



# INSTALLATION INSTRUCTIONS

## 0 to 100% Low Leak Economizer – Downflow

### JAYECON355\*

**USED WITH:**

Oxbox Cooling and Gas/ Electric  
7.5 to 12.5 Tons

**Models:**

J4PRC 090-150, J4PRG 090-150

## BX-SVN-JAYECON355-1A-EN



RECOGNIZE THIS SYMBOL AS AN INDICATION OF IMPORTANT SAFETY INFORMATION

**WARNING**

These instructions are intended as an aid to qualified licensed service personnel for proper installation, adjustment and operation of this unit. Read these instructions thoroughly before attempting installation or operation. Failure to follow these instruction may result in improper installation, adjustment, service or maintenance possibly resulting in fire, electrical shock, property damage, personal injury or death.



Intertek



**DO NOT DESTROY THIS MANUAL**

Please read carefully and keep in a safe place for future reference by a serviceman.

## Safety Section

Safety advisories appear throughout this manual as required. Your personal safety and the proper operation of this machine depend upon the strict observance of these precautions.

The three types of advisories are defined as follows:

 <b>WARNING</b>	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
 <b>CAUTION</b>	Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury. It could also be used to alert against unsafe practices.
<b>NOTICE</b>	Indicates a situation that could result in equipment or property damage only accidents.

### Important Environmental Concerns

Scientific research has shown that certain man-made chemicals can affect the earth's naturally occurring stratospheric ozone layer when released to the atmosphere. In particular, several of the identified chemicals that may affect the ozone layer are refrigerants that contain Chlorine, Fluorine and Carbon (CFCs) and those containing Hydrogen, Chlorine, Fluorine and Carbon (HCFCs). Not all refrigerants containing these compounds have the same potential impact to the environment. Oxbox advocates the responsible handling of all refrigerants-including industry replacements for CFCs and HCFCs such as saturated or unsaturated HFCs and HCFCs.

### Important Responsible Refrigerant Practices

Oxbox believes that responsible refrigerant practices are important to the environment, our customers, and the air conditioning industry. All technicians who handle refrigerants must be certified according to local rules. For the USA, the Federal Clean Air Act (Section 608) sets forth the requirements for handling, reclaiming, recovering and recycling of certain refrigerants and the equipment that is used in these service procedures. In addition, some states or municipalities may have additional requirements that must also be adhered to for responsible management of refrigerants. Know the applicable laws and follow them.

## WARNING

### Personal Protective Equipment (PPE) Required!

Failure to wear proper PPE for the job being undertaken could result in death or serious injury. Technicians, in order to protect themselves from potential electrical, mechanical, and chemical hazards, MUST follow precautions in this manual and on the tags, stickers, and labels, as well as the instructions below:

- Before installing/servicing this unit, technicians MUST put on all PPE required for the work being undertaken (Examples; cut resistant gloves/sleeves, butyl gloves, safety glasses, hard hat/bump cap, fall protection, electrical PPE and arc flash clothing). ALWAYS refer to appropriate Safety Data Sheets (SDS) and OSHA guidelines for proper PPE.
- When working with or around hazardous chemicals, ALWAYS refer to the appropriate SDS and OSHA/GHS (Global Harmonized System of Classification and Labelling of Chemicals) guidelines for information on allowable personal exposure levels, proper respiratory protection and handling instructions.
- If there is a risk of energized electrical contact, arc, or flash, technicians MUST put on all PPE in accordance with OSHA, NFPA 70E, or other country-specific requirements for arc flash protection, PRIOR to servicing the unit. NEVER PERFORM ANY SWITCHING, DISCONNECTING, OR VOLTAGE TESTING WITHOUT PROPER ELECTRICAL PPE AND ARC FLASH CLOTHING. ENSURE ELECTRICAL METERS AND EQUIPMENT ARE PROPERLY RATED FOR INTENDED VOLTAGE.

## WARNING

### Follow EHS Policies!

Failure to follow instructions below could result in death or serious injury.

- All Oxbox personnel must follow the company's Environmental, Health and Safety (EHS) policies when performing work such as hot work, electrical, fall protection, lockout/tagout, refrigerant handling, etc. Where local regulations are more stringent than these policies, those regulations supersede these policies.
- Non-Oxbox personnel should always follow local regulations.

**⚠ WARNING**

**Proper Field Wiring and Grounding Required!**

Failure to follow code could result in death or serious injury. All field wiring **MUST** be performed by qualified personnel. Improperly installed and grounded field wiring poses **FIRE** and **ELECTROCUTION** hazards. To avoid these hazards, you **MUST** follow requirements for field wiring installation and grounding as described in NEC and your local/state/ national electrical codes.

**Pre-Installation**

**Unit Inspection**

To protect against loss due to damage incurred in transit, perform inspection immediately upon receipt of the unit.

**Exterior Inspection**

If the job site inspection reveals damage or material shortages, file a claim with the carrier immediately. Specify the type and extent of the damage on the bill of lading before signing. Notify the appropriate sales representative.

**Important:** Do not proceed with installation of a damaged unit without sales representative's approval.

- Visually inspect the complete exterior for signs of shipping damages to unit or packing material.
- Verify that the nameplate data matches the sales order and bill of lading.
- Verify that the unit is properly equipped and there are no material shortages.
- Verify that the power supply complies with the unit nameplate specifications.

**Inspection for Concealed Damage**

Visually inspect the components for concealed damage as soon as possible after delivery and before it is stored.

If concealed damage is discovered:

- Notify the carrier's terminal of the damage immediately by phone and by mail.
- Concealed damage must be reported within 15 days.
- Request an immediate, joint inspection of the damage with the carrier and consignee.
- Stop unpacking the unit.
- Do not remove damaged material from receiving location.

**General Information**

The barometric relief hood is sized to provide up to 100% relief. It is designed to meet low leak requirements to prevent infiltration of air when closed.

**Revision History**

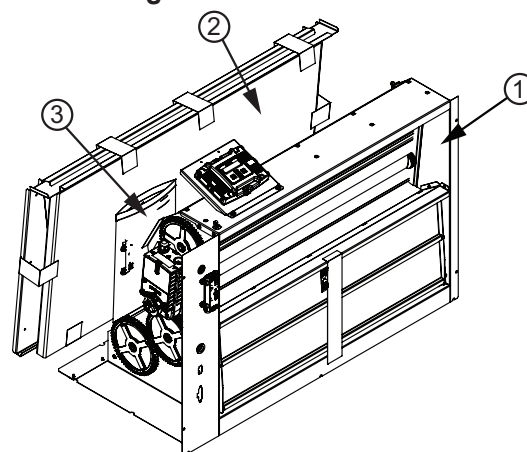
- Added important note for barometric relief provision in Parts List section.
- Updated Installation chapter.
- Updated Economizer Controller chapter.

- Take photos of the damage, if possible.
- The owner must provide reasonable evidence that the damage did not occur after delivery.

**Table 1. Parts List**

Component	Description
1	Economizer Assembly
2	Hood Package
2a	Hood Top
2b	Side A (Left)
2c	Side B (Right)
2d	Center Divider
2e	Aluminum Filter
3	Parts Bag
3a	Screw Bag
3b	Mixed Air Sensor

**Figure 1. Package contents JAYECON355\***

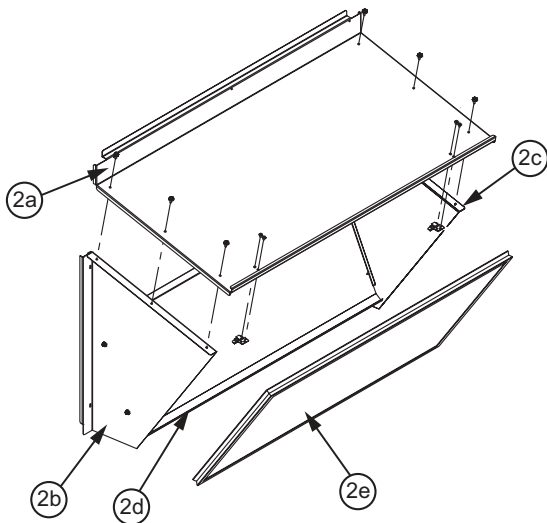


**Important:** The downflow economizer accessory includes the barometric relief provisions as part of the damper assembly.

## Installation

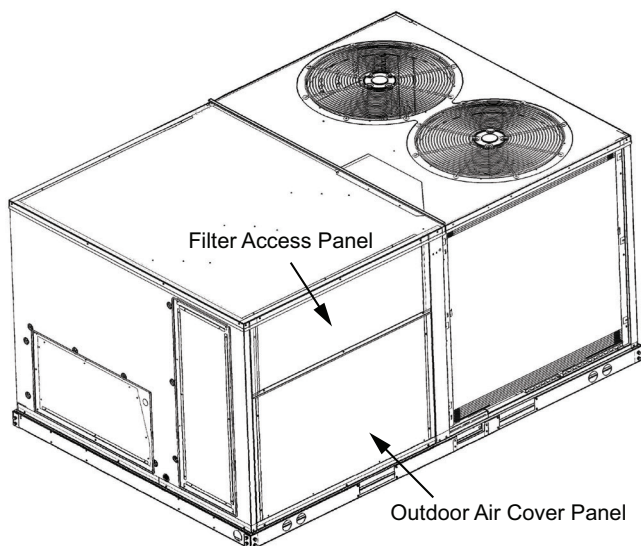
1. Remove hood package from the carton. See Figure 1, page 4.
2. Assemble the hood. See Figure 2, page 4.
  - a. Fasten side A and side B to the hood top.
  - b. Fasten the center divider in place using the prepunched holes to guide its placement.
  - c. Place aluminum filter at the bottom of the center divider and hold in place using the filter clips preinstalled on the hood top.

