Stand Alone ERV
I/O/M manual

PD 06/22/2022 - v 1.00
PN IOM-0051

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DEFINITIONS

ELECTRICAL
Transformer – A device that converts one voltage to another.

Fuse Block – A device that contains fuses, which protects the circuitry and/or other components in an over current situation.

Field Terminal Strip – A series of connection points for wiring external devices to the ERV cabinet.

Disconnect Switch – The point at which the incoming power enters the ERV cabinet.

SENSOR
Dry Bulb Sensor – Used to monitor the temperature.

Humidity Sensor – Used to monitor the humidity and calculate enthalpy.

ERV
Outside Airflow (OA) - Outside air that is entering the ERV.

Exhaust Airflow (EA) - Airflow leaving the ERV exhaust to the outside.

Supply Airflow (SA) - The fresh air that is being provided to the building space or the HVAC unit.

Return Airflow (RA) - The stale air that is being exhausted from the building space.

ERV Wheel - The device in the ERV unit that transfers heat and/or humidity from one air stream to another.

Sensible Wheel - An ERV wheel that is designed to only transfer heat energy from one air stream to another.

Enthalpy Wheel - An ERV wheel that is designed to transfer both heat energy and humidity from one air stream to another.

CONTROLLER
LED - Display screen on ERV controller.

Pushbuttons - Tabs on the front of the ERV controller used to navigate through the program.

Part Numbering Scheme

ER 1 2 - 3 - 4 5 6 7 8 9 10 11 - 12

Size (1)

19 - 19” 68 - 68”
25 - 25” 74 - 74”
30 - 30” 81 - 81”
36 - 36” 86 - 86”
41 - 41” 92 - 92”
46 - 46” 99 - 99”
52 - 52” 104 - 104”
58 - 58” 110 - 110”
64 - 64”

Wheel (2)

L - Low
H - High
Z - Special

Voltage (3)

E - 208VAC 1Φ
F - 208VAC 3Φ
G - 230VAC 1Φ
H- 23 AC 3Φ
K - 460VAC 3Φ
L - 575VAC 3Φ

Fan OA Config (4)

0 - NO FAN
A - CENTRIFUGAL
B - EC CENTRIFUGAL
D - 450MM
G - 450MM HP
H - 310MM HP

Fan OA Qty (5)

0-9 - Quantity

Fan EX Config (6)

0 - NO FAN
A - CENTRIFUGAL
B - EC CENTRIFUGAL
D - 450MM
G - 450MM HP
H - 310MM HP

Fan EX Qty (7)

0-9 - Quantity

Control (8)

0 - ELECTRO MECH
A - IAQ
B - ECON
C - DCV
Z - SPECIAL

Location (9)

R - ROOFTOP
I - INDOOR

Configuration (10)

D - DOWN RETURN RTU
H - HORIZ RETURN RTU
Z - SPECIAL

Disconnect (11)

0 - NO DISCONNECT
A - FUSED DISCONNECT
B - SWITCH DISCONNECT
Z - SPECIAL

Options (12)

0 - No Options
A - 2 Position Outside Air Damper
B - 2 Position Exhaust Air
C - Building Pressure
D - Outside Airflow Monitoring
H - Supply Air FIlter Status
J - Exhaust Air FIlter Status
K - Supply Air BLower Status
L - Exhaust Air Blower Status
N - Sensible Wheel
P - Frost Protection

ERV UNIT DESCRIPTIONS
(Digit 3 in part number scheme)

IAQ sized unit - An IAQ sized ERV has an ERV that is sized to handle approximately 10% of the outside air that the RTU is normally recirculating. If you have a 10 Ton RTU, the RTU is normally recirculating about 4,000 CFM (RTU's are normally designed around 400 CFM/ton). The iAIRE ERV would be sized to bring in approximately 400 CFM into this RTU through the wheel. The outside air that is coming in through the wheel would correspond to the DCV set point for CO2 and the low set point for VOC. As either the CO2 or VOC sensor say the space needs more outside air, the bypass damper would open to allow more air into the system. The blowers in this unit run at a constant speed. The IAQ sized ERV has a bypass damper that is sized to allow 100% outside air through the damper. When this unit goes into free cooling, the blowers in the ERV shut off.

MIN OA sized unit - A Min OA sized ERV has an ERV that is sized to handle approximately 30% of the outside air that the RTU is normally recirculating. If you have a 10 Ton RTU, the RTU is normally recirculating about 4,000 CFM (RTU's are normally designed around 400 CFM/ton). The iAIRE ERV would be sized to bring in approximately 1,200 CFM into this RTU through the wheel. The blowers in this unit are variable speed. As the CO2 & VOC sensor call for more or less OA, the blowers modulate to ramp the air going through the wheel up and down. When this unit goes into free cooling, the ERV wheel shuts off and the blowers ramp up to bring in cool outside air. If the blowers cannot bring in enough cool air, the bypass damper will open and modulate to bring in additional cool air.

STAND ALONE ERV OPTIONS

#	DESCRIPTION	OPTION
1	No Options	0
2	2-POS OA Damper	A
3	2-POS EA Damper	B
4	Building Pressure	C
5	Frost Protect	D
6	Humidity Sensor	E
7	BACnet	F

OPTION DESCRIPTIONS
OA / EA Damper - This option allows for the prevention of back-draft when the ERV is not running.
Disconnect - Factory installed electrical disconnects are available for most ERV units. Disconnects are sized to handle the combined load of the ERV unit. Both non-fused and fused disconnects are available.
Building Pressure - This option is used to control the exhaust blower and maintain a constant pressure inside the building.
Frost Protect - This option is used in cold climates to help prevent the ERV wheel from freezing. Once the outside air temperature is cold enough, the system checks for a large increase in differential pressure across the wheel which indicates the formation of ice. The OA blower is shut off to allow the warm exhaust air to de-ice the wheel.
Humidity Sensor – The humidity sensor add on to the unit changes the operation of free cooling from a sensible (dry-bulb) temperature only calculation to an enthalpy (wet-bulb) calculation to help prevent humidity from getting into the space.
BACnet - Provides reliable protocol translation for your system.

GENERAL OPERATIONS

An ERV's operation is a function of the options and control packages that the ERV is equipped with. On a base unit with no factory installed options the cabinet is turned on by simply turning on the power disconnect switch. With power applied to the unit, the blowers will energize provided proper connection between the HVAC unit and the ERV at terminals "C & G", see the electrical schematic located in this document.

GENERAL INSTRUCTIONS

The ***iAIRE*** Energy Recovery Ventilator (ERV) is designed to provide years of energy savings while meeting today's requirements for increased outside air intake.

The ***iAIRE*** ERV can be mated to a rooftop unit, an air handler or used as a standalone unit.

In the summer months the heat and humidity are removed from the outside air and transferred through the rotary energy recovery device to the exhaust air. The outside air is tempered (sensible and latent) before entering the HVAC united in a mated application, or the building space in a stand-alone application.

In the winter months the heat and humidity from the return air is transferred to the outside air intake to temper it before it enters the HVAC unit or building space.

This technology provides lower initial costs allowing you to downsize the HVAC unit and associated ductwork, while at the same time the ***iAIRE*** ERV provides signifi cant energy savings and a comfortable environment.

RECEIVING / INSPECTION

(Check part # of ERV to ensure it is what was ordered. Verify it is designed to mate to the RTU (voltage/phases match).)

At the time of delivery the ***iAIRE*** ERV unit should be visually inspected for possible damage. If any damage is found it should be reported immediately to the last courier company, preferably in writing. ***iAIRE*** recommends leaving the ERV in its' shipping packaging until the time of installation.

SAFETY CONSIDERATIONS

Installation and servicing of the Energy Recovery units and HVAC units can be hazardous due to system, pressure, electrical components and moving parts. Only trained and qualifi ed service personnel should install, repair or service these units.

When working on ERV or HVAC units observe precautions in the literature, tags and labels attached to the units, and any other safety precautions that may apply.

Follow all local, national and industry electrical codes when installing these units and accessories.

ROOFTOP INSTALLATION

1. Verify the unit is the correct part # and voltage.

2. Check the ERV weight listed in this packet to determine if building structure reinforcements are required.

3. See the lifting and rigging section of this packet for instructions on setting the ERV.

RIGGING / LIFTING

1. Rig and place the HVAC unit per the instructions provided by the HVAC manufacturer (for mated applications only)

2. Inspect the ERV unit for transportation damage. File any claim with the transportation company.

3. The ERV unit weight is included in this packet. Check the lifting devices for capacity constraints.

4. Hook rigging shackles through the holes in the ERV unit base rails. Connect lifting straps and use spreader bars. Spreaders bars must be positioned to prevent straps from rubbing against the ERV unit. (Small units can be lifted and installed without base rails to support weight).

SCOOP AND ERV INSTALLATION

It should be noted that the RTU cannot have an economizer with our ERV. If your system has an economizer, please remove it before continuing. The ERV and Scoop will ship in separate packages.

ERV UNIT (PKG. 1)

SCOOP (PKG. 2)

ERV INSTALLATION CONFIGURATIONS

#	TYPE 1	TYPE 2	TYPE 3
1	Pred 36 IAQ	Sun 36 IAQ	Sun 15 Min OA
2	Pred 36 MIN OA	Sun 36 MinOA	Sun 1725 Min OA
3	Pred 712 IAQ	Chassis 1 IAQ	
4	Pred 712 MIN OA	Chassis 1 Min OA	
5	Sun 15 IAQ	Chassis 2 IAQ	
6	Sun1725 IAQ	Chassis 2 Min OA	
7	Chassis 6/7 IAQ	Chassis 3 IAQ	
8	Chassis 6/7 MIN OA	Chassis 3 Min OA	
9	Chassis 8/9 IAQ	Chassis 4 IAQ	
10	Chassis 8/9 MIN OA	Chassis 4 MinOA	
11		Chassis 5 IAQ	
12		Chassis 5 MinOA	

*See unit reference guide in appendix for specific units

TYPE 1 **TYPE 2** **TYPE 3**

1. Turn the Electrical Disconnect “OFF” or Remove power to the RTU.
2. Remove the panels located at point “A” (Figure 1).
   b. Take screws out of the top panel of the RTU to allow the lip of the ERV to be pushed under the top panel.
   NOTE: for the SUN36 ERV, see Figure 2 for additional mounting instructions.
3. The parts kit includes gasket that will need to be applied to the Scoop prior to installation into the RTU, as shown below.

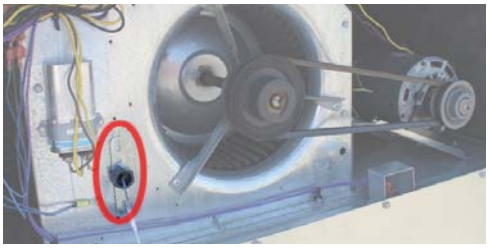
BEFORE AFTER

4. Insert the Scoop Assembly, shown below, into cavity “A” (Figure 1) and screw down to the RTU.

The parts kit also includes gasket for the ERV that will need to be applied prior to installation onto the RTU, as shown below.

BEFORE AFTER

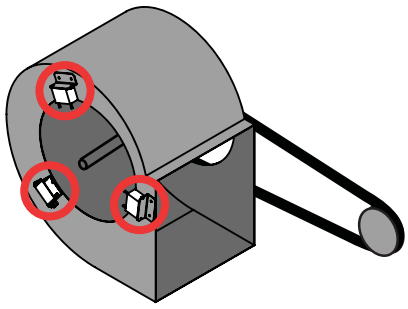
5. Once the Scoop Assembly is installed as shown below, lift the top of the RTU so the ERV can be mounted in front of cavity “A” (Figure 1).
6. The SAT should be mounted in the blower (either by inserting into an existing hole, or by using a drill bit to create an opening).



NOTE: See Terminal Strip Detail on pg. 13 for wiring.

OPTIONAL

1. Mount ion generator(s) so the ionization cloud *(refer to ion generator data sheet for more information)* is in front of the inlet to the supply fan (some ion generator(s) should be installed by the inlet of the supply fan on the opposite side of the drive shaft and belt, if present). Ion generator(s) should be tied to 24 VAC in the RTU.



7. When the ERV has been mounted to the RTU, replace all covers. (Figure 3)
   b. Put sheet metal screws around perimeter of the ERV into the RTU panels.
   c. Fasten scoop to the ERV and floor of the RTU so no air can bypass around the scoop.
   d. Re-attach the top panel of the RTU.
   e. See electrical installation section for instructions on running power and controller to the unit.

Figure 1

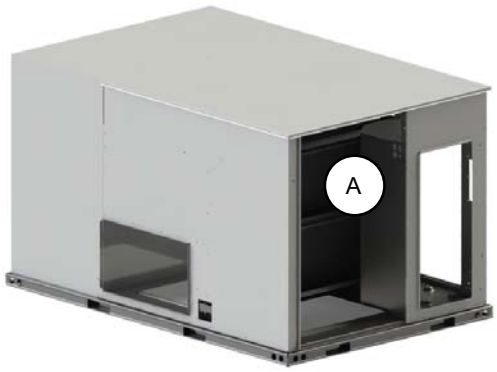


Figure 2

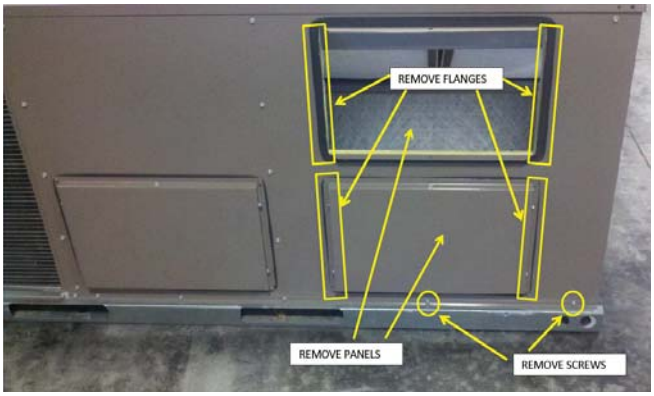


Figure 3

CAUTION!
The ERV cabinet contains moving parts and sharp metal edges keep all routed wiring away from these areas. Follow all local and state codes when routing the ERV Control wires.

ELECTRICAL INSTALLATION

1. All ERV units should be equipped with a disconnect switch. If one was not factory installed, a qualified electrician should install one on or near the ERV unit.

2. Route the power wires in water tight conduit from the disconnect switch box to the ERV's high voltage distribution block, open the control box panel. Once open, there is a cover that separates the high voltage power from the low voltage power. Remove this cover.

3. Connect the incoming power wire of proper voltage and ampacity ratings to the line side of the disconnect switch.

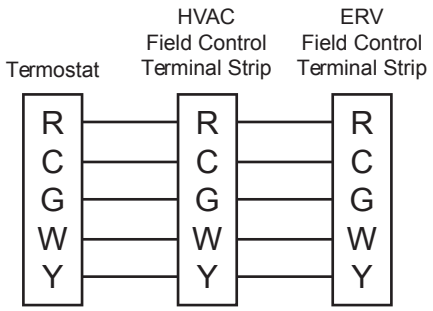
4. Secure the power wires away from sharp edges and moving parts.
   b. Re-attach the cover over the high voltage power.

5. The field connection terminal strip is located in the same box as the high voltage power.

6. Run 24V power from the RTU to the ERV and check 24V ampacity and ensure proper power.

7. The wires connecting to the field terminal strip can be routed through the nearest ¾" hole and through conduit to the HVAC unit, or they can be routed down the sidewall of the cabinet.

8. Connect all sensors for this system to the field terminal strip.



9. There is a jumper between pin locations 1 &3 on terminal strip 3. This forces the unit in occupied mode and has the ERV operate immediately with power. If you are using an occupancy signal, remove the jumper and route the signal wires to those 2 pin locations.

OPTIONAL

1. If using VOC and CO2 sensors, wire and mount the sensors in the building space at the same level as the thermostat.

ELECTRICAL DATA

See unit reference guide (pg 33-34) for specific unit.

YORK

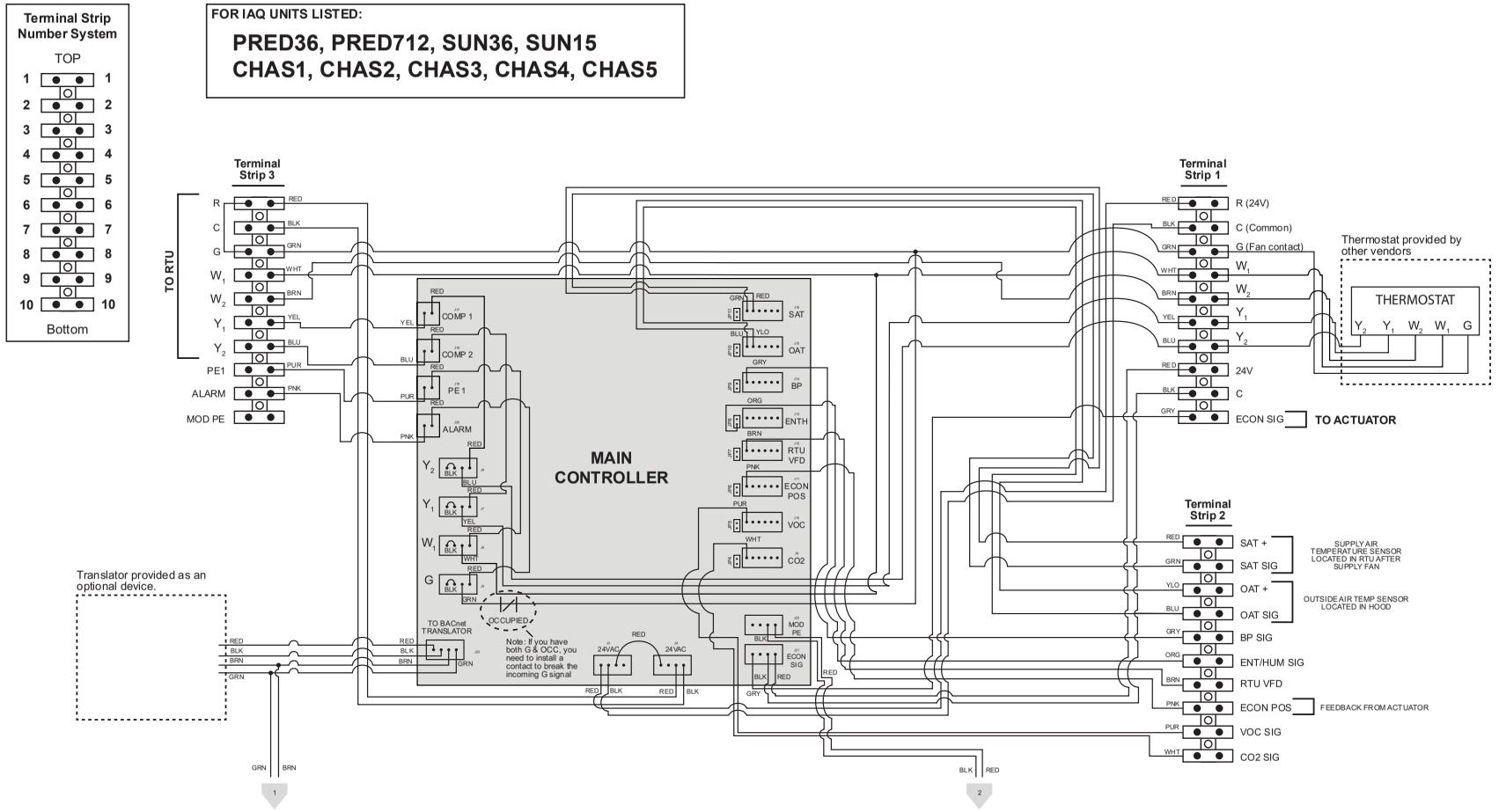
YORK UNIT	FLA	MCA	MOP
SUN 36 IAQ 208 V, 1/3 ph	4.18	5.22	8.50
SUN 36 IAQ 230 V, 1/3 ph	3.78	4.72	7.69
SUN 36 IAQ 460 V, 3 ph	1.89	2.36	3.85
SUN 36 MIN OA 208 V, 1/3 ph	4.31	5.39	8.79
SUN 36 MIN OA 230 V, 1/3 ph	3.90	4.88	7.95
SUN 36 MIN OA 460 V, 3 ph	1.95	2.44	3.98
PRED36 IAQ 208 V, 1/3 ph	4.18	5.22	8.50
PRED36 IAQ 238 V, 1/3 ph	3.78	4.72	7.69
PRED36 IAQ 460 V, 3 ph	1.89	2.36	3.85
PRED36 MIN OA 208 V, 1/3 ph	4.25	5.31	8.72
PRED36 MIN OA 230 V, 1/3 ph	3.84	4.80	7.89
PRED36 MIN OA 460 V, 3 ph	1.92	2.40	3.94
PRED712 IAQ 208 v, 3 ph	4.18	5.22	8.50
PRED712 IAQ 230 v, 3 ph	3.78	4.72	7.69
PRED712 IAQ 460 V, 3 ph	1.89	2.36	3.85
PRED712 MIN OA 208 V, 3 ph	5.88	7.35	12.13
PRED712 MIN OA 230 V, 3 ph	5.32	6.65	10.97
PRED712 MIN OA 460 V, 3 ph	2.66	3.33	5.48
SUN15 IAQ 208 V, 3 ph	8.02	10.03	10.43
SUN15 IAQ 230 V, 3 ph	7.26	9.07	9.43
SUN15 IAQ 460 V, 3 ph	3.63	4.54	4.72
SUN15 MIN OA 208 V, 3 ph	5.88	7.35	12.13
SUN15 MIN OA 230 V, 3 ph	5.32	6.65	10.97
SUN15 MIN OA 460 V, 3 ph	2.66	3.33	5.48
SUN1725 IAQ 208 V, 3 ph	5.88	7.35	12.13
SUN1725 IAQ 230 V, 3 ph	5.32	6.65	10.97
SUN1725 IAQ 460 V, 3 ph	2.66	3.33	5.48
SUN1725 MIN OA 208 V, 3 ph	8.99	11.24	15.24
SUN1725 MIN OA 230 V, 3 ph	8.13	10.16	13.78
SUN1725 MIN OA 460 V, 3 ph	4.29	5.36	7.11

CARRIER

CARRIER UNIT	FLA	MCA	MOP
Chassis 1 IAQ 208 V, 1/3 ph	4.18	5.22	8.50
Chassis 1 IAQ 230 V, 1/3 ph	3.78	4.72	7.69
Chassis 1 IAQ 460 V, 3 ph	1.89	2.36	3.85
Chassis 1 MIN OA 208 V, 1/3 ph	4.31	5.39	8.79
Chassis 1 MIN OA 230 V, 1/3 ph	3.90	4.88	7.95
Chassis 1 MIN OA 460 V, 3 ph	1.95	2.44	3.98
Chassis 2 IAQ 208 V, 1/3 ph	4.18	5.22	8.50
Chassis 2 IAQ 230 V, 1/3 ph	3.78	4.72	7.69
Chassis 2 IAQ 460 V, 3 ph	0.15	0.19	0.15
Chassis 2 MIN OA 208 V, 1/3 ph	8.29	10.37	10.78
Chassis 2 MIN OA 230 V, 1/3 ph	7.50	9.38	9.75
Chassis 2 MIN OA 460 V, 3 ph	3.93	4.91	5.06
Chassis 3 IAQ 208 v, 3 ph	4.18	5.22	8.50
Chassis 3 IAQ 230 v, 3 ph	3.78	4.72	7.69
Chassis 3 IAQ 460 V, 3 ph	1.89	2.36	3.85
Chassis 3 MIN OA 208 V, 3 ph	5.88	7.35	12.13
Chassis 3 MIN OA 230 V, 3 ph	5.32	6.65	10.97
Chassis 3 MIN OA 460 V, 3 ph	2.66	3.33	5.48
Chassis 4 IAQ 208 v, 3 ph	6.10	7.63	10.43
Chassis 4 IAQ 230 v, 3 ph	5.52	6.90	9.43
Chassis 4 IAQ 460 V, 3 ph	2.76	3.45	4.72
Chassis 4 MIN OA 208 V, 3 ph	5.88	7.35	12.13
Chassis 4 MIN OA 230 V, 3 ph	5.32	6.65	10.97
Chassis 4 MIN OA 460 V, 3 ph	2.66	3.33	5.48
Chassis 5 IAQ 208 V, 3 ph	8.02	10.03	10.43
Chassis 5 IAQ 230 V, 3 ph	7.26	9.07	9.43
Chassis 5 IAQ 460 V, 3 ph	3.63	4.54	4.72
Chassis 5 MIN OA 208 V, 3 ph	5.88	7.35	12.13
Chassis 5 MIN OA 230 V, 3 ph	5.32	6.65	10.97
Chassis 5 MIN OA 460 V, 3 ph	2.66	3.33	5.48
Chassis 6/7 IAQ 208 V, 3 ph	5.88	7.35	12.13
Chassis 6/7 IAQ 230 V, 3 ph	5.32	6.65	10.97
Chassis 6/7 IAQ 460 V, 3 ph	2.66	3.33	5.48
Chassis 6/7 MIN OA 208 V, 3 ph	8.99	11.24	15.24
Chassis 6/7 MIN OA 230 V, 3 ph	8.13	10.16	13.78
Chassis 6/7 MIN OA 460 V, 3 ph	4.29	5.36	7.11
Chassis 8/9 IAQ 208 V, 3 ph	5.88	7.35	12.13
Chassis 8/9 IAQ 230 V, 3 ph	5.32	6.65	10.97
Chassis 8/9 IAQ 460 V, 3 ph	2.66	3.33	5.48
Chassis 8/9 MIN OA 208 V, 3 ph	11.77	14.71	15.24
Chassis 8/9 MIN OA 230 V, 3 ph	10.64	13.30	13.78
Chassis 8/9 MIN OA 460 V, 3 ph	5.54	6.93	7.11

ERV WIRING DIAGRAM (fixed speed NON EC BLOWER)

2/05/2014 v 1.8

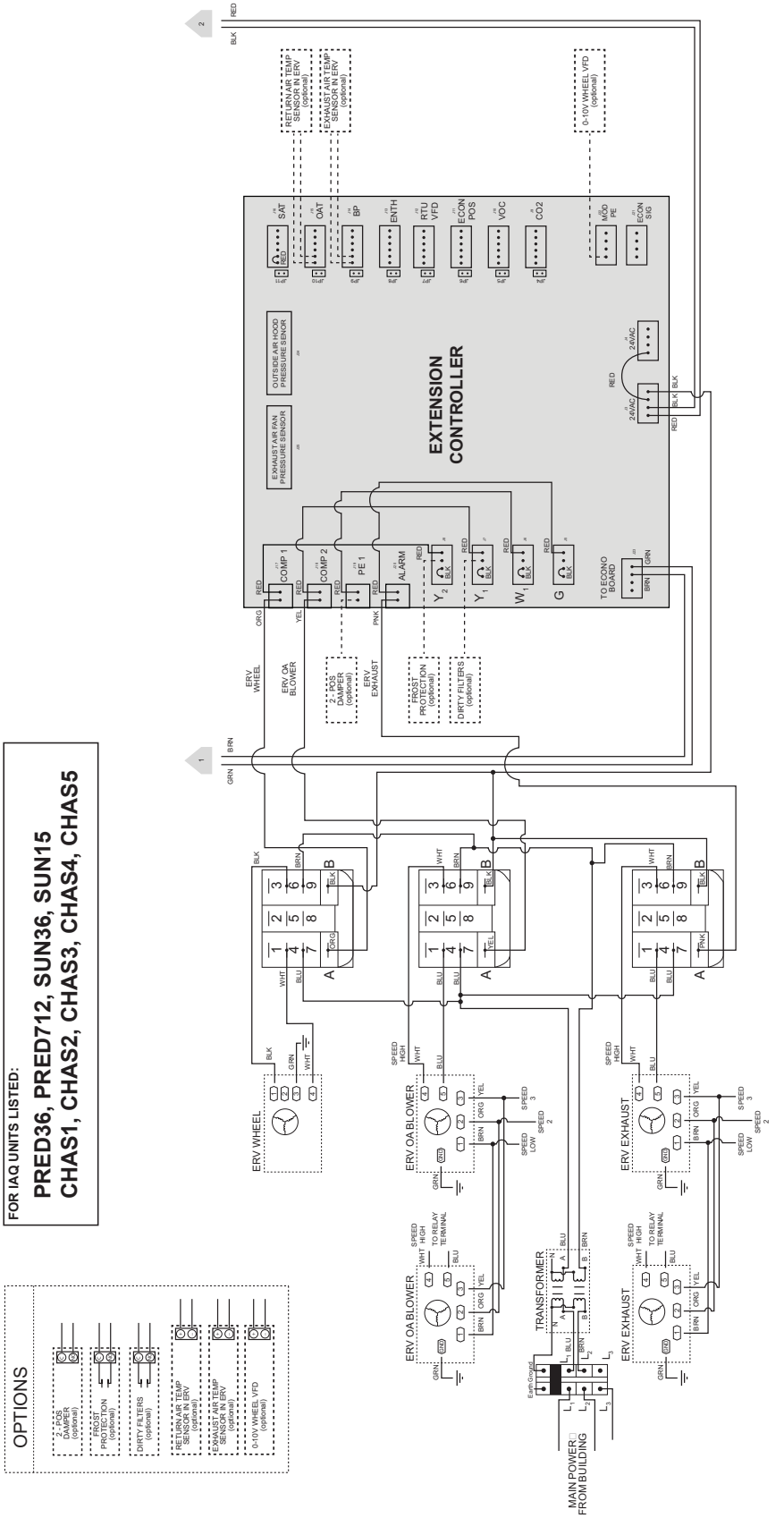


ERV WIRING DIAGRAM (fixed speed NON EC BLOWER)

2/05/2014 v 1.8

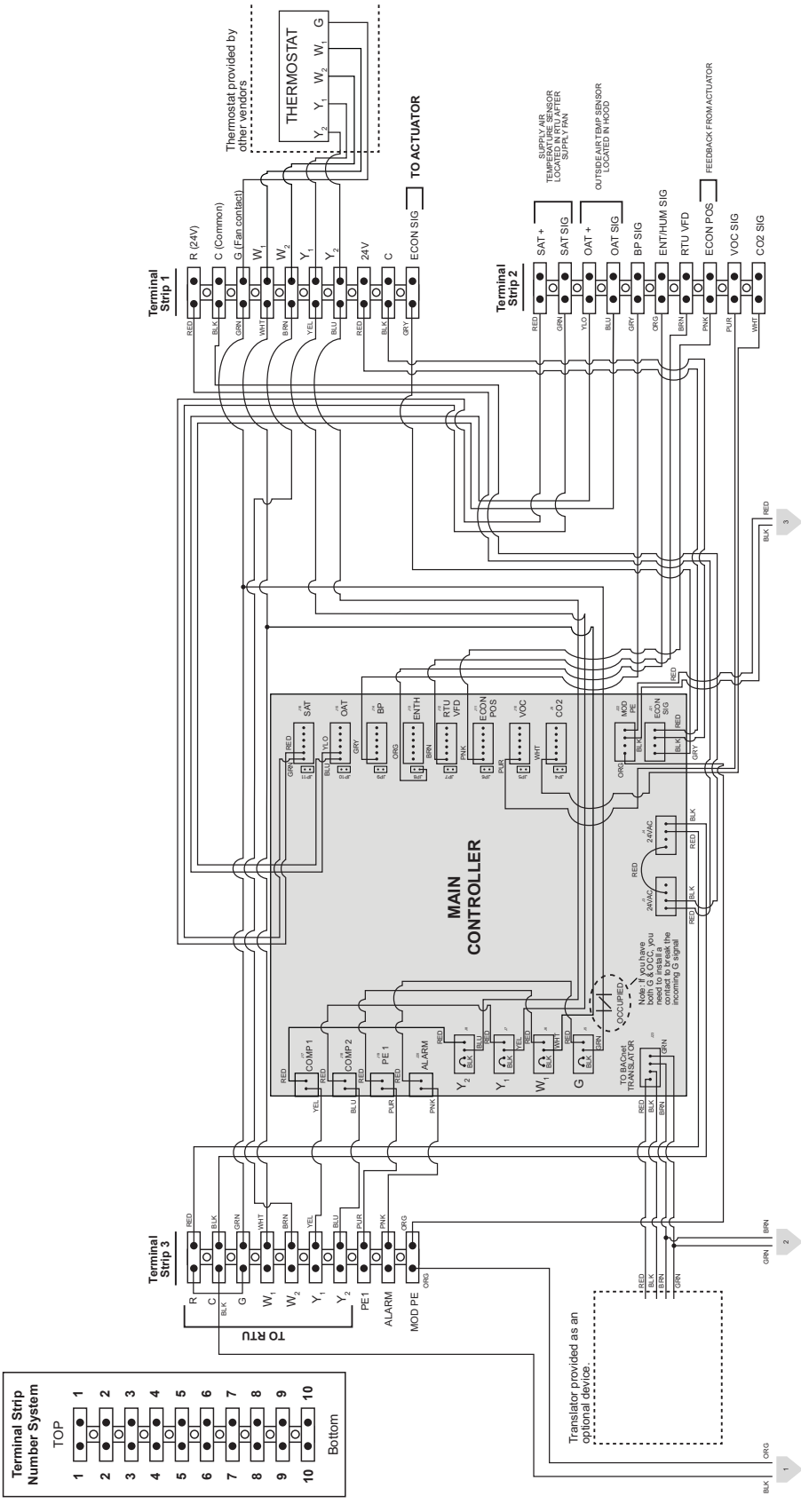
FOR IAQ UNITS LISTED:

PRED36, PRED712, SUN36, SUN15
CHAS1, CHAS2, CHAS3, CHAS4, CHAS5



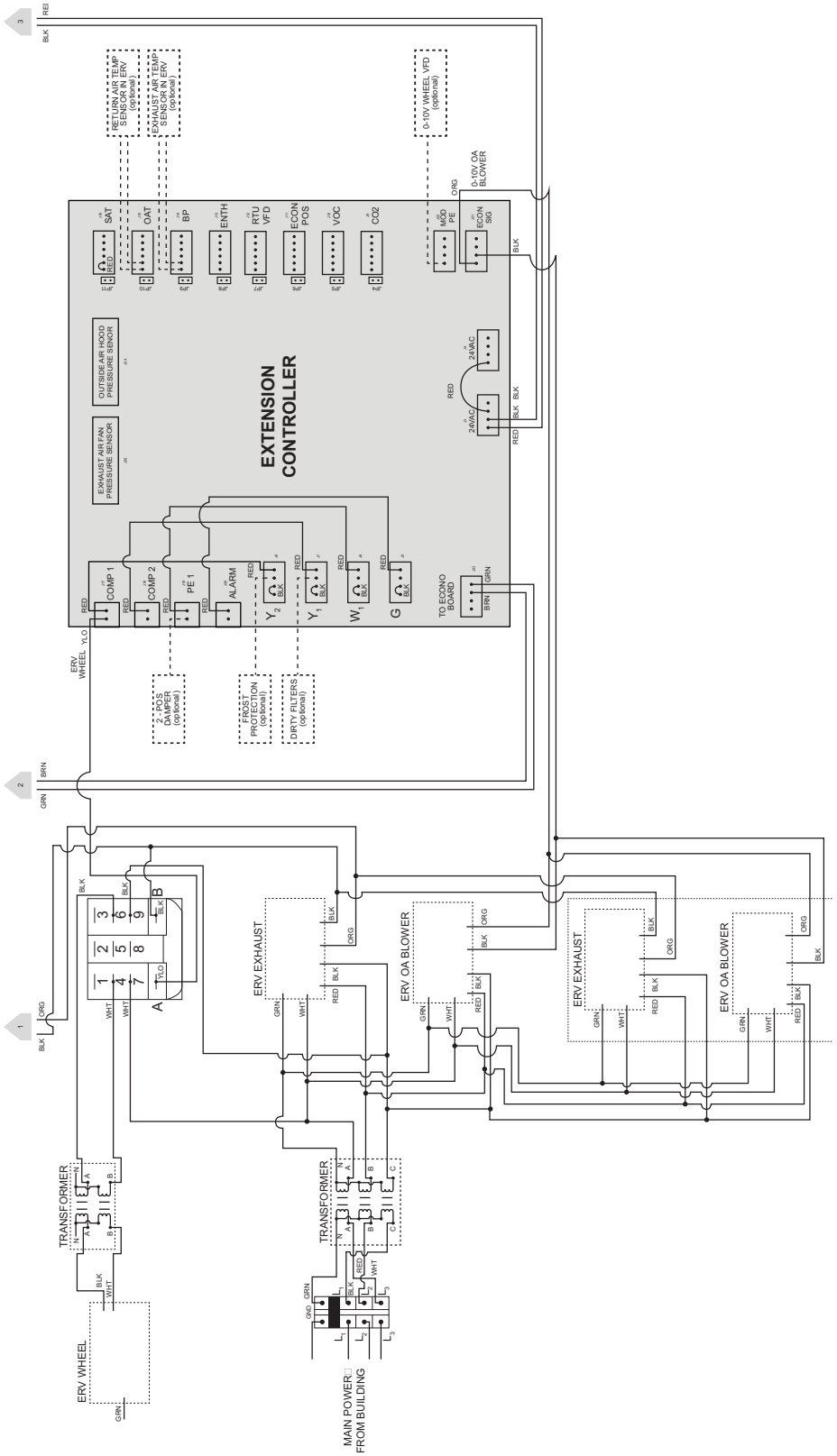
ERV WIRING DIAGRAM (variable speed)

1/08/2014 v 1.2

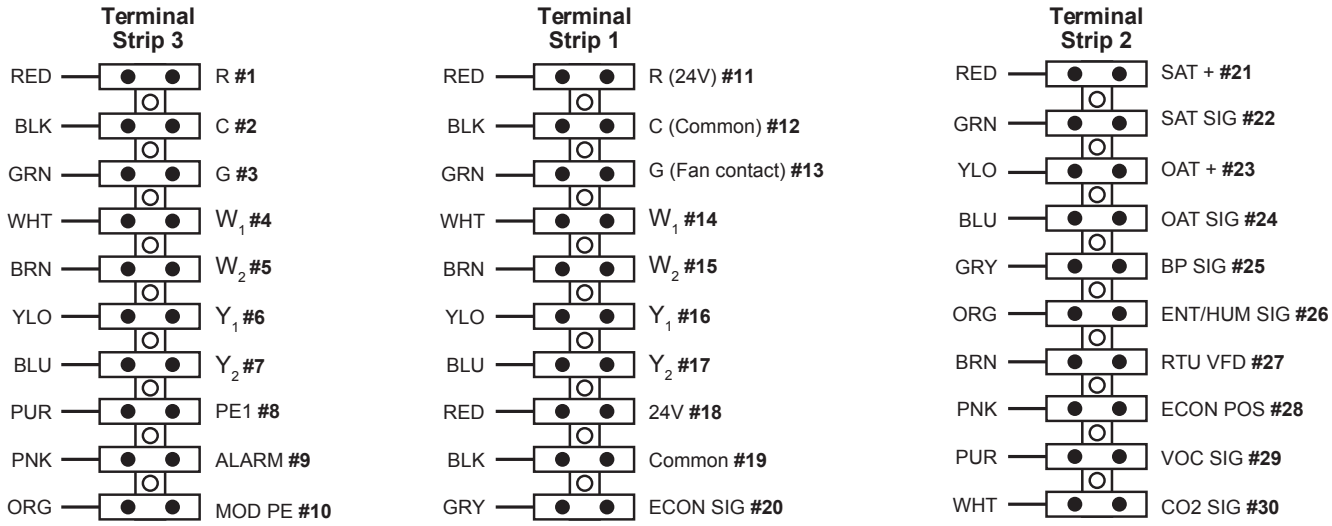


ERV WIRING DIAGRAM (variable speed)

1/08/2014 v 1.2



Terminal Strip Detail



Actuator
Power should land on #1
Common should land on #2
Signal should land on #20
Feedback signal should land on #28 *(optional)*

SAT Sensor
Power should land on #21
Common should land on #22

OAT Sensor
Power should land on #23
Common should land on #24

Ion Generator(s)
Power should land on #18
Common should land on #19

VOC Sensor
Power should land on #11
Common should land on #12
Signal should land on #29

CO2 Sensor
Power should land on #18
Common should land on #19
Signal should land on #30

Humidity Sensor *(optional)*
Power should land on #11
Common should land on #12
Signal should land on #26

Building Pressure Sensor *(optional)*
Power should land on #18
Common should land on #19
Signal should land on #25

RTU VFD *(optional)*
Signal should land on #27

MOD PE *(optional)*
Signal should land on #10

BACnet Translator *(optional)*
Plug provided for direct insertion into the economizer controller at the spot labeled RS485.

ALARM Signal *(optional)*
Signal should land on #9

POWER UP

After the controller is mounted and wired, restore power to the RTU.

STARTUP PROCEDURE

1. Verify that all of the panels are in place and secure.

2. Before turning the disconnect switch on, verify that the voltage being provided to the ERV unit matches the voltage shown on the ERV nameplate.

3. Verify that any openings to the ERV cabinet are clear of foreign materials.

4. Turn on the disconnect switch, the wheel should start moving and the blowers will run at the speed that is set on the display.

(Refer to sequence of operations appendix at back of book for additional information)

POWER UP DELAY

When powering up the VOC and humidity sensors, the VOC sensor has a first time warm up period of 48 hours. After first start-up, the warm up period is one (1) hour. The humidity sensor has a start-up delay of 3 minutes.

POWER LOSS

All setpoints and advanced settings are restored to the defaults after any power loss or interruption.

USING KEYPAD WITH MENUS

When using the keypad to navigate between menus:
• The up arrow is used to move to a previous menu.
• The down arrow is used to move to the next menu.
• The enter button will display the first item in the currently selected menu.
• The esc button is used to exit a menu's item and return to the list of menus.

USING KEYPAD WITH SETTINGS

• Navigate to the desired menu.
• Press enter to display the first item in the selected menu.
• Use the up and down arrows to scroll and select the desired parameter.
• Press enter to display the value of the current selection.
• Press the up arrow to increase or the down arrow to decrease the parameter value.
• Press enter to accept the value and store it.
• Press enter again to return to the selected menu
• Press esc to return to the previous menu.

CONTROLLER INFORMATION

There are (3) three lights that are visible from the front of the controller at different times of operation. These lights are:
Status - Red Light
Reset - Red Light
Power - Green Light
When power is applied to the controller and it has the correct programing, the green power light should be on and the other two lights should be off. If the status and reset slights are flashing red, it is indicating the unit is in alarm.

MENU STRUCTURE

1. STATUS
Allows user to check current system statuses
2. SET POINTS
Allows user to enter system set points
3. CONFIGURATION
Allows user to set modes and configure set points
4. TEST
Allows user to put system into test mode to check individual functionality of system components
5. ALARMS
Allows user to view system alarms

MODES

4 - IAQ ERV
5 - MIN OA ERV

* *For mode details, see pages 9 and 10.*

CONTROLLER MODE CONFIGURATION SETTINGS

The controller mode allows the user to select which mode the controller will run in. To select the mode, use the up and down buttons to bring up the screen for the mode you would like and hit the enter button to enable the selection.

Mode 4 – IAQ ERV

The controller is in indoor air quality mode with an ERV present. In this mode, the ERV has fixed speed blowers. These blowers run continuously. They are meant to bring in air at the minimum required levels. All other air is brought into the space by opening the by-pass damper.

In this mode, there is both a CO2 & VOC sensor present. The user will select a minimum outside air setting (the maximum air that is brought into the RTU) and a DCV set-point (the minimum air that is brought into the RTU). The user selects a minimum CO2 PPM (zero) and a maximum CO2 PPM to go with these airflow set-points. The CO2 sensor will sense occupancy and output a PPM. If this PPM is less than the minimum CO2 PPM set-point, the damper will be open to the DVC set-point. If the CO2 PPM is more than the maximum CO2 PPM set-point, the damper will be open to the minimum outside air setting. If the CO2 PPM is in-between the minimum and maximum CO2 set-points, the controller determines a straight line between the 2 points to determine the damper position.

The user will select a minimum VOC set-point and a maximum VOC set-point. The user selects a minimum VOC PPM (zero) and a maximum VOC PPM to go with these airflow set-points. The VOC sensor will sense occupancy and output a PPM. If this PPM is less than the minimum VOC PPM set-point, the damper will be open to the DVC set-point. If the VOC PPM is more than the maximum VOC PPM set-point, the damper will be open to the minimum outside air setting. If the VOC PPM is in-between the minimum and maximum VOC set-points, the controller determines a straight line between the 2 points to determine the damper position.

The controller will add the CO2 damper position and the VOC damper position together to determine the actual damper position. If free cooling is available, the controller will modulate the damper to control the SA set-point in the RTU. In free cooling the ERV blowers shut off.

Mode 5 – MIN OA ERV

The controller is in indoor air quality mode with an ERV present. In this mode, the ERV has variable speed blowers.

In this mode, there is both a CO2 & VOC sensor present. The user will select a minimum outside air setting (the maximum air that is brought into the RTU) and a DCV set-point (the minimum air that is brought into the RTU). The user selects a minimum CO2 PPM (zero) and a maximum CO2 PPM to go with these airflow set-points. The CO2 sensor will sense occupancy and output a PPM. If this PPM is less than the minimum CO2 PPM set-point, the blower will ramp to the DVC set-point. If the CO2 PPM is more than the maximum CO2 PPM set-point, the blowers will ramp to the minimum outside air setting. If the CO2 PPM is in-between the minimum and maximum CO2 set-points, the controller determines a straight line between the 2 points to determine the blower speed.

The user will select a minimum VOC set-point and a maximum VOC set-point. The user selects a minimum VOC PPM (zero) and a maximum VOC PPM to go with these airflow set-points. The VOC sensor will sense occupancy and output a PPM. If this PPM is less than the minimum VOC PPM set-point, the blowers will ramp to the DVC set-point. If the VOC PPM is more than the maximum VOC PPM set-point, the blowers will ramp to the minimum outside air setting. If the VOC PPM is in-between the minimum and maximum VOC set-points, the controller determines a straight line between the 2 points to determine the blower speed.

The controller will add the CO2 blower speed and the VOC blower speed together to determine the actual blower speed. If free cooling is available, the controller will modulate the blowers to control the SA set-point in the RTU. Once the blowers reach 100%, the damper will open up to bring in additional air if required.

CONFIGURATION MENU SETTINGS

Using the up and down arrows, you will be able to configure your system using items listed below:

The controller mode allows the user to select which mode the controller will run in. There are (5) modes to choose from:
Econo Mode / DVC mode / IAQ mode / IAQ ERV mode / MIN OA ERV mode
**for mode details, see CONTROLLER MODE CONFIGURATION SETTINGS on previous page.*

This setting should be “disabled” unless the RTU has a 2-speed fan or a variable speed fan. If the RTU has a 2-speed fan or a variable speed fan, this setting should be “enabled”. If the setting is “enabled”, it allows the controller to have a damper offset to account for the difference in the static pressure coming in the outside air hood between the varying speeds of the motor and allows the damper to bring in the correct outside air regardless of blower speed.

This setting should be “disabled” unless you have installed a humidity sensor into the control scheme. If a humidity sensor is installed, this setting should be “enabled”. Once the setting is “enabled”, the controller will calculated the outside air enthalpy and allow the user to input an enthalpy setting into the system to prevent free cooling from happening on humid cooler days.

This setting tells the user the version and revision of the software loaded into the controller.

STATUS MENU SETTINGS

Using the up and down arrows on the controller, find the status menu and hit enter.

Using the up and down arrows, you will be able to check the system status for items listed below using the enter button:

Allows you to view the controller commanded set points of the economizer damper.

Allows you to view the current actual position of the economizer damper.

Allows you to check to see if the power exhaust command is on.

Allows you to check if the compressor 1 output is active or de-active.

Allows you to check if the compressor 2 output is active or de-active.

Allows you to check if the power exhaust 1 output is active or de-active.

Allows you to check if the power exhaust 2 output is active or de-active.

Allows you to check if the economizer enable option is active or de-active.

Allows you to check if the HVAC heating stage 1 from the thermostat is active or de-active.

Allows you to check if the compressor 1 input from the thermostat is active or de-active.

Allows you to check if the compressor 2 input from the thermostat is active or de-active.

Allows you to check the current CO2 PPM reading coming from the sensor.

Allows you to check if the ERV heat wheel is active or de-active.

Allows you to check if the ERV make up fan is active or de-active.

Allows you to check if the power exhaust fan is active or de-active.

Allows you to check if the power exhaust fan is active or de-active.

Allows you to check the outside air fan speed.

Allows you to check the exhaust air fan speed.

Allows you to check the outside CFM.

Allows you to check the exhaust CFM.

Allows you to check the outside air temperature.

Allows you to check the supply air temperature.

Allows you to check the current VOC PPM reading coming from the sensor.

Allows you to check the current machine state. (this helps when troubleshooting)

Allows you to check the current humidity reading coming from the sensor.

Allows you to check the current calculated btu/lb reading.

Allows you to check if free cooling is available or not.

SETPOINTS MENU SETTINGS

Using the up and down arrows, you will be able to change system set points for items listed below using the enter button:

Allows you to set the high temperature limit for the economizer.

Allows you to set the low temperature limit for the economizer.

Allows you to set the free cooling temperature limit for the supply air.

Allows you to set the min outside air position for the economizer.

Allows you to set the max position of allowable damper stroke.

Allows you to set where the power exhaust is positioned.

Allows you to set where the power exhaust is positioned.

Allows you to set the building pressure.

Allows you to set the min DCV economizer position.

Allows you to set the max CO2 level.

Allows you to set the min CO2 level.

Allows you to set the min CFM level.

Allows you to set the exhaust CFM offset level.

Allows you to set the min VOC CFM level.

Allows you to set the min VOC PPM level.

Allows you to set the max VOC PPM level.

Allows you to set the min VOC economizer position.

Allows you to set the min VOC economizer position.

Allows you to set the economizer offset position if you are using a 2 speed unit.

Allows you to set the btu/lb point for enthalpy for free cooling. (refer to Enthalpy table in appendix D)

Allows you to set the outside air fan position.

Allows you to set the power exhaust fan position.

TEST MENU SETTINGS

Using the test menu you will be able to turn off and on the test mode for the system to check the functionality of the system components.

After hitting enter, you can use the arrow buttons to select yes or no for enabling the test mode.

ALARM MENU SETTINGS

Using the up and down arrows, you will be able to view system alarms for items listed below:

Each screen displays alarm status as either active or deactive in place of the “xxx” shown in the picture.

IAQ Sized ERV Mode

NAME	FUNCTION	DEFAULT SET POINTS
Econ HighTmpLimt Setpoint	Sets the high temperature limit for when free cooling can happen (in degrees F)	65
Econ LowTmpLimt Setpoint	Sets the low temperature limit for when free cooling can happen (in degrees F)	0
Econ Free Cool Sat Setpoint	Discharge temperature setting that damper is controlling temperature to	55
Econo Min Position Configuration	High CO2 damper setpoint & maximum design outside air condition	20
Econo Max Position Configuration	Maximum stroke of economizer damper	100
Power Exht1 Position Configuration	Damper setpoint where user desire PE1 relay to energize	30
Building Pressure	Inside building pressure if using modulating powered exhaust (inches H2O)	0.05
HVAC 2-speed Conf	Is the unit a 2-speed fan RTU?	Deactive
HVAC 2-speed ECON offset	Damper default when the RTU is goes to high fan speed	-10
Humidity Sensor Config	Does the system have a humidity sensor	Deactive
Enthalpy Set Point	Free cooling is possible less than this default setting (BTU/lb)	26
IAQ Econo Min position	Low CO2 damper setpoint	0
Min IAQ Level Pos	Low CO2 PPM setpoint	400
Max IAQ Level Pos	High CO2 PPM setpoint	1000
Min VOC Level PPM	Low VOC PPM setpoint	12
Max VOC Level PPM	High VOC PPM setpoint	25
VOC Econo Min Pos	Low VOC damper setpoint	0
VOC Econo Max Pos	High VOC damper setpoint	10
OA ERV fan speed	ERV OA outside air fan speed setpoint	50
EX ERV fan speed	ERV EX outside air fan speed setpoint	75
Min ERV damper position	Minimum damper position that econo damper will be in free cooling	20

MIN OA Sized ERV Mode

NAME	FUNCTION	DEFAULT SET POINTS
Econ HighTmpLimt Setpoint	Sets the high temperature limit for when free cooling can happen (in degrees F)	65
Econ LowTmpLimt Setpoint	Sets the low temperature limit for when free cooling can happen (in degrees F)	0
Econ Free Cool Sat Setpoint	Discharge temperature setting that damper is controlling temperature to	55
Econo Max Position Configuration	Maximum stroke of economizer damper	100
Power Exht1 Position Configuration	Damper setpoint where user desire PE1 relay to energize	30
Building Pressure	Inside building pressure if using modulating powered exhaust (inches H2O)	0.05
HVAC 2 Speed Config.	Is the unit a 2-speed fan RTU	Deactive
HVAC 2-speed ECON offset	Damper default when the RTU goes to high fan speed	-10
Humidity Sensor Config.	Does the system have a humidity sensor?	Deactive
Max DCV Level Pos	High CO2 PPM setpoint	1000
Min DCV Level Pos	Low CO2 PPM setpoint	700
Max VOC Level PPM	Low VOC PPM setpoint	25
Min VOC Level PPM	High VOC PPM setpoint	12
OA ERV Min fan speed	ERV OA outside air fan speed setpoint	50
EX ERV Min fan speed	ERV EX outside air fan speed setpoint	75
OA ERV DCV fan speed	ERV OA outside DCV air fan speed setpoint	25
EX ERV DCV fan speed	ERV EX outside DCV air fan speed setpoint	50
OA ERV VOC Min fan speed	ERV OA outside air fan speed min VOC offset	0
EX ERV VOC Min fan speed	ERV EX outside air fan speed min VOC offset	0
OA ERV VOC Max fan speed	ERV OA outside air fan speed max VOC offset	10
EX ERV VOC Max fan speed	ERV EX outside air fan speed max VOC offset	10

GENERAL MAINTENANCE

Air Filters: With this ERV unit and with most other forced air heating, cooling and ventilation systems regular air filter maintenance is of utmost importance. Proper filter maintenance will improve indoor air quality, keeps the building air handling system clean for peak efficiency, and will prolong the life of your HVAC equipment. The life of the air filters is directly related to the application to which the ERV unit is installed. The air filters should be inspected every couple of weeks until the maintenance schedule is established. Your ERV unit is equipped from the factory with throw-away filters, however if the installer changed the filter type consult the installer for filter maintenance instructions.

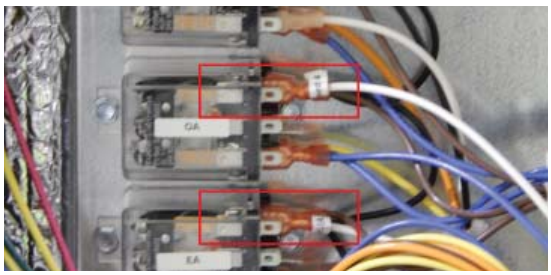
Replacing the Throw-Away Filters: Turn off the power to the ERV. Open the service door on either side of the ERV and remove the filter spacers. Pull the filters or filter racks out the cabinet. Replace the filters with the OEM replacements or equivalents. See the spare parts section of this manual for sizes and quantity.

Cleaning the ERV Wheel: The ***iAIRE*** ERV cabinet has been designed for easy access to the wheel for cleaning. To access the wheel for cleaning turn off the power to the ERV, open the service door, and disconnect the power connector to the wheel motor and pull the wheel out half way. In this position all of the segments of the wheel can be cleaned and rinsed by rotating the wheel by hand. *See the AirXchange service instructions included in the appendix of this manual for maintenance intervals and cleaning instructions*.

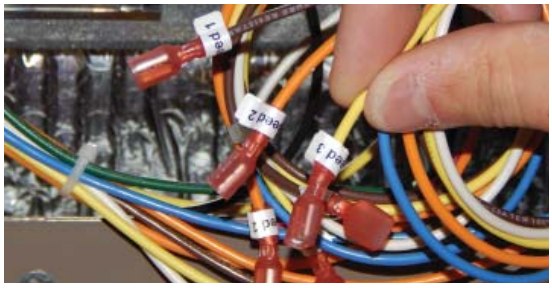
CHANGING BLOWER SPEED

1. **For fixed speed blowers (Type 1)**, remove the high voltage panel below the ERV controllers to expose wiring.

2. To adjust either the OA or EA fan speed, remove the wire for speed 4.



3. Replace with the desired speed (either 1, 2, or 3).



1. **For variable speed blowers (Type 2)**, on the main controller, access the setpoints menu.

2. Using the up and down arrows, scroll to the outside air and exhaust fan setpoint screens (one at a time).

2. Using the up and down arrows, change the setpoint for each. The higher the number, the faster the fan speed. The lower the number the lower the fan speed.

REPLACING A BLOWER

#	TYPE 1	TYPE 2
1	Sun 36 IAQ	Pred 712 MIN OA
2	Sun 36 MinOA	Sun 15 Min OA
3	Pred 36 IAQ	Sun1725 IAQ
4	Pred 36 MIN OA	Sun1725 MIN OA
5	Pred 712 IAQ	Chassis 3 Min OA
6	Sun 15 IAQ	Chassis 4 Min OA
7	Chassis 1 IAQ	Chassis 5 Min OA
8	Chassis 1 Min OA	Chassis 6/7 IAQ
9	Chassis 2 IAQ	Chassis 6/7 MIN OA
10	Chassis 2 MinOA	Chassis 8/9 IAQ
11	Chassis 3 IAQ	Chassis 8/9 MIN OA
12	Chassis 4 IAQ	
13	Chassis 5 IAQ	

*See unit reference guide in appendix for specific units

OA BLOWER TYPE 1 - BLACK COMPOSITE BLOWERS

1. Turn the power off and lock out the ERV electrical circuit.
2. Remove the OA hood from the ERV.
3. The unit might have (2) OA blowers. If so, determine which blower needs replaced.

4. Disconnect the wiring from the blower.
5. Open the ERV door and remove the supply filter from the ERV.
6. Unhook the power wire to the ERV wheel cassette and slide the ERV wheel out of the unit.
7. Remove screws around the 4 corners of the blower and lift the blower out of the unit.(Accessed through the open ERV door).

8. Remove the blower from the unit.
9. Follow these instruction steps in reverse order to install the blower.

EX BLOWER TYPE 1 - BLACK COMPOSITE BLOWERS

1. Turn the power off and lock out the ERV electrical circuit.
2. Open the ERV door and remove the exhaust filter from the ERV.
3. Unhook the power wire to the ERV wheel cassette and slide the ERV wheel out of the unit.

5. You will be able to gain access now to the EX blowers.
6. The unit might have (2) EX blowers. If so, determine which blower needs replaced.
7. Disconnect the wiring from the blower.
8. Remove the EX hood and barometric relief damper.
9. Remove screws around the 4 corners of the blower and lift the blower out of the unit. (Accessed from the front of the unit)

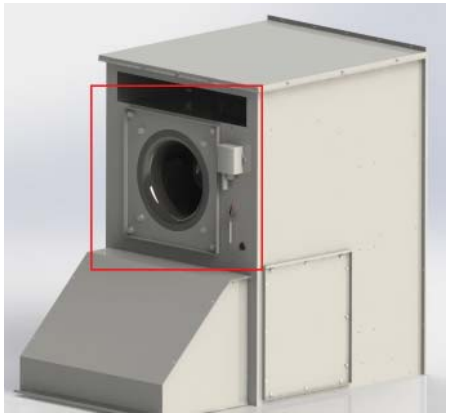
10. Remove the blower through the open ERV door.

11. Follow these instruction steps in reverse order to install the blower.

OA BLOWER TYPE 2 – EC IMPELLERS

1. Turn the power off and lock out the ERV electrical circuit.
2. Remove the OA hood from the ERV.

3. The unit might have (2) OA blowers. If so, determine which blower needs replaced.
4. Disconnect the wiring from the blower.
5. Remove screws around the 4 corners of the blower and lift the blower out of the unit.



6. Follow these instruction steps in reverse order to install the blower.

EX BLOWER TYPE 2 – EC IMPELLERS

1. Turn the power off and lock out the ERV electrical circuit.
2. Remove the EX hood from the ERV.

3. The unit might have (2) EX blowers. If so, determine which blower needs replaced.
4. Disconnect the wiring from the blower.
5. Remove screws around the 4 corners of the blower and lift the blower out of the unit.

6. Follow these instruction steps in reverse order to install the blower.

Replacing the ERV Wheel Motor:

See the AirXchange service instructions included in the appendix of this manual.

Replacing the ERV Wheel Segments:

See the AirXchange service instructions included in the appendix of this manual.

TROUBLESHOOTING

Symptom	Possible Causes	What to Check	How to Check or Repair
ERV will not turn on	Disconnect switch is in the off position	Verify that the disconnect switch is in the 'ON' position	Move the disconnect lever to the 'ON' position.
	No power to the ERV	Check for power at the disconnect switch	Using a volt meter verify that the voltage being supplied to the ERV matches the ERV's operating voltage. If the ERV operates on three phase power check all three legs.
	Transformer fuses have opened	Fuses are provided when a step-down transformer is installed.	"TURN POWER OFF" – Using a volt meter check the continuity of the fuses in the circuit.
	Transformer circuit breaker is tripped	Look at the small transformer to see if the black circuit pushed out	Depress the circuit breaker back in.
The ERV is on but the blower/s won't turn run	Disconnected or loose wiring	Check connection points on terminal strip, Enthalpy and Dry bulb thermostat, and contactor.	"TURN POWER OFF" – Visually inspect and correct connections as needed.
	One Blower does not work.	If one blower is on and the other will not run. Check and verify proper connection.	Swap or switch the working blower for the non-working blower.
	One of the blowers is wired incorrectly	Check for wiring errors.	Using the wiring schematics verify that both the power wires and the control wires are connect properly.
The Blowers are on but the wheel is not turning	The ERV Enthalpy Control, Dry bulb Control / Wheel By-Pass Stop Jog Option (if equipped) is activated	-	-
	The wheel motor is unplugged.	Check to see if the connector between the wheel motor and the cabinet wiring is securely connected.	Plug the two connectors together.
	The wheel motor is wired incorrectly.	Check for wiring errors.	Compare the wheel motor; control board and relay are wired correctly.
	The wheel belt is off or broken	Check the wheel belt.	Verify that the wheel belt is seated in the pulley and on the rim of the wheel.
	The air seals on the wheel are too tight	Check to see if the wheel spins freely.	Carefully rotate the wheel by grabbing the outer rim and spin the wheel. After letting go the wheel should continue to spin for three to four seconds. Should the air seals need adjusting see the maintenance section of this manual.

TROUBLESHOOTING

1. Make sure the unit has power and the green power light on the controller is on.
2. If the unit has flashing red status and reset lights, it is indicating the unit has an alarm.

Go to the controller screen and push the up arrow until you get to the alarm menu and hit enter.

Once you are in the alarm menu, scroll through the following possible alarms to see which one(s) are active:

1. **CO2** - If active, the controller does not sense the CO2 sensor. Check the wiring to make sure the sensor is wired up to the unit correctly. You must have the ground, power & signal wires all attached for the sensor to work. If the sensor is wired correctly and has power, check the sensor to make sure there is a 0-10 VDC output coming from the sensor. When the alarm is active, the controller automatically moves the economizer damper to the Econo Min Position so the building is receiving the appropriate amount of air.

2. **VOC** - If active, the controller does not sense the VOC sensor. Check the wiring to make sure the sensor is wired up to the unit correctly. You must have the ground, power & signal wires all attached for the sensor to work. If the sensor is wired correctly and has power, check the sensor to make sure there is a 0-10 VDC output coming from the sensor. When the alarm is active, the controller automatically moves the economizer damper to the Econo Min Position so the building is receiving the appropriate amount of air.

3. **Outside Air temperature sensor (OAT)** - If active, the controller does not sense the OAT sensor. Check the wiring to make sure the sensor is wired up to the unit correctly. If the wiring is correct, the sensor is bad.

4. **Supply Air temperature sensor (SAT)** - If active, the controller does not sense the SAT sensor. Check the wiring to make sure the sensor is wired up to the unit correctly. If the wiring is correct, the sensor is bad.

5. **Outside Air Damper** - If active, the controller does not have feedback from the economizer actuator. If the controller was used as a replacement for a system already in the field, the previous actuator may not have feedback. If feedback is not present, this alarm will be (and remain) active. The system will continue to function normally with this alarm on.

To assist with troubleshooting the system, it may be helpful to put the controller in test mode. The mode allows the user to test the controller by forcing certain items in the system to see if they are operational. The user can force the following:

- Economizer position
- Modulating PE speed
- Comp 1
- Comp 2
- PE 1
- PE 2
- ERV wheel
- ERV OA fan
- ERV OA fan speed
- ERV EX fan speed

ADDITIONAL INFORMATION

The default set points and configurations for each mode are outlined on pages 13 through 21.

If a field replacement of an existing controller is needed, please contact the manufacturer by phone or email at:

844-348-9168 | sales@myiaire.com

If the optional BACnet translator is being used, please see the reference points list on the next page (page 8).

ERV WARRANTY PLAN

General Warranty Statement

The ERV rotary cassette wheel used in ***iAIRE*** ERV units are warranted to be free from defects in material and workmanship under normal use and service for a period of 5 years from the ship date for all parts and components.

iAIRE warrants for two years from the ship date, all energy recovery unit products (other than the ERV wheel) to be free from defects in design, material and workmanship under normal use and service.

This warranty applies to blower assemblies and all other ERV components (other than the ERV wheel). Our obligation shall be limited to repairing or replacing defective components or assemblies, as our inspection determines to be defective. ***iAIRE*** will allow freight charges, however air freight charges are not included.

General Conditions

All warranty periods commence from the original ship date of the ERV from the factory.

This warranty does not cover the cost of labor for any adjustments or service calls, nor does it include the cost of labor for replacing defective parts or components. This warranty does not apply if the ERV unit or wheel has been subject to misuse, abuse, neglect, accidental damage or alteration. This warranty applies to parts supplied or designated by ***iAIRE***.

This express warranty is in lieu of all other warranties, expressed or implied, including implied warranties of merchantability or fitness for a particular purpose, which are hereby excluded. ***iAIRE*** shall not be liable for special, incidental for consequential damages or losses from any cause whatsoever including, without limitation, loss of use, commercial profits or customer goodwilll and any other claims based on contract or tort, whether or not arising from ***iAIRE's*** negligence.

APPENDIX A - AIRXCHANGE

ENERGY TRANSFER SEGMENT INSTALLATION AND REMOVAL INSTRUCTION FOR MODELS ERC-36" through 81" (no. SI000044C)

General

Energy Transfer Segments are the "heat exchangers" of the cassette. These are not filters and represent a substantial portion of the value of the cassette. Segments must be handled with care and never be dropped. Use a suitable crate or harness to lift segments to a roof surface, never use the shipping cartons for this purpose. Segments may require "slight" persuasion during installation and removal but never be forced or banged with a hammer or similar tool.

Tools Required

"STOP" for stabilizing wheel (see CAUTION)

Warning: Before performing service or maintenance operations on unit, turn off main power switch to unit. Electrical shock could cause personal injury.

Note: Both installation and removal procedures must be performed from the pulley side of the cassette.

Caution: Weight of the installed segment will cause the wheel to accelerate in rotation. Failure to maintain control of the wheel rotation while installing all segments could cause severe injury to fingers or hand caught between revolving spokes and the bearing support beam. Handle of hammer, or other stop, should be inserted through spokes and above or below bearing support beams to limit rotation of unbalanced wheel. See Figure 1.

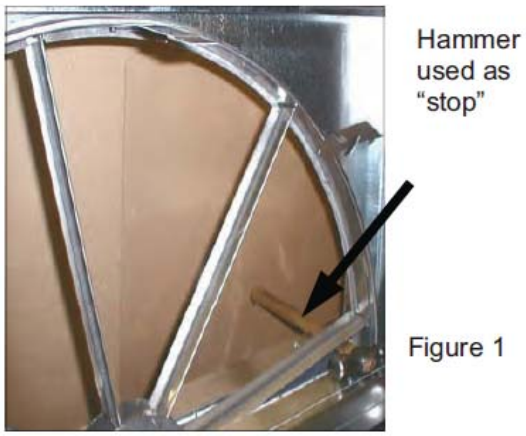


Figure 1

Installation Procedure

1. Begin by positioning one segment opening at the top of the cassette. Unlock and open the segment retaining brackets on both sides of the selected segment opening. See Figure 1.

2. Holding the segment as vertically as possible and centered between spokes, insert nose of segment downward between the hub plates. See Figure 2.

Figure 2

Note: The face of the segment, with the embedded stiffener (vertical support between nose and rim end of segment) must face the motor side of the cassette. See Figure 3.

3. Ease the segment downward until its outer rim clears the inside of the wheel rim. Then press the segment inward against the spoke flanges.

4. Close and latch segment retaining brackets to the position shown in Figure 4. Make certain the retaining bracket is fully engaged under the catch.

5. Slowly rotate, by hand, the first installed segment to the bottom of the cassette, then install the second segment opposite the first. Repeat this sequence with the two installed segments rotated to the horizontal position to balance the weight of installed segments. Continue this sequence with the remaining segments.

Figure 3.
View from motor side of segment

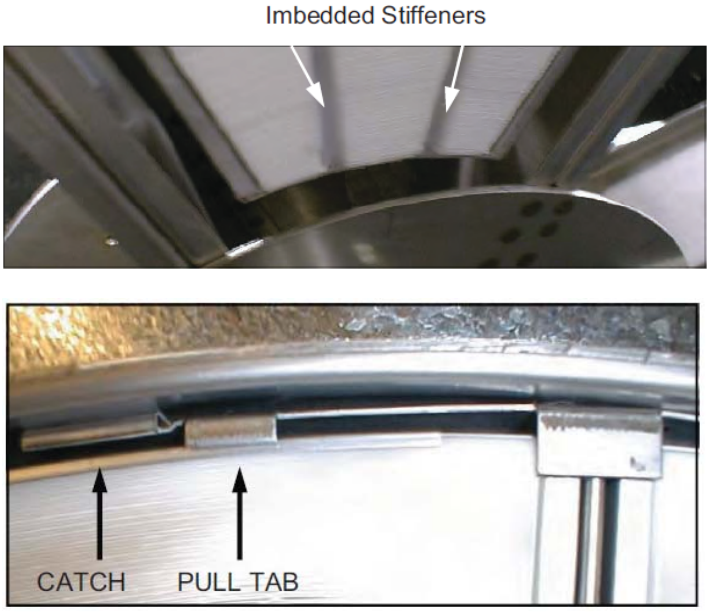


Figure 4

Removal Procedure

1. Unlock and open the segment retaining brackets on both sides of the selected segment opening. Refer to Figure 5.

2. Gently lift segment outward.

3. Close segment retaining latches and rotate wheel 180° to remove next segment. Follow this pattern to remove all segments. This pattern will help keep wheel balanced.

Figure 5

Routine Maintenance

Routine maintenance of the Energy Recovery Cassettes includes periodic cleaning of the Energy Recovery Wheel as well as inspection of the Air Seals and Wheel Drive Components as follows:

Cleaning

The need for periodic cleaning of the energy· recovery wheel will be a function of operating schedule, climate and contaminants in the indoor air being exhausted and the outdoor air being supplied to the building.

The Airxchange wheel is “self-cleaning” with respect to dry particles due to its laminar flow characteristics. Smaller particles pass through; larger particles land on the surface and are blown clear as the flow direction is reversed. Any material that builds up on the face of the wheel can be removed with a brush or vacuum. The primary need for cleaning is to remove oil based aerosols that have condensed on energy transfer surfaces.

A characteristic of all dry desiccants, such films can close off micron sized pores at the surface of the desiccant material, reducing the efficiency by which the desiccant can adsorb and desorb moisture and also build up so as to reduce airflow.

In a reasonably clean indoor environment such as a school or office building, measurable reductions of airflow or loss of sensible (temperature) effectiveness may not occur for several years. Measurable changes in latent energy (water vapor) transfer can occur in shorter periods of time in applications such as moderate occupant smoking or cooking facilities. In applications experiencing unusually high levels of occupant smoking or oil based aerosols such as industrial applications involving the ventilation of machine shop areas for example, annual washing of energy transfer may be necessary to maintain latent transfer efficiency. Proper cleaning of the energy recovery wheel will restore latent effectiveness to near original performance.

To clean, gain access to the energy recovery wheel and remove wheel. Brush foreign material from the face of the wheel. Wash the wheel in a 5% solution of non-acid based coil cleaner (such as Acti-Klean, available through Grainger, Stock# 5W402) or alkaline detergent and warm water.

Soak in the solution until grease and tar deposits are loosened (Note: some staining of the desiccant may remain and is not harmful to performance). Before removing, rapidly run finger across surface of wheel to separate polymer strips for better cleaning action. Rinse dirty solution from wheel and remove excess water before reinstalling.

Caution: Do not use acid based cleaners, aromatic solvents, steam or temperatures in excess of 170°F; damage to the wheel may occur!

Air Seals
Diameter seals are provided on each cassette to minimize transfer of air bet>M:!en the counter flowing airstreams.

To adjust diameter seals, loosen diameter seal adjusting screws and back seals away from wheel surface (Figure 2). Rotate wheel clockwise until two opposing spokes are hidden behind the bearing support beam. Using a folded piece of paper as a feeler gauge, position paper between the wheel surface and diameter seals. Adjust seals towards wheel surface until a slight friction on the feeler gauge (paper) is detected when gauge is moved along the length of the spoke. Re-tighten adjusting screws and recheck clearance with “feeler’’ gauge.

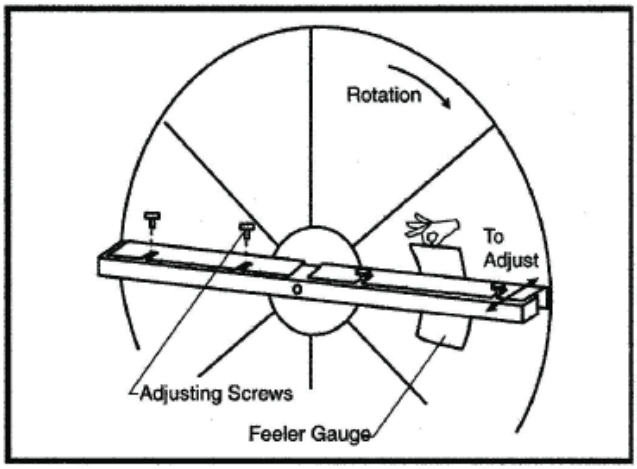


Figure 2 Diameter Seal Adjustment

Wheel Drive Components
The **wheel drive motor** bearings are pre-lubricated and no further lubrication is necessary. Make certain air cooling ports are not blocked.

The **wheel drive pulley** is secured to the drive motor shaft by a set screw. The set screw is secured with removable locktite to prevent loosening. Annually confirm set screw is secure.

The **wheel drive belt** is a urethane stretch belt designed to provide constant tension through the life of the belt. No adjustment is required. Inspect the drive belt annually for proper tracking and tension. A properly tensioned belt will turn the wheel immediately after power is applied with no visible slippage during startup.

Service

Energy Transfer Wheel Removal and Replacement
19” Through 21” Series

Energy Transfer Wheels are secured to the shaft and bearing support beam by a philips head screw and hub cover. See Figure 3.

To remove the Energy Transfer Wheel, follow steps one through four below. (See Fig. 3). Reverse procedure for wheel

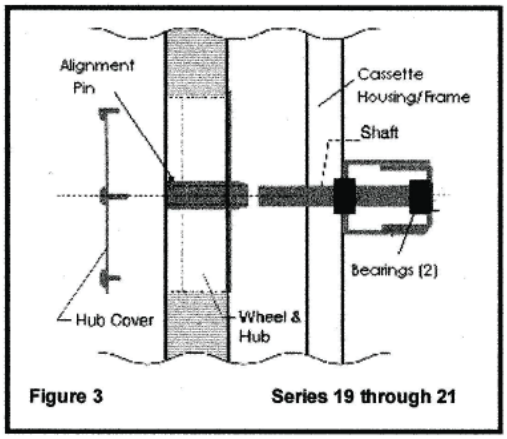


Figure 3 **Series 19 through 21**

1. Remove front seal assembly (pulley side of cassette) if present.

2. Remove belt from pulley and position temporarily around wheel rim.

3. Remove the hub cover from the wheel. Note the wheel to shaft alignment pin under the hub cover. Insure this pin engages the notch at the end of the shaft when reinstalling the wheel.

4. Pull the wheel straight off the shaft. Handle wheel with care to prevent distorting of the wheel.

25” Series
These wheels include the shaft and are secured to (2) wheel support beams by (2) flange bearings with locking collars. See Figure 4.

To install energy transfer wheel follow steps one through five below. Reverse procedure for wheel removal.

1. Loosen the two set screws on each of the two (2) wheel bearings. See Figure 4.

2. Remove belt from pulley and position temporarily around wheel rim.

3. Remove pulley side wheel support beam with bearing, by removing (4) support beam screws.

4. Pull the wheel with shaft straight out of the motor side wheel support beam and bearing . Handle wheel Wl'th care to prevent distorting of the wheel.

5. When replacing wheel be certain to retighten (4) bearing set screws. Premature bearing failure could occur if neglected.

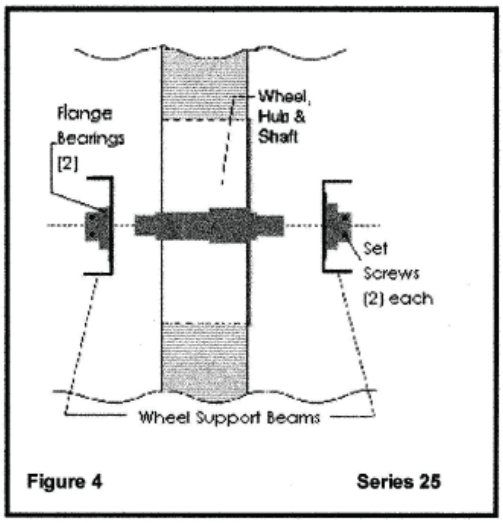


Figure 4 **Series 25**

Wheel Drive Motor & Pulley Replacement

1. Disconnect power to wheel drive motor.

2. Remove belt from pulley and position temporarily around wheel rim.

3. Loosen set screw In wheel drive pulley using allen wrench and remove pulley from motor driveshaft.

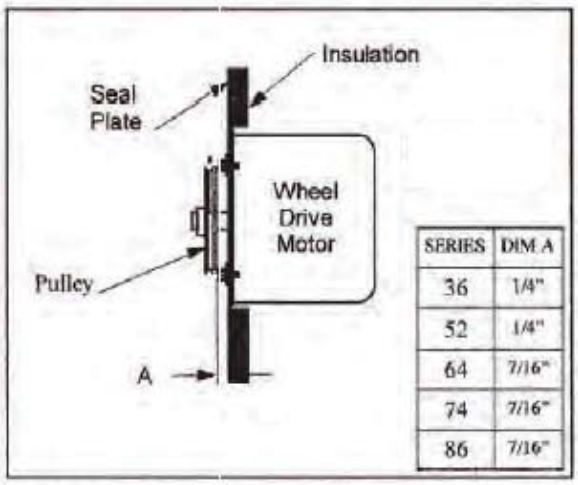
4. While supporting weight of drive motor in one hand, loosen and remove (4) mounting bolts.

5. Install replacement motor with hardware kit supplied.

6. Install pulley to dimension shown in (Figure 6) and secure set screw to drive shaft.

7. Stretch belt over pulley and engage in groove.

8. Follow start-up procedure on previous page.



SERIES	DIM A
36	1/4"
52	1/4"
64	7/16"
74	7/16"
86	7/16"

Figure 6 Pulley Location

Belt Replacement(See Figure 7)

1. Obtain access to the pulley side bearing access plate. Bearing access plates are not provided on Series 36 cassettes. Remove two bearing access plate retaining screws and the access plate.

2 Using hexagonal wrench, loosen set screw in bearing locking collar. Using light hammer and drift (in drift pin hole) tap collar in the direction of wheel rotation to unlock collar. Remove collar.

3. Using socket wrench with extension, remove two nuts which secure bearing housing lo the bearing support beam Slide bearing from shaft.

Note: Slight hand pressure against wheel rim will lift weight of wheel from inner race of bearing to assist bearing removal and installation. If not removable by hand, use bearing pulley.

4. Using a wrench, remove diameter seal retaining screws (Series 36 through 74) or hub seal retaining screws (Series 86). Remove diameter seals (Series 36 through 74) or hub seal (Series 86) from bearing beam.

Caution: Protect hands and belt from possible sharp edges of hole in Bearing Support Beam.

5. Form a small loop of belt and pass it through the hole in the bearing support beam Grasp the belt at the wheel hub and pull the entire belt clown. Loop the trailing end of the belt over the shaft (Fig. 8 shows bell partially through the opening).

6. Reinstall the bearing onto the wheel shaft being careful to engage the two locating pins into the holes in the bearing support beam. Secure the bearing with two self locking nuts.

7. Install the belts around the wheel and pulley according to the instructions provided with the belt.

8. Reinstall diameter seals or hub seal and tighten retaining screws (see previous page for seal adjustment). Rotate wheel in clockwise direction to determine that wheel rotates freely with slight drag on seals.

9. Reinstall bearing locking collar. Rotate collar by hand in the direction the wheel rotates (see label provided on each cassette for wheel rotation). Lock in position by tapping drift pin hole with hammer and drift. Secure in position by tightening set screw.

10. Reinstall Bearing Access Cover.

11. Apply power to wheel and ensure that the Wheel rotates freely without interference.

Alternate Belt Replacement Methods

Alternate belt replacement methods may be used in some applications depending upon accessibility of the cassette. Consult instructions provided with the belt for further information.

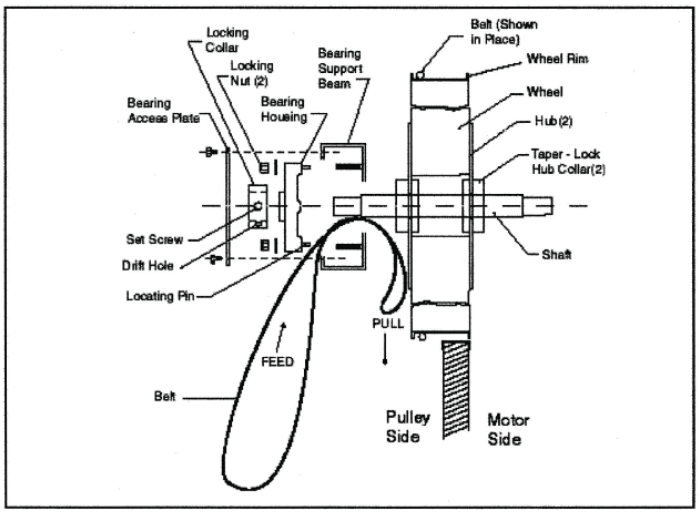


Figure 8 Belt Replacement (Figure 8 shown with diameter seals removed)

Replacement Parts

How to Order

Contact your equipment manufacturer for parts service. Order by Part Number. Serial Number (SN:) of cassette must be provided in order to verify proper part number selection. Serial Numbers are provided on product label (see Figure 7).

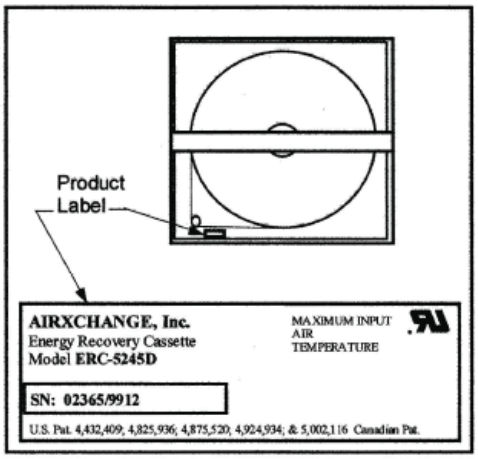


Figure 7 Product Label

APPENDIX B - UNIT REFERENCE GUIDE

YORK CHASSIS REFERENCE GUIDE

	YORK	JOHNSON CONTROLS	COLEMAN	LUXAIRE
CHASSIS CLASSIFICATION	**UNIT PART NUMBER**	**UNIT PART NUMBER**	**UNIT PART NUMBER**	**UNIT PART NUMBER**
PREDATOR 36	ZR/ZH 037,049,061,078,090; ZJ 037,049,061; XP/ZF 078,090; DM/DF 090,102; DH 078,090,102	JA3-JA5 ZH/ZJ; J06-J07 ZH/ZF/ZR/XP	ZU/ZK A3-07; ZS 06-07; ZW/ZV A3-A5; DS/DL 07-08; DU 06-08; XA/BA 07	ZU/ZK A3-07; ZS 06-07; ZW/ZV A3-A5; DS/DL 07-08; DU 06-08; XA/BA 07
PREDATOR 712	ZF/XP/ZH/ZR 102,120,150; ZJ 078,090,102,120,150; DF 078,120; DM/DH 120,150; DJ 150; DR 090,120,150	J06-J12 ZJ; J08-J12 ZH/ZF/ZR/XP;	ZU/ZK/ZS 08-12; ZW 06-12; DW 12; DK 07-10; DS 06,10; DU 10-12; DL 06,10,12; XA/BA 06,08-12	ZU/ZK/ZS 08-12; ZW 06-12; DW 12; DK 07-10; DS 06,10; DU 10-12; DL 06,10,12; XA/BA 06,08-12
SUN 36	ZR/XP/DJ/ZJ 036,048,060; ZF/DR/DM/DF/DH/DCG/DCE 036,048,060,072	J03-J06 ZF; J03-J05 ZR/XP/ZJ/ZH	XA/DW/DG 03-05; ZS/ZK/DK/BA 03-A6	XA/DW/DG 03-05; ZS/ZK/DK/BA 03-A6
SUN 15	ZF/DM 180	J15 ZF	ZS/DU/DL/BA 15	ZS/DU/DL/BA 15
SUN 1725	ZF/DH 210-300; DJ/ZJ/ZR/DR 180-300; XP 180-240; DM 240-300	J28,J20,J25 ZF; J15,J18,J20,J25 ZR/ZJ	ZW/ZK/DW/WW/WK/DK 15-25; ZS/DU 18-25; DL 20-25; XA 15-20; BA/BB 20	ZW/ZK/DW/WW/WK/DK 15-25; ZS/DU 18-25; DL 20-25; XA 15-20; BA/BB 20

CARRIER CHASSIS REFERENCE GUIDE

All units listed below reference units manufactured after the year 2000 Carrier design change. Please contact the factory for units manufactured before 2000.

	CARRIER	BRYANT	ICP
CHASSIS	UNIT PART NUMBER	UNIT PART NUMBER	UNIT PART NUMBER
CHASSIS 1	48/50TC 04-06; 50TCQ 04-05; 48/50HC,LC 04; 50HCQ 04; 48/50 TF,TM 004-007; 48TJ 004-007; 48HJ 004-006; 50TJ 004-006; 50HJ,HJQ 004-006	580J,558J 04-06; 548J 04-05; 581,551J 04; 549J 04	PAH,PGH,RAS,RGS 036-060; RHS 036-048; RAH,RGH,RHH 036; PAE 036-072; PAS,PGE,PGS,PHS 072
CHASSIS 2	48/50TC 07; 50TCQ 06-07; 48/50HC,LC 05-06; 50HCQ 05-06; 48HJ 007; 50TJ 007	580J, 558J 07; 548J 06-07; 581J, 551J 05-06; 549J 05-06	PAH,PGH,RAS,RGS 072; RAH,RGH,RHH 048-060; RHS 060-072
CHASSIS 3	48/50TC 08; 48/50HC 07; 50HCQ 07; 48/50 TJ,TF,TM 008-009; 48/50 HJ 008	580J,558J 08; 581J,551J 07; 549J 07	PAH,RAS,PGS,PHS 090; RAS,RGS 090-091; RAH,RGH,RHH 072; PGE,PAE 090-102
CHASSIS 4	48/50LC 07; 48/50HC 08-12; 48/50HCQ 08-09; 48/50TC 09-14; 50TCQ 08-12; 48/50 TJ,TF,TM 012-014; 48/50 HJ 009-014	580J,548J 09-14; 548J 08-12; 581J,551J 08-12; 549J 08-09	PAH, PGH 102-120; RAS, RGS 102-150; RHS,RAH,RGH 090-120; RHH 090-102; PAE,PAS,PGE,PGS 120-150; PHS 120
CHASSIS 5	48/50TC 16; 50TCQ 14; 48/50HC 14; 50HCQ 12; 48/50LC 08-12	580J,558J 16; 548J 14; 581J,551J 14; 549J 12	RAS,RGS 180; RHS,RGH 150; RHH 120
CHASSIS 6	48/50LC 14; 48/50HC 17; 48/50TC 17-20; 48/50TCQ 17	580J, 558J 17-20; 548J 17	RAS,RGS 210/213; RHS,RAH,RGH 181/183
CHASSIS 7	48/50HC 20; 48/50TC 24; 48/50TCQ 24	580J, 558J, 548J 24	RAS,RHS,RGSS 240/243; RAH,RGH 210/213
CHASSIS 8	48/50LC 17-20; 48/50HC 24; 48/50TC 28	580J, 558J 28	RAS,RGS 300/303; RAH,RGH 240/243
CHASSIS 9	48/50LC 24-26; 48/50HC 28; 48/50TC 30	580J, 558J 30	RAS,RGS 336/333; RAH,RGH 300/303

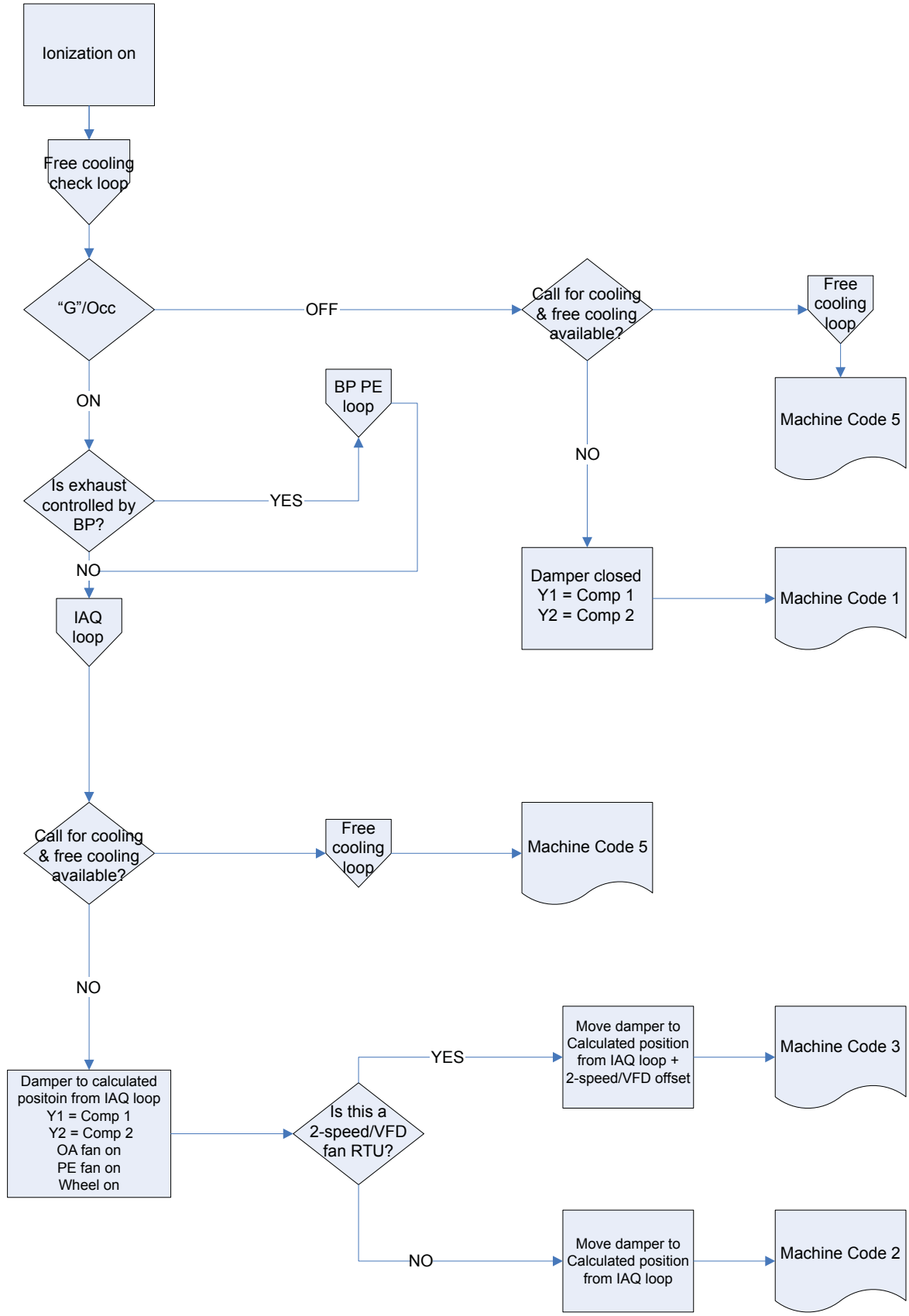
APPENDIX C - ENTHALPY TABLE

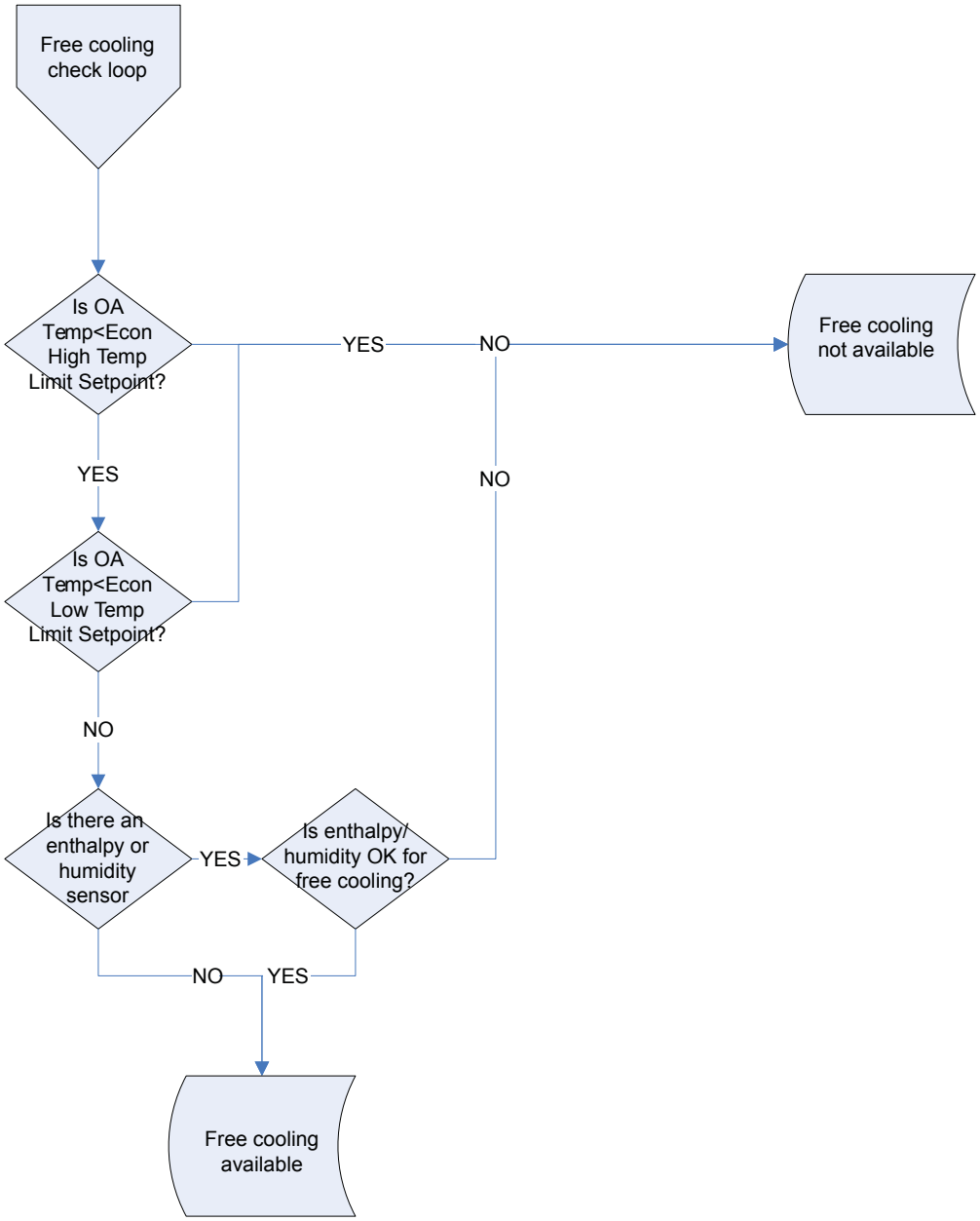
Enthalpy Table

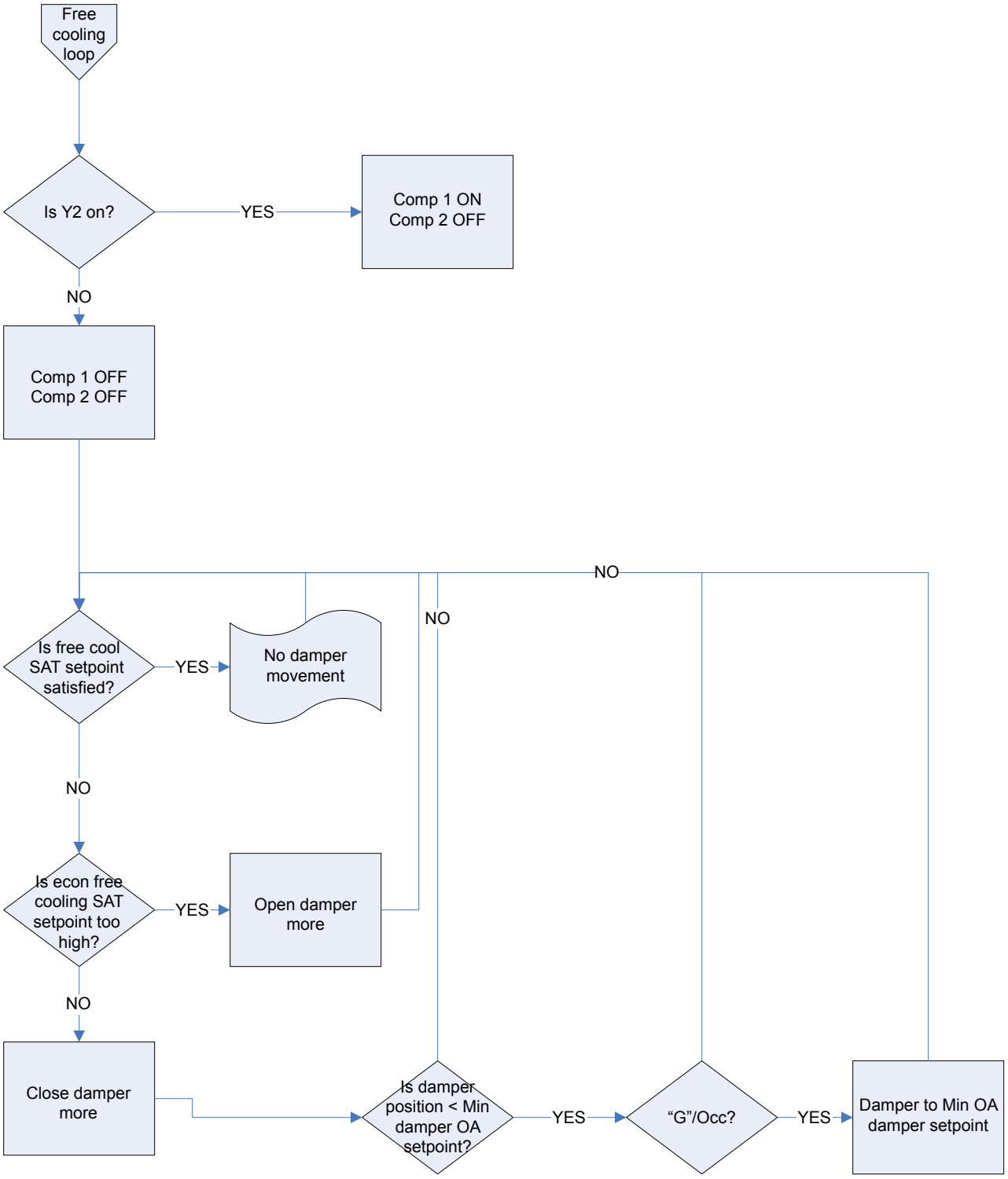
Enthalpy (but/lb/da)	Point P1		Point P2	
	Temp. °F	Humidity %RH	Temp. °F	Humidity %RH
32.4	86.0	38.9	72.4	80.3
28.0	80.0	36.8	66.3	80.1
26.0	75.0	39.6	63.3	80.0
24.0	70.0	42.3	59.7	81.4
22.0	65.0	44.8	55.7	84.2
20.0	60.0	46.9	51.3	88.5

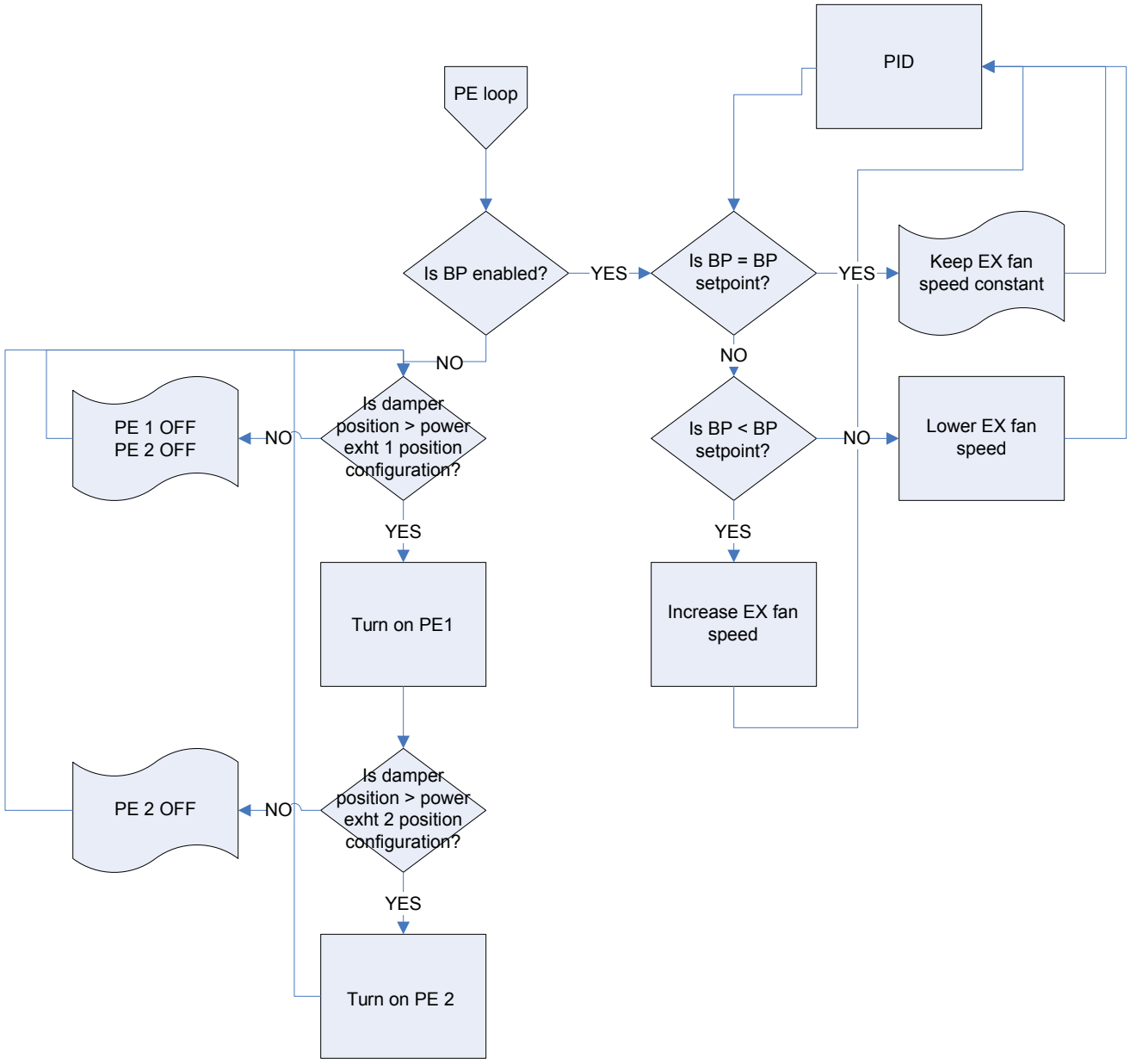
The enthalpy table above shows sample enthalpy to help you determine what your enthalpy set points should be.

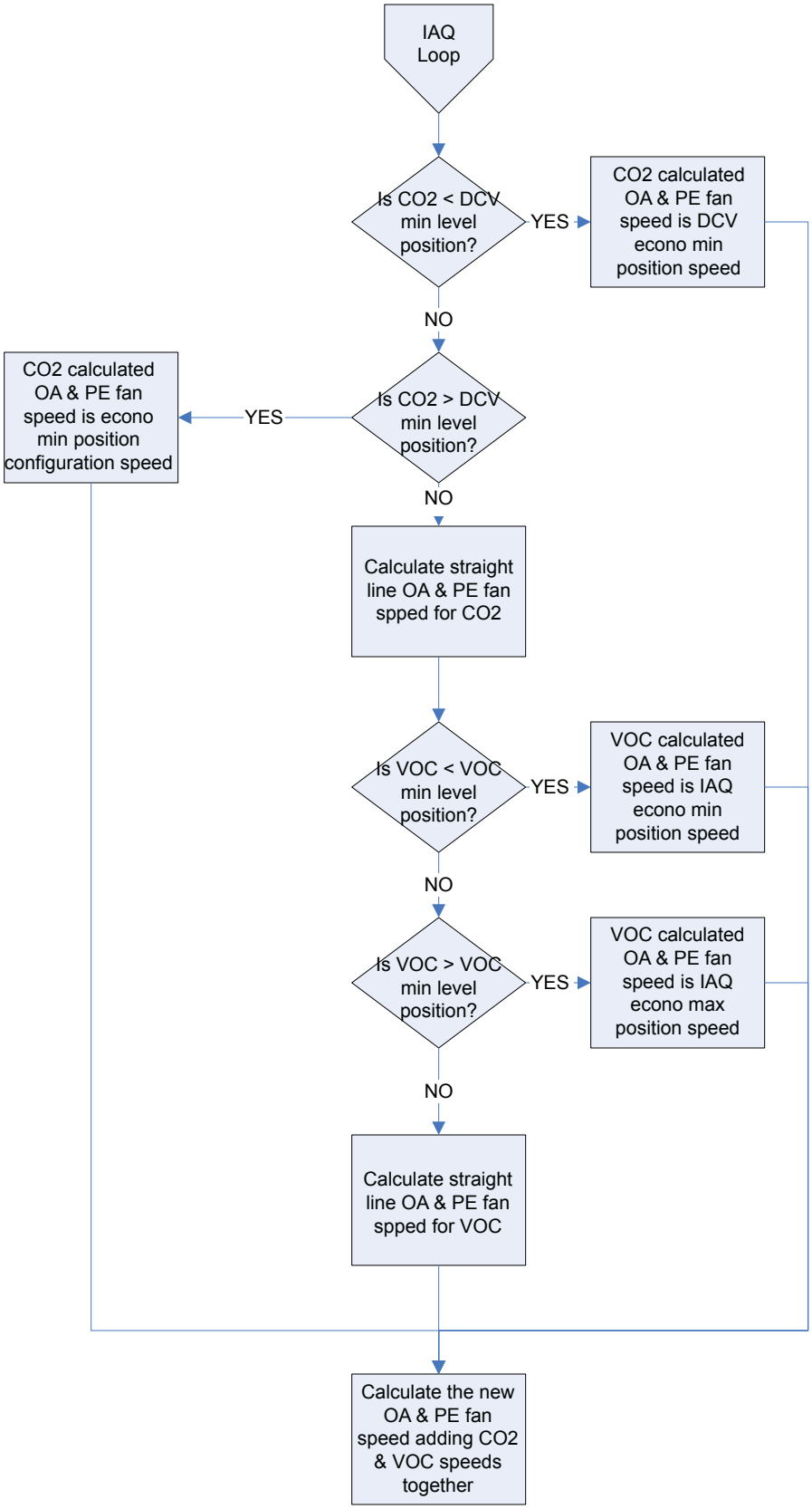
APPENDIX D - SEQ. OF OPS. MODE 4



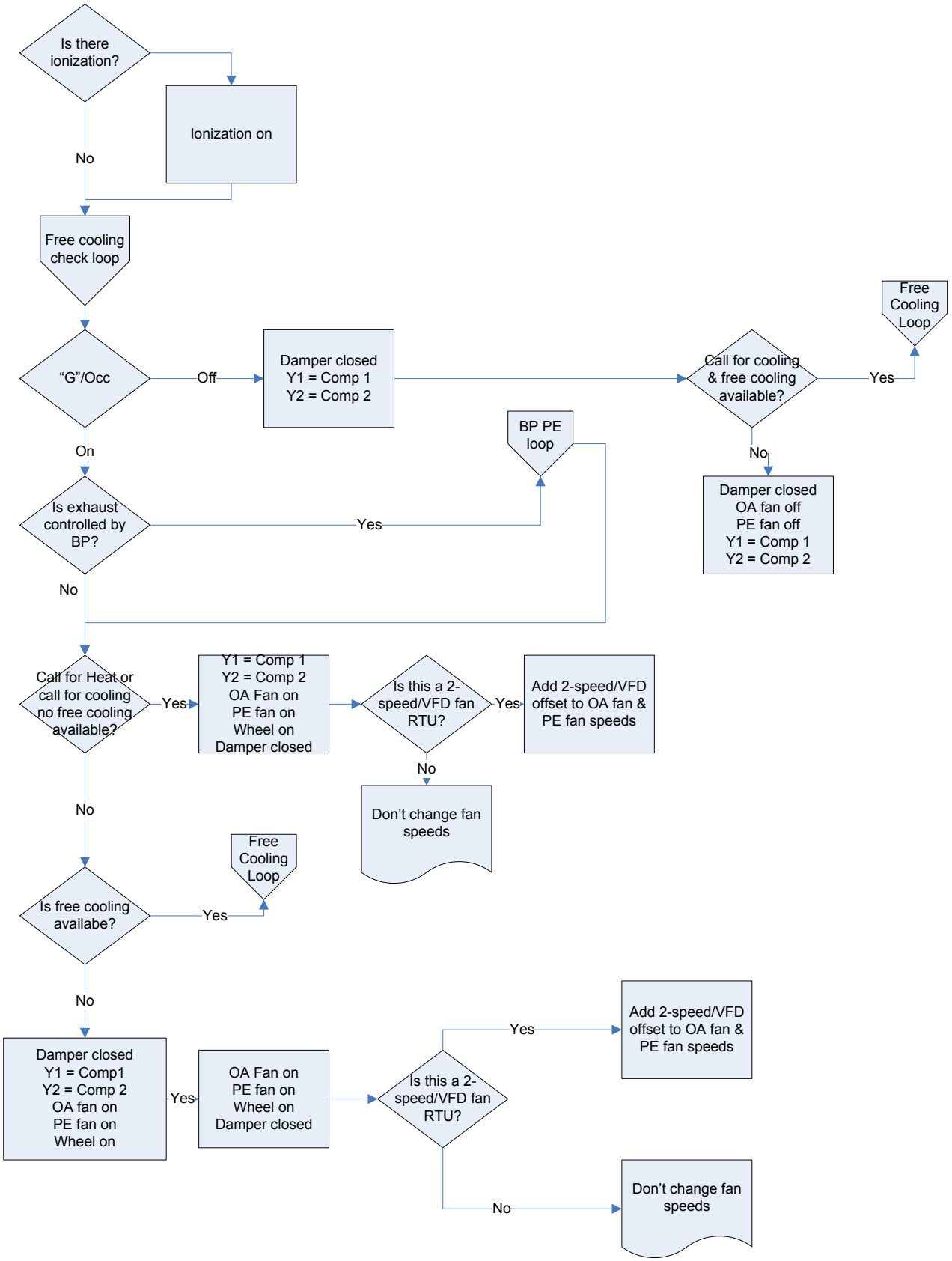

Free cooling check loop
Is OA Temp<Econ High Temp Limit Setpoint?
YES
NO
Free cooling not available
YES
NO
Is OA Temp<Econ Low Temp Limit Setpoint?
NO
Is there an enthalpy or humidity sensor
YES
Is enthalpy/ humidity OK for free cooling?
NO
YES
Free cooling available


Free cooling loop
Is Y2 on?
YES
Comp 1 ON
Comp 2 OFF
NO
Comp 1 OFF
Comp 2 OFF
NO
NO
Is free cool SAT setpoint satisfied?
YES
No damper movement
NO
Is econ free cooling SAT setpoint too high?
YES
Open damper more
NO
Close damper more
Is damper position < Min damper OA setpoint?
YES
"G"/Occ?
YES
Damper to Min OA damper setpoint

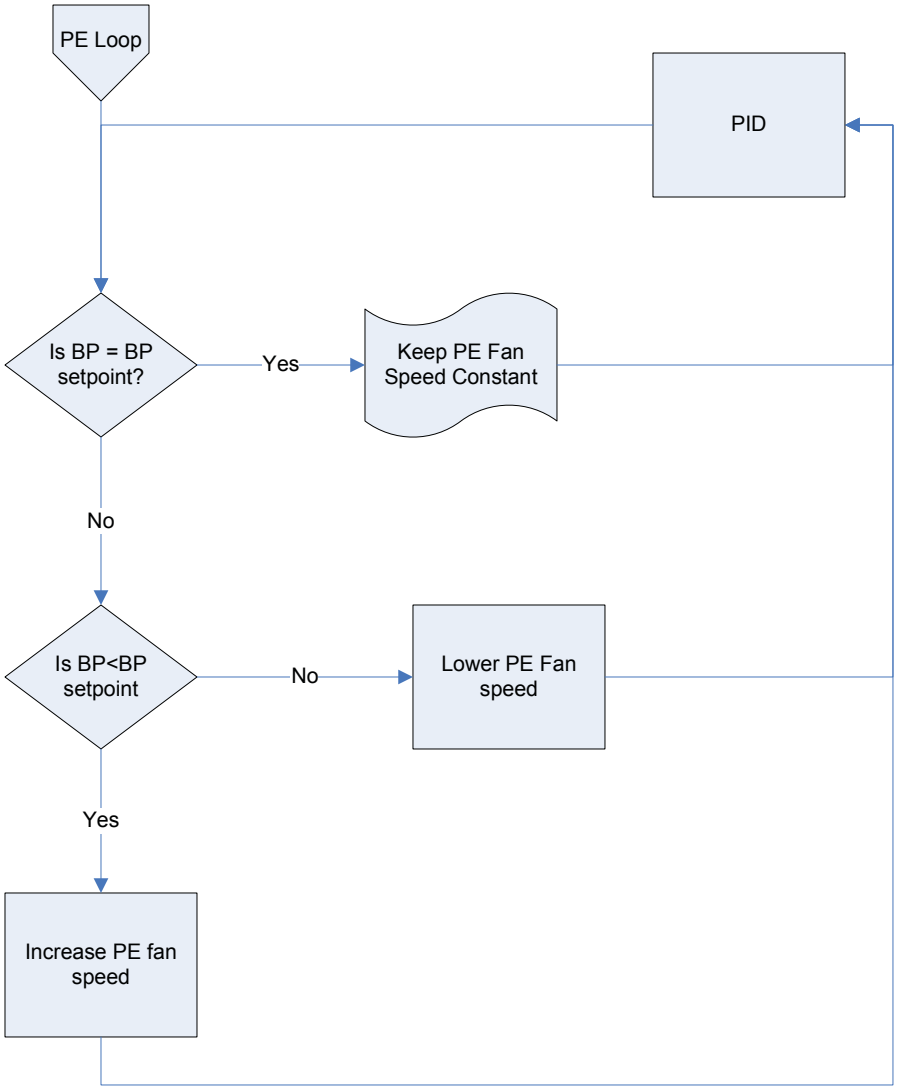

PE loop
PID
Is BP enabled?
YES
Is BP = BP setpoint?
YES
Keep EX fan speed constant
NO
NO
Is damper position > power exht 1 position configuration?
PE 1 OFF
PE 2 OFF
NO
Is BP < BP setpoint?
NO
Lower EX fan speed
YES
YES
Turn on PE1
Increase EX fan speed
Is damper position > power exht 2 position configuration?
PE 2 OFF
NO
YES
Turn on PE 2

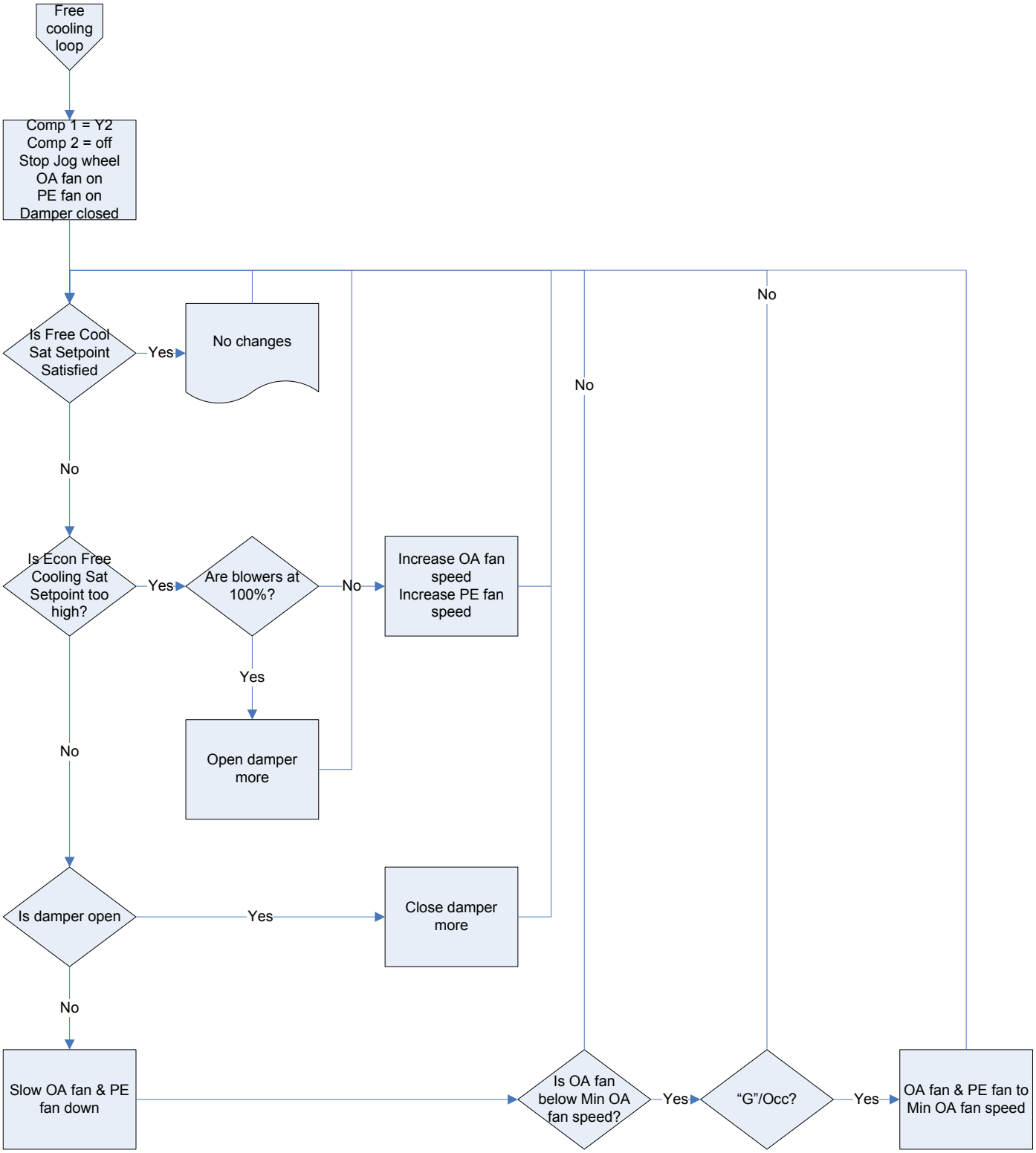

IAQ Loop
Is CO2 < DCV min level position?
YES
CO2 calculated OA & PE fan speed is DCV econo min position speed
NO
Is CO2 > DCV min level position?
YES
CO2 calculated OA & PE fan speed is econo min position configuration speed
NO
Calculate straight line OA & PE fan spped for CO2
Is VOC < VOC min level position?
YES
VOC calculated OA & PE fan speed is IAQ econo min position speed
NO
Is VOC > VOC min level position?
YES
VOC calculated OA & PE fan speed is IAQ econo max position speed
NO
Calculate straight line OA & PE fan spped for VOC
Calculate the new OA & PE fan speed adding CO2 & VOC speeds together

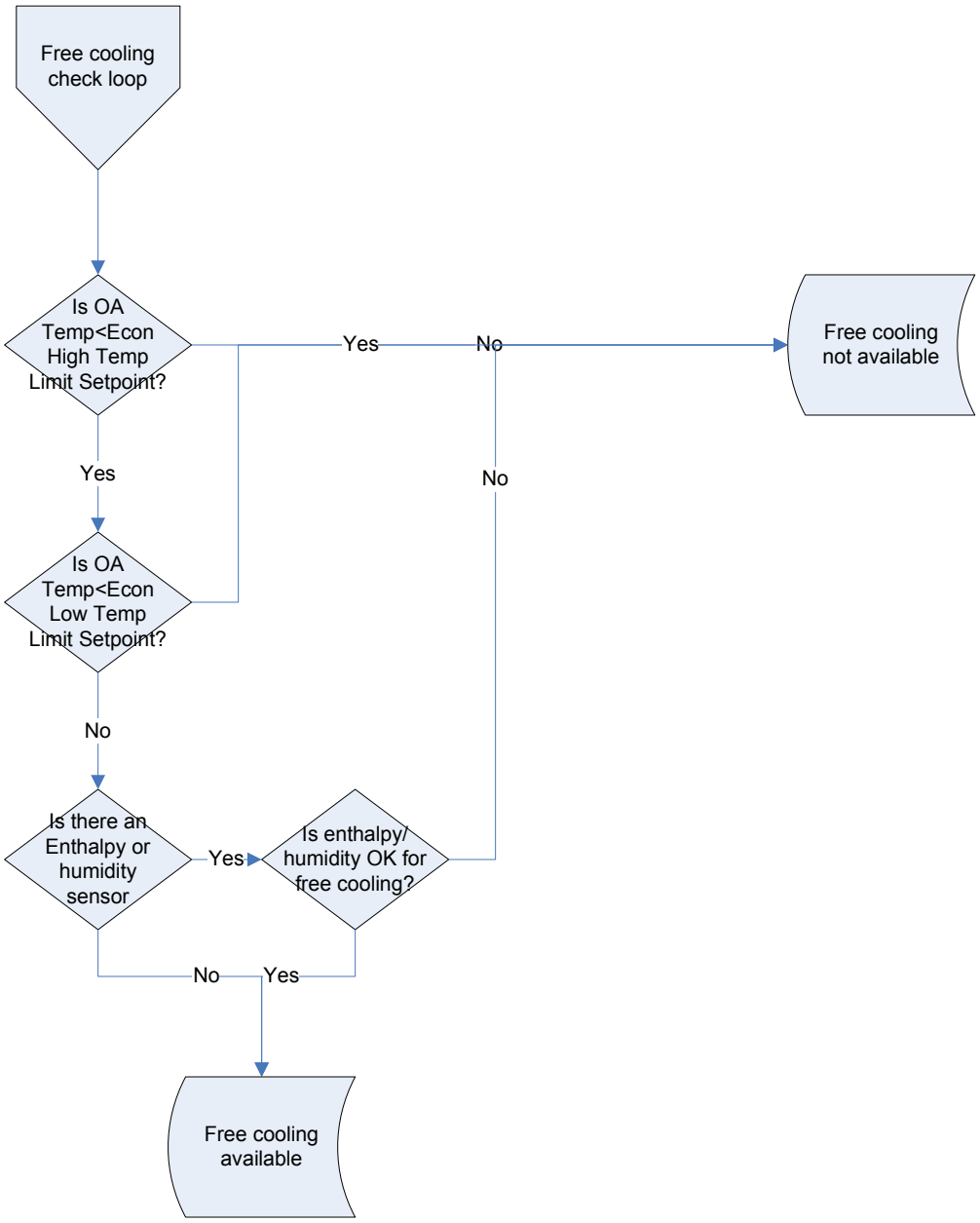
APPENDIX E - SEQ. OF OPS. MODE 5



PE loop


PE Loop
PID
Is BP = BP setpoint?
Yes
Keep PE Fan Speed Constant
No
Is BP<BP setpoint
No
Lower PE Fan speed
Yes
Increase PE fan speed


Free cooling loop
Comp 1 = Y2
Comp 2 = off
Stop Jog wheel
OA fan on
PE fan on
Damper closed
Is Free Cool Sat Setpoint Satisfied
Yes
No changes
No
Is Econ Free Cooling Sat Setpoint too high?
Yes
Are blowers at 100%?
No
Increase OA fan speed
Increase PE fan speed
Yes
Open damper more
No
Is damper open
Yes
Close damper more
No
Slow OA fan & PE fan down
No
Is OA fan below Min OA fan speed?
Yes
"G"/Occ?
Yes
OA fan & PE fan to Min OA fan speed
No
No


Free cooling check loop
Is OA Temp<Econ High Temp Limit Setpoint?
Yes
No
Free cooling not available
Yes
No
Is OA Temp<Econ Low Temp Limit Setpoint?
No
Is there an Enthalpy or humidity sensor
Yes
Is enthalpy/ humidity OK for free cooling?
No
Yes
Free cooling available