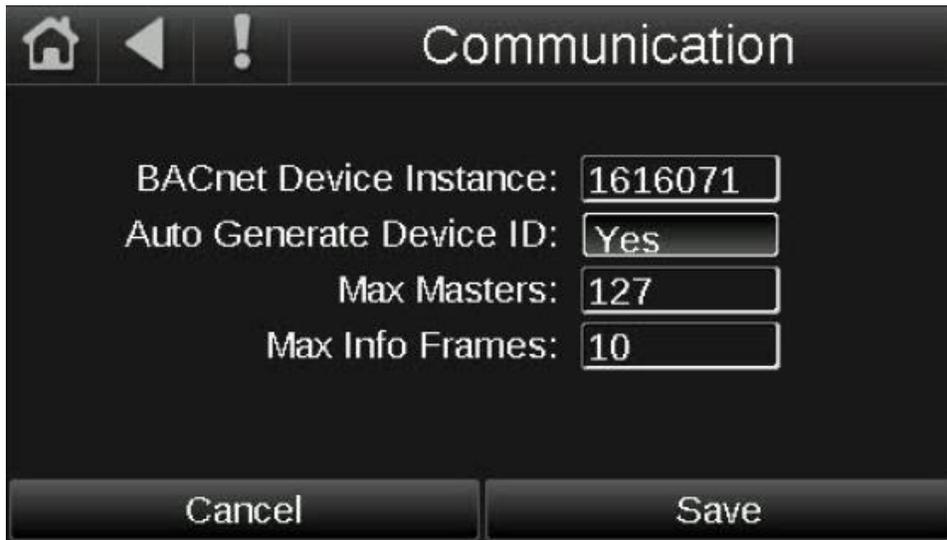
Set Time and Date Screen

The Set Time and Date screen allows a user to set the controller's local time and date. Touch the Time or Date fields to enter a new time or date. If the controller communicates with a WebCTRL server or building automation system (BAS), the controller will automatically resync the time and date with the server at least once every 24 hours. If the controller does not communicate with a WebCTRL server or BAS, it may be necessary to change the time and date on the controller to match the local time and date.



Communication (BACnet) Screen

The Communication screen allows a user to edit controller communication settings. Touch a field on this screen to change its value. The BACnet Device Instance, Auto Generate Device ID, Max Masters, and Max Info Frames values may be changed from this screen.



The screenshot shows a mobile application interface titled "Communication". At the top, there are navigation icons: a home icon, a back arrow, and an exclamation mark. Below the title, there are four input fields with labels and values:

- BACnet Device Instance: 1616071
- Auto Generate Device ID: Yes
- Max Masters: 127
- Max Info Frames: 10

At the bottom of the screen, there are two buttons: "Cancel" and "Save".

- The **BACnet Device Instance** number is the unique ID assigned to the controller on the BACnet network.
- The **Auto Generate Device ID** number configures the controller device ID for use as a standalone device or a device on a WebCTRL server (No); Or as a device on a BAS network (Yes). The controller's device instance number must be unique on the BACnet network. **Duplicate BACnet device instance numbers on a BAS network will cause communication issues.**

If Auto Generate Device ID is set to "No", the operator must manually enter the BACnet device instance number, into the BACnet device instance field.

Auto Generate Device ID is set to "Yes", the BACnet device instance number will be automatically generated as 24000 + the rotary address switch settings on the controller. If the rotary address switches are set to 0 and 2, the BACnet device instance will be 24002 from (24000 + 2). When viewing the controller from the front, the top rotary switch is the tens digit of the address, and the bottom rotary switch is the ones digit of the address. For example, with the top switch in the 7 position and the bottom switch in the 2 position, the address on the controller is 72, from $(7 \times 10) + (2 \times 1)$. The BACnet device instance number in this case would be 24072 (24000 + 72). You will not be able to manually enter a BACnet Device Instance number on the Communication screen, if the Auto Generate Device ID is set to "Yes".

- The **Max Masters** number is set to the highest controller MAC address (rotary switch) on a BACnet MS/TP network. If a device is added later with a higher address, you must change this field to that new address.

The Max Masters address is a critical setting when using a BACnet router. **Communication between the controller and the router are disabled, if the Max Masters address is set below the highest controller MAC address.**

Communication (BACnet) Screen (cont.)

- The **Max Info Frames** specifies the maximum number of information messages a controller may transmit before it must pass the token to the next controller. Increasing this number allows the controller to transmit more messages while it has the token, but it also increases the overall time it takes for the token to pass through the network. For a router, set this value to a high number such as 200. For a non-router, like the I/O Zone 583 controller, set this value according to the following formula:

$$\text{Max Info Frames} = [2 \times (\text{devices} \times (0.002 + (80 / \text{baud})))] / [(600 / \text{baud}) \times \text{devices}]$$

For example, if the network has 15 devices at 19200 baud, Max Info Frames would be:
Max Info Frames = $[2 \times (15 \times (0.002 + (80 / 19200)))] / [(600 / 19200) \times 15]$

Max Info Frames = approx. 4.0693 (round down to nearest whole number) = 4

In the case of 15 devices at 19200 baud, you would set Max Info Frames to 4.

Note: The Max Masters and Max Info Frames fields must be configured, for devices on BACnet MS/TP networks.

IP Screen

The IP screen allows a user to view or edit the IP Network, IP Address, Subnet Mask, Gateway IP Address of a controller, and the UDP Port the BAS network uses to communicate with the controller. The default UDP Port is 47808.

The screenshot shows a dark-themed interface titled "IP". At the top left are icons for home and back. The main area contains seven rows of configuration fields, each with a label and a text input box. A vertical scrollbar is on the right side of these fields. At the bottom are two buttons: "Cancel" and "Save".

IP Network:	1600
Current IP Address:	161.145.81.124
Current Subnet Mask:	255.255.255.0
Current Gateway IP Addr:	161.145.81.1
Current UDP Port:	47808
Assigned IP Address:	161.145.81.124
Assigned Subnet Mask:	255.255.255.0

Router Screen

The **Router** screen is currently unsupported. Do not use this screen.

Time Master Screen

The **Router** screen is currently unsupported. Do not use this screen.

Touchscreen Setup Screens

Touchscreen Setup Screen

The Touchscreen Setup screen provides access to several touchscreen setup functions. Touch a button to go to the screen indicated by the text on the button.



About Screen

Touch the **About** button to view the *Equipment Touch* firmware version, the software part number, and the bootloader version. The technical services department may request this information if a hardware issue is suspected.

Sensor Setup Screen

The **Sensor Setup** screen is currently unsupported. Do not use this screen.

Key Click Off/On Screen

Touch the **Key Click On / Key Click Off** to toggle whether the *Equipment Touch* makes a clicking noise when interacting with items on the display. Touch **Key Click Off** to turn off the sound when you touch a field or button. Touch **Key Click On** to turn on the sound.

Reload Firmware Screen

This screen allows the factory or installer to update the touchscreen firmware through the *Equipment Touch* USB port. The **Reload Firmware** button erases the firmware in the touchscreen and renders the touchscreen unusable until new firmware is installed. Do not press this button unless instructed by the factory. A warning message is displayed when the Reload Firmware button is touched, prompting the user to select Yes or No.

Passwords Screen

The **Passwords** button can be used to change the Admin and User account passwords. The touchscreen will prompt the user for the current password, and then ask for the new password. The Factory account password is not accessible to the user, from the Passwords screen. The Factory password is assigned by a factory engineer, in the *Equipment Touch* design software.

Touchscreen Setup Screens (cont.)

Inactivity Timeout Screen

The **Inactivity Timeout** sets the period of time in minutes that a user will remain logged into the touchscreen and have no activity (touching display), and logging out the user. Touch the time value to set the inactivity timeout on the numeric popup screen, and then touch the Done button. Set the inactivity timeout to 0, to deactivate this feature.

