

The background features a dark blue field with several thick, white, angular lines that intersect to form a series of overlapping, irregular shapes. These shapes resemble stylized, fragmented letters or geometric patterns, creating a dynamic and modern visual effect.

INSIGHT PARTNERS
AAON Prism II

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OVERVIEW

AAON ORION CONTROLS

1

SETPOINTS SCREEN

2

CONTROL CONCEPTS

3

ACTIVE SUPPLY AIR TEMP

4

CONFIGURATION & SETPOINTS

5

TUNING

Prism 2 –Setpoint Screen 1

VCCX Controller Setpoints - Temperatures

Selected Unit on Loop 1 Address 7 VCC-X Controller Unit ID#196

Mode Enable

- 75 Cooling Mode Enable Setpoint
- 70 Heating Mode Enable Setpoint
- 1 Mode Selection Deadband
- 0 Maximum Slide Offset Effect
- 30 Unoccupied Cooling Offset
- 30 Unoccupied Heating Offset
- 30 Control Mode High Alarm Offset
- 30 Control Mode Low Alarm Offset

SAT Cooling

- 75 High Reset Source
- 70 Low Reset Source

SAT Heating

- 75 High Reset Source
- 70 Low Reset Source

Morning Warmup

- 72 Warm-Up Target Setpoint
- 100 Warm-Up Supply Air Setpoint

Morning Cool-down

- 68 Cool-Down Target Setpoint
- 55 Cool-Down Supply Air Setpoint

Economizer

- 10 Economizer Min Position
- 55 Economizer Enable Setpoint
- 28 Comparative Econo Enable Setpoint
- 0.5 Comparative Econo Enable Deadband

Water Side Economizer

- 3 Entering Water Control Deadband

Preheat Setpoints

- 30 Pre-Heat Setpoint
- 40 Cool Mode Leaving Air Setpoint
- 60 Heat Mode Leaving Air Setpoint
- 50 Vent Mode Leaving Air Setpoint

OA Setpoints for: Hood On (Bin 3), Supply Air Tempering, and Space Control With High% OA

- 75 Hood On MUA Cooling Setpoint
- 70 Hood On MUA Heating Setpoint

Dehumidification (Need Digital SP/TH or RA/TH Sensor)

- 60 Indoor Humidity Hi Setpoint/Hi Reset
- 50 Indoor Humidity Lo Setpoint/Lo Reset

MUA Dehumidification (Need Digital OA/TH Sensor)

- 55 Outdoor Air Dewpoint Setpoint

Dehumidification Evap Coil Setpoint

- 40 Coil Setpoint High Reset Limit
- 40 Coil Setpoint Low Reset Limit

SAT Safety Cutoff

- 40 Low Temp Cutoff
- 150 High Temp Cutoff

Lockout Temps

- 50 Mechanical Cooling OAT Lockout
- 90 Heating OAT Lockout
- 35 Heat Pump OAT Lockout
- 0 Dehumidification OAT Lockout

Low Ambient

- 30 Low Ambient Setpoint
- 0 HW Valve Protection Position

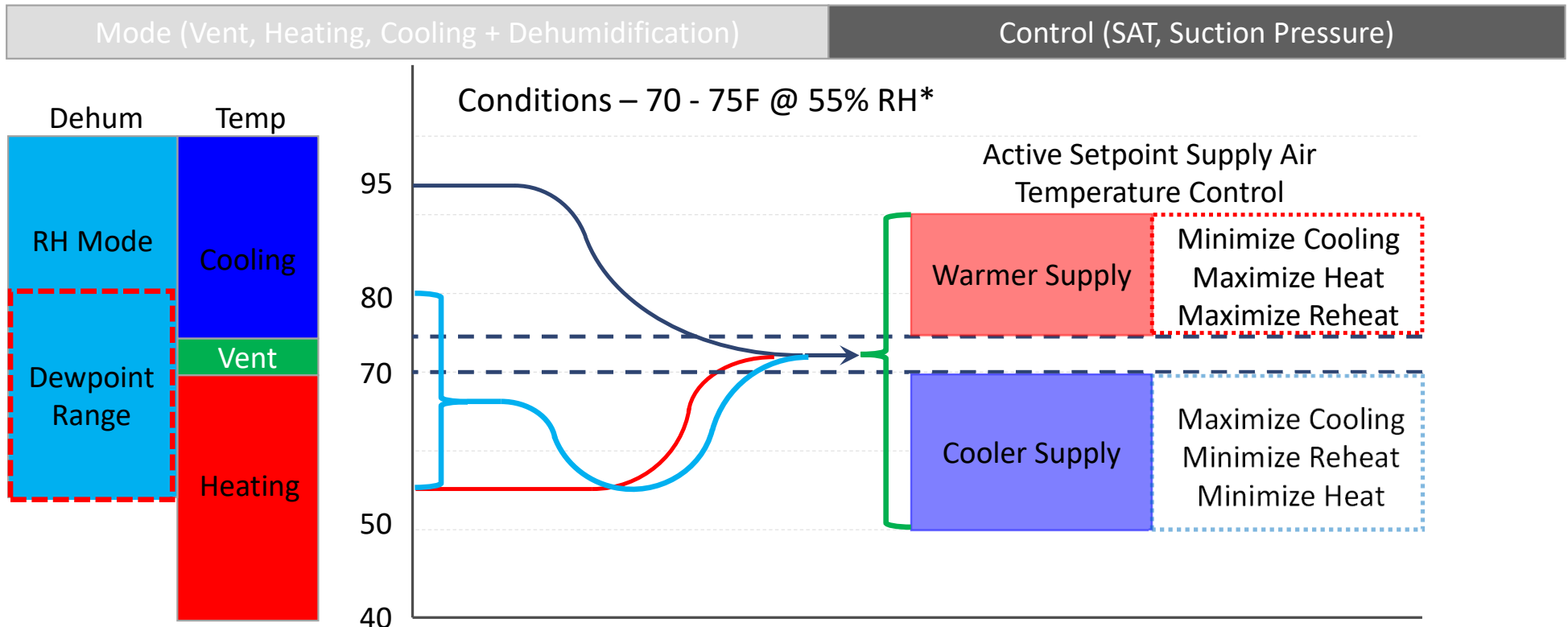
Heat Wheel Defrost

- 30 Heat Wheel Defrost Temperature

Temperature Scaling defaults to degrees Fahrenheit. See Configuration Page 3 to change the Temperature Scaling to Celsius.

Ready

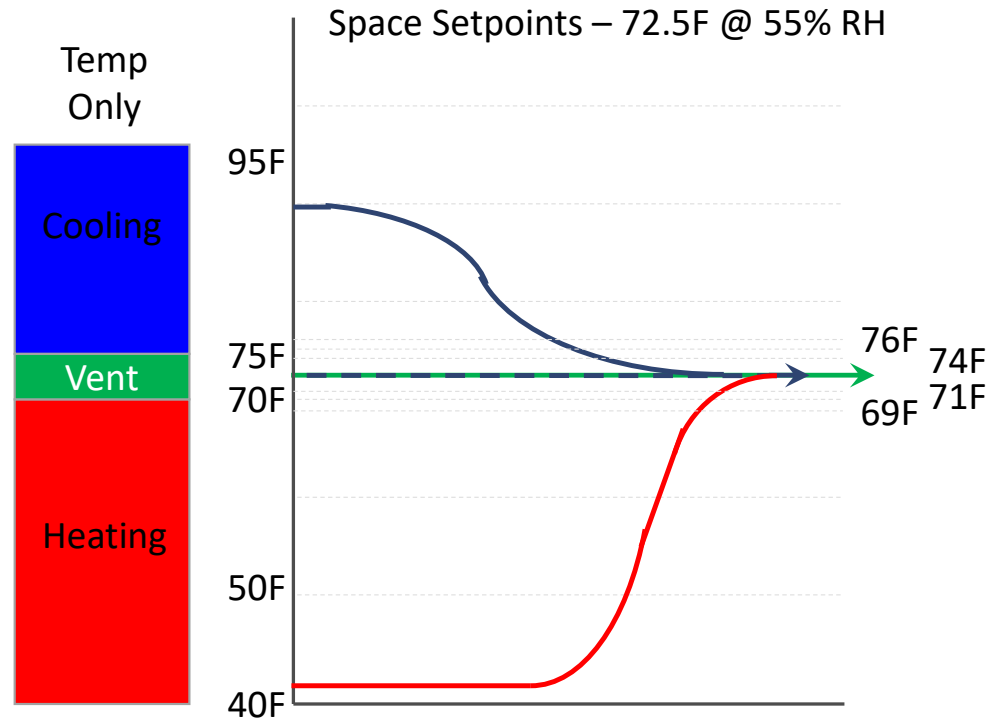
Make-Up Air Unit Control



* Factory Defaults Example, Hint, They Don't Work for Make-Up Air

Prism 2 – Temperatures Mode Enable

Temperatures	
Mode Enable	
75	Cooling Mode Enable Setpoint
70	Heating Mode Enable Setpoint
1	Mode Selection Deadband
0	Maximum Slide Offset Effect
30	Unoccupied Cooling Offset
30	Unoccupied Heating Offset
30	Control Mode High Alarm Offset
30	Control Mode Low Alarm Offset

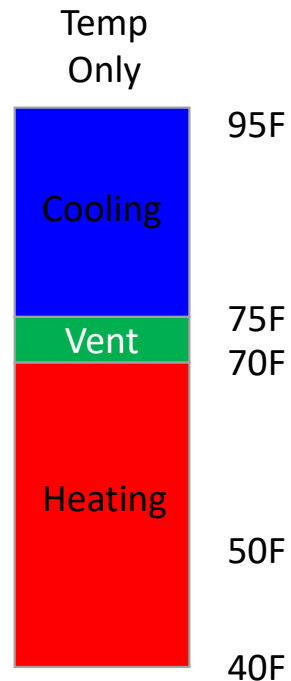


Ride the Psychrometric Roller Coaster

30 Offset = Off in Unoccupied

Prism 2 – Temperatures Mode Enable

Temperatures	
Mode Enable	
75	Cooling Mode Enable Setpoint
70	Heating Mode Enable Setpoint
1	Mode Selection Deadband
0	Maximum Slide Offset Effect
30	Unoccupied Cooling Offset
30	Unoccupied Heating Offset
30	Control Mode High Alarm Offset
30	Control Mode Low Alarm Offset



Vent Mode to Cooling Mode

1. Temp Begins at 72F and Rises to 76F
2. Temp Increased above SP (75) + DB (1) = Cool (@76F)

Cooling Mode to Vent Mode

1. Temp Begins at 76F and Cools to 74F
2. Temp Decreased below SP (75) - DB (1) = Vent (@74F)

Vent Mode to Heating Mode

1. Temp Continues to drop to 69F
2. Temp Decreased below SP (70) - DB (1) = Heat (@69F)

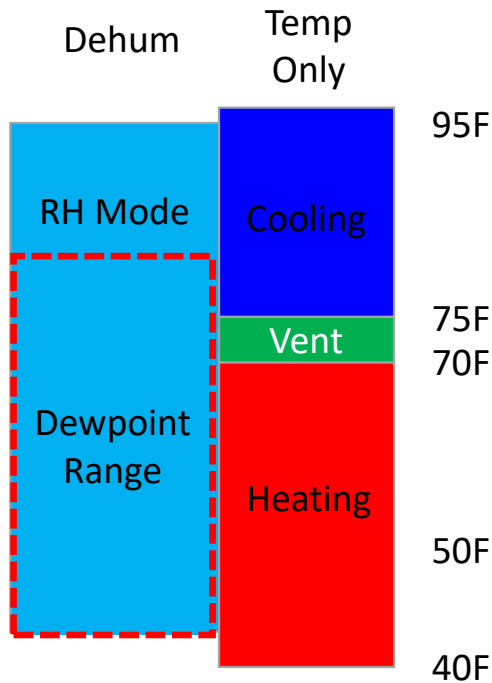
Heating Mode to Vent Mode

1. Temp at 69F begins to rise to 71F
2. Temp Increased above SP (70) + DB (1) = Heat (@71F)

** 30 Offset = Off in Unoccupied.
Even at 30F, unit will not come on!*

Prism 2 – Dehumidification Mode Added

OA Setpoints for: Hood On (Bin 3), Supply Air Tempering, and Space Control With High% OA	
75	Hood On MUA Cooling Setpoint
70	Hood On MUA Heating Setpoint
Dehumidification (Need Digital SP/TH or RA/TH Sensor)	
60	Indoor Humidity Hi Setpoint/Hi Reset
50	Indoor Humidity Lo Setpoint/Lo Reset
MUA Dehumidification (Need Digital OA/TH Sensor)	
55	Outdoor Air Dewpoint Setpoint
Dehumidification Evap Coil Setpoint	
43	Coil Setpoint High Reset Limit
38	Coil Setpoint Low Reset Limit



RH Enables Above Hi Reset Setpoint & Turns Off at Low

- Cooling + RH
- Vent + RH
- Heating + RH

Coil Suction Temperature (% RH Control)

- Compressors Controls to Coil Setpoint
- At 60% or above, Coil setpoint is 38F
- As RH drops to 50%, Coil approaches 43F
- Below 50%, RH Mode Drops and Temp Only Control

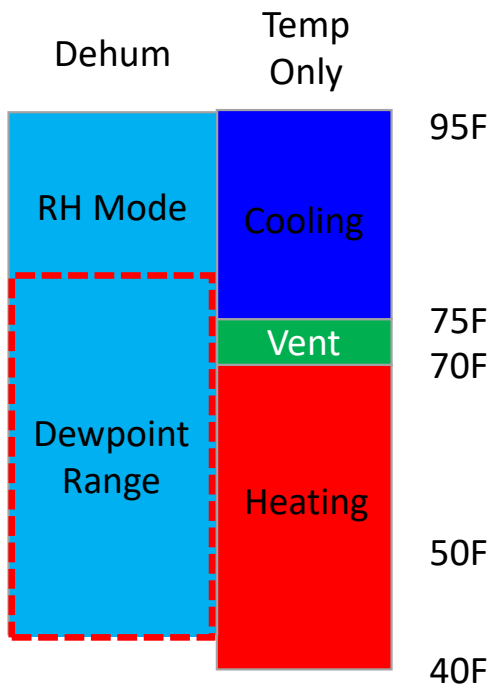
MAU / Outdoor Air Unit (Dewpoint Control)

RH Mode anytime Outdoor Dewpoint is above 55F

Requires RH Reading for CAV, Outdoor Air RH for MAU Control

Prism 2 – Supply Air Temp

Mode Enable		SAT Cooling		
<input type="text" value="75"/>	Cooling Mode Enable Setpoint	<input type="text" value="75"/>	High Reset Source	<input type="text" value="55"/> <u>SAT Setpoint</u> or Low SAT Limit for Reset
<input type="text" value="70"/>	Heating Mode Enable Setpoint	<input type="text" value="70"/>	Low Reset Source	<input type="text" value="75"/> SAT High Reset Limit
<input type="text" value="1"/>	Mode Selection Deadband	SAT Heating		<input type="text" value="65"/> Max SAT Cooling (SZVAV w/ Hi OA only)
<input type="text" value="0"/>	Maximum Slide Offset Effect	<input type="text" value="75"/>	High Reset Source	<input type="text" value="120"/> <u>SAT Setpoint</u> or Low SAT Limit for Reset
		<input type="text" value="70"/>	Low Reset Source	<input type="text" value="120"/> SAT High Reset Limit



Assume **No Reset**, De-Humidification Control: **Occupied Vent Mode Only**

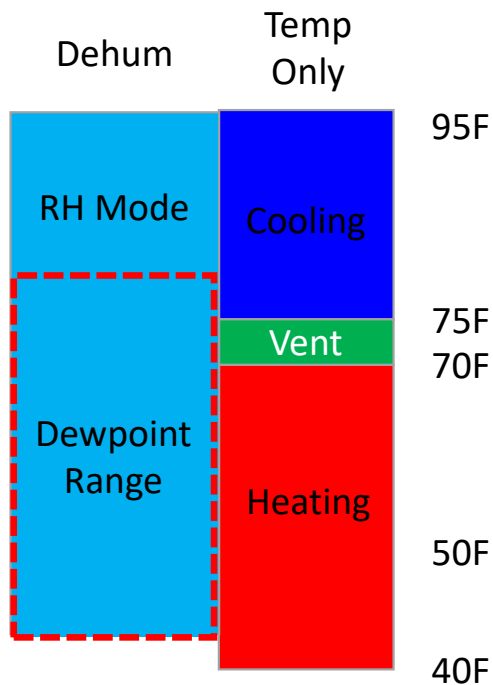
- Cooling Mode: SAT = 55F
- Cooling + RH: SAT = 55F
- Vent Mode: SAT = 72.5F
- Vent Mode + RH: SAT = 72.5F
- Heat Mode: SAT = 120F
- Heat Mode + RH: SAT = 120F

Default Value Concerns

- 55F SAT High Reset Limit needs to be raised when reset enabled
- 120F Heating Setpoint is too high. Suggest 90F as starting point
- Hot Gas Reheat not likely to get to 120F, Heat Mode + RH could subcool

Prism 2 – Supply Air Temp + Reset

Mode Enable		SAT Cooling			
75	Cooling Mode Enable Setpoint	75	High Reset Source	55	<u>SAT Setpoint</u> or Low SAT Limit for Reset
70	Heating Mode Enable Setpoint	70	Low Reset Source	75	SAT High Reset Limit
1	Mode Selection Deadband	SAT Heating		65	Max SAT Cooling (SZVAV w/ Hi OA only)
3	Maximum Slide Offset Effect	75	High Reset Source	60	<u>SAT Setpoint</u> or Low SAT Limit for Reset
		70	Low Reset Source	90	SAT High Reset Limit



Assume Space Reset, Occupied Vent Mode Only, High RH

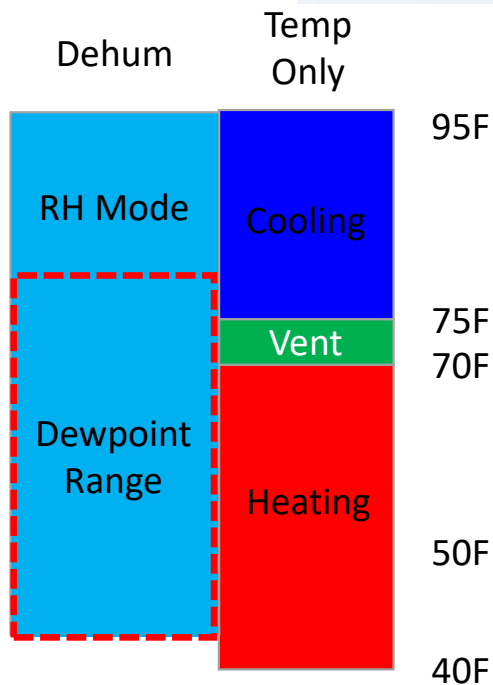
- Space Temp = 90F, Cooling Mode: SAT = 55F
- Space Temp = 78F, Cooling Mode: SAT = 55F
- Space Temp = 74.1F, Cooling + RH: SAT = 58.6F
- Space Temp = 73F, Vent Mode + RH: SAT = 72.5F
- Space Temp = 70.9F, Heat Mode + RH: SAT = 83.6F
- Space Temp = 68F, Heat Mode: SAT = 90F
- Space Temp = 50F, Heat Mode: SAT = 90F

Key Points

- 1) Vent Mode: SAT goes to ½ between Heating & Cooling Setpoints
- 2) Reset Source = Mode Enable isn't best way for Smooth SAT Reset

Prism 2 – Supply Air Temp + Reset

Mode Enable		SAT Cooling			
75	Cooling Mode Enable Setpoint	77	High Reset Source	55	<u>SAT Setpoint</u> or Low SAT Limit for Reset
70	Heating Mode Enable Setpoint	68	Low Reset Source	75	SAT High Reset Limit
1	Mode Selection Deadband	SAT Heating		65	Max SAT Cooling (SZVAV w/ Hi OA only)
3	Maximum Slide Offset Effect	75	High Reset Source	60	<u>SAT Setpoint</u> or Low SAT Limit for Reset
		70	Low Reset Source	90	SAT High Reset Limit



Assume Space Reset, Occupied Vent Mode Only, High RH

- Space Temp = 90F, Cooling Mode: SAT = 55F
- Space Temp = 75F, Cooling Mode: SAT = 59.4F
- Space Temp = 74.1F, Cooling + RH: SAT = 61.4F
- Space Temp = 73F, Vent Mode + RH: SAT = 72.5F

Key Points

- 1) Reset Greater than Mode Enable allows for Smoother SAT Control
- 2) Reset Source can be various inputs

Prism 2 – How to Choose Starting Setpoints

RN-070-3-0-EA09-3CB : A000-DOB-GDG-AF0-0DFB0BE-00-0000000VB

Tag: RTU# 2

Job Information

Job Name: Collins Aerospace
 Job Number: 14587-STK21050
 Site Altitude: 0 ft
 Refrigerant: R-410A

Static Pressure

External: 1.50 in. wg.
 Evaporator: 0.33 in. wg.
 Filters Clean: 0.26 in. wg.
 Dirt Allowance: 0.35 in. wg.

Cooling Section

	Gross	Net
Total Capacity:	737.59	709.03 MBH
Sensible Capacity:	419.97	391.40 MBH
Latent Capacity:	317.62 MBH	
Mixed Air Temp:	79.30 °F DB	68.04 °F WB
Entering Air Temp:	78.30 °F DB	68.04 °F WB
Lv Air Temp (Coil):	49.13 °F DB	48.93 °F WB
Lv Air Temp (Unit)	51.06 °F DB	49.79 °F WB
Digital Comp. Capacity Ratio:	100%	
Supply Air Fan:	2 x 245D @ 5.11 BHP Ea.	
SA Fan RPM / Width:	1397 / 5.560"	
Evaporator Coil:	43.8 ft ² / 6 Rows / 12 FPI	
Evaporator Face Velocity:	308.6 fpm	

Unit Information

Approx. Op./Ship Weights: 6386 / 6386 lbs. (±5%)
 Supply CFM/ESP: 13500 / 1.5 in. wg.
 Pre-Filter FV / Qty: 281.25 fpm / 24
 Final Filter FV / Qty: 281.25 fpm / 24
 Outside CFM: 4050
 Ambient Temperature: 93 °F DB / 78 °F WB
 Return Temperature: 72 °F DB / 63 °F WB

Economizer: 0.13 in. wg.
 Heating: 0.08 in. wg.
 Cabinet: 0.14 in. wg.
 Re-Heat Coil: 0.04 in. wg.
 Total: 2.83 in. wg.

Heating Section

PreHeat Type: Std (No Preheat)
 Heating Type: Nat. Gas Heat
 Heating CFM: 8700
 Total Capacity: 432.0 MBH
 OA Temp: 15.0 °F DB / 14.0 °F WB
 RA Temp: 68.0 °F DB / 54.0 °F WB
 Entering Air Temp: 43.3 °F DB / 38.2 °F WB
 Leaving Air Temp: 89.3 °F DB / 58.9 °F WB
 Input: 540.0 MBH
 Heater Qty: 3
 Consumption: 540.0 MBH
 Total Turndown Ratio: 10:1

Re-Heat Coil:

Capacity: 333 MBH
 LA DB / WB: 72.00 °F / 58.35 °F
 RH: 44%

Key Points

- 1) Obtain Rating Page and/or Know Application
- 2) Unit Capable of Setpoints?
- 3) Review Airflows
 - 13,500 cfm Total
 - 4,050 cfm O/A (30%)
 - Coil Face Velocity 308 fpm
- 4) Review Cooling Temps
 - O/A Temp = 93/78
 - R/A Temp = 72/63
 - LCT = 49.13/48.93
 - Reheat Temp = 72F
 - Reheat Supply RH = 44%
- 5) Review Heating Temps
 - O/A Temp = 15/14
 - R/A Temp = 68/54
 - Supply Temp = 89.3F

Prism 2 – Starting Configuration

Key Points

- 1) Obtain Rating Page and/or Know Application
- 2) Unit Capable of Setpoints?
- 3) Review Airflows
 - 13,500 cfm Total
 - 4,050 cfm O/A (30%)
 - Coil Face Velocity 308 fpm
- 4) Review Cooling Temps
 - O/A Temp = 93/78
 - R/A Temp = 72/63
 - LCT = 49.13/48.93
 - Reheat Temp = 72F
 - Reheat Supply RH = 44%
- 5) Review Heating Temps
 - O/A Temp = 15/14
 - R/A Temp = 68/54
 - Supply Temp = 89.3F

Configuration Thoughts

- 1) HVAC Mode: If it has Space Temp Sensor, there is 30% O/A, so we start at MAU. Other Potential is CAV.
- 2) Coil Temperatures and Supply Temperatures are low so this appears to be a low dewpoint application.
- 3) Supply RH at 72F is down around 44%. Set space RH at ~ 5% above
- 4) Coil Leaving Temp at 49F, I set Coil Temp at 10-15F lower as starting place.
- 5) Unit has a Digital Scroll compressor and should offer flexibility of control on the coil temp.
- 6) Reset Source: Temperature Resets help tuning process and stabilized SAT along with Stable Control. Add some offset for SAT to minimize swings.
- 7) Unit has 10:1 turndown on Gas Heater. That will offer semi-stable supply temperatures when setup correctly.

Prism 2 – Starting Setpoints

Key Points

- 1) Obtain Rating Page and/or Know Application
- 2) Unit Capable of Setpoints?
- 3) Review Airflows
 - 13,500 cfm Total
 - 4,050 cfm O/A (30%)
 - Coil Face Velocity 308 fpm
- 4) Review Cooling Temps
 - O/A Temp = 93/78
 - R/A Temp = 72/63
 - LCT = 49.13/48.93
 - Reheat Temp = 72F
 - Reheat Supply RH = 44%
- 5) Review Heating Temps
 - O/A Temp = 15/14
 - R/A Temp = 68/54
 - Supply Temp = 89.3F

Mode Enable

75	Cooling Mode Enable Setpoint
70	Heating Mode Enable Setpoint
1	Mode Selection Deadband
3	Maximum Slide Offset Effect

Dehumidification (Need Digital SP/TH or RA/TH Sensor)

60	Indoor Humidity Hi Setpoint/Hi Reset
50	Indoor Humidity Lo Setpoint/Lo Reset

MUA Dehumidification (Need Digital OA/TH Sensor)

55	Outdoor Air Dewpoint Setpoint
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Dehumidification Evap Coil Setpoint

43	Coil Setpoint High Reset Limit
38	Coil Setpoint Low Reset Limit

Based on Rating Page

- Cooling Mode: 62F
- Heating Mode: 58F
- Deadband: 1F

- RH High Setpoint: 50%
- RH Low Setpoint: 40%

- Outdoor Air Dewpoint: 45F

- Coil High Reset: 38F
- Coil Low Reset: 35F

Set Mode around Desired Control Temperature as long as unit sized appropriately

Prism 2 – Tuning

AAND VCCX Controller Setpoints - Staging Delays and Control Timers

The screenshot displays the 'VCCX Controller Setpoints' software interface. The title bar indicates 'Selected Unit on Loop 1 Address 7' and 'VCC-X Controller' with 'Unit ID#188'. The main content area is titled 'Staging Delays and Control Timers' and is divided into several sections:

- Cooling:** Includes parameters like Cooling Stage Up (3), Cooling Stage Down (1), Cooling Min Run Time (5), Cooling Min Off Time (3), Cool Staging Window (SAT) (5), Mod Cooling Window (SAT) (10), Mod Cooling Time Period (30), Heat / Cool Changeover Delay Period (5), and Mechanical Fail Timeout (15).
- Heating:** Includes parameters like Heating Stage Up (3), Heating Stage Down (1), Heating Min Run Time (5), Heating Min Off Time (1), Heat Staging Window (SAT) (5), Mod Heating Window (SAT) (10), Mod Heating Time Period (30), and Aux Heat Delay (3).
- Air-to-Air Heat Pump Defrost:** Includes Heat Pump Defrost Interval (30) and Heat Pump Adaptive Defrost Time (0).
- Economizer:** Includes Economizer Proportional Window (10) and Economizer Control Rate (10).
- Supply Fan:** Includes Fan Starting Delay (-1), Fan Running Purge Mode Delay (30), and Single Zone VAV Integral (0).
- SAT/COIL Reset:** Includes SAT/COIL Setpoint Reset Interval Rate (30).
- Morning Warm-Up/Cool-Down:** Includes WarmUp Timeout (60).
- Schedule/Push-Button Ovd/Trend Rate:** Includes Controlling Week Schedule (0), Daylight Savings Start Day (0), Daylight Savings Ending Day (0), Push-Button Override Duration (2), and Trend Rate (15).
- Relay Run Time Warning:** Includes Generate a Warning if a Relay Run Time Exceeds this Amount of Time (0).

The interface also features a 'RESET PAGE' button and a taskbar at the bottom with various system icons and a 'Ready' status.

Tuning

- Adjust Trend Rate and Log
- Look for Stable SAT
- Review Cycling on/off
- Review Staging up and down
- Increase Staging Windows – Slowly at times on heating



DISCUSSION

Q&A

THANK YOU!