Economizer Controls Package
I/O/M manual
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**Package Description**

The economizer replacement controls package is designed to clean your air and save on utility costs. Packages include ion air cleaners for 400 CFM/Ton nominal Roof Top Units (RTU) & standard loading, VOC sensor, CO2 sensor, 2 temperature probes and an ion mounting plate. If your current system has drastically different CFM/Ton, contact the factory for more information on adjustments that are needed.

**Part Number**

<table>
<thead>
<tr>
<th>Part #</th>
<th>Ion Generator mod. #</th>
<th>Voc Sensor mod. #</th>
<th>Transformer Kit mod. #</th>
<th>Economizer Controller mod. #</th>
<th>CO2 Sensor mod. #</th>
<th>Temperature Probe mod. #</th>
<th>Electrical Data</th>
<th>Total Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC-26-<em>A-</em></td>
<td>ION-00A*00</td>
<td>SEN-0071</td>
<td>TRN-0005 Kit</td>
<td>CNT-0008B</td>
<td>SEN-0002</td>
<td>SEN-0012</td>
<td>24v</td>
<td>1.07 lbs</td>
</tr>
<tr>
<td>EC-712-<em>A-</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>230v</td>
<td>1.72 lbs</td>
</tr>
<tr>
<td>EC-1525-<em>A-</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>460v</td>
<td>5.52 lbs</td>
</tr>
<tr>
<td>EC-3050-<em>A-</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8.12 lbs</td>
</tr>
<tr>
<td>EC-6075-<em>A-</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10.72 lbs</td>
</tr>
<tr>
<td>EC-100-<em>A-</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>15.82 lbs</td>
</tr>
<tr>
<td>EC-125-<em>A-</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>20.25 lbs</td>
</tr>
<tr>
<td>EC-150-<em>A-</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>23.62 lbs</td>
</tr>
<tr>
<td>EC-175-<em>A-</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>28.72 lbs</td>
</tr>
<tr>
<td>EC-200-<em>A-</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>32.87 lbs</td>
</tr>
</tbody>
</table>

**Package Matrix**

<table>
<thead>
<tr>
<th>Part #</th>
<th>Type</th>
<th>Tonnage</th>
<th>Actuator</th>
<th>Controls</th>
<th>Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC-26-<em>A-</em></td>
<td>EC - ECONOMIZER</td>
<td>26 - 2 to 6 tons</td>
<td>0 - NONE</td>
<td>A - IAQ</td>
<td>0 - NONE</td>
</tr>
<tr>
<td>EC-712-<em>A-</em></td>
<td></td>
<td>100 - 100 tons</td>
<td>A - SIEMENS 20 IN-LB</td>
<td></td>
<td>A - HUMIDITY</td>
</tr>
<tr>
<td>EC-1525-<em>A-</em></td>
<td></td>
<td>125 - 125 tons</td>
<td>B - SIEMENS 62 IN-LB</td>
<td></td>
<td>B - BACNET</td>
</tr>
<tr>
<td>EC-3050-<em>A-</em></td>
<td></td>
<td>150 - 150 tons</td>
<td>C - SIEMENS 160 IN-LB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EC-6075-<em>A-</em></td>
<td></td>
<td>175 - 175 tons</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EC-100-<em>A-</em></td>
<td></td>
<td>200 - 200 tons</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# Economizer Controls Package Add-Ons

<table>
<thead>
<tr>
<th>Add-On</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Humidity Sensor mod. # SEN-0001</td>
<td>If you would like to add enthalpy sensing to your system, include a humidity sensor.</td>
</tr>
</tbody>
</table>
| Actuators mod. # MTR-000* | Allows for feedback to be given. Can replace current actuators without a feedback system.  
MTR-0002 - 20 in-lbs; MTR-0003 - 60 in-lbs; MTR-0004 - 160 in-lbs |
| BACnet Translator mod. # PRG-BACNET-ECON-5.** KIT | For reliable protocol translation, add our BACNet Translator to your system. |
| BP Sensor mod. # SEN-0085 | Allows for low-pressure measurement for building energy management and comfort control. |

## Tools/Parts (provided by contractor)

- Wire cutters / strippers
- Screwdriver (small flathead and philips)
- Needle nose pliers
- Drill with 5/16 nut driver bit, step bit and 1/2" drill bit for temperature probe holes
- Wire (thermostat wire) for VOC, CO2, ion generator, optional humidity, optional transformer, optional BACnet translator, optional actuator and/or mod power exhaust.

## Hardware Included with controls package

(not shown on pg. 3). Reference pg. 3 for major components.

- Wire connectors (6)
- Screws (40 self tapping)
- Wire ties (5)
Economizer Controls Installation
Supply Air Temperature Sensor

⚠️ IMPORTANT Before beginning installation, test all Roof Top Unit (RTU) functionality to ensure it is working properly. Once complete, shut off all power to the RTU and follow lock-out tag-out procedures, then continue with the installation below.

Start by removing the blower access panel to gain access for the installation of the supply air temperature sensor (SAT) and ion generator(s).

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). See figures [1.1] and [1.2] below. (For SAT instructions, refer to SEN-0012 install documents in reference documentation (page 41))

The temperature sensor should clear the blower wheel. Make sure to tie wires away from any moving parts or areas that may cause wires to be sucked into the blower.

figure [1.1]

If using multiple ion generators, tie the wires of each generator together after mounting (if using the mounting plate, mount the generators to the plate and tie the wires of each generator together before mounting each plate). Be sure to keep all wires away from the generator tips, moving objects and areas that may cause wires to be sucked into the blower.

(For additional instructions, refer to ION-0A*0 install and data sheet documentation (page 42)).

(When wiring to the iAIRE economizer controller, the wires will land on the terminal in the spot labeled 24V)

After mounting the SAT and the ion generator(s), run the wiring over to the controller so the wires can land on the controller terminal strip. This may require the removal of the top panel on the RTU. See figure [1.4] below.

Ion Generator(s)

Next, mount your ion generator(s) perpendicular to the air stream between the carbon fiber needles. Some ion generator(s) should be installed by the inlet of the supply fan on the opposite side of the drive shaft and belt. See figure [1.3] below. This may require the removal of the top panel on the RTU. If multiple blowers exist, evenly distribute the number of ion generators between them.

figure [1.3]
VOC and CO2 Sensors

Wire and mount your VOC and CO2 sensors in the building occupied space at the same level as the thermostat.

Alternately, (but not recommended) you can mount the sensors in the return duct. After running the supply air temperature sensor and ionization generator(s) wires, remove the RTU hood and pull the economizer damper out of the RTU to gain access to the return air. See figure [1.5] below. (Refer to installation documentation for VOC (part # - SEN-0071) on page 44 and CO2 (part # - SEN-0002) on page 43)

Optional Parts Installation

After installation of the OAT sensor, if you have purchased the optional humidity sensor, actuator or BACNet translator, follow the installation instructions below. If you do not have any of these additional parts, please skip to the iAIRE controller section of the installation (page 7).

Optional Humidity Sensor

The humidity sensor should be mounted in the hood of the RTU. Make sure the probe is in the outside air flow. See figure [1.7] below. (For humidity instructions, refer to SEN-0001 install documents in reference documentation (page 47))

Outside Air Temperature Sensor

Next, install the Outside Air Temperature sensor (OAT) in the top of the economizer damper. The temperature probe should be mounted in the center of the outside air opening. Use a drill bit to make a 3/4" hole for the probe to be inserted (it should be installed so that the probe is closest to the hood edge of the economizer and does not interfere with the damper blade). See figure [1.6] at the top of the next column. (For OAT instructions, refer to SEN-0012 install documents in reference documentation (page 41))
Optional Actuator

The replacement actuator should be mounted in the same location as the original actuator. See figure [1.8] below. If moving the mounting location, please reference the actuator installation documents for mounting instructions.
(For actuator instructions, refer to MTR-000* install documents in reference documentation (page45))

figure [1.8]

(When wiring to the iAIRE economizer controller, the wires will land on the terminal in the spot labeled ECON SIG, if you have feedback, that will land in the spot labeled ECON POS)

Optional BACNet Translator

The BACnet Translator should be mounted to the back of the controller plate. (shown in figure [1.9])
(When wiring to the iAIRE economizer controller, the wires will plug in the controller in the spot labeled RS485)

figure [1.9]

After the new iAIRE economizer controller is mounted, begin landing the wires from the sensors, ion generator(s) and temperature probes. Reference the iAIRE economizer controller wiring schematic on page 8 and the terminal detail on page 9 for further information on where wires should land.

ACT has provided some wire connectors with the package to assist in landing multiple wires under one screw terminal.

When the wiring is complete, restore power to the RTU and run the controller in IAQ mode, making sure that all set-points for this mode are correct. Once confirmed, make sure all panels and doors on the RTU are in place and resecured.

Economizer Controls Installation Controller

Once all parts have been installed, you will remove the old economizer controller (refer to page 10 for information on where wires should land on the new controller from the old economizer controller). Next, you will mount the new iAIRE economizer controller to the top of the economizer damper. The controller should be mounted far enough to the back of the economizer damper that the screws clear the damper blades and the controller wires do not interfere with the RTU cover panel. See figure [1.9] at the top of the next column.

Additional installation questions? Contact us:

iAIRE LLC
2100 Consulate Dr. Suite 102, Orlando, FL. 32837 Toll Free: 844-348-9168
ECONOMIZER CONTROL SCHEMATIC

SCH-0014-O

Revision V-09.02

UNIT FACTORY

CONTROL BOARD

See options

Terminal Strip 1

Terminal Strip 3

ECONOMIZER CONTROLLER

NOTE 1: ALL FIELD WIRING MUST BE SHIELDED CABLE OR TWISTED PAIR
NOTE 2: BUILDING PRESSURE WITH DRAIN WIRE SHIELDED CABLE OR TWISTED PAIR
NOTE 3: DUCT STATIC SENSOR USES 0-1" TRANSDUCER

FIELD SUPPLIED WIRING ............... 0-5" TRANSDUCER

HI - INSTALLED IN BUILDING OR DUCT
LO - INSTALLED INTO ATMOSPHERE

iAIRE, LLC

IAIRE Economizer Controller
### 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
Existing Controller Wiring Diagrams

When replacing the economizer controller, use the diagrams below to verify where wires should be cut and landed to the new \textit{iAIRE} economizer controller terminal strips.