**Figure 2. Hood assembly**



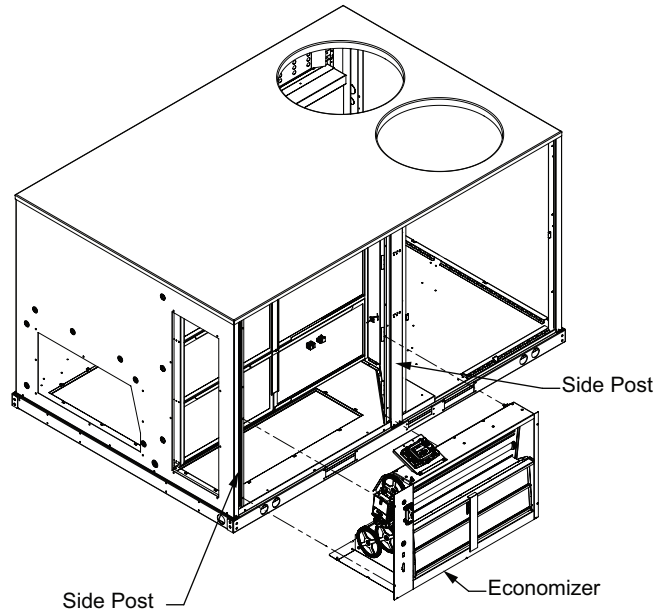
3. Remove filter access panel and outdoor air cover panel. Retain unit screws for attaching economizer and hood. See Figure 3, page 4.

**Figure 3. Unit**



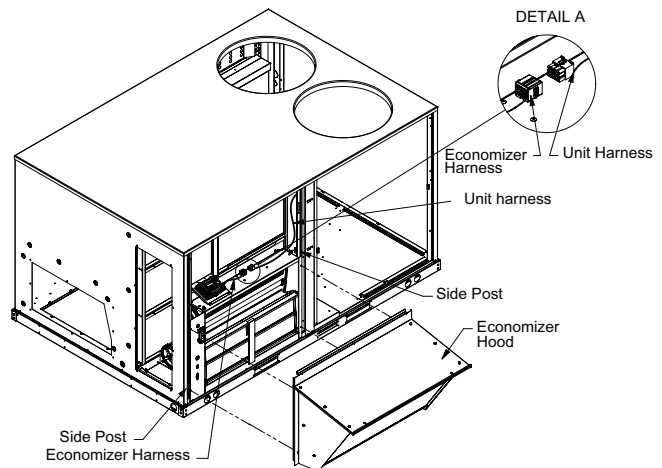
4. Install economizer assembly over the vertical return air opening and attach the economizer to the side post using the existing holes in the unit and prepunched holes on the economizer. See Figure 4, page 4.

**Figure 4. Economizer assembly installation**



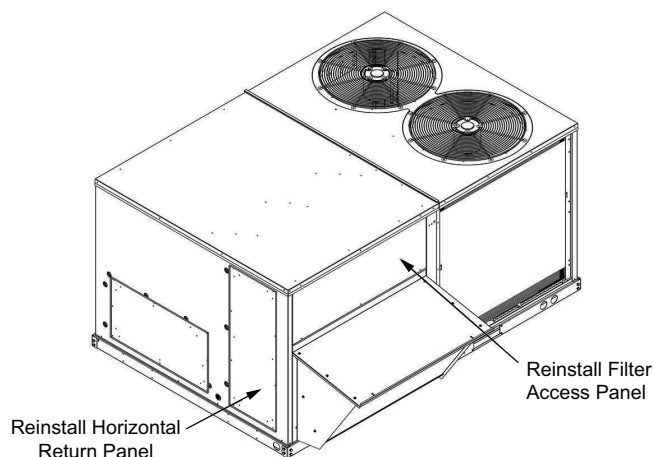
5. Connect the unit harness to the economizer harness. See the figure that follows. Additionally, connect the green, purple, white, and orange loose wires with plug 1/4-inch quick connects, next to the unit harness, to the green, purple, white, and orange socket 1/4-inch quick connects from the economizer controller harness. Install economizer hood over the economizer assembly. See Figure 5, page 4.

**Figure 5. Economizer harness connections**



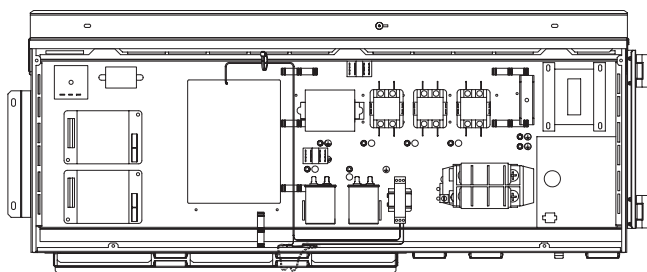
6. Reinstall the filter access panel. See Figure 6, page 5.
7. Remove the mixed air sensor and two wire purple and green wire harness from the parts bag. Remove the control box panel and supply air blower panel. Connect the two wire harness to the purple and green wires located in the low voltage control box. The white wire should be terminated to W1 on the unit control board, this can be done by cutting and stripping the end of the wire. The orange wire is

Figure 6. Filter access door installation



provided for a fault alarm relay or light. When the controllers AUX1-OUT is set to SYS, this wire will provide 24V when a fault is detected. See Figure 7, page 5.

Figure 7. Low voltage control box



- Route the two wire purple and green wire harness into the supply air blower section and attach the mixed air sensor to the supply blower. Confirm the screw does not interfere with the blower operation. Connect the wires to the mixed air sensor. See Figure 8, page 5.

Figure 8. Supply fan blower section



- Reinstall the supply air blower panel and the control box cover panel.
- Read the economizer controller section to determine the setup for your application.

## Economizer Controller

### NOTICE

#### Electrostatic Discharge!

Electrostatic discharge can short equipment circuitry. Ensure that you are properly grounded before handling sensitive electronic equipment.

#### Notes:

- Upon power up or after a power outage or brownout (or if power goes below 18 Vac), the controller begins a **five minute** power up delay before enabling mechanical cooling. Power must be above 18 Vac for the delay to become functional.
- The controller will be in Setup mode for the first 60 minutes after powered. If a sensor for outside air or one of the Sylk bus devices (sensor or actuator) is disconnected during the set up mode, the controller will not alarm that failure. The mixed air temperature sensor is a system critical sensor, if it is removed during the set up mode the controller

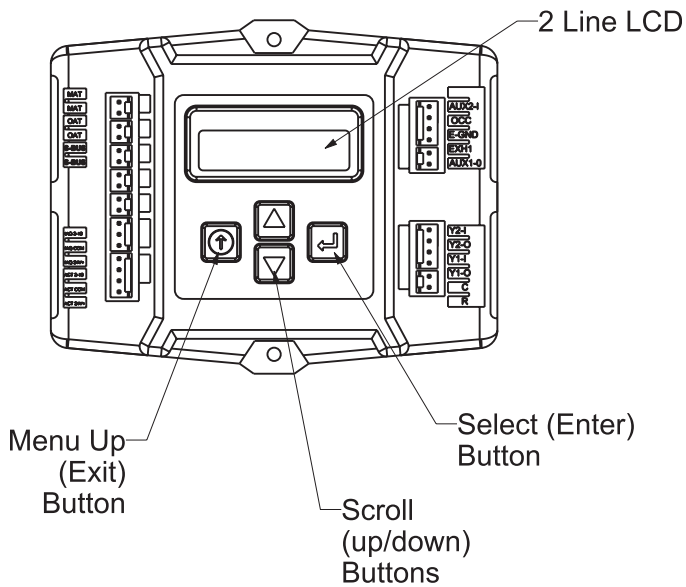
will alarm. After 60 minutes the controller will change to Operation mode and all components removed or failed will alarm in the operation mode.

- The terminals on MAT, OAT and S-BUS sensors are polarity insensitive.

### Controller User Interface and Keypad

The user interface consists of an LCD display and a 4-button keypad on the front of the economizer module. The LCD is a 16 character by 2 line dot matrix display.