Clean Screen

The **Clean Screen** button activates a 60 second timer that counts down automatically and provides the user with time to clean the screen to remove fingerprints with a microfiber or similar cloth without touching something that would affect unit operation. Once initiated, the times must finish counting down before any other functions can be used. There is no way to override the timer once it has begun.

Alarm Sound Off/On Screen

Touch the **Alarm Sound On / Alarm Sound Off** to toggle whether the *Equipment Touch* makes a beep noise when an alarm is active. Touch **Alarm Sound Off** to turn off the alarm notification sound. Touch **Alarm Sound On** to turn on the alarm notification sound.

Language Screen

The **Language** screen is currently unsupported. Do not use this screen. The touchscreen is currently configured for the English language only.

Calibrate Touch Panel Screen

The **Calibrate Touch Panel** button allows the operator to run through a calibration sequence with the touchscreen. The device is calibrated at the factory, but time, temperature, and handling could affect calibration. Recalibrate the screen if you touch it in one location and it responds as if you touched another. Following calibration, the view file will reload and the Home screen will appear on the screen.

Login Screen

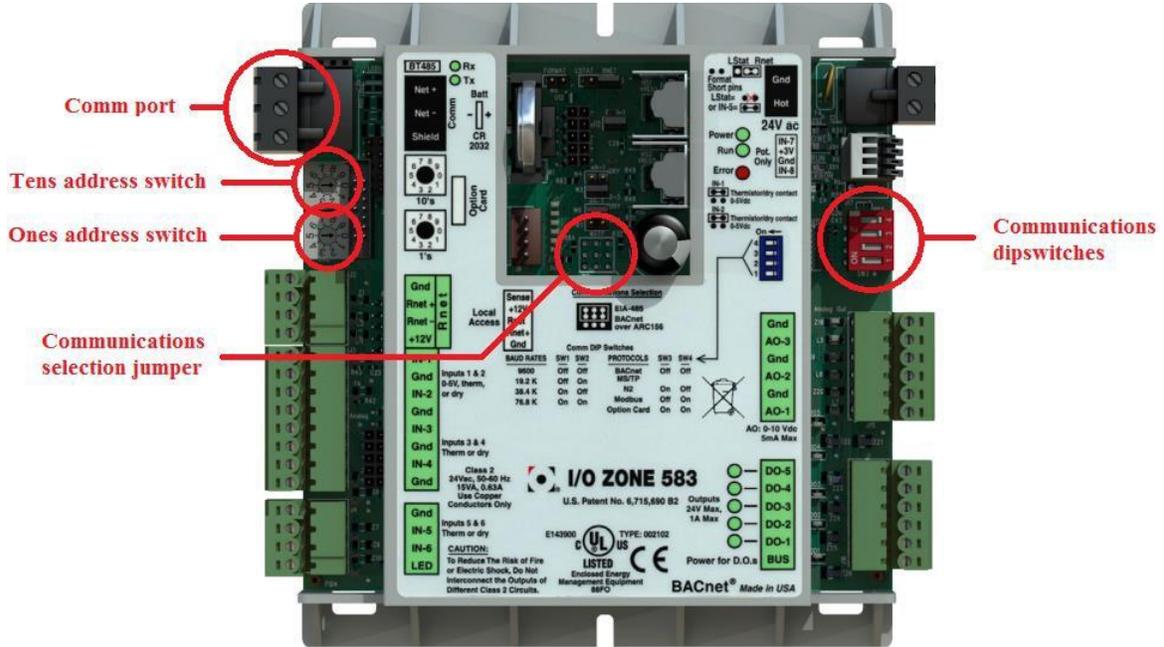
The *Equipment Touch* requires users to log in, to access certain features of the control program. When asked to log in, the keyboard screen will appear:



Protocol Setup

This section will assist the user in configuring the DDC controller for one of the available field communication protocols.

The following image shows the location of various configuration jumper and switches:



BACnet MS/TP

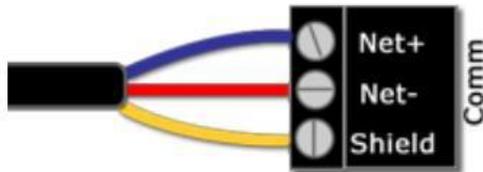
To configure the controller to communicate in BACnet MS/TP protocol, complete the following procedure:

1. Turn off the power for the I/O Zone 583.
2. Using the rotary address switches on the left-hand side of the controller, set a unique address. Set the tens switch to the tens digit of the address and set the ones switch to the ones digit. Refer to *Equipment Touch User Guide > Navigation > Communication (BACnet) Screen* for more information about how the rotary address switches affect the device address.
3. Set the Communications Selection jumper to the EIA-485 position.
4. Set communications DIP switches 1 and 2 on the right-hand side of the controller to the appropriate position for the desired communication speed (baud rate). All devices on the same network must be set to the same communications speed.

DIP switches are On when the switch is toward the left-hand side of the controller (indicated by a small arrow and word "On" on the DIP switch block) and Off when the switch is toward the right-hand side of the controller.

Baud rate	DIP switch 1	DIP switch 2
9,600 bps	Off	Off
19.2 kbps	Off	On
38.4 kbps	On	Off
76.8 kbps	On	On

5. Set communications DIP switches 3 and 4 to the Off position.
6. Connect the communications wiring to the Comm port in the screw terminals labeled Net +, Net -, and Shield. Use a dedicated 24 AWG to 18 AWG twisted pair wire (EIA-485). Maximum length should be 2,000 ft for 76.8 kbps baud rate or 3,000 feet for 9600 bps, 19.2 kbps, or 38.4 kbps baud rate. Devices should be daisy chained and not star wired. Use the same polarity throughout the network.



7. Turn on power for the I/O Zone 583.
8. Refer to *Equipment Touch User Guide > Navigation > Communication (BACnet) Screen* to verify that the BACnet Device Instance is the value you expected.

Modbus

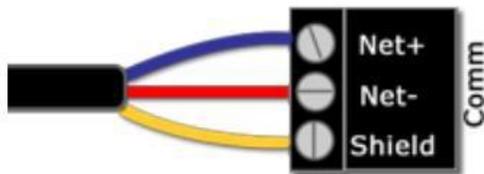
To configure the controller to communicate in Modbus RTU protocol, complete the following procedure:

1. Turn off the power for the I/O Zone 583.
2. Using the rotary address switches on the left-hand side of the controller, set a unique address. Set the tens switch to the tens digit of the address and set the ones switch to the ones digit. Refer to *Equipment Touch User Guide > Navigation > Communication (BACnet) Screen* for more information about how the rotary address switches affect the device address.
3. Set the Communications Selection jumper to the EIA-485 position.
4. Set communications DIP switches 1 and 2 on the right-hand side of the controller to the appropriate position for the desired communication speed (baud rate). All devices on the same network must be set to the same communications speed.

DIP switches are On when the switch is toward the left-hand side of the controller (indicated by a small arrow and word "On" on the DIP switch block) and Off when the switch is toward the right-hand side of the controller.

Baud rate	DIP switch 1	DIP switch 2
9,600 bps	Off	Off
19.2 kbps	Off	On
38.4 kbps	On	Off
76.8 kbps	On	On

5. Set communications DIP switches 3 to the Off position and 4 to the On position.
6. Connect the communications wiring to the Comm port in the screw terminals labeled Net +, Net -, and Shield. Use a dedicated 24 AWG to 18 AWG twisted pair wire (EIA-485). Maximum length should be 2,000 ft for 76.8 kbps baud rate or 3,000 feet for 9600 bps, 19.2 kbps, or 38.4 kbps baud rate. Devices should be daisy chained and not star wired. Use the same polarity throughout the network.



7. Turn on power for the I/O Zone 583.

N2

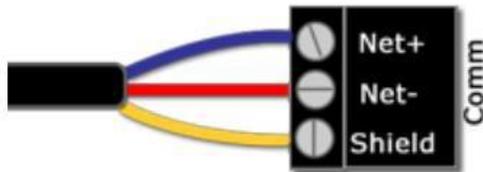
To configure the controller to communicate in N2 protocol, complete the following procedure:

1. Turn off the power for the I/O Zone 583.
2. Using the rotary address switches on the left-hand side of the controller, set a unique address. Set the tens switch to the tens digit of the address and set the ones switch to the ones digit. Refer to *Equipment Touch User Guide > Navigation > Communication (BACnet) Screen* for more information about how the rotary address switches affect the device address.
3. Set the Communications Selection jumper to the EIA-485 position.
4. Set communications DIP switches 1 and 2 on the right-hand side of the controller to the appropriate position for the desired communication speed (baud rate). DIP switches 1 and 2 must be set to the Off position for N2 (9,600 bps). All devices on the same network must be set to the same communications speed.

DIP switches are On when the switch is toward the left-hand side of the controller (indicated by a small arrow and word "On" on the DIP switch block) and Off when the switch is toward the right-hand side of the controller.

Baud rate	DIP switch 1	DIP switch 2
9,600 bps	Off	Off

5. Set communications DIP switches 3 to the On position and 4 to the Off position.
6. Connect the communications wiring to the Comm port in the screw terminals labeled Net +, Net -, and Shield. Use a dedicated 24 AWG to 18 AWG twisted pair wire (EIA-485). Maximum length should be 3,000 feet for 9600 bps baud rate. Devices should be daisy chained and not star wired. Use the same polarity throughout the network.



7. Turn on power for the I/O Zone 583.

LonWorks (LonTalk)

The LonWorks Option card is initialized with the I/O Zone 583 controller during the unit testing procedure. If either the LonWorks Option Card or the I/O Zone 583 fails to operate for any reason, contact the factory to help resolve the issue.

To configure the controller to communicate in LonTalk protocol using the LonWorks Option card, complete the following procedure:

1. Turn off the power for the I/O Zone 583.
2. Using the rotary address switches on the left-hand side of the controller, set a unique address. Set the tens switch to the tens digit of the address and set the ones switch to the ones digit. Refer to the *Equipment Touch User Guide > Navigation > Communication (BACnet) Screen* section of this manual for more information about how the rotary address switches affect the device address.
3. Set the Communications Selection jumper to the EIA-485 position.
4. Set communications DIP switches 1 and 2 on the right-hand side of the controller to the appropriate position for the desired communication speed (baud rate). All devices on the same network must be set to the same communications speed.

DIP switches are On when the switch is toward the left-hand side of the controller (indicated by a small arrow and word "On" on the DIP switch block) and Off when the switch is toward the right-hand side of the controller.

Baud rate	DIP switch 1	DIP switch 2
9,600 bps	Off	Off
19.2 kbps	Off	On
38.4 kbps	On	Off
76.8 kbps	On	On

5. Set communications DIP switches 3 and 4 to the On position.
6. Connect the LON network to pins 1 and 2 on the LonWorks Option Card.
7. Turn on power for the I/O Zone 583.

Diagnostics – Critical Alarm Codes

This section should assist the user in troubleshooting critical alarm codes messages that have been displayed on the *Equipment Touch*. These alarms almost always require the operator to correct the condition and manually reset the alarm before normal unit operation resumes. Exceptions to this rule are noted in the alarm problem descriptions that follow.

ALARM CODE: *Freeze Stat*

PROBLEM: The controller has detected a low discharge temperature at the unit discharge, and has shut off the unit. The Freeze Stat indication will appear on the *Equipment Touch* panel's alarm screen (standard).

A freeze stat switch (TC-08) is required for this function. This function is activated whenever the switch contact is closed between terminals 224 and 225 on the unit's terminal strip located in the unit's main control panel. See the Typical Wiring Schematic, Multiplexed Input, and Freeze Stat sections of this manual for more information.

SOLUTION: If heating coil was operating prior to shutdown (check alarm log):

1. Use the Alarms Reset parameter on the touchscreen to reset the alarm. Navigate to the *Equipment Touch* panel's Resets screen. Did the alarm clear?
 - a. Yes.
 - b. No. Continue.
2. Is the discharge air temperature (DA Temp) value displayed on the *Equipment Touch* panel's Home or Status screen, reading -40°F or less?
 - a. Yes. That sensor circuit or the sensor itself is open. Jumper the input for the sensor. Did the display change to 150°F or more?
 - 1) No. The controller input IN-6 is open. Replace the controller.
 - 2) Yes. Disconnect the sensor wiring at the sensor. Connect an ohmmeter to the sensor. If it is open replace the sensor. At 77°F the resistance should be 10K . See thermistor output curve for other temperatures. If it is not open, there is a break in the wiring between the sensor and the input plug. Determine cause and rectify.

ALARM CODE: *Freeze Stat (cont.)*

SOLUTION: If heating coil was not operating prior to shutdown (check alarm log):

1. MRT-Touch: Is the room air temperature (Room Temp) value displayed on the *Equipment Touch* panel's Home or Status screen 150°F or more?
 - a. Yes. The sensor circuit or the sensor itself is shorted. Unplug the Rnet port plug from the controller. Did the display change to -40°F or less?
 - 1) No. There is a short in the controller Rnet port. Replace the controller.
 - 2) Yes. Disconnect the sensor wiring at the sensor. Connect an ohmmeter to the sensor. If it is shorted replace the sensor. At 77°F the resistance should be 10K . See thermistor output curve for other temperatures. If it is not shorted, there is a short in the wiring between the sensor and the input plug. Determine cause and rectify. Refer to Appendix A for a typical 10K thermistor output curve.
 - b. No. Continue.
2. Is the discharge air temperature (DA Temp) value displayed on the *Equipment Touch* panel's Home or Status screen, reading -40°F or less?
 - a. Yes. The discharge air temperature sensor circuit or the sensor itself is open. Jumper the input for the sensor. Did the display change to 150°F or more?
 - 1) No. The controller input IN-6 is open. Replace the controller.
 - 2) Yes. Disconnect the discharge air temperature sensor wiring at the sensor. Connect an ohmmeter to the sensor. If it is open replace the sensor. At 77°F the resistance should be 10K . See thermistor output curve for other temperatures. If it is not open, there is a break in the wiring between the sensor and the input plug. Determine cause and rectify.
 - b. No. Continue
3. Use the Alarms Reset parameter on the touchscreen to reset the alarm. Navigate to the *Equipment Touch* panel's Resets screen. Did the alarm clear?
 - a. No. Check for DC voltage at controller output AO-1, and note the DC voltage on the *Equipment Touch* panel's Status screen, for the face & bypass damper modulation.
 - b. No. If using the MRT-Touch control system, set the Heating Occupied and Night Setback Setpoints for 130°F. Set the Heating Minimum and Maximum DA Temp Setpoints for 130°F. Did the face & bypass damper VDC, displayed on the *Equipment Touch* panel's Status screen increase?
 - c. Yes. Continue.

Diagnostics – Non-Critical Alarm Codes

This section should assist the user in troubleshooting non-critical alarm code messages that have been displayed on the *Equipment Touch*. Most of these alarms are automatically reset once the alarm is corrected or condition changes. Exceptions to this rule are noted in the alarm problem descriptions that follow.

ALARM CODE: Unit Off/Fan On

PROBLEM: The controller has not activated the unit enable output to start the fan, but the fan status input is receiving a signal that the fan is running (aka: fan hand). The Unit Off/Fan On indication will appear on the *Equipment Touch* panel's alarm screen (standard). This alarm automatically clears about 15 seconds after the alarm is corrected.

SOLUTION: If fan is running:

1. Is controller DO-1 unit enable output LED lit?
 - a. Yes. There is a problem with the controller program. Call factory.
 - b. No. Continue.
2. Is controller DO-1 unit enable output closed?
 - a. Yes. Turn off the power to the controller and recheck. If contact is still closed the controller output is shorted. Replace the controller.
 - b. No. Continue.
3. Is the unit enable relay energized?
 - a. Yes. There is a short or jumper in the wiring. Determine cause and rectify.
 - b. No. Continue.
4. Is motor starter energized?
 - a. Yes. There is a short or jumper in the wiring. Determine cause and rectify.
 - b. No. Continue.
5. Is the fan status relay energized?
 - a. Yes. There is a short or jumper in the wiring. Determine cause and rectify.
 - b. No. Continue.
6. Is the fan status relay's normally open contact, closed?
 - a. Yes. Replace relay.
 - b. No. Continue.
7. Is there continuity between the controller fan status terminals 223 and 224?
 - a. Yes. There is a short in the wiring between these terminals. Determine cause and rectify.
 - b. No. Replace controller.

SOLUTION: If fan is not running:

1. Is the fan status relay's normally open contact, closed?
 - a. Yes. Replace relay.
 - b. No. Continue.
2. Is there approximately 5VDC at both controller terminals used for fan status?
 - a. Yes. There is a short in the wiring between these terminals. Determine cause and rectify.
 - b. No. Replace controller.

ALARM CODE: *Unit On/Fan Off*

PROBLEM: The controller has activated the unit enable output to start the fan, but the fan status input is not receiving a signal that the fan is running (aka: fan failure). The Unit On/Fan Off indication will appear on the *Equipment Touch* panel's alarm screen (standard). This alarm automatically clears about 60 seconds after the alarm is corrected. Turning the unit off and then on will clear this alarm at any time.

SOLUTION: **If fan/motor is running:**

1. Is the *Equipment Touch* indicating an alarm?
 - a. Yes. Check previous alarms and continue.
 - b. No. Continue.
2. Is the motor starter's normally open auxiliary contact, closed?
 - a. No. Replace contact.
 - b. Yes. Continue.
3. Is the fan status relay energized?
 - a. No. There is an open or break in the wiring. Determine cause and rectify.
 - b. Yes. Continue.
4. Is the fan status relay's normally open auxiliary contact, closed?
 - a. No. Replace relay.
 - b. Yes. Continue.
5. Is there continuity between the controller fan status terminals 223 and 224?
 - a. No. There is an open in the wiring between these terminals. Determine cause and rectify.
 - b. Yes. Replace controller.

SOLUTION: **If fan/motor is not running:**

1. Is the *Equipment Touch* indicating an alarm?
 - a. Yes. Check previous alarms and continue.
 - b. No. Continue.
2. Is controller DO-1 unit enable output LED lit?
 - a. No. There is a problem with the controller. Replace controller.
 - b. Yes. Continue.
 - c. Is the unit enable relay energized? No. There is an open in the wiring between these terminals. Determine cause and rectify.
 - d. Yes. Continue.
3. Is the unit enable relay's normally open contact, closed?
 - a. No. Replace relay.
 - b. Yes. Continue.
4. Is the motor overload relay tripped?
 - a. Yes. Determine cause, rectify and reset.
 - b. No. Continue.
5. Is the motor starter energized?
 - a. No. There is an open or break in the wiring. Determine cause and rectify.
 - b. Yes. Check motor and motor wiring.

ALARM CODE: *Fan Cut-Off*

PROBLEM: The discharge air temperature is below the fan cut-off setpoint, for longer than the fan cut-off buffer setpoint after a cold start. The fan cut-off function automatically cycles the fan off and forces the face/bypass dampers to close (full bypass). The fan cut-off function also prevents the unit from starting. The Fan Cut-Off indication will appear on the *Equipment Touch* panel's alarm screen (standard).

SOLUTION: Investigate the fan cut-off setpoints:

There is an initial 5-minute run delay prior to fan cut-off activation. The default fan cut-off temperature setpoint is 45°F (35°F to 80°F, adjustable). The default fan cut-off buffer time setpoint is 3 minutes (3 - 9 minutes, adjustable). To change the fan cut-off setpoints, navigate to the *Equipment Touch* panel's Setpoints screen. Select the Fan Cut-Off SP setpoint and enter a new temperature, or select the Fan Cut-Off Buffer SP setpoint and enter a new time.

ALARM CODE: *Clogged Filters*

PROBLEM: The Clogged Filter function automatically notifies the user of a dirty filter condition. When the pressure differential across the filters exceeds the clogged filter switch pressure setting, the operator is alerted that filter maintenance is required. The Clogged Filter indication will appear on the *Equipment Touch* panel's alarm screen (optional). This alarm will automatically clear about 5 seconds after the problem is corrected.

SOLUTION: If the clogged filter switch is closed:

An optional clogged filter switch (PS-12) is required for this function. This function is activated whenever the switch contact is closed between terminals 222 and 223 on the unit's terminal strip, in the main control panel. See the Typical Wiring Schematic, Multiplexed Input, and Clogged Filter sections of this manual for more information.

1. Are the filters dirty?
 - a. Yes. Install clean filters and continue.
 - b. No. Continue.
2. Are the clogged filter switch sensing tubes obstructed?
 - a. Yes. Clear and continue.
 - b. No. Continue.
3. Are the wires connected to the clogged filter switch's normally open contacts?
 - a. No. Rewire switch and continue.
 - b. Yes. Continue.
4. Is the clogged filter switch's normally open contacts, open?
 - a. No. Replace the switch if contacts do not open.
 - b. Yes. Continue.
5. Find the clogged filter switch (PS-12) on the unit wiring diagram. Disconnect wires 222 and 223 from the control panel terminals. Does this clear the alarm?
 - a. Yes. There is short in the wiring between the terminal strip and the switch. Determine cause and rectify.
 - b. No. Continue.
6. Unplug the 8-wire connector from the controller's multiplexed input IN-4. Does this clear the alarm?
 - a. Yes. There is short in the wiring of the multiplexed resistors. Determine cause and rectify.
 - b. No. There is an internal short in the controller. Replace the controller.

ALARM CODE: *Discharge Air Temp High*

PROBLEM: The discharge air sensor is displaying a temperature of 10°F above either the maximum heating discharge air temperature setpoint (MRT Touch) or the heating discharge air temperature setpoint (MDT Touch) for over 1 minute on the *Equipment Touch* panel, and supply fan has been running for 10 minutes. The DA Temp High indication will appear on the *Equipment Touch* panel's alarm screen (standard). This alarm will automatically clear when the discharge air temperature drops below setpoint.

SOLUTION: Investigate the heating setpoints.

1. MRT-Touch: Is the unit's control system set to MRT (Room Temp) control?
 - a. Yes. Check the Max Heating DAT SP setpoint, on the touchscreen. The default maximum heating discharge air temperature setpoint is 80°F (40°F to 130°F, adjustable). Navigate to the *Equipment Touch* panel's Setpoints screen. Touch the Max Heating DAT SP setpoint, and enter a lower temperature. Change the unit enable parameter to Auto to restart unit. Did the DA Temp High alarm clear?
 - 1) Yes. Continue
 - 2) No. Contact the factory.
2. MDT-Touch: Is the unit's control system set to MDT (Discharge Temp) control?
 - a. Yes. Check the Heating DAT SP setpoint, on the touchscreen. The default maximum heating discharge air temperature setpoint is 80°F (35°F to 80°F, adjustable). Navigate to the *Equipment Touch* panel's Setpoints screen. Touch the Heating DAT SP setpoint, and enter a lower temperature. Change the unit enable parameter to Auto to restart unit. Did the DA Temp High alarm clear?
 - 1) Yes. Continue
 - 2) No. Contact the factory.
3. Mechanical (optional): Change the touchscreen unit enable parameter to Off, to allow the heating coil to cool down, for a certain period of time. The supply fan will continue to run for 2 minutes. Navigate to the *Equipment Touch* panel's Modes screen. Touch the Unit Enable Mode dropdown and select Off.
 - a. Check the building's heating source (steam or hot water) equipment and piping for any faulty or high temperature condition(s). Determine cause and rectify. Change the unit enable parameter to Auto to restart unit. Did the DA Temp High alarm clear?
 - 1) Yes. Continue
 - 2) No. Contact the factory.

ALARM CODE: *Discharge Air Temp Sensor Wiring Open*

PROBLEM: The discharge air sensor (TS-03) is displaying a temperature greater than 200°F, for over 1 minute on the *Equipment Touch* panel's Home or Status screens. The DA Temp Sensor Wiring Open indication will appear on the *Equipment Touch* panel's alarm screen (standard). This alarm will automatically clear after the discharge air sensor wiring issue is corrected.

SOLUTION: **Investigate the discharge air sensor:**

1. Is the discharge air temperature (DA Temp) value displayed on the *Equipment Touch* panel's Home or Status screens reading 200°F or more?
 - a. Yes. The discharge air sensor circuit, or the sensor itself is shorted. Unplug the 4-wire terminal plug from controller inputs IN-5 and IN6. Did the DA Temp screen value change to -40°F or less?
 - 1) No. There is a short in the controller input. Replace the controller.
 - 2) Yes. Disconnect the sensor wiring at the sensor. Connect an ohmmeter to the sensor. If it is shorted replace the sensor. At 77°F the resistance should be 10K . See thermistor output curve for other temperatures. If it is not shorted, there is a short in the wiring between the sensor and the input plug. Determine cause and rectify. Refer to Appendix A for a typical 10K thermistor output curve.
 - b. No. Continue.

ALARM CODE: *Discharge Air Temp Sensor Wiring Short*

PROBLEM: The discharge air sensor (TS-03) is displaying a temperature less than -50°F for over 1 minute, on the touchscreen. The DA Temp Sensor Wiring Short indication will appear on the *Equipment Touch* panel's alarm screen (standard). This alarm automatically clears after the discharge air sensor wiring issue is corrected.

SOLUTION: **Investigate the discharge air sensor:**

1. Is the discharge air temperature (DA Temp) value displayed on the *Equipment Touch* panel's Home or Status screen, reading -40°F or less?
 - a. Yes. That sensor circuit or the sensor itself is open. Jumper the input for the sensor. Did the display change to 150°F or more?
 - 1) No. The controller input IN6 is open. Replace the controller.
 - 2) Yes. Disconnect the sensor wiring at the sensor. Connect an ohmmeter to the sensor. If it is open replace the sensor. At 77°F the resistance should be 10K . See thermistor output curve for other temperatures. If it is not open, there is a break in the wiring between the sensor and the input plug. Determine cause and rectify.

ALARM CODE: *Outside Air Temp Sensor Wiring Open*

PROBLEM: The outside air sensor (TS-01) is displaying a temperature greater than 200°F, for over 1 minute on the *Equipment Touch* panel's Home or Status screens. The OA Temp Sensor Wiring Open indication will appear on the *Equipment Touch* panel's alarm screen (standard). This alarm will automatically clear after the outside air sensor wiring issue is corrected.

SOLUTION: Investigate the outside air sensor:

1. Is the outside air temperature (OA Temp) value displayed on the *Equipment Touch* panel's Home or Status screen, reading 200°F or more?
 - a. Yes. The outside air sensor circuit, or the sensor itself is shorted. Unplug the 4-wire terminal plug from controller inputs IN-5 and IN6. Did the OA Temp screen value change to -40°F or less?
 - 1) No. There is a short in the controller input. Replace the controller.
 - 2) Yes. Disconnect the sensor wiring at the sensor. Connect an ohmmeter to the sensor. If it is shorted replace the sensor. At 77°F the resistance should be 10K . See thermistor output curve for other temperatures. If it is not shorted, there is a short in the wiring between the sensor and the input plug. Determine cause and rectify. Refer to Appendix A for a typical 10K thermistor output curve.
 - b. No. Continue.

ALARM CODE: *Outside Air Temp Sensor Wiring Short*

PROBLEM: The outside air sensor (TS-01) is displaying a temperature less than -50°F for over 1 minute, on the touchscreen. The OA Temp Sensor Wiring Short indication will appear on the *Equipment Touch* panel's alarm screen (standard). This alarm automatically clears after the outside air sensor wiring issue is corrected.

SOLUTION: Investigate the outside air sensor:

1. Is the outside air temperature (OA Temp) value displayed on the *Equipment Touch* panel's Home or Status screen, reading -40°F or less?
 - a. Yes. The outside air sensor circuit, or the sensor itself is open. Jumper controller input IN-5 for the outside air sensor. Did the display change to 150°F or more?
 - 1) No. The controller input IN-5 is open. Replace the controller.
 - 2) Yes. Disconnect the sensor wiring at the sensor. Connect an ohmmeter to the sensor. If it is open replace the sensor. At 77°F the resistance should be 10K . See thermistor output curve for other temperatures. If it is not open, there is a break in the wiring between the sensor and the input plug. Determine cause and rectify.

ALARM CODE: *Room Sensor Failure*

PROBLEM: Communications between the room sensor and controller have failed, when a unit is configured for the MRT-Touch control system. The Room Sensor Failure indication will appear on the *Equipment Touch* panel's alarm screen (standard). This alarm will automatically clear after the alarm is corrected.

SOLUTION: Investigate room sensor:

1. When communications are interrupted between the room sensor and controller, the displayed room temperature will be equal to the last good temperature value received from the room sensor, for approximately 5 minutes following the interruption. For example, if the room temperature was 67°F when the room sensor was disconnected, the displayed room temperature will be 67°F for approximately 5 minutes. After this time period has elapsed, the unit will default to a failsafe mode, during which the discharge air temperature will be maintained at 70°F. The displayed room temperature on the *Equipment Touch* will be 45°F. If the unit control module then loses power any time after the loss of communications and is repowered, the room temperature will be displayed as 0°F until the communications failure is rectified.
2. Is the room sensor wired correctly and securely in the terminal connectors on the back of the room sensor, as well as at the Rnet input on the left side of the controller?
 - a. No. Correct wiring and securely tighten connections. Check to see if the alarm has turned off, indicating the problem has been resolved.
 - b. Yes. Internal room sensor failure. Replace room sensor.

**ALARM CODE: *Monthly Maintenance Reminder (See IOM)*
Quarterly Maintenance Reminder (See IOM)
*Yearly Maintenance Reminder (See IOM)***

PROBLEM: The controller has determined that based on unit runtime, the operator should perform monthly, quarterly, or yearly maintenance functions as outlined in the unit's *Installation, Operation, and Maintenance* (IOM) manual. This alarm does not indicate an actual fault or issue with the unit operation. This alarm merely serves as a reminder that the unit should be inspected, and any relevant maintenance functions should be performed to continue to ensure successful operation of the unit.

SOLUTION: If an active maintenance reminder alarm is present:

1. Perform monthly, quarterly, or yearly maintenance functions as indicated in the unit's IOM.
2. Use the Alarms Reset parameter on the touchscreen to reset the alarm. Navigate to the *Equipment Touch* panel's Resets screen, to reset the alarm.

ALARM CODE: *Invalid Damper Control Mode*

PROBLEM: The user has selected Mixed Air Temperature control mode for mixing box damper operation, and the unit is configured for MDT-Touch control, *or* communications between the room sensor and the unit control module have failed during MRT-Touch control. This alarm will automatically clear after the alarm is corrected.

SOLUTION: **If the unit is configured for MRT-Touch controls:**

1. Is the room sensor wired correctly and securely in the terminal connectors located on the back of the room sensor, as well as at the Rnet input on the left side of the unit control module?
 - a. No. Correct wiring and securely tighten connections.
 - b. Yes. Internal room sensor failure. Replace room sensor.

SOLUTION: **If the unit is configured for MDT-Touch controls:**

1. Select either the Manual or Building Pressure damper control modes. Mixed Air Temperature control mode is incompatible with MDT-Touch control systems. Mixed Air Temperature control mode requires that the unit be configured for MRT-Touch controls and that a room sensor be installed and functioning.

ALARM CODE: *Invalid Fan Size*

PROBLEM: The FAS unit size and/or fan type setpoint has been set to an invalid value. The FAS unit size and fan type are set at the factory, to match the FAS unit customer order. The touchscreen either has an incorrect FAS unit size number, or an incorrect FAS unit size number and fan type (manufacturer).

Acceptable FAS unit size numbers are: 13, 17, 19, 22, 24, 25, 27, 30, 33, and 36. Rosenberg fans are the default FAS fan type, and are available in the following unit sizes: 13, 17, 19, 22, 24, 25, 27, and 30. Rosenberg fans are not available in unit sizes 33 and 36. Ebmpapst fans are an optional FAS fan type, and are available in the following unit sizes: 17, 19, 22, 24, 25, 27, 30, 33, and 36. Ebmpapst fans are not available in unit size 13. This alarm will automatically clear after the fan setpoint(s) are corrected.

SOLUTION: **Check the FAS Unit Size:**

Navigate to the touchscreen's Unit Setup screen (Home > Unit Setup).

1. Is the FAS unit size set to 13, 17, 19, 22, 24, 25, 27, 30, 33, or 36?
 - a. Yes. Continue.
 - b. No. Check customer order, and change the FAS Unit Size number.

SOLUTION: **Check the FAS Unit Size and FAS Fan Type:**

Navigate to the touchscreen's Unit Setup screen (Home > Unit Setup).

1. Is the FAS unit size set to 33 or 36, and the FAS Fan Type set to Rosenberg?
 - a. Yes. Check customer order, and change the FAS Unit Size number and FAS Fan Type to match the customer order..
 - b. No. Continue.
2. Is the FAS unit size set to 13, and the FAS Fan Type set to Ebmpapst?
 - a. Yes. Check customer order, and change the FAS Unit Size number and FAS Fan Type to match the customer order.

Glossary

Equipment Touch ó A touchscreen display used to change setpoints and monitor the unit's operation.

PID Loop or Control – Proportional, Integral, Derivative control, a common control scheme used in modulating HVAC systems.

WebCTRL ó A web-based graphical user interface, which provides the user access to the unit controller via an Internet browser.

Appendix A

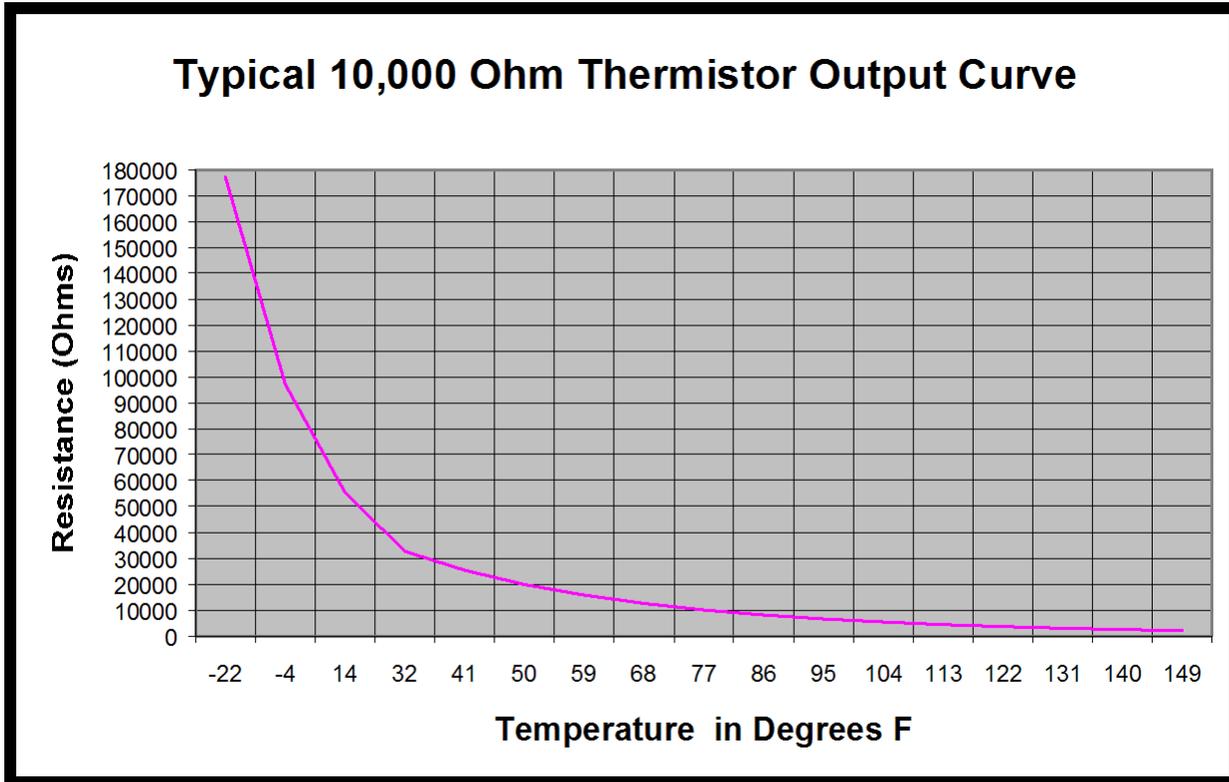
High Static FAS Fan Information

The high static FAS fan parameters are linked to the unit size, in the unit controller. These fan parameters are automatically configured, to match the fan ordered by the customer.

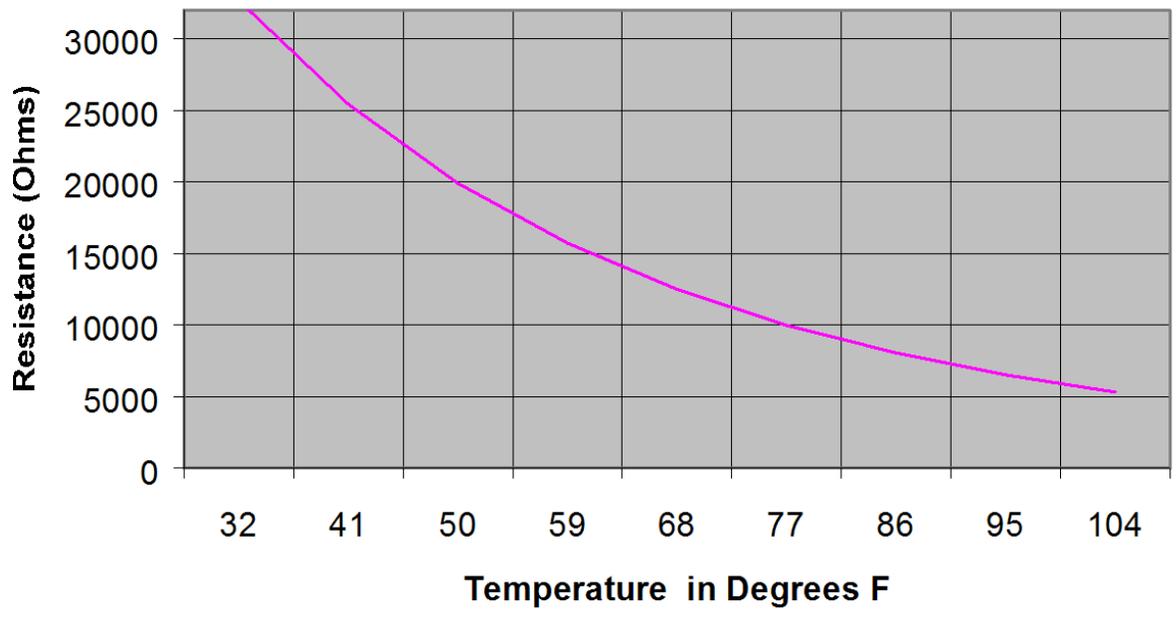
Unit Size	Minimum Fan Airflow	Maximum Fan Airflow	Rosenberg Fan Ranges		Ebmpapst Fan Ranges	
			Low Diff	High Diff Press	Low Diff	High Diff Press
FAS-13 (250 mm)	455 cfm (Rosenberg)	855 cfm (Rosenberg)	0.60 öw.c.	2.12 öw.c.	n/a	n/a
FAS-13 (280 mm)	700 cfm (Rosenberg)	855 cfm (Rosenberg)	1.12 öw.c.	1.67 öw.c.	n/a	n/a
FAS-17	1,100 cfm	1,400 cfm	1.85 öw.c.	3.00 öw.c.	1.50 öw.c.	2.25 öw.c.
FAS-19	1,850 cfm	2,000 cfm	2.43 öw.c.	2.84 öw.c.	1.70 öw.c.	2.10 öw.c.
FAS-22	2,600 cfm	2,750 cfm	1.26 öw.c.	1.41 öw.c.	1.60 öw.c.	1.85 öw.c.
FAS-24	2,900 cfm	3,700 cfm	1.57 öw.c.	2.56 öw.c.	1.80 öw.c.	2.80 öw.c.
FAS-25	3,500 cfm	4,300 cfm	2.29 öw.c.	3.46 öw.c.	2.50 öw.c.	4.00 öw.c.
FAS-27	4,000 cfm	5,300 cfm	2.73 öw.c.	4.78 öw.c.	2.30 öw.c.	4.20 öw.c.
FAS-30	5,000 cfm	7,000 cfm	1.67 öw.c.	3.28 öw.c.	2.40 öw.c.	4.80 öw.c.
FAS-33	6,500 cfm	8,500 cfm	n/a	n/a	2.20 öw.c.	3.40 öw.c.
FAS-36	8,000 cfm	10,000 cfm	n/a	n/a	3.10 öw.c.	4.90 öw.c.

Appendix B

10KΩ Thermistor Output Curve



Typical 10,000 Ohm Thermistor Output Curve



Appendix C

I/O Zone 583 Controller Specifications

POWER REQUIREMENTS

24VAC \pm 10%, 20VA

NETWORK COMMUNICATION

BACnet (MS/TP or ARCNET), Modbus RTU, or N2 bus at up to 76.8K baud or 156K baud over ARCnet. LonWorks using plug-in communications board, or Ethernet using a BAS Router for BACnet Ethernet, BACnet MS/TP, or BACnet/IP.

USER INTERFACE

MRT-Touch: modulating room temperature control with intelligent room sensor and *Equipment Touch* control panel.

MDT-Touch: modulating discharge temperature control with *Equipment Touch* control panel.

MEMORY

1 MB non-volatile battery-backed RAM, 4 MB flash memory, 16-bit memory bus

REALTIME CLOCK

Battery-backed to keep time in event of power failure.

TEMPERATURE OPERATING RANGE

0°F to 130°F,
10% to 95% RH non-condensing

INPUTS/OUTPUTS

8 Universal Inputs

- Inputs 1 & 2
 - Dry, thermistor, 0-5VDC
- Inputs 3 & 6
 - Dry, thermistor
- Inputs 7 & 8
 - 1k ϕ 10k pot 5

Digital Outputs

- Relay contacts rated at 1A Resistive @ 24VAC/VDC
- LED indication

3 Analog Outputs

- 0 ϕ 10 VDC

OUTPUT ASSIGNMENTS - ANALOG

AO1 Face & Bypass Damper, 0 ϕ 10 VDC
AO2 Mixing Damper Control, 0 ϕ 10VDC
AO3 Supply Fan Speed, 0 ϕ 10VDC

OUTPUT ASSIGNMENTS - DIGITAL

DO1 Unit Enable
DO2 N/C
DO3 N/C
DO4 N/C
DO5 N/C

INPUT ASSIGNMENTS - UNIVERSAL

IN1 Building Pressure Transducer for Fan Control or Mixing Damper Control
IN2 Piezo Ring Pressure Transducer for Fan Control & Airflow Measurement
IN3 Multiplexed

- 100% Outside Air
- N/C
- N/C
- N/C

IN4 Multiplexed

- Auxiliary Unit Enable
- Clogged Filter Alarm
- Fan Status
- Freeze Stat Alarm

IN5 Outside Air Temp Sensor
IN6 Discharge Air Temp Sensor
IN7 N/C
IN8 N/C

RNET Room Air Temp Sensor, and Equipment Touch panel (MRT-Touch control system)

Appendix D

I/O Zone 583 Controller Battery Checkout

The battery on the unit control module retains the controller's memory in the event of power failure. The 10-year Lithium CR2032 battery provides a minimum of 10,000 hours of data retention during power outages. Remember to check the battery periodically (once a month) to verify that its voltage is approximately 3 VDC.

If the voltage is not at least 3 VDC, replace the battery so that the controller's program is not lost during a power outage. Loss of the program will require the controller to be shipped back to the factory for reprogramming because the unit will not function without the program.

Note: Make sure the controller is powered any time the battery is removed, or the controller's memory may be lost.

Figure 5 shows the location of the battery on the controller.

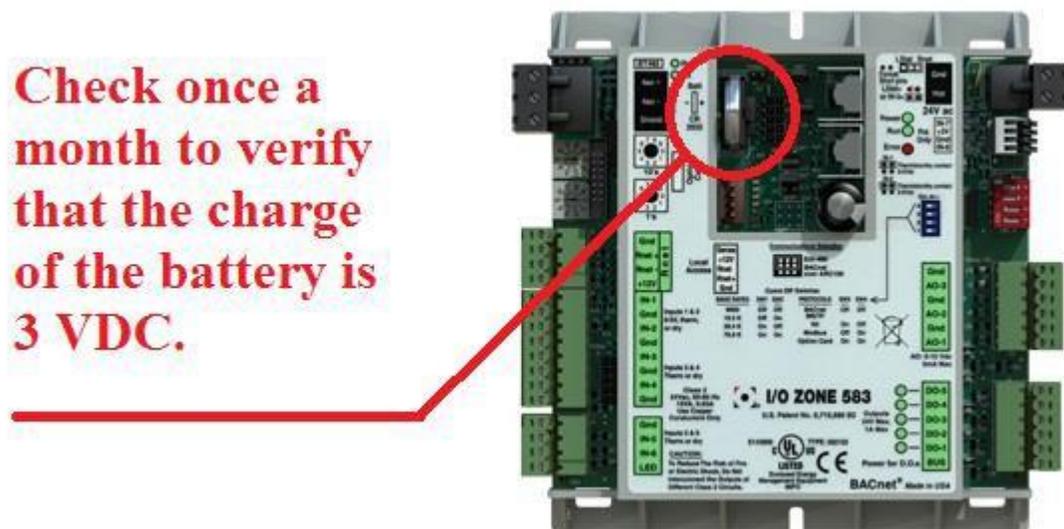


Figure 5

Appendix E

Control System Field Conversion

The unit can be converted to a different control system in the field. Locate the unit's current control system in the "From" column and the new control system in the "To" column that is in the same row as the current control system. Follow the steps outlined in the "New" column to complete the field conversion.

NOTE: Contact the factory for the *Equipment Touch* Admin password if required and to have the wiring diagram updated when doing a control system field conversion. Failure to do so will result in inaccurate documentation that can complicate possible future troubleshooting efforts.

From	To
<i>MRT-Touch</i>	<i>MDT-Touch</i> <ol style="list-style-type: none">1. On the <i>Equipment Touch</i>, navigate to the Setup screen (Home > Menu > Setup). Change the Control System parameter to "MDT".2. Navigate to the Setpoints screen (Home > Menu > Setpoints). Configure the appropriate setpoints for the MDT-Touch control system.3. Optionally disconnect the room sensor. Leaving the room sensor connected will not affect unit operation, when the MDT-Touch control system is active.
<i>MDT-Touch</i>	<i>MRT-Touch</i> <ol style="list-style-type: none">1. Mount a room sensor and wire it to the Rnet terminals on the controller.2. On the <i>Equipment Touch</i>, navigate to the Setup screen (Home > Menu > Setup). Change the Control System parameter to "MRT".3. <i>Navigate</i> to the Setpoints screen (Home > Menu > Setpoints). Configure the appropriate setpoints for the MRT-Touch control system.

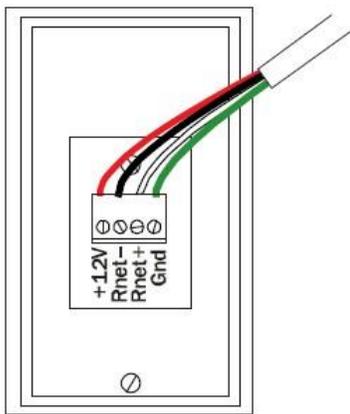
Appendix F

Room Sensor Wiring

For the room sensor wiring, use a 4 conductor shielded or unshielded plenum rated cable, 22 AWG. Wire length between the room sensor and controller must not exceed 500 feet.

If using shielded wire (recommended), terminate the shield wire to the GND terminal on the Rnet port at the controller together with the green wire. Do not terminate the shield wire on the room sensor side. Isolate the unterminated end of the shield wire so it does not come into contact with any other wires or conductive surfaces.

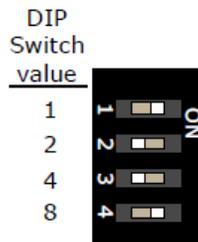
Wire each terminal on the controller's Rnet port (located on the left-hand side of the controller) to the terminal of the same name on the room sensor. The figure below is provided for reference. It does not matter if your cable's wire colors do not match this figure, as long as each terminal on the room sensor is connected to the terminal of the same name on the controller.



Connect this wire...	To this terminal...
Red	+12V
Black	Rnet-
White	Rnet+
Green	Gnd

The room temperature sensor (*ZS Sensor*) is a thermistor-based sensor, with a Local Access port. The room sensor communicates the temperature value at 115 kbps, to the controller's Rnet port. If the room sensor communication fails, a room temperature value of 0°F will be displayed on the *Equipment Touch* panel. The controller will switch to the MDT-Touch control system, and activate the Room Sensor Failure alarm.

Each room sensor on an Rnet port must have a unique address. Use the DIP switches on the back of the *ZS Sensor* to set an address from 0 to 14. (0 is factory default.) Each DIP switch has the value shown in the figure below. Turn on as many DIP switches as you need so that their total value equals the address.



EXAMPLE:

DIP switches 1 and 4 above are on. Their values (1 + 8) total 9, so the sensor's address is 9.

Appendix G

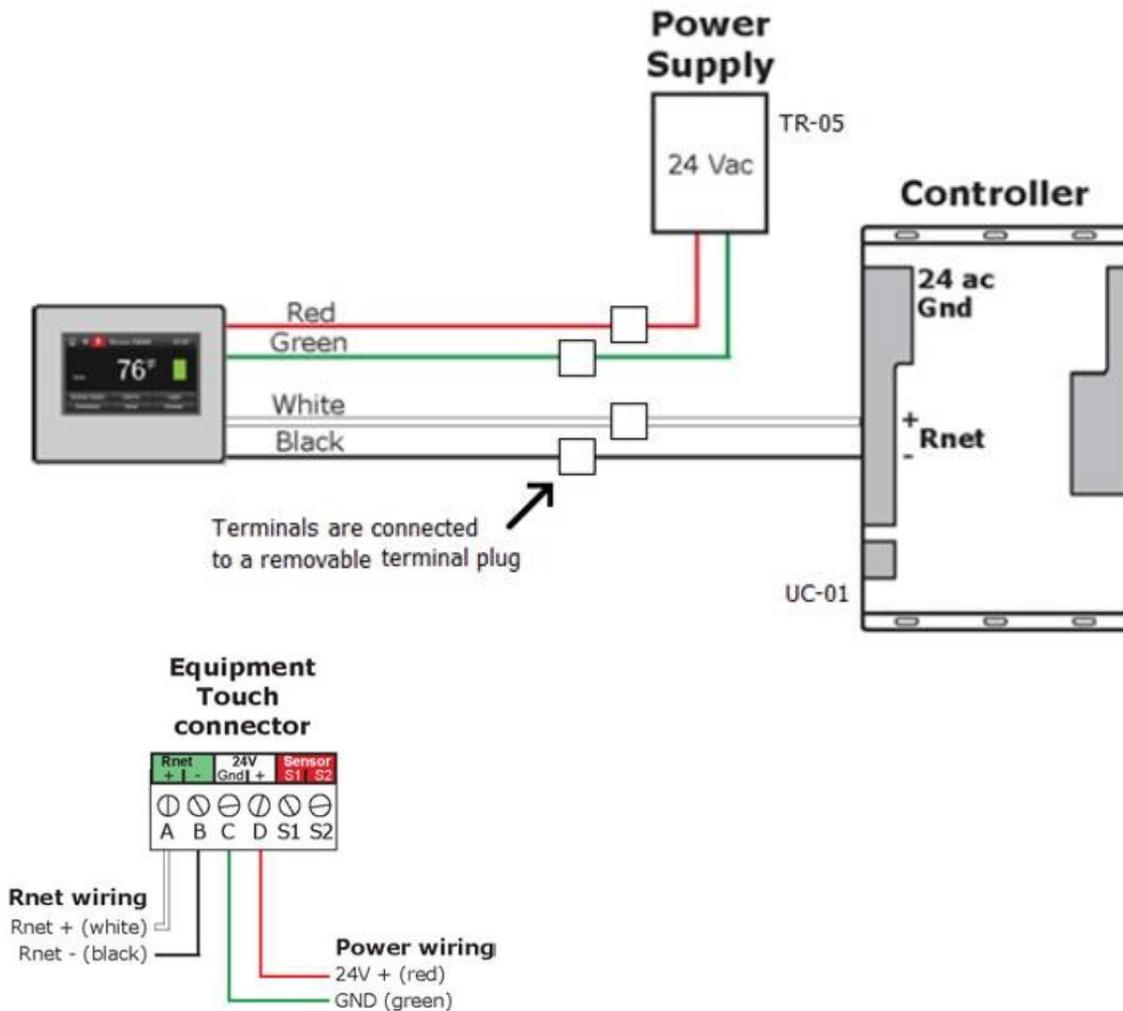
Equipment Touch Wiring

Portable / Using the Terminal Plug

The *Equipment Touch* is supplied from the factory with a 10-foot cable with a terminal plug on one end. The other end of the cable is connected to the terminals on the *Equipment Touch*. To use the *Equipment Touch*, plug the terminal plug on the cable into the appropriate terminal blocks in the unit's main control panel.

For your convenience, two of the terminal blocks are pre-wired at the factory to the Rnet+ and Rnet- terminals on the controller. The other two terminal blocks are pre-wired at the factory to the 24 VAC power source in the main control panel (typically control transformer TR-05).

Plugging the terminal plug into the four terminal blocks completes the connection between the *Equipment Touch* (shown on the left-hand side of the terminal plug in the figure below) and the controller and power supply/transformer (shown on the right-hand side of the terminal plug in the figure below). Refer to the figure below for a visual representation of these connections.





4830 Transport Drive, Dallas, TX 75247

Phone: 214-638-6010

www.ljwing.com