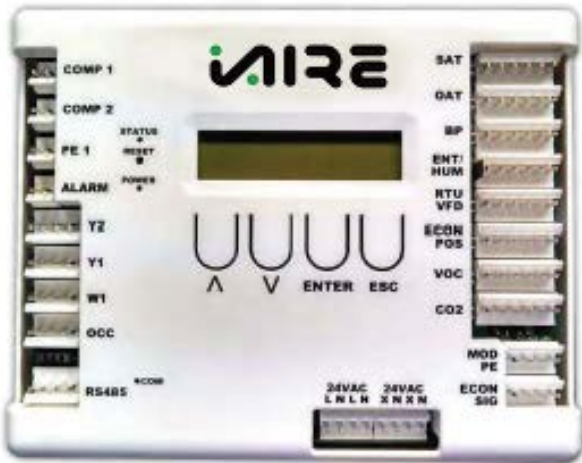




# **Economizer Controller Installation Guide**

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This document describes wiring, power up, basic troubleshooting and common installation issues for the **iAIRE** economizer controller.

## INPUTS

### Analog Inputs:

- (J9) = (0-10v) | CO2
- (J10) = (0-10V) | VOC
- (J11) = (0-10V) | Economizer position reading
- (J12) = (0-10V) | Pressure1 (0-5v) & RTU VFD
- (J13) = (0-10V) | Pressure2 (0-5v) & Enthalpy sensor or Humidity sensor
- (J14) = (0-5V) | Building pressure
- (J15) = (0-5V) | Outside Air Temperature ( OAT)
- (J16) = (0-5V) | Supply Air Temperature (SAT)

### Digital Inputs:

- Input1 = (24VAC) | occupied signal
- Input2 = (24VAC) | W1
- Input3 = (24VAC) | Y1
- Input4 = (24VAC) | Y2

## OUTPUTS

### Analog Outputs:

- 1 = (0-10V) | Economizer actual position reading
- 2 = (0-10V) | Modulating powered exhaust control

### Digital Outputs:

- Relay1 = (DC) | COMP1
- Relay2 = (DC) | COMP2
- Relay3 = (DC) | PE1
- Relay4 = (DC) | PE2

## WHILE INSTALLING THIS CONTROLLER

Installer must be an experienced and trained service technician.

Be sure to read instructions thoroughly. Incorrect installation could result in damage to the controller or create a hazard to those performing the installation.

Verify the ratings in the instructions and on the product to ensure it is suitable for your application.

Once the installation is complete, review controller operations provided with this installation document.

### Additional Questions?

Visit our website at [www.myiaire.com](http://www.myiaire.com) to view product data sheets, or email us at [support@myiaire.com](mailto:support@myiaire.com).

## ACCESSORIES

- Temp. Probe | SEN-0012
- CO2 Sensor | SEN-0002
- VOC Sensor | SEN-0071
- Ion Generator | ION-0A\*0
- Mounting Plate | UNV0016

## OPTIONAL ACCESSORIES

- Humidity Sensor | SEN-0001
- BP Sensor | SEN-0065
- BACnet Translator | TRN-0005-Kit

*\*indicates customer part selections.*

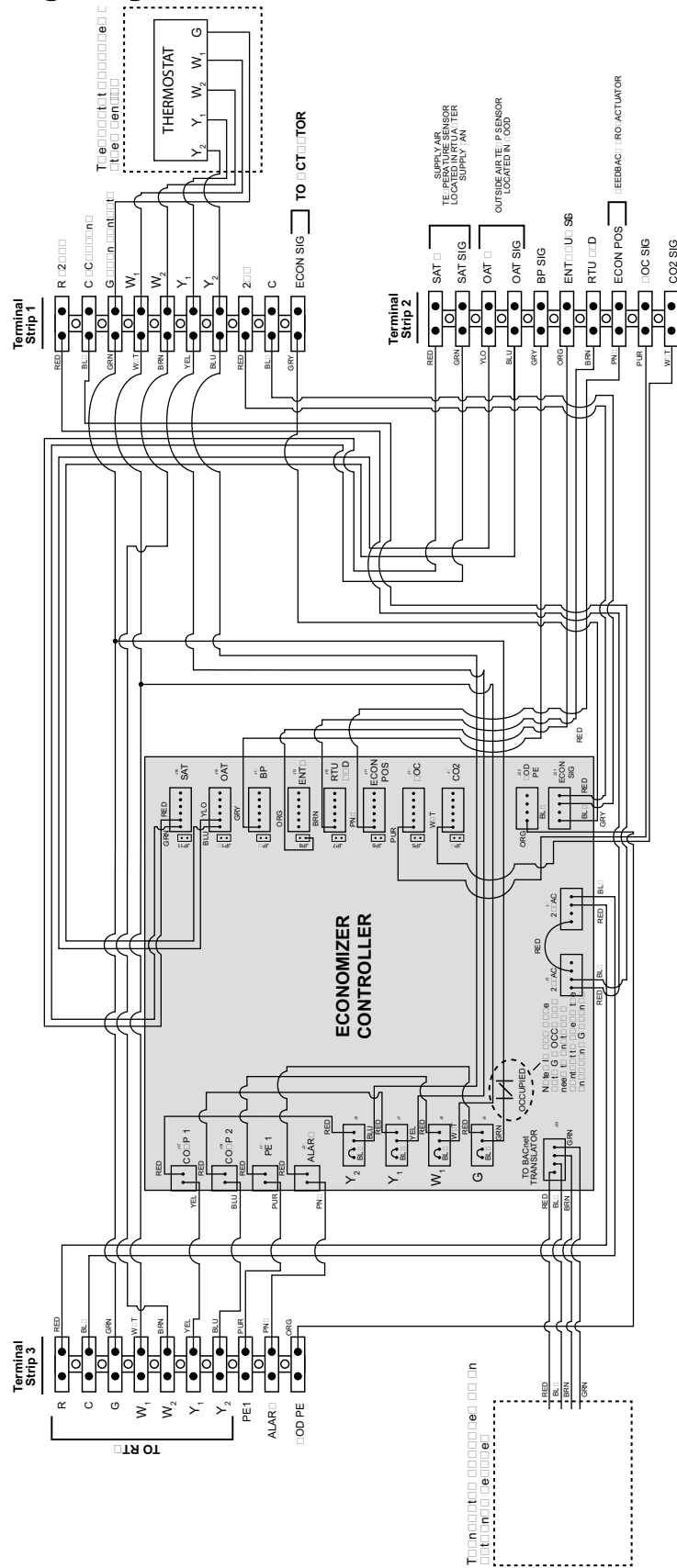
## INSTALLATION AND SETUP

The **iAIRE** economizer controller can be mounted at any orientation. When mounting, allowing for proper viewing of the controller LCD screen and use of the buttons should be taken into consideration.

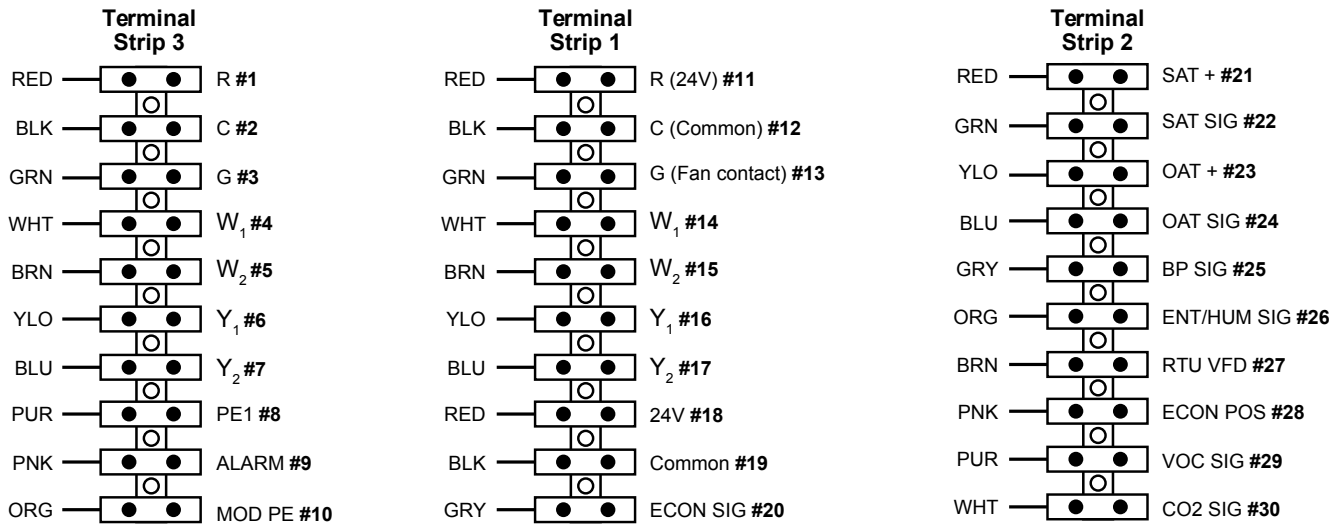
## WIRING

All wiring must be in compliance with local applicable electrical codes, or as specified on the installation wiring diagram (page 4 & 5 in this document).

# iAIRE Controller Wiring Diagram version 1.4 7/15/2013



## iAIRE Controller Terminal 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

### 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

## Enthalpy Table

| Enthalpy<br>(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.

### POWER UP

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

### 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 programming, the green power light should be on and the other two lights should be off. If the status and reset lights 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

1. Econo Mode
2. DCV Mode
3. IAQ Mode
4. IAQ ERV

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

## STATUS MENU SETTINGS

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

STATUS  
MENU

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

ECONO POS  
COMMAND STATUS

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

ECONO POS  
READ STATUS

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

MOD PWREXHT POS  
COMMAND STATUS

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

COMPRESSOR1  
OUTPUT STATUS

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

COMPRESSOR2  
OUTPUT STATUS

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

POWER EXHAUST 1  
STATUS

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

POWER EXHAUST2  
STATUS

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

OCCUPIED  
INPUT STATUS

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

HVAC W1  
INPUT STATUS

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

COMPRESSOR1  
INPUT STATUS

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

COMPRESSOR2  
INPUT STATUS

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

IAQ CO2  
INPUT STATUS

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

ERV HEAT WHEEL  
INPUT STATUS

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

ERV MAKEUPFAN  
STATUS

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

ERV PE1  
STATUS

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

ERV PE2  
STATUS

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

ERV OA FANSPEED  
STATUS

Allows you to check the outside air fan speed.

ERV EX FANSPEED  
STATUS

Allows you to check the exhaust air fan speed.

ERV OA CFM  
STATUS

Allows you to check the outside CFM.

ERV EX CFM  
STATUS

Allows you to check the exhaust CFM.

OUTSIDE AIR TEMP  
STATUS

Allows you to check the outside air temperature.

SUPPLY AIR TEMP  
STATUS

Allows you to check the supply air temperature.

VOC  
STATUS

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

MACHINE STATE  
STATUS

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

HUMIDITY PERCENT  
STATUS

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

ENTHALPY  
STATUS

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

FREE COOLING  
STATUS

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

OPERATION  
PARAMETERS

Allows you to check the operation parameters.



## CONFIGURATION MENU SETTINGS

CONFIGURATION  
MENU

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

CONTROLLER MODE  
CONFIGURATION

The controller mode allows the user to select which mode the controller will run in. There are (4) modes to choose from:

Econo Mode / DVC mode / IAQ mode / IAQ ERV mode

*\*for mode details, see CONTROLLER MODE CONFIGURATION SETTINGS in the next column.*

HVAC 2SPEED  
CONFIG

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.

HUMIDITY SENSOR  
CONFIG

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 calculate 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.

ACTUATOR  
FEEDBK CONFIG

Allows you to check if the Actuator Feedback is active or not.

SOFTWARE VER  
CONFIG

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

## 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 1 – Econo Mode

The controller is in the standard economizer mode of operation. The user selects a minimum outside air set-point. This set-point does not change unless the controller determines that free cooling is available. If free cooling is available, the controller will modulate the damper to control the SA set-point in the RTU.

### Mode 2 - DVC mode

The controller is in demand control ventilation mode. In this mode, there is a CO2 sensor present. The user will select a minimum outside air setting (the maximum air that is brought into the RTU) and a DVC set-point (the minimum air that is brought into the RTU). The user selects a minimum CO2 PPM 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. If free cooling is available, the controller will modulate the damper to control the SA set-point in the RTU. Refer to Fig. A.

### Mode 3 – IAQ mode

The controller is in indoor air quality mode. 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 DVC set-point (the minimum air that is brought into the RTU). The user selects a minimum CO2 PPM 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 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 CO<sub>2</sub> 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. Refer to Fig. A and Fig. B.

#### Mode 4 – IAQ ERV

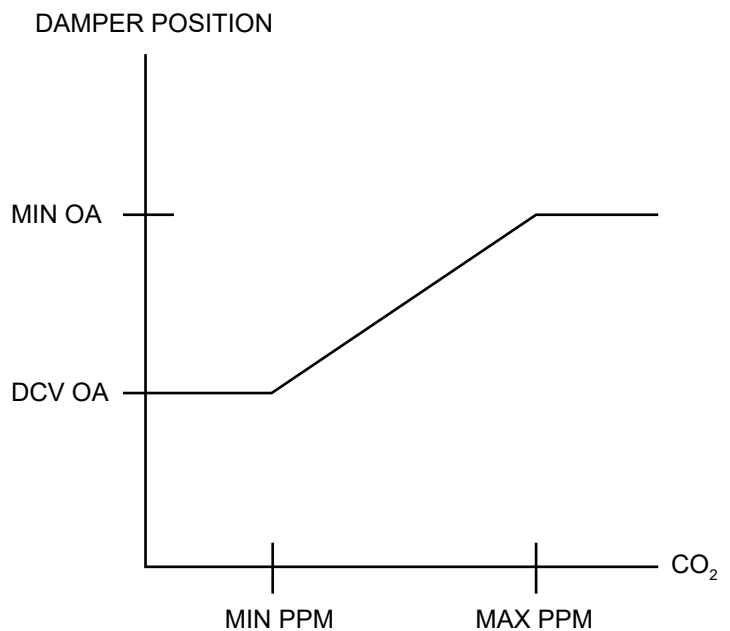
The controller is in indoor air quality mode with an ERV present. In this mode, the ERV has fixed speed blowers. These blowers run continuously. They are meant to bring in air at the minimum required levels. All other air is brought into the space by opening the by-pass damper.

In this mode, there is both a CO<sub>2</sub> & 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 CO<sub>2</sub> PPM (zero) and a maximum CO<sub>2</sub> PPM to go with these airflow set-points. The CO<sub>2</sub> sensor will sense occupancy and output a PPM. If this PPM is less than the minimum CO<sub>2</sub> PPM set-point, the damper will be open to the DVC set-point. If the CO<sub>2</sub> PPM is more than the maximum CO<sub>2</sub> PPM set-point, the damper will be open to the minimum outside air setting. If the CO<sub>2</sub> PPM is in-between the minimum and maximum CO<sub>2</sub> 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.

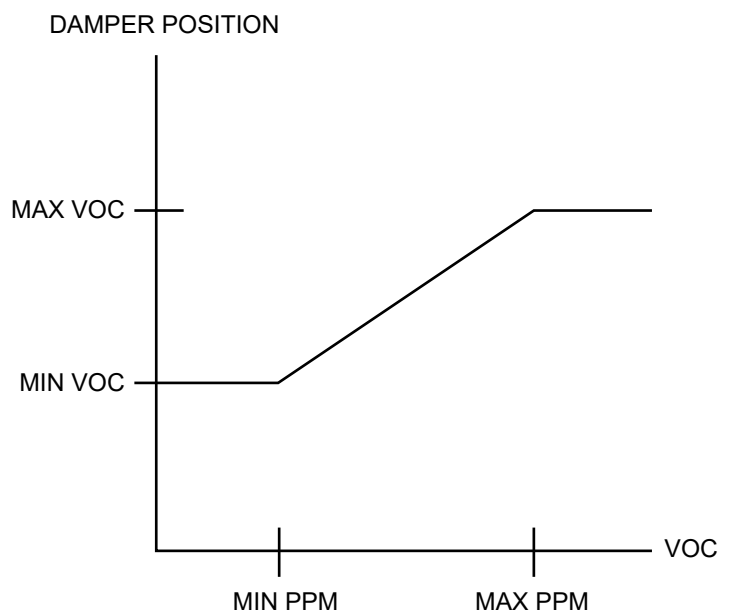
The controller will add the CO<sub>2</sub> damper position and the VOC damper position together to determine the actual damper position. If free cooling is available, the controller will modulate the damper to control the SA set-point in the RTU. In free cooling the ERV blowers shut off.

Fig. A



+

Fig. B



## SETPOINTS MENU SETTINGS

SETPOINTS  
MENU

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

ECON HIGHTMPLIMIT  
SETPOINT

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

ECON LOWTMPLIMIT  
SETPOINT

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

ECON FREECOOLSAT  
SETPOINT

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

ECON MIN POS  
SETPOINT

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

ECON MAX POS  
SETPOINT

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

POWER EXHT 1 POS  
SETPOINT

Allows you to set where the power exhaust is positioned.

POWER EXHT2 POS  
SETPOINT

Allows you to set where the power exhaust is positioned.

BUILDING PRESS  
SETPOINT

Allows you to set the building pressure.

DCV ECONO MIN  
POS

Allows you to set the min DCV economizer position.

MAX DCV LEVEL  
POS (PPM)

Allows you to set the max CO2 level.

MIN DCV LEVEL  
POS (PPM)

Allows you to set the min CO2 level.

MIN OA CFM  
LEVEL

Allows you to set the min CFM level.

EXHAUST CFM OFFE  
LEVEL

Allows you to set the exhaust CFM offset level.

IAQ OA CFM  
LEVEL

Allows you to set the min VOC CFM level.

MIN VOC LEVEL  
PPM

Allows you to set the min VOC PPM level.

MAX VOC LEVEL  
PPM

Allows you to set the max VOC PPM level.

VOC ECONO MIN  
POS

Allows you to set the min VOC economizer position.

VOC ECONO MAX  
POS

Allows you to set the max VOC economizer position.

HVAC 2SPEED ECON  
OFFSET POS

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

ENTHALPY  
SETPOINT

Allows you to set the btu/lb point for enthalpy for free cooling.

ERV OA FAN  
SETPOINT

Allows you to set the outside air fan position.

ERV PE FAN  
SETPOINT

Allows you to set the power exhaust fan position.

OA ERV MIN FAN  
SPEED

Allows you to check outside air ERV min fan speed.

EX ERV MIN FAN  
SPEED

Allows you to check exhaust ERV min fan speed.

OA ERV DCV  
FAN SPEED

Allows you to check outside air ERV DCV fan speed.

OA ERV VOC  
MIN FAN SPEED

Allows you to check outside ERV VOC min fan speed.

OA ERV VOC  
MAX FAN SPEED

Allows you to check outside ERV VOC max fan speed.

EX ERV VOC MIN  
FAN SPEED

Allows you to check exhaust ERV VOC min fan speed.

EX ERV VOC  
MAX FAN SPEED

Allows you to check exhaust ERV VOC max fan speed.

FAN SPEED  
DEAD BAND

Allows you to set fan dead band.

FAN SPEED  
TIMER

Allows you to check timer.

## TEST MENU SETTINGS



TEST MODE  
MENU

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.



TEST MODE

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

## ALARM MENU SETTINGS



ALARMS  
MENU

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



CO2 ALARM STAT  
ALARM XXX



VOC ALARM STAT  
ALARM XXX



OATEMP STAT  
ALARM XXX



SATEMP STAT  
ALARM XXX



OADAMPER STAT  
ALARM XXX



HUMIDITY STAT  
ALARM XXX



DIRTY FILTER  
ALARM XXX

Each screen displays alarm status as either active or inactive in place of the "xxx" shown in the picture.

## 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. **CO<sub>2</sub>** - If active, the controller does not sense the CO<sub>2</sub> 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
- Comp
- PE
- PE
- ERV wheel
- ERV OA fan
- ERV OA fan speed
- ERV EX fan speed

## APPENDIX INFORMATION

The default set points and configurations for each mode are outlined on pages 7 through 13.

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.com

If the optional BACNet translator is being used, please see the reference points list on the next page (page 15).

## BACnet Points List

| OBJECT ID | iAIRE POINT NAME            | POINT TYPE | BACNET OBJECT NAME | OBJECT TYPE | DEFAULT SET POINTS | READ ACCESS  |
|-----------|-----------------------------|------------|--------------------|-------------|--------------------|--------------|
| 1         | OUTSIDE AIR TEMPERATURE     | ANALOG     |                    | AV          | N/A                | READ ONLY    |
| 2         | SUPPLY AIR TEMPERATURE      | ANALOG     |                    | AV          | N/A                | READ ONLY    |
| 3         | ECON HIGH LIMIT SETPOINT    | ANALOG     |                    | AV          | 65 DEGF            | READ / WRITE |
| 4         | ECON LOW LIMIT SETPOINT     | ANALOG     |                    | AV          | 0 DEGF             | READ / WRITE |
| 5         | ECON FREE COOL SETPOINT     | ANALOG     |                    | AV          | 55 DEGF            | READ / WRITE |
| 6         | ECON MIN POSITION SETPOINT  | ANALOG     |                    | AV          | 20%                | READ / WRITE |
| 7         | ECON MAX POSITION SETPOINT  | ANALOG     |                    | AV          | 100%               | READ / WRITE |
| 8         | ECONOMIZER DAMPER POSITION  | ANALOG     |                    | AV          | N/A                | READ ONLY    |
| 9         | ECONOMIZER DAMPER COMMANDED | ANALOG     |                    | AV          | N/A                | READ ONLY    |
| 10        | VOC STATUS                  | ANALOG     |                    | AV          | N/A                | READ ONLY    |
| 11        | VOC MAX SETPOINT            | ANALOG     |                    | AV          | 900 PPM            | READ / WRITE |
| 12        | VOC MIN SETPOINT            | ANALOG     |                    | AV          | 400 PPM            | READ / WRITE |
| 13        | VOC MIN POSITION            | ANALOG     |                    | AV          | 0%                 | READ / WRITE |
| 14        | VOC MAX POSITION            | ANALOG     |                    | AV          | 15%                | READ / WRITE |
| 15        | CO2 STATUS                  | ANALOG     |                    | AV          | N/A                | READ ONLY    |
| 16        | CO2 MAX SETPOINT            | ANALOG     |                    | AV          | 900 PPM            | READ / WRITE |
| 17        | CO2 MIN SETPOINT            | ANALOG     |                    | AV          | 500 PPM            | READ / WRITE |
| 18        | IAQ Min Position            | ANALOG     |                    | AV          | 0%                 | READ / WRITE |
| 19        | HUMIDITY STATUS             | ANALOG     |                    | AV          | N/A                | READ ONLY    |
| 20        | OUTSIDE ENTHALPY SETPOINT   | ANALOG     |                    | AV          | 80 KJ/KG           | READ / WRITE |
| 21        | ENTHALPY STATUS             | ANALOG     |                    | AV          | N/A                | READ ONLY    |
| 22        | BUILDING PRESSURE           | ANALOG     |                    | AV          | N/A                | READ / WRITE |
| 23        | BUILDING PRESSURE SETPOINT  | ANALOG     |                    | AV          | 0.05 IN-WC         | READ / WRITE |
| 24        | PWR EXHAUST DMP POSITION    | ANALOG     |                    | AV          | 30                 | READ / WRITE |
| 25        | PWR EXHAUST STATUS          | DIGITAL    |                    | BV          | N/A                | READ ONLY    |
| 26        | PWR EXHAUST %               | ANALOG     |                    | AV          | N/A                | READ ONLY    |
| 27        | HEATING STG 1 INPUT         | DIGITAL    |                    | BV          | N/A                | READ ONLY    |
| 28        | HEATING STG 2 INPUT         | DIGITAL    |                    | BV          | N/A                | READ ONLY    |
| 29        | HEATING STG 1 OUTPUT        | DIGITAL    |                    | BV          | N/A                | READ ONLY    |
| 30        | HEATING STG 2 OUTPUT        | DIGITAL    |                    | BV          | N/A                | READ ONLY    |
| 31        | COOLING STG 1 INPUT         | DIGITAL    |                    | BV          | N/A                | READ ONLY    |
| 32        | COOLING STG 2 INPUT         | DIGITAL    |                    | BV          | N/A                | READ ONLY    |
| 33        | COOLING STG 1 OUTPUT        | DIGITAL    |                    | BV          | N/A                | READ ONLY    |
| 34        | COOLING STG 2 OUTPUT        | DIGITAL    |                    | BV          | N/A                | READ ONLY    |
| 35        | FREE COOLING STATUS         | DIGITAL    |                    | BV          | N/A                | READ ONLY    |

## Standard Economizer 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                 |
| Power Exht2 Position Configuration | Damper setpoint where user desire PE2 relay to energize                         | 70                 |
| 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 (KJ/KG)                 | 80                 |



## DCV Economizer with CO2 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                 |
| Power Exht2 Position Configuration | Damper setpoint where user desire PE2 relay to energize                         | 70                 |
| 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 (KJ/KG)                 | 80                 |
| IAQ Econo Min position             | Low CO2 damper setpoint   | 0                  |
| Min IAQ Level Pos                  | Low CO2 PPM setpoint  | 500                |
| Max IAQ Level Pos                  | High CO2 PPM setpoint   | 900                |

## IAQ Economizer with CO2 and VOC 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                 |
| Power Exht2 Position Configuration | Damper setpoint where user desire PE2 relay to energize                         | 70                 |
| 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 (KJ/KG)                 | 80                 |
| 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  | 400                |
| Max VOC Level PPM                  | High VOC PPM setpoint   | 1000               |
| VOC Econo Min Pos                  | Low VOC damper setpoint   | 0                  |
| VOC Econo Max Pos                  | High VOC damper setpoint  | 15                 |

## 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                 |
| Power Exht2 Position Configuration | Damper setpoint where user desire PE2 relay to energize                         | 70                 |
| 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 (KJ/KG)                 | 80                 |
| 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  | 400                |
| Max VOC Level PPM                  | High VOC PPM setpoint   | 1000               |
| VOC Econo Min Pos                  | Low VOC damper setpoint   | 0                  |
| VOC Econo Max Pos                  | High VOC damper setpoint  | 15                 |
| OA ERV fan speed                   | ERV OA outside air fan speed setpoint   | 75                 |
| 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 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                         | 40                 |
| Power Exht2 Position Configuration | Damper setpoint where user desire PE2 relay to energize                         | 75                 |
| 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  | 400                |
| Max VOC Level PPM                  | High VOC PPM setpoint   | 1000               |
| VOC Econo Min Pos                  | Low VOC damper setpoint   | 0                  |
| VOC Econo Max Pos                  | High VOC damper setpoint  | 15                 |
| OA ERV fan speed                   | ERV OA outside air fan speed setpoint   | 1000               |
| EX ERV fan speed                   | ERV EX outside air fan speed setpoint   | 1000               |
| Min ERV damper position            | Minimum damper position that econo damper will be in free cooling               | 20                 |

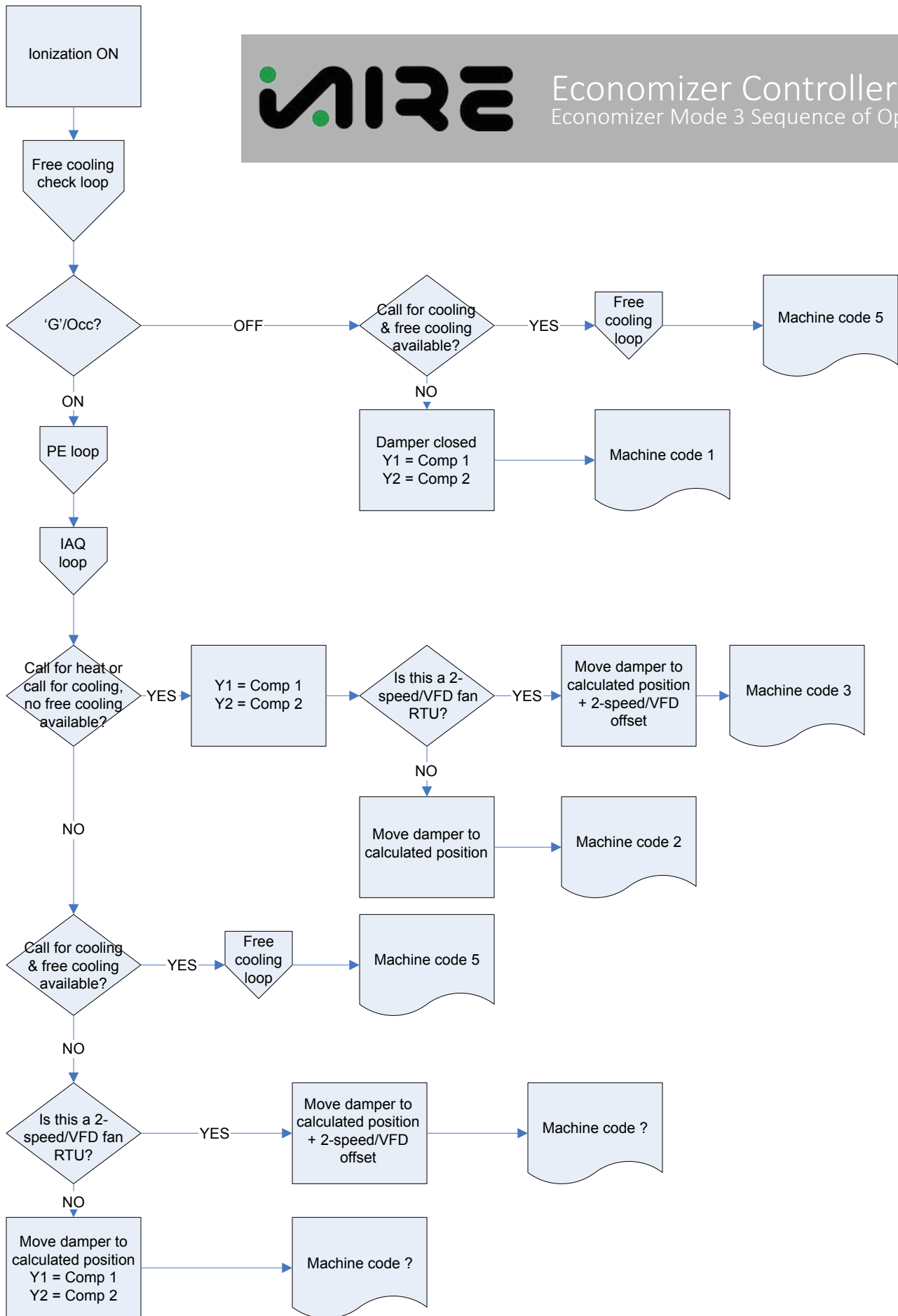
## CONTROLLER SEQUENCE OF OPERATIONS

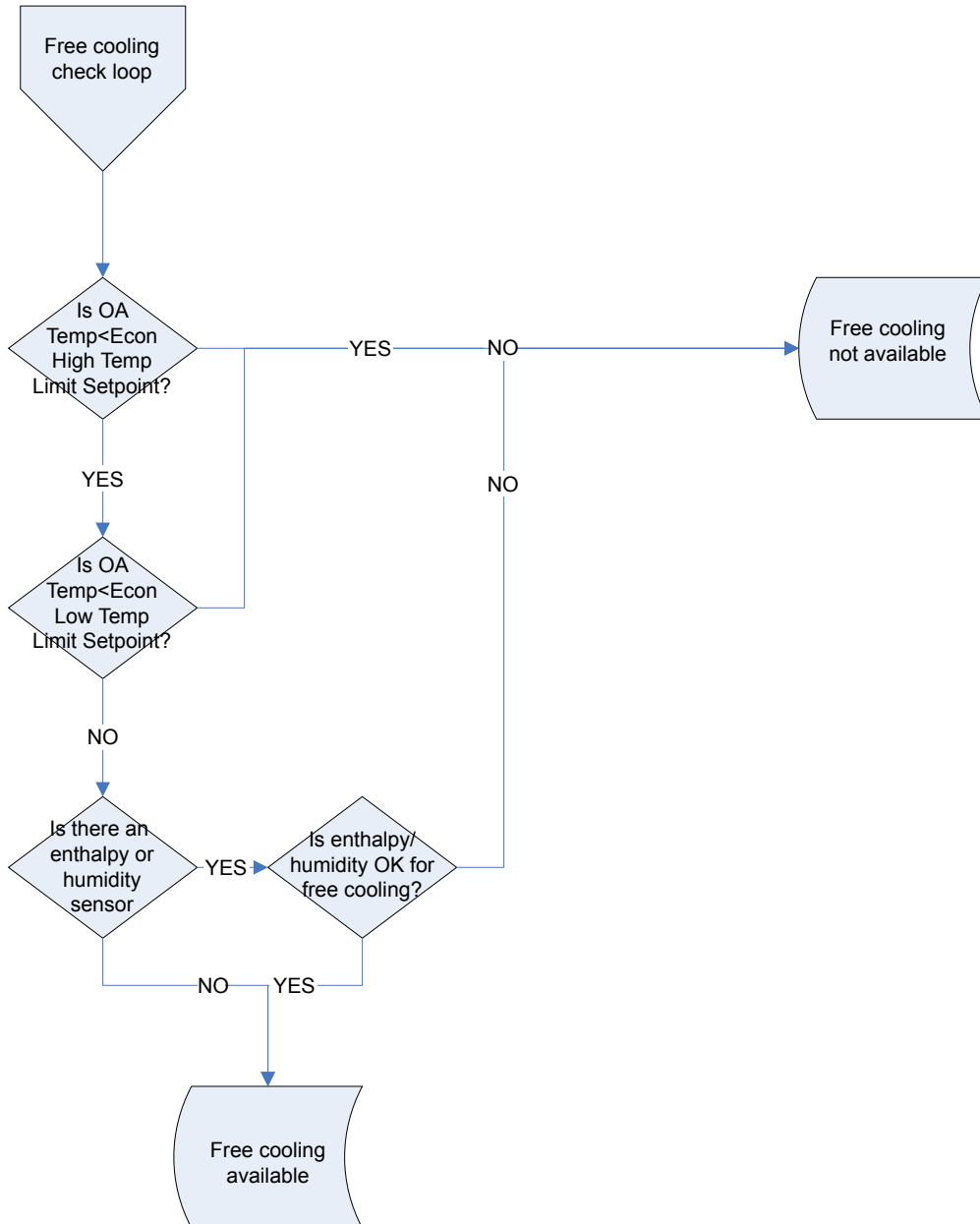
The following pages in this installation guide outline the sequence of operations for the *iAIRE* controller.

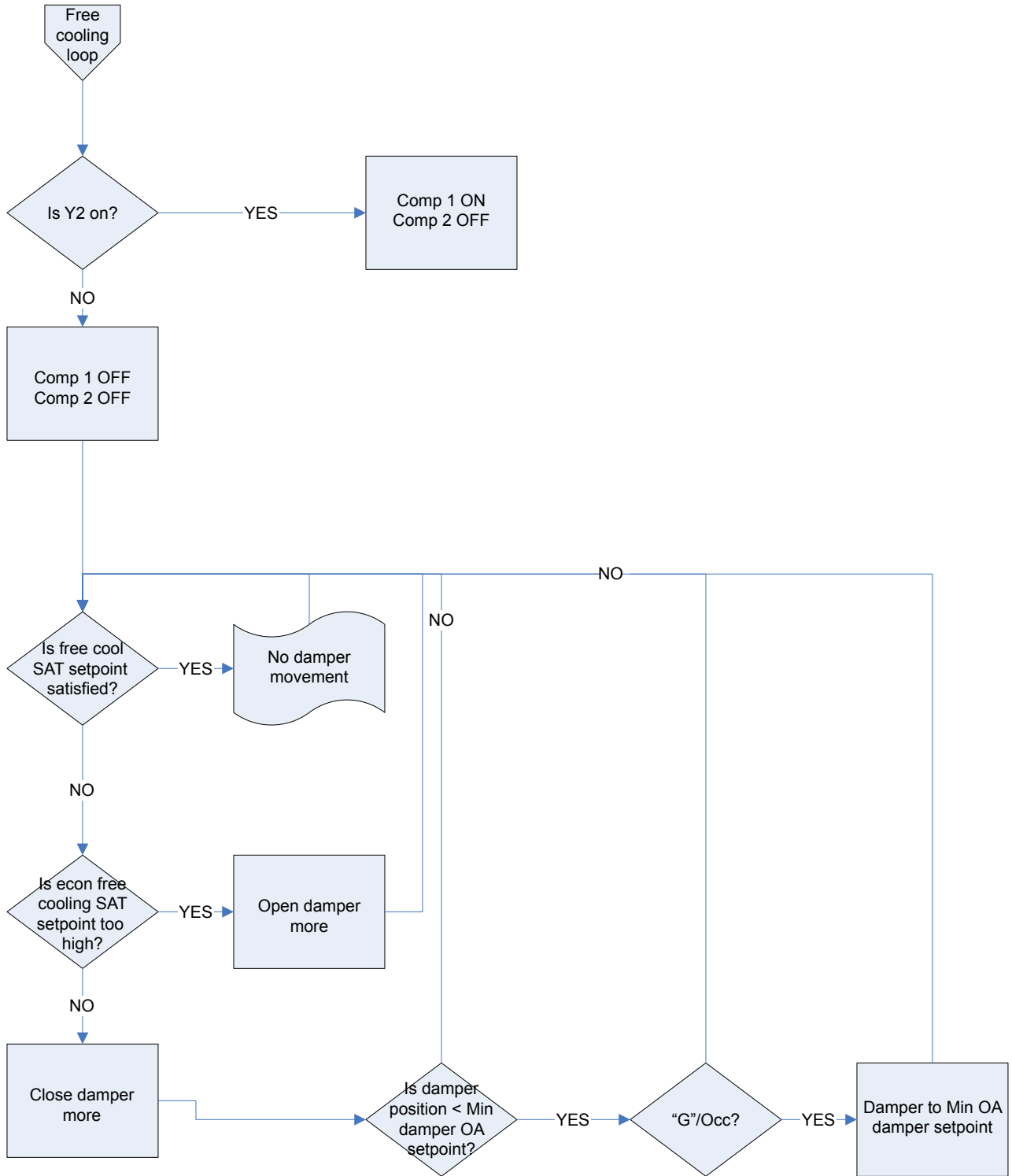


# Economizer Controller

## Economizer Mode 3 Sequence of Operations



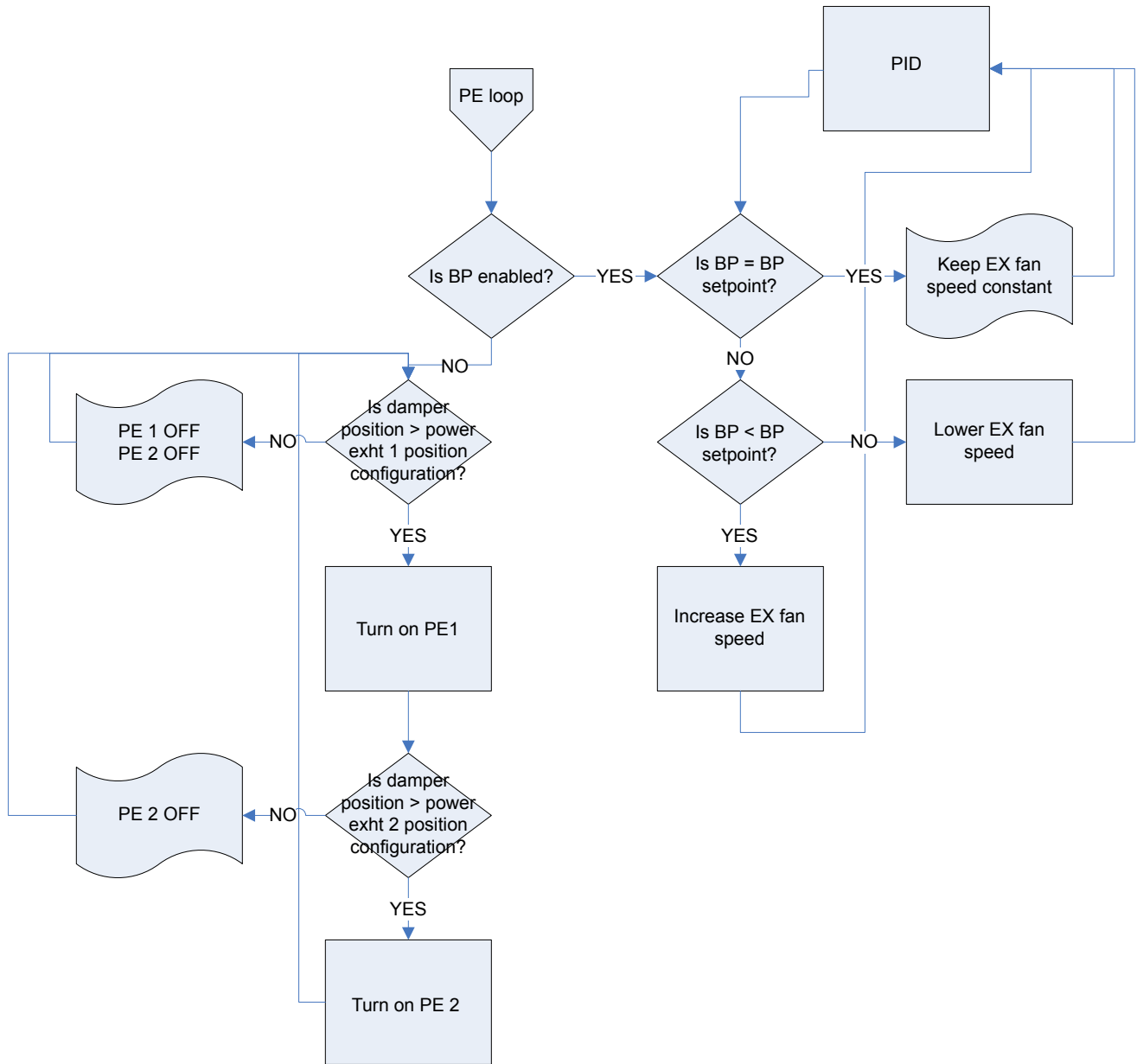








# Economizer Controller PE Loop





# Economizer Controller IAQ Loop

