OPERATION MANUAL

OM 1357-4

DECEMBER 2025

MICROTECH® CONTROLLER

FOR PRECISELINE® LIGHT AIR HANDLERS

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Safety Information

Hazard Identification

⚠ DANGER

Danger indicates a hazardous situation, which will result in death or serious injury if not avoided.

⚠ WARNING

Warning indicates a potentially hazardous situations, which can result in property damage, personal injury, or death if not avoided.

⚠ CAUTION

Caution indicates a potentially hazardous situations, which can result in minor injury or equipment damage if not avoided.

NOTICE

Notice indicates practices not related to physical injury.

NOTE: Indicates important details or clarifying statements for information presented in Figures or Tables.

Safety Considerations

This manual provides installation, operation, and maintenance information for Daikin Applied MicroTech Unit Controller with PreciseLine Light Air Handler units.

⚠ DANGER

LOCKOUT/TAGOUT all power sources prior to service, pressurizing, de-pressuring, or powering down the unit. Failure to follow this warning exactly can result in serious injury or death. Disconnect electrical power before servicing the equipment. More than one disconnect may be required to denergize the unit. Be sure to read and understand the installation, operation, and service instructions within this manual.

⚠ WARNING

Electric shock hazard. Improper handling of this equipment can cause personal injury or equipment damage. This equipment must be properly grounded. Connections to and service of the MicroTech control panel must be performed only by personnel that are knowledgeable in the operation of the equipment being controlled.

⚠ WARNING

Polyolester Oil, commonly known as POE oil is a synthetic oil used in many refrigeration systems, and may be present in this Daikin Applied product. POE oil, if ever in contact with PVC/CPVC, will coat the inside wall of PVC/CPVC pipe causing environmental stress fractures. Although there is no PVC/CPVC piping in this product, please keep this in mind when selecting piping materials for your application, as system failure and property damage could result. Refer to the pipe manufacturer's recommendations to determine suitable applications of the pipe.

⚠ CAUTION

Static sensitive components. A static discharge while handling electronic circuit boards can cause damage to the components. Discharge any static electrical charge by touching the bare metal inside the control panel before performing any service work. Never unplug any cables, circuit board terminal blocks, or power plugs while power is applied to the panel.

NOTICE

Installation and maintenance are to be performed only by licensed, if required by local codes and regulations, or qualified personnel who are familiar with local codes and regulations and are experienced with this type of equipment.

NOTICE

QUEBEC DISCLOSURE REGARDING AVAILABILITY OF REPLACEMENT PARTS, REPAIR SERVICES AND INFORMATION FOR MAINTENANCE AND REPAIR: Daikin Applied Americas Inc. (Daikin Applied) does not guarantee the availability of (1) replacement parts; (2) repair services; and (3) information necessary to maintain or repair products, within the meaning of section 39.1 of the Consumer Protection Act, CQLR, c P-40.1 and section 79.18 of the Regulation respecting the application of the Consumer Protection Act, CQLR, c P-40.1, r. 3.

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Introduction

This manual provides operating information about the MicroTech unit controller as pertains to PreciseLine light air handler models. For installation and/or maintenance procedures, see Daikin Applied IM 1267.

⚠ WARNING

Only qualified personnel should install, operate, and service the equipment and that improper adjustment of settings and operation by an unqualified person could result in property damage, injury, or death.

Unit Description

A typical unit will range between three sizing categories, as shown in the following figures. These figures are for general information only. See the project's certified submittals for actual specific dimensions and locations.

Figure 1: Typical Size 006-020 Units (Horizontal)

Figure 2: Typical Size 006-020 Units (Vertical)

Figure 3: Typical Size 030-050 Units (Horizontal)

Figure 4: Typical Size 030-050 Units (Vertical)

Figure 5: Typical Size 060-100 Units

Menu Description Tables Glossary

Portable Interface

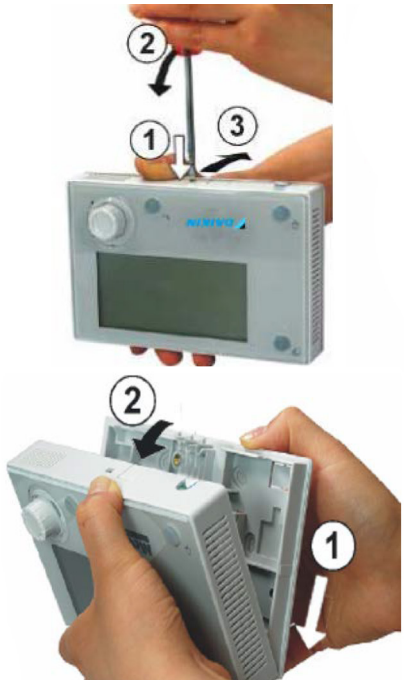
⚠ WARNING

Electric shock hazard. Can cause personal injury, death, or property damage.

This equipment must be properly grounded. Connections and service to the MicroTech unit controller must be performed only by personnel knowledgeable in the operation of the equipment being controlled.

1. Remove plastic cover (Figure 6) to access the RJ45 connection.
2. Mount the portable interface. The portable interface has magnets for mounting to metallic surfaces.

Figure 6: Removing the Cover



Direct Connection

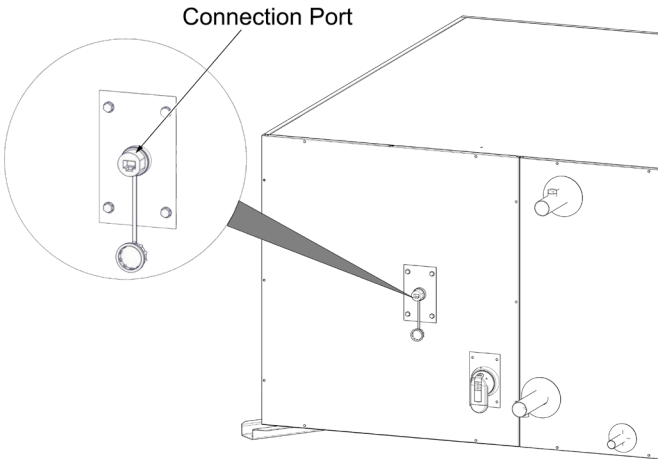
The portable interface can be wired directly to a single MicroTech unit controller over a standard RJ45 (Ethernet) connection.

1. Locate the external RJ45 plug shown in Figure 7

Interface Details for RJ45 Connector:

- Bus connection - RJ45 Interface
- Max length of shielded cable: 164 ft (50 m)
- Max length of unshielded cable: 9.8 ft (3 m)
- Cable type: standard Ethernet cable

Figure 7: Connection Port (Size 030 Shown)



Using the Portable Interface

Hardware Features

The portable interface keypad/display consists of an 8-line by 30 character display, a “push and roll” navigation wheel, and three buttons: Alarm, Home (Menu), and Back (Figure 8).

- Turn the navigation wheel clockwise (right) or counterclockwise (left) to navigate between lines on a screen and also to increase and decrease changeable values when editing. Press down on the wheel to use it as an Enter button.
- Press the Back button to display the previous page.
- Press the Home button to return to the main screen from the current page.
- Press the Alarm button to view the Alarm Lists menu.

Keypad/Display Features

The first line on each page includes the page title and the line number to which the cursor is currently “pointing.” The line numbers are X/Y to indicate line number X of a total of Y lines for that page. The left most position of the title line includes an “up” arrow to indicate there are pages “above” the currently displayed items, a “down” arrow to indicate there are pages “below” the currently displayed items or an “up/down” arrow to indicate there are pages “above and below” the currently displayed page. Each line on a page can contain status-only information or include changeable data fields. When a line contains status-only information and the cursor is on that line, all but the value field of that line is highlighted - meaning the text is white with a black box around it. When the line contains a changeable value and the cursor is at that line, the entire line is highlighted.

Each line on a page may also be defined as a “jump” line, meaning pushing the navigation wheel will cause a “jump” to a new page. An arrow is displayed to the far right of the line to indicate it is a “jump” line and the entire line is highlighted when the cursor is on that line.

NOTICE

Only menus and items that are applicable to the specific unit configuration are displayed.

Figure 8: Portable Interface Main Features

Keypad/Display Functions

The keypad/display information is organized into a series of menus or menu groups designed to allow navigation through unit operating parameters and editing access to customize unit performance.

Passwords control access to service technician level and field engineering level parameters.

Advanced menus include the most advanced items such as “unit configuration” and service related parameters. These generally do not require changes unless there is a fundamental change to (or a problem with) unit operation.

NOTICE
Only menus and items that are applicable to the specific unit configuration are displayed.

Passwords

When the keypad/display is first accessed, the Home Key is pressed, the Back Key is pressed multiple times, or if the keypad/display has been idle for the Password Timeout timer (default 10 minutes), the display will show a “main” page where the user can enter a password or continue without entering a password.

Various menu functions are accessible or inaccessible, depending on the access level of the user, and the password they enter, if any. There are four access levels, including no password, Level 2, Level 4, and Level 6, with Level 2 having the highest level of access. Without entering a password, the user has read-only access to current basic menu items including Quick Menu, Alarm Lists, and About This AHU menus. Alarms can be acknowledged at this level. Entering the Level 6 password (5321) allows access to basic menu items plus the View Status menu group. Entering the Level 4 password (2526) allows similar access as Level 6 with the addition of the Commission Unit and Service Menu groups. Entering the Level 2 password (6363) allows similar access as Level 4 with the addition of the Manual Control and Unit Maintenance menus, plus Advanced Menus accessible through the Service Menu.

The password field initially has a value **** where each * represents an adjustable numeric field. These values can be changed by entering the Edit Mode.

Entering an invalid password has the same effect as continuing without entering a password.

Once a valid password has been entered, the selected access is maintained until either the password timer expires or a different password is entered. The default value for this password timer is 10 minutes and may be changed in the Advanced Timers menu (Advanced Menus).

Navigation Mode

In the Navigation Mode, values which can be edited are indicated by the entire line being highlighted (black box with white text). Values which are “read only”, displayed for information only, will have only the parameter name highlighted.

When the navigation wheel is turned clockwise, the cursor moves to the next line (down) on the page. When the wheel is turned counter-clockwise the cursor moves to the previous line (up) on the page. The faster the wheel is turned the faster the cursor moves.

When the Back Button is pressed the display reverts back to the previously displayed page. If the Back button is repeatedly pressed the display continues to revert one page back along the current navigation path until the “main menu” is reached.

When the Menu (Home) Button is pressed the display reverts to the “main page.”

When the Alarm Button is depressed, the Alarm Lists menu is displayed. Repeated pressing of the Alarm Button toggles between active alarms and the alarm history.

Edit Mode

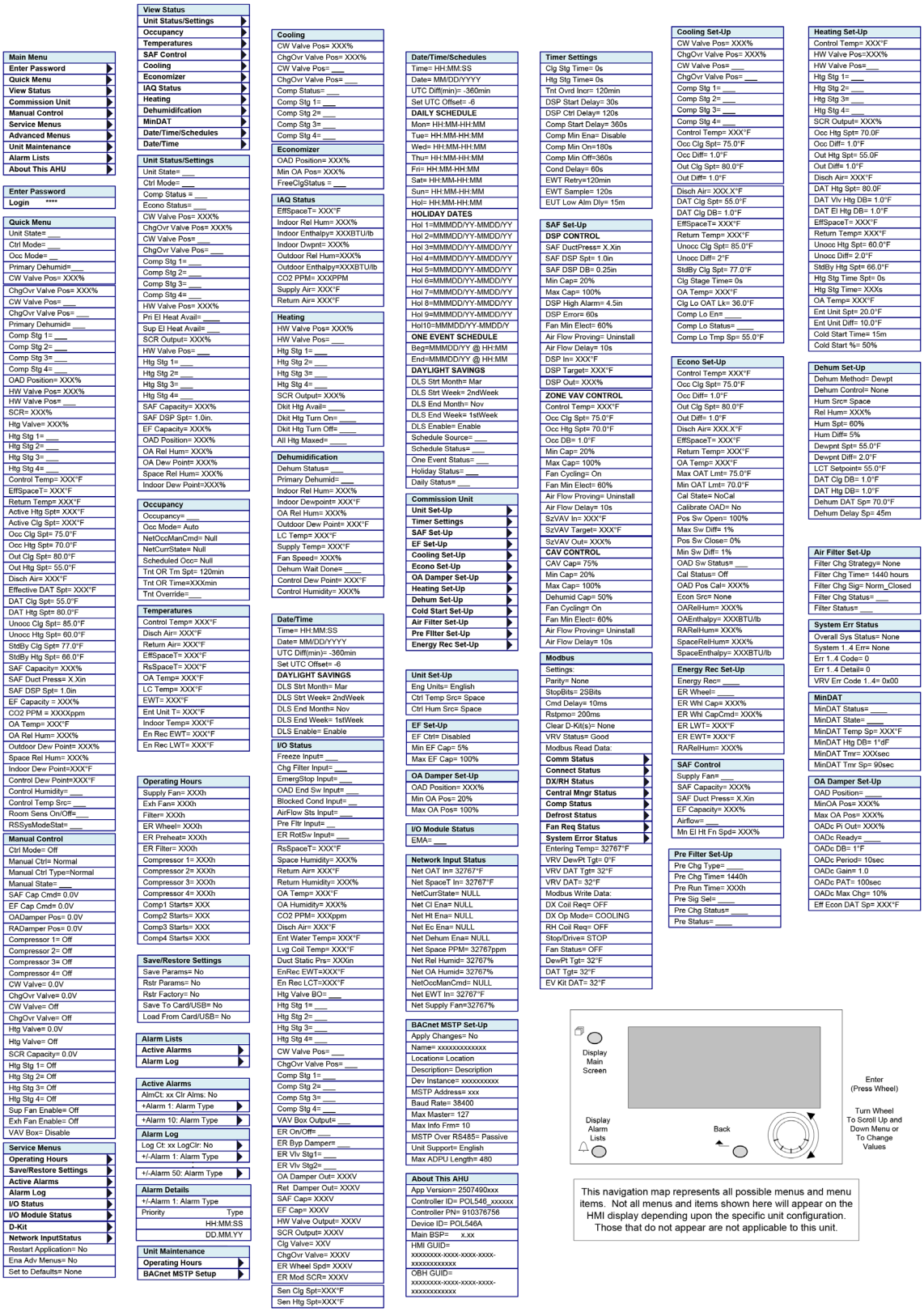
The Editing Mode is entered by pressing the navigation wheel while the cursor is pointing to a line containing an editable field. Once in the edit mode pressing the wheel again causes the editable field to be highlighted. Turning the navigation wheel clockwise or counter-clockwise will either increase or decrease the value in the selected field, respectively.

The faster the wheel is turned the faster the value is incremented. Pressing the wheel will save the new value and return the display to the navigation mode. Pressing the back button will exit the editing mode without saving the change.

Keypad and Display

The following is a description of the MicroTech unit controller menu structure. These menus and items can all be displayed with the keypad/display. Menu items displayed will change based on the selected unit configuration.

Figure 9: Keypad Navigation



This navigation map represents all possible menus and menu items. Not all menus and items shown here will appear on the HMI display depending upon the specific unit configuration. Those that do not appear are not applicable to this unit.

Figure 10: Advanced Menus Keypad Navigation

To Access Advanced Menu Scroll to location: Main Menu \ Service Menu; Scroll to bottom of Service menu and set Ena Adv Menu = Yes. Return to Main Menu. Now Advanced Menu will be visible for 30 min.

Advanced Menus
Advanced Timers
SAF Set-Up
EF Set-Up
Cooling Set-Up
CW Valve Set-Up
Heating Set-Up
Preheat Set-Up
Supheat Set-Up
HW Valve Set-Up
EH Htg Set-Up
ChgOvr Vlv Set-Up
Econo Set-Up
Dehum Set-Up
CO2 Set-Up
Energy Rec Set-Up
Alarms Set-Up
Unit Configuration
IO Readings

Advanced Timers
Apply Changes= No
Pwd Timeout= 10min
SAF Ctrl Dly= XXXs
Filter Chg Time= 1440h
Filter Runtime= XXXh
Heat Stage Timer= XXXs
El Heat Stage Timer= XXXs
DSP Dly Timer= XXXs
SAF On Timer= XXXs
State Change Timer= XXXs
Startup Timer= XXXs
EWT Htg Timer= XXXs
EWT Clg Timer= XXXs
EWT Htg Retry= XXXmin
EWT Clg Retry= XXXmin
DSP Alm Tmr= XXXs
RS Comm= ___
RS Spc Tmp Tmr= XXXs
Comp Start Delay Tm= XXXs
Tnt OR Timer= XXXs
Comp 1 On Tmr= XXXs
Comp 2 On Tmr= XXXs
Comp 3 On Tmr= XXXs
Comp 4 On Tmr= XXXs
Comp 1 Off Tmr= XXXs
Comp 2 Off Tmr= XXXs
Comp 3 Off Tmr= XXXs
Comp 4 Off Tmr= XXXs
Vrv Comp On Tme= XXXs
Vrv Comp Off Tmr= XXXs
Cold Start Tmr= XXXs

SAF Set-Up
SAF DSP Control
1 Zone VAV Control

SAF DSP Control
DSP Period= 5s
DSP Gain= 0.1
DSP PAT= 60s
DSP Max Chg= 5.0%
DSP PI Target= XXXin
DSP PI Input= XXXin
DSP PI Output= XXX%

1 Zone VAV Control
1ZnVAV Period=10s
1ZnVAV Gain= 1.0
1ZnVAV PAT= 100s
1ZnVAVMaxChg= 10%

EF Set-Up
EF Damper Setpt= 20%
EF Const Speed Setpt= 75%

Cooling Set-Up
Lead Compressor= RunTime
Compressor Diff= 2.00°F
Clg Period= 10s
Clg Gain= 1.0
Clg PAT= 100s
Clg Max Chg= 10.0°F
Compressor Avail= ___
Comp Off Timer= XXXs
Comp On Timer= XXXs
Cooling Stage Timer= XXXs
Desired Cooling= XXX%
Desired Cooling Stg= X
Current Cooling Stg= X
Comp Turn On= ___
Comp Turn Off= ___
Clg PI Target= XXX°F
Clg PI Input= XXX°F
Clg PI Output= XXX%

CW Valve Set-Up
Clg Period= 20s
Clg Gain= 1.0
Clg PAT= 40s
Clg Max Chg= 15.0%
CW Vlv Direction= Direct
CW Vlv Signal= OnOff24VAC
CW Cooling Avail= ___
Clg PI Target= XXX°F
Clg PI Input= XXX°F
Clg PI Output= XXX%

Heating Set-Up
Comp Htg Turn On= _____
Comp Htg Turn Off= _____
All Htg Maxed= _____

Preheat Set-Up
Preheat Source= OAT
PH En Diff Sp= 10.0°F
PH Tgt Sp= 16.0°F
PH OAT Diff Sp= 2.0°F
PH OAT Tgt Sp= 23.0°F
Preheat Temp In= XXX°F
Preheat Required= ____
Eut Low Lim Spt= 16°F

Supheat Set-Up
Supheat Source= None
Sup Heat Needed= NotNeeded
Sup Heat En Time= 5m
Sup Heat En Diff= 2.0°F
SupHtg Wait Done= FALSE
Sup Heat Dly Time= 15m

HW Valve Set-Up
Htg Period= 60s
Htg Gain= 1.5
Htg PAT= 90s
Htg Max Chg= 10.0%
HW Vlv Direction= Direct
HW Vlv Signal= OnOff24VAC
HW Heating Avail= ___
Htg PI Target= XXX°F
Htg PI Input= XXX°F
Htg PI Output= XXX%

EH Htg Set-Up
Htg Period= 10s
Htg Gain= 1.0
Htg PAT= 100s
Htg Max Chg= 10%
Htg PI Target= XXX°F
Htg PI Input= XXX°F
Htg PI Output= XXX%
Elec Heat Avail= ___
Desired Htg Stage= X
Current Htg Stage= X
El Heat Cmd= NONE

ChgOvr Vlv Set-Up
Clg Period= 20s
Clg Gain= 1.0
Clg PAT= 40s
Clg Max Chg= 15.0%
Htg Period= 60s
Htg Gain= 1.5
Htg PAT= 90s
Htg Max Chg= 10.0%
CO Valve Direction= Direct
CO ValveSignal=OnOff24VAC
EWT Diff= 5.0°F
EWT= XXX°F
Htg PI Target= XXX°F
Htg PI Input= XXX°F
Htg PI Output= XXX%
HW Htg Avail= ___
Clg PI Target= XXX°F
Clg PI Input= XXX°F
Clg PI Output= XXX%
CW Clg Avail= ___
EWT Heating Status= __
EWT Cooling Status= __
EWT Htg Tmr= XXXs
EWT Clg Tmr= XXXs
EWT Htg Retry= XXXmin
EWT Clg Retry= XXXmin

Alarm Set-Up
High DAT Lim Spt= 170.0°F
Low DAT Lim Spt= 40.0°F
DAT Alm Dly Spt= 35s
Low AirTmp Alm Dly= 6m

Econo Set-Up
Strategy= None
OAD Out Scaling= Linear
OAD Min= 20%
OAD Max= 100%
RAD Out Scaling= Linear
RAD Min= 20%
RAD Max= 100%
Econo OAT Setpt= 70.0°F
Out Enth Setpt= 28.0BTU/lb
Temp Diff Setpt= 2.0°F
Enth Diff Setpt= 2.0BTU/lb
OAT Econ LO Ena= Disabled
OAT Econ LO Sp= 36.0°F
Econo Stg Time= 5min
Outdoor Enthalpy= XXXBTU/lb
Indoor Enthalpy= XXXBTU/lb
OAT High Status= ___
OAT Lockout Status= ___
OAT Status= ___
Econo Avail= ___
DCV OA Signal= XXX%
EconoOAD DB= 1.0
EconoOAD Period= 30sec
EconoOAD Gain= 10.0
EconoOAD PAT= 60sec
EconoOAD MxChg= 10%
Eff Econo Strategy= ___

Dehum Set-Up
Dehum Htg Disable= Inactive
Dehum Strategy= None
Dehum Type= Dewpt
Dehum Required= ___
Dehum CW Vlv Cmd=XXX%
Dehum Cmp Clg Cmd=XXX%
Dehum HW Vlv Cmd= ___
Dehum EH Cmd= ___
Dehum Available= ___
Dehum DAT Sp= 70.0°F
Dehum Htg DAT Sp= 80.0°F
Dehum Wait Done= FALSE

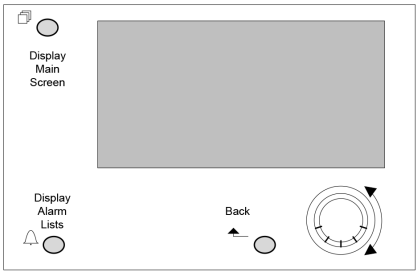
CO2 Set-Up
DCV Enable= Disabled
Min OA CO2 Spt= 500ppm
Max OA CO2 Spt= 2000ppm
DCV OA Signal= XXX%
DCV Status= ___

Energy Rec Set-Up
Eff Ret Hum= XXX%
Eff Stg Tm= XXXm
Defrost Menu
Capacity Limiting
Frost Prevention
Start/Stop
Passive Rotation

The Unit Configuration is unique to every unit; Do not change from factory defaults without consulting tech support

Unit Configuration
Apply Changes= No
SAF Control= Const(0)
HeatCool Valve= None(0)
EWT Sensor= NotInst(0)
2/4 Pipe Sel= 2-Pipe(0)
Valve Signal=OnOff24VAC(2)
Cool Valve Dir= Direct(0)
Heat Valve Dir= Direct(0)
Chng Valve Dir=Direct(0)
El Heat Stages= None(0)
El Heat Type= PRIMARY(0)
Compressor Stages= None(0)
D-Kit Quantity= One(0)
Ctrl Temp Src= Space(0)
Ctrl Humidity Src= Space(0)
Preheat Temp In= OAT(0)
LCT Sensor Type= SingleP(0)
DCV Enable= Disable(0)
CO2 Sensor= NotInst(0)
Economizer= None(0)
Outdoor Damper= NotInst(0)
OAT Sensor= NotInst(0)
Spc Hum Sensor= NotInst(0)
OA Hum Sensor= NotInst(0)
Return Air Damper= NotInst(0)
Exhaust Fan= Disabled(0)
Exh Fan Output= NotInst(0)
Dehumidification= None(0)
Lvg Coil Sensor= NotInst(0)
Econo FDD= Disabled(0)
Damper End Sw= NotInst(0)
Fltr Notify= None(0)
RAT Sensor= NotInst(0)
El Heat Type= PRIMARY
Dkit Quantity= ONE
Ctrl Temp Src= Space
Ctrl Hum Src= Space
PreHt Temp In= OAT
LCT Sens Type= SingleProbe
Air Flow Proving= NotInst(0)
Remote Sensor= Installed(1)
ER Config= None
ER Frst Ctrl Sel= None
ER Preheat Sel= None
ER Rotation Sw= NotInst
ER Valve Sig= OnOff24VAC
ER Chng Valve Dir= Direct
Pre Fltr Notify= None
Config Index= ___
Config Fault= ___
Apply Changes = No

IO Reading
MCB UNIVERSAL
MCB X1= XXX
MCB X2= XXX
MCB X3= XXX
MCB X4= XXX
MCB X5= XXX
MCB X6= XXX
MCB X7= XXX
MCB X8= XXX
MCB X9= XXX
MCB X10= XXX
MCB X11= XXX
MCB DI
MCB DI1= ___
MCB DI2= ___
MCB DI3= ___
MCB DI4= ___
MCB DI5= ___
MCB DI6= ___
MCB DO
MCB DO1= ___
MCB DO2= ___
.....
MCB D10= ___
EMA UNIVERSAL
EMA X1= XXX
EMA X2= XXX
.....
EMA X8= XXX
EMA DI
EMA DI1= ___
EMA DO
EMA DO1= ___
EMA DO2= ___
EMA DO3= ___
EMA DO4= ___
EMA DO5= ___
EMA DO6= ___
EMB UNIVERSAL
EMB X1= XXX
EMB X2= XXX
.....
EMB X8= XXX
EMB DI
EMB DI1= ___
EMB DO
EMB DO1= ___
EMB DO2= ___
EMB DO3= ___
EMB DO4= ___
EMB DO5= ___
EMB DO6= ___



This navigation map represents all possible menus and menu items. Not all menus and items shown here will appear on the HMI display depending upon the specific unit configuration. Those that do not appear are not applicable to this unit.

Field Control Wiring

⚠ DANGER

LOCKOUT/TAGOUT all power sources prior to wiring or servicing the unit. Electrical shock hazard may cause injury, death, or property damage. Connect only low voltage NEC Class II circuits to terminal blocks TB2, TB3, TB4, and TB12. Reinstall and secure all protective front panels when the wiring installation is complete.

PreciseLine units are available with several control schemes which may require low voltage field wiring. Use the Unit Specific Electrical Schematics to determine which control connections will be required for installation. Check unit specific electrical documentation in the door of the control panel. Table 1 and Table 2 show the possible field connections that can be made.

NOTICE

Possible field connections listed have no effect on unit function unless a factory installed controller or a field installed controller with the necessary controls logic is used with the unit.

Table 1: Potential Field Connections and Locations (Sizes 006-050)

	Label	Description	Signal
TB12	T1	Freezestat	24VAC Contact Closure
	T2	Condensate Overflow	Discrete Contact Closure
	T3	Space Humidity Sensor	0-10 VDC Input
	T4	Compressor 2	24VAC Output
	T5	Discharge Air Temperature	Thermistor Input
	T6	Airflow Switch	24VAC Contact Closure
	T7	Entering Water Temp / Leaving Coil Temp	Thermistor Input
	T8	Duct Static Pressure	0-10 VDC Input
	T9	Duct Static Pressure Power	24 VDC Supply
	T10	Emergency Stop	Discrete Contact Closure
	T11	Remote Space Sensor (CE-)	Remote Space Sensor Communications (CE-)
	T12	Remote Space Sensor (CE+)	Remote Space Sensor Communications (CE+)
TB4	T1	Supply Fan Signal	0-10 VDC Output
	T2	Compressor 1 or Valve 1	24VAC Output / 0-10 VDC Output
	T3	Electric Heat or Valve 2	24VAC Output / 0-10 VDC Output
	T4	Outside Air Damper	0-10 VDC Output
TB2	24+	Supply Voltage	24VAC Output Supply
	Common	Supply Voltage Common	Ground

Table 2: Potential Field Connections and Locations (Sizes 060-100)

	Label	Description	Signal
TB2 or TB3	24V	Supply Voltage	24VAC Output Supply
	N24	Supply Voltage Common	Ground
	236	Sensor Common	Sensor Common
	+24V	Sensor Power MCB	24VDC Supply MCB
	+24V-A	Sensor Power EXP-A	24VDC Supply EXP-A
	202	Condensate Overflow Switch	Discrete Contact Closure
	208	Outdoor Air Humidity	0-10VDC Input
	208E	Space Humidity Sensor	0-10VDC Input
	208G	Return Air Humidity Sensor	0-10VDC Input
	210	Remote Integrated Thermostat	CTX
	212	Remote Integrated Thermostat	CTX
	213	Space CO2	0-10VDC Input
	220	Freeze Stat	24VAC Contact Closure
TB2 or TB3	222	SCR Electric Heat/Electric Heat Stage 1	0-10VDC Output/24VAC Output
	223	Electric Heat Stage 2	24VAC Output
	224	Electric Heat Stage 3	24VAC Output
	225	Electric Heat Stage 4	24VAC Output
	228C	Hot Water Valve Output	24VAC Output
	232A	Main Dirty Filter Switch	Discrete Contact Closure
	247	Entering Water Temp/Leaving Coil Temp	Thermistor Input
	249	Compressor 1/Vlv1 On Off/Chilled Water Vlv	24VAC Output
	251	Compressor 2	24VAC Output
	254	Compressor 3	24VAC Output
	256	Compressor 4	24VAC Output
	267	Supply Fan Signal	0-10VDC Output
	275	Exhaust Fan Signal	0-10VDC Output
	277	Outdoor Air Damper	0-10VDC Output
	281	Discharge Air Temp	Thermistor Input
	282	Return Air Temp	Thermistor Input
	297	Outdoor Air Temp	Thermistor Input
	299	Emergency Stop	Discrete Contact Closure
	2120	Air Flow Switch	24VAC Contact Closure
	2124	Duct Static Pressure	0-10VDC Input
	2130	Damper End Switch	Discrete Contact Closure
	2133	Return Air Damper	0-10VDC Output
	2140	VAV Box Output	24VAC Output
	2150	Mod Chilled Water Vlv/Mod Changeover Vlv	0-10VDC Output
	222	Modulating Hot Water Valve Output	0-10VDC Output
	302	Energy Recovery/OA Filter Switch	Discrete Contact Closure
	306	Energy Recovery Wheel On/Off	24VAC Output
	305	Bypass Damper CCW (Bypass)	24VAC Output
	301	Bypass Damper CW (Not Bypass)	24VAC Output
	300	Defrost 2 Position HW Valve	24VAC Output
	300	Defrost Electric Heat Stage 1	24VAC Output
	308	Supply Air Leaving Wheel Temperature (ER_LWT)	Thermistor Input
	309	Exhaust Air Exiting Wheel Temperature (ER_EWT)	Thermistor Input
	307	Energy Recovery Wheel Rotation Switch	Discrete Contact Closure
	303	Defrost Modulating Heating Valve	0-10VDC Output
	303	Defrost SCR Electric Heat	0-10VDC Output
	304	ERW VFD	0-10VDC Output
	GND	Main Unit Ground	Ground

NOTE 1: TB2 is for horizontal units. TB3 is for vertical units.

Figure 11: Terminal Block Layout (Sizes 006-050)

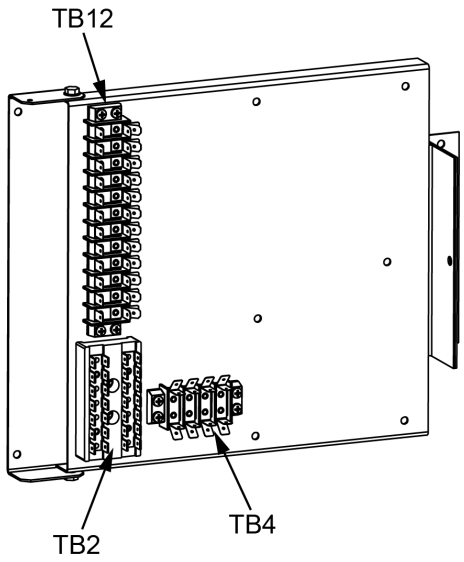
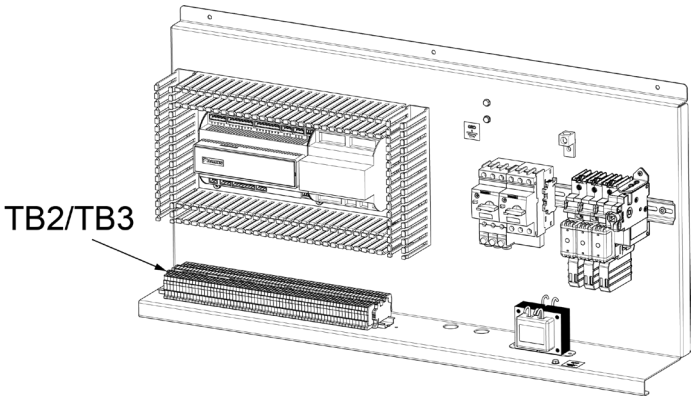


Figure 12: Terminal Block Layout (Sizes 060-100)



PreciseLine units operate with 115V and 24V control circuit power. All field control wiring connections are made at the class II terminal blocks TB2/TB3, TB4, and TB12 which is located in the Low Voltage Control Panel, shown in Figure 11 and Figure 12.

NOTICE

The installation of all field wiring, must comply with all applicable local codes and ordinances. The warranty may be limited or certain aspects excluded if the field wiring is not in accordance with these standards.

If a single conduit containing 24V and 115V wiring is run above the roofline between units, consider the 24V wiring within as an NEC Class I wiring system.

MicroTech Unit Controller Field Installed Sensors

The MicroTech unit controller can be connected to a variety of field installed sensors.

- Integrated Thermostat - Daikin Applied PN: 910392744
- Space/Duct Humidity Sensor - Daikin Applied PN: 910392826
- Wall Mounted CO2 Sensor - Daikin Applied PN: 107287012
- Duct Mounted CO2 Sensor - Daikin Applied PN: 910111672
- Duct Static Pressure - Daikin Applied PN: 910236931
- Airflow Status - Daikin Applied PN: 910270652
- OA Temperature - Daikin Applied PN: 910236951
- OA Temp/Humidity Combo - Daikin Applied PN: 910236923
- Leaving Coil Temperature - Daikin Applied PN: 099483400
- Entering Water Temp - Daikin Applied PN: 107201601

Manual Control

⚠ WARNING

Only qualified personnel should install, operate and service the equipment and that improper adjustment of settings and operation by an unqualified person could result in property damage, injury, or death.

Manual Control mode is used to temporarily command specific components to operate. For Manual Control to operate, a Space Temp Sensor must be connected.

If Manual Control Mode is set to “Enable” and no modifications have been made to any of the override parameters for 30 minutes, the Manual Control Mode will be set to “Normal”.

When the Manual Control Mode changes from “Enable” to “Normal”, all of the Override parameters will return to their default values. The Override parameters will no longer dictate the functionality of the controller outputs, and the unit will return to the Off state based on the Control Mode.

If the Manual Control Mode is set to “Enable” and the Control Mode changes from “Off” to anything else, the Manual Control Mode will change to “Normal” and the unit will momentarily transition to the Off state and then resume normal operation based on the Control Mode.

If Electric Heat is selected in the unit configuration, the Supply Air Fan Capacity Command (SAF Cap Cmd) must be set above 6.0 VCD, and Sup Fan Ena must be enabled before the following parameters can be commanded “On” to prevent the unit from over-heating due to no airflow:

- Heating Valve/SCR Heat
- Heating Stage 1
- Heating Stage 2
- Heating Stage 3
- Heating Stage 4
- Frost Prevention Preheat Heating Stage 1
- Frost Prevention SCR Heat

NOTICE

Manual operation is not intended for extended operation beyond troubleshooting or initial start-up.

Manual Control Mode

The Control Mode must be set to “Off” before entering the Manual Control mode.

Manual Control is designed to temporarily allow the technician to control the unit as desired for Start-up or troubleshooting. There are four Manual Control Modes:

1. **Normal**
   When Manual Control is enabled and Manual Control Mode is set to Normal, all parameters in Table 3 can be set by the technician.
2. **Cooling**
   When Manual Control is disabled and Manual Control Mode is set to Cooling, the unit will attempt to operate to maximum cooling capacity. The unit will adhere to normal operating sequences and alarm responses.
3. **Heating**
   When Manual Control is disabled and Manual Control Mode is set to Heating, the unit will attempt to operate to maximum heating capacity. The unit will adhere to normal operating sequences and alarm responses.
4. **Dehumidification**
   When Manual Control is disabled and Manual Control Mode is set to Dehum, the unit will attempt to operate in dehumidification mode. The unit will adhere to normal operating sequences and alarm responses.

Changing the Manual Control Mode to anything but “Normal” will reset Manual Control to “Normal”.

Manual Control Mode will time out after 30 minutes of inactivity.

When Manual Control Mode is not set to “Normal” the timers will set to the associated fixed value.

When Manual Control Mode is set to “Heating” the unit will attempt to go to full heating capacity, regardless of the control conditions, following the normal unit sequence of operations and adhering to alarms, using the abbreviated timers.

When Manual Control Mode is set to “Cooling” the unit will attempt to go to full cooling capacity, regardless of the actual control conditions, following the normal unit sequence of operations and adhering to alarms, using the abbreviated timers.

When Manual Control Mode is set to “Dehumidification” the unit will attempt to go to dehumidification mode, regardless of the actual control conditions, following the normal unit sequence of operations and adhering to alarms, using the abbreviated timers. If the Manual Control Mode is changed from anything other than “Normal” back to “Normal”, the unit will return to the Off state following normal sequence of operations, using the abbreviated timers.

If Manual Control Mode is not “Normal” and the Control Mode changes from “Off” to anything else, the Manual Control Mode will change to “Normal” and the unit will momentarily transition to the Off state and then resume normal operation based on the Control Mode.

If Manual Control Mode is not “Normal” and no modifications have been made to Manual Control Mode for 30 minutes, the Manual Control Mode will be set to “Normal”.

Manual Control

Table 3: Main Menu \ Manual Control

Menu Display Name	Default	Range	Description
Ctrl Mode=	Off	AUTO HEAT COOL FAN_ONLY OFF	Ctrl Mode is an adjustable item which sets the occupancy mode of the unit. The unit can be Heat Only, Cool Only, Fan Only, Automatic, or Off.
Manual Ctrl=	Normal	NORMAL ENABLED	Manual Ctrl is an adjustable item that allows the unit to enter manual control.
Manual Control Type=	NORMAL	NORMAL HEAT COOL DEHUMID	Manual Control Type is an adjustable item that allows the unit to manually place the unit in a specified operating mode.
Manual State=	NORMAL	NORMAL HEAT COOL DEHUMID	Manual State is a status only item that indicates if the unit is in a manual control state.
SAF Cap Cmd=	0VDC	0-10VDC	SAF Cap Cmd is an adjustable item that manually drive the supply fan to a capacity.
EF Cap Cmd=	0VDC	0-10VDC	EF Cap Cmd is an adjustable item that manually drive the exhaust fan to a capacity.
OADamper Pos=	0VDC	0-10VDC	OADamper Pos an adjustable item that manually drive the outdoor air damper to a position.
RADamper Pos=	0VDC	0-10VDC	RADamper Pos an adjustable item that manually drive the return air damper to a position.
Compressor 1=	Off	OFF ON	Compressor 1 is an adjustable item that manually turns on the Compressor 1 output.
Compressor 2=	Off	OFF ON	Compressor 2 is an adjustable item that manually turns on the Compressor 2 output.
Compressor 3=	Off	OFF ON	Compressor 3 is an adjustable item that manually turns on the Compressor 3 output.
Compressor 4=	Off	OFF ON	Compressor 4 is an adjustable item that manually turns on the Compressor 4 output.
CW Valve=	0VDC	0-10VDC	CW Valve is an adjustable item that manually sets the Modulating Chilled Water Valve output capacity.
CW Valve=	Off	OFF ON	CW Valve is an adjustable item that manually sets the two position Chilled Water Valve output.
Htg Valve=	0VDC	0-10VDC	Htg Valve is an adjustable item that manually sets the Modulating Hot Water Valve output capacity.
Htg Valve=	Off	OFF ON	Htg Valve is an adjustable item that manually sets the two position Hot Water Valve output.
SCR Capacity=	0VDC	0-10VDC	SCR Capacity is an adjustable item that manually sets the SCR Electric Heat output capacity.
Htg Stg 1=	Off	OFF ON	Htg Stg 1 is an adjustable item that manually turns on the Electric Heat Stage 1 output.
Htg Stg 2=	Off	OFF ON	Htg Stg 2 is an adjustable item that manually turns on the Electric Heat Stage 2 output.
Htg Stg 3=	Off	OFF ON	Htg Stg 3 is an adjustable item that manually turns on the Electric Heat Stage 3 output.
Htg Stg 4=	Off	OFF ON	Htg Stg 4 is an adjustable item that manually turns on the Electric Heat Stage 4 output.
Sup Fan Enable	Off	OFF ON	Sup Fan Enable is an adjustable item that manually turns on the Supply Fan Enable output.
ChgOvr Valve=	0VDC	0-10VDC	ChgOvr Valve is an adjustable item that manually sets the Modulating Changeover Valve output capacity.
ChgOvr Valve=	OFF	OFF ON	ChgOvr Valve is an adjustable item that manually sets the two position Changeover Valve output.
VAV Box=	DISABLE	DISABLE ENABLE	VAV Box is an adjustable item that manually turns on the VAV Box output.
Er OnOff=	Off	OFF ON	Er OnOff is an adjustable item that manually turns on the on/off Energy Recovery Wheel output.
Er Byp Damper=	Open	Open Close	Er Byp Damper is an adjustable item that manually sets the two position Energy Recovery Bypass Damper position.

Menu Display Name	Default	Range	Description
Er Vlv Stg1=	Off	OFF ON	Er Vlv Stg 1 is an adjustable item that manually turns on the ER Frost Prevention Stage 1 electric heat or on/off hot water valve output.
Er Vlv Stg2=	Off	OFF ON	Er Vlv Stg 2 is an adjustable item that manually turns on the Stage 2 Energy Recovery Valve output.
Er Wheel Spd=	0VDC	0-10VDC	Er Wheel Spd is an adjustable item that manually sets the Energy Recovery Wheel speed capacity.
Er Mod SCR=	0VDC	0-10VDC	Er Mod SCR is an adjustable item that manually sets the ER frost prevention Modulating SCR Heater or modulating hot water valve output capacity.

VRV D-Kit Test Mode

When commissioning a unit PreciseLine MicroTech unit controller with D-Kit integrated to a VRV system, it may be necessary to run the VRV outdoor unit in test mode. Before running the outdoor unit in test mode, the MicroTech unit controller “Ctrl Mode” must be set to “Off” and the Supply Fan Minimum Speed must be set to the supply fan nominal operating speed. During the test mode process, the supply fan will be commanded to run at the Supply Fan Minimum Speed when fan operation is requested by the D-Kit controller. Once test mode is complete, the Supply Fan Minimum Speed and Ctrl Mode should be returned to their desired values.

Quick Menu

Items in the Quick Menu contain basic unit operating status and control set point parameters. The items shown in the Quick Menu are Read Only if a valid password has not been entered. The following are brief descriptions of the Quick Menu items. No password is required to view the Quick Menu.

Quick Menu

Table 4: Main Menu \ Quick Menu

Menu Display Name	Default	Range	Description
Unit State=	-	OFF HEAT COOL ECONO ECONO_COOL DEHUMID FAN_ONLY OVERRIDE TEST	Unit State is a status only item which indicates the state of unit operation in which the unit is currently operating. The unit can be in any of the operating states shown.
Ctrl Mode=	Off	AUTO HEAT COOL FAN_ONLY OFF	Ctrl Mode is an adjustable item which sets the control mode of the unit. The unit can be Heat Only, CoolOnly, Fan Only, Automatic, or Off.
Occ Mode=	Auto/ Net	OCCUPIED UNOCCUPIED BYPASS STANDBY AUTO	Occ Mode is an adjustable item which sets the occupancy mode of the unit.
Primary Dehumid=	-	DISABLE ENABLE	Status only item that indicates if dehumidification is active while in the cooling or heating state.
CW Valve Pos=	-	0% - 100%	CW Valve Pos is a status only item which indicates the percentage that the modulating chilled water valve is currently open.
CW Valve Pos=	Off	INACTIVE ACTIVE	CW Valve Pos is a status only item which indicates if the two position chilled water valve is currently open.
ChgOvr Valve Pos=	-	0% - 100%	ChgOvr Valve Pos is a status for Change Over modulating valve.
ChgOvr Valve Pos=	Off	INACTIVE ACTIVE	ChgOvr Valve Pos is a status for Change Over Binary valve.
Comp Stg 1 =	Off	INACTIVE ACTIVE	Comp Stg 1 is a status only item which indicates if the compressor stage 1 output is currently energized.
Comp Stg 2 =	Off	INACTIVE ACTIVE	Comp Stg 2 is a status only item which indicates if the compressor stage 2 output is currently energized.
Comp Stg 3 =	Off	INACTIVE ACTIVE	Comp Stg 3 is a status only item which indicates if the compressor stage 3 output is currently energized.
Comp Stg 4 =	Off	INACTIVE ACTIVE	Comp Stg 4 is a status only item which indicates if the compressor stage 4 output is currently energized.
OAD Position=	-	0% - 100%	OAD Position is a status only item which indicates the percentage that the outdoor air damper is currently open.
HW Valve Pos=	-	0% - 100%	HW Valve Pos is a status only item which indicates the percentage that the modulating hot water valve is currently open.
HW Valve Pos=	-	INACTIVE ACTIVE	HW Valve Pos is a status only item which indicates if the two position hot water valve is currently open.
SCR=	-	0% - 100%	SCR Output is a status only item which indicates the percentage that the SCR electric heat output is currently commanded.
Htg Valve=	-	0% - 100%	This is an analog output that is used as a means of controlling a valve for Hot Water or an SCR for electric heat.
Htg Stg 1=	-	INACTIVE ACTIVE	Stage 1 Heat is a status only item which indicates if the Electric Heat Stage 1 output is currently energized.
Htg Stg 2=	-	INACTIVE ACTIVE	Stage 2 Heat is a status only item which indicates if the Electric Heat Stage 2 output is currently energized.
Htg Stg 3=	-	INACTIVE ACTIVE	Stage 3 Heat is a status only item which indicates if the Electric Heat Stage 3 output is currently energized.
Htg Stg 4=	-	INACTIVE ACTIVE	Stage 4 Heat is a status only item which indicates if the Electric Heat Stage 4 output is currently energized.

Menu Display Name	Default	Range	Description
Control Temp=	-	-40°F - 212°F	Control Temp is a status only item which displays the current value of the Control Temperature. The Control Temperature is defined as the temperature input selected by the Control Temperature Source parameter.
EffSpaceT=	-	-40°F - 212°F	EffSpaceT is a status only item which displays the current temperature reading from an optional space temperature sensor.
Return Temp=	-	-40°F - 212°F	Return Temp is a status only item which displays the current temperature reading from an optional return air temperature sensor.
Active Htg Spt=	-	50°F - 95°F	Active Htg Spt is a status only item which indicates the current active heating setpoint.
Active Clg Spt=		50°F - 95°F	Active Clg Spt is a status only item which indicates the current active cooling setpoint.
Occ Clg Spt=	75.0°F	0.0°F - 100.0°F	Occ Clg Spt is an adjustable item which affects the temperature at which the unit will go into the cooling mode of operation when the Control Temperature source is not Outdoor Air Temperature
Occ Htg Spt=	70.0°F	0.0°F - 100.0°F	Occ Htg Spt is an adjustable item which affects the temperature at which the unit will go into the heating mode of operation when the Control Temperature source is not Outdoor Air Temperature
Out Clg Spt=	80.0°F	50°F - 95°F	Out Clg Spt is an adjustable item which affects the temperature at which the unit will go into the cooling mode of operation when the Control Temperature source is Outdoor Air Temperature.
Out Htg Spt=	55.0°F	45°F - 70°F	Out Htg Spt is an adjustable item which affects the temperature at which the unit will go into the cooling mode of operation when the Control Temperature source is Outdoor Air Temperature

Menu Display Name	Default	Range	Description
Disch Air=	-	-50.0°F - 250.0°F	Disch Air is a status only item which displays the current temperature reading from the unit's discharge air temperature sensor (DAT).
Effective DAT Spt=	-	45.0°F - 120.0°F	Effective DAT Spt is a status only item which indicates the current active Discharge Air Temperature setpoint.
DAT Clg Spt=	55.0°F	40.0°F - 100.0°F	DAT Clg Spt is a status only item which indicates the temperature that the DAT should be maintained at when it is in the cooling mode of operation. Once a valid password has been entered this item becomes an adjustable item.
DAT Htg Spt=	80.0°F	75.0°F - 120.0°F	DAT Htg Spt is a status only item which indicates the temperature that the DAT should be maintained at when in the heating mode of operation. Once a valid password has been entered this item becomes an adjustable item.
Unocc Clg Spt=	85.0°F	40.0°F - 100.0°F	Unocc Clg Spt is an adjustable item which sets the control temperature above which the unit starts up and provides unoccupied cooling (night setback) during unoccupied periods.
Unocc Htg Spt=	60.0°F	40.0°F - 100.0°F	Unocc Hlg Spt is an adjustable item which sets the control temperature below which the unit starts up and provides unoccupied heating (night setup) during unoccupied periods.
StdBy Clg Spt=	77.0°F	50°F - 95°F	StdBy Clg Spt is a status only item which indicates the temperature in which the unit will go into the cooling mode of operation in the standby occupancy state. Once a valid password has been entered this item becomes an adjustable item.

Menu Display Name	Default	Range	Description
StdBy Hlg Spt=	66.0°F	50°F - 95°F	StdBy Hlg Spt is a status only item which indicates the temperature in which the unit will go into the heating mode of operation in the standby occupancy state. Once a valid password has been entered this item becomes an adjustable item.
SAF Capacity=	-	0% - 100%	SAF Capacity is a status only item which indicates the current capacity of the supply air fan.
SAF Duct-Press=	-	0.0 in - 5.0 in	SAF DuctPress is a status only item which displays the current supply duct static pressure reading.
SAF DSP Spt=	1.0 in	0.2 in - 5.0 in	SAF DSP Spt is a status only item which displays the current supply fan duct static pressure setpoint. Once a valid password has been entered this item becomes an adjustable item.
EF Capacity=	-	0% - 100%	EF Capacity is a status only item indicated the current capacity of the return/exhaust fans.
CO2 PPM=	-	0-3000 ppm	
OA Temp=	-	-40.0°F - 212.0°F	OA Temp is a status only item which displays the current temperature reading from the unit mounted Outdoor air temperature sensor.
OA Rel Hum=	-	0% - 100%	OA Rel Hum is a status only item that indicates the current outdoor air relative humidity reading.
Outdoor Dew Point=		0°F - 100°F	Calculated Outside Air Dewpoint using outside air temp and outside air humidity.
Space Rel Hum=	-	0% - 100%	Indoor Rel Hum is a status only item that indicates the current space relative humidity reading.
Indoor Dew Point=	-	0°F - 100°F	Indoor Dew Point is a status only item that indicates the current calculate space dewpoint.

Menu Display Name	Default	Range	Description
Control Humidity=		0% - 100%	Control Hum is a status only item which indicates the current control relative humidity. The “Control Relative Humidity” is defined as the temperature input selected by the Control Humidity Source parameter.
Control Dewpt=		0°F - 100°F	Control Dewpt is a status only item which indicates the current calculated control dew point. The “Control Relative Dew Point “ is defined as the temperature input selected by the Control Humidity Source parameter.
Control Temp Src=	SPACE	SPACE RETURN AVERAGE OUTDOOR	Control Temp Src is an adjustable item that selects the control temperature source from either a space, return air sensor, the average temperature of the space and return, or the outdoor air sensor.
Room Sensor On/Off=	On	OFF ON	Room Sensor On/Off is a value set by the optional remote integrate thermostat which enables or disables unit operation.
RSSysModeStat=	AUTO	AUTO HEAT COOL FAN_ONLY	RSSysModeStat is a value set by the optional remote integrate thermostat which affects the operational mode of the unit. The unit can be Heat Only, Cool Only, Fan Only, or Automatic.

Commission Unit

Unit Set-Up

General unit set-up configurations are used to adjust the MicroTech unit controllers: Units of Measure, Unit Name, and Control Temperature Source.

Unit Name

The unit name will display as “PL AHU”.

Control Temperature Source

Control Temperature Source selects what temperature reading is used to change the unit between heating, cooling, and fan only modes. This can be set to the space temperature, return air temperature (if equipped), an average of the space and return air temperature values, or the outdoor air temperature.

Control Humidity Source

Control Humidity Source selects which humidity reading is used to initiate dehumidification. This can be set to the space humidity, outdoor air humidity, or an average of the space and outdoor air humidity. This parameter will also be used to determine what temperature and humidity values will be used to calculate the control dew point.

Enable the Unit

Control Mode

The unit can be set to run in five control modes:

1. **OFF**
   The unit is disabled.
2. **HEAT**
   Heating functions will operate to maintain the heating set points. Cooling, economizer, and dehumidification are disabled.
3. **COOL**
   Cooling functions will operate to maintain the cooling set points. Heating is disabled.
4. **AUTO**
   All modes of operation are enabled. The unit will automatically switch between heating and cooling modes as necessary.
5. **FAN ONLY**
   The circulating fans are allowed to operate. All heating and cooling functions are disabled.

Occupancy Mode

Occupancy mode determines unit functionality based on the current unit setting. The setting can be any of the following:

1. **Occupied**
   The unit operates normally, providing heating, cooling, dehumidification, and ventilation as required to maintain the occupied setpoints.
2. **Unoccupied**
   The unit operates normally, providing heating, cooling, and dehumidification as required to maintain the unoccupied setpoints. The outdoor air damper remains closed during unoccupied mode, thus ventilation and eco-cooling are not functional.
3. **Bypass**
   The unit operates normally, providing heating, cooling, dehumidification, and ventilation as required to maintain the occupied setpoints for the duration of the bypass timer.
4. **Standby**
   The unit operates normally, providing heating, cooling, dehumidification, and ventilation as required to maintain the standby setpoints.
5. **Auto**
   The unit is allowed to automatically shift between occupancy modes in accordance with schedule priorities.

Determining Occupancy Source

The unit’s occupancy mode setting can be driven by a number of sources. The priority of the sources is the following:

1. Network Override Command
2. HMI Keypad Input
3. Tenant Override (Thermostat)
4. Network Schedule
5. Internal Schedule

The override setting at the highest priority will be the effective setting for the unit. A “Null” or “Auto” selection will pass control to the next highest priority source.

Dirty Filter Notification

The MicroTech unit controller is programmed to provide a notification to change air filters. This notification can configured to be based on supply fan runtime, a dirty filter switch input, or a combination of the two. This configuration is selected using the Filter Change Strategy parameter.

The polarity of the dirty filter switch input can be selected using the Filter Change Signal and Filter Change Status parameters.

NOTICE
If the Filter Change Signal parameter is Normally Open and there is no device connected to the dirty filter switch input (TB2, 232A), this will disable the dirty filter switch input.

Table 5: Occupancy Source Table

Network Manual Occupancy	Keypad Manual Occupancy	Tenant Override Input	Network Occupancy Scheduler	Internal Occupancy Scheduler	Effective Occupancy
OCCUPIED	NA	NA	NA	NA	OCCUPIED
UNOCCUPIED	NA	NA	NA	NA	UNOCCUPIED
BYPASS	NA	NA	OCCUPIED	NA	OCCUPIED
			UNOCCUPIED	NA	BYPASS
			STANDBY	NA	BYPASS
			NULL	Occ	OCCUPIED
				Unocc	BYPASS
				NULL	BYPASS
STANDBY	NA	NA	NA	NA	STANDBY
NULL	OCCUPIED	NA	NA	NA	OCCUPIED
NULL	UNOCCUPIED	NA	NA	NA	UNOCCUPIED
NULL	BYPASS	NA	OCCUPIED	NA	OCCUPIED
			UNOCCUPIED	NA	BYPASS
			STANDBY	NA	BYPASS
			NULL	Occ	OCCUPIED
				Unocc	BYPASS
				NULL	BYPASS
NULL	STANDBY	NA	NA	NA	STANDBY
NULL	AUTO	INACTIVE	OCCUPIED	NA	OCCUPIED
			UNOCCUPIED	NA	UNOCCUPIED
			STANDBY	NA	STANDBY
			NULL	Occ	OCCUPIED
				Unocc	UNOCCUPIED
				NULL	OCCUPIED
NULL	AUTO	ACTIVE	OCCUPIED	NA	OCCUPIED
			UNOCCUPIED	NA	BYPASS
			STANDBY	NA	BYPASS
			NULL	Occ	OCCUPIED
				Unocc	BYPASS
NULL	AUTO	ACTIVE	NULL	NULL	OCCUPIED

Remote Integrated Thermostat Operation

The remote integrated thermostat is an optional accessory that can be mounted in the space to adjust temperature settings and parameters. For units where the Control Temperature Source is Space, Average, or where the Supply Fan Control Strategy is Single Zone VAV, the Remote Integrated Thermostat is required.

For more technical information on the thermostat, consult Daikin Applied IM 1366.

Figure 13: Thermostat Display

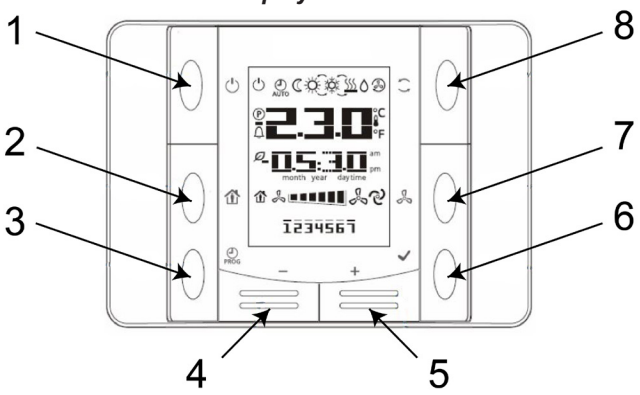


Table 6: Thermostat Buttons

Number	Name	Function
1	ON/OFF	Power on or power off
2	Presence	Enter or exit a programmed presence mode.
3	Program	Time Scheduler. Pressing this button adjusts date/time setting, while holding it allows schedule programming.
4	Minus	Setpoint adjustment. Each operation of the Minus (-) button reduces the setpoint by 0.1 °C/0.5°F or 0.5 °C/1.0°F which is defined in controller's setting.
5	Plus	Setpoint adjustment, each operation of the Plus (+) button increases the set point by 0.1 °C/0.5°F or 0.5 °C/1.0°F which is defined in controller's setting.
6	OK	Confirms date/time and scheduler settings.
7	Fan	Fan speed adjustment. The fan speed is set up in grades by the controller. By pressing the Fan button, the grades can be selected clockwise in a cyclical way. The current grade selected manually is indicated by the highlighted bar on the display.
8	Mode	Energy mode selection. The 3 energy modes are Auto, Comfort and Economy. By pressing the Mode button, the user can switch HMI-SG between the 3 modes in a cyclical way. The current mode manually selected is indicated by relevant symbol on the display.

Unit Set-Up

Table 7: Main Menu \ Commission Unit \ Unit Set-Up

Menu Display Name	Default	Range	Description
Eng Units=	English	SI English	Eng Units is an adjustable item to indicate if the unit is to display English or Metric units of measure.
Ctrl Temp Src=	SPACE	SPACE RETURN AVERAGE OUTDOOR	Ctrl Temp Src is an adjustable item that selects the control temperature source from either a space, return air sensor, the average temperature of the space and return, or the outdoor air sensor.
Ctrl Hum Src=	SPACE	SPACE OUTDOOR SPACE_ OUTDOOR	Control Humidity Src is an adjustable item that selects the control humidity source from either a space humidity, outdoor air humidity, or an average of the space and outdoor air humidity.

Timer Settings

Table 8: Main Menu \ Commission Unit \ Timer Settings

Menu Display Name	Default	Range	Description
Clg Stg Time=	0	0-600 Seconds	Clg Stg Time is an adjustable item which sets the minimum amount of time between bringing on/off stages of cooling.
Htg Stg Time=	0	0-3600 Seconds	Htg Stg Time is an adjustable item which sets the minimum amount of time between bringing on/off stages of heating.
Tnt Ovrd Incr=	120	0-480 Minutes	Tnt Ovrd Incr is an adjustable item that sets the amount of time the unit will be in the bypass mode when initiated by a tenant override input.
DSP Start Delay=	30	5-120 Seconds	DSP Start Delay is an adjustable item which sets the minimum amount of time after the VAV box output has been energized before the supply fan will be enabled. This applies to units where the SAF Control is DSP.
DSP Control Delay=	120	5-240 Seconds	DSP Control Delay is an adjustable item which sets the minimum amount of time after the supply fan has been enabled, that it will run at minimum speed before DSP control is commenced.
Comp Start Delay=	360	360-420 Seconds	Comp Start Delay is an adjustable item which sets the minimum amount of time after initial power up that the compressor must remain off. If this value is at the default of 360 and additional random value of 1-60 seconds will be added to this delay to prevent multiple units from turning on their compressors at the same time.
Comp Min Ena=	DISABLE	DISABLE ENABLE	Comp Min Ena is an adjustable item which enables or disables minimum compressor on/off timers.
Comp Min On=	180	60-600 Seconds	Comp Min On is an adjustable item which sets the minimum amount of time a compressor output must be on before it can be turned off.
Comp Min Off=	360	300-600 Seconds	Comp Min Off is an adjustable item which sets the minimum amount of time a compressor output must be off before it can be turned back on.
Cond Delay=	60	0-120 Seconds	Cond Delay is an adjustable item which sets the amount of time the condensate overflow input must be active before a condensate overflow alarm will be triggered. This is to prevent nuisance indications of condensate.
EWT Retry=	120	10-600 Minutes	EWT Retry is an adjustable item which sets the amount of time that must pass after the entering water has been deemed inadequate for a mode of operation, before the controller will retry operation in that mode. This applies to 2 pipe chilled water/hot water changeover units only.
EWT Sample=	120	60-600 Seconds	EWT Sample is an adjustable item which sets the amount of maximum amount of time that the controller will sample the entering water temperature to determine if it is adequate for the desired mode of operation. This applies to 2 pipe chilled water/hot water changeover units only.
EUT Low Alm Dly=	15	1-30 Minutes	EUT Low Alm Dly is the Entering Unit Temperature Low Alarm Delay Setpoint.

Supply Air Fan Set-Up Menu

Table 9: Main Menu \ Commission Unit \ SAF Set-up

Menu Display Name	Default	Range	Description
DSP CONTROL			
SAF DuctPress=	-	0.0 in - 5.0 in	SAF DuctPress is a status only item that indicates the current value for the duct static pressure sensor.
SAF DSP Spt=	1.0 in	0.0 in - 5.0 in	SAF DuctSP Spt is an adjustable item which sets the supply fan duct static pressure setpoint. The SAF is modulated with a PI_Loop to maintain this setpoint.
SAF DSP DB=	0.10 in	0 in - 2.0 in	SAF DSP DB is an adjustable item which sets a dead band around the DuctSP Spt. No Duct static pressure control action is taken when the current duct static pressure input is within this deadband.
Min Cap=	20%	20% - 100%	Min Cap is an adjustable item which sets the minimum output value when the supply fan is operating.
Max Cap=	100%	20% - 100%	Max Cap is an adjustable item which sets the maximum output value when the supply fan is operating.
DSP High Alarm =	4.5 in	2.0 - 5.0 IWC	DSP High Alarm is an adjustable item which sets the measured DSP value above which will trigger a DSP High Alarm.
DSP Error =	60 Seconds	60-360 Seconds	DSP Error is an adjustable item which sets the amount of time the measured DSP value must be above the DSP High Alarm value before a DSP High Alarm is triggered.
Fan Min Elect=	60%	60% - 100%	Fan Min Elect is an adjustable item which sets the minimum output value of the supply fan as a percentage of the electric heat capacity.
Air Flow Proving=	Uninstall	Uninstall Install	Air Flow Proving is an adjustable item which configures the controller to expect an input from an airflow proving switch.
Air Flow Delay=	10 Seconds	10-240 Seconds	Air Flow Delay is an adjustable item which sets the amount of time the supply air fan must be running before the application checks the status of the air flow proving switch input.
1 ZONE VAV CONTROL			
Control Temp=	-	-40°F - 212°F	Control Temp is a status only item which displays the current value of the Control Temperature. The Control Temperature is defined as the temperature input selected by the Control Temperature Source parameter.
Occ Clg Spt=	75°F	50°F - 95°F	Occ Clg Spt is a status only item which indicates the temperature in which the unit will go into the cooling mode of operation. Once a valid password has been entered this item becomes an adjustable item.
Occ Htg Spt=	70°F	50°F - 95°F	Occ Htg Spt is a status only item which indicates the temperature in which the unit will go into the heating mode of operation. Once a valid password has been entered this item becomes an adjustable item.
Occ DB =	1.0°F	0.0°F - 5.0°F	Occ DB is an adjustable item which sets a dead band around the Occ Cooling and Heating Setpoint parameter. For example, if the Occ Cooling Setpoint parameter is set to 75ºF and the Occ DB parameter is set to 2ºF the dead band around the setpoint would be from 76.0ºF to 74.0ºF.
Min Cap=	20%	20% - 100%	Min Cap is an adjustable item which sets the minimum output value when the supply fan is operating.
Max Cap=	100%	20% - 100%	Max Cap is an adjustable item which sets the maximum output value when the supply fan is operating.
Fan Cycling=	ON	ON CYCLE	Fan Cycling is an adjustable item which configures the supply fan to be always on, or to cycle off when there's no demand, when the Occupancy is occupied or bypass.
Fan Min Elect=	60%	60% - 100%	Fan Min Elect is an adjustable item which sets the minimum output value of the supply fan as a percentage of the electric heat capacity.
Air Flow Proving=	Uninstall	Uninstall Install	Air Flow Proving is an adjustable item which configures the controller to expect an input from an airflow proving switch.
Air Flow Delay=	10 Seconds	10-240 Seconds	Air Flow Delay is an adjustable item which sets the amount of time the supply air fan must be running before the controller checks the status of the air flow proving switch input.
CAV Control			
CAV Cap=	75%	20% - 100%	CAV Cap is an adjustable item which sets the supply air fan capacity when the supply fan is operating in any mode other that dehumidification.
Min Cap=	20%	20% - 100%	Min Cap is an adjustable item which sets the minimum output value when the supply fan is operating.

Menu Display Name	Default	Range	Description
Max Cap=	100%	20% - 100%	Max Cap is an adjustable item which sets the maximum output value when the supply fan is operating.
Dehumid Cap=	30%	20% - 100%	Dehumid Cap is an adjustable item which sets the supply air fan capacity when the supply fan is operating in dehumidification.
Fan Cycling=	ON	ON CYCLE	Fan Cycling is an adjustable item which configures the supply fan to be always on, or to cycle off when there's no demand, when the Occupancy is occupied or bypass.
Fan Min Elect=	60%	60% - 100%	Fan Min Elect is an adjustable item which sets the minimum supply air fan capacity as a percentage of the total electric heat output when any amount of electric heat is being provided.
Air Flow Proving=	Uninstall	Uninstall Install	Air Flow Proving is an adjustable item which configures the controller to expect an input from an airflow proving switch
Air Flow Delay=	10 Seconds	10-240 Seconds	Air Flow Delay is an adjustable item which sets the amount of time the supply air fan must be running before the application checks the status of the air flow proving switch input.

Exhaust Fan Set-Up Menu

Table 10: Main Menu \ Commission Unit \ EF Set-Up

Menu Display Name	Default	Range	Description
EF Ctrl=	Disabled	Disabled Tracking Const_Speed	EF Ctrl is an adjustable item which configures exhaust fan speed control.
Min EF Cap=	5%	5% - 100%	Min EF Cap is an adjustable item which sets the minimum output value when the exhaust fan is operating and EF Ctrl is Tracking.
Max EF Cap=	100%	20% - 100%	Max EF Cap is an adjustable item which sets the maximum output value when the exhaust fan is operating and EF Ctrl is Tracking.

Cooling Setup

Table 11: Main Menu \ Commission Unit \ Cooling Set-Up

Menu Display Name	Default	Range	Description
CW Valve Pos=	-	0%-100%	CW Valve Pos is a status only item which indicates the percentage that the modulating chilled water valve is currently open.
ChgOvr Valve Pos=	-	0% - 100%	ChgOvr Valve Pos is a status only item which indicates the percentage that the modulating changeover water valve is currently open.
CW Valve Pos=	-	INACTIVE ACTIVE	CW Valve Pos is a status only item which indicates the condition of the two position chilled water valve output.
ChgOvr Valve Pos=	-	INACTIVE ACTIVE	ChgOvr Valve Pos is a status only item which indicates the condition of the two position changeover valve output.
Comp Stg 1 =	-	INACTIVE ACTIVE	Comp Stg 1 is a status only item which indicates the condition of the compressor stage 1 output.
Comp Stg 2 =	-	INACTIVE ACTIVE	Comp Stg 2 is a status only item which indicates the condition of the compressor stage 2 output.
Comp Stg 3 =	-	INACTIVE ACTIVE	Comp Stg 3 is a status only item which indicates the condition of the compressor stage 3 output.
Comp Stg 4 =	-	INACTIVE ACTIVE	Comp Stg 4 is a status only item which indicates the condition of the compressor stage 4 output.
Control Temp=	-	-40°F - 212°F	Control Temp is a status only item which displays the current value of the “Control Temperature.” The “Control Temperature” is defined as the temperature input selected by the Control Temperature Source parameter.
Occ Clg Spt=	75.0°F	50°F - 95°F	Occ Clg Spt is an adjustable item which affects the temperature at which the unit will go into the cooling mode of operation.
Occ Diff	1.0°F	1°F - 5°F	Occ Diff is an adjustable item which affects the temperature at which the unit will exit the cooling or heating mode of operation when Occupancy is occupied, bypass, or standby. This value will be subtracted from the cooling setpoint or added to the heating setpoint to determine when to exit the mode.

Menu Display Name	Default	Range	Description
Out Clg Spt=	80.0°F	50°F - 95°F	Out Clg Spt is an adjustable item which affects the temperature at which the unit will go into the cooling mode of operation when the Control Temperature source is Outdoor Air Temperature.
Out Diff=	1.0°F	1°F - 5°F	Out Diff is an adjustable item which affects the temperature at which the unit will exit the cooling or heating mode of operation when Control Temperature Source is Outdoor Air. This value will be subtracted from the cooling setpoint or added to the heating setpoint to determine when to exit the mode.
Disch Air=	-	-40°F - 212°F	Disch Air is a status only item which displays the current temperature reading from the unit's discharge air temperature sensor (DAT).
DAT Clg Spt=	55.0°F	45°F - 75°F	DAT Clg Spt is an adjustable item which sets the temperature that the DAT should be maintained at when it is in the cooling mode of operation. This point is only available on units that use discharge air temperature control.
DAT Clg DB=	1.0°F	1.0°F - 10.0°F	DAT Clg DB is an adjustable item which sets a dead band around the DAT Clg Spt parameter. For example, if the DAT Clg Spt parameter is set to 55ºF and the DAT Clg DB parameter is set to 1ºF the dead band around the setpoint would be from 55.5ºF to 54.5ºF.
EffSpaceT=	-	-40°F - 212°F	EffSpaceT is a status only item which displays the current space temperature value being used by the controller. This will be the network supplied space temperature if available or the input from the integrated thermostat.
Return Temp=	-	-40°F - 212°F	Return Temp is a status only item which displays the current temperature reading from the unit's return air temperature sensor (RAT).
Unocc Clg Spt=	85.0°F	50.0°F - 95.0°F	Unocc Clg Spt is an adjustable item which sets the control temperature below which the unit starts up and provides unoccupied cooling (night setback) during unoccupied periods.
Unocc Diff=	2°F	1°F - 10°F	Unocc Diff is an adjustable item which affects the temperature at which the unit will exit the cooling or heating mode of operation when Occupancy is unoccupied. This value will be subtracted from the cooling setpoint or added to the heating setpoint to determine when to exit the mode.
StdBy Clg Spt=	77°F	50°F - 95°F	Stdby Clg Spt is a status only item which indicates the temperature in which the unit will go into the cooling mode of operation in the standby occupancy state. Once a valid password has been entered this item becomes an adjustable item.
Clg Stg Time=	0 Seconds	0-600 Seconds	Clg Stg Time is an adjustable item which sets the minimum amount of time between bringing on/off stages of cooling.
OA Temp=	-	-40°F - 212°F	OA Temp is a status only item which displays the current temperature value being used by the controller. This will be the network supplied space temperature if available or the input from the outdoor air temperature sensor.
Clg Lo OAT Lk=	36°F	25°F - 60°F	Clg Lo OAT Lk is an adjustable item which sets the outdoor air temperature below which the outdoor air damper will be closed if OAT Lockout Ena is Enabled.

Dehumidification Set-Up

Table 12: Main Menu \ View Status \ Dehum Set-up

Menu Display Name	Default	Range	Description
Dehum Method=	DEWPT	REL_HUM DEWPT	Dehum Method is an adjustable item which configures dehumidification will be enabled based on a space relative humidity setpoint or a space dewpoint setpoint.
Dehum Control=	NONE	NONE PASSIVE ACTIVE PRIMARY	Dehum Control is an adjustable item which configures the controller to use active, passive, or no dehumidification.
Hum Src=	SPACE	SPACE OUTDOOR SPACE_ OUTDOOR	Hum Src is an adjustable item that selects the control humidity source from either a space humidity, outdoor air humidity, or an average of the space and outdoor air humidity.

Menu Display Name	Default	Range	Description
Rel Hum=	-	0% - 100%	Rel Hum is a status only item that indicates the current space relative humidity value being used by the controller. This will be the network supplied relative humidity if available or the input from the space relative humidity sensor.
Hum Spt=	60%	20% - 100%	Hum Spt is an adjustable item which indicates the space relative humidity above which the unit will go into the dehumidification mode of operation, if available.
Hum Diff=	5%	1% - 10%	Hum Diff is an adjustable item which sets the differential below the Hum Spt where the controller will disable dehumidification.
Dewpnt Spt=	55°F	45°F - 70°F	Dewpnt Spt is an adjustable item which indicates the space dewpoint setpoint above which the unit will go into the dehumidification mode of operation, if available.
Dewpnt Diff=	2°F	1°F - 10°F	Dewpnt Diff is an adjustable item which sets the differential below the Dewpnt Spt where the controller will disable dehumidification.
LCT Setpoint=	45.0°F	42°F - 70°F	LCT Setpoint is an adjustable item which is used to set the leaving coil temperature setpoint the compressors control to maintain during dehumidification operation.
DAT Clg Spt=	55.0°F	45°F - 75°F	DAT Clg Spt is an adjustable item which sets the temperature that the DAT should be maintained at when it is in the cooling mode of operation. This point is only available on units that use discharge air temperature control
DAT Clg DB=	1.0°F	1.0°F - 10.0°F	DAT Clg DB is an adjustable item which sets a dead band around the LCT Setpoint parameter. For example, if the LCT Setpoint parameter is set to 55ºF and the DAT Htg DB parameter is set to 1ºF the dead band around the setpoint would be from 55.5ºF to 54.5ºF.
DAT Htg DB=	1.0°F	1.0°F - 10.0°F	DAT Htg DB is an adjustable item which sets a dead band around the Dehum DAT Sp parameter. For example, if the Dehum Spt parameter is set to 70ºF and the DAT Htg DB parameter is set to 1ºF the dead band around the setpoint would be from 70.5ºF to 74.5ºF.
Dehum DAT Sp=	70.0°F	45.0°F - 120.0°F	Dehum DAT Sp is an adjustable item which sets the temperature that the DAT should be maintained at when it is in the dehumidification mode of operation

Heating Set-Up Menu

Table 13: Main Menu \ Commission Unit \ Heating Set-Up

Menu Display Name	Default	Range	Description
Control Temp=	-	-40-212°F	Control Temp is a status only item which displays the current value of the “Control Temperature.” The “Control Temperature” is defined as the temperature input selected by the Control Temperature Source parameter.
HW Valve Pos=	-	0% - 100%	HW Valve Pos is a status only item which indicates the percentage that the hot water valve is currently open
HW Valve Pos=	-	INACTIVE ACTIVE	HW Valve Pos is a status only item which indicates the condition of the two position hot water valve output.
Htg Stg 1 =	-	INACTIVE ACTIVE	Htg Stg 1 is a status only item which indicates the condition of the electric heat stage 1 output.
Htg Stg 2 =	-	INACTIVE ACTIVE	Htg Stg 2 is a status only item which indicates the condition of the electric heat stage 2 output.
Htg Stg 3 =	-	INACTIVE ACTIVE	Htg Stg 3 is a status only item which indicates the condition of the electric heat stage 3 output.
Htg Stg 4 =	-	INACTIVE ACTIVE	Htg Stg 4 is a status only item which indicates the condition of the electric heat stage 4 output.
SCR Output=	-	0% - 100%	SCR Output is a status only item which indicates the current capacity of the SCR electric heater.
Occ Htg Spt=	70.0°F	0.0°F - 100.0°F	Occ Htg Spt is an adjustable item which affects the temperature at which the unit will go into the heating mode of operation.
Occ Diff=	1°F	1°F - 5°F	Occ Diff is an adjustable item which affects the temperature at which the unit will exit the cooling or heating mode of operation when Occupancy is occupied, bypass, or standby. This value will be subtracted from the cooling setpoint or added to the heating setpoint to determine when to exit the mode.
Out Htg Spt=	55.0°F	45°F - 70°F	Out Htg Spt is an adjustable item which affects the temperature at which the unit will go into the heating mode of operation when the Control Temperature source is Outdoor Air Temperature.
Out Diff=	1.0°F	1°F - 5°F	Out Diff is an adjustable item which affects the temperature at which the unit will exit the cooling or heating mode of operation when Control Temperature Source is Outdoor Air. This value will be subtracted from the cooling setpoint or added to the heating setpoint to determine when to exit the mode.

Menu Display Name	Default	Range	Description
Disch Air=	-	-40°F - 212°F	Disch Air is a status only item which displays the current temperature reading from the unit's discharge air temperature sensor (DAT).
DAT Htg Spt=	80°F	75°F - 120°F	DAT Htg Spt is an adjustable item which sets the temperature that the DAT should be maintained at when it is in the heating mode of operation. This point is only available on units that use discharge air temperature control.
DAT Vlv Htg DB=	1.0°F	1.0°F - 10.0°F	DAT Vlv Htg DB is an adjustable item which sets a dead band around the DAT Htg Spt parameter. For example, if the DAT Htg Spt parameter is set to 80ºF and the DAT Vlv Htg DB parameter is set to 1ºF the dead band around the setpoint would be from 80.5ºF to 79.5ºF.
DAT El Htg DB=	1.0°F	1.0°F - 10.0°F	DAT El Htg DB is an adjustable item which sets a dead band around the DAT Htg Spt parameter. For example, if the DAT Htg Spt parameter is set to 80ºF and the DAT El Htg DB parameter is set to 1ºF the dead band around the setpoint would be from 80.5ºF to 79.5ºF.
EffSpaceT=	-	-40°F - 212°F	EffSpaceT is a status only item which displays the current space temperature value being used by the controller. This will be the network supplied space temperature if available or the input from the integrated thermostat.
Return Temp=	-	-40°F - 212°F	Return Temp is a status only item which displays the current temperature reading from the unit's return air temperature sensor (RAT).
Unocc Htg Spt=	60°F	50°F - 95°F	Unocc Htg Spt is an adjustable item which sets the control temperature below which the unit starts up and provides unoccupied heating (night setup) during unoccupied periods.
Unocc Diff=	2°F	1°F - 10°F	Unocc Diff is an adjustable item which affects the temperature at which the unit will exit the cooling or heating mode of operation when Occupancy is unoccupied. This value will be subtracted from the cooling setpoint or added to the heating setpoint to determine when to exit the mode.
StdBy Htg Spt=	66.0°F	50°F - 95°F	Stdby Htg Spt is a status only item which indicates the temperature in which the unit will go into the heating mode of operation in the standby occupancy state. Once a valid password has been entered this item becomes an adjustable item.
Htg Stg Time Spt=	0 Seconds	0-3600 Seconds	Htg Stg Time Spt is an adjustable item which sets the minimum amount of time between bringing on/off stages of heating.
Htg Stg Time=	-	0-3600 Seconds	Htg Stg Time is a status only item which displays the amount of time remaining before the heating stage timer expires.
OA Temp=	-	-40°F - 212°F	OA Temp is a status only item which displays the current temperature value being used by the controller. This will be the network supplied space temperature if available or the input from the outdoor air temperature sensor.
Ent Unit Spt=	20°F	10°F - 40°F	Ent Unit Spt is an adjustable item which affects the entering unit temperature target used for staging pre-heat when preheat is required.
Ent Unit Diff=	10°F	1°F - 20°F	Ent Unit Diff is an adjustable item which affects the temperature at which the unit will exit the preheat state for staged preheat applications.

OA Damper Set-Up

Table 14: Main Menu \ Commission Unit \ OA Damper Set-Up

Menu Display Name	Default	Range	Description
OAD Position=	-	0% - 100%	OAD Position is a status only item which displays the current OAD position.
Min OA Pos=	20%	0% - 100%	Min OA Pos is an adjustable item which indicates the minimum position of the outdoor damper while the fan is running. The actual OAD damper position will vary between this value and the Max OA Pos depending on economizer and DCV requirements.
Max OA Pos=	100%	0% - 100%	Max OA Pos is an adjustable item which indicates the maximum position of the outdoor damper while the fan is running. The actual OAD damper position will vary between this value and the Min OA Pos depending on economizer and DCV requirements.

Econo Set-Up Menu

Table 15: Main Menu \ Commission Unit \ Econo Set-Up Menu

Menu Display Name	Default	Range	Description
Control Temp=	-	-40°F - 212°F	Control Temp is a status only item which displays the current value of the “Control Temperature.” The “Control Temperature" is defined as the temperature input selected by the Control Temperature Source parameter.
Occ Clg Spt=	75°F	50°F - 95°F	Occ Clg Spt is an adjustable item which affects the temperature at which the unit will go into the cooling mode of operation.
Occ Diff=	1°F	1°F - 5°F	Occ Diff is an adjustable item which affects the temperature at which the unit will exit the cooling or heating mode of operation when Occupancy is occupied, bypass, or standby. This value will be subtracted from the cooling setpoint or added to the heating setpoint to determine when to exit the mode.
Out Clg Spt=	80.0°F	50°F - 95°F	Out Clg Spt is an adjustable item which affects the temperature at which the unit will go into the cooling mode of operation when the Control Temperature source is Outdoor Air Temperature.
Out Diff=	1.0°F	1°F - 5°F	Out Diff is an adjustable item which affects the temperature at which the unit will exit the cooling or heating mode of operation when Control Temperature Source is Outdoor Air. This value will be subtracted from the cooling setpoint or added to the heating setpoint to determine when to exit the mode
Disch Air=	-	-40°F - 212°F	Disch Air is a status only item which displays the current temperature reading from the unit’s discharge air temperature sensor (DAT).
EffSpaceT=	-	-40°F - 212°F	EffSpaceT is a status only item which displays the current space temperature value being used by the controller. This will be the network supplied space temperature if available or the input from the integrated thermostat.
Return Temp=	-	-40°F - 212°F	Return Temp is a status only item which displays the current temperature reading from the unit’s optional return air temperature sensor (RAT).
OA Temp=	-	-40°F - 212°F	OA Temp is a status only item which displays the current temperature value being used by the controller. This will be the network supplied space temperature if available or the input from the outdoor air temperature sensor.
Max OAT Lmt=	75.0°F	50.0°F - 100.0°F	Max OAT Lmt is an adjustable item which sets the maximum outdoor air temperature for the applicable climate zone above which economizer should not be enabled.
Min OAT Lmt=	70.0°F	50.0°F - 100.0°F	Min OAT Lmt is an adjustable item which sets the minimum outdoor air temperature for the applicable climate zone below which economizer should be enabled.
Cal State=	NoCAL	NoCAL Cal Pass Fail	Cal State is a status only item which indicates the results of calibration process.
Calibrate OAD=	NO	NO YES	Calibrate OAD is an adjustable item used to initiate the calibration function that captures the command position at which the outdoor damper position end switches open and close at the closed and open ends of the damper modulation range.
Pos Sw Open=	100%	0% - 100%	Pos Sw Open is an item that indicates the captured command position at which the outdoor damper position end switch closes at the open end of the damper modulation range. This parameter can also be manually adjusted.
Max Sw Diff=	1%	0% - 50%	Max Sw Diff is an item that indicates the captured switch differential at the open (maximum) end of the damper modulation. This parameter can also be manually adjusted.
Pos Sw Close=	0%	0% - 100%	Pos Sw Close is an item that indicates the captured command position at which the outdoor damper position end switch closes at the closed end of the damper modulation range. This parameter can also be manually adjusted.
Min Sw Diff=	1%	0% - 50%	Min SW Diff is an item that indicates the captured switch differential at the closed (minimum) end of the damper modulation. This parameter can also be manually adjusted.
OAD Sw Status=	-	OPEN CLOSED	OAD Sw Status is a status only item that indicates the current condition of the damper end switch position input (Open/Closed).

Menu Display Name	Default	Range	Description
Cal Status=	OFF	OFF INC_OPN DEC_CLS INCOPNDIF INC100PCT DECOPN INCCLS DECOPNDIF DEC0PCT	Cal Status is a status only item that indicates the current step of the OAD end switch calibration process.
OAD Pos Cal=	-	0% - 100%	OAD Pos Cal is a status only item that indicates the OA damper position being commanded as part of the end switch calibration process.
Econ Src=	NONE	NONE OAT ENTHALPY_ OUT TEMP_ DIFF ENTHALPY_ DIFF	Econ Src is an adjustable item which sets the strategy that will be used to determine if the outdoor air is suitable for economizing.
OARelHum=	-	0% - 100%	OARelHum is a status only item which indicates the current outdoor relative humidity value being used by the controller. This will be the network supplied relative humidity if available or the input from the outdoor relative humidity sensor.
OAEnthalpy=	-	-200 to 200 BTU/lb	OAEnthalpy is a status only item which indicates the current calculated space enthalpy.
Return Humidity=	-	0% - 100%	Return Humidity is a status only item which indicates the current outdoor relative humidity value being used by the controller. This will be the network supplied relative humidity if available or the input from the return relative humidity sensor.
SpaceRel Hum=	-	0% - 100%	SpaceRel Hum is a status only item which indicates the current outdoor relative humidity value being used by the controller. This will be the network supplied relative humidity if available or the input from the return relative humidity sensor.
Space Enthalpy=	-	-200 - 200 BTU/lb	SpaceEnthalpy is a status only item which indicates the current calculated space enthalpy.

Air Filter Set-Up

Table 16: Main Menu \ Commission Unit \ Air Filter Set-Up

Menu Display Name	Default	Range	Description
Filter Chg Strategy=	NONE	NONE RUNTIME BIN_INPUT BOTH	Filter Chg Strategy is an adjustable item which selects if and when a dirty filter warning will be indicated.
Filter Chg Time=	1440 Hours	360 – 4320 Hours	Filter Chg Time is an adjustable item which sets the incremental supply fan run hours that must occur before a dirty filter warning will be indicated when the Filter Chg Strategy is BINARY_INPUT or BOTH.
Filter Chg Sig=	NORM_ CLOSED	NORM_ OPEN NORM_ CLOSED	Filter Chg Sig is an adjustable item which selects if the dirty filter binary input is expecting a normally open, or normally closed signal. If nothing is wired to the binary input and NORM_OPEN is selected, this feature is effectively disabled.
Filter Chg Status=	-	OPEN CLOSED	Filter Chg Status is a status only item that indicates the current condition of the dirty filter switch input.
Filter Status=	-	CLEAN DIRTY	Filter Status is a status only item that indicates the current calculated condition of the air filter based on the Filter Chg Strategy parameter criteria.

View Status

Scheduling

The unit can be scheduled for operation by using the following three methods:

- Unit internal time scheduling functions
- External time clock function
- Network time scheduling function

Provided the unit is not locally or remotely disabled, the unit operates when any of these scheduling functions is calling for occupied operation. Conversely, the unit enters the unoccupied mode when all of these scheduling functions are calling for unoccupied operation. Therefore, any unused scheduling functions should be set for continuous unoccupied operation.

The next four sections: “Date and Time,” “Internal Daily Scheduling,” “Holiday Scheduling,” and “One Event Scheduling” describe functions related to the internal unit scheduling functions. These are followed by a section describing the optimal start function which can be used with internal scheduling and network scheduling. This is followed by two sections that describe the external time scheduling and network time scheduling functions.

Date and Time

The controller uses the Date and Time to execute its internal scheduling functions. The current Time and Date will not be lost if the unit is turned off for up to forty-eight hours. The Time and Date are set from the keypad. The Time of day can be set by entering the hour (00-23), minute (00-59), and second (00-59) into three fields of the Current Time. Note that MicroTech unit controller uses “military” time. The current Date can be set by entering the day (00-31), month (01- 12) and year (1999-2155) into the three fields of the Current Date.

Internal Daily Scheduling

An Internal Daily Schedule provides one start time and one stop time for each of the seven days of the week and for holidays. When the Occ Mode= parameter is set to “Auto/Net”, and the unit is not disabled for other reasons, it starts and stops according to the controller internal schedule.

Holiday Scheduling

The operator may select the days when start and stop times for holidays are used by selecting a start date and an end date for up to ten periods during the year using the Holiday Scheduling feature. Whenever a holiday period occurs, the controller uses the Holiday Schedule start and stop time for the period. For example, assume that Christmas Eve occurs on a Thursday. The building is shut down on both Christmas Eve and Christmas Day, but operates normally on the weekend. This holiday period would be scheduled by setting the Holiday Schedule to the default “no schedule” values “HH:MM - HH:MM” and setting the Holiday Period to “12/24/19 - 12/25/19

One Event Scheduling

One Event Scheduling is provided so that the operating period for a unique day can be scheduled without affecting the regular internal daily and holiday schedules. A start date/time and an end date/time can be set. The unit can be scheduled to operate during a specified period by using this feature. During the day’s period defined by the One Event Beginning Date and One Event Ending Date parameters, the unit starts up and runs continuously from the time period defined by the One Event Beginning Time until the One Event Ending Time, regardless of internal daily or holiday schedules.

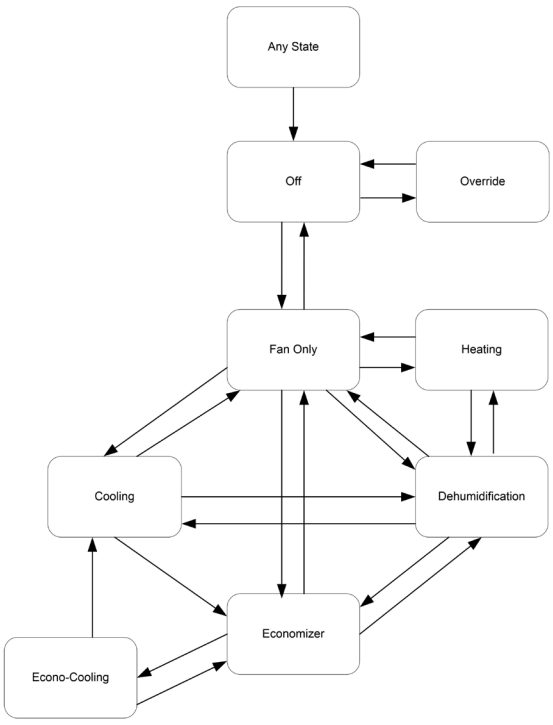
Unit State

The Unit State can operate in one of seven operational states based on the control temperature source, (Ctrl Temp Src), selected in the HtgClg ChngOVr set up menu, a sensor will drive the unit into the correct state of the states - Heating, Cooling, Economizer, Econo-Cooling, Dehumidification, and Fan Only.

The current state will be displayed by the Unit State parameter in the Main Menu/Quick Menu, or the Main Menu/ViewStatus/Unit Status/Settings Menu

Neither heating or cooling is provided when the unit is in the Fan Only state.

Figure 14: Unit State Diagram



Off

In the OFF operating state the fans are off, the outsider air dampers are closed and cooling and heating are disabled. The unit is in the OFF state when it is not enabled, or when it is in unoccupied mode with no call for unoccupied operation.

Fan Only

The unit enters the Fan Only operating state after power up and anytime there is no requirement for heating, cooling, or dehumidification. The outdoor air dampers are open to the minimum position in this state. Based on the control temperature source (Ctrl Temp Src), selected in the HtgClg ChngOVr set up menu, a sensor will drive the unit into one of the states - Heating, Cooling, Economizer, Econo-Cooling, Dehumidification, and Fan Only.

Cooling

The unit enters the Cooling operating state when cooling is required and the economizer is disabled, not present, or already fully open. Cooling operation can be mechanical DX compressors or chilled water coils.

- The transition to cooling will occur when the following are true:
  - The control temperature rises above the active cooling setpoint. The unit will exit the cooling state when the control temperature falls below the active cooling setpoint minus the occupied/unoccupied off differential.
  - The economizer operation is disabled or not present.

Economizer

If the unit is equipped with a 0% - 100% modulating Economizer and the conditions are suitable for free cooling, the unit attempts to satisfy the cooling load by using outdoor air before using mechanical cooling. Suitability for Economizer operation is determined by dry bulb, comparative dry bulb, or comparative energy/enthalpy. See “Economizer” on page 44 for details.

- The transition to Economizer will occur when the following are true:
  - The control temperature rises above the active cooling setpoint. The unit will exit the economizer state when the control temperature falls below the active cooling setpoint minus the occupied/unoccupied off differential or if the economizer is disabled.
  - The economizer operation is not disabled
- Dehumidification: When a unit is operating in dehumidification, dehumidification must finish operation and transition to cooling before the unit will enter economizer

Dehumidification

Dehumidification is activated based on a selectable humidity or dewpoint sensor input. Dehumidification can be initiated based on humidity measurements in the space, outdoor air, or both based on the Dehumidification Source configuration.

Heating

The unit enters the Heating operating state when the control temperature falls below the Occupied or Unoccupied Heating Setpoint. During the Heating operating state, the outdoor air dampers are controlled to the minimum outside air position.

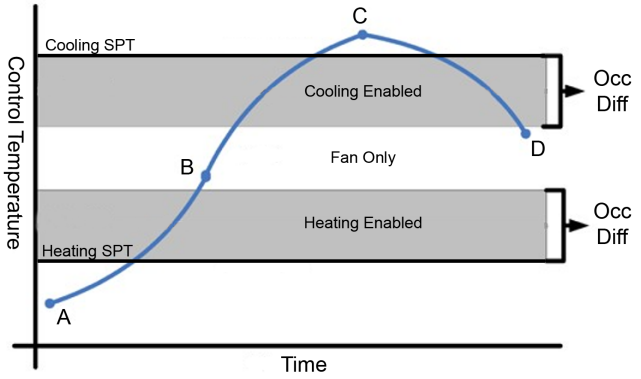
Heating/Cooling Changeover

Control Temperature Source

When the control temperature is below the Occupied, Standby, or Unoccupied Heating Setpoint (point A), heating operation is enabled. Heating operation then remains enabled until the control temperature begins to rise and rises above the Occupied, Standby, or Unoccupied Heating Setpoint by more than the occupied off differential (for occupied/standby mode) or unoccupied off differential (for unoccupied mode) (point B), at which point heating operation is disabled and the unit enters the fan only operating state. If the control temperature rises above the Occupied, Standby, or Unoccupied Cooling Setpoint (point C) cooling operation is enabled. Cooling operation remains enabled until the control temperature begins to fall below the Occupied, Standby, or Unoccupied Cooling Setpoint by more than the occupied off differential (for occupied/standby mode) or unoccupied off differential (for unoccupied mode) (point D), at which point the unit returns or fan only operating state.

When the Control Temperature Source is Outdoor Air Temperature, the unit will only run in the Occupied mode using the Outdoor Cooling and Heating setpoints and the Outdoor Off Differential. Occupied, Standby, and Unoccupied setpoints will not be used for mode determination.

Figure 15: Heating/Cooling Control Temperature



The “Control Temperature” is defined as the unit temperature input used to make the heat/cool changeover decision. This determines whether or not cooling or heating is enabled. The Control Temperature Source (Cntrl Temp Src) can be selected as Space, RAT (return air temperature), Average (which will use an average of the space and return air temperature values), or OAT (outdoor air temperature). The control temperature source selected will vary by application and temperature control configuration.

Space Setpoint Adjustment

The user has the option of using a space mounted remote sensor with setpoint adjustment functionality to control the setpoint of the space being controlled. See “Remote Integrated Thermostat Operation” on page 19 for more information.

NOTICE

Remote Integrated Thermostat space setpoint adjustment has no effect when the Control Temperature Source is OAT.

Supply Air Fan

Supply Air Fan Operation

The standard supply fans will be controlled using a single 0-10VDC analog capacity output.

The supply fans will control between an adjustable minimum and maximum fan capacity. The range is adjustable from 0% - 100%.

The supply fan will always be running before heating or cooling is activated.

If the unit is configured for electric heat, the fan will remain on for a minimum 30 seconds after all electric heat outputs have been de-energized.

If the unit is configured for an optional Airflow Proving Switch digital input, after the fan has been commanded to operate and Air Flow Startup Delay timer has expired, the controller will monitor the input. If the input indicates that the fan is not operating for 30 consecutive seconds the unit will go into an alarm state and shutdown.

When the unit is in unoccupied mode, the fan will be off when there’s no demand, and the fan will cycle on with demand when operation is required.

Supply Air Fan Control Types

Constant Speed

When fan operation is required, the supply fan 0-10VDC output will drive the fan to run at scaled % output set by the end user. If the unit is configured to support dehumidification, when dehumidification is required, the supply fan 0-10VDC output will drive the fan to run at scaled % output for the Supply Fan Dehumidification Speed Setpoint set by the user. The Constant and Dehumidification fan speeds can be set to the same value, if desired.

Single Zone VAV Control (1ZnVAV)

Single Zone VAV control operates the unit as a single VAV box. The cooling and heating are controlled to maintain a discharge air temperature setpoint and the supply fan is modulated to maintain the appropriate space temperature setpoint. If the Control Temperature Source is Outdoor Air Temperature and the fan speed control is Single Zone VAV, a space temperature sensor will still be required to modulate the supply fan.

Duct Pressure Control (DSP)

Duct pressure control operates the unit to maintain the supply duct conditions. The cooling is controlled to maintain a discharge air temperature setpoint and the supply fan is modulated to maintain a supply duct static pressure setpoint. The duct pressure setpoint can be adjusted at the unit controller interface or via a network input signal.

Using the Fan Cycling Configuration, the supply fan can be configured to be always on when in the occupied state or to cycle on/off with demand. If Fan Cycling Configuration is set to “On” and the unit is in the occupied mode, the fan will be at the Supply Fan Minimum Speed when there is no heating or cooling demand.

When fan operation is required, the Zone Damper Output will first be energized and the DSP Startup Delay timer will begin to count down. The supply fan will not be allowed to run until the DSP Startup Delay Timer has expired. When fan operation is required, the fan will initially run at minimum speed for the duration of the DSP Control Delay timer. The supply fan output will be controlled by a field adjustable control loop monitoring the Duct Static Pressure input to maintain it at the Duct Static Pressure Setpoint.

Exhaust Fan

Units have the option of being equipped with one or more exhaust fans. When equipped, each exhaust fan will be controlled by a single 0-10VDC analog capacity value. The exhaust fan will be controlled between adjustable minimum and maximum fan capacity.

Exhaust Fan Control Types

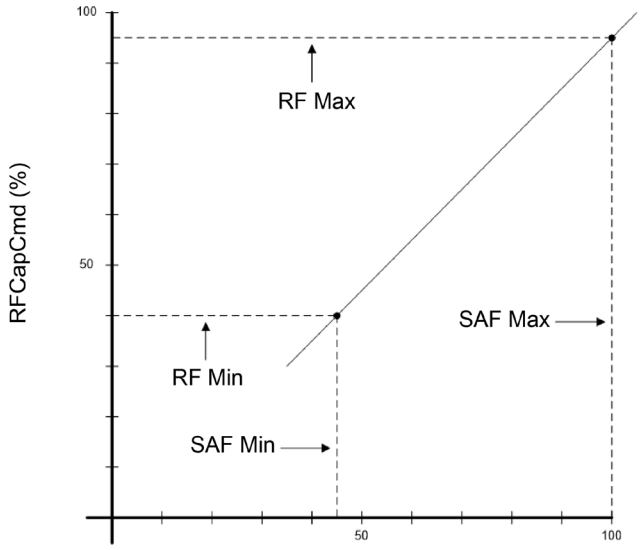
Constant Speed

When the Exhaust Fan Control is set to Constant Speed, the exhaust fan will be controlled to the Exhaust Fan Constant Speed Setpoint.

Fan Tracking Control (Tracking)

When the Exhaust Fan Control is set to Tracking the exhaust fan capacity is varied to maintain an adjustable offset between the Exhaust Fan capacity and the Supply Fan capacity. The user specifies the offset at maximum and maximum supply fan capacity and the Exhaust Fan controls linearly between the two points.

Figure 16: Exhaust Fan Tracking



The field process for setting these parameters will be as follows:

1. With the unit running and the outdoor air dampers at minimum position (in Fan Only State for example), the VAV box system will be manipulated to simulate a call for maximum airflow.
2. The supply air fan will be allowed to stabilize (normally under DSP control) and the Supply Fan Maximum Speed parameter will be set to the steady-state SAF Capacity value.
3. The Exhaust Fan at Supply Fan Max value will then be adjusted until the desired building pressure is obtained (usually slightly positive).
4. The VAV Box system will then be manipulated to simulate call for minimum airflow.
5. The supply air fan will be allowed to stabilize (normally under DSP control) and the Supply Fan Maximum Speed Parameter will be set to the steady-state SAF Capacity value.
6. The Exhaust Fan at Supply Fan Minimum Value will be adjusted until the desired building pressure is obtained (generally slightly positive).

NOTICE

Ideally the minimum and maximum conditions should be checked with the outdoor dampers at minimum and maximum positions to assure there are not significantly different requirements depending on the outdoor damper position. If the differences are significant then the parameters may be manually adjusted to compromise between the two conditions. If the differences are too great, it may be necessary to change to building pressure RAF/EAF control for the application.

NOTICE

Setting the minimum and maximum tracking points will not necessarily establish minimum and maximum SAF modulation ranges, but rather simply establishes the slope of the tracking curve. The curve line will be projected up to effective max SAF capacity and down to the effective minimum SAF capacity.

Network Control

The Network Exhaust Fan Enable Input can be used by a building management system to enable/disable the exhaust fan.

Outdoor Air Damper Control (OAD)

When the unit is equipped with a exhaust fan, the Exhaust Fan Min Damper Position parameter can be used to disable exhaust fan operation when the OA damper position is below the Exhaust Fan Min Damper Position value.

Cooling

Staged Compressors

In units equipped with staged compressors that are configured for Constant Speed supply fan control, the compressors stage on and off to maintain the control temperature (Space, RAT, or an average of the two). The control temperature being maintained is the occupied or unoccupied cooling setpoint.

When Compressor Stages is 1, when cooling is required, the compressor 1 output will be energized. If Compressor Stages is 2, the compressor 2 output will be energized when the control temperature reaches the active cooling setpoint plus the compressor cooling differential. If the Compressor 2 output is energized and the control temperature falls below the active cooling setpoint + Compressor Cooling Differential – Unoccupied Off Differential, then Compressor 2 output will de-energize.

When Compressor Stages is 4, the controller will use a PID control to stage the 4 compressor stages.

If the Supply Fan Control is “Constant Speed”, the PID loop will stage to control the control temperature. If the Supply Fan Control is “Duct Static Pressure” or “Single Zone VAV” the PID loop will stage to control discharge air temperature to the Cooling Discharge Air Temperature Setpoint.

The compressor outputs Compressor 1, Compressor 2, Compressor 3, and Compressor 4 each represent 25% of the cooling capacity.

- When cooling output is >0% Compressor 1 will be energized and it will be de-energized when the cooling output is 0%.
- When cooling output is >25% Compressor 2 will be energized and it will be de-energized when the cooling output is 20%.
- When cooling output is >50% Compressor 3 will be energized and it will be de-energized when the cooling output is 45%.
- When cooling output is >75% Compressor 4 will be energized and it will be de-energized when the cooling output is 70%.

For all compressor configurations, when mechanical cooling is no longer required, it will be de-energized. Additionally, when a stage of cooling is energized/de-energized, the interstage timer will start and the next stage of cooling will not be brought on/off until the interstage timer expires.

D-Kit Compressor

When cooling is required, the variable speed compressor will control to the Cooling Discharge Air Temperature setpoint.

Minimum Compressor On/Off Time

When the Compressor Minimum On/Off Configuration is Enabled, the MicroTech unit controller will use minimum On and Off timers when staging the compressor outputs. When a compressor is turned off, it must remain off for the duration of the Compressor Minimum Off Time. When a compressor is turned on, it must remain on for the duration of the Compressor Minimum On Time. If the Compressor Minimum On/Off Configuration is disabled, the Compressor Minimum On Time and Compressor Minimum Off Time will not be used when turning on and off any compressor outputs.

After initial power up of the controller, clearing of a fault, or transition from Unoccupied, all compressors must remain off for the duration of the Compressor Minimum Off Time plus a randomly generated value of up to 60 additional seconds. This prevents multiple units from turning on compressors at the same time when power is applied.

Lead Compressor Selection

If Lead Compressor Configuration is Run Hours, when a compressor is needed to satisfy the cooling requirement, the controller will bring on the compressor with the lowest total runtime. If Lead Compressor Configuration is Compressor 1, when a compressor is needed to satisfy the cooling requirement, the controller will bring on the compressors in numerical order. Compressors will be turned off in the reverse order that they were turned on. Lead Compressor selection does not apply to the D-Kit Configuration.

Valve Control

Two-Position Chilled Water Valve

In units equipped with a two-position chilled water valve, when cooling is required, the chilled water valve will be open. When cooling is no longer required the chilled water valve will be closed.

Modulating Chilled Water Valve

In units equipped with a modulating chilled water valve, the controller will use PI control to modulate the valve open and closed.

If the Supply Fan Control is “Constant Speed”, the PI loop will modulate to control to space temperature. If the Supply Fan Control is “Duct Static Pressure” or “Single Zone VAV” the PI loop will modulate to control discharge air temperature to the Cooling Discharge Air Temperature Setpoint.

Heating

Heating Operation

A unit may be configured with one of several optional types of primary Heating: Hot Water, Steam, or Electric Heat. The options will either be staged or modulating controlled. The unit enters the Heating operating state from the Fan Only operating state when the control temperature falls below the Occupied or Unoccupied Heating Setpoint. The unit transitions from the Heating to Fan Only operating state when the control temperature rises above the Occupied or Unoccupied Heating Set Point plus the Occupied or Unoccupied Off Differential.

Single Stage Electric Heat / Two-Position ON/OFF Hot Water Valve

When heating is active, the Electric Heat will be On or the hot water valve will be open. Electric Heat staging is subject to the Heating Interstage Timer. When heating is no longer required, the electric heat will be Off or the hot water valve will be closed.

Four Stage Electric Heat

The electric heat outputs will each represent 25% for the heating capacity.

- When heating output is >0% Heat Stage-1 will be energized and it will be de-energized when the heating output is 0%.
- When heating output is >25% Heat Stage-2 will be energized and it will be de-energized when the heating output is 20%.
- When heating output is >50% Heat Stage-3 will be energized and it will be de-energized when the heating output is 45%.
- When heating output is >75% Heat Stage-4 will be energized and it will be de-energized when the heating output is 70%.

Electric heat staging is subject to the Heating Interstage Timer.

- Constant Air Volume Fan Control:
  When the unit enters the Heating Operating state the heating outputs will be controlled based on comparing the Control Temperature to the Active Heating setpoint for the space.
- Duct Static Pressure and Single Zone VAV Fan Control:
  When the unit enters the Heating Operating state the heating outputs will be controlled based on comparing the Discharge Air Temperature to the Heating Discharge Air Temperature Setpoint.

SCR Electric Heat / Modulating Hot Water Valve

In units equipped with a SCR electric heat or a modulating chilled water valve, the controller will use PI control to increase or decrease the electric heat output or modulate the valve open and closed.

- Constant Air Volume Fan Control:
  When the unit enters the Heating Operating state the heating outputs will be controlled based on comparing the Control Temperature to the Active Heating setpoint for the space.
- Duct Static Pressure and Single Zone VAV Fan Control:
  When the unit enters the Heating Operating state the heating outputs will be controlled based on comparing the Discharge Air Temperature to the Heating Discharge Air Temperature Setpoint.

D-Kit Compressor

When heating is required, the variable speed compressor will control to the Heating Discharge Air Temperature setpoint.

Preheat Control

Pre heat control is provided to ensure that the entering unit temperature is maintained above a certain value. Preheat is enabled based on Outdoor Air Temperature or Entering Unit Temperature depending on the Preheat Enable Configuration parameter. The supply fan must be running and the unit must be in the heating mode for preheat to be enabled. Preheat control is used when the Electric Heat Type is Preheat or Pre/Supplemental Heat.

When the Preheat Enable Configuration parameter is Outdoor Air Temperature, preheat will be enabled with the outdoor air temperature value drops below the Preheat Low OAT Setpoint value and remain active until the outdoor air temperature rises above the Preheat Low OAT Setpoint value + Preheat Low OAT Differential.

When the Preheat Enable Configuration parameter is Entering Unit Temperature, preheat will be enabled with the entering unit temperature value drops below the Entering Unit Temperature Low Limit value and remain active until the outdoor air temperature rises above the Entering Unit Temperature Low Limit + Preheat Enable Differential.

1-Stage Preheat

For units with 1 stage of electric heat with preheat control, when preheat is required, the electric heat output will be energized and the out put will be de-energized when preheat is no longer required.

SCR Preheat

For units with 1 stage of electric heat with preheat control, when preheat is required, the controller will use a PID loop to modulate the SCR electric heater output to maintain the entering unit temperature at the Entering Unit Temperature Preheat Target Setpoint value.

Entering Unit Temperature Low Alarm

For units configured for preheat control, if the heating capacity is maxed out and the entering unit temperature is below the Entering Unit Temperature Low Limit Value for longer tan the Entering Unit Temperature Low Alarm Delay, an Entering Unit Temperature Low alarm will be generated.

Special Preheat Startup Sequence

A special start sequence is used for units with SCR preheat. If heat is required within Cold Start Time after power up or an occupancy change the preheat output will be immediately set to the Cold Start Heating Percent, at which point normal preheat operation will resume.

Supplemental Heat Control

Supplemental heat control is provided on units to provide additional electric heating capacity on units with a non-electric primary heat source (compressor heat pumps). Supplemental electric heat will be used when the primary heat source is at 100% and the heating target is still not being met. When the heat source is at 100% for longer than the discharge air temperature is below the Heating Discharge Air Temperature Setpoint minus the Supplemental Electric Heat Enable Differential for longer than the Supplemental Heat Enable Timer, electric heat output(s) will be used to maintain the heating discharge air temperature setpoint. Electric heat capacity will be 0% before the primary heating source is staged down.

NOTICE

If the electric heat type is Pre/Supplemental Electric heat, the electric heat output(s) can be used for either preheat or supplemental heat. In this case, the control logic will prioritize meeting the preheat demand before the supplemental electric heat demand.

Min DAT

MinDAT can occur in FanOnly and Cooling Modes. If heating is enabled and there is no heating load (normally Fan Only operating state), the controller activates the units heating equipment as required to prevent the discharge air temperature from becoming too cool if the Min DAT Ctrl Flag is set to yes via the Main Menu \ Commission Unit \ Heating Set-Up. The unit enters the MinDAT operating state during occupied operation when neither cooling or heating is required based on the HtgClgChgOvr function, but based on the if the discharge air temperature falls below a minimum discharge air limit. If the discharge air temperature falls below the minimum discharge air limit by more than half the discharge heating deadband, the unit operating state changes from Fan Only to Min DAT. The unit transitions out of the Min DAT operating state once the discharge air temperature is above minimum discharge temperature limit and the heating capacity has been at its minimum position for the duration of the heating stage timer.

NOTICE

On discharge air control and single zone VAV units, the DAT cooling set point parameter in the Cooling Setup menu acts as the minimum discharge temperature limit. On Zone Control units, the Min DAT limit parameter in the Heating Set-Up menu (Main Menu \ Commission Unit \ Heating Set-Up \ MinDAT Limit) acts as the minimum discharge temperature limit.

The unit will not be allowed to transition to MinDAT if Dehumidification is active. The unit will transition to Fan Only operation if the dehumidification becomes active while in the MinDAT state.

Dehumidification

Mechanical cooling will be used to lower the air temperature enough to wring out moisture and subsequently reheat will be used to raise it back up to achieve the unit discharge air temperature requirements. Reheat types can be Hot Water or Electric Heat. Dehumidification is only available on units with a reheat coil that are equipped with space humidity, discharge air temperature, and (when necessary) leaving coil temperature sensors. When in Dehumidification mode, the unit is not allowed to operate in the Economizer state.

When in the dehumidification mode, if all heating outputs are at maximum and the discharge air temperature is below the Dehumidification Discharge Air Temperature setpoint minus 5°F, the unit will leave the dehumidification state for a minimum of 5 minutes. When in the dehumidification mode, if the control temperature drops below the Occupied Heating setpoint (regardless of heating configuration) the unit will exit the dehumidification state.

Active Dehumidification

When the Dehumidification Type is Active, dehumidification will be available only when there is no call for heating or dehumidification. When dehumidification is required, reheat will control to the Dehumidification discharge Air Temperature setpoint. If there is a call for heating or cooling the unit will exit the dehumidification mode.

Primary Dehumidification

When the Dehumidification Type is Primary, dehumidification will be unavailable when there's a call for heating (dehumidification is available in the cooling or fan only modes). When cooling is required, reheat will be controlled to the Cooling Discharge Air Temperature Setpoint. When cooling nor heating is required, reheat will be controlled to the Dehumidification Discharge Air Temperature Setpoint.

Passive Dehumidification

Passive dehumidification can be field-enabled on constant air volume units with space humidity sensors, but without reheat coils. Passive dehumidification can be used to reduce the supply fan speed when the unit is cooling and the space humidity is above the dehumidification setpoint.

Dehumidification Initiation

If the Dehumidification Source is Outdoor, dehumidification will be initiated based on the outdoor humidity sensor value. If the Dehumidification Source is Space, dehumidification will be initiated based on the space humidity sensor value. If the Dehumidification Source is Outdoor and Space, dehumidification will be initiated based on an average of the space and outdoor humidity sensor values. The unit may be set up to dehumidify based on relative humidity or dewpoint. Humidity sensors are configured in the Dehumidification Set-Up menu.

- Relative Humidity:
  When configured for relative humidity, the basis of dehumidification will be determined by the measured relative humidity.
- Dewpoint:
  When configured for dewpoint, the basis of dehumidification will be determined by the calculated space dewpoint.

Dehumidification Operation

Single Compressor

When dehumidification is active the Compressor-1 output will be energized. Reheat will be controlled as described in the "Reheat Control" section.

Two or Four Compressors

If the Compressor Stages is 2, or the LCT Sensor Type Parameter is single probe, when dehumidification is active the Compressor-1 and Compressor-2 outputs will be staged on and off to maintain the leaving coil temperature setpoint, subject to compressor minimum ON/OFF times and the cooling interstage time. The Compressor-3 and Compressor-4 outputs will not be used. When Compressor Stages is 4 and the LCT Sensor Type Parameter is averaging, when dehumidification is required, the controller will use a PI control to stage the 4 compressor stages to the maintain the leaving coil temperature setpoint.

Reheat will be controlled as described in the Reheat Control section.

D-Kit Compressor

For units with D-Kit compressors, the D-Kit is responsible for controlling both the cooling and reheat in dehumidification. When Dehumidification is active, the DX coil will be controlled to the leaving coil temperature setpoint and the Rh coil will be controlled to the Active Discharge Air Temperature setpoint.

Two-Position ON/OFF Chilled Water Valve

When dehumidification is active the two-position Chilled Water Valve will be open. Reheat will be controlled as described in the "Reheat Control" section.

Modulating Chilled Water Valve

When dehumidification is active the Chilled Water Valve will be modulated open or closed to maintain the leaving coil temperature setpoint. Reheat will be controlled as described in the "Reheat Control" section.

Reheat Control

Single Stage Electric Heat / Two-Position ON/OFF Hot Water Valve

When dehumidification is active the Electric Heat will be on or the Hot Water Valve will be open when the discharge air temperature is below the Dehumidification Discharge Air Temperature Setpoint. The Electric Heat will be de-energized or the Hot Water Valve will be closed when the discharge air temperature is above the Dehumidification Discharge Air Temperature setpoint plus a 5°F differential. Electric heat staging is subject to the Heating Interstage Timer.

Four Stage / SCR / Modulating Valve

When dehumidification is active the Electric Heat/Valve outputs will be used to maintain the Dehumidification Discharge Air Temperature setpoint. Electric Heat staging is subject to the Heating Interstage Timer.

Changeover Valve

Two-Position Chilled Water Valve

In units equipped with a two-position changeover valve, when cooling or heating is required, the changeover valve will be open. The face and bypass damper will be modulated to control the discharge air temperature. When cooling or heating is no longer required, the changeover valve will be closed.

Modulating Changeover Valve

In units equipped with a modulating changeover valve, the controller will use PI control to modulate the valve open and closed.

If the Supply Fan Control is “Constant Speed”, the PI loop will modulate to control to space temperature. If the Supply Fan Control is “Duct Static Pressure” or “Single Zone VAV” the PI loop will modulate to control discharge air temperature to the Cooling/ Heating Discharge Air Temperature Setpoint.

Entering Water Temperature Sampling

In units equipped with a modulating changeover valve, when there is a call for heating or cooling, the valve will open (20% if modulating and 100% if two-position) and the Entering Water Sample Timer will begin to count down. The controller will monitor the entering water temperature to determine if the water is adequate for heating or cooling. If the Entering Water Sample Timer expires and the water temperature is not deemed adequate for the mode of operation, the changeover valve will close and a notification will be provided to the BAS and at the local keypad. If the desired mode of operation is heating, electric heat will be used if it is available. That mode of operation will be locked out for the duration of the Entering Water Retry Timer. The entering water will be deemed adequate if the Entering Water Temperature is greater than the Control Temperature + Entering Water Temperature Differential for heating or if the Entering Water Temperature is less than the Control Temperature - Entering Water Temperature Differential for cooling.

Freezestat

When a unit is equipped with chilled water, hot water, or steam coil, a freeze problem occurs when the optional Freezestat contacts open as a result of detecting an abnormally low water or steam coil temperature.

When the freeze problem occurs, the controller opens the chilled water and heating valves. If the freezestat contacts are closed, the valves return to normal operation.

Outside Air Damper

Outside Air Damper Operation

Units may be configured with a two-position Outdoor Air (OA) Damper or a 0% - 100% OA Economizer. During occupied normal operation, units with a 0% - 100% OA economizer damper control to a minimum outdoor air position, which is a fixed value or optionally determined by space CO2.

Two-Position Outside Air Damper Operation

Two-position actuators are controlled by an analog output so the OA damper is driven to 100% open position when the OA damper analog output is at its maximum value, and it is driven closed when the OA damper analog output is at its minimum value. Units equipped with a two-position OA damper open when the fan is running and close when it is not running. The damper will be closed when the fan is running in the standby/unoccupied modes. For DOAS applications, the outside air damper should be configured for a 2 position damper.

Closed Operation

In the occupied mode in the Off unit state the OA damper position is always closed. In the unoccupied mode the outdoor air damper is always closed, and in standby mode the damper is closed unless overridden by DCV or Economizer functionality.

Minimum Outside Air Damper Control

When a unit is equipped with a modulating economizer damper the effective minimum OA position is set to a fixed value.

For units equipped with an optional space C02 sensor for demand-controlled ventilation (DCV), this minimum position will be automatically adjusted based on comparing the space C02 levels to a C02 setpoint.

The damper will be at minimum position when the CO2 level is at or below the MinOACO2 value, and the damper will be at maximum position when the CO2 level is at or above the MaxOACO2 value.

Economizer Control

Economizer Operation

On units equipped with a 0% - 100% Outside Air Economizer, if the outdoor air is suitable for free cooling and the control temperature is above the Occupied Cooling Setpoint, the unit will attempt to satisfy the cooling load by entering the Econo State; thereby, the unit uses only outdoor air via the Economizer before it uses mechanical cooling.

If mechanical cooling is available and the unit has been in the Econo operating state longer than the economizer interstage timer (indicating that the economizer is unable to satisfy the cooling load), the transition from the Econo state to the Econo-Cool state will occur.

When the unit state is Econo state, and the MOD option is selected, the OAD will be at maximum position (100% OPEN).

When the unit state is Econo state, and the DAT-MOD option is selected, the OAD is modulated up (20% - 100% OPEN) until the control temperature is at or below the Occupied Cooling Setpoint or a state transition from Econ to Econo-Cool occurs.

NOTICE

A DAT sensor is required to select the DAT-MOD option.

When the unit state is Econo-Cool state, the OAD will be at maximum position (100% OPEN) for both MOD and DAT-MOD options.

The economizer changeover method will be preprogrammed based on the sensors shipped with the unit, but may need to be reconfigured in the field to match the desired sequence of operations.

0% - 100% Outside Air Economizer Operation

A 0% - 100% outdoor air economizer damper is controlled by a modulating analog output. This actuator is driven to its fully open position - nominally 100%, when the OA damper analog output is at its maximum value, and it is closed when the OA damper analog output is at its minimum value. The desired minimum open position between 0 and 100% is normally set by an editable keypad menu item (Min OA Pos). The modulating damper is driven to the closed position when the supply fan is OFF. The modulating damper is driven to the desired minimum open position when the fan is running and the economizer is not required. Control of the dampers in the Economizer state is described in “Economizer” on page 44.

Fixed Dry Bulb Economizer

All units equipped with a Fixed Dry Bulb Economizer can be configured to determine if the outdoor air is suitable for free cooling by using a single, fixed outdoor air dry bulb setpoint. When the outdoor air temperature is below this setpoint, the economizer is available.

Comparative Dry Bulb Economizer

Units equipped with a Comparative Dry Bulb Economizer determine the outdoor air is suitable for free cooling by comparing the control temperature with the outdoor air temperature.

Fixed Outdoor Enthalpy Economizer

Units equipped with a Fixed Outdoor Enthalpy Economizer can be configured to determine if the outdoor air is suitable for free cooling by using a single, fixed outdoor air enthalpy setpoint. When the outdoor air enthalpy is below this setpoint, the economizer is available.

Comparative Energy/Enthalpy Economizer

Some units are equipped with a Comparative Energy Economizer. A Comparative Energy/Enthalpy Economizer determines if the outdoor air is suitable for free cooling by comparing the energy enthalpy of the outdoor air and return air with the energy needed for cooling to meet the DAT or Zone Setpoint. There are four operating cases the MicroTech controller compares to evaluate energy efficient economizer control. These cases are summarized in Table 17 The economizer logic evaluates if free cooling is more energy efficient by comparing the Return air dew point against the DAT Spt – an Offset. The offset is to account for fan heat or other factors that move the discharge air away from the saturation line. The default offset is 0.0°F.

Table 17: Energy/Enthalpy Economizer Offsets

	Economize Decision Matrix	**Outside Air Dewpt (DP2)**	
		> DAT Stpt - Offset (DB3)	**< DAT Stpt - Offset (DB3)**
Return Air Dewpt (DP1)	> DAT Stpt - Offset (DB3)	Case 1 Economize if h2 < Rh1	Case 2 Economize if 0.245*(DB2 - DB3) < (h1 - h3)
	< DAT Stpt - Offset (DB3)	Case 3 Economize if 0.245*(DB1 - [DB3 - Offset]) < (h2 - h3)	Case 4 Economize if DB2 < DB1

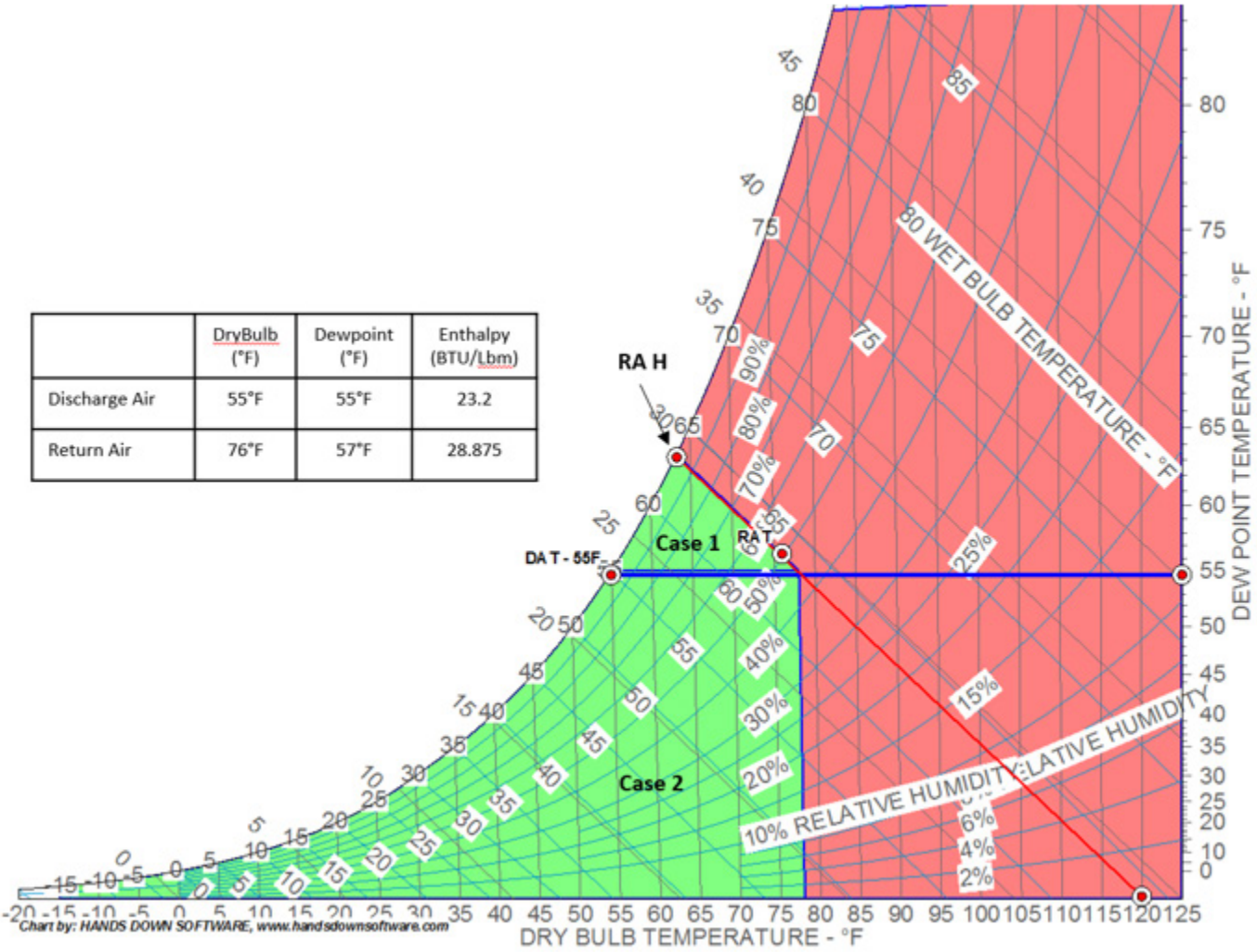
NOTE 1: A key assumption of this table is that DAT setpoint is at saturation and therefore equal to the DAT dew point. This is not always the case. An offset will need to be subtracted to cover the various applications like remote mounted DAT sensors. The DAT offset should be between 0-10°F.

NOTE 2: Case 2 and Case 3 use simplified formulas for sensible heat transfer rates ($q = m \times Cp \times \Delta T$, where m = mass flow rate of the air, Cp = 0.245 BTU/lbm °F, ΔT is the change in dry bulb temperature [°F]) and total heat transfer ($q = m \times \Delta h$, where m = mass flow rate of the air, Δh is the change in enthalpy).

Case 1 and 2

The light blue row in Table 17 is represented by Figure 17 The green shaded areas of this chart represents outdoor air conditions where economizing is allowed to occur for Cases 1 and 2. Cases 1 and 2 are only valid for cases where the return air dew point is greater than the discharge air setpoint dew point.

Figure 17: Case 1 and 2

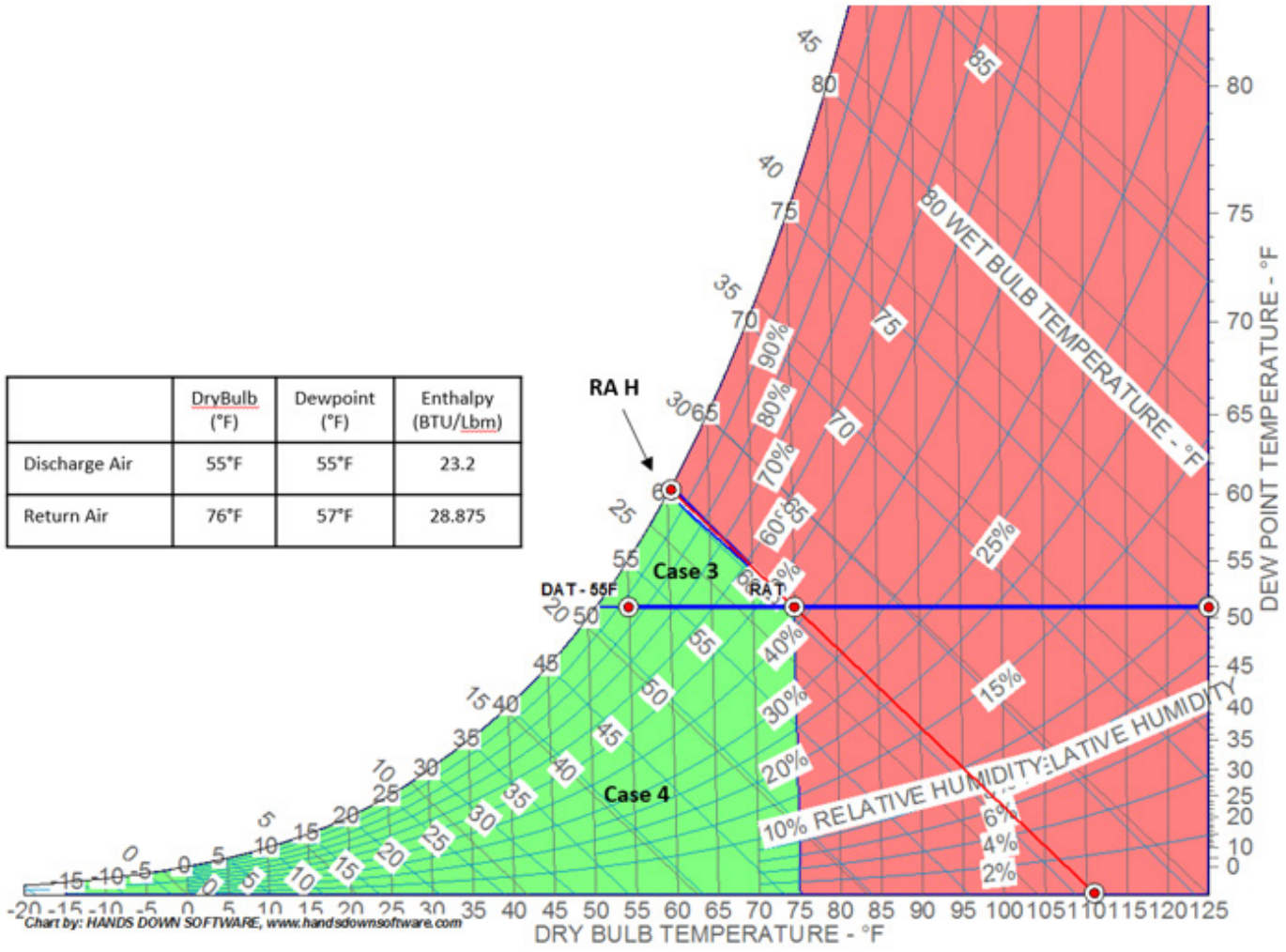


	DryBulb (°F)	Dewpoint (°F)	Enthalpy (BTU/Lbm)
Discharge Air	55°F	55°F	23.2
Return Air	76°F	57°F	28.875

Case 3 and 4

The light red row in Table 17 on page 36 is represented by Figure 18 below. The shaded greed areas of this chart represent the Outdoor air conditions where economizing is allowed to occur for Cases 3 and 4. Cases 3 and 4 are valid if the Return air dew point is less than the discharge air setpoint less the offset.

Figure 18: Case 3 and 4



	DryBulb (°F)	Dewpoint (°F)	Enthalpy (BTU/Lbm)
Discharge Air	55°F	55°F	23.2
Return Air	76°F	57°F	28.875

OA Temperature Lockout

Units with the optional OA Temperature Lockout enabled, the OA damper will be closed when the OA temperature drops below the OAT Lockout setpoint.

Return Air Damper Operation (Unit Sizes 060-100)

On units with a separate dedicated return air damper actuator (sizes 060-100), return air damper output will vary between the return air damper minimum position value and the return air damper maximum position value directly proportional to the OA damper output as it varies between the OA damper minimum position value and the OA damper maximum position value.

Outdoor Air Damper Output Scaling

The signal sent to the outdoor damper actuator to control its position can be scaled based on the calculated outdoor damper position percentage. If the Outdoor Air Damper Output Scaling parameter is set to linear, the output signal will be directly related to the calculated outdoor air damper position percentage. If the Outdoor Air Damper Output Scaling parameter is set to Squared, the output will be scaled to the calculated percentage (%) by the following equation:

Outdoor Air Damper Output = (Calculated %^2)/1000

Return Air Damper Output Scaling

The signal sent to the return air damper actuator to control its position can be scaled based on the calculated outdoor damper position percentage. If the Return Air Damper Output Scaling parameter is set to linear, the output signal will be directly related to the calculated outdoor air damper position percentage. If the Return Air Damper Output Scaling parameter is set to Squared, the output will be scaled to the calculated % by the following equation:

Outdoor Air Damper Output = (Calculated %^2)/1000

Economizer Fault Detection Diagnostics

The economizer fault detection and diagnostics function provides a warning alarm indication of over economizing, under economizing, stuck dampers and excess outdoor air.

OAD End Switch Calibration

On units equipped with economizer fault detection and diagnostic capabilities, the Outdoor Air Damper (OAD) End Switch input requires calibration function that captures the command position, at which the switches open and close at the closed and open ends of the damper modulation range. This function consists of a manually initiated sequence that strikes the dampers fully open, then fully closed, and detects the changes of state of the switch input and records the points where changes occur. The sequence must be initiated while the Unit State is Off and starting with the end switch input in the closed position.

When the Calibrate OAD parameter is set from No to Yes, the following sequence occurs:

1. The damper command is increased 1% every 2 seconds until the OAD End Switch opens.
2. The damper command is then be decreased 1% every 2 seconds until the OAD End Switch input closes. At this point the current command % is captured.
3. The damper command is increased 1% every 2 seconds until the OAD End Switch input opens. At this point the difference between the current command % and the damper end switch closed value is captured.
4. The damper command is increased and held at 100% until the OAD End Switch input closes.
5. The damper command is decreased 1% every 2 seconds until the OAD End Switch input opens.
6. The damper command is increased 1% every 2 seconds until the OAD End Switch input closes. At this point the current command % is captured.
7. The damper command is decreased 1% every 2 seconds until the OAD End Switch input opens. At this point the difference between the damper open end switch value and the current command % value is captured.
8. The damper command is decreased and held at 0% until the OAD End Switch input closes at which point the values captured in Step 2, Step 3, Step 6, Step 7 are written to the damper end switch open (posSwOpen%). Minimum switch differential (MinSwDiff), damper end switch closed (PosSwClose%) and maximum switch differential (MaxSwDiff) parameters respectively.

Calibrate OAD= parameter is then be set back to No and normal unit operation resumes.

View Status

Table 18: Main Menu \ View Status

Menu Display Name	Default	Range	Description
Unit State=	-	OFF HEAT COOL ECONO ECONO_COOL DEHUMID FAN_ONLY OVERRIDE TEST	See "Unit State" on page 28.
Ctrl Mode =	Off	AUTO HEAT COOL FAN_ONLY OFF	Cntrl Mode is an adjustable item which sets the occupancy mode of the unit. The unit can be Heat Only, CoolOnly, Fan Only, Automatic, or Off.
Occ Mode=	Auto	OCCUPIED UNOCCUPIED BYPASS STANDBY AUTO	Occ Mode is an adjustable item that sets the occupancy mode for manual occupied, standby, and unoccupied operation, or for automatic operation based on a time schedule input, or manual tenant override (bypass) operation.
Room Sensor On/Off=	On	ON OFF	Room Sensor On/Off is a status only item that indicates the status of the on/off input from the integrated thermostat.

Unit Status/Settings

Table 19: Main Menu \ View Status \ Unit Status\Settings

Menu Display Name	Default	Range	Description
Unit State=	-	OFF HEAT COOL ECONO, ECONO_COOL DEHUMID FAN_ONLY OVERRIDE TEST	Unit State is a status only item which indicates the state of unit operation in which the unit is currently operating. The unit can be in any of the operating states shown.
Ctrl Mode=	Off	AUTO HEAT COOL FAN_ONLY OFF	Cntrl Mode is an adjustable item which sets the occupancy mode of the unit.
Comp Status=	-	UNAVAIL AVAIL	Comp Status is a status only item which indicates whether or not compressor cooling is currently allowed.
Pri El Heat Avail=	-	UNAVAIL AVAIL	Pri El Heat Avail is a status only item which indicates if the primary electric heating is available.
Sup El Heat Avail=	-	UNAVAIL AVAIL	Sup El Heat Avail is a status only item which indicates if the supplemental electric heating is available.
Electric Heat Avail=	-	UNAVAIL AVAIL	Electric Heat Avail is a status only item which indicates whether or not electric heating is currently allowed.
Econo Status=	-	UNAVAIL AVAIL	Econo Status is a status only item which indicates whether or not the economizer is currently enabled.
CW Valve Pos=	-	0% - 100%	CW Valve Pos is a status only item which indicates the percentage that the modulating chilled water valve is currently open.
CW Valve Pos=	-	INACTIVE ACTIVE	CW Valve Pos is a status only item which indicates the condition of the two position chilled water valve output.
Comp Stg 1 =	-	INACTIVE ACTIVE	Comp Stg 1 is a status only item which indicates the condition of the compressor stage 1 output.
Comp Stg 2 =	-	INACTIVE ACTIVE	Comp Stg 2 is a status only item which indicates the condition of the compressor stage 2 output.
Comp Stg 3 =	-	INACTIVE ACTIVE	Comp Stg 3 is a status only item which indicates the condition of the compressor stage 3 output.
Comp Stg 4 =	-	INACTIVE ACTIVE	Comp Stg 4 is a status only item which indicates the condition of the compressor stage 4 output.
HW Valve Pos=	-	0% - 100%	HW Valve Pos is a status only item which indicates the percentage that the hot water valve is currently open.
SCR Output=	-	0% - 100%	SCR Output is a status only item which indicates the current capacity of the SCR electric heater.
HW Valve Pos=	-	INACTIVE ACTIVE	HW Valve Pos is a status only item which indicates the condition of the two position hot water valve output.
Htg Stg 1 =	-	INACTIVE ACTIVE	Htg Stg 1 is a status only item which indicates the condition of the electric heat stage 1 output.
Htg Stg 2 =	-	INACTIVE ACTIVE	Htg Stg 2 is a status only item which indicates the condition of the electric heat stage 2 output.

Menu Display Name	Default	Range	Description
Htg Stg 3 =	-	INACTIVE ACTIVE	Htg Stg 3 is a status only item which indicates the condition of the electric heat stage 3 output.
Htg Stg 4 =	-	INACTIVE ACTIVE	Htg Stg 4 is a status only item which indicates the condition of the electric heat stage 4 output.
SAF Capacity=	-	0% - 100%	SAF Capacity is a status only item which indicates the current capacity of the supply air fan.
SAF DSP Spt=	-	0% - 100%	SAF DuctSP Spt is a status only item which indicates the supply fan duct static pressure setpoint. The SAF is modulated with a PI_Loop to maintain this setpoint.
EF Capacity=	-	0% - 100%	EF Capacity is a status only item indicated the current capacity of the exhaust fans.
OAD Position=	-	0% - 100%	OAD/Economizer Cap is a status only item which indicates the percentage that the outdoor air damper is currently open.
OA Rel Hum=	-	0% - 100%	OA Rel Hum is a status only item that indicates the current outdoor air relative humidity reading.
Space Rel Hum =	-	0% - 100%	Space Rel Hum is a status only item that indicates the current space relative humidity reading.
Space Dew Point =	-	0°F - 100°F	Space Dew Point is a status only item that indicates the current calculate space dewpoint.

Occupancy Menu

Table 20: Main Menu \ View Status \ Occupancy

Menu Display Name	Default	Range	Description
Occupancy=	-	Occupied Unocc Bypass Standby	Occupancy is a status only item that displays the current occupancy status. Occupancy can be one of four values, Occupied, Unoccupied, Bypass and Standby.
Occ Mode=	AUTO	Occupied Unocc Bypass Standby Auto	Occ Mode is an adjustable item that sets the occupancy mode for manual occupied, standby, and unoccupied operation, or for automatic operation based on a time schedule input, or manual tenant override (bypass) operation.
NetOccManCmd=	NULL	Occupied Unocc Bypass Standby Null	NetOccManCmd is network adjustable item that indicates occupancy mode for manual occupied, standby, and unoccupied operation, or manual tenant override (bypass) operation via a network signal.
NetCurrState=	NULL	Occupied Unocc Standby Null	NetCurrState is network adjustable item that indicates occupancy mode for scheduled occupied, standby, and unoccupied operation, or manual tenant override (bypass) operation via a network signal.
Scheduled Occ=	NULL	Null Unocc Occupied	Occupancy is a status only item that displays the current occupancy status of the internally programmed schedule.
Tnt OR Tm Spt=	120	0-480 Minutes	Tnt OR Tm Spt is an adjustable item that sets the amount of time the unit will be in the bypass mode when initiated by a tenant override input.
Tnt OR Time=	-	0-480 minutes	Tnt OR Time is a status only item that displays the remaining amount of time the unit will be in the bypass mode.
Tnt Override=	-	INACTIVE ACTIVE	Tnt Override is a status only item that indicates if tenant override is active.

Date/Time/Schedules Menu

Table 21: Main Menu \ View Status \ Date/Time/Schedule

Menu Display Name	Default	Range	Description
Time=	-	0-23:0-59:0-59	Time: is an adjustable item that sets the current time (Hr:Mn:Sec)
Date=	-	1-12/0-31/1970-9999	Date is an adjustable item that sets the current date. (M/D/Y)
UTC Diff=	-60 min	-1560	UTC Diff is an adjustable parameter that can be set to indicate how the load time where the unit is situated differs from the Coordinated Universal Time.
DAILY SCHEDULE			
Mon= Tue= Wed= Thu= Fri= Sat= Sun= Hol=	HH:MM – HH:MM	HH:MM – 23:59	The Daily Schedule sets the start and stop times for each of the days of the week. One start and one stop time can be set for each day.

Menu Display Name	Default	Range	Description
HOLIDAY DATES			
Hol 1=	MMMD-D/**-MMMDD/**	MMMD-D/**-DEC31/99	The Holiday Schedule is used to set the start and stop times for up to 10 different holidays.
Hol 2=			
Hol 3=			
Hol 4=			
Hol 5=			
Hol 6=			
Hol 7=			
Hol 8=			
Hol 9=			
Hol 10=			
ONE EVENT SCHEDULE			
Beg=	MMMDD/** @ HH:MM	MMMD-D/**-DEC31/99 @ HH:MM – 23:59	The One Event Schedule is used to set the start and stop times for one event.
End=			
DAYLIGHT SAVINGS			
DLS Strt Month=	Mar	NA	DLS Strt Mon is an adjustable item that sets the month for daylight savings time to begin.
		Jan-Dec	
DLS Strt Week=	2ndWeek	1st-Week-5thWeek	DLS Strt Week is an adjustable item that sets the week of the month for daylight savings time to begin.
DLS End Month=	Nov	NA	DLS End Mon is an adjustable item that sets the month for daylight savings time to end.
		Jan-Dec	
DLS End Week=	1stWeek	1st-Week-5thWeek	DLS End Week is an adjustable item that sets the week of the month for daylight savings time to end.
DLS Enable=	Auto	Off/Auto	DLS Enable is an adjustable item that sets whether or not daylight savings time is enabled.
Schedule Source=	NULL	OneEvent	Schedule Source is a status only item which indicates the input source or function that is responsible for setting the Scheduled Status internal schedule occupancy parameter.
		Holiday	
		Daily	
		NULL	
Schedule Status=	Null	Null	Schedule Status is a status only item that displays the current occupancy status provided by the internal schedule displayed in Schedule Source.
		Unocc	
		Occ	

Menu Display Name	Default	Range	Description
One Event Status=	Null	Null	One Event Status is a status only item that displays the current occupancy status provided by the one event schedule.
		Unocc	
		Occ	
Holiday Status=	Null	Null	Holiday Status is a status only item that displays the current occupancy status provided by the holiday schedule.
		Unocc	
		Occ	
Daily Status=	Null	Null	Daily Status is a status only item that displays the current occupancy status provided by the daily schedule.
		Unocc	
		Occ	

Date/Time Menu

Table 22: Main Menu \ View Status \ Date/Time

Menu Display Name	Default	Range
Time=	-	0-23:0-59:0-59
Date=	-	1-12/0-31/1970-9999
UTC Diff=	-60	-
DAYLIGHT SAVINGS		
DLS Strt Month=	Mar	Jan-Dec
DLS Strt Week=	2ndWeek	1stWeek
		2ndWeek
		3rdWeek
		4thWeek
		5thWeek
DLS End Month=	Nov	Jan-Dec
DLS End Week=	1stWeek	1stWeek
		2ndWeek
		3rdWeek
		4thWeek
		5thWeek
DLS Enable=	Auto	Off
		Auto

SAF Control

The SAF Control Menu displays the fan operation and the relevant current control parameters.

Table 23: Main Menu \ View Status \ SAF Control

Menu Display Name	Default	Range	Description
Supply Fan=	-	DISABLED	Supply Fan is a status only item which indicates the status of the supply air fan.
		ENABLED	
SAF Capacity=	-	0% - 100%	SAF Capacity is a status only item which indicates the current capacity of the supply air fan.

Menu Display Name	Default	Range	Description
SAF Duct-Press=	-	0.0 in - 5.0 in	SAF DuctSP Spt is an adjustable item which sets the supply fan duct static pressure setpoint. The SAF is modulated with a PI_Loop to maintain this setpoint.
EF Capacity=	-	0% - 100%	EF Capacity is a status only item which indicates the current capacity of the exhaust fans.
Airflow=	-	NO_FLOW FLOW	Airflow is a status only item which indicates the output from the optional airflow proving switch.
Mn El Ht Fn Spd=	-	0% - 100%	Mn El Ht Fn Spd is a status only item which indicates the minimum supply fan speed command based on active electric heat capacity.

Cooling

Table 24: Main Menu \ View Status \ Cooling

Menu Display Name	Default	Range	Description
CW Valve Pos=	-	0% - 100%	CW Valve Pos is a status only item which indicates the percentage that the modulating chilled water valve is currently open.
ChgOvr Valve Pos=	-	0% - 100%	ChgOvr Valve Pos is a status only item which indicates the percentage that the modulating changeover water valve is currently open.
CW Valve Pos=	Off	INACTIVE ACTIVE	CW Valve Pos is a status only item which indicates the condition of the two position chilled water valve output.
ChgOvr Valve Pos=	-	INACTIVE ACTIVE	ChgOvr Valve Pos is a status only item which indicates the condition of the two position changeover valve output.
Comp Status=	-	-	Comp Status is a status only item which indicates whether or not compressor cooling is currently allowed.
Comp Stg 1 =	-	INACTIVE ACTIVE	Comp Stg 1 is a status only item which indicates the condition of the compressor stage 1 output.
Comp Stg 2 =	-	INACTIVE ACTIVE	Comp Stg 2 is a status only item which indicates the condition of the compressor stage 2 output.
Comp Stg 3 =	-	INACTIVE ACTIVE	Comp Stg 3 is a status only item which indicates the condition of the compressor stage 3 output.
Comp Stg 4 =	-	INACTIVE ACTIVE	Comp Stg 4 is a status only item which indicates the condition of the compressor stage 4 output.

Dehumidification

Table 25: Main Menu \ View Status \ Dehumidification

Menu Display Name	Default	Range	Description
Dehum Status=	-	UNAVAIL PASSIVE_AVAIL ACTIVE_AVAIL	Dehum Status is a status only item which indicates whether or not dehumidification is currently allowed.
Primary Dehumid=	-	DISABLE ENABLE	Status only item that indicates if dehumidification is active while in the cooling or heating state.
Indoor Rel Hum=	-	0% - 100%	Indoor Rel Hum is a status only item that indicates the current space relative humidity value being used by the controller. This will be the network supplied relative humidity if available or the input from the space relative humidity sensor.
Indoor Dew-point=	-	0°F - 100°F	Indoor Dew Point is a status only item that indicates the current calculate space dewpoint.
LC Temp=	-	-40°F - 212°F	LC Temp is a status only item which displays the current temperature reading from the unit's leaving coil temperature sensor.
Supply Temp=	-	-40°F - 212°F	Supply Temp is a status only item which displays the current temperature reading from the unit's discharge air temperature sensor (DAT).
Fan Speed=	-	0% - 100%	Fan Speed is a status only item which indicates the current capacity of the supply air fan.

Heating

Table 26: Main Menu \ View Status \ Heating

Menu Display Name	Default	Range	Description
HW Valve Pos=	-	0% - 100%	HW Valve Pos is a status only item which indicates the percentage that the hot water valve is currently open.
HW Valve Pos=	-	INACTIVE ACTIVE	HW Valve Pos is a status only item which indicates the condition of the two position hot water valve output.
Htg Stg 1 =	-	INACTIVE ACTIVE	Htg Stg 1 is a status only item which indicates the condition of the electric heat stage 1 output.
Htg Stg 2 =	-	INACTIVE ACTIVE	Htg Stg 2 is a status only item which indicates the condition of the electric heat stage 2 output.
Htg Stg 3 =	-	INACTIVE ACTIVE	Htg Stg 3 is a status only item which indicates the condition of the electric heat stage 3 output.

Menu Display Name	Default	Range	Description
Htg Stg 4 =	-	INACTIVE ACTIVE	Htg Stg 4 is a status only item which indicates the condition of the electric heat stage 4 output.
SCR Output=	-	0% - 100%	SCR Output is a status only item which indicates the current capacity of the SCR electric heater.
All Htg Maxed=	-	INACTIVE ACTIVE	All Htg Maxed is a status only item which indicates if the all heating sources are at full capacity.
Pri Htg Maxed=	-	INACTIVE ACTIVE	Pri Htg Maxed is a status only item which indicates if the primary heating sources are at full capacity.

Economizer

Table 27: Main Menu \ View Status \ Economizer

Menu Display Name	Default	Range	Description
OAD Position=	-	0% - 100%	OAD Position is a status only item which displays the current OAD position.
Min OA Pos=	-	0% - 100%	Min OA Pos is an adjustable item which indicates the minimum position of the outdoor damper while the fan is running. The actual OAD damper position will vary between this value and the Max OA Pos depending on economizer and DCV requirements
FreeClg-Status=	-	UNAVAIL AVAIL	Free Clg Status is a status only item that indicates whether airside economizer free cooling is available or unavailable based on a definable ambient temperature range.

Temperatures

Table 28: Main Menu \ View Status \ Temperatures

Menu Display Name	Default	Range	Description
Control Temp=	-	-40°F - 212°F	Control Temp is a status only item which displays the current value of the Control Temperature. The Control Temperature is defined as the temperature input selected by the Control Temperature Source parameter.
Disch Air=	-	-40.0°F - 212.0°F	Disch Air is a status only item which displays the current temperature reading from the unit's discharge air temperature sensor (DAT).
Return Air=	-	-40.0°F - 212.0°F	Return Air is a status only item which displays the current temperature reading from the unit's return air temperature sensor (RAT).
EffSpaceT=	-	-40.0°F - 212.0°F	EffSpaceT is a status only item which displays the current space temperature value being used by the controller. This will be the network supplied space temperature if available or the input from the integrated thermostat.
RsSpaceT=	-	-40.0°F - 212.0°F INVALID	RsSpaceT= is a status only item which displays the current space temperature value being provided by the integrated thermostat.
Space Temp=	-	-40.0°F - 212.0°F INVALID	Space Temp is a status only item which displays the current temperature reading from a space temperature sensor. Up to 3 sensors can be attached to the unit.
OA Temp=	-	-40.0°F - 212.0°F	OA Temp is a status only item which displays the current temperature value being used by the controller. This will be the network supplied space temperature if available or the input from the outdoor air temperature sensor.
LC Temp=	-	-40.0°F - 212.0°F	LC Temp is a status only item which displays the current leaving coil temperature reading from the unit mounted temperature sensor. This sensor is available on AHU units with dehumidification capability. This sensor is also installed on AHU units equipped with electric heat and is used by the controller to calculate the heat rise across the heat exchanger by comparing it to the discharge air temperature input. The controller uses this information to protect the heat exchanger against overheating.
EWT=	-	-40.0°F - 212.0°F	EWT is a status only item which displays the current entering water temperature value being used by the controller. This will be the network supplied entering water temperature if available or the input from the entering water temperature sensor.
Ent Unit T=		-4.0°F - 140.0°F	Ent Unit T is a status only item which displays the current temperature reading from unit's entering unit temperature sensor (EUT) connected to the D-Kit controller.
Indoor Temp=	-	-40.0°F - 212.0°F	Status only item that indicates the current indoor air temperature, depending on Ctrl Temp Src.

IAQ Status

Table 29: Main Menu \ View Status \ IAQ Status

Menu Display Name	Default	Range	Description
EffSpac-eT=	-	-40°F - 212°F	Space Temp is a status only item which displays the current space temperature value being used by the controller. This will be the network supplied space temperature if available or the input from the integrated thermostat.
Indoor Rel Hum=	-	0% - 100%	Indoor Rel Hum is a status only item that indicates the current space relative humidity value being used by the controller. This will be the network supplied relative humidity if available or the input from the space relative humidity sensor.
Indoor Enthalpy=	-	-200 - 200 BTU/#	Indoor Enthalpy is a status only item that indicates the current calculated indoor enthalpy.
Indoor Dwpnt=	-	0°F - 100°F	Indoor Dwpnt is a status only item that indicates the current calculated indoor dewpoint.
Outdoor Rel Hum=	-	0% - 100%	Outdoor Rel Hum is a status only item that indicates the current outdoor relative humidity value being used by the controller. This will be the network supplied relative humidity if available or the input from the outdoor relative humidity sensor.
Outdoor Enthalpy=	-	-200 - 200 BTU/#	Outdoor Enthalpy is a status only item that indicates the current calculated outdoor enthalpy.
CO2 PPM=	-	0-3000 ppm	CO2 PPM is a status only item that indicates the current space CO2 concentration being used by the controller. This will be the network supplied CO2 concentration if available or the input from the space CO2 sensor.
Supply Air=	-	-40°F - 212°F	Supply Air is a status only item which displays the current temperature reading from the unit's discharge air temperature sensor (DAT).
Return Air=	-	-40°F - 212°F	Return Air is a status only item which displays the current temperature reading from an optional return air temperature sensor.

Energy Recovery

Energy Recovery is provided by drawing outside air across half of an energy recovery wheel and drawing exhaust air across the other half. As the wheel rotates, latent and sensible heat are transferred from the hotter, moister air stream, to the colder dryer air stream. In summer operation the direction of transfer is from the outdoor air to the exhaust air. In winter operation, the direction of transfer is from the warm exhaust air to the cold dry outdoor air. Control of the wheel consists of starting and stopping the wheel, and modulating the speed. The outdoor air dampers and supply and exhaust fans are controlled normally during wheel operation.

Energy Wheel Operation

The energy recovery wheel is turned on whenever the unit is in occupied mode, the exhaust fans are on, the OA dampers are at the minimum position, the unit is not in economizer mode, and the wheel has not been shut off due to frost prevention, Enthalpy override or capacity limiting control. Exhaust fans and outdoor air dampers are controlled to their normal states when equipped with energy recovery wheels.

When the energy recovery wheel is not running and the unit is Unoccupied or the Exhaust Fan is not running, the controller will periodically rotate the wheel to prevent the buildup of dust, dirt, and the accumulation of moisture that could lead to mold and bacterial growth.

- **Enthalpy Override:** During Cooling or Dehumidification operation, the MicroTech will evaluate if the energy wheel should be operating or if it is more energy efficient to bring outdoor air directly. Enthalpy override is decided by following the same cases as the energy economizer option except for Case 4 where the LWT must less than the RAT. Review Energy Economizer for details. Enthalpy override is true when the Clg/DHERWOvrdOff Flag is True. Once True this flag will be held true for at least the ERWStgTime before changing to false.
- **Heating Override:** During Heating, Fan Only, or MinDAT operation, if the energy recovery wheel heat transfer is in cooling, the wheel will shut off and the HtgERWOvrdOff flag will be set to true. Once True, this flag will be held true for at least the ERWStgTime before changing to false.

Energy Recovery Wheel Bypass

For units equipped with an energy recovery wheel, a bypass damper may be provided for economizer operation or Enthalpy or Heating override conditions. During economizer, enthalpy override, and heating override operation, the energy wheel is turned Off and the bypass damper is opened to bypass the outside air around the energy wheel. This lowers the total air pressure drop and increases the effectiveness of economizer operation.

Capacity Limiting

Energy wheel capacity limiting control is a means to limit the capacity of an energy wheel during part load conditions. Normally, wheels are sized for the worst case winter/summer load. Therefore, at part load the wheel may be oversized. Capacity limiting control is allowed when the energy recovery wheel leaving air temperature sensor is present and the outdoor air temperature is colder than the return air temperature.

- **Fan Only:** When the unit is in the Fan Only state, the energy recovery wheel is slowed down due to capacity limiting whenever the discharge air temperature (DAT) is above the MinDAT Limit set point by more than ½ the discharge air heating deadband. The wheel will modulate to maintain the DAT at the MinDAT Limit set point. If the DAT falls back below the MinDAT Limit set point plus the ½ discharge heating deadband, the wheel will modulate back to full speed.
- **Heating:** When the unit is operating in the Heating state, the energy recovery wheel is slowed down due to capacity limiting whenever all heating is OFF and the discharge air temperature (DAT) is above the discharge heating set point by more than ½ the discharge air heating deadband. The wheel will modulate to maintain the heating discharge air set point when all other heating is OFF and capacity limiting is active. The wheel is modulated back to full speed when the DAT falls back to or below the discharge heating set point plus ½ the discharge air heating deadband.
- **Cooling:** When the unit is operating in the Cooling state, the energy recovery wheel is slowed down due to capacity limiting whenever all cooling is OFF and the discharge air temperature is below the discharge cooling set point by more than ½ the discharge air cooling deadband. The wheel will modulate to maintain the cooling discharge air set point when all other cooling is OFF and the capacity limiting is active. The wheel is modulated back to full speed when the DAT falls back to or above the discharge cooling set point plus ½ the discharge air cooling deadband.

Energy Wheel Frost Prevention

Two different energy wheel frost prevention methods are provided depending on whether or not the unit is supplied with an electric or hot water preheat energy wheel defrost coil.

The Preheat method (Frost Method= Preheat) uses energy wheel defrost coil to raise the outdoor air temperature coming into the wheel to eliminate the frost potential. A second method (Frost Method= WhlSpd) slows the speed of the energy recovery wheel. This second method can be achieved by actively reducing and/or stopping the wheel so that less enthalpy transfer occurs.

When there is a threat of frost or condensation on the enthalpy wheel, a wheel with an electric or hot water preheat will be defrosted by modulating the electric or hot water preheat to raise the outdoor air temperature coming into the wheel to eliminate the frost potential. A variable speed wheel may be first slowed down, and then stopped so that less enthalpy transfer occurs and frosting or condensation on the energy wheel is avoided. In either case the frost control action will be based on a psychrometric intersection point.

Condensation and frosting on the energy recovery wheel is possible when the exhaust air leaving the wheel is saturated. Saturated exhaust air is only possible when the energy recovery psychrometric saturation process line between the indoor and outdoor design points intersect the psychrometric saturation curve. The two ends of the energy recovery process line will be the outdoor air temperature at 95% relative humidity and the return air temperature at the return air relative humidity. The process line example shown in Figure 19 depicts a process line that intersects the saturation curve. It intersects at two points, which indicates a potential for energy recovery wheel frosting.

The higher of the two points is the intersection point that will be used by the frost prevention functions. The curve that does not intersect indicates no potential for frosting.

Modulating Wheel Frost Prevention

Modulating wheel frost prevention is initiated when the exhaust air temperature leaving the wheel is below the intersection point, plus an adjustable minimum temperature difference. In the example shown in Figure 20, the exhaust air (EA) is significantly below the intersection point.

During modulating wheel frost prevention, the wheel is controlled to its minimum wheel speed (default 15%). When the wheel is at its minimum speed, the wheel effectiveness is reduced. The resulting exhaust air temperature during frost prevention (EAF) is warmer than the intersection point and frost is prevented. The leaving wheel temperature (LWF) during frost prevention is also reduced.

ERW Frost Prevention – Variable Wheel Speed

- Frost Method= WheelSpeed or Frost Method= Preheat
- Energy Recovery Preheat Max
  - Frost Method= Preheat and the preheat outputs are at maximum for the duration of the minimum time between energy recovery operational changes (ErStgTmSp=) before any wheel speed frost control occurs
- Energy Recovery Variable Speed Frost Control Enable
  - Variable Speed frost prevention is enabled when both of the following conditions are true:
    - ErConfig = VFDECM
    - Frost Method= WhlSpd or Energy Recovery Preheat Max
- Energy Recovery Variable Speed Override Minimum Capacity Command
  - The Energy Recovery Wheel is set to minimum capacity when ErVSOvrdMin is set to Enable (the Energy Recovery Wheel is limited to run at the min speed setpoint)
  - The Energy Recovery Wheel is set back to full capacity (100%) when ErVSOvrdMin is set to Disable
- Energy Recovery Variable Speed Override Off Command
  - ErStrtCmd is set to Off, and ErCapacity is set to 0%, when ErVSOvrdOff is set to Enabled

ERW Frost Prevention – Constant Speed

- Either Frost Method= WheelSpeed or both Frost Method= Preheat and ErPreheatMax= True
- Frost Prevention Constant Speed enabled
- ErConfig= OnOff
- Energy Recovery Wheel Constant Speed Override Off Calculation
  - ERW is stopped: ErCSOvrdOff= Enable
  - ERW is allowed to run: ErCSOvrdOff= Disable

Figure 19: Frost Prevention Curve

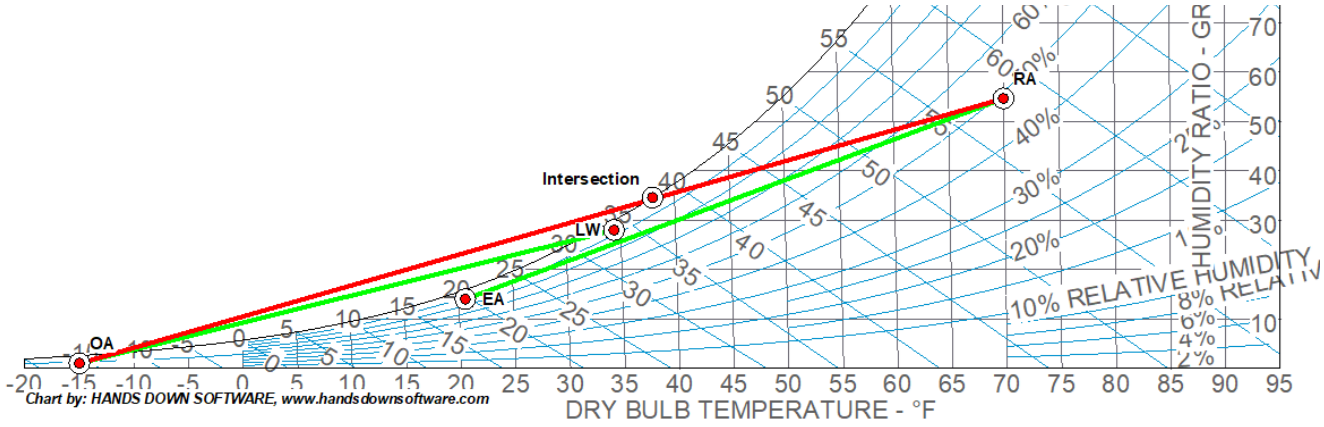
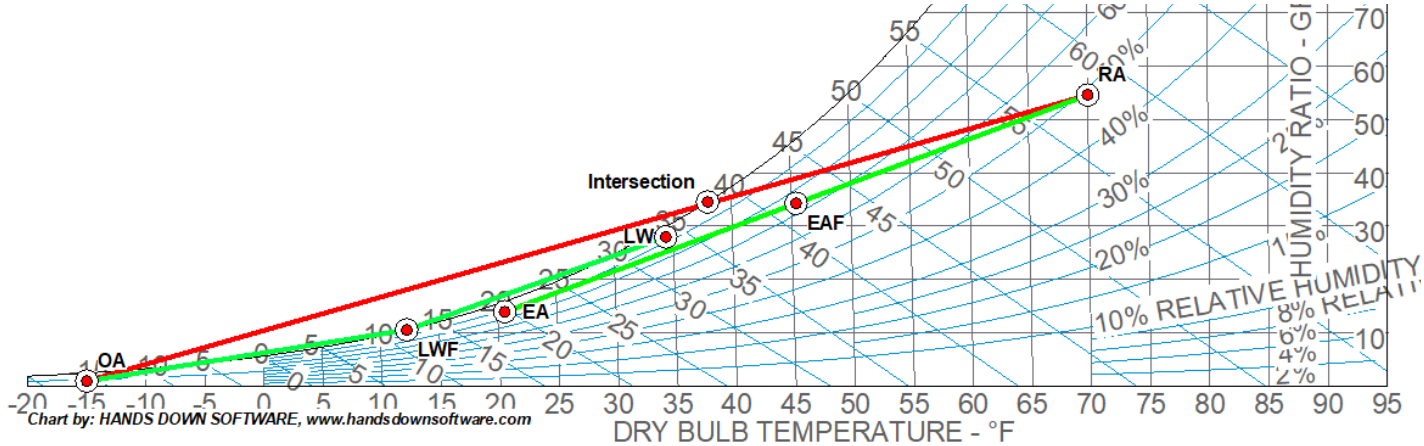


Figure 20: Modulating Wheel Frost Prevention Curve



Energy Recovery Defrost Control

This timed defrost method of frost management is available when the unit is equipped with a fixed speed wheel arrangement (ErConfig: OnOff). With this method the energy recovery wheel will be stopped periodically (pulsed) for a defrost time duration when the EffOAT is below an outdoor frost temperature threshold (ErFrstThldSp). See Table 30.

Energy Recovery Wheel Defrost Control – Timed Defrost (Pulsing)

The following applies when Frost Method= Timed:

- Timed Defrost is only allowed to run if ErConfig = OnOff.
- The controller calculates ErFrostThld based on the Return Air Temperature and Return Air Humidity using curve fit polynomials.
- If the Outdoor Air Temperature is less than or equal to the Frost Threshold, Timed Defrost becomes active.
- When Timed Defrost is active the controller performs an Energy Recovery Defrost Pulse Cycle.
- The Energy Recovery Defrost Pulse Cycle lasts for the duration of Energy Recovery Wheel Defrost Time.
- During the Energy Recovery Defrost Pulse Cycle, the boErOnOff output is energized for the duration of ErDfOnTmSp.
- During the Energy Recovery Defrost Pulse Cycle, the boErOnOff output is deenergized for the duration of ErDfOffTmSp.
- After the defrost cycle has run for the duration of EnErDfTimeSp, the Energy Recovery Wheel resumes normal operation.
- To prevent short cycling of the Pulse Cycle once a Pulse Cycle has been initiated, the controller must wait until after the pulse cycle has completed before calculating if another Timed Defrost cycle is needed.
- After the Energy Recovery Wheel Defrost Time has expired the Energy Recovery Defrost Pulse Cycle will be allowed to reinitiate after the Energy Recovery Wheel Defrost Period.
- When the Outdoor Air Temperature is above the Frost Threshold, Timed Defrost is not active.

Table 30: Energy Recovery Wheel Frost Prevention – Timed Defrost

Parameter Name	Range (Default)	Description
ErConfig	None OnOff VFDECM	Energy Recovery is not used. Energy Recovery Wheel runs at a constant speed (On/Off). Energy Recovery Wheel runs at a variable speed (Modbus).
ErFrostCtrlSel	None, Timed, WhlSpd, PreHeat	No frost prevention control. Timed pulse defrost for constant speed ERW. Wheel speed reduction frost prevention. Preheat and wheel speed reduction frost prevention.
ErFrostThld	73.4°F to 105.8°F (23.0°C to 41.0°C)	Calculated value used to determine if the potential for Energy Recovery Wheel frost exists based on Exhaust Air Temperature.
ErDfActive	Inactive Active	Calculated value used to display when the system is in a defrost state.
ErDfOvrdOff	Disabled Enabled	Energy Recovery Wheel is allowed to run. Energy Recovery Wheel is disabled from running during defrost cycle.
ErDfTimeSp	0-60 min 5 min	Adjustable item that sets the duration of a defrost pulse cycle.
ErDfPeriodSp	0-1440 min 60 min	Adjustable item that sets how often a defrost pulse cycle will be initiated.
ErDfOnTmSp	0-999 sec 1 sec	Adjustable item used to select how long the constant speed energy wheel is energized during defrost.
ErDfOffTmSp	0-999 sec 24 sec	Adjustable item used to select how long the constant speed energy wheel is de-energized during defrost.
ErDfPulse	Off On	Calculated item used to determine when to turn energy recovery wheel on during defrost cycle.

Energy Recovery Wheel Commissioning

Energy Recovery Wheel units should come from the factory pre-programmed with the correct control requirements. There is nothing to commission during start up. The menu below displays energy recovery operating information. Advanced menu energy recovery options can be viewed in Table 72 on page 70.

Table 31: Main Menu \ Commission Unit \ Energy Rec Set-Up

Menu Display Name	Default	Range	Description
Energy Rec=	None	None, OnOff, VFDECM	Energy Rec is an adjustable item which states if there is an energy recovery system or not.
ER Wheel=	-	Off On	ER Wheel is a status only item used to indicate whether the energy recovery wheel is currently ON or OFF.
ER Whl Cap=	-	0-100%	ER Wheel Cap is a status only item that displays the current wheel capacity/speed.
ER Whl CapCmd=	-	0-100%	ER Wheel CapCmd is a status only item that displays the capacity the wheel is being commanded to operate at.
ER LWT=	-	-40.0-200.0°F	ER LWT is status only item which displays the current discharge air temperature leaving the optional energy recovery wheel.
ER EWT=	-	-40.0-200.0°F	ER EWT is a status only item which displays the current exhaust air temperature leaving the optional energy recovery wheel.
RARelHum=	-	0-100%	RARelHum is a status only item that displays the current relative humidity of the return air humidity sensor.

Unit Maintenance

BACnet MSTP Set-Up

Table 32: Main Menu \ Unit Maintenance \ BACnet MSTP Set-Up

Menu Display Name	Default	Range	Description
Apply Changes=	No	No	ApplyChanges is an adjustable item which will commit any changes made to the BACnet MS/TP parameters.
		Yes	
Name=	-	-	Name is an adjustable item which sets the BACnet "Name" parameter.
Location=	-	-	Location is an adjustable item which sets the BACnet "Location" parameter.
Description=	-	-	Description is an adjustable item which sets the BACnet "Description" parameter.
Dev Instance=	23	0-4194302	Dev Instance is an adjustable item which sets the BACnet device instance.
MSTP Address=	18	0-127	MSTP Address is an adjustable item which sets the BACnet MS/TP MAC address.
Baud Rate=	38400	9600	Baud Rate is an adjustable item which sets the BACnet MS/TP communication baud rate.
		19200	
		38400	
		76800	
Max Master=	127	1-127	Max Master is an adjustable item which sets the BACnet "Max Master" parameter.
Max Info Frm=	10	1-32	Max Info Frm is an adjustable item which sets the BACnet "Max Info Frames" parameter.
Unit Support=	English	SI/English	Unit Support is an adjustable item which sets the units of measure provided via BACnet communications.

Service Menus

Operating Hours Menu

(also available in Unit Maintenance Menu)

The Operating Hours menu contains status items that display the number run hours for various components and operating states.

Table 33: Main Menu \ Service Menus \ Operating Hours

Menu Display Name	Default	Range	Description
Supply Fan=	-	0.0-300000.0h	Supply Fan is an adjustable item which displays the current supply fan operating hours. This value can be manually reset when the component is replaced.
Exh Fan=	-	0.0-300000.0h	Exh Fan is an adjustable item which displays the current exhaust fan operating hours. This value can be manually reset when the component is replaced.
Filter=	0.0h	0.0-300000.0h	Filter is an adjustable item which displays the supply fan operating hours with the current air filter. This value can be manually reset when the component is replaced.
ER Wheel=	0.0h	0.0-300000.0h	ER Wheel is an adjustable item which displays the current compressor 1 operating hours. This value can be manually reset when the component is replaced.
ER Preheat=	0.0h	0.0-300000.0h	ER Preheat is an adjustable item which displays the electric heater or hot water valve operating hours. This value can be manually reset when the component is replaced.
ER Filter=	0.0h	0.0-300000.0h	ER Filter is an adjustable item which displays the Energy Recovery/Exhaust Fan Filter operating hours (based on the number of hours that the Exhaust Fan has been on since installation or the last change). This value can be manually reset when the component is replaced.
Compressor 1=	0.0h	0.0-300000.0h	Compressor 1 is an adjustable item which displays the current compressor 1 operating hours. This value can be manually reset when the component is replaced.
Compressor 2=	0.0h	0.0-300000.0h	Compressor 2 is an adjustable item which displays the current compressor 2 operating hours. This value can be manually reset when the component is replaced.
Compressor 3=	0.0h	0.0-300000.0h	Compressor 3 is an adjustable item which displays the current compressor 3 operating hours. This value can be manually reset when the component is replaced.
Compressor 4=	0.0h	0.0-300000.0h	Compressor 4 is an adjustable item which displays the current compressor 4 operating hours. This value can be manually reset when the component is replaced.
Compressor 1 Starts=	0	0-300000	Compressor 1 Starts is an adjustable item which displays the number of starts recorded for compressor 1. This value can be manually reset when the component is replaced.
Compressor 2 Starts=	0	0-300000	Compressor 2 Starts is an adjustable item which displays the number of starts recorded for compressor 2. This value can be manually reset when the component is replaced.
Compressor 3 Starts=	0	0-300000	Compressor 3 Starts is an adjustable item which displays the number of starts recorded for compressor 3. This value can be manually reset when the component is replaced.
Compressor 4 Starts=	0	0-300000	Compressor 4 Starts is an adjustable item which displays the number of starts recorded for compressor 4. This value can be manually reset when the component is replaced.

Network Input Status

Table 34: Main Menu \ Service Menus \ Network Input Status

Menu Display Name	Default	Range	Description
Net OAT In=	-	-40°F - 212°F INVALID	Net OAT In is a status only item which displays the outdoor air temperature value being provided by network communications (if applicable).
Net SpaceT In=	-	-40°F - 212°F INVALID	Net SpaceT In is a status only item which displays the space temperature value being provided by network communications (if applicable).
Net-CurrState=	NULL	OCCUPIED UNOCCUPIED STANDBY NULL	NetCurrState is a status only item which displays the occupancy scheduler value being provided by network communications (if applicable).

Menu Display Name	Default	Range	Description
Net Cl Ena=	NULL	DISABLED ENABLED NULL	Net Cl Ena is a status only item which displays the cooling enable value being provided by network communications (if applicable).
Net Ht Ena=	NULL	DISABLED ENABLED NULL	Net Ht Ena is a status only item which displays the heating enable value being provided by network communications (if applicable).
Net Ec Ena=	NULL	DISABLED ENABLED NULL	Net Ec Ena is a status only item which displays the economizer enable value being provided by network communications (if applicable).
Net Dehum Ena =	NULL	DISABLED ENABLED NULL	Net Dehum Ena is a status only item which displays the dehumidification enable value being provided by network communications (if applicable).
Net Space PPM=	INVALID	0-3000 ppm INVALID	Net Space PPM is a status only item which displays the space co2 concentration value being provided by network communications (if applicable).
Net Rel Humid=	INVALID	0% - 100% INVALID	Net Rel Humid is a status only item which displays the space relative humidity value being provided by network communications (if applicable).
Net OA Humid	INVALID	0% - 100% INVALID	Net OA Humid is a status only item which displays the outdoor air relative humidity value being provided by network communications (if applicable).
NetOccManCmd=	NULL	OCCUPIED UNOCCUPIED BYPASS STANDBY NULL	NetOccManCmd is a status only item which displays the occupancy override command being provided by network communications (if applicable).
Net EWT In=	INVALID	-40°F - 212°F INVALID	Net EWT In is a status only item which displays the entering water temperature value being provided by network communications (if applicable).
Net Supply Fan=	INVALID	0% - 100% INVALID	Net Supply Fan is a status only item which displays the supply fan operating speed value being provided by network communications (if applicable).

Modbus Settings

Table 35: Modbus Settings

Menu Display Name	Default	Range	Description
Parity=	None	Even Odd None	Status only items that indicate the Modbus communication setting
StopBits=	2SBits	1SBit 2SBits	
Cmd Delay=	10ms	0-60000 ms	
Rstpmo Delay=	200ms	0-60000 ms	
Clear D-Kit(s)=	None	None Reset	Status only item that indicates if a D-Kit alarm is being cleared.
VRV Status=	Good	Good Bad	Status only item that indicates if there is a D-Kit communication error.

Modbus Read

Table 36: Modbus \ Modbus Read

Menu Display Name	Default	Range	Description
Entering Temp=	32 °F (0.0°C)	-4.0°F - 140.0°F (-20.0°C - 60.0°C)	Status only item that indicates the Suction Air Temperature sensor connected to the D-Kit which measures the Entering Unit Temperature.
VRV DewPt Tgt=	32 °F (0.0°C)	0°F - 100.0°F (-17.0°C - 37.7°C)	Status only item that indicates the dewpoint target differential being used by the D-Kit for dehumidification.
VRV DAT Tgt=	32 °F (0.0°C)	-4.0°F - 140.0°F (-20.0°C - 60.0°C)	Status only item that indicates the discharge air temperature target setpoint being used by the D-Kit.
VRV DAT=	32 °F (0.0°C)	-4.0°F - 140.0°F (-20.0°C - 60.0°C)	Status only item that indicates the discharge air temperature being used by the D-Kit.
VRV Dhum Stg Tm=	0 min	0-480 min	Status only item that indicates the Supply Fan Dehumidification state run time.

Modbus Write Data

Table 37: Modbus \ Modbus Write Data

Menu Display Name	Default	Range	Description
DX Coil Req=	OFF	OFF ON	Status only item that indicates the DX Coil Request value being written to the D-Kit by the MicroTech unit controller.
DX Op Mode=	COOLING	COOLING HEATING	Status only item that indicates the DX Coil Operating Mode value being written to the D-Kit by the MicroTech unit controller.
RH Coil Req=	OFF	OFF ON	Status only item that indicates the RH Coil Request value being written to the D-Kit by the MicroTech unit controller.
Stop/Drive=	STOP	STOP DRIVE	Status only item that indicates the Drive Stop Command value being written to the D-Kit by the MicroTech unit controller.
Fan Status=	OFF	OFF ON	Status only item that indicates the Fan Operating Status value being written to the D-Kit by the MicroTech unit controller.
Dewpt Tgt=	32 °F (0.0°C)	0°F - 100.0°F (-17.0°C - 37.7°C)	Status only item that indicates the Dewpoint Target Differential value being written to the D-Kit by the MicroTech unit controller.
DAT Tgt=	32 °F (0.0°C)	0°F - 100.0°F (-17.0°C - 37.7°C)	Status only item that indicates the Discharge Air Temperature Target value being written to the D-Kit by the MicroTech unit controller.
EV Kit DAT=	32 °F (0.0°C)	-4.0°F - 140.0°F (-20.0°C - 60.0°C)	Status only item that indicates the Discharge Air Temperature value being written to the D-Kit by the MicroTech unit controller.

Modbus Comm Status

Table 38: Modbus \ Modbus Read \ Comm Status

Menu Display Name	Default	Range	Description
Overall Comm Status=	OFF	OFF ON	Status only item that indicates the overall Modbus Communication status between the D-Kit and the MicroTech unit controller.
Comm 1 Status=	OFF	OFF ON	Status only item that indicates the Modbus communication status between the individual D-Kits and the MicroTech unit controller.
Comm 2 Status=	OFF	OFF ON	
Comm 3 Status=	OFF	OFF ON	
Comm 4 Status=	OFF	OFF ON	

Modbus Connect Status

Table 39: Modbus \ Modbus Read \ Connect Status

Menu Display Name	Default	Range	Description
Overall DX Conn=	OFF	OFF ON	Status only item that indicates the overall Connection status to the DX control boards.
DX 1 Connection=	OFF	OFF ON	Status only item that indicates the connection status to the DX control boards in the individual D-Kits.
DX 2 Connection=	OFF	OFF ON	
DX 3 Connection=	OFF	OFF ON	
DX 4 Connection=	OFF	OFF ON	
Overall RH Conn=	OFF	OFF ON	Status only item that indicates the overall Connection status to the RH control boards.
RH 1 Connection=	OFF	OFF ON	Status only item that indicates the connection status to the RH control boards in the individual D-Kits.
RH 2 Connection=	OFF	OFF ON	
RH 3 Connection=	OFF	OFF ON	
RH 4 Connection=	OFF	OFF ON	

Modbus DX/RH Status

Table 40: Modbus \ Modbus Read \ DX/RH Status

Menu Display Name	Default	Range	Description
Overall DX/RH Status=	OFF	OFF ON	Status only item that indicates the overall connection status to all the DX/RH control boards.
DX1/RH1 Status=	OFF	OFF ON	Status only item that indicates the overall connection status to the DX/RH control boards in the individual D-Kits.
DX2/RH2 Status=	OFF	OFF ON	
DX3/RH3 Status=	OFF	OFF ON	
DX4/RH4 Status=	OFF	OFF ON	

Modbus Central Mngr Status

Table 41: Modbus \ Modbus Read \ Central Mngr Status

Menu Display Name	Default	Range	Description
Overall Central Mngr=	OFF	OFF	Status only item that indicates the overall In Central Management status for all the D-kits.
		ON	
Central Mngr 1=	OFF	OFF	Status only item that indicates the In Central Management status for the individual D-Kits.
		ON	
Central Mngr 2=	OFF	OFF	
		ON	
Central Mngr 3=	OFF	OFF	
		ON	
Central Mngr 4=	OFF	OFF	
		ON	

Modbus Comp Status

Table 42: Modbus \ Modbus Read \ Comp Status

Menu Display Name	Default	Range	Description
Overall Comp Status=	OFF	OFF	Status only item that indicates the overall compressor operational status for all the D-kits
		ON	
Comp 1 Status=	OFF	OFF	Status only item that indicates the compressor operational status for the individual D-Kits.
		ON	
Comp 2 Status=	OFF	OFF	
		ON	
Comp 3 Status=	OFF	OFF	
		ON	
Comp 4 Status=	OFF	OFF	
		ON	

Modbus Defrost Status

Table 43: Modbus \ Modbus Read \ Defrost Status

Menu Display Name	Default	Range	Description
Overall Def Status=	OFF	OFF	Status only item that indicates the overall Defrost status for all the D-kits.
		ON	
Defrost 1 Status=	OFF	OFF	Status only item that indicates the Defrost status for the individual D-Kits.
		ON	
Defrost 2 Status=	OFF	OFF	
		ON	
Defrost 3 Status=	OFF	OFF	
		ON	
Defrost 4 Status=	OFF	OFF	
		ON	

Modbus Fan Request Status

Table 44: Modbus \ Modbus Read \ Fan Request Status

Menu Display Name	Default	Range	Description
Overall Fan Req Status=	OFF	OFF	Status only item that indicates the overall Fan Operation Request status for all the D-Kits.
		ON	
Fan Req 1 Status=	OFF	OFF	Status only item that indicates the overall Fan Operation Request status for the individual D-Kits.
		ON	
Fan Req 2 Status=	OFF	OFF	
		ON	
Fan Req 3 Status=	OFF	OFF	
		ON	
Fan Req 4 Status=	OFF	OFF	
		ON	

Modbus System Err Status

Table 45: Modbus \ Modbus Read \ System Err Status

Menu Display Name	Default	Range	Description
Overall Sys Error=	NONE	NONE	Status only item that indicates the overall System Error status for all D-Kits.
		WARNING	
		ALARM	
		ERROR	
System 1 Err=	NONE	NONE	Status only item that indicates the System Error parameters in the individual D-Kits
		WARNING	
		ALARM	
		ERROR	
System 2 Err=	NONE	NONE	
		WARNING	
		ALARM	
		ERROR	
System 3 Err=	NONE	NONE	
		WARNING	
		ALARM	
		ERROR	
System 4 Err=	NONE	NONE	
		WARNING	
		ALARM	
		ERROR	
Err 1 Code=	0	0 to 255	Status only item that indicates the Error Code parameters in the individual D-Kits.
Err 2 Code=	0	0 to 255	
Err 3 Code=	0	0 to 255	
Err 4 Code=	0	0 to 255	

Menu Display Name	Default	Range	Description
Err 1 Detail=	0	0 to 63	Status only item that indicates the Error Code Detail parameters in the individual D-Kits.
Err 2 Detail=	0	0 to 63	
Err 3 Detail=	0	0 to 63	
Err 4 Detail=	0	0 to 63	
VRV Err Code 1=	0x00	0x00 to 0xFF	Status only item that indicates the Hexadecimal Error Code values in the individual D-Kits.
VRV Err Code 2=	0x00	0x00 to 0xFF	
VRV Err Code 3=	0x00	0x00 to 0xFF	
VRV Err Code 4=	0x00	0x00 to 0xFF	

Alarm Lists

Alarms provide the user with information about abnormal conditions that affect unit operation. The cause of the alarm should be investigated and eliminated before the unit or any disabled equipment in it is placed back into service.

Viewing Alarms

The Active Alarms menu displays up to 10 active alarms. Pushing the scroll wheel in, will show details about the alarm, as well as when it occurred. The Alarm Log, shows the same information, but up to 50 of the latest alarms - both active and previous alarms.

Alarms are categorized as Warnings, Problems or Faults.

Faults are conditions that are serious enough to shut down the unit.

Problems are conditions that result in some limitation of unit operation, but the unit is allowed to continue to operate.

Warnings inform the user of conditions that should be addressed, but do not limit operation in any way.

All active alarms as well as the date and time that they were detected are displayed on the Active Alarm menu. These alarms are displayed in order of priority. Higher priority alarms are displayed first. The last 50 alarm “events” detected, as well as the date and times that they were detected, are displayed on the Alarm Log menu. An alarm “event” is either an alarm becoming active, or being cleared. A “+” symbol precedes the active alarm event and a “-” symbol precedes the cleared alarm event. These alarms are displayed in the order that they were detected. The alarm that was detected most recently is displayed first. Multiple occurrences of the same alarm may appear.

Alarm Resets

Alarm resetting has 3 categories:

- **Manual**
  Once the alarm has occurred, the controller will remain in the alarm state until the alarm has been cleared through the keypad, the integrated thermostat, BAS communications, or by cycling power to the controller.
- **Automatic**
  The alarm will clear once the alarm conditions have been resolved with no action necessary.
- **Intelligent Reset**
  The alarm will clear automatically up to two times in a 7-day period once the alarm conditions have been resolved, but will need to be manually cleared on the third occurrence in a 7-day period.

Table 46: Main Menu \ Service Menus \ Active Alarms

Menu Display Name	Default	Range
AlmCt:** Clr Alms:	No	NO
		CLEAR_FAULTS
		CLEAR_PROBLEMS
		CLEAR_WARNINGS
		CLEAR_ALL

Table 47: Main Menu \ Service Menus \ Alarm Log

Menu Display Name	Default	Range
LogCt:** Clr Log:	No	0-30:
		No
		Yes

MicroTech Unit Controller Inputs/Outputs

The complete set of Inputs and Outputs that are possible on a MicroTech unit controller are listed below. These vary by configuration and may or not be included on any given unit based on the features selected and shipped from the factory.

Table 48: Main Menu \ Service Menus \ I/O Module Status

Menu Display Name	Default	Range	Description
EMA=	-	OK	EMA is a status only item which indicates the state of communications with optional I/O expansion modules.
		NoComm	
EMB=	-	OK	EMB is a status only item which indicates the state of communications with optional I/O expansion modules.
		NoComm	

Table 49: Main Menu \ Service Menus \ I/O Status

Menu Display Name	Default	Range	Description
Freeze Input=	-	FREEZE	Status only item that indicates the present condition of the indicated input/output.
		NORMAL	
Final Fltr Input=	-	OPEN	
		CLOSED	
EmergStop Input=	-	STOP	
		RUN	
OAD End Sw Input=	-	OPEN	
		CLOSED	
Blocked Cond Input=	-	WET	
		DRY	
AirFlow Sts Input=	-	NOFLOW	
		FLOW	
Pre Fltr Input=	-	OPEN	
		CLOSED	
ER RotSw Input=	-	NOROTATION	
		ROTATION	
RsSpaceT=	-	-40°F - 212°F	
		INVALID	
Space Humidity=	-	0%-100%	
Return Temp=	-	-40°F - 158°F	
Return Humidity=	-	0% - 100%	
OA Temp=	-	-40°F - 212°F	
OA Humidity=	-	0% - 100%	
CO2 PPM=	-	0-3000 ppm	
Disch Air=	-	-40°F - 212°F	
Ent Water Temp=	-	-40°F - 212°F	
Lvg Coil Temp	-	-40°F - 212°F	
Duct Static Prs=	-	0.0-5.0″	
		32767.0 INVALID	
En Rec EWT=	-	-50°F - 200°F	
En Rec LWT=	-	-50°F - 200°F	
Htg Valve BO=	-	OFF	
		ON	
Htg Stg 1 =	-	OFF	
		ON	
Htg Stg 2 =	-	OFF	
		ON	
Htg Stg 3 =	-	OFF	
		ON	
Htg Stg 4 =	-	OFF	
		ON	
CW Valve Pos=	-	OFF	
		ON	
Comp Stg 1 =	-	OFF	
		ON	
Comp Stg 2 =	-	OFF	
		ON	
Comp Stg 3 =	-	OFF	
		ON	
Comp Stg 4 =	-	OFF	Status only item that indicates the present condition of the indicated input/output.
		ON	
VAV Box Output=	-	DISABLED	
		ENABLED	
ER On/Off=	-	OFF	
		ON	
ER Byp Damper=	-	OPEN	
		CLOSED	
ER Vlv Stg 1=	-	OFF	
		ON	
ER Htg Stg2=	-	OFF	
		ON	
OA Damper Output=	-	0-10VDC	
Ret Damper Output=	-	0-10VDC	
SAF Cap=	-	0-10VDC	
EF Cap=	-	0-10VDC	
HW Valve Output=	-	0-10VDC	
SCR Output=	-	0-10VDC	
Clg Valve=	-	0-10VDC	
ChgOvr Valve=	-	0-10VDC	
ER Wheel Spd=	-	0-10VDC	
ER Mod SCR=	-	0-10VDC	
Sen Clg Spt=	-	50°F - 95°F	
Sen Htg Spt=	-	50°F - 95°F	
Comp Cap=	-	0% - 100%	

Main Control Board (POL546)

Table 50: Main Control Board Terminal Information

Terminal	Signal	Range	Description
T2-DO1B	24VAC	On/Off	Compressor 1/Two Position Chilled Water Valve/ Two Position CW-HW Changeover Water Valve
T3-DO2B	24VAC	On/Off	Electric Heat Stage 1/ Two Position Hot Water Valve
T3-DO3	24VAC	On/Off	Compressor 2
T3-DO5	24VAC	On/Off	Supply Fan Run Enable
T5-DO6	24VAC	On/Off	VAV Box Enable Signal
T12	RS485		
T13	PLNK (KNX)	-40°F - 70°F (-40°C - 21°C)	QMX/POS Communicating sensor with Space Temperature, Setpoint Adjust
T7-X9	10K Type II	-40°F - 70°F (-40°C - 21°C)	Discharge Air Temperature Sensor
T7-X10	10K Type II	-40°F - 70°F (-40°C - 21°C)	Either the Entering Water or Leaving Coil Temperature Sensor

Terminal	Signal	Range	Description
T7-X11	10K Type II	-40°F - 70°F (-40°C - 21°C)	Outdoor Air Temperature Sensor
T8-X1	Discrete BI	Open - Closed	Title 24 Outdoor Air Damper End Switch
T8-X2	0-10VDC	0% - 100% RH (0-10VDC)	Space Humidity Input
T8-X3	0-10VDC	0-5" WC	Duct Static Pressure Sensor
T8-X4	0-10VDC	0% - 100% (0/2-10VDC)	Outdoor Air Humidity Sensor
T9-X5	0-10VDC	0% - 100% (0-10VDC)	Supply Fan Control Output
T9-X6	0-10VDC	0% - 100% (2-10VDC scaled)	Outdoor Air Damper Output
T9-X7	0-10VDC	0% - 100% (0/2-10VDC)	Modulating Chilled Water Valve Output
T9-X8	0-10VDC	0% - 100% (0/2-10VDC)	Modulating Hot Water Valve or SCR Heat Output
T10-DI1	Discrete BI	Run - Stop	Emergency Stop Input
T10-DI2	Discrete BI	Dry - Wet	Condensate Overflow Float Switch
T11-DI3	24VAC BI	No Flow - Flow	Airflow Status Switch
T11-DI4	24VAC BI	Normal - Freeze	Freeze Stat Input

Expansion Module A I/O (POL965)

Table 51: Expansion Module A I/O Terminal Information

Terminal	Signal	Range	Description
T1-DO1	24VAC	On/Off	Compressor 3
T1-DO2	24VAC	On/Off	Compressor 4
T1-DO3	24VAC	On/Off	Electric Heat Stage 2
T1-DO4	24VAC	On/Off	Electric Heat Stage 3
T2-DO5	24VAC	On/Off	Electric Heat Stage 4
T2-DO6	24VAC	On/Off	Exhaust Fan Enable
T4-X1	10K Type II	-40°F - 70°F (-40°C - 21°C)	Return Air Temperature Sensor
T4-X2	0-10VDC	0% - 100% RH (0-10VDC)	Return Air Relative Humidity Sensor
T4-X3	0-10VDC	0% - 100% (2-10VDC scaled)	Return Air Damper Output
T4-X4	Discrete BI	Open - Closed	Final Dirty Filter Switch
T5-X5	0-10VDC	0% - 100% (0-10VDC)	Exhaust Fan Control Output
T5-X6	0-10VDC	0 ppm - 3000 ppm	Space CO2 Sensor
T5-X7	Discrete BI	Open/Closed	Pre Dirty Filter Switch

Expansion Module B I/O (POL965)

Table 52: Expansion Module B I/O Terminal Information

Terminal	Signal	Range	Description
T1-DO1	24VAC	On/Off	Energy Recovery Wheel On Off Output
T1-DO2	24VAC	On/Off	
T1-DO3	24VAC	Open/Closed	Energy Recovery Bypass Damper Close Output
T1-DO4	24VAC	Open/Closed	Energy Recovery Bypass Damper Open Output
T2-DO5	24VAC	On/Off	Energy Recovery Heat Stage 1/Hot Water Valve Output
T2-DO6	24VAC	On/Off	Energy Recovery Heat Stage 2 Output
T4-X1	10K Type II	-40°F - 100°F (-40°C - 212°C)	Supply Air Leaving Wheel Temperature
T4-X2	10K Type II	-40°F - 100°F (-40°C - 212°C)	Exhaust Air Exiting Wheel Temperature
T4-X3	0-10VDC	0% - 100%	Energy Recovery Wheel Speed Command
T5-X6	Discrete BI	Open (No Rotation)/Closed (Rotation)	Energy Recovery Wheel Rotation Switch
T5-X7	0-10VDC	0% - 100%	Energy Recovery Modulating Hot Water Valve/ SCR Electric Heat

Save / Restore Settings

Save/Restore Menu

The Save/Restore menu can be used to save or restore the user configured parameters as well as reset the controller back to the factory default parameters. Save Params is an adjustable item used to save the current parameters and configuration.

Table 53: Main Menu \ Service Menus \ Save \ Restore Settings

Menu Display Name	Default	Range	Description
Status=	OK	Param Saved	Status= is a status only item that will display the state of the unit functionality.
		Unit Not Off	
		No Card	
		ReadOnly Card	
		OK	
		N/A	

Menu Display Name	Default	Range	Description
Save Params=	No	No Yes	Save Params= is an adjustable item that indicates whether or not parameters are saved as Factory parameters on the device. No - nothing occurs (parameters not saved). Yes - the parameters are saved as Factory parameters on the device. The device is then reset and Save Params= is reset to no.
Rstr Params=	No	No Yes	Rstr Params is an adjustable item used to restore the current parameters and configuration.
Rstr Factory=	No	No Yes	Rstr Factory is an adjustable item used to restore the factory parameters and configuration.
Save To Card/USB=	No	No Yes NoCard RdOnly	SaveToCard is an adjustable item used to save the current parameters and configuration to an SD card.
Load From Card/USB=	No	No Yes RdOnly	LoadFromCard is an adjustable item used to restore the current parameters and configuration from an SD card.

Advanced Menus

Unit Configuration

⚠ WARNING

Operational settings should only be made with the advisement of a qualified person; changing key configurations away from factory settings may result in damage to equipment or surrounding property. Recommended settings may vary based on application specific requirements.

Unit Configuration String

After the main control board application software is loaded into the MCB, it must be “configured” for the specific control application. This consists of setting the value of 41 configuration variables within the MCB. These variables define things such as the type of cooling, number of compressors, cooling stages, and the type of heat. If all of these items are not set appropriately for the specific unit, the unit will not function properly.

The table below lists the configuration code variables, including the position within the code, description of the parameter, and the applicable settings for each. The unit is configured at the factory however may also be configured in the field by accessing the Unit Configuration menu. Once changes have been made to the Unit Configuration menu, the Apply Changes flag must be changed from no to yes in order for the controller to recognize the changes. Setting the Apply Changes Flag to Yes will automatically reset the controller.

Unit Configuration

Table 54: Main Menu \ Advanced Menu \ Unit Configuration

Menu Display Name	Default	Range	Description
Apply Changes=	NO	NO YES	ApplyChanges is an adjustable item which will commit any changes made to the configuration parameters.
SAF Control=	CONST	CONST DSP SZ_VAV	SAF Control is an adjustable item which configures supply fan speed control.
HeatCool Valve=	NONE	NONE COOL HEAT BOTH	HeatCool Valve is an adjustable item which configures heating and cooling valve operation.
EWT Sensor=	NotInst	NotInst Installed	EWT is an adjustable item which configures if the controller will expect an entering water temperature sensor input (network or hardwired), required for 2 pipe changeover systems.
2/4 Pipe Sel=	2PIPE	2PIPE 4PIPE	2/4 Pipe is an adjustable item which configures the chilled water and/or hot water coils.
Valve Signal=	ON-OFF24VAC	MOD2-10V MOD0-10V ONOFF24VAC	Valve Signal is an adjustable item which configures the chilled water and/or hot water valve control signal.
Cool Valve Dir=	DIRECT	DIRECT REVERSE	Cool Valve Dir is an adjustable item which configures the chilled water valve action.
Heat Valve Dir=	REVERSE	DIRECT REVERSE	Heat Valve Dir is an adjustable item which configures the hot water valve action.
Chng Valve Dir=	DIRECT	DIRECT REVERSE	Chng Valve Dir is an adjustable item which configures the change-over valve action.
El Heat Stages=	NONE	NONE, 1-STG 4-STG SCR	El Heat Stages is an adjustable item which configures the electric heat control.
Compressor Stages=	NONE	NONE 1STG 2STG 4STG VRV-D	Compressor Stages is an adjustable item which configures the number of compressor cooling stages.

Menu Display Name	Default	Range	Description
DCV Enable=	DISABLED	DISABLED ENABLED	DCV Enable is an adjustable item which configures demand controlled ventilation control.
CO2 Sensor=	NotInst	NotInst Installed	CO2 Sensor is an adjustable item which configures if the controller will expect a CO2 sensor input (network or hardwired), required for demand controlled ventilation.
Economizer=	NONE	NONE OAT ENTHALPY_OUT TEMP_DIFF ENTHALPY_DIFF	Economizer is an adjustable item which configures the strategy that will be used to determine if the outdoor air is suitable for economizing.
Outdoor Damper=	NotInst	NotInst 2POS MOD DAT-MOD	Outdoor Damper is an adjustable item which configures the outdoor air damper control.
OAT Sensor=	NotInst	NotInst Installed	OAT Sensor is an adjustable item which configures if the controller will expect an outdoor air temperature sensor input (network or hardwired), required for economizer operation.
Spc Hum Sensor=	NotInst	NotInst Installed	Spc Hum Sensor is an adjustable item which configures if the controller will expect a space humidity sensor input (network or hardwired).
OA Hum Sensor=	NotInst	NotInst Installed	OA Hum Sensor is an adjustable item which configures if the controller will expect a outdoor humidity sensor input (network or hardwired).
Return Air Damper=	NotInst	NotInst Installed	Return Air Damper is an adjustable item which configures the return air damper control.
Exhaust Fan=	DISABLED	DISABLED TRACKING CONST_SPEED	Exhaust Fan is an adjustable item which configures exhaust fan speed control.
Exh Fan Output=	NotInst	NotInst Installed	Exhaust Fan Output is an adjustable item which enables exhaust fan speed control.
Dehumidification=	NONE	NONE PASSIVE ACTIVE PRIMARY	Dehumidification is an adjustable item which configures dehumidification control.

Menu Display Name	Default	Range	Description
Lvg Coil Sensor=	NotInst	NotInst Installed	Lvg Coil Sensor is an adjustable item which configures if the controller will expect a leaving coil temperature sensor input.
Econo FDD=	DISABLED	DISABLED ENABLED	Econo FDD is an adjustable item which configures economizer fault detection and diagnostics.
Damper End Sw=	NotInst	NotInst Installed	Damper End Sw is an adjustable item which configures if the controller will expect outdoor air damper end switch input, required for economizer fault detection and diagnostics.
Fltr Notify=	NONE	NONE RUNTIME BIN_INPUT BOTH	Fltr Notify is an adjustable item which configures main dirty filter notification.
RAT Sensor=	NotInst	NotInst Installed	RAT Sensor is an adjustable item which configures if the controller will expect a return air temperature sensor input (network or hardwired).
El Heat Type=	PRIMARY	PRIMARY PRE_HEAT SUP_HEAT PRE_AND_SUP_HEAT	El Heat Type is an adjustable item which configures when and how electric heat will be used.
DKit Quantity=	ONE	ONE TWO FOUR	DKit Quantity is an adjustable item which configures the number of D-Kit VRV controllers that will be connected
Ctrl Temp Src=	SPACE	SPACE RETURN AVERAGE OUTDOOR	Ctrl Temp Src is an adjustable item that selects the control temperature source from either a space, return air sensor, the average temperature of the space and return, or the outdoor air sensor.
Ctrl Hum Src=	SPACE	SPACE OUTDOOR SPACE_OUTDOOR	Ctrl Hum Src is an adjustable item which configures which humidity value will be used for dehumidification.
PreHt Temp In=	OAT	OAT EUT	PreHt Temp In is an adjustable item that selects which temperature value is used to determine if preheat is needed.

Menu Display Name	Default	Range	Description
LCT Sens Typ=	SingleProbe	SingleProbe Averaging	LCT Sens Typ is an adjustable item which configures the type of leaving oil temperature sensor is used for 4 compressor configurations.
Air Flw Proving=	NotInst	NotInst Installed	Air Flow Proving is an adjustable item which configures whether or not an Air Flow Proving switch is installed
Remote Sensor=	Installed	NotInst Installed	Remote Sensor is an adjustable item which configures whether or not a Remote Space Temperature sensor is installed.
ER Config=	None	None OnOff VFDSCM	ER Config is an adjustable item that sets the Energy Recovery Wheel type to either none, running at constant speed, or running at variable speed (via MODBUS).
ER Frst Ctrl Sel=	None	None Timed WhlSpd Preheat	ER Frst Ctrl Sel is an adjustable item that determines the method of Energy Wheel frost prevention: None - No frost prevention control. Timed - Timed pulse defrost for constant speed ERW. WhlSpd - Wheel speed reduction. Preheat - Preheat and wheel speed reduction.
ER Preheat Sel=	None	None HotWtrVlv 1StgEl 2StgEl SCR	ER Preheat Sel is an adjustable item used to select activate Energy Recovery Preheat and the method of Energy Recovery Preheat to be used: None - No Energy Recovery Preheat. HotWtrVlv - A hot water valve will be used to provide ER preheat. 1StgEl - A single stage electric heater is used to provide ER preheat. 2StgEl - A two-stage electric heater will be used to provide ERpreheat. (not used) SCR - A SCR electric heater will be used to provide ER preheat.
ER Rotation Sw=	NotInst	NotInst Installed	ER Rotation Sw is an adjustable item used to select if there is a digital energy recovery wheel rotation sensor installed.

Menu Display Name	Default	Range	Description
ER Valve Sig=	On-Off24VAC	Mod2-10V Mod0-10V OnOff24VAC	ER Valve Sig is an adjustable item that sets the control of the ER valve (On/Off or modulating): Mod2-10V - Modulating 0-100% capacity control using a 2-10VDC signal. Mod0-10V - Modulating 0-100% capacity control using a 0-10VDC signal. OnOff24VAC - On or off capacity control using a 24VAC signal.
ER Chng Valve Dir=	Direct	Direct Reverse	ER Chng Valve Dir is a status only item that determines the direction in which the Hot Water Valve is adjusted
Pre Fltr Notify=	None	NONE RUNTIME BIN_INPUT BOTH	Pre Fltr Notify is a status only item that determines the basis for the the controller's change filter notification for the pre filters. The notifications are based on the following values: NONE - Controller will not provide a change filter notification. RUNTIME - Controller will provide a change filter notification based on fan run time. BIN_INPUT - Controller will provide a change filter notification based on a digital input. BOTH - Controller will provide a change filter notification based on fan runtime or a digital input.
Config Index=	0	0 to 35	Config Index is a status only item that provides verification of a valid configuration by assigning a number to represent a configuration. Config Index= will be set to 0 if a proper configuration has not been setup.
Config Fault=	None	-	Config Fault is a stats only item that provides detail regarding a configuration alarm.
Apply Changes=	NO	NO YES	ApplyChanges is an adjustable item which will commit any changes made to the configuration parameters.

Advanced Timers

⚠ WARNING

Operational settings should only be made with the advisement of a qualified person; changing key configurations away from factory settings may result in damage to equipment or surrounding property. Recommended settings may vary based on application specific requirements.

Table 55: Main Menu \ Advanced Menus \ Advanced Timers

Menu Display Name	Default	Range	Description
Apply Changes=	No	No Yes	Apply Changes is an adjustable item which will commit any changes made to the BACnet MS/TP parameters.
Pwd Timeout=	10 min	3-30 min	Pwd Timeout is an adjustable item that sets the amount of time in minutes that the controller will allow access to applicable menus without re-entering the necessary password. If the keypad display remains idle for this time period the display will revert to the "main menu" requiring a re-entering of the password.
SAF Ctrl Dly=	-	5-120 Seconds	SAF Ctrl Dly is an adjustable item that sets the duration of time that the minimum speed signal is sent to the variable speed supply air fan after the supply fan is started via a modbus or digital output. Control reverts to either duct pressure or speed after the fan has been on for the SAF CtrlDelay (default 30 seconds).
Filter Chg Time=	1440 Hours	360-4320 Hours	Filter Chg Time is an adjustable item which sets the incremental supply fan run hours that must occur before a dirty filter warning will be indicated when the Filter Chg Strategy is BINARY_INPUT or BOTH.
Filter Runtime=	0.0 h	0-300000 Hours	Filter Runtime is an adjustable item which displays the supply fan operating hours with the current air filter. This value can be manually reset when the component is replaced.
Heat Stage Timer=	-	0-3600 seconds	Heat Stage Timer is a status only item which displays the amount of time remaining before the heating stage timer expires.
EI Heat Stage Timer=	-	0-30 seconds	EI Heat Stage Timer is a status only item which displays the amount of time remaining before the supply fan electric heat off timer expires.
DSP Dly Timer=	-	0-120 seconds	DSP Dly Timer is a status only item which displays the amount of time remaining after the VAV box output was energized, before duct static pressure control will be allowed.
SAF On Timer=	-	0-999999 seconds	SAF On Timer is a status only item indicating the amount of time the supply air fan has been running.
State Change Timer=	-	0-999999 seconds	State Change Timer is a status only item indicating the value of the state change timer.
Startup Timer=	-	0-999999 seconds	Startup Timer is a status only item indicating the value of the unit startup change timer.
EWT Htg Tmr=	-	seconds	EWT Htg Tmr is a status only item indicating the value of the entering water temperature sampling timer for heating.
EWT Clg Tmr=	-	seconds	EWT Clg Tmr is a status only item indicating the value of the entering water temperature sampling timer for cooling.
EWT Htg Retry=	-	min	EWT Htg Retry is a status only item indicating the value of the entering water temperature retry timer for heating.
EWT Clg Retry=	-	min	EWT Clg Retry is a status only item indicating the value of the entering water temperature retry timer for cooling.
DSP Alm Tmr=	-	0-360 seconds	DSP Alm Tmr is a status only item indicating the value of the duct static pressure alarm timer.
RS Comm=	-	INACTIVE ACTIVE	RS Comm is a status only item indicating the status of communications with the integrated thermostat.
RS Spc Tmp Tmr=	-	seconds	RS Spc Tmp Tmr is a status only item indicating the value of the timer used in establishing communications with the integrated thermostat.
Comp Start Delay Tm=	-	0-420 seconds	Comp Start Delay Tm is a status only item indicating the value of the compressor startup delay timer.
Tnt OR Timer=	-	0-480 minutes	Tnt OR Timer is a status only item indicating the value of the tenant override temporary occupancy timer.
Comp 1 On Tmr=	-	seconds	Status only item that indicates the Compressor 1 On Timer
Comp 2 On Tmr=	-	seconds	Status only item that indicates the Compressor 2 On Timer
Comp 3 On Tmr=	-	seconds	Status only item that indicates the Compressor 3 On Timer
Comp 4 On Tmr=	-	seconds	Status only item that indicates the Compressor 4 On Timer

Menu Display Name	Default	Range	Description
Comp 1 Off Tmr=	-	seconds	Status only item that indicates the Compressor 1 Off Timer
Comp 2 Off Tmr=	-	seconds	Status only item that indicates the Compressor 2 Off Timer
Comp 3 Off Tmr=	-	seconds	Status only item that indicates the Compressor 3 Off Timer
Comp 4 Off Tmr=	-	seconds	Status only item that indicates the Compressor 4 Off Timer
Vrv Comp On Tmr=	-	seconds	Status only item that indicates the VRV Compressor On Timer
Vrv Comp Off Tmr=	-	seconds	Status only item that indicates the VRV Compressor Off Timer
Cold Start Tmr=	-	minutes	Status only item that indicates the Cold Start Logic run time after power up or occupancy change.

SAF Set-Up

1 Zone VAV Control

Table 56: Main Menu \ Advanced Menu \ SAF Set-Up \ 1 Zone VAV Control

Menu Display Name	Default	Range	Description
1ZnVAV Period=	60sec	0-600 seconds	1ZnVAV Period is an adjustable item that sets the “sampling time” used in the PI control function to vary the supply fan speed when 1ZnVAV supply fan control is selected.
1ZnVAV Gain=	2.0	0.0-255.0	1ZnVAV Gain is an adjustable item that sets the “gain” used in the PI control function to vary the supply fan speed when 1ZnVAV supply fan control is selected.
1ZnVAV PAT=	400sec	0-600 seconds	1ZnVAV PAT is an adjustable item that sets the “project ahead time” used in the PI control function to vary the supply fan speed when 1ZnVAV supply fan control is selected.
1ZnVAV-MaxChg=	10.0%	0.0-100.0%	1ZnVAVMaxChg is an adjustable item that sets the maximum value of increase or decrease of the supply fan speed each period used in the PI control function to vary the supply fan speed when 1ZnVAV supply fan control is selected.

SAF DSP Control

Table 57: Main Menu \ Advanced Menu \ SAF Set-Up \ DSP Control

Menu Display Name	Default	Range	Description
DSP Period=	5 seconds	0-600 seconds	DSP Period is an adjustable item that sets the “sampling time” used in the PI control function to vary the supply fan speed when DSP supply fan control is selected.
DSP Gain=	0.1	0.0-255.0	DSP Gain is an adjustable item that sets the “gain” used in the PI control function to vary the supply fan speed when DSP supply fan control is selected.
DSP PAT=	60 seconds	0-600 seconds	DSP PAT is an adjustable item that sets the “project ahead time” used in the PI control function to vary the supply fan speed when DSP supply fan control is selected.
DSP Max Chg=	5%	0.0-100.0%	DSP Max Chg is an adjustable item that sets the maximum value of increase or decrease of the supply fan speed each period used in the PI control function to vary the supply fan speed when DSP supply fan control is selected.
DSP PI Target=	-	0.0-5.0 IWC	DSP PI Target is a status only item that indicates the target value used calculate the error for DSP control.
DSP PI Input=	-	0.0-5.0 IWC	DSP PI Input is a status only item that indicates the measured value that is compared to the DSP PI Target to calculate the error for DSP control.
DSP PI Output=	-	0% - 100%	DSP PI Output is a status only item that indicates the supply fan speed output for DSP supply fan control.

EF Set-Up

Table 58: Main Menu \ Advanced Menu \ EF Set-Up

Menu Display Name	Default	Range	Description
EF Damper Setpt=	20%	0% - 100%	EF Damper Setpt is an adjustable item that sets the minimum commanded outdoor air damper position, above which the exhaust fan will be allowed to operate.
EF Const Speed Setpt=	75%	0% - 100%	EF Const Speed Setpt is an adjustable item that sets the exhaust fan operating speed when the EF Ctrl= Const. Speed.

Cooling Set-Up

Table 59: Main Menu \ Advanced Menu \ Cooling Set-Up

Menu Display Name	Default	Range	Description
Lead Compressor=	Runtime	Run-Hours Comp1	Lead Compressor is an adjustable item that sets how the controller determines the sequence in which compressor outputs are activated and deactivated.
Compressor Diff=	2°F	1°F - 5°F	Compressor Diff is an adjustable item that sets the stage 2 compressor cooling differential.
Clg Period=	10 seconds	0-600 seconds	Clg Period is an adjustable item that sets the “sampling time” used in the PI control function to vary the compressor stage outputs.
Clg Gain=	1	0.0-255.0	Clg Gain is an adjustable item that sets the “gain” used in the PI control function to vary the compressor stage outputs.
Clg PAT=	100 seconds	0-600 seconds	Clg PAT is an adjustable item that sets the “project ahead time” used in the PI control function to vary the compressor stage outputs.
Clg Max Chg=	10.0°F	0.0°F - 10.0°F	ClgMaxChg is an adjustable item that sets the maximum value of increase or decrease of the compressor stage output each period used in the PI control function.
Compressor Avail=	-	UNAVAIL AVAIL	Compressor Avail is a status only item that indicates if compressor cooling is available.
Comp Off Timer=	-	0-999999 seconds	Comp Off Timer is a status only item indicating the value of the compressor minimum off timer.
Comp On Timer=	-	0-999999 seconds	Comp On Timer is a status only item indicating the value of the compressor minimum on timer.
Cooling Stage Timer=	-	0-999999 seconds	Cooling Stage Timer is a status only item indicating the value of the cooling stage timer.
Desired Cooling=	-	0% - 100%	Desired Cooling is a status only item that indicates the calculated percentage of compressor cooling capacity required.
Desired Cooling Stg=	-	0-4	Desired Cooling Stg is a status only item that indicates the calculated compressor cooling stage required.
Current Cooling Stg=	-	0-4	Current Cooling Stg is a status only item that indicates the actual number of compressor stages energized, limited by availability, stage timers, and minimum on/off timers.
Comp ClgTurn On=	-	UNAVAIL AVAIL	Comp Clg Turn On is a status only item that indicates if next sequenced compressor output is available to be energized based on stage and compressor minimum on timers.
Comp Clg Turn Off=	-	UNAVAIL AVAIL	Comp Clg Turn Off is a status only item that indicates if the energized compressor output sequenced to be turned off next is available to be de-energized, based on stage and compressor minimum off timers.
Clg PI Target=	-	-40°F - 212°F	Clg PI Target is a status only item that indicates the target value used calculate the error for compressor staging control.
Clg PI Input=	-	-40°F - 212°F	Clg PI Input is a status only item that indicates the measured value that is compared to the Clg PI Target to calculate the error for compressor staging control.
Clg PI Output=	-	0% - 100%	Clg PI Output is a status only item that indicates the supply fan speed output for compressor staging control.

CW Clg Set-Up

Table 60: Main Menu \ Advanced Menu \ CW Valve Set-Up

Menu Display Name	Default	Range	Description
Clg Period=	20 seconds	1-600 seconds	Clg Period is an adjustable item that sets the “sampling time” used in the PI control function to vary the modulating chilled water valve position.
Clg Gain=	1.0	0.0-255.0	Clg Gain is an adjustable item that sets the “gain” used in the PI control function to vary the modulating chilled water valve position.
Clg PAT=	40 seconds	0-600 seconds	Clg PAT is an adjustable item that sets the “project ahead time” used in the PI control function to vary the modulating chilled water valve position.
Clg Max Chg=	15.00%	0.0%-100.0%	Clg Max Chg is an adjustable item that sets the maximum value of increase or decrease of the modulating chilled water valve each period used in the PI control function.
CW Valve Direction=	Direct	Direct Reverse	CW Valve Direction is an adjustable item that sets the chilled water valve output as direct acting (increasing voltage opens the valve) or reverse acting (decreasing voltage opens the valve).

Menu Display Name	Default	Range	Description
CW Valve Signal=	On-Off24VAC	Mod0-10V Mod2-10V On-Off24VAC	CW Valve Signal is an adjustable item that sets the type of signal used to control the chilled water valve.
CW Cooling Avail=	-	Unavail Avail	CW Cooling Avail is a status only item that indicates if chilled water cooling is available.
Clg PI Target=	-	50°F - 95°F	Clg PI Target is a status only item that indicates the target value used calculate the error for modulating chilled water valve control.
Clg PI Input=	-	-40°F - 212°F	Clg PI Input is a status only item that indicates the measured value that is compared to the Clg PI Target to calculate the error for modulating chilled water valve control.
Clg PI Output=	-	0% - 100%	Clg PI Output is a status only item that indicates the supply fan speed output for modulating chilled water valve control.

Heating Set-Up

Table 61: Main Menu \ Advanced Menu \ Heating Set-Up

Menu Display Name	Default	Range	Description
Control Temp=	-	-40°F - 212°F	Control Temp is a status only item which displays the current value of the Control Temperature. The Control Temperature is defined as the temperature input selected by the Control Temperature Source parameter.
HW Valve Pos=	-	0.0%-100.0%	HW Valve Pos is a status only item that indicates the hot water valve position based on the hot water and cold output water temperatures.
HW Valve Pos=	-	INACTIVE ACTIVE	HW Valve Pos is a status only item that indicates the Hot Water Valve position based on entering water setpoint temperature vs time.
Htg Stg 1=	-	INACTIVE ACTIVE	Htg Stg 1 is a status only item used as a means of turning on/off the 1st heating element when using electric heat.
Htg Stg 2=	-	INACTIVE ACTIVE	Htg Stg 2 is a status only item used as a means of turning on/off the 1st heating element when using electric heat.
Htg Stg 3=	-	INACTIVE ACTIVE	Htg Stg 3 is a status only item used as a means of turning on/off the 1st heating element when using electric heat.
Htg Stg 4=	-	INACTIVE ACTIVE	Htg Stg 4 is a status only item used as a means of turning on/off the 1st heating element when using electric heat.
SCR Output=	-	0.0%-100.0%	SCR Output is a status only item that is one of two applications that can provide an analog value to control an SCR for electric heat.
Occ Htg Spt=	70.0°F	50°F - 95°F	Occ Htg Spt is an adjustable item that indicates heating is required when the parameter for the Occupancy state has been selected.
Occ Diff	1°F	1°F - 5°F	Occ Diff is an adjustable item that sets the differential value used to determine if cooling/heating is no longer needed when the parameter for the Occupancy state has been set to occupied or standby.
Out Htg Spt=	55.0°F	45°F - 70°F	Out Htg Spt is an adjustable item that establishes the Control Temperature setpoint, below which the heating state is entered when the system is configured to use outdoor air to determine if heating or cooling are needed and occupied mode is selected.
Out Diff=	1.0°F	1°F - 5°F	Out Diff is an adjustable item that establishes the setpoint differential temperature value in which the system leaves heating or cooling mode when in Outdoor Air Temperature control.
Disch Air=	-	-40°F - 212°F	Disch Air is a status only item that is an analog input value to the system from a sensor that measures the Discharge Air Temperature.
DAT Htg Spt=	80.0°F	75.0°F - 120.0°F	DAT Htg Spt is an adjustable item that establishes the temperature setpoint used to modulate heating capacity when the unit is controlling the discharge air temperature.
DAT Vlv Htg DB=	1.0°F	1.0°F - 10.0°F	DAT Vlv Htg DB is a boundary zone, outside of which, the algorithm operates to keep the Discharge Air Temperature within.
DAT El Htg DB=	1.0°F	1.0°F - 10.0°F	DAT El Htg DB is a boundary zone, outside of which, the algorithm operates to keep the Discharge Air Temperature within.
EffSpaceT=	-	-40°F - 212°F	EffSpaceT is a status only item that is the Network Space Temperature (as received via BACNET) if valid, or the Room Sensor Space Temperature.
Return Temp=		-40°F - 212°F	Return Temp is a status only item that is the Effective Return Air Temperature.

Menu Display Name	Default	Range	Description
Unocc Htg Spt=	60.0°F	50.0°F - 95.0°F	Unocc Htg Spt is an adjustable item that indicates heating is required when the parameter for the Occupancy state (Occupancy=) has been set to unoccupied.
Unocc Diff=	2.0°F	1.0°F - 10.0°F	Unocc Diff is an adjustable item that establishes the setpoint differential temperature value in which the system leaves heating or cooling modes when the parameter for the Occupancy state (Occupancy=) has been set to unoccupied.
StdBy Htg Spt=	66.0°F	50.0°F - 95.0°F	StdBy Htg Spt is an adjustable item that indicates heating is required when the parameter for the Occupancy state (Occupancy=) has been set to standby.
Htg Stg Time Spt=	0 seconds	0-3600 seconds	Htg Stg Time Spt is an adjustable item that sets the maximum interval between binary heat stage changes.
Htg Stg Time=		0-3600 seconds	Htg Stg Time is status only item that is the interval between binary heat stage changes.
OA Temp=	-	-40°F - 212°F	OA Temp is a status only item that is an analog input value to the system from a sensor that measures the Effective Outdoor Air Temperature.

Preheat Set-Up

Table 62: Main Menu \ Advanced Menu \ Preheat Set-Up

Menu Display Name	Default	Range	Description
Preheat Source=	OAT	OAT EUT	Preheat Source is an adjustable item that selects which temperature value is used to determine if preheat is needed.
PH En Diff Sp=	10.0°F (-12.22°C)	1.0°F - 20.0°F (-17.22°C - -6.67°C)	PH En Diff Sp is an adjustable item which affects the temperature at which the unit will exit the preheat state for staged preheat applications.
PH Tgt Sp=	16.0°F (-8.89°C)	0.0°F - 40.0°F (-17.78°C - 4.44°C)	PH Tgt Sp is an adjustable item which affects the entering unit temperature target used for staging pre-heat when preheat is required.
PH OAT Diff Sp=	2.0°F (-16.67°C)	1.0°F - 10.0°F (-17.22°C - 12.22°C)	PH OAT Diff Sp is an adjustable item which affects the temperature at which the unit will exit the preheat state when OAT is the Preheat Source.
PH OAT Tgt Sp=	23.0°F (-5.0°C)	0.0°F - 40.0°F (-17.78°C - 4.44°C)	PH OAT Tgt Sp is an adjustable item which affects the temperature at which the unit will enter the preheat state when OAT is the Preheat Source.
Preheat Temp In=		-40°F - 212°F (-40°C - 100°C)	Preheat Temp In is a status only item that is the system preheat temperature input which can be sourced from either the OAT or EUT. Preheat is used by VRV's only.
Preheat Required=	NOT_REQUIRED	NOT_REQUIRED REQUIRED	Preheat Required is an adjustable item that indicates if system pre heat is required.
Eut Low Lim Spt=	16.0°F (-8.89°C)	0.0°F - 40.0°F (-17.78°C - 4.44°C)	Eut Low Lim Spt is an adjustable item which affects the entering unit temperature target used for staging pre-heat when preheat is required.

Supheat Set-Up

Table 63: Main Menu \ Advanced Menu \ Supheat Set-Up

Menu Display Name	Default	Range	Description
SUP Heat Source=	None	None 1-STG 4-STG SCR	SUP Heat Source is an adjustable item which configures the electric heat control.
Sup Heat Needed=	NOT_NEEDED	NOT_NEEDED NEEDED	Status only item that indicates if supplemental electric heat is needed or not.
Sup Heat En Time=	5 min	1-20 min	Sup Heat En Time is an adjustable item which affects how long to wait before enabling supplemental electric heat. This timer is for steady state operation after the Sup Heat Dly timer has expired.
Sup Heat En Diff=	2.0°F (-16.67°C)	1.0°F - 10.0°F (-17.22°C - 12.22°C)	Sup Heat En Diff is an adjustable item which affects how long to wait before enabling supplemental electric heat. This timer is for steady state operation after the Sup Heat Dly timer has expired.
SupHtg Wait Done=	FALSE	FALSE TRUE	Status only item that indicates if the controller is waiting for one of the timers to expire before using supplemental electric heat.
Sup Heat Dly Tm=	15 min	10-60 min	Sup Heat Dly Tm is an adjustable item which affects how long to allow the primary heat source to operate before enabling supplemental electric heat. This timer is for transitions to allow the primary heat source to satisfy the heating demand.

HW Valve Set-Up

Table 64: Main Menu \ Advanced Menu \ HW Valve Set-Up

Menu Display Name	Default	Range	Description
Htg Period=	60 seconds	1-600 seconds	Htg Period is an adjustable item that sets the “sampling time” used in the PI control function to vary the modulating hot water valve position.
Htg Gain=	1.5	0.0-255.0	Htg Gain is an adjustable item that sets the “gain” used in the PI control function to vary the modulating hot water valve position.
Htg PAT=	90 seconds	0-600 seconds	Htg PAT is an adjustable item that sets the “project ahead time” used in the PI control function to vary the modulating hot water valve position.
Htg Max Chg=	10.00%	0.0-100.0%	Htg Max Chg is an adjustable item that sets the maximum value of increase or decrease of the modulating hot water valve each period used in the PI control function.
HW Valve Direction=	Reverse	Direct Reverse	HW Valve Direction is an adjustable item that sets the hot water valve output as direct acting (increasing voltage opens the valve) or reverse acting (decreasing voltage opens the valve).
HW Valve Signal=	On-Off24VAC	Mod0-10V Mod2-10V On-Off24VAC	HW Valve Direction is an adjustable item that sets the type of signal used to control the hot water valve.
HW Heating Avail=	-	Unavail Avail	HW Heating Avail is a status only item that indicates if hot water heating is available.
Htg PI Target=	-	50°F - 95°F	Htg PI Target is a status only item that indicates the target value used calculate the error for modulating hot water valve control.
Htg PI Input=	-	-40°F - 212°F	Htg PI Input is a status only item that indicates the measured value that is compared to the Htg PI Target to calculate the error for modulating hot water valve control.
Htg PI Output=	-	0% - 100%	Htg PI Output is a status only item that indicates the supply fan speed output for modulating hot water valve control.

El Htg Set-Up

Table 65: Main Menu \ Advanced Menu \ El Htg Set-Up

Menu Display Name	Default	Range	Description
Htg Period=	10sec	1-600 seconds	Htg Period is an adjustable item that sets the “sampling time” used in the PI control function to vary the electric heat output.
Htg Gain=	1.5	0.0-255.0	Htg Gain is an adjustable item that sets the “gain” used in the PI control function to vary the electric heat output.
Htg PAT=	90 seconds	0-600 seconds	Htg PAT is an adjustable item that sets the “project ahead time” used in the PI control function to vary the electric heat output.
Htg Max Chg=	10	0.0-10.0%	Htg Max Chg is an adjustable item that sets the maximum value of increase or decrease of the electric heat output each period used in the PI control function.
Htg PI Target=	-	50°F - 95°F	Htg PI Target is a status only item that indicates the target value used calculate the error for electric heat output control.
Htg PI Input=	-	-40°F - 212°F	Htg PI Input is a status only item that indicates the measured value that is compared to the Htg PI Target to calculate the error for electric heat output control.
Htg PI Output=	-	0% - 100%	Htg PI Output is a status only item that indicates the supply fan speed output for electric heat output control.
Elec Heat Avail=	-	UNAVAIL AVAIL	Elec Heat Avail is a status only item that indicates if electric heat is available.
Desired Htg Stage=	-	0-4	Desired Htg Stage is a status only item that indicates the calculated number of electric heat stages required.
Current Htg Stage=	-	0-4	Current Htg Stage is a status only item that indicates the actual number of electric heat stages energized, limited by availability and stage timers.
El Heat Cmd=		NONE PRE-HEAT SUP PRIMARY REHEAT	Status only item that indicates the type of electric heat being provided

ChgOvr Valve Set-up

Table 66: Main Menu \ Advanced Menu \ ChgOvr Vlv Set-Up

Menu Display Name	Default	Range	Description
Clg Period=	20 seconds	1-600 seconds	Clg Period is an adjustable item that sets the "sampling time" used in the PI control function to vary the modulating changeover valve position in cooling.
Clg Gain=	1.0	0.0-255.0	Clg Gain is an adjustable item that sets the "gain" used in the PI control function to vary the modulating changeover valve position in cooling.
Clg PAT=	40 seconds	0-600 seconds	Clg PAT is an adjustable item that sets the "project ahead time" used in the PI control function to vary the modulating changeover valve position in cooling.
Clg Max Chg=	15.00%	0.0-100.0%	Clg Max Chg is an adjustable item that sets the maximum value of increase or decrease of the modulating changeover valve each period used in the PI control function in cooling.
Htg Period=	60 seconds	1-600 seconds	Htg Period is an adjustable item that sets the "sampling time" used in the PI control function to vary the modulating changeover valve position in heating.
Htg Gain=	1.5	0.0-255.0	Htg Gain is an adjustable item that sets the "gain" used in the PI control function to vary the modulating changeover valve position in heating.
Htg PAT=	90 seconds	0-600 seconds	Htg PAT is an adjustable item that sets the "project ahead time" used in the PI control function to vary the modulating changeover valve position in heating.
Htg Max Chg=	10.00%	0.0-100.0%	Htg Max Chg is an adjustable item that sets the maximum value of increase or decrease of the modulating changeover valve each period used in the PI control function in heating.
CO Valve Direction=	DIRECT	DIRECT REVERSE	CO Valve Direction is an adjustable item that sets the changeover water valve output as direct acting (increasing voltage opens the valve) or reverse acting (decreasing voltage opens the valve).
CO Valve Signal=	BINARY-24VAC	MOD2_TO_10VDC MOD0_TO_10VDC BINARY-24VAC	CO Valve Signal is an adjustable item that sets the type of signal used to control the changeover water valve.

Menu Display Name	Default	Range	Description
EWT Diff=	5°F	0°F - 10°F	EWT Diff is an adjustable item that sets the entering water temperature differential.
EWT=	-	-40°F - 212°F	EWT is a status only item which displays the current entering water temperature value being used by the controller. This will be the network supplied entering water temperature if available or the input from the entering water temperature sensor.
Htg PI Target=	-	50°F - 95°F	Htg PI Target is a status only item that indicates the target value used calculate the error for modulating changeover valve control in heating.
Htg PI Input=	-	-40°F - 212°F	Htg PI Input is a status only item that indicates the measured value that is compared to the Htg PI Target to calculate the error for modulating changeover valve control in heating.
Htg PI Output=	-	0% - 100%	Htg PI Output is a status only item that indicates the changeover valve output for modulating changeover valve control in heating.
HW Htg Avail=	-	UNAVAIL AVAIL	HW Htg Avail is a status only item that indicates if hot water heating is available.
Clg PI Target=	-	50°F - 95°F	Clg PI Target is a status only item that indicates the target value used calculate the error for modulating changeover valve control in cooling.
Clg PI Input=	-	-40°F - 212°F	Clg PI Input is a status only item that indicates the measured value that is compared to the Clg PI Target to calculate the error for modulating changeover valve control in cooling.
Clg PI Output=	-	0% - 100%	Clg PI Output is a status only item that indicates the changeover vale output for modulating changeover valve control in cooling.
CW Clg Avail=	-	UNAVAIL AVAIL	CW Clg Avail is a status only item that indicates if chilled water cooling is available.
EWT Heating Status=	IDLE	IDLE TESTING GOOD WAITING	EWT Heating Status is a status only item that indicates that status of the entering water temperature sampling for heating mode.
EWT Cooling Status=	IDLE	IDLE TESTING GOOD WAITING	EWT Cooling Status is a status only item that indicates that status of the entering water temperature sampling for cooling mode.

Menu Display Name	Default	Range	Description
EWT Htg Tmr=	-	seconds	EWT Htg Tmr is a status only item indicating the value of the entering water temperature sampling timer for heating.
EWT Clg Tmr=	-	seconds	EWT Clg Tmr is a status only item indicating the value of the entering water temperature sampling timer for cooling.
EWT Htg Retry=	-	min	EWT Htg Retry is a status only item indicating the value of the entering water temperature retry timer for heating.
EWT Clg Retry=	-	min	EWT Clg Retry is a status only item indicating the value of the entering water temperature retry timer for cooling.

Alarm Set-Up

Table 67: Main Menu \ Advanced Menu \ Alarm Set-Up

Menu Display Name	Default	Range	Description
High DAT Lim Spt=	170°F	90°F – 250°F	High DAT Lim Spt is a adjustable setpoint for the high discharge air temperature limit alarm.
Low DAT Lim Spt=	40°F	32°F - 50°F	Low DAT Lim Spt is a adjustable setpoint for the low discharge air temperature limit alarm.
DAT Alm Dly Spt=	35 Seconds	0-300 Seconds	DAT Alm Dly Spt is an adjustable item that is used to set the sensor alarm delay time.
Low AirTmp Alm Dly=	6 Minutes	0-15 Minutes	Low AirTmp Alm Dly is an adjustable item used to set how long the supply fan must be running before a low discharge air temperature alarm can occur.

Econo Set-Up

Table 68: Main Menu \ Advanced Menu \ Econo Set-Up

Menu Display Name	Default	Range	Description
Strategy=	NONE	NONE OAT ENTHAL-PY_OUT TEMP_ DIFF ENTHAL-PY_DIFF	Strategy is an adjustable item which sets the strategy that will be used to determine if the outdoor air is suitable for economizing.

Menu Display Name	Default	Range	Description
OAD Out Scaling=	LINEAR	LINEAR SQUARED	OAD Out Scaling is an adjustable item which sets how the return air damper output signal is scaled.
OAD Min=	20%	0% - 100%	Min OA Pos is an adjustable item which sets the minimum position of the outdoor damper while the fan is running. The actual OAD damper position will vary between this value and the Max OA Pos depending on economizer and DCV requirements.
OAD Max=	100%	0% - 100%	Max OA Pos is an adjustable item which sets the maximum outdoor damper signal that the controller will send.
RAD Out Scaling=	LINEAR	LINEAR SQUARED	RAD Out Scaling is an adjustable item which sets how the outdoor air damper output signal is scaled.
RAD Min=	20%	0% - 100%	RAD Min is an adjustable item which sets the position of the return air damper when the outdoor air damper is at its minimum position.
RAD Max=	100%	0% - 100%	RAD Max is an adjustable item which sets the position of the return air damper when the outdoor air damper is at is maximum position.
Econo OAT Setpt=	70°F	0°F - 100°F	Econo OAT Setpt is an adjustable item which sets the outdoor dry bulb temperature, above which the economizer will not be available.
Out Enth Setpt=	28 BTU/lb	5-50BTU/lb	Out Enth Setpt is an adjustable item which sets the Outdoor Enthalpy setpoint used in determining economizer availability.
Temp Diff Setpt=	2°F	1°F - 10°F	Temp Diff Setpt is an adjustable item which sets the control temperature to outdoor air temperature differential used in determining economizer availability.
Enth Diff Setpt=	2 BTU/lb	1-10 BTU/lb	Enth Diff Setpt is an adjustable item which sets the control enthalpy to outdoor air enthalpy differential used in determining economizer availability.
OAT Econ Lo Ena=	DISABLED	DISABLED ENABLED	OAT Econ Lo Ena is an adjustable item which sets if economizer lockout based on low outdoor air temperature is enabled.
OAT Econ LO Sp=	36°F	25°F - 60°F	OAT Econ LO Sp is an adjustable item which sets the outdoor air temperature at which OAT Lockout will be enabled.
Econo Stg Time=	5 min	3-60 min	Econo Stg Time is an adjustable item which sets the economizer interstage timer.

Menu Display Name	Default	Range	Description
Outdoor Enthalpy=	-	-200-200 BTU/lb	Outdoor Enthalpy is a status only item that indicates the current calculated outdoor enthalpy.
Indoor Enthalpy=	-	-200-200 BTU/lb	Indoor Enthalpy is a status only item that indicates the current calculated indoor enthalpy.
OAT High Status=	-	INACTIVE ACTIVE	OAT High Status is a status only item that indicates if the current outdoor air temperature is too high for economizing.
OAT Lockout Status=	-	UNLOCK LOCK	OAT Lockout Status is a status only item that indicates if the OAT Lockout functionality is preventing economizing.
OAT Status=	-	NOT_OK OK	OAT Status is a status only item that indicates if the outdoor air temperature is suitable for economizing.
Econo Avail=	-	UNAVAIL AVAIL	Econo Status is a status only item which indicates whether or not the economizer is currently enabled.
DCV OA Signal=	-	0% - 100%	DCV OA Signal is a status only item that indicates the OA damper position being commanded as part of DCV control.
EconOAD DB=	1.0	1.0-10.0	EconOAD DB is an adjustable item which sets the Deadband Setpoint to be used for the Outside Air Damper (OAD) Control PID operation when in ECONO mode.
EconOAD Period=	30 seconds	1-999 seconds	EconOAD Period is an adjustable item that sets the PID Period Setpoint for the Outdoor Air Damper.
EconOAD Gain=	10.0	0.0-100.0	EconOAD Gain is an adjustable item that sets the PID Gain Setpoint for the Outdoor Air Damper.
EconOAD PAT=	60 seconds	0-600 seconds	EconOAD PAT is an adjustable item that sets the PID Project Ahead Time Setpoint for the Outdoor Air Damper.
EconOAD MxChg=	10%	0%-100%	EconOAD MxChg is an adjustable item that sets the PID maximum Setpoint change for the Outdoor Air Damper.
Eff Strategy=	NONE	NONE OAT ENTHALPY_OUT TEMP_DIFF ENTHALPY_DIFF	Eff Strategy is an adjustable item which indicates the economizer strategy currently being used to determine if the outdoor air is suitable for economizing. This is based on the Econo Strategy and the reliability of the required sensors.

Dehum Set-Up

Table 69: Main Menu \ Advanced Menu \ Dehum Set-Up

Menu Display Name	Default	Range	Description
Dehum Htg Disable=	INACTIVE	INACTIVE ACTIVE	Dehum Htg Disable is an adjustable item that determines if dehumidification is available when in the heating mode.
Dehum Strategy=	NONE	NONE PASSIVE ACTIVE PRIMARY	Dehum Strategy is an adjustable item which configures the controller to use primary, active, passive, or no dehumidification.
Dehum Type=	DEWPT	REL_HUM DEWPT	Dehum Type is an adjustable item which configures dehumidification will be enabled based on a space relative humidity setpoint or a space dewpoint setpoint.
Dehum Required=	-	NONE NEEDED	Dehum Required is a status only item which indicates if dehumidification is required.
Dehum CW Vlv Cmd=	-	0% - 100%	Dehum CW Vlv Cmd is a status only item that indicates the chilled water valve output being commanded as part of dehumidification control.
Dehum HW Vlv Cmd=	-	INACTIVE ACTIVE	Dehum HW Vlv Cmd is a status only item that indicates the status of hot water valve control related to dehumidification.
Dehum EH Cmd=	-	INACTIVE ACTIVE	Dehum EH Cmd is a status only item that indicates the status of electric heat control related to dehumidification.
Dehum Available=	-	UNAVAIL PASSIVE_AVAIL ACTIVE_AVAIL	Dehum Available is a status only item that indicates if dehumidification is available.
Dehum DAT Sp=	70.0°F	45.0°F - 120.0°F	Dehum DAT Sp is an adjustable item which sets the temperature that the DAT should be maintained at when it is in the dehumidification mode of operation.
Dehum Htg DAT Sp=	80.0°F	75.0°F - 120.0°F	Dehum Htg DAT Sp is an adjustable item which sets the temperature that the DAT should be maintained at when it is in the heating mode of operation and dehumidification is required.
Dehum Wait Done=	FALSE	FALSE TRUE	Status only item that indicates if dehumidification startup delay timer has expired.

CO2 Sensor Set-Up

Table 70: Main Menu \ Advanced Menu \ CO2 Set-Up

Menu Display Name	Default	Range	Description
DCV Enable=	DISABLED	DISABLED ENABLED	DCV Enable is an adjustable item which sets if demand controlled ventilation will be enabled.
Min OA CO2 Spt=	500 ppm	0-3000 ppm	Min OA CO2 Spt is an adjustable item which sets the measured CO2 level where the DCV OA Signal will be the minimum OA damper position.
Max OA CO2 Spt=	2000 ppm	0-3000 ppm	Max OA CO2 Spt is an adjustable item which sets the measured CO2 level where the DCV OA Signal will be the maximum OA damper position.
DCV OA Signal=	-	0% - 100%	DCV OA Signal is a status only item that indicates the OA damper position being commanded as part of DCV control.
DCV Status=	ENABLED	DISABLED ENABLED	DCV OA Signal is a status only item that indicates if DCV has been disabled because of a CO2 sensor problem.

Energy Rec Set-Up

Table 71: Main Menu \ Advanced Menu \ Energy Rec Set-Up

Menu Display Name	Default	Range	Description
Eff Ret Hum=		0-100%	Eff RetHum is a status only item indicating the humidity level of the return air.
ER Stg Tm=	5 min	1-100 min	ER Stg Tm is an adjustable item used to set a minimum time for operating at either the minimum or maximum wheel speed before action is taken to change speed.

Table 72: Main Menu \ Advanced Menu \ Energy Rec Set-Up \ Defrost Menu

Menu Display Name	Default	Range	Description
Frost Method=	None	None Timed WhlSpd Preheat	Frost Method is an adjustable item that determines the method of Energy Wheel frost prevention: None - No frost prevention control. Timed - Timed pulse defrost for constant speed ERW. WhlSpd - Wheel speed reduction. Preheat - Preheat and wheel speed reduction.
OA Frst Temp	32.0 °F	-40-100.0°F	OA Fst Temp is an adjustable item used to set the outside air frost temperature.
Defrost Time	5min	0-60min	Defrost Time is an adjustable item used to set the duration of a defrost cycle.
Defrst Period	60min	0-1440min	Defrst Period is an adjustable item used to set how often a defrost cycle will be initiated.
Defrst On Tm	1 second	0-999 second	Defrst On Tm is an adjustable item used to select how long the constant speed energy wheel is energized during defrost.
Defrost Off Tm	24 seconds	0-999 seconds	Defrst Off Tm is an adjustable item used to select how long the constant speed energy wheel is de-energized during defrost.

Table 73: Main Menu \ Advanced Menu \ Energy Rec Set-Up \ Capacity Limiting

Menu Display Name	Default	Range	Description
Cap Limiting=	Yes	No Yes	Capacity Limiting is an adjustable item used to turn ON and OFF the energy wheel capacity limiting function.
Cap Max Sp=	100%	0% - 100%	Cap Max Sp is an adjustable item that sets the maximum operational speed output for a variable speed energy recovery wheel.
Cap Min Sp=	15%	0% - 100%	Cap Min Sp is an adjustable item that sets the minimum operational speed output for a variable speed energy recovery wheel.
CapLmt Diff=	5.0F	1F - 30.0F	CapLmt Diff is an adjustable item that sets the discharge air temperature differential required before slowing down the wheel for units with staged or D-Kit compressors.
CapLmt DB=	1.0dF	1dF - 10dF	CapLmt DB is an adjustable item which sets a dead band around the active target setpoint. No output control action is taken when the current target temperature input is within this dead band. This value will be used in cases where a heating or cooling dead band doesn't exist, based on operating mode.
Eff CapLmt DB=	1.0dF	1dF - 10dF	Eff CapLmt DB is a status only item that is the calculated value that sets the Variable Speed Capacity Limiting PID deadband based on the unit configuration.
CapLmt Per=	30sec	0 - 600sec	CapLmtPer is an adjustable item that sets the time period in which Capacity Limiting is active.

Menu Display Name	Default	Range	Description
CapLmt Gain=	1.0	0.0 - 10.0	CapLmtGain is an adjustable item that sets the “gain” used in the PID control function for capacity limit control.
CapLmt Pat=	90sec	0 - 600sec	CapLmt Pat is an adjustable item (Project Ahead Time) that will reduce overshoot as the electric heat control input approaches setpoint by causing staging to stop increasing before reaching the setpoint.
CapLmt MaxChg=	10%	0% - 100%	CapLmt MaxChg is an adjustable item that sets the maximum value of increase or decrease of the energy recovery wheel each period.
CapLmt Pid Tgt=	-	0.0 - 120.0°F	CapLmt Pid Tgt is a status only item that is used to determine if the Energy Recovery Wheel should enter/exit capacity limiting.
CapLmt Pid In=	-	0 - 100%	CapLmt Pid In is a status only item that is the Variable Speed Capacity Limiting PID Input (feedback).
CapLmt Pid Out=	-	0 - 100%	CapLmt Pid Out is a status only item that is the Variable Speed Capacity Limiting PID output.

Table 74: Main Menu \ Advanced Menu \ Energy Rec Set-Up \ Frost Prevention

Menu Display Name	Default	Range	Description
ER Min Off Tm=	20min	1- 100min	ER Min Off Tm is an adjustable item used to set the minimum amount of time the energy wheel will remain off after being turned OFF due to a frosting/ condensation condition.
Min ExhT Diff=	2°F	1.0- 20.0°F	Min Exh T Diff is an adjustable item that sets a differential below the calculated potential energy recovery exhaust air frosting point. When the ER Exh T falls below the calculated frosting point by more that this value, the energy wheel will be driven to its minimum speed, or turned OFF, to prevent frosting.
Max ExhT Diff=	6°F	1.0- 20.0°F	Max Exh T Diff is an adjustable item that sets a differential above the calculated potential energy recovery exhaust air frosting point. Once the wheel is driven to minimum speed, or turned off, to prevent frosting, it is driven back to maximum speed, or turned ON, only when ER Exh T rises back above the calculated frosting point by more that this value.
Exht Frost Sp=	32.0°F	23.0- 41.0°F	Exht Frost Sp is an adjustable item that sets a minimum entering wheel temp at which frost prevention will be allowed.
Intersect Pt=	-	-146.2- 150.0°F	Intersect Pt is the calculated intersection point with saturation line for the process line between the OAT at 95% RH and the actual return air temperature and return air humidity.
Preheat Capacity=	0%	0% to 100%	Preheat Capacity is a status only item that is the Energy Recovery Preheat Capacity Percentage.
PHgt Stg Diff=	5.0dF	1.0 - 10.0°F	
Scr Htg DB=	2.0F	1.0 - 10.0°F	
Scr Htg Period=	60.0s	0-999s	Scr Htg Period an adjustable item which sets the “sampling time” used in the PI control function.
Scr Htg Gain=	0.8	0.0-100.0	Scr Htg Gain is an adjustable item which sets the “Gain” used in the PI control function.
Scr Htg PAT=	120.0s	0-999s	Scr Htg PAT is an adjustable item which sets the “project ahead time” used in the PI control function.
Scr Htg Max Chg=	10%	0-100%	Scr Htg Max Chg is an adjustable item that sets the maximum value for an increase or decrease of the energy recovery wheel speed.
Scr Htg Min Sp=	-	0% to 100%	
Scr Htg Pid Tgt=	-	-167.8 - 170.6°F	
Scr Htg Pid In=	-	-148 - 150°F	
Scr Htg Pid Out=	-	0% to 100%	
Mod Htg DB=	2.0F	1.0 - 10.0°F	
Mod Htg Period=	60sec	0 - 999sec	
Mod Htg Gain=	0.8	0.0 to 100.0	
Mod Htg PAT=	120sec	0 - 999sec	
Mod Htg Max Chg=	10%	0% to 100%	
Mod Htg Min Sp=	-	0% to 100%	
Mod Htg Pid In=	-	-148 - 150°F	Mod Htg Pid In is a status only item that is the Energy Recovery Electric Preheat PI loop input (feedback).

Menu Display Name	Default	Range	Description
Mod Htg Pid Out=	-	0% to 100%	Mod Htg Pid Out is a status only item that is the Energy Recovery Electric Heat PI loop output.
Mod Htg Pid Tgt=	-	-167.8 - 170.6°F	Mod Htg Pid Tgt is a status only item that is the calculated setpoint used for ER preheat control.

Table 75: Main Menu \ Advanced Menu \ Energy Rec Set-Up \ Start/Stop

Menu Display Name	Default	Range	Description
Start Command=	Off	Off On	Start Command is a status only item that indicates whether the Energy Recovery Wheel is being commanded to turn on or off.
Wheel Command=	-	0.0 - 100.0%	Wheel Command is a status only item that indicates the speed of the Energy Recovery Wheel as percentage of voltage or speed being commanded.
Capacity=	-	0.0 - 100.0%	Capacity is a status only item that indicates the capacity of the Energy Recovery Wheel as a percentage. For On/Off configuration, this is set to 100%. For variable speed configurations, this is obtained from the VFD.
Capacity Fdbk=	-	0.0 - 100.0%	Capacity Fdbk is a status only item that is the Wheel speed feedback value.
Rotation Status=	-	Invalid NotRotating Rotating	Rotation Status is a status only item that is the output of the Energy Recovery Wheel Proof of Rotation code.
Enth OA Diff=	-	0.0 - 10.0°F	Enth OA Diff is an adjustable item that allows the field to adjust the offset to the Cooling DAT Target used to define the expected temperature of the cooling coil.
Enth Sat SupAir=	-	-200 to 200 BTU/lb	Enth Sat SupAir is a status only item that is the calculated value used to determine if the Energy Recovery Wheel should run or not when in the Cooling or Dehumidification modes.
Htg DAT Tgt=		0.0F - 120.0°F	Htg DAT Tgt is a status only item that is the calculated value used to determine if the Energy Recovery Wheel should run or not when in the Heating, FanOnly, or MinDat modes.
Clg DAT Tgt=	-	0.0F - 120.0°F	Clg DAT Tgt is a status only item that is the calculated value used to determine if the Energy Recovery Wheel should run or not when in the Cooling or Dehumidification modes.

Table 76: Main Menu \ Advanced Menu \ Energy Rec Set-Up \ Passive Rotation

Menu Display Name	Default	Range	Description
Pre Chg Type=	NONE	NONE RUNTIME BIN_INPUT BOTH	Pre Chg Type is an adjustable item that determines if the controller will provide a change filter notification and, if so, whether the notification will be based on fan runtime, digital input, or both.
Pre Chg Time=	1440 Hours	360 – 4320 Hours	Pre Chg Time is an adjustable item that sets the setpoint at which a dirty filter notification will occur.
Pre Runtime=	0hr	0hr to 1440hr	Pre Runtime is a status only item that is the Energy Recovery Filter Runtime or, more specifically, the total amount of time the fan has been running since the last pre dirty filter reset occurred. Pre Runtime= can be reset when the filter is replaced.
Pre Sig Sel=	NORM_ CLOSED	NORM_ OPEN NORM_ CLOSED	Pre Sig Sel is an adjustable paramater that sets whether the dirty filter switch for the pre filter(s) is normally open or normally closed.
Pre Chg Status=		OPEN CLOSED	Pre Chg Status is a status only item that is a binary input to the system that indicates that a pre filter of some type needs to be changed.
Pre Status=		CLEAN DIRTY	Pre Status is a status only item that is the current status of the binary input referencing the Pre Sig Sel= and Pre Chg Status=.

Table 77: Alarm Types and Descriptions

Alarm Number	Alarm Display Name	Reset Type	Description
230	Control Model	Auto	A fault alarm that indicates that there is an incompatibility between unit controller hardware and the software application. Contact Daikin Applied to acquire the correct version of software.
225	Freeze Alarm	Manual	When a unit is equipped with chilled water or hot water coil, the Freeze Alarm occurs when the optional freezestat contacts open as a result of detecting an abnormally low water coil temperature. When the Freeze fault occurs, the controller opens the unit will shut down, 2-position chilled water and/or hot water valves will open, and modulating chilled water and/or hot water valves will open to 50%.
220	Emergency Stop	Auto	An Emergency Stop Fault will occur when the Emergency Stop Input in the Alarm (Open) condition.
219	VRV D-Kit Communication Fault	Auto	If the MicroTech 4 Unit Controller is unable to communicate with the D-Kit controller, a VRV D-Kit Communication Fault alarm will be generated and the unit will be shut down.
218	VRV D-Kit Outdoor Unit Fault Alarm	Auto	The VRV outdoor unit has indicated a fault and the unit needs to be shut down.
217	Configuration Fault Alarm	Auto	A fault alarm that indicates the unit is configured incorrectly relative to the actual hardware configuration. To understand the misconfiguration, a user must enter ConfigFltStatus to find the fault parameter and cross reference the parameter with its corresponding description in Table 78 on page 77.
216	Entering Unit Temp Sensor Fail	Auto	If the unit requires an entering unit temperature sensor (EUT) for control and the input is open or short circuited, the Entering Unit Temp sensor fail occurs. When the Entering Unit Temp sensor fail occurs, the unit is shut down.
215	Control Temp Failure	Manual	If both the space and optional return air temperature sensor are not reliable, a Control Temperature Failure occurs. When the Control Temperature Fault occurs, the unit is shut down. It remains shut down until the Control Temperature Failure is manually cleared through the unit keypad or via a network signal.
213	Discharge Air Temp Low Fault Alarm	Manual	If the discharge air temperature is less than the Low Discharge Temperature Limit (Default = 40°F) for longer than 35 seconds and the supply fan has been on for longer than the LowDAT temperature alarm delay (Default = 6 minutes), the Low Discharge Air Temperature fault occurs. When the Low Discharge Air Temperature fault occurs, the unit is shut down. It remains shut down until the Low Discharge Air Temperature fault is manually cleared through the unit keypad or via a network signal.
212	Discharge Air Temp High Fault Alarm	Manual	If the discharge air temperature is greater than the High Discharge Temperature Limit (Default = 170°F) and the supply fan has been on for longer than the Temperature Alarm Delay (Default = 35 seconds), the High Discharge Air Temperature fault occurs. When the High Discharge Air Temperature fault occurs, the unit is shut down. It remains shut down until the High Discharge Air Temperature fault is manually cleared through the unit keypad or via a network signal.
210	Airflow Alert	Intel	The Airflow Alert occurs when the airflow switch is installed and indicates that there is no airflow when the supply fan has been running for longer than the air flow start delay. When the Airflow Alert occurs, the unit is shut down.
209	VRV D-Kit Rh Connection Fault Alarm	Auto	If the D-Kit detects a communication problem with the reheat EEV controller a D-Kit Rh Connection Fault Alarm will be generated and the unit will be shut down.
208	VRV D-Kit Dx Connection Fault Alarm	Auto	If the D-Kit detects a communication problem with the compressor EEV controller a D-Kit DX Connection Fault Alarm will be generated and the unit will be shut down.
207	Entering Unit Temp Low Fault Alarm	Manual	If preheat is required, all forms of pre heat are maxed out and the entering unit temperature is still below setpoint for longer than the Entering Unit Temperature Low Alarm Delay (default 15 minutes), an entering unit temperature Low Fault Alarm will be generated and the unit will be shut down.
205	Discharge Air Temp sensor Fail	Auto	If the unit requires a discharge air temperature sensor (DAT) for control and the input is open or short circuited , the Discharge Air Temp sensor fail occurs. When the Discharge Air Temp sensor fail occurs, the unit is shut down.
203	VRV W-Kit Outdoor Unit Fault Alarm	Auto	If the W-Kit detects a communication problem with Leaving Coil Temperature Sensor (either sensor failure, Invalid or out of range temperature, or not installed) for 30 seconds, a VRV W-Kit, Outdoor Unit Fault Alarm will be generated and the unit will be shut down.
188	Blocked Condensate	Auto	The Blocked Condensate problem occurs when the optional condensate overflow switch is installed and indicates the presence of condensate for longer than 60 seconds. When the Blocked Condensate problem occurs, mechanical cooling and dehumidification are immediately disabled.
175	Space Temp Sensor Fail	Auto	A Space Temp sensor Fail problem will occur if the Control Temperature Source is Space or Average, and the space temperature value is not reliable. When the Space Temp sensor Fail problem occurs, the controller will attempt to temporarily switch the Control Temperature Source to Return Air, if the return air temperature is available, otherwise it will result in a Control Temperature Failure.

Alarm Number	Alarm Display Name	Reset Type	Description
177	SZVAV Space Temp Problem with OAT Control	Auto	If the space air temperature sensor value is either invalid on a Single Zone VAV unit where the Control Temperature Source is outdoor air temperature, a SZVAV Space Temp Problem with OAT Control alarm will be generated and the supply fan speed will not be modulated.
165	Duct Static Pressure Sensor Fail	Auto	The Duct Static Pressure Sensor Fail problem occurs if a unit is configured for duct static pressure supply fan control and the duct static pressure sensor input is open or shorted. When the Duct Static Pressure Sensor Fail problem occurs, the supply fan will be set to minimum speed and an alarm will be indicated at the user interfaces and via BACnet.
160	Entering Water Temp Sensor Fail	Auto	The Entering Water Temp sensor Fail problem occurs if a unit requiring an entering water temperature sensor for control and the effective entering water temperature is unreliable. When the Entering Water Temp sensor Fail problem occurs, changeover valve heating and cooling will be disabled, and an alarm will be indicated at the user interfaces and via BACnet.
155	Entering Water Temp Inadequate Fail	Auto	The Entering Water Temp sensor Fail problem occurs on a two pipe chilled water/hot water changeover unit if the controller has been sampling the entering water temperature for longer than the entering water temperature sampling time, and it has not been deemed adequate for the appropriate mode of operation. When the Entering Water Temp sensor Fail problem occurs, changeover valve heating and cooling will be disabled for the duration of the entering water temperature retry time, and an alarm will be indicated at the user interfaces and via BACnet.
150	Outdoor Air Temp Sensor Fail	Auto	The Outdoor Air Temp sensor Fail problem occurs if a unit requires an outdoor air temperature sensor for control and the effective outdoor air temperature is unreliable. When the Outdoor Air Temp sensor Fail problem occurs, economizer operation will be disabled, and an alarm will be indicated at the user interfaces and via BACnet.
149	Energy Recovery Return Air Humidity Fail	Auto	The Energy Recovery Return Air Humidity Fail problem occurs if a unit requiring a return air humidity sensor for control and the return air humidity value input is unreliable. When the Energy Recovery Return Air Humidity Fail occurs, the Energy Recovery Weel Defrost and Capacity Limiting will be disabled and an alarm will be indicated at the user interfaces and via BACnet.
148	Energy Recovery Leaving Air Temperature Fail	Auto	The Energy Recovery Leaving Air Temperature Sensor Fail problem occurs if a leaving air temperature sensor for control and the Energy Recovery Wheel Exhaust Temperature input is unreliable when the Energy Recovery Frost Control Type is Wheel Speed Reduction or both Preheat and Wheel Speed Reduction for frost prevention. When the Energy Recovery Leaving Air Temperature Sensor Fail problem occurs, the Energy Recovery Wheel Defrost will be disabled, and an alarm will be indicated at the user interfaces and via BACnet.
147	Energy Recovery Wheel Exhaust Temperature Fail	Auto	The Energy Recovery Wheel Exhaust Temperature Sensor Fail problem occurs if a wheel exhaust air temperature sensor for control and the Energy Recovery Wheel Exhaust Temperature input is unreliable when the Energy Recovery Frost Control Type is Wheel Speed Reduction or both Preheat and Wheel Speed Reduction for frost prevention. When the Energy Recovery Wheel Exhaust Temperature Fail occurs, the Energy Recovery Wheel Defrost will be disabled, and an alarm will be indicated at the user interfaces and via BACnet.
145	CO2 Sensor Fail	Auto	The CO2 sensor Fail problem occurs if a unit has demand controlled ventilation enabled and the effective outdoor air temperature is unreliable. When the CO2 sensor Fail problem occurs, demand controlled ventilation operation will be disabled, and an alarm will be indicated at the user interfaces and via BACnet.
140	Outdoor Air Humidity Sensor Fail	Auto	The Outdoor Air Humidity sensor Fail problem occurs if a unit requires an outdoor air humidity sensor for control and the effective outdoor air humidity is unreliable. When the Outdoor Air Humidity sensor Fail problem occurs, the economizer strategy will be temporarily be limited to outdoor air temperature, and an alarm will be indicated at the user interfaces and via BACnet.
135	Dehumidification DAT Low	Intel	The Dehumidification DAT Low problem occurs if a unit is in the dehumidification mode, heating is at maximum and the discharge air temperature is below the dehumidification discharge air temperature setpoint -3F for more than 5 minutes. When the Dehumidification DAT Low problem occurs, dehumidification will be disabled for 5 minutes, and an alarm will be indicated at the user interfaces and via BACnet.
130	Space Humidity Sensor Fail	Auto	The Space Humidity Sensor Fail problem occurs if a unit requires a space air humidity sensor for control and the effective space humidity is unreliable. When the Space Humidity sensor Fail problem occurs, the economizer strategy will be temporarily be limited to outdoor air enthalpy, or outdoor air temperature, and an alarm will be indicated at the user interfaces and via BACnet.
125	Return Air Temp Sensor Fail	Auto	A Return Air Temp sensor Fail problem will occur if the Control Temperature Source is Return or Average, and the return air temperature value is not reliable. When the Return Air Temp sensor Fail problem occurs, the controller will attempt to temporarily switch the Control Temperature Source to Space, if the space temperature is available, otherwise it will result in a Control Temperature Failure.

Alarm Number	Alarm Display Name	Reset Type	Description
120	Leaving Coil Temp Sensor Fail	Auto	The Leaving Coil Temp sensor Fail problem occurs if a unit requires a leaving coil temperature sensor for control and the leaving coil temperature sensor input is open or shorted. When the Leaving Coil Temp sensor Fail problem occurs, the economizer strategy will be temporarily be limited to outdoor air enthalpy, or outdoor air temperature, and an alarm will be indicated at the user interfaces and via BACnet.
45	Outdoor Air Damper Stuck	Auto	A warning alarm indicating the outdoor air dampers are stuck and not modulating will be generated whenever the damper are stuck open or stuck closed. The dampers are considered stuck open when either of the following abnormal situations occurs: The damper command value is less than the calibrated damper end switch closed value continuously for 180 seconds yet the outside air damper end switch input remains open. The damper end switch input does not change from closed to open with 30 seconds of the damper command value dropping (and remaining) below the calibrated damper end switch open value (less the calibrated maximum switch differential). The dampers are considered stuck closed when either of the following abnormal situations occurs: The damper command value is greater than the calibrated damper end switch open value continuously for 180 seconds yet the outside air damper end switch input remains open. The damper end switch input does not change from closed to open with 30 seconds of the damper command value rising above the calibrated damper end switch closed value (plus the calibrated minimum switch differential). The damper stuck warning will also be generated when the damper end switch operation is unreliable. The end switches are considered unreliable when the end switch input remains closed when the damper command value is between the calibrated end switch closed and open values (plus and minus the calibrated minimum and maximum switch differentials). The alarm will automatically clear when the conditions causing the alarm are no longer present.
40	Excess Outdoor Air	Auto	A warning alarm indicating the unit is delivering excessive outdoor air will be generated whenever the outdoor air dampers are stuck open. The outdoor dampers are considered stuck open when either of the following abnormal situations occurs: The damper command value is less than the calibrated damper end switch closed value continuously for 180 seconds yet the outside air damper end switch input remains open. The damper end switch input does not change from closed to open with 30 seconds of the damper command value dropping (and remaining) below the calibrated damper end switch open value (less the calibrated maximum switch differential). The excess outdoor air warning will also be generated while operating in the Econo or Cooling state when the Econo Status is Enabled and the OAT is greater than the Max OAT Limit setting (default 75F). NOTE: This case is ignored when the economizer enable decision is being controlled by a network input or when the economizer changeover method (EconChgovr) is set for OAT/RAT dry bulb comparison (OAT/ RAT). The alarm will automatically clear when the conditions causing the alarm are no longer present. NOTE: The damper end switch open (PosSwOpen%), Minimum switch differential (MinSwDiff), damper end switch closed (PosSwClose%) and maximum switch differential (MaxSwDiff) values are determined during the OAD damper end switch calibration process. The alarm will automatically clear when the conditions causing the alarm are no longer valid.

Alarm Number	Alarm Display Name	Reset Type	Description
35	Under Economizing	Auto	A warning alarm indicating the unit is not economizing when it should be will be generated whenever the outdoor air dampers are stuck closed while operating in the Econo or Cooling state. The dampers are considered stuck closed when either of the following abnormal situations occurs: The damper command value is greater than the calibrated damper end switch open value continuously for 180 seconds yet the outside air damper end switch input remains open. The damper end switch input does not change from closed to open with 30 seconds of the damper command value rising above the calibrated damper end switch closed value (plus the calibrated minimum switch differential). The under economizing alarm will also be generated if the Econo Status is not Enabled when the OAT is less than the Min OAT Limit setting (default 70F). NOTE: This case is ignored when the economizer enable decision is being controlled by a network input or when the economizer changeover method (EconChgovr) is set for OAT/RAT dry bulb comparison (OAT/RAT). The under economizing alarm will also be generated when the OAT sensor is unreliable or the RAT sensor is unreliable while the OAT is below the Min OAT Limit setting (default 70F) and the economizer changeover method (EconChgovr) is set for OAT/RAT dry bulb comparison (OAT/RAT). The alarm will automatically clear when the conditions causing the alarm are no longer present. NOTE: The damper end switch open (PosSwOpen%), Minimum switch differential (MinSwDiff), damper end switch closed (PosSwClose%) and maximum switch differential (MaxSwDiff) values are determined during the OAD damper end switch calibration process.
30	Over Economizing	Auto	A warning alarm indicating the unit is economizing when it should not be will be generated whenever the outdoor air dampers are stuck open while operating in the Econo or Cooling operating state. The dampers are considered stuck open when either of the following abnormal situations occurs: The damper command value is less than the calibrated damper end switch closed value continuously for 180 seconds yet the outside air damper end switch input remains open. The damper end switch input does not change from closed to open with 30 seconds of the damper command value dropping (and remaining) below the calibrated damper end switch open value (less the calibrated maximum switch differential). The over economizing warning will also be generated if the Econo Status is Enabled when the OAT is greater than the Max OAT Limit setting (default 75F). NOTE: This case is ignored when the economizer enable decision is being controlled by a network input or when the economizer changeover method (EconChgovr) is set for OAT/RAT dry bulb comparison (OAT/ RAT). The alarm will automatically clear when the conditions causing the alarm are no longer present. NOTE: The damper end switch open (PosSwOpen%), Minimum switch differential (MinSwDiff), damper end switch closed (PosSwClose%) and maximum switch differential (MaxSwDiff) values are determined during the OAD damper end switch calibration process.
25	Duct Static Pressure Alert	Auto	The Duct Static Pressure Alert warning occurs if a unit is configured for duct static pressure supply fan control and the duct static pressure has been .25in above or below setpoint for longer than the duct static pressure alarm timer. When the Duct Static Pressure Sensor Fail warning occurs, an alarm will be indicated at the user interfaces and via BACnet.
20	Change Filter	Auto	The Change Filter warning occurs based on incremental supply fan run hours, or a digital input depending on the Filter Chg Strategy parameter. When the Change Filter warning occurs, an alarm will be indicated at the user interfaces and via BACnet. The alarm will clear when the switch returns to its normal state, or the Filter operating hours has been reset below the Filter Chg Time.
15	Pre Change Filter Warning Alarm	Auto	This warning indicates that the Energy Recovery filter needs to be changed. This warning triggers the Change Filter alarm at the user interfaces and BACnet (see Change Filter above).
10	VRV D-Kit Defrost Warning Alarm	Auto	This warning indicates that the VRV outdoor unit has entered a defrost state and heating operation may not meet expectations
5	Modbus Wheel Feedback Warning	Auto	If the Modbus Energy Recovery Wheel feedback communication is interrupted for 60 seconds, or a Modbus fault is detected, or the Energy Recovery Wheel has been on longer than the Stage Timer and no rotation is detected by the Rotation Sensor, an alarm is sent to the User Interface and/or BACNET warning of the condition.

Table 78: Configuration Alarms

Priority	Indication	Condition	Description
1	PreHeatWithoutVrv	((cpElHtgType == [PRE_HEAT, PRE_SUP_HEAT]) AND (cpCmpStgsSel != [VRV-D, VRV-W]))	Configured for Electric PreHeat, but compressor is not VRV.
2	VrvWPreheatNoOat	((cpCmpStgsSel == VRV-W) AND (cpElHtgType == [PRE_HEAT, PRE_AND_SUP_HEAT])) AND ((cpPreheatTempInSel != OAT) OR (cpOATInst == NotInst))	Configured for VRV-W with PreHeat, but OAT is not available.
3	VrvPrimaryElectHt	((cpCmpStgsSel == [VRV-D, VRV-W]) AND (cpElHtgSel != NONE) AND (cpElHtgType == PRIMARY))	VRV cannot have Primary electric heat.
4	SCRPreHtWithoutVrvD	((cpElHtgSel == SCR) AND (cpElHtgType == [PRE_HEAT, PRE_AND_SUP_HEAT]) AND (cpCmpStgsSel != VRV-D]))	SCR with Preheat configured and its not a VRV-D.
5	Invalid Fan Type	((cpDehumCtrlSel == PASSIVE) AND (cpSupFanCtrlSel== [DSP, SZ_VAV)	It is an invalid configuration type to be configured with PASSIVE Dehumidification and a Fan type of DSP or SZ_VAV.
6	No Heat Source	(cpClgHtgVlv == [None, Cooling]) AND (cpElHtgSel == NONE) AND (cpDehumCtrlSel == [ACTIVE, PRIMARY])	Active or Primary dehumidification is selected with no heat source.

7	Dehumid Selected	{ // No Dehum with this type of Config is allowed
		cpPipe==2Pipe AND
		clClgHtgVlv==HEAT AND
		cpCmpStgsSel==None AND
		cpDehumCtrlSel != NONE
		}
		||
		{ // Only PASSIVE is allowed with this type of Config
		cpDehumCtrlSel==[ACTIVE, PRIMARY] AND
		cpPipe==2-Pipe AND
		cpElHtgSel==None AND
		cpClgHtgVlv == [None, Cool] AND
		cpCmpStgsSel != VRV-D
		}
			This is used to identify a Dehumidification configuration that is illegal.

8	ElHeatVlvHeat	Rule22==TRUE
		AND
		{
		cpHtgClgVlvSel==[HEAT, BOTH]
		AND
		NOT (2-Pipe Changeover Configuration)
		}
			A Valve Heating Source and an Electric Heating source can never be configured together.

9	NoLctInstalled	Rule27==FALSE AND Rule30==TRUE	Dehumidification should never be selected without having the LCT installed.

IO Readings

Table 79: Main Menu \ Advanced Menu \ IO Readings

Menu Display Name	Default	Range	Description
MCB Universal			
MCB X1=	-	0-9999999	Status only item that indicates the unprocessed data of the indicated input/output.
MCB X2=	-	0-9999999	
MCB X3=	-	0-9999999	
MCB X4=	-	0-9999999	
MCB X5=	-	0-9999999	
MCB X6=	-	0-9999999	
MCB X7=	-	0-9999999	
MCB X8=	-	0-9999999	
MCB X9=	-	0-9999999	
MCB X10=	-	0-9999999	
MCB X11=	-	0-9999999	
MCB DI			
MCB DI1=	Passive	Passive	Status only item that indicates the unprocessed data of the indicated input/output.
		Active	
MCB DI2=	Passive	Passive	
		Active	
MCB DI3=	Passive	Passive	
		Active	
MCB DI4=	Passive	Passive	
		Active	
MCB DI5=	Passive	Passive	
		Active	
MCB DI6=	Passive	Passive	
		Active	
MCB DO			
MCB DO1=	Passive	Passive	Status only item that indicates the unprocessed data of the indicated input/output.
		Active	
MCB DO2=	Passive	Passive	
		Active	
MCB DO3=	Passive	Passive	
		Active	
MCB DO4=	Passive	Passive	
		Active	
MCB DO5=	Passive	Passive	
		Active	
MCB DO6=	Passive	Passive	
		Active	
MCB DO7=	Passive	Passive	Status only item that indicates the unprocessed data of the indicated input/output.
		Active	
MCB DO8=	Passive	Passive	
		Active	
MCB DO9=	Passive	Passive	
		Active	
MCB DO10=	Passive	Passive	
		Active	
EMA Universal			
EMA X1=	-	0-9999999	Status only item that indicates the unprocessed data of the indicated input/output.
EMA X2=	-	0-9999999	
EMA X3=	-	0-9999999	
EMA X4=	-	0-9999999	
EMA X5=	-	0-9999999	
EMA X6=	-	0-9999999	
EMA X7=	-	0-9999999	
EMA X8=	-	0-9999999	
EMA DI			
EMA DI1=	Passive	Passive	Status only item that indicates the unprocessed data of the indicated input/output.
		Active	
EMA DO			
EMA DO1=	Passive	Passive	Status only item that indicates the unprocessed data of the indicated input/output.
		Active	
EMA DO2=	Passive	Passive	
		Active	
EMA DO3=	Passive	Passive	
		Active	
EMA DO4=	Passive	Passive	
		Active	
EMA DO5=	Passive	Passive	
		Active	
EMA DO6=	Passive	Passive	
		Active	
EMB Universal			
EMB X1=	-	0-9999999	Status only item that indicates the unprocessed data of the indicated input/output.
EMB X2=	-	0-9999999	
EMB X3=	-	0-9999999	
EMB X4=	-	0-9999999	
EMB X5=	-	0-9999999	
EMB X6=	-	0-9999999	
EMB X7=	-	0-9999999	
EMB X8=	-	0-9999999	
EMB DI			
EMB DI1=	Passive	Passive	Status only item that indicates the unprocessed data of the indicated input/output.
		Active	
EMB DO			
EMB DO1=	Passive	Passive	Status only item that indicates the unprocessed data of the indicated input/output.
		Active	
EMB DO2=	Passive	Passive	
		Active	
EMB DO3=	Passive	Passive	
		Active	
EMB DO4=	Passive	Passive	
		Active	
EMB DO5=	Passive	Passive	
		Active	
EMB DO6=	Passive	Passive	
		Active	

About This AHU

Table 80: Main Menu \ About This AHU

Menu Display Name	Description
App Version=	Status only indicating information concerning the unit controller application version.
Controller ID=	
Controller PN=	
Device ID=	
Main BSP=	
HMI GIUD=	
OBH GIUD=	

Appendix

Example Wiring Diagrams

Figure 21: 3 Phase Power, SCR Electric Heat, No Valve, Modulating Damper, VFD Fan

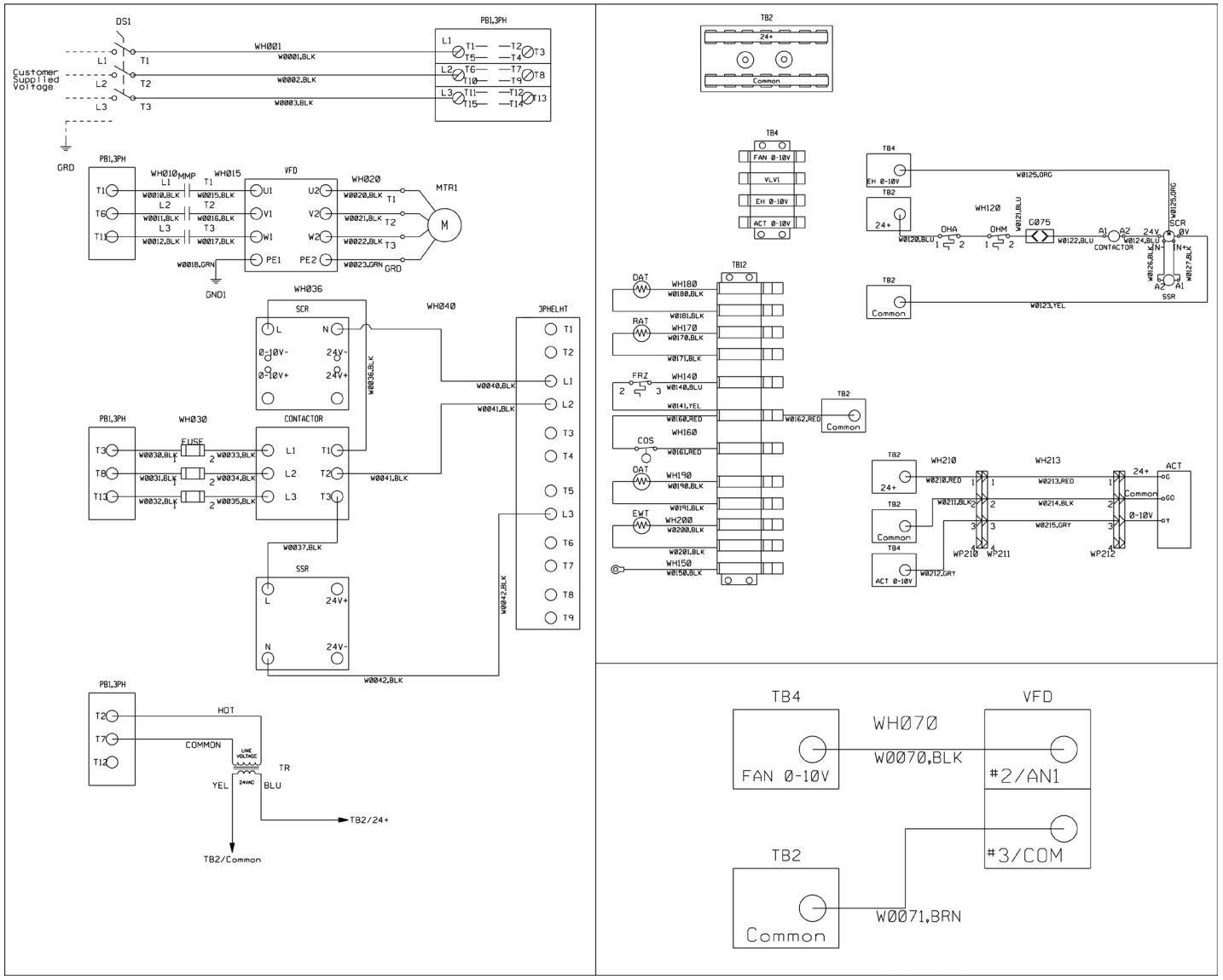


Figure 22: 1 Phase Power, SCR Electric Heat, Modulating Valve, Modulating Damper, Modulating Fan

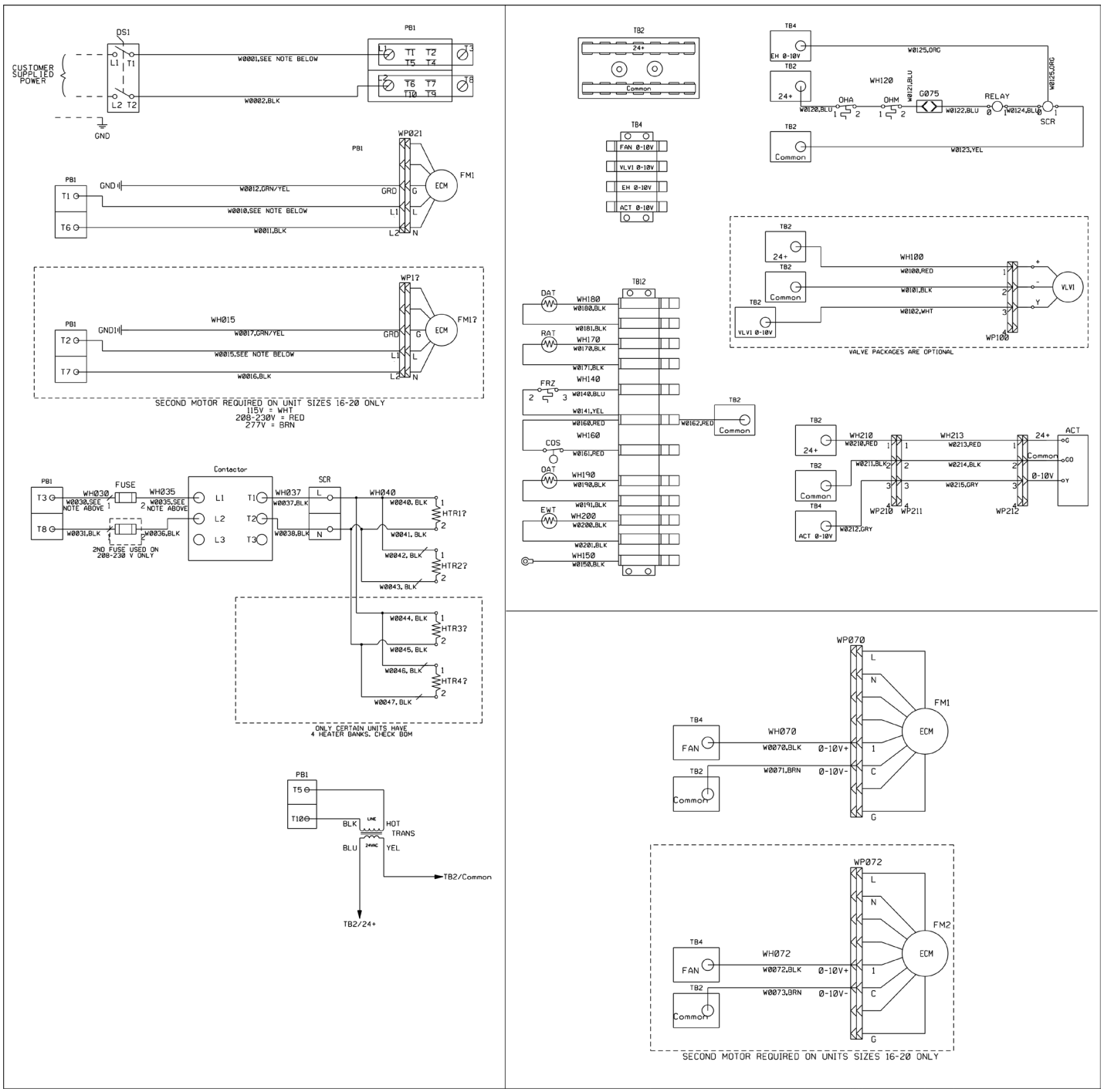


Figure 23: 1 Phase Power, On-Off Electric Heat, On-Off Valve, On-Off Damper, 3-Speed Fan

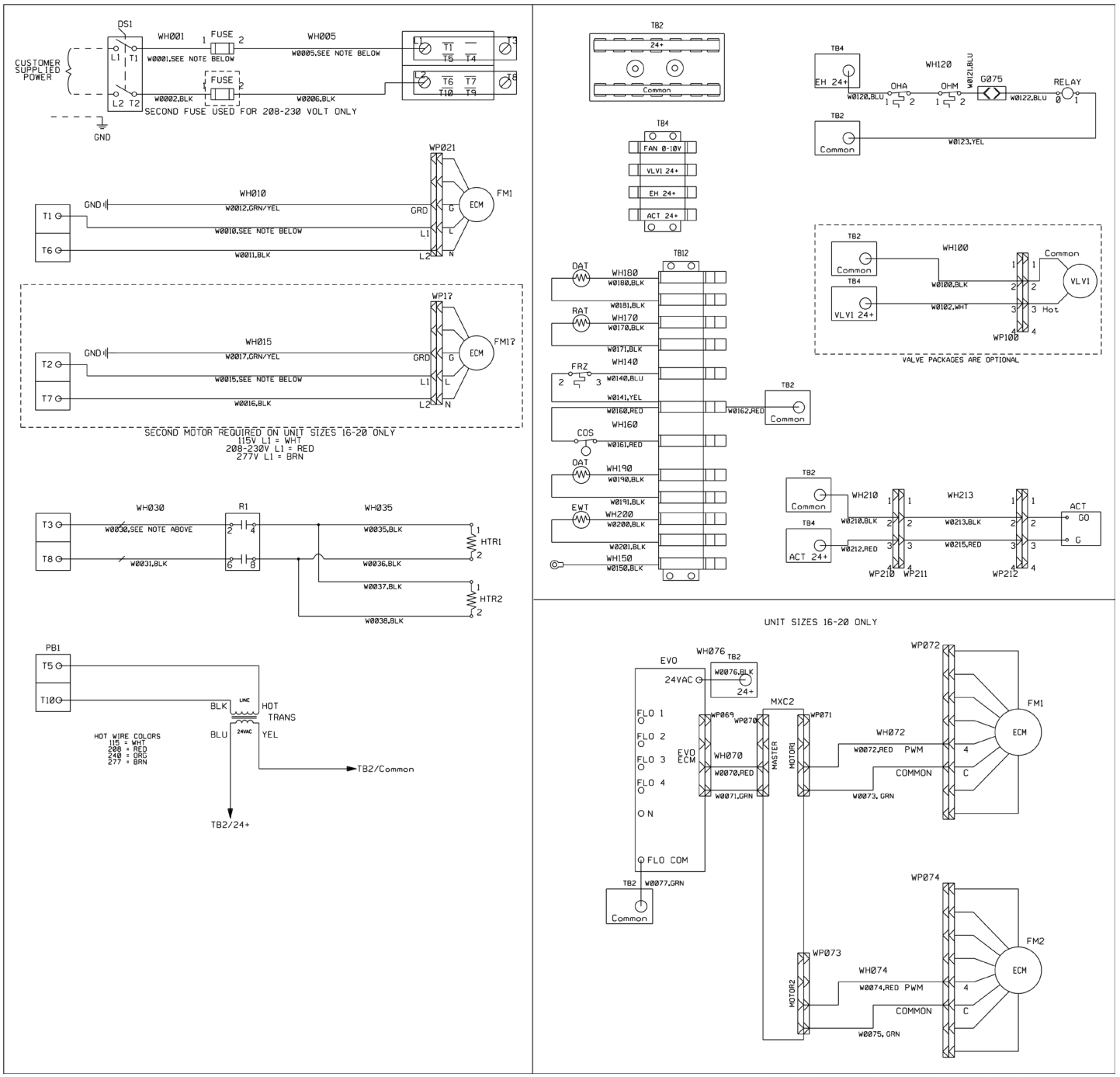


Figure 24: 3-Phase Power, Welded Aluminum Airfoil Plenum Fan, On-Off Electric Heat, On/Off Damper, Fused

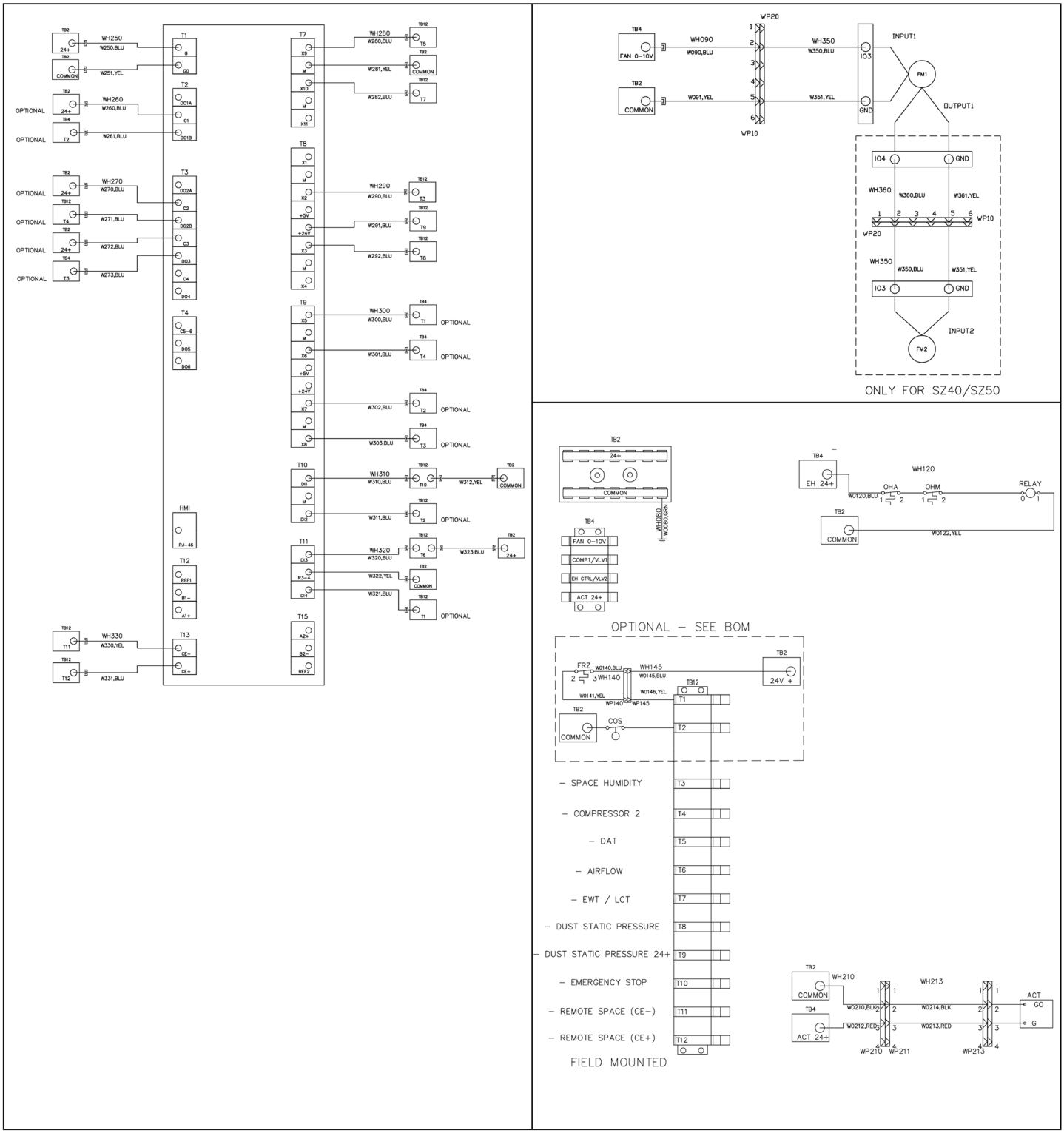


Figure 25: MicroTech Unit Controller for Sizes 006-050

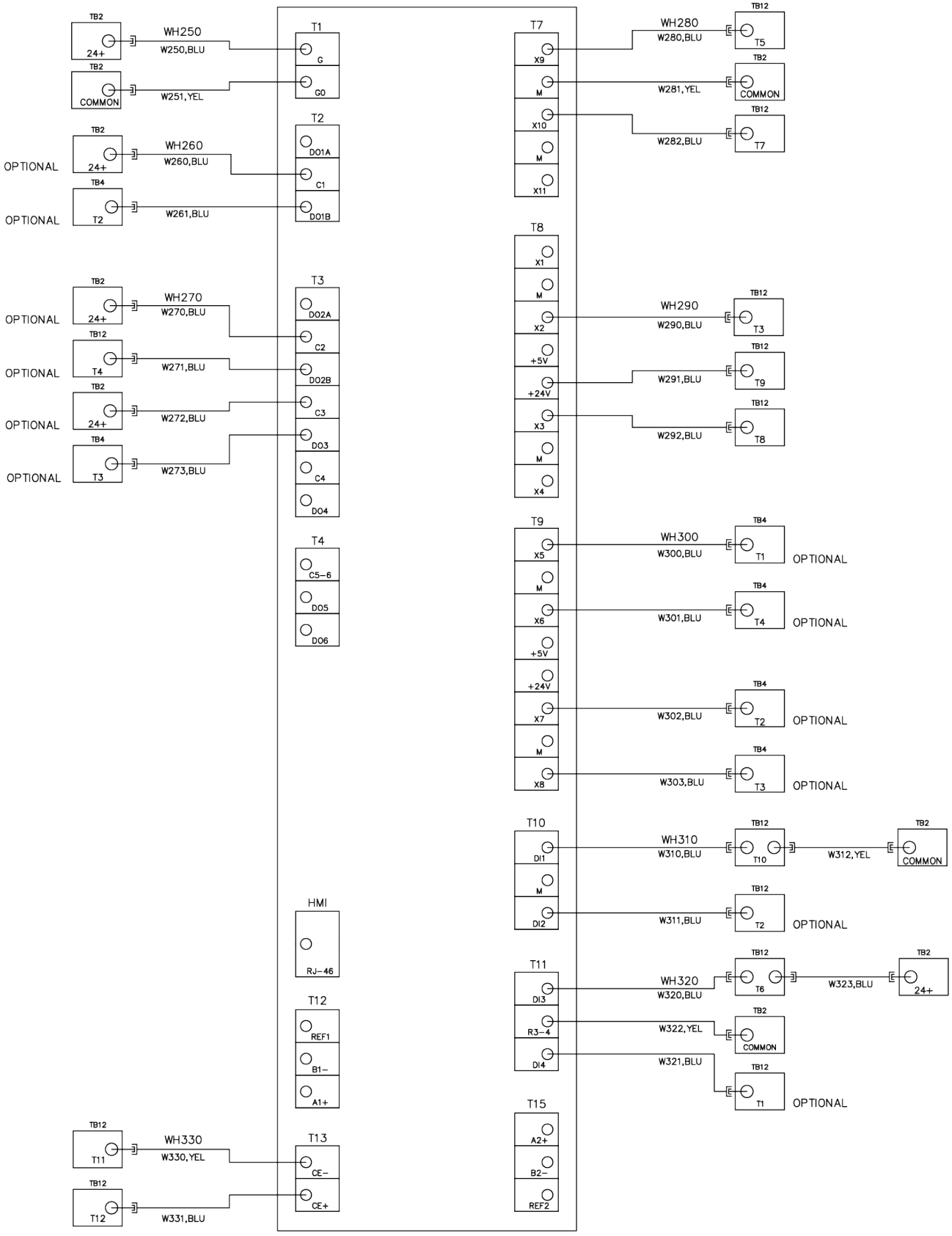
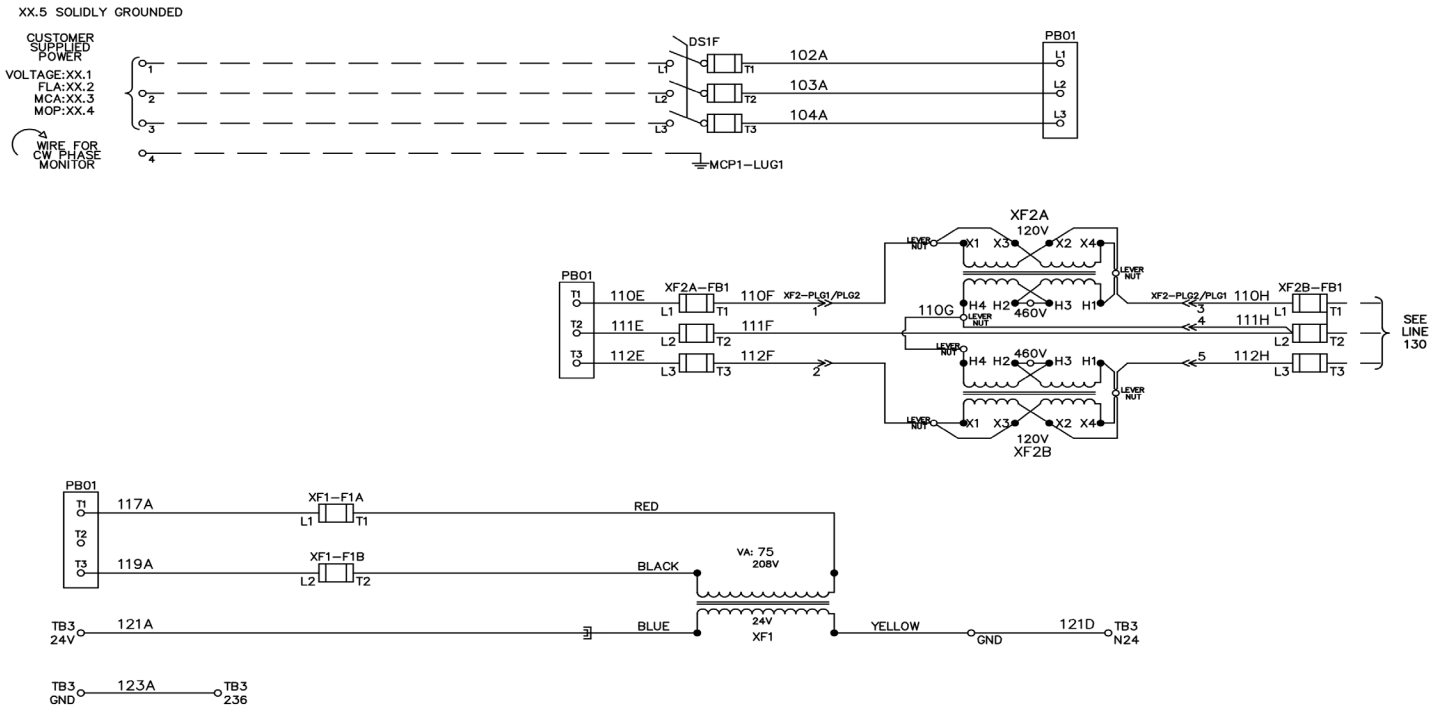
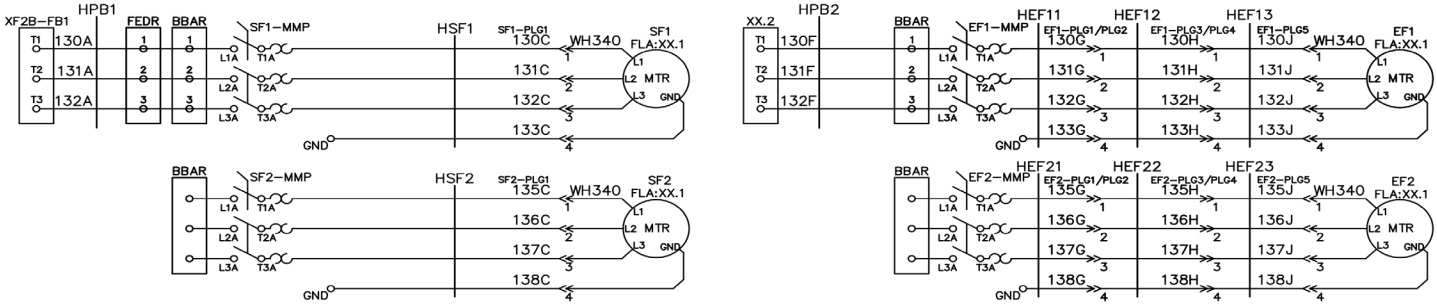
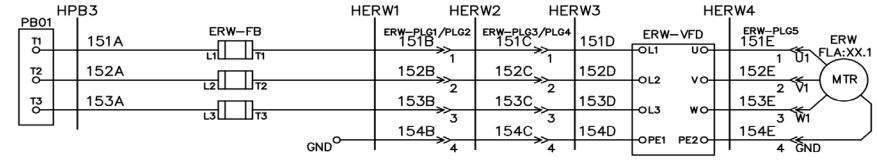
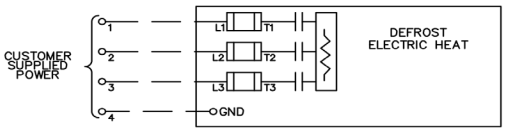


Figure 26: MicroTech Unit Controller for Sizes 060-100 with Optional Energy Recovery Wheel









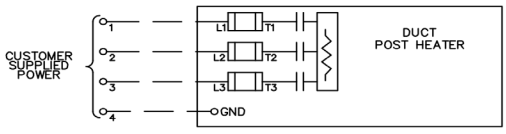


Figure 27: MicroTech Unit Controller for Sizes 060-100 with Optional Energy Recovery Wheel

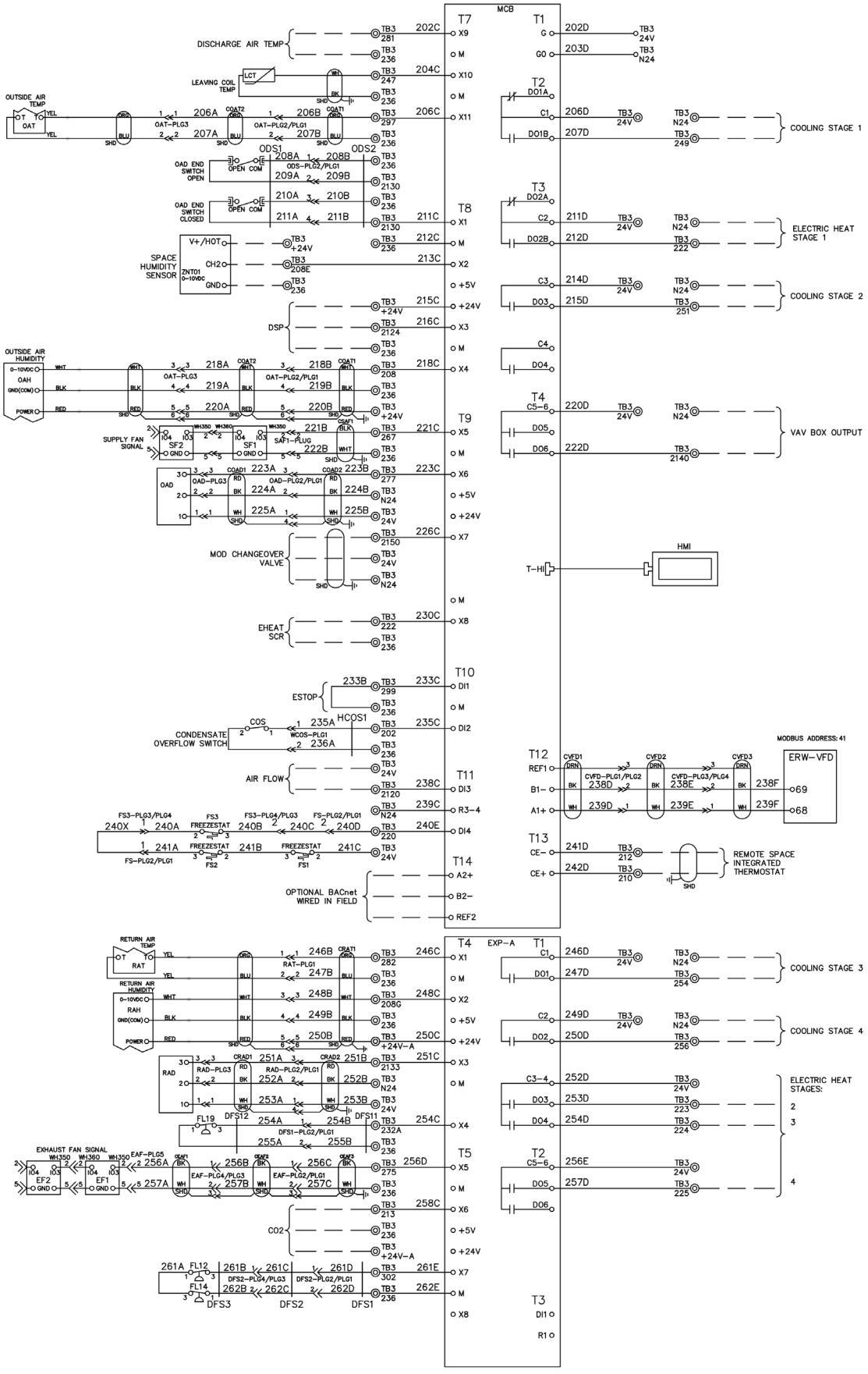
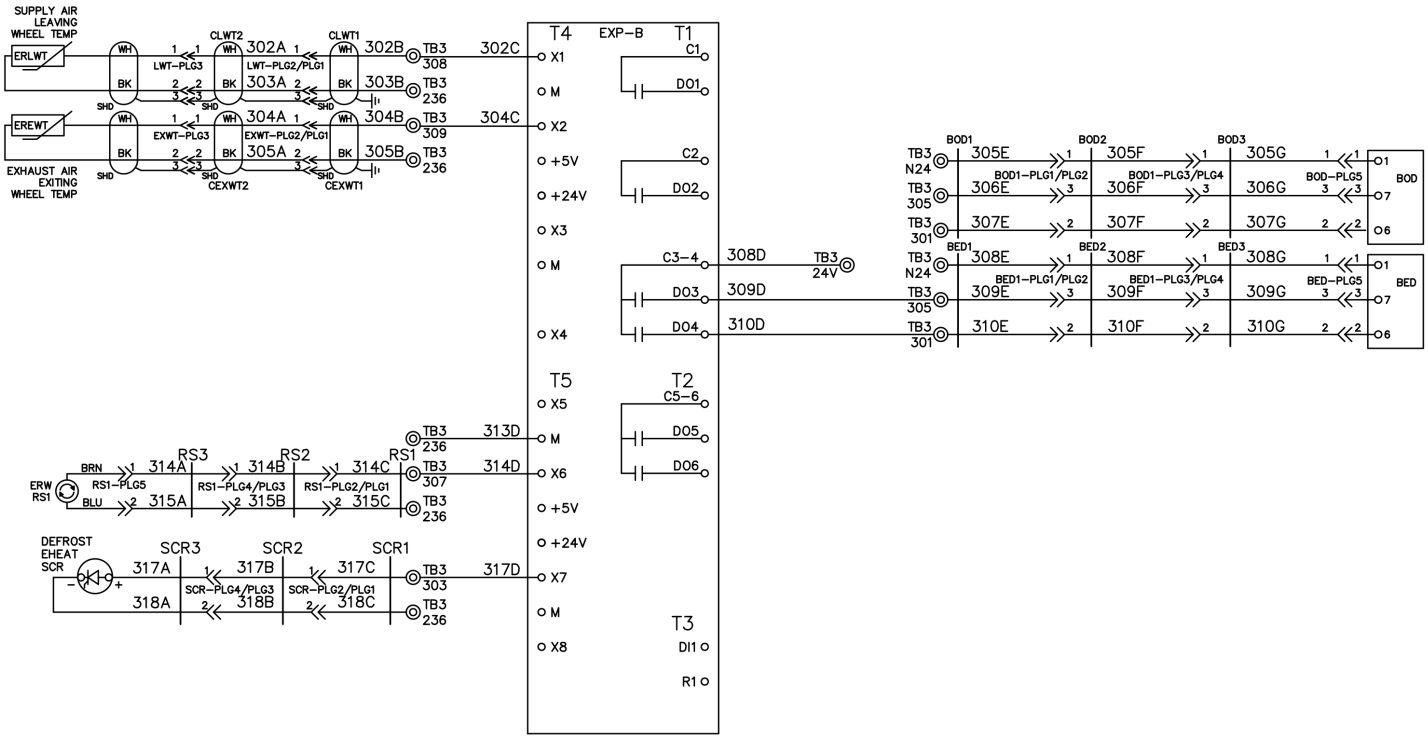
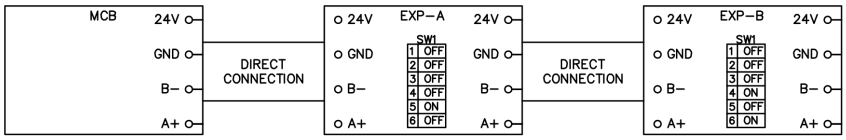


Figure 28: MicroTech Unit Controller for Sizes 060-100 with Optional Energy Recovery Wheel





Wiring Schematics Legend for "Example Wiring Diagrams"

LEGEND			
ACT	Mixing Box Damper Actuator	**OAT**	Outside Air Temperature Sensor
BBSF-EF	BusBar Supply-Exhaust	**OHA**	Automatic High Temp Cutout Switch
BED	Bypass Exhaust Air Damper	**OHM**	Manual High Temp Cutout Switch
BOD	Bypass Outside Air Damper	**PB1**	Main Power Distribution Block
C500	MicroTech 4 Lite Controller	**PB2**	Electric Heat Power Distribution Block
CON	Energy Wheel Motor Contactor	**PB3**	24VAC Power Distribution Block
COS	Condensate Overflow Switch/Sensor	**R1-2**	Electric Heater Power Relay
DAT	Discharge Air Temperature Sensor	**R3**	Electric Heater Control Relay
DS	Disconnect Switch	**RAD**	Return Air Damper
EB	MicroTech I/O Expansion Board	**RAT**	Return Air Temperature Sensor
EF1-3	Exhaust Fan Motor	**RS1**	Rotational Switch
ERW	Energy Recovery Wheel	**SF1-2**	Supply Fan Motor
EWT	Entering Water Temperature	**TB2-3**	24VAC Terminal Block
EXP-A	MicroTech I/O Expansion Board	**TB4**	EC Motor Control Terminal Block
EXP-B	MicroTech I/O Expansion Board	**TB5**	Intermediate Electric Heat Terminal Block
FM1-2	Fan Motor	**TB6**	No Controls Terminal Block
FLxx	Dirty Filter Switch	**TR**	Control Transformer
FRZ	Freeze Alarm Switch	**TS1-2**	Thermal Switch (Intermediate Electric Heat)
FS1-3	Freeze Alarm Switch	**TS3**	Thermal Switch (Automatic Change Over)
FSW	Fan 3-Speed Switch	**VSV1-2**	Coil Valve Actuator (Primary or Secondary)
G075	Quick Connect Splice	**WHxxx**	Wire Harness
HTR1-4	Electric Heater Elements	**WNxxx**	Wire Nut
LVB	Low Voltage Control Board	**WPxxx**	Wire Plug
MCB	MicroTech Control Board (C500)	**Wxxx**	Wire
NCB	Network Communication Board	**XF1**	Control Transformer
OAD	Outside Air Damper	**XF2A-B**	Buck Boost Transformers

NOTE: Devices may or may not be on unit.
NOTE: Wiring diagrams are typical, always defer to the wiring diagram provided with the unit.

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