\textbf{(Honeywell W7212)}

\begin{itemize}
\item Cut and pull 24V power and land on R #29 on terminal detail (other wire should land on C) #30 on terminal detail
\item Cut and land on G #3 on terminal detail
\item Cut and land on Y1(in) #16 on terminal detail
\item Cut and land on Y1(out) #6 on terminal detail
\end{itemize}

\begin{figure}
\centering
\includegraphics[width=\textwidth]{Honeywell_W7212_diagram.png}
\caption{Honeywell W7212 diagram}
\end{figure}

Leave the two halves of the harness plugged together. Tie wires off of harness to the controller plug end to the \textit{iAIRE} terminal strips.

All other wires are not needed. Either discard extra wires or make sure they will not interfere with the new \textit{iAIRE} controls system.
7212 with M7215 damper motor and T7300 thermostat
7212 with M7215 damper motor and T7350 thermostat
7212 with M7215 damper motor and TB7220 or TB8220 thermostat
7212 with single-stage cooling system with single enthalpy changeover and Honeywell actuator and time clock for occupancy.
7212 with two-stage cooling system with Honeywell Series 72 Actuator and time clock for occupancy.
7212 controlling parallel-wired Honeywell Series 72 Actuators and time clock for occupancy.
7213, 7214 controlling heat pump system.
Economizer Controller Installation Guide
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 to view product data sheets, or email us at support@myiaire.com.

ACCESSORIES

*indicates customer part selections.

OPTIONAL ACCESSORIES

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 8 & 9 in this document).
Enthalpy Table

<table>
<thead>
<tr>
<th>Enthalpy (but/lb/da)</th>
<th>Point P1</th>
<th>Point P2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Temp. °F</td>
<td>Humidity %RH</td>
</tr>
<tr>
<td>32.4</td>
<td>86.0</td>
<td>38.9</td>
</tr>
<tr>
<td>28.0</td>
<td>80.0</td>
<td>36.8</td>
</tr>
<tr>
<td>26.0</td>
<td>75.0</td>
<td>39.6</td>
</tr>
<tr>
<td>24.0</td>
<td>70.0</td>
<td>42.3</td>
</tr>
<tr>
<td>22.0</td>
<td>65.0</td>
<td>44.8</td>
</tr>
<tr>
<td>20.0</td>
<td>60.0</td>
<td>46.9</td>
</tr>
</tbody>
</table>

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 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

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.

<table>
<thead>
<tr>
<th>Status Menu</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>STATUS MENU</strong></td>
<td>Allows you to view the controller commanded set points of the economizer damper.</td>
</tr>
<tr>
<td><strong>ECONO POS COMMAND STATUS</strong></td>
<td>Allows you to view the controller commanded set points of the economizer damper.</td>
</tr>
<tr>
<td><strong>ECONO POS READ STATUS</strong></td>
<td>Allows you to view the current actual position of the economizer damper.</td>
</tr>
<tr>
<td><strong>MOD PWREXHT POS COMMAND STATUS</strong></td>
<td>Allows you to check to see if the power exhaust command is on.</td>
</tr>
<tr>
<td><strong>COMPRSSOR1 OUTPUT STATUS</strong></td>
<td>Allows you to check if the compressor 1 output is active or de-active.</td>
</tr>
<tr>
<td><strong>COMPRSSOR2 OUTPUT STATUS</strong></td>
<td>Allows you to check if the compressor 2 output is active or de-active.</td>
</tr>
<tr>
<td><strong>POWER EXHAUST1 STATUS</strong></td>
<td>Allows you to check if the power exhaust 1 output is active or de-active.</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Status Menu</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>POWER EXHAUST2 STATUS</strong></td>
<td>Allows you to check if the power exhaust 2 output is active or de-active.</td>
</tr>
<tr>
<td><strong>OCCUPIED INPUT STATUS</strong></td>
<td>Allows you to check if the economizer enable option is active or de-active.</td>
</tr>
<tr>
<td><strong>HVAC W1 INPUT STATUS</strong></td>
<td>Allows you to check if the HVAC heating stage 1 from the thermostat is active or de-active.</td>
</tr>
<tr>
<td><strong>COMPRSSOR1 INPUT STATUS</strong></td>
<td>Allows you to check if the compressor 1 input from the thermostat is active or de-active.</td>
</tr>
<tr>
<td><strong>COMPRSSOR2 INPUT STATUS</strong></td>
<td>Allows you to check if the compressor 2 input from the thermostat is active or de-active.</td>
</tr>
<tr>
<td><strong>IAQ CO2 INPUT STATUS</strong></td>
<td>Allows you to check the current CO2 PPM reading coming from the sensor.</td>
</tr>
<tr>
<td><strong>ERV HEAT WHEEL INPUT STATUS</strong></td>
<td>Allows you to check if the ERV heat wheel is active or de-active.</td>
</tr>
<tr>
<td><strong>ERV MAKEUPFAN STATUS</strong></td>
<td>Allows you to check if the ERV make up fan is active or de-active.</td>
</tr>
</tbody>
</table>
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.

Allows you to check the operation parameters.
CONFIGURATION MENU SETTINGS

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:

- Eco 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 calculated the outside air enthalpy and allows 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
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. Refer to Fig. A and Fig. B.

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.
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:

- **ECON HIGHTMPLIMT SETPOINT**
  - Allows you to set the high temperature limit for the economizer.

- **ECON LOWTMLPLIMT 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 EXHT1 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.
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.

Allows you to set the outside air fan position.

 Allows you to set the power exhaust fan position.

Allows you to check outside air ERV min fan speed.

Allows you to check exhaust ERV min fan speed.

Allows you to check outside air ERV DCV fan speed.

Allows you to outside ERV VOC min fan speed.

Allows you to outside ERV VOC max fan speed.

Allows you to check exhaust ERV VOC min fan speed.

Allows you to check exhaust ERV VOC max fan speed.

Allows you to fan dead band.

Allows you to check timer.
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:

- CO2 Alarm Status
- VOC Alarm Status
- OATemp Status
- SATemp Status
- OADAMPER Status
- Humidity Status
- Dirty Filter

Each screen displays alarm status as either active or deactive 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. **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
- PE
- ERV wheel
- ERV OA fan speed
- ERV EX fan speed

APPENDIX INFORMATION

The default set points and configurations for each mode are outlined on pages 21 through 27.

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 29).
# BACnet Points List

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

<table>
<thead>
<tr>
<th>NAME</th>
<th>FUNCTION</th>
<th>DEFAULT SET POINTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Econ High Tmp Limit Setpoint</td>
<td>Sets the high temperature limit for when free cooling can happen (in degrees F)</td>
<td>65</td>
</tr>
<tr>
<td>Econ Low Tmp Limit Setpoint</td>
<td>Sets the low temperature limit for when free cooling can happen (in degrees F)</td>
<td>0</td>
</tr>
<tr>
<td>Econ Free Cool Sat Setpoint</td>
<td>Discharge temperature setting that damper is controlling temperature to</td>
<td>55</td>
</tr>
<tr>
<td>Econo Min Position Configuration</td>
<td>High CO2 damper setpoint &amp; maximum design outside air condition</td>
<td>20</td>
</tr>
<tr>
<td>Econo Max Position Configuration</td>
<td>Maximum stroke of economizer damper</td>
<td>100</td>
</tr>
<tr>
<td>Power Exht1 Position Configuration</td>
<td>Damper setpoint where user desire PE1 relay to energize</td>
<td>30</td>
</tr>
<tr>
<td>Power Exht2 Position Configuration</td>
<td>Damper setpoint where user desire PE2 relay to energize</td>
<td>70</td>
</tr>
<tr>
<td>Building Pressure</td>
<td>Inside building pressure if using modulating powered exhaust (inches H2O)</td>
<td>0.05</td>
</tr>
<tr>
<td>HVAC 2-speed Conf</td>
<td>Is the unit a 2-speed fan RTU?</td>
<td>Deactive</td>
</tr>
<tr>
<td>HVAC 2-speed ECON offset</td>
<td>Damper default when the RTU is goes to high fan speed</td>
<td>-10</td>
</tr>
<tr>
<td>Humidity Sensor Config</td>
<td>Does the system have a humidity sensor</td>
<td>Deactive</td>
</tr>
<tr>
<td>Enthalpy Set Point</td>
<td>Free cooling is possible less than this default setting (KJ/KG)</td>
<td>80</td>
</tr>
</tbody>
</table>
## DCV Economizer with CO2 Mode

<table>
<thead>
<tr>
<th>NAME</th>
<th>FUNCTION</th>
<th>DEFAULT SET POINTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Econ HighTmpLimit Setpoint</td>
<td>Sets the high temperature limit for when free cooling can happen (in degrees F)</td>
<td>65</td>
</tr>
<tr>
<td>Econ LowTmpLimit Setpoint</td>
<td>Sets the low temperature limit for when free cooling can happen (in degrees F)</td>
<td>0</td>
</tr>
<tr>
<td>Econ Free Cool Sat Setpoint</td>
<td>Discharge temperature setting that damper is controlling temperature to</td>
<td>55</td>
</tr>
<tr>
<td>Econo Min Position Configuration</td>
<td>High CO2 damper setpoint &amp; maximum design outside air condition</td>
<td>20</td>
</tr>
<tr>
<td>Econo Max Position Configuration</td>
<td>Maximum stroke of economizer damper</td>
<td>100</td>
</tr>
<tr>
<td>Power Exht1 Position Configuration</td>
<td>Damper setpoint where user desire PE1 relay to energize</td>
<td>30</td>
</tr>
<tr>
<td>Power Exht2 Position Configuration</td>
<td>Damper setpoint where user desire PE2 relay to energize</td>
<td>70</td>
</tr>
<tr>
<td>Building Pressure</td>
<td>Inside building pressure if using modulating powered exhaust (inches H2O)</td>
<td>0.05</td>
</tr>
<tr>
<td>HVAC 2-speed Conf</td>
<td>Is the unit a 2-speed fan RTU?</td>
<td>Deactive</td>
</tr>
<tr>
<td>HVAC 2-speed ECON offset</td>
<td>Damper default when the RTU is goes to high fan speed</td>
<td>-10</td>
</tr>
<tr>
<td>Humidity Sensor Config</td>
<td>Does the system have a humidity sensor</td>
<td>Deactive</td>
</tr>
<tr>
<td>Enthalpy Set Point</td>
<td>Free cooling is possible less than this default setting (KJ/KG)</td>
<td>80</td>
</tr>
<tr>
<td>IAQ Econo Min position</td>
<td>Low CO2 damper setpoint</td>
<td>0</td>
</tr>
<tr>
<td>Min IAQ Level Pos</td>
<td>Low CO2 PPM setpoint</td>
<td>500</td>
</tr>
<tr>
<td>Max IAQ Level Pos</td>
<td>High CO2 PPM setpoint</td>
<td>900</td>
</tr>
</tbody>
</table>
# IAQ Economizer with CO2 and VOC Mode

<table>
<thead>
<tr>
<th>NAME</th>
<th>FUNCTION</th>
<th>DEFAULT SET POINTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Econ HighTmpLimit Setpoint</td>
<td>Sets the high temperature limit for when free cooling can happen (in degrees F)</td>
<td>65</td>
</tr>
<tr>
<td>Econ LowTmpLimit Setpoint</td>
<td>Sets the low temperature limit for when free cooling can happen (in degrees F)</td>
<td>0</td>
</tr>
<tr>
<td>Econ Free Cool Sat Setpoint</td>
<td>Discharge temperature setting that damper is controlling temperature to</td>
<td>55</td>
</tr>
<tr>
<td>Econo Min Position Configuration</td>
<td>High CO2 damper setpoint &amp; maximum design outside air condition</td>
<td>20</td>
</tr>
<tr>
<td>Econo Max Position Configuration</td>
<td>Maximum stroke of economizer damper</td>
<td>100</td>
</tr>
<tr>
<td>Power Exht1 Position Configuration</td>
<td>Damper setpoint where user desire PE1 relay to energize</td>
<td>30</td>
</tr>
<tr>
<td>Power Exht2 Position Configuration</td>
<td>Damper setpoint where user desire PE2 relay to energize</td>
<td>70</td>
</tr>
<tr>
<td>Building Pressure</td>
<td>Inside building pressure if using modulating powered exhaust (inches H2O)</td>
<td>0.05</td>
</tr>
<tr>
<td>HVAC 2-speed Conf</td>
<td>Is the unit a 2-speed fan RTU?</td>
<td>Deactive</td>
</tr>
<tr>
<td>HVAC 2-speed ECON offset</td>
<td>Damper default when the RTU is goes to high fan speed</td>
<td>-10</td>
</tr>
<tr>
<td>Humidity Sensor Config</td>
<td>Does the system have a humidity sensor</td>
<td>Deactive</td>
</tr>
<tr>
<td>Enthalpy Set Point</td>
<td>Free cooling is possible less than this default setting (KJ/KG)</td>
<td>80</td>
</tr>
<tr>
<td>IAQ Econo Min position</td>
<td>Low CO2 damper setpoint</td>
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</tr>
<tr>
<td>Min IAQ Level Pos</td>
<td>Low CO2 PPM setpoint</td>
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<tr>
<td>Max IAQ Level Pos</td>
<td>High CO2 PPM setpoint</td>
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</tr>
<tr>
<td>Min VOC Level PPM</td>
<td>Low VOC PPM setpoint</td>
<td>400</td>
</tr>
<tr>
<td>Max VOC Level PPM</td>
<td>High VOC PPM setpoint</td>
<td>1000</td>
</tr>
<tr>
<td>VOC Econo Min Pos</td>
<td>Low VOC damper setpoint</td>
<td>0</td>
</tr>
<tr>
<td>VOC Econo Max Pos</td>
<td>High VOC damper setpoint</td>
<td>15</td>
</tr>
</tbody>
</table>
## IAQ Sized ERV Mode

<table>
<thead>
<tr>
<th>NAME</th>
<th>FUNCTION</th>
<th>DEFAULT SET POINTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Econ HighTmpLimit Setpoint</td>
<td>Sets the high temperature limit for when free cooling can happen</td>
<td>65</td>
</tr>
<tr>
<td></td>
<td>(in degrees F)</td>
<td></td>
</tr>
<tr>
<td>Econ LowTmpLimit Setpoint</td>
<td>Sets the low temperature limit for when free cooling can happen</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>(in degrees F)</td>
<td></td>
</tr>
<tr>
<td>Econ Free Cool Sat Setpoint</td>
<td>Discharge temperature setting that damper is controlling temperature to</td>
<td>55</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Econo Min Position Configuration</td>
<td>High CO2 damper setpoint &amp; maximum design outside air condition</td>
<td>20</td>
</tr>
<tr>
<td>Econo Max Position Configuration</td>
<td>Maximum stroke of economizer damper</td>
<td>100</td>
</tr>
<tr>
<td>Power Exht1 Position Configuration</td>
<td>Damper setpoint where user desire PE1 relay to energize</td>
<td>30</td>
</tr>
<tr>
<td>Power Exht2 Position Configuration</td>
<td>Damper setpoint where user desire PE2 relay to energize</td>
<td>70</td>
</tr>
<tr>
<td>Building Pressure</td>
<td>Inside building pressure if using modulating powered exhaust (inches H2O)</td>
<td>0.05</td>
</tr>
<tr>
<td>HVAC 2-speed Conf</td>
<td>Is the unit a 2-speed fan RTU?</td>
<td>Deactive</td>
</tr>
<tr>
<td>HVAC 2-speed ECON offset</td>
<td>Damper default when the RTU is goes to high fan speed</td>
<td>-10</td>
</tr>
<tr>
<td>Humidity Sensor Config</td>
<td>Does the system have a humidity sensor</td>
<td>Deactive</td>
</tr>
<tr>
<td>Enthalpy Set Point</td>
<td>Free cooling is possible less than this default setting (KJ/KG)</td>
<td>80</td>
</tr>
<tr>
<td>IAQ Econo Min position</td>
<td>Low CO2 damper setpoint</td>
<td>0</td>
</tr>
<tr>
<td>Min IAQ Level Pos</td>
<td>Low CO2 PPM setpoint</td>
<td>400</td>
</tr>
<tr>
<td>Max IAQ Level Pos</td>
<td>High CO2 PPM setpoint</td>
<td>1000</td>
</tr>
<tr>
<td>Min VOC Level PPM</td>
<td>Low VOC PPM setpoint</td>
<td>400</td>
</tr>
<tr>
<td>Max VOC Level PPM</td>
<td>High VOC PPM setpoint</td>
<td>1000</td>
</tr>
<tr>
<td>VOC Econo Min Pos</td>
<td>Low VOC damper setpoint</td>
<td>0</td>
</tr>
<tr>
<td>VOC Econo Max Pos</td>
<td>High VOC damper setpoint</td>
<td>15</td>
</tr>
<tr>
<td>OA ERV fan speed</td>
<td>ERV OA outside air fan speed setpoint</td>
<td>75</td>
</tr>
<tr>
<td>EX ERV fan speed</td>
<td>ERV EX outside air fan speed setpoint</td>
<td>75</td>
</tr>
<tr>
<td>Min ERV damper position</td>
<td>Minimum damper position that econo damper will be in free cooling</td>
<td>20</td>
</tr>
</tbody>
</table>
# Min IAQ Sized ERV Mode

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<td>Discharge temperature setting that damper is controlling temperature to</td>
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<tr>
<td>Econo Min Position Configuration</td>
<td>High CO2 damper setpoint &amp; maximum design outside air condition</td>
<td>20</td>
</tr>
<tr>
<td>Econo Max Position Configuration</td>
<td>Maximum stroke of economizer damper</td>
<td>100</td>
</tr>
<tr>
<td>Power Exht1 Position Configuration</td>
<td>Damper setpoint where user desire PE1 relay to energize</td>
<td>40</td>
</tr>
<tr>
<td>Power Exht2 Position Configuration</td>
<td>Damper setpoint where user desire PE2 relay to energize</td>
<td>75</td>
</tr>
<tr>
<td>IAQ Econo Min position</td>
<td>Low CO2 damper setpoint</td>
<td>0</td>
</tr>
<tr>
<td>Min IAQ Level Pos</td>
<td>Low CO2 PPM setpoint</td>
<td>400</td>
</tr>
<tr>
<td>Max IAQ Level Pos</td>
<td>High CO2 PPM setpoint</td>
<td>1000</td>
</tr>
<tr>
<td>Min VOC Level PPM</td>
<td>Low VOC PPM setpoint</td>
<td>400</td>
</tr>
<tr>
<td>Max VOC Level PPM</td>
<td>High VOC PPM setpoint</td>
<td>1000</td>
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<td>VOC Econo Min Pos</td>
<td>Low VOC damper setpoint</td>
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<tr>
<td>OA ERV fan speed</td>
<td>ERV OA outside air fan speed setpoint</td>
<td>1000</td>
</tr>
<tr>
<td>EX ERV fan speed</td>
<td>ERV EX outside air fan speed setpoint</td>
<td>1000</td>
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<td>Min ERV damper position</td>
<td>Minimum damper position that econo damper will be in free cooling</td>
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</tr>
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</table>
CONTROLLER SEQUENCE OF OPERATIONS

The following pages in this installation guide outline the sequence of operations for the iAIRE controller.
Free cooling check loop

Is OA Temp < Econ High Temp Limit Setpoint?

YES -> Free cooling available

NO -> Is OA Temp < Econ Low Temp Limit Setpoint?

YES -> Free cooling not available

NO -> Is there an enthalpy or humidity sensor?

YES -> Is enthalpy/humidity OK for free cooling?

YES -> Free cooling available

NO -> Free cooling not available

NO
Free Cooling Loop

Is Y2 on?

YES → Comp 1 ON Comp 2 OFF

NO → Comp 1 OFF Comp 2 OFF

Is free cool SAT setpoint satisfied?

YES → Open damper more

NO → Is econ free cooling SAT setpoint too high?

YES → No damper movement

NO → Close damper more

Is damper position < Min damper OA setpoint?

YES → "G"/Occ?

NO → Damper to Min OA damper setpoint

"G"/Occ?

YES → Damper to Min OA damper setpoint

NO → Open damper more
PE Loop

- Is BP enabled?
  - YES
    - Is BP = BP setpoint?
      - YES: Keep EX fan speed constant
      - NO: Lower EX fan speed
  - NO: Increase EX fan speed

- PE 1 OFF
  - PE 2 OFF
    - NO: PE 2 OFF
      - NO: Turn on PE 2
    - YES: Is damper position > power exht 2 position configuration?
      - YES: Turn on PE 2
      - NO: Is damper position > power exht 1 position configuration?
        - YES: Turn on PE1
        - NO: Is BP < BP setpoint?
          - YES: Increase EX fan speed
          - NO: NO
Is CO₂ < DCV min level position? 

- YES: CO₂ calculated OA & PE fan speed is DCV econo min position speed
- NO: Calculate straight line OA & PE fan speed for CO₂

Is CO₂ > DCV min level position?

- YES: CO₂ calculated OA & PE fan speed is DCV econo min position speed
- NO: Calculate the new OA & PE fan speed adding CO₂ & VOC speeds together

Is VOC < VOC min level position?

- YES: VOC calculated OA & PE fan speed is IAQ econo min position speed
- NO: Calculate straight line OA & PE fan speed for VOC

Is VOC > VOC min level position?

- YES: VOC calculated OA & PE fan speed is IAQ econo max position speed
- NO: Calculate the new OA & PE fan speed adding CO₂ & VOC speeds together
The following are reference product installation sheets
The temperature probe should be mounted using (2) two screws through the existing screw holes. (Unit can be mounted in any position or angle)

**INSTALLATION**

The **iAIRE** temperature probe is both non-polarity and non-position sensitive. All thermistor type room units are supplied with a two-pole terminal block. It is recommended to use 18-20 AWG twisted pair wire or shielded cable for sensor installation.

**MOUNTING**

The temperature probe should be mounted using (2) two screws through the existing screw holes.

(UNIT can be mounted in any position or angle)

**WIRING**

The wires for the temperature probe should land at the desired location (either the SAT or OAT location on your controller).

⚠️ (Be sure to follow all local and electrical codes. Turn off power to the unit before mounting or making any connections.)
ION-0A*00 INSTALL
Ion Generator for AHUs, Heating and AC Units

READ THESE INSTRUCTIONS BEFORE BEGINNING INSTALLATION

INSTALLATION
The iAIRE ion generator is a versatile product and can be mounted in any type HVAC system. It is designed for airflows of up to 2,500 CFM and standard VOC loading. 1250 CFM in smoking environments.

MOUNTING
Find a suitable location in the air stream. The optimal location is at the inlet to the supply fan. Keep the carbon fiber needles far enough away from any conductive surface to prevent arcing.

The ion air purifier has two mounting flanges with a hole to accommodate 1/8” self tapping sheet metal screws [ figure 1.1 ]. With the provided metal screws, mount the ion air purifier perpendicular to and in the middle of the air stream such that air will flow between the carbon fiber needles [figure 1.2]. The exposed end of the screw should not protrude from the unit where someone can be cut on the screw tip.

In some cases, to properly mount the ion air purifier, the optional mounting bracket (not included) is required [ figure 1.3 ]. This bracket has (4) holes: (2) that accommodate mounting of the ion air purifier and (2) for mounting with #10 hardware to a surface so the air purifier is perpendicular to the air stream.

MAINTENANCE
A small cleaning brush (GNP-0148) is included for easy, routine maintenance. This should be done as the ion brushes become dirty, normally when the AHU filters are changed.

⚠️ (Be sure to follow all local and electrical codes. Turn off power to the unit before mounting or making any connections.)

ION - 0A * 00

VOLTAGE:
- A - 24VAC / VDC, 1φ
- D - 115VAC, 1φ
- G - 208/230VAC, 1φ

35 inch red = Positive (HVAC “G” Terminal)
35 inch black = Neutral or Ground (HVAC “C” Terminal) or chassis in case of furnace

Inline C-Class Fuse

- Verify the product will not overload the power requirement for the HVAC system before wiring.
- Check the label on the product and wire it only to the voltage range shown. The 24V product accepts VAC/VDC power and can be utilized as a lower voltage block with less output.
- Unit should be interlocked to fan operation (“G” terminal) or other similar control.
- Inline C-Class Fusing:
  - 500mA @ 24V; (FUS-0037)
  - 200mA @ 115V/208V/230V (FUS-0048)

- Green LED will illuminate when powered and operating.
READ THESE INSTRUCTIONS BEFORE YOU BEGIN INSTALLATION

INSTALLATION

The iAIRE CO2 sensor is a versatile product and can be mounted to any standard wall. It is designed for real-time CO2 detection in basic HVAC and Ventilation systems.

MOUNTING

Find a suitable location on the wall to mount the sensor. The sensor should be mounted at a similar height to the thermostat.

⚠️ (It is recommended when mounting on a wall to secure the unit using drywall anchors or to wall studs directly.)

Using screws, mount the sensor to the wall ensuring it is secure.

(Unit should be mounted vertically so that product labels are facing up)

(hole for wall mounting located on back of device)

WIRING

⚠️ (Be sure to follow all local and electrical codes. Turn off power to the unit before mounting or making any connections.)

• Only 0–10VDC output
READ THESE INSTRUCTIONS BEFORE BEGINNING INSTALLATION

INSTALLATION

◆ Always cut off power before mounting, removing, or cleaning the monitor.
◆ Notice the supply power voltage of the transmitter: 24VAC/VDC. Do not install the transmitter on voltages higher than marked on the transmitter. 24VAC/VDC.

Mounting and Wire Connection

◆ With power off, put a flat head screwdriver deep inside of the hole on the top of the detector housing following step 1 in figure 2. Then slant the screwdriver and gently separate the cover from the wall plate by following steps 2 through 4.

◆ The transmitter should be mounted near the place where you want to detect VOC level. However, do not mount the detector near a steam source, such as a diffuser, or in direct sunlight.
READ THESE INSTRUCTIONS BEFORE YOU BEGIN INSTALLATION

INSTALLATION

The *iAIRE* actuators have standardized footprints, wiring configurations and checkout procedures allowing for fast installation resulting in lower installed cost.

MOUNTING

There are several mounting options for the MTR-000* actuators.

For easy mounting on short shafts without special accessories, the self-centering shaft adapter can be mounted on the backside of the actuator. Each actuator includes an adapter so that the position indicator is still easily viewed [figure 1.1].

The frame mounting kit (MTR-0002) is used when the actuator cannot be directly mounted on the damper shaft due to space limitations [figure 1.2].

Easily replace existing Honeywell, Johnson and Barber-Colman modulating motors using the foot mounting kit (MTR-0003). The foot mounting kit can also be used for placing the actuator in the airstream and linking to the damper blades [figure 1.3].

Other kits provide additional mounting options such as wall mounting (MTR-0004) [figure 1.4].

(For all kits, parts are included, except for the damper rod.)

WIRING

⚠️ (Be sure to follow all local and electrical codes. Turn off power to the unit before mounting or making any connections.)

Multiple actuators can be powered off of one transformer (up to ten on one transformer) [figure 2.1].

Actuators can be wired in parallel with one signal driving up to ten actuators. Feedback should not be wired together and can be read off of one of the actuators [figure 2.2].

Actuators can be wired in parallel with one signal driving a bank of up to ten actuators. Multiple transformers can power multiple actuators. Feedback should not be wired together and can be read off of one of the actuators [figure 2.3].

Master and slave actuators can be tandem mounted for 0 to 10 V applications. This effectively doubles the torque produced by one actuator. This unique feature allows the actuators to operate in a wider range of applications [figure 2.4].

With the settings shown in [figure 2.5], two 0 to 10 V actuators can be sequenced such that the first one will operate at 0 to 2 V and the second at 2 to 10 V. This feature allows for specialized applications, such as staging or minimum required airflow.
WIRING CONFIGURATIONS

fig. 2.1
(one transformer)

fig. 2.2
(parallel w/ one signal)

fig. 2.3
(parallel w/ multiple transformers)

fig. 2.4
(master and slave)

fig. 2.5
(sequencing)
READ THESE INSTRUCTIONS BEFORE YOU BEGIN INSTALLATION

INSTALLATION

The iAIRE Humidity sensor is a versatile product and can be mounted to any standard wall. The unit is designed to transmit relative humidity and temperature measurements.

MOUNTING

Find a suitable location on the wall to mount the sensor.

(It is recommended when mounting on a wall to secure the unit using drywall anchors or to wall studs directly.)

Using screws, mount the sensor to the wall ensuring it is secure.

(Unit should be mounted vertically so that product labels are facing up)

WIRING

(Be sure to follow all local and electrical codes. Turn off power to the unit before mounting or making any connections.)

- 2x0~10VDC (default) or 2x4~20mA (selectable by jumpers)
- 2x0~5VDC (selected when order is placed)

To change the output, follow steps below:
- Power off and remove the face cover, you can see a set of short-circuit block jumpers S1-S4 in the middle of the PCB board. When you block the top two pins of the S1-S4, the analog output is voltage output. Blocking the lower two pins sets analog output.
- There is a set of short circuit block jumpers J1-J3 in the top of the PCB board. Connecting or disconnecting the J1 will switch between 0-10V and 4-20mA outputs.