**Figure 9. Controller user interface and keypad**



**Table 2. Economizer module – left hand terminal blocks**

Label	Type	Description
<b>Top Left Terminal Block</b>		
MAT MAT	20k NTC and COM	Mixed Air Temperature Sensor (polarity insensitive connection)
OAT OAT	20k NTC and COM	Outdoor Air Temperature Sensor (polarity insensitive connection)
S-BUS S-BUS	SYLK Bus	Sylk Bus Sensor (polarity insensitive connection)
<b>Bottom Left Terminal Block</b>		
IAQ 2-10	2-10 Vdc	Air Quality Sensor Input (e.g. CO2 sensor)
IAQ COM	COM	Air Quality Sensor Common
IAQ 24V	24 Vac	Air Quality Sensor 24 Vac Source
ACT 2-10	2-10 Vdc	Damper Actuator Output (2-10 Vdc)
ACT COM	COM	Damper Actuator Output Common
ACT 24V	24 Vac	Damper Actuator 24 Vac Source
	n/a	The last pin is not used

**Table 3. Economizer module – right hand terminal blocks**

Label	Type	Description
<b>Top Right Terminal Block</b>		
	n/a	The first pin is not used
AUX2 I	24 Vac IN	Shut Down (SD) or Heat (W) Conventional only or Heat Pump Changeover (O/B) in Heat Pump mode
OCC	24 Vac IN	Occupied / Unoccupied Input
E-GND	EGND	Earth Ground - System Required
EXH1	24 Vac OUT	Exhaust Fan 1 Output
AUX1 O	24 Vac OUT	Programmable: Exhaust fan 2 Output or ERV or System Alarm output
<b>Bottom Right Terminal Block</b>		
Y2-I	24 Vac IN	Y2 in - Cooling Stage 2 Input from Space Thermostat
Y2-O	24 Vac OUT	Y2 out - Cooling Stage 2 Output to Stage 2 Mechanical Cooling
Y1-I	24 Vac IN	Y1 in - Cooling Stage 1 Input from Space Thermostat
Y1-O	24 Vac OUT	Y1 out - Cooling Stage 1 Output to Stage 1 Mechanical Cooling
C	COM	24 Vac Common
R	24 Vac	24 Vac Power (Hot)

## Use of the Keypad When Working with Menus

- Navigate to the desired menu.
- Press the ↵ button (Enter) to display the first item in the currently displayed menu.
- Use the Δ and ▽ buttons to scroll to the desired parameter.
- Press the ↵ button (Enter) to display the value of the currently displayed item.
- Press the Δ button to increase (change) the displayed parameter value.
- Press the ▽ button to decrease (change) the displayed parameter value.

**Note:** When values are displayed, pressing and holding the Δ or ▽ buttons causes the display to automatically increment.

- Press the ↵ button to accept the displayed value and store it in non-volatile RAM.
- 'CHANGE STORED' displays.
- Press the ⬆ button (Menu Up) to return to the menu list.

## Time-out and Screensaver

When no buttons have been pressed for 10 minutes, the LCD displays a screensaver, which cycles through the Status items. Each Status item displays in turn and cycles to the next item after 5 seconds.

## Controller Menu Structure

**Important:** Table 4, page 7 illustrates the complete hierarchy. Your menu parameters will be different depending on your configuration. For example if you do not have a DCV (CO2) sensor, then none of the DCV parameters appear and only MIN POS will display. If you have a CO2 sensor, the DCV MIN and DCV MAX will appear AND if you have 2 speed fan DCV MIN (high and low speed) and DCV MAX (high and low speed) will appear.

The menus in display order are:

- STATUS
- SETPOINTS
- SYSTEM SETUP
- ADVANCED SETUP
- CHECKOUT
- ALARMS

**Table 4. Controller menu structure**

Menu	Parameter	Parameter Default Value	Parameter Range and Increment <sup>(a)</sup>	Parameter Recommended Value <sup>(b)</sup>	Notes
STATUS	ECON AVAIL <sup>(c)</sup>	NO	YES/NO	N/A	YES = economizing available; the system can use Outdoor Air for free cooling when required.
	ECONOMIZING <sup>(c)</sup>	NO	YES/NO	N/A	YES = Outdoor Air being used for 1st stage cooling.
	OCCUPIED <sup>(c)</sup>	NO	YES/NO	N/A	YES = OCC signal received from space thermostat or unitary controller. YES = 24 Vac on terminal OCC No = 0 Vac on terminal OCC.
	HEAT PUMP	N/A	COOL HEAT	N/A	HEAT PUMP is not available.
	COOL Y1-IN <sup>(c)</sup>	OFF	ON/OFF	N/A	Y1-I signal from space thermostat or unitary controller for cooling stage 1. ON = 24 Vac on term Y1-I OFF = 0 Vac on term Y1-I
	COOL Y1-OUT <sup>(c)</sup>	OFF	ON/OFF	N/A	Cool Stage 1 Relay Output to mechanical cooling (Y1-OUT terminal).
	COOL Y2-IN <sup>(c)</sup>	OFF	N/A	N/A	COOL Y2-IN is not available.
	COOL Y2-OUT <sup>(c)</sup>	OFF	N/A	N/A	COOL Y2-OUT is not available.
	MA TEMP <sup>(c)</sup>	___.°F	-40 to 140°F	N/A	Displays value of measured mixed air from MAT sensor. Displays -.- if not connected, short, or out-of-range.
	DA TEMP	___.°F	-40 to 140°F	N/A	DA TEMP is not available.
	OA TEMP <sup>(c)</sup>	___.°F	-40 to 140°F	N/A	Displays measured value of outdoor air temperature. Displays -°F if sensor sends invalid value, if not connected, short or out-of-range.
	OA HUM <sup>(c)</sup>	__ %	0 to 100%	N/A	Displays measured value of outdoor humidity from OA Sylk Bus sensor. Displays -% if not connected, short, or out-of-range.
RA TEMP <sup>(c)</sup>	___.°F	0 to 140°F	N/A	Displays measured value of return air temperature from RA Sylk Bus sensor. Displays -°F if sensor sends invalid value, if not connected, short or outof- range.	

Menu	Parameter	Parameter Default Value	Parameter Range and Increment <sup>(a)</sup>	Parameter Recommended Value <sup>(b)</sup>	Notes
STATUS	RA HUM <sup>(c)</sup>	-- %	0 to 100%	N/A	Displays measured value of return air humidity from RA Sylk Bus sensor. Displays --% if sensor sends invalid value, if not connected, short or outof- range.
	IN CO2 <sup>(c)</sup>	--- ppm	0 to 2000 ppm	N/A	Displays value of measured CO2 from CO2 sensor. Invalid if not connected, short or out-of-range. May be adjusted in Advanced menu by Zero offset and Span. 0-10 Vdc CO2 sensors require CO2 ZERO to be 400 and CO2 SPAN to be 1600 in Advanced Setup menu.
	DCV STATUS <sup>(c)</sup>	N/A	ON/OFF	N/A	Displays ON if above setpoint and OFF if below setpoint, and ONLY if a CO2 sensor is connected.
	DAMPER OUT <sup>(c)</sup>	2.0 V	2.0 to 10.0 V	N/A	Displays output voltage or position to the damper actuator. <sup>(d)</sup>
	ACT POS <sup>(c)</sup>	N/A	0 to 100%	N/A	Displays actual position of actuator.
	ACT COUNT <sup>(c)</sup>	N/A	1 to 65,535	N/A	Displays number of times actuator has cycled. 1 Cycle equals the sum of 180° of movement in any direction.
	ACTUATOR <sup>(c)</sup>	N/A	OK/Alarm (on Alarm menu)	N/A	Displays Error if voltage or torque is below actuator range.
	EXH1 OUT <sup>(c)</sup>	OFF	ON/OFF	N/A	Output of EXH1 terminal. Displays ON when damper position reaches programmed percentage setpoint. ON = 24 Vac Output; OFF = No Output.
	EXH2 OUT	OFF	ON/OFF	N/A	EXH2 OUT is not available.
	ERV	OFF	ON/OFF	N/A	ERV is not available.
	MECH COOL ON <sup>(c)</sup>	0	0, 1, or 2	N/A	Displays number of mechanical cooling stages that are active.
	FAN SPEED <sup>(c)</sup>	N/A	LOW or HIGH	N/A	Displays speed of fan on a 2-speed fan unit.
W (HEAT IN) <sup>(c)</sup>	N/A	ON/OFF	N/A	Displays status of heat on a 2-speed fan unit.	
SETPOINTS	MAT SET <sup>(c)</sup>	53°F	38 to 70°F; increment by 1	53°F	The economizer will modulate the OA damper to maintain the mixed air temperature at the setpoint.
	LOW T LOCK <sup>(c)</sup>	32°F	-45 to 80°F; increment by 1	32°F	Setpoint determines outdoor temperature when the mechanical cooling cannot be turned on. Commonly referred to as the Compressor lockout. At or below the setpoint the Y1-O will not be energized on the controller.
	DRYBLB SET <sup>(c)</sup>	63°F	48 to 80°F; increment by 1	67°F	Setpoint determines where the economizer will assume outdoor air temperature is good for free cooling; e.g.; at 63°F setpoint unit will economize at 62°F and below and not economize at 64 °F and above. There is a 2°F deadband.
	ENTH CURVE <sup>(c)</sup>	ES3	ES1, ES2, ES3, ES4, or ES5	ES3	Enthalpy boundary “curves” for economizing using single enthalpy. See Table 9, p. 17 for description of enthalpy curves.
	DCV SET <sup>(c)</sup>	1100ppm	500 to 2000 ppm increment by 100	1100 ppm	Displays ONLY if a CO2 sensor is connected. Setpoint for Demand Control Ventilation of space. Above the setpoint, the OA dampers will modulate open to bring in additional OA to maintain a space ppm level below the setpoint.

Menu	Parameter	Parameter Default Value	Parameter Range and Increment <sup>(a)</sup>	Parameter Recommended Value <sup>(b)</sup>	Notes
SETPOINTS	MIN POS <sup>(c)</sup>	2.8V	2 to 10 Vdc	2.8V/3.2V LO/ 2.8V HI	Displays ONLY if a CO2 sensor is NOT connected. With 2-speed fan units MIN POS L (low speed fan) and MIN POS H (high speed fan) settings are required. Default for MIN POS L is 3.2V and MIN POS H is 2.8V.
	VENTMAX <sup>(c)</sup>	2.8V	2 to 10 Vdc or 100 to 9990 cfm increment by 10	2.8V/3.2V LO/2.8V HI	Displays only if a CO2 sensor is connected. Used for Vbz (ventilation max cfm) setpoint. VENTMAX is the same setting as MIN POS would be if you did not have the CO2 sensor. Displays 2 to 10 V if <3 sensors (RA, OA and MA). In DCV CAL ENABLE AUTO mode dampers controlled by CFM With 2-speed fan units VENTMAX L (low speed fan) and VENTMAX H (high speed fan) settings are required. Default for VENTMAX L is 3.2V and VENTMAX H is 2.8V.
	VENTMIN <sup>(c)</sup>	2.25 V	2 to 10 Vdc or 100 to 9990 cfm increment by 10	2.25V/2.5V LO/ 2.25V HI	Displays only if CO2 sensor is connected. Used for Va (ventilation min cfm) setpoint. This is the ventilation for less than maximum occupancy of the space. Displays 2 to 10 V if <3 sensors (RA,OA and MA). Va is only set if DCV is used. In DCV CAL ENABLE AUTO mode dampers controlled by CFM With 2- speed fan units VENTMIN L (low speed fan) and VENTMIN H (high speed fan) settings are required. Default for VENTMIN L is 2.5V and VENTMIN H is 2.25V.
	ERV OAT SP	32°F	0 to 50°F; increment by 1	N/A	ERV OAT SP is not available.
	EXH1 SET <sup>(c)</sup>	50%	1 to 100%; increment by 1	50%/65% LO/ 50% HI	Setpoint for OA damper position when exhaust fan 1 is powered by the economizer. With 2-speed fan units Exh1 L (low speed fan) and Exh1 H (high speed fan) settings are required. Default for Exh1 L is 65% and Exh1 H is 50%.
	EXH2 SET	75%	0 to 100%; increment by 1	N/A	EXH2 SET is not available.
SYSTEM SETUP	INSTALL <sup>(c)</sup>	1/1/2011		Present date	Display order = MM/DD/YY Setting order = DD, MM, then YY.
	UNITS DEG <sup>(c)</sup>	°F	°F or °C	°F	Sets economizer controller in degrees Fahrenheit or Celsius.
	EQUIPMENT <sup>(c)</sup>	CONV	CONV HP	CONV	CONV = conventional. HP is not available.
	AUX2 I <sup>(c)</sup>	N/A	Shutdown (SD) Heat (W1) HP(O) HP(B)	Heat (W1)	In CONV mode: SD = Enables configuration of shutdown (default); W = Informs controller that system is in heating mode. <b>Note:</b> If using 2-speed fan mode, you must program CONV mode for W. Shutdown is not available in the two-speed fan mode. In HP O/B mode: HP(O) = energize heat pump on Cool (default); HP(B) = energize heat pump on Heat.

Menu	Parameter	Parameter Default Value	Parameter Range and Increment <sup>(a)</sup>	Parameter Recommended Value <sup>(b)</sup>	Notes
SYSTEM SETUP	FAN SPEED <sup>(c)</sup>	1 speed	1 speed/ 2 speed	See unit nameplate: Digit 15 = 0 or 1 -1 speed; Digit 15 = 7 or 9 - 2 speed	Sets economizer controller for operation of 1 speed or 2 speed supply fan. The controller does not control the fan but positions the OA and RA dampers to the heating or cooling mode. See page 13 for modes and position. <b>Note:</b> 2-speed fan option also needs Heat (W1) programmed in AUX 2 In.
	FAN CFM <sup>(c)</sup>	5000cfm	100 to 15000 cfm; increment by 100	5000 cfm	This is the capacity of the RTU. The value is found in the Unit Catalog. The cfm of the fan is only used with DCV CAL ENABLE AUO.
	AUX1 OUT	NONE	NONE ERV EXH2 SYS	NONE	AUX1 OUT is a programmable output used for System Alarm output.
	OCC <sup>(c)</sup>	INPUT	INPUT or ALWAYS	ALWAYS	When using a setback thermostat with occupancy out (24 Vac), the 24 Vac is input "INPUT" to the OCC terminal. If no occupancy output from the thermostat then change program to "ALWAYS" OR add a jumper from terminal R to OCC terminal.
	FACTORY DEFAULT <sup>(c)</sup>	NO	NO or YES	NO	Resets all set points to factory defaults when set to YES. LCD will briefly flash YES and change to NO but all parameters will change to factory default values.
ADVANCED SETUP	MA LO SET <sup>(c)</sup>	45°F	35 to 55°F; increment by 1°F	45°F	Temp to activate Freeze Protection (close damper or modulate to MIN POS if temp falls below set value).
	FREEZE POS <sup>(c)</sup>	CLO	CLO MIN	CLO	Damper position when freeze protection is active (closed or MIN POS).
	CO2 ZERO <sup>(c)</sup>	0ppm	0 to 500 ppm; increment by 10	0ppm	CO2 ppm level to match CO2 sensor start level. 0-10 Vdc CO2 sensors require CO2 ZERO to be 400.
	CO2 SPAN <sup>(c)</sup>	2000ppm	1000 to 3000 ppm; increment by 50	2000 ppm	CO2 ppm span to match CO2 sensor; e.g.; 500-1500 sensor output would be 500 CO2 zero and 1000 CO2 span. 0-10 Vdc CO2 sensors require CO2 SPAN to be 1600.
	STG3 DLY	2.0h	0 min, 5 min, 15 min, then 15 min intervals. Up to 4h or OFF	2.0h	Delay after stage 2 for cool has been active. Turns on 2nd stage of mechanical cooling when economizer is 1st stage call and mechanical cooling is 2nd stage call. Allows three stages of cooling, 1 economizer and 2 mechanical. OFF = no Stage 3 cooling.
	SD DMPR POS	CLO	CLO OPN	CLO	Indicates shutdown signal from space thermostat or unitary controller. When controller receives 24 Vac input on the SD terminal in conventional mode, the OA damper will open if programmed for OPN and OA damper will close if programmed for CLO. All other controls, e.g., Y1-O, EXH1, etc. will shut off.
DCVCAL ENA	MAN	MAN (manual) AUTO	MAN	Turns on the DCV automatic control of the dampers. Resets ventilation based on the RA, OA and MA sensor conditions. Requires all sensors (RA, OA, MA and CO2). This operation is not operable with a 2-speed fan unit.	

Menu	Parameter	Parameter Default Value	Parameter Range and Increment <sup>(a)</sup>	Parameter Recommended Value <sup>(b)</sup>	Notes
ADVANCED SETUP	MAT T CAL <sup>(c)</sup>	0.0 F°	(+/-2.5°F)	0.0 F°	Allows for the operator to adjust for an out of calibration temperature sensor.
	OA T CAL <sup>(c)</sup>	0.0 F°	(+/-2.5°F)	0.0 F°	Allows for the operator to adjust for an out of calibration temperature sensor.
	OA H CAL <sup>(c)</sup>	0% RH	(+/-10% RH)	0% RH	Allows for the operator to adjust for an out of calibration humidity sensor.
	RA T CAL <sup>(c)</sup>	0.0 F°	(+/-2.5°F)	0.0 F°	Allows for the operator to adjust for an out of calibration temperature sensor.
	RA H CAL <sup>(c)</sup>	0% RH	(+/-10% RH)	0% RH	Allows for the operator to adjust for an out of calibration humidity sensor.
	DA T CAL <sup>(c)</sup>	0.0 F°	(+/-2.5°F)	0.0 F°	DA T CAL is not available.
	2SP FAN DELAY <sup>(c)</sup>	5 Minutes	0 to 20 minutes in 1 minute increments.	5 Minutes	When in economizing mode this is the delay for the high speed fan to try to satisfy the call for second stage cooling before the first stage mechanical cooling is enabled.
CHECKOUT	DAMPER VMIN-HS	N/A	N/A	N/A	Positions damper to VMIN position.
	DAMPER VMAX-HS (LS) <sup>(c)</sup>	N/A	N/A	N/A	Positions damper to VMAX position. With 2-speed fan units the damper will position to VMAX low speed fan.
	DAMPER OPEN <sup>(c)</sup>	N/A	N/A	N/A	Positions damper to the full open position. Exhaust fan contacts enable during the DAMPER OPEN test. Make sure you pause in this mode to allow for exhaust contacts to energize due to the delay in the system.
	DAMPER CLOSE <sup>(c)</sup>	N/A	N/A	N/A	Positions damper to the fully closed position.
	CONNECT Y1-O <sup>(c)</sup>	N/A	N/A	N/A	Closes the Y1-O relay (Y1-O). See Step
	CONNECT Y2-O <sup>(c)</sup>	N/A	N/A	N/A	N/A
	CONNECT AUX1-O <sup>(c)</sup>	N/A	N/A	N/A	CONNECT AUX1 O energizes the AUX1-O output. If AUX1-O setting is: <ul style="list-style-type: none"> <li>NONE — No action taken</li> <li>ERV — 24 Vac out. Turns on or signals an ERV that the conditions are not good for economizing but are good for ERV operation.</li> <li>SYS — 24 Vax out. Issues a system alarm.</li> </ul>
	CONNECT EXH1 <sup>(c)</sup>	N/A	N/A	N/A	Closes the power exhaust fan 1 relay (EXH1).
ALARMS( <u>  </u> ) <sup>(e)</sup>	MAT SENS ERR	N/A	N/A	N/A	
	CO2 SENS ERR <sup>(c)</sup>	N/A	N/A	N/A	
	OAT SENS ERR <sup>(c)</sup>	N/A	N/A	N/A	
	DA ENTHL ERR	N/A	N/A	N/A	DA ENTHL ERR is not available.
	SYS ALARM	N/A	N/A	N/A	When AUX1-O is set to SYS and there is any alarm the AUX1-O terminal has 24 Vac out.
	ACT UNDER V <sup>(c)</sup>	N/A	N/A	N/A	Voltage received by Actuator is above expected range.
	ACT OVER V <sup>(c)</sup>	N/A	N/A	N/A	Voltage received by Actuator is below expected range.
	ACT STALLED <sup>(c)</sup>	N/A	N/A	N/A	Actuator stopped before achieving commanded position.

## Installer's Guide

- (a) When values are displayed, pressing and holding the Up or Down button causes the display to automatically increment.
- (b) N/A = Not Applicable
- (c) This parameter is directly associated with the LLE economizer.
- (d) The Honeywell communicating actuator will report in XX.X% open versus XX.X Vdc for damper out.
- (e) Alarms display only when they are active. The menu title "ALARMS (\_)" includes the number of active alarms in parenthesis ().

## Sequence of Operation

**Table 5. Dry bulb operation no DCV (CO2 sensor) – 1 speed fan**

DCV	OA Good to economize?	Y1-I	FAN SPD	Y1-O	Occupied	Unoccupied
None	None	Off	High	0-v/Off	MIN POS	Closed
		On	High	24-v/On	MIN POS	Closed
None	Yes	Off	High	0-v/Off	MIN POS	Closed
		On	High	0-v/Off	MIN POS to Full-Open	Closed to Full-Open
		On	High	24-v/On	MIN POS to Full-Open	Closed to Full-Open

**Table 6. Dry bulb operation with DCV (CO2 sensor) – 1 speed fan**

DCV	OA Good to economize?	Y1-I	FAN SPD	Y1-O	Occupied	Unoccupied
Below CO2 set	No	Off	High	0-v/Off	VENTMIN	Closed
		On	High	24-v/On	VENTMIN	Closed
	Yes	Off	High	0-v/Off	VENTMIN	Closed
		On	High	0-v/Off	VENTMIN to Full-Open	Closed to Full-Open
		On	High	24-v/On	VENTMIN to Full-Open	Closed to Full-Open
Above CO2 set	No	Off	High	0-v/Off	VENTMIN to VENTMAX	Closed
		On	High	24-v/On	VENTMIN to VENTMAX	Closed
	Yes	Off	High	0-v/Off	VENTMIN to VENTMAX	Closed
		On	High	0-v/Off	VENTMIN to Full-Open	Closed to Full-Open
		On	High	24-v/On	VENTMIN to Full-Open	Closed to Full-Open

**Table 7. Enthalpy operation no DCV (CO2 sensor) – 1 speed fan**

DCV	OA Good to economize?	Y1-I	FAN SPD	Y1-O	Occupied	Unoccupied
None	None	Off	High	0-v/Off	MIN POS	Closed
		On	High	24-v/On	MIN POS	Closed
None	Yes	Off	High	0-v/Off	MIN POS	Closed
		On	High	0-v/Off	MIN POS to Full-Open	Closed to Full-Open
		On	High	24-v/On	MIN POS to Full-Open	Closed to Full-Open

**Table 8. Enthalpy operation with DCV (CO2 sensor) – 1 speed fan**

DCV	OA Good to economize?	Y1-I	FAN SPD	Y1-O	Occupied	Unoccupied
Below CO2 set	No	Off	High	0-v/Off	VENTMIN	Closed
		On	High	24-v/On	VENTMIN	Closed
	Yes	Off	High	0-v/Off	VENTMIN	Closed
		On	High	0-v/Off	VENTMIN to Full-Open	Closed to Full-Open
		On	High	24-v/On	VENTMIN to Full-Open	Closed to Full-Open
Above CO2 set	No	Off	High	0-v/Off	VENTMIN to VENTMAX	Closed
		On	High	24-v/On	VENTMIN to VENTMAX	Closed
	Yes	Off	High	0-v/Off	VENTMIN to VENTMAX	Closed
		On	High	0-v/Off	VENTMIN to Full-Open	Closed to Full-Open
		On	High	24-v/On	VENTMIN to Full-Open	Closed to Full-Open

### Initiation of Operating Modes

The JADE controller is able to initiate the following modes:

- Compressor
- Economizer
- Fans
- Heating System
- Cooling System

The Compressor mode is initiated by either the OAT going above the DRYBLB SET setting or by the thermostat initiating a call to cool when the damper is at 100% open. The Economizer mode is controlled by the MAT getting above the MAT SET setting while the OAT is below the DRYBLB SET setting. While the fans are not controlled by the controller, the Fan mode is dependent on what state the system is in (OCC or Y1 states will cause the damper to go to a LOW fan speed damper setting, while W state will cause the controller to open the damper to the HIGH fan speed damper setting). The Heating System mode requires an input to the AUX2-1 terminal from the thermostat, and the Cooling System mode requires an input to the Y1 IN terminals from the thermostat.

### Economizer Setup and Configuration (Field and Factory Installed Option)

Before being placed into service the controller must be setup and configured for the installed system.

**Important:** During setup, the economizer controller is live at all times.

1. Using the keypad on the controller scroll through the Setpoints, System Setup, and Advanced Setup menus and verify or set/change the parameters. See Table 4, page 7.
2. Install front filter access panel back on to unit and secure with previous screws.

**Notes:**

- The W (heating mode) is not controlled by the controller but it requires the status to know where to position the outside air damper for minimum position for the fan speed.
- All setpoints and advanced settings are restored after any power loss or interruption.

## Enthalpy Settings

### NOTICE

#### Electrostatic Discharge!

Electrostatic discharge can short equipment circuitry. Ensure that you are properly grounded before handling sensitive electronic equipment.

When the outside air temperature, enthalpy, and dew point are below the respective setpoints, the outdoor air can be used for economizing. See Figure 10, page 14.

**Note:** The controller calculates the enthalpy and dew point using the outside air temperature and humidity input from the outside air sensor.

1. There are 5 boundaries (setpoints ES1 through ES5), which are defined by dry bulb temperature, enthalpy and dew point. See Table 9, page 14.
2. When conditions are below the selected boundary, the economizer sets the economizing mode to YES and economizing is available. When conditions are above the selected boundary, the conditions are not good to economize and the mode is set to NO.

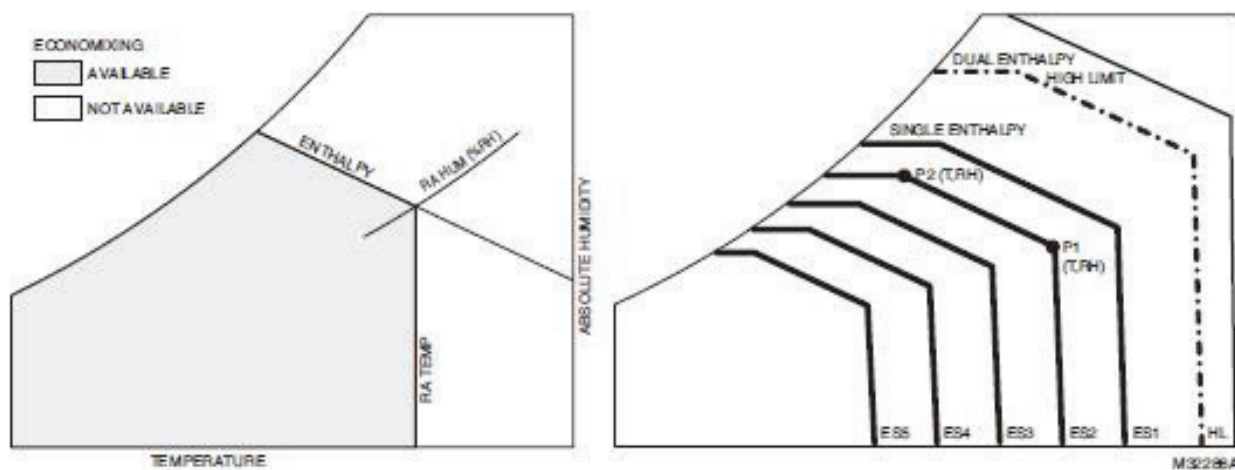
**Note:** When using the enthalpy (Sylk Bus) sensors, there will be a slight delay while the controller and the sensor communicate. Analog sensors do not communicate on the Sylk Bus and output a 20k ohm signal to the controller with an instantaneous response time.

Table 9. Single enthalpy and dual enthalpy boundaries (parameters ES1 through ES5)

Enth. Curve	Temp. dry Bulb (°F)	Temp. dew point (°F)	Enth. (btu/lb/da)	Temp. °F	Humid. %RH	Temp. °F	Humid.%RH
ES1	80	60	28	80	36.8	66.3	80.1
ES2	75	57	26	75	39.6	63.3	80
ES3	70	54	24	70	42.3	59.7	81.4
ES4	65	51	22	65	44.8	55.7	84.2
ES5	60	48	20	60	46.9	51.3	88.5
HL	86	66	32.4	86	38.9	72.4	80.3

**Note:** For differential enthalpy there is a high limit boundary. The high limit boundary is ES1 when there are no stages of mechanical cooling energized and HL when a compressor stage is energized.

Figure 10. Single enthalpy curve and boundaries



**Note:** When the OA temperature, OA humidity, and the OA dew point are all below the selected boundary, the economizer sets the economizing mode to YES (economizing is available).

### Powered Exhaust

To configure the LLE controller, set EXH1 SET in the SETPOINTS menu.

### CO2 Sensor

This optional sensor can be added for Demand Control Ventilation (DCV) functionality. To configure the JADE controller, set the following parameters:

SETPOINTS Menu:

DCV SET = desired CO2 ppm to start DCV

VENTMAX = desired maximum position w/DCV & occupied status

VENTMIN = desired minimum position w/DCV & occupied status

ADVANCED SETUP Menu:

CO2 ZERO = set to detector's start level

CO2 SPAN = detector's max level minus start level  
Attach the sensor to the CO2 and "R" terminals (at customer connections).

**Note:** When using any 0-10 Vdc CO2 sensor with the JADE you will need to set CO2 ZERO to 400 ppm and the CO2 SPAN to 1600 ppm in the ADVANCED SETUP menu.

### Occupancy Sensor

A customer-supplied occupancy sensor can also be added to provide damper control based on occupied/ unoccupied conditions. To configure the JADE controller, set:

SYSTEM SETUP menu: OCC = INPUT

Attach the occupancy sensor to the OCC SENSOR wire and "R" terminal (at customer connections). The occupancy sensor must utilize a normally open contact for proper operation.

If an occupancy sensor is not used, another option to controlling occupied and unoccupied status is to use the 'G' input (fan is running). Connect the G input to the OCC SENSOR wire (at customer connections). The controller will then operate in the occupied mode every time the indoor fan is running.

### Checkout

#### WARNING

##### Hazardous Voltage!

**Failure to disconnect power before servicing could result in death or serious injury. Disconnect all electric power, including remote disconnects before servicing. Follow proper lockout/tagout procedures to ensure the power can not be inadvertently energized. Verify that no power is present with a voltmeter.**

Inspect all wiring connections at the Economizer module's terminals, and verify compliance with the installation wiring diagrams.

For checkout, review the status of each configured parameter and perform the checkout tests.

### Power Up

After the module is mounted and wired, apply power.

### Power Up Delay

Upon power up (or after a power outage or brownout), the controller module begins a 5 minute power up delay before enabling mechanical cooling.

### Initial Menu Display

On initial start up, "Honeywell" displays on the first line and "Economizer W7220" on the second line. After a brief pause, the revision of the software appears on the first line and the second line will be blank.

### Power Loss

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

**Note:** If power goes below 18 Vac, the controller module assumes a power loss and the 5 minute power up delay will become functional when power returns above 18 Vac.

### Status

Use the Status menu (see Table 4, page 7) to check the parameter values for the various devices and sensors configured.

**Note:** See "Controller User Interface and Keypad," page 6 for information about menu navigation and use of the keypad.

### Checkout Tests

#### NOTICE

##### Compressor Damage!

Failure to ensure enough time for compressor start-up and shutdown between checkout tests could result in compressor damage.

Do not short-cycle compressors.

Use the Checkout menu (Table 4, p. 10) to test the damper operation and any configured outputs. Only items that are configured are shown in the Checkout menu.

To perform checkout tests:

1. Scroll to the desired test in the Checkout menu using the  $\Delta$  and  $\nabla$  buttons.
2. Press the  $\leftarrow$  button to select the item.
3. "RUN?" is displayed.
4. Press  $\leftarrow$  to start the test.
5. The unit pauses and then displays "IN PROGRESS".
6. When the test is complete, "DONE" appears.
7. When all parameters have been tested, press  $\text{\textcircled{P}}$  (Menu Up) to end the test (e.g. turn off the relay).

## Notes:

- The checkout tests can all be performed at the time of installation or any time during the operation of the system.
- To disable economizer for functional testing (optional), use 10 mm wrench to loosen shaft coupling on actuator. After testing, securely tighten coupling onto damper shaft using minimum 120 lb-in. (13.6 Nm) to maximum 180 lb-in. (20.3 Nm) torque.

## Troubleshooting

### WARNING

#### Hazardous Voltage!

Failure to disconnect power before servicing could result in death or serious injury. Disconnect all electric power, including remote disconnects before servicing. Follow proper lockout/tagout procedures to ensure the power can not be inadvertently energized. Verify that no power is present with a voltmeter.

### NOTICE

#### Compressor Damage!

Failure to ensure enough time for compressor start-up and shutdown between checkout tests could result in compressor damage. Do not short-cycle compressors.

The economizer controller provides alarm messages that display on the 2-line LCD.

If one or more alarms are present and there has been no keypad activity for at least 5 minutes, the Alarms menu displays and cycles through the active alarms.

You can also navigate to the Alarms menu at any time.




**Note:** Upon power up, the module waits 60 minutes before checking for alarms. This allows time for all the configured devices (e.g. sensors, actuator) to become operational. The exception is the MA sensor which will alarm immediately.

Table 10. FDD troubleshooting

TESTS	FAULTS				
	Air temp. sensor failure/fault	Not economizing when it should	Economizing when it should not	Damper not modulating	Excess outdoor air
Damper Stuck Open			x	x	x
Damper Stuck at Minimum		x		x	
Bad or Unplugged Actuator		x	x	x	
Sensor Hard Failure	x	x	x		x
Actuator Mechanically Disconnected		x	x	x	x

## To Clear an Alarm

Once the alarm has been identified and the cause has been removed (e.g. replaced faulty sensor), the alarm can be cleared from the display.

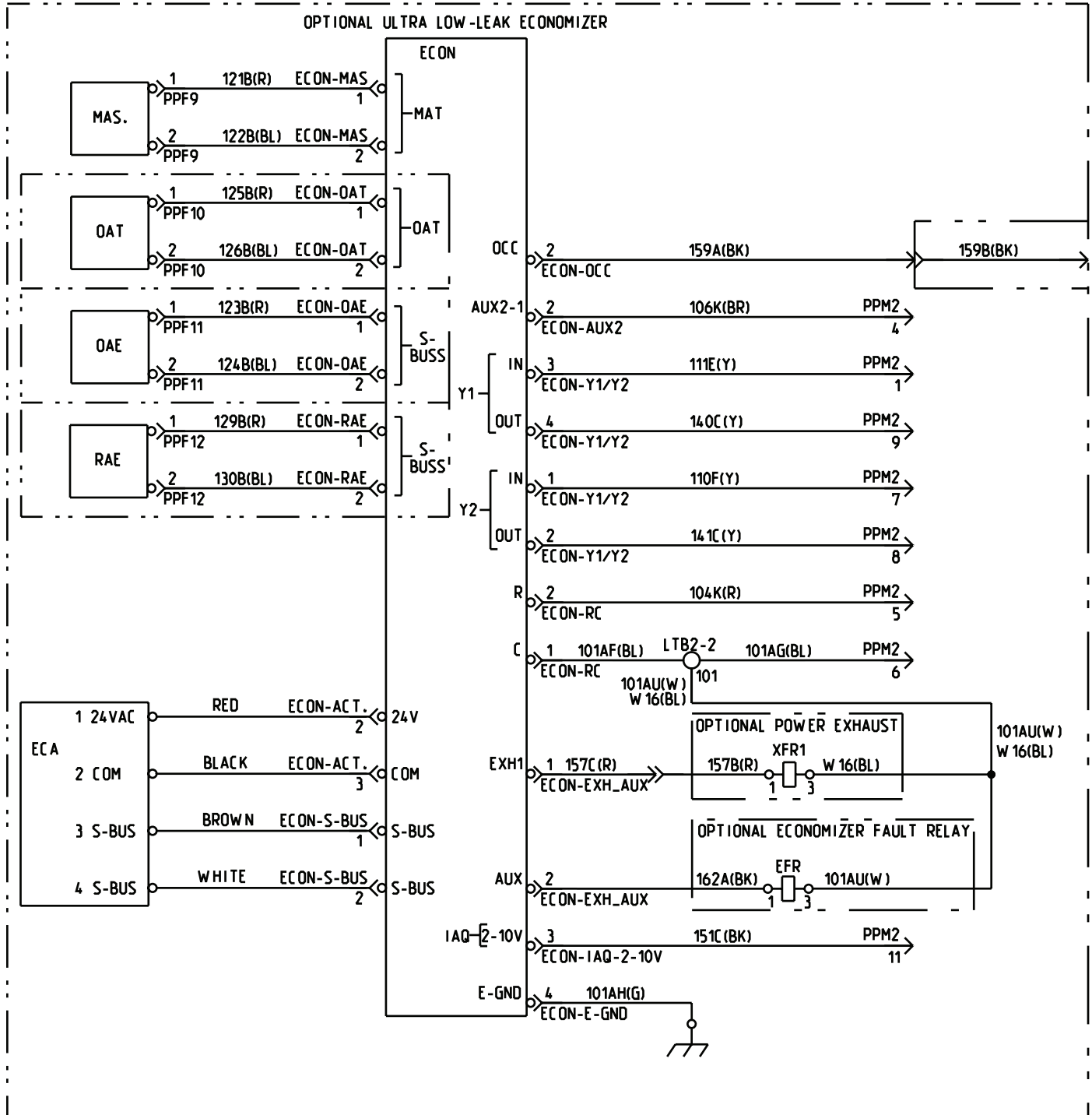
1. Navigate to the desired alarm.
2. Press .
3. "ERASE?" is displayed.
4. Press .
5. "ALARM ERASED" is displayed.
6. Press  (Menu Up) to complete the action and return to the previous menu.

**Note:** If an alarm still exists after you clear it, it redisplay within 5 seconds.

## Fault Detection and Diagnostics (FDD) Certification

The JADE controller is a certified FDD product (HJW10) by California Title 24, Part 6.

Figure 11. Ultra low leak economizer wiring diagram



Oxbox®, endorsed by Trane®, offers simple, affordable residential heating and cooling solutions strong enough to tackle the toughest conditions. For more information visit [www.oxboxhvac.com](http://www.oxboxhvac.com).

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The manufacturer has a policy of continuous data improvement and it reserves the right to change design and specifications without notice. We are committed to using environmentally conscious print practices.

*Representative-only illustrations included in this document.*

BX-SVN-JAYECON355-1A-EN 28 Sep 2023

Supersedes (New)

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# INSTALLATION INSTRUCTIONS

## 0 to 100% Standard Economizer – Horizontal

### JAYECON311\*

**USED WITH:**

Oxbox Cooling and Gas/ Electric  
7.5 to 12.5 Tons

**Models:**

J4PRC 090-150, J4PRG 090-150

## BX-SVN-JAYECON311-1A-EN



RECOGNIZE THIS SYMBOL AS AN INDICATION OF IMPORTANT SAFETY INFORMATION

 **WARNING**

These instructions are intended as an aid to qualified licensed service personnel for proper installation, adjustment and operation of this unit. Read these instructions thoroughly before attempting installation or operation. Failure to follow these instruction may result in improper installation, adjustment, service or maintenance possibly resulting in fire, electrical shock, property damage, personal injury or death.





**DO NOT DESTROY THIS MANUAL**  
Please read carefully and keep in a safe place for future reference by a serviceman.

## Safety Section

Safety advisories appear throughout this manual as required. Your personal safety and the proper operation of this machine depend upon the strict observance of these precautions.

The three types of advisories are defined as follows:

 <b>WARNING</b>	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
 <b>CAUTION</b>	Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury. It could also be used to alert against unsafe practices.
<b>NOTICE</b>	Indicates a situation that could result in equipment or property damage only accidents.

### Important Environmental Concerns

Scientific research has shown that certain man-made chemicals can affect the earth's naturally occurring stratospheric ozone layer when released to the atmosphere. In particular, several of the identified chemicals that may affect the ozone layer are refrigerants that contain Chlorine, Fluorine and Carbon (CFCs) and those containing Hydrogen, Chlorine, Fluorine and Carbon (HCFCs). Not all refrigerants containing these compounds have the same potential impact to the environment. Oxbox advocates the responsible handling of all refrigerants-including industry replacements for CFCs and HCFCs such as saturated or unsaturated HFCs and HCFCs.

### Important Responsible Refrigerant Practices

Oxbox believes that responsible refrigerant practices are important to the environment, our customers, and the air conditioning industry. All technicians who handle refrigerants must be certified according to local rules. For the USA, the Federal Clean Air Act (Section 608) sets forth the requirements for handling, reclaiming, recovering and recycling of certain refrigerants and the equipment that is used in these service procedures. In addition, some states or municipalities may have additional requirements that must also be adhered to for responsible management of refrigerants. Know the applicable laws and follow them.

## **WARNING**

### **Personal Protective Equipment (PPE) Required!**

Failure to wear proper PPE for the job being undertaken could result in death or serious injury. Technicians, in order to protect themselves from potential electrical, mechanical, and chemical hazards, **MUST** follow precautions in this manual and on the tags, stickers, and labels, as well as the instructions below:

- Before installing/servicing this unit, technicians **MUST** put on all PPE required for the work being undertaken (Examples; cut resistant gloves/sleeves, butyl gloves, safety glasses, hard hat/bump cap, fall protection, electrical PPE and arc flash clothing). **ALWAYS** refer to appropriate Safety Data Sheets (SDS) and OSHA guidelines for proper PPE.
- When working with or around hazardous chemicals, **ALWAYS** refer to the appropriate SDS and OSHA/GHS (Global Harmonized System of Classification and Labelling of Chemicals) guidelines for information on allowable personal exposure levels, proper respiratory protection and handling instructions.
- If there is a risk of energized electrical contact, arc, or flash, technicians **MUST** put on all PPE in accordance with OSHA, NFPA 70E, or other country-specific requirements for arc flash protection, **PRIOR** to servicing the unit. **NEVER PERFORM ANY SWITCHING, DISCONNECTING, OR VOLTAGE TESTING WITHOUT PROPER ELECTRICAL PPE AND ARC FLASH CLOTHING. ENSURE ELECTRICAL METERS AND EQUIPMENT ARE PROPERLY RATED FOR INTENDED VOLTAGE.**

## **WARNING**

### **Follow EHS Policies!**

Failure to follow instructions below could result in death or serious injury.

- All Oxbox personnel must follow the company's Environmental, Health and Safety (EHS) policies when performing work such as hot work, electrical, fall protection, lockout/tagout, refrigerant handling, etc. Where local regulations are more stringent than these policies, those regulations supersede these policies.
- Non-Oxbox personnel should always follow local regulations.

**⚠ WARNING**

**Proper Field Wiring and Grounding Required!**

Failure to follow code could result in death or serious injury. All field wiring **MUST** be performed by qualified personnel. Improperly installed and grounded field wiring poses **FIRE** and **ELECTROCUTION** hazards. To avoid these hazards, you **MUST** follow requirements for field wiring installation and grounding as described in NEC and your local/state/ national electrical codes.

**Pre-Installation**

**Unit Inspection**

To protect against loss due to damage incurred in transit, perform inspection immediately upon receipt of the unit.

**Exterior Inspection**

If the job site inspection reveals damage or material shortages, file a claim with the carrier immediately. Specify the type and extent of the damage on the bill of lading before signing. Notify the appropriate sales representative.

**Important:** Do not proceed with installation of a damaged unit without sales representative's approval.

- Visually inspect the complete exterior for signs of shipping damages to unit or packing material.
- Verify that the nameplate data matches the sales order and bill of lading.
- Verify that the unit is properly equipped and there are no material shortages.
- Verify that the power supply complies with the unit nameplate specifications.

**Inspection for Concealed Damage**

Visually inspect the components for concealed damage as soon as possible after delivery and before it is stored.

If concealed damage is discovered:

- Notify the carrier's terminal of the damage immediately by phone and by mail.
- Concealed damage must be reported within 15 days.
- Request an immediate, joint inspection of the damage with the carrier and consignee.
- Stop unpacking the unit.
- Do not remove damaged material from receiving location.

**General Information**

The barometric relief hood is sized to provide up to 100% relief. It is designed to meet low leak requirements to prevent infiltration of air when closed.

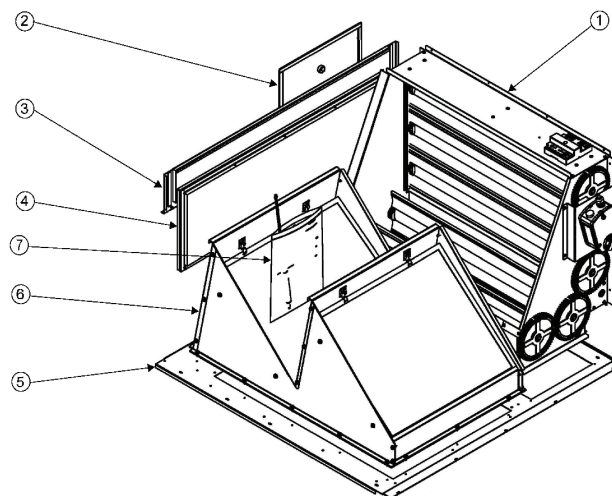
- Take photos of the damage, if possible.
- The owner must provide reasonable evidence that the damage did not occur after delivery.

**Parts List**

**Table 1. Economizer component list**

Component	Description
1	Economizer Assembly
2	R/A Blank Off
3	O/A Blank Off
4	Filter Access Door
5	O/A Cover Panel
6	Hood Assembly
7	Parts Bag
7a	Screw Bag
7b	Mixed Air Sensor
7c	Installation Instructions

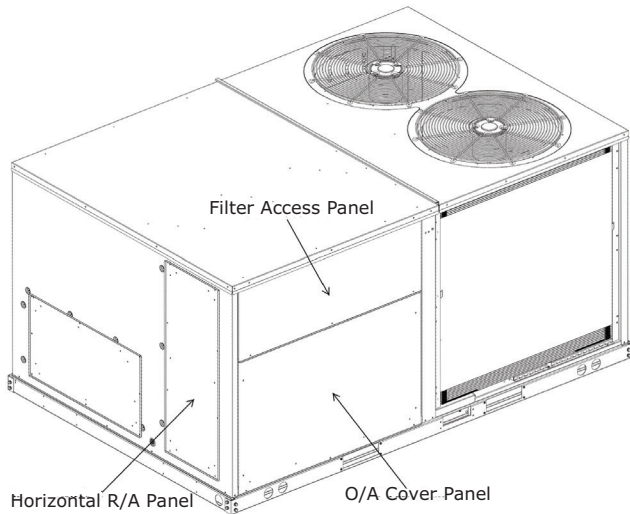
**Figure 1. Package contents JAYECON311\***



## Installation

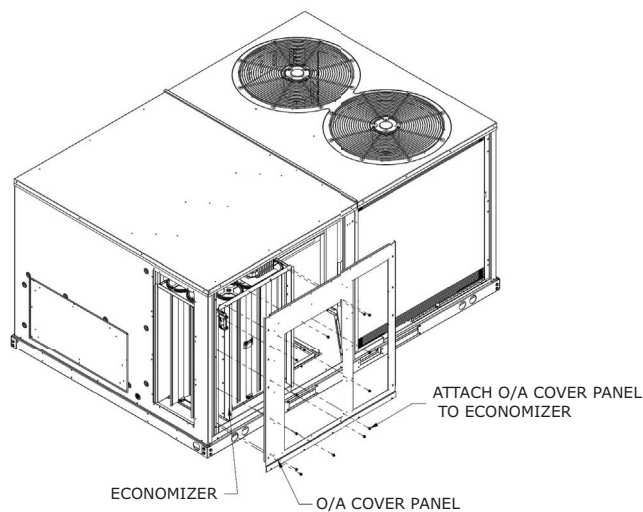
1. Remove all items from the carton. See Figure 1, page 3.
2. Remove Filter access panel, Horizontal R/A opening, and O/A cover panel from the RTU. Retain unit screws for attaching economizer and hood parts. See Figure 2, page 4.

**Figure 2. Unit image**



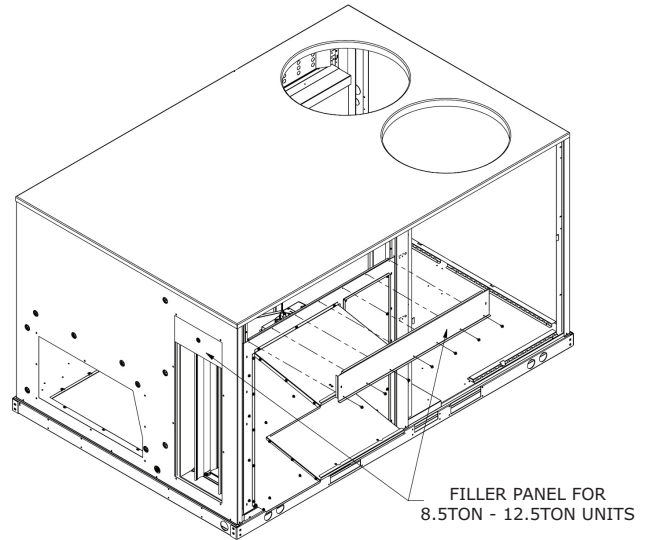
3. Install the horizontal R/A panel over the vertical return opening, then position the economizer assembly upright over the unit's vertical R/A opening and up against the horizontal R/A opening, next attach the O/A cover panel, that shipped with the economizer, over the RTU O/A opening and fasten it to the economizer. See Figure 3, page 4.

**Figure 3. Economizer assembly installation**



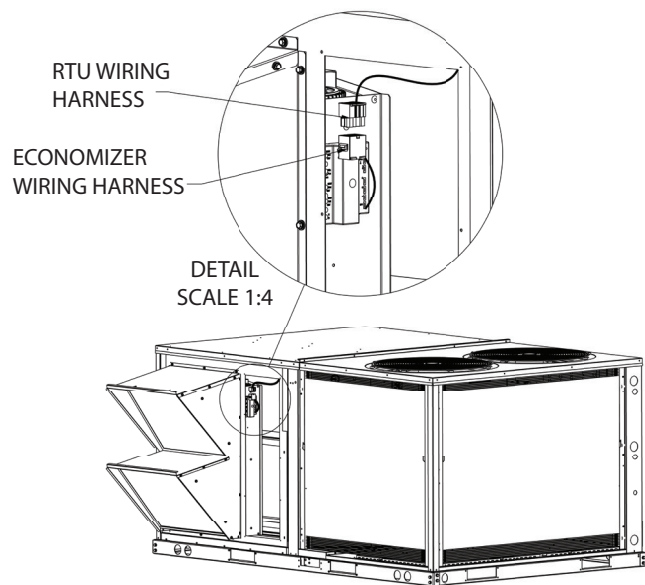
4. Install the provided hood on the O/A Cover panel, for 8.5T-12.5T units install the R/A and O/A blank off panels. See Figure 4, page 4.

**Figure 4. Hood installation**



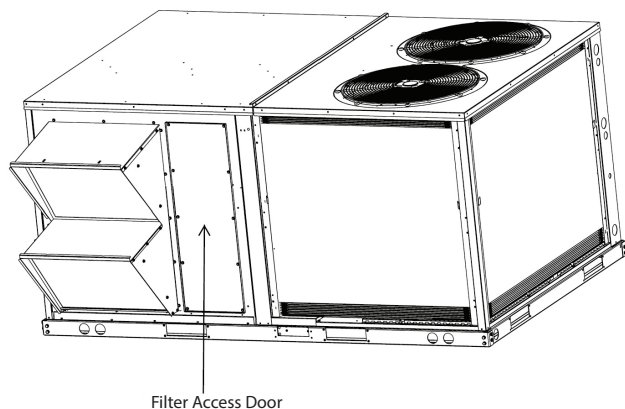
5. Connect the unit harness to the economizer harness. See Figure 5, page 4. Additionally, connect the green and purple loose wires with male 1/4-inch quick connects, next to the unit harness, to the green and purple female 1/4-inch quick connects from the economizer controller harness. See Figure 5, page 4.

**Figure 5. Economizer harness connections**



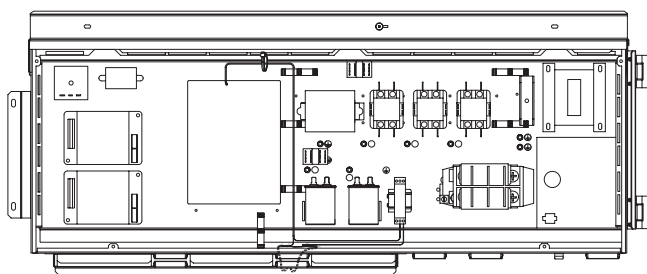
6. Install the filter access door, provided with the economizer assembly. See Figure 6, page 5.

**Figure 6. Filter access door installation**



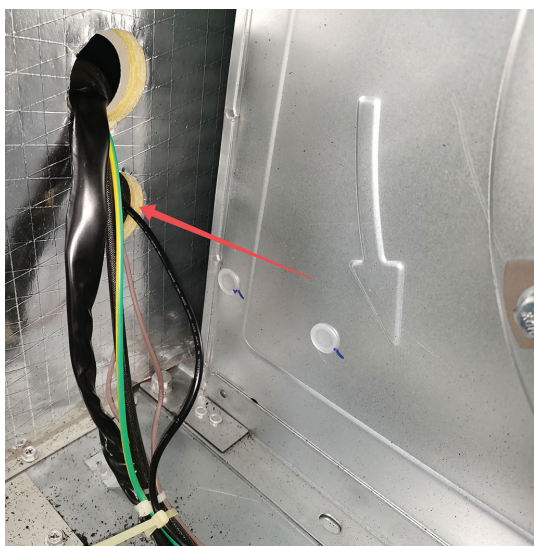
7. Remove the mixed air sensor and 2-wire purple and green wire harness from the parts bag. Remove the RTU control box panel and supply air blower panel. Connect the 2-wire harness to the purple and green wires located in the low voltage control box. See the Figure 7, page 5.

**Figure 7. Low voltage control box**



8. Route the 2-wire purple and green wire harness into the supply air blower section, attach the mixed air sensor to the supply blower (ensure the screw doesn't interfere with the blower operation), then connect the wires to the mixed air sensor. See Figure 8, page 5.

**Figure 8. Supply fan blower section**



9. Reinstall the supply air blower panel and the control box cover panel.
10. Read the economizer controller section to determine the setup for your application.

## Economizer Controller

### Operation

The purpose of the economizer is to use outdoor air for cooling, whenever possible, to reduce compressor operation.

Power at the N terminal determines the Occupied/Unoccupied setting:

— W7212:

- 24 Vac (Occupied)
- No power (Unoccupied)

**Note:** When module is operating in Occupied mode, the minimum position is defined by the potentiometers.

When the module is operating in Unoccupied mode, and there is no call for cooling, the damper drives fully closed. The system uses a C7660 Dry Bulb Temperature Sensor. The C7660 responds to dry bulb temperature. Do Not use the C7660 in differential dry bulb applications.

The logic module functions as a true first stage of cooling providing maximum energy economy during the cooling cycle. It automatically locks out free cooling during heating; holding the outdoor air damper at the minimum position setting (or if using Demand Control Ventilation and the space CO2 level is above the set point, the damper will be between the MIN POS and DCV MAX position).

**Table 2. W7212 DCV I/O Logic**

Occupied Terminal N has 24 VAC power	Input on AQ–AQ1 terminals <sup>(a)</sup>	Action with 24 VAC power applied to W7212 (TR–TR1)
Yes	1 Vdc	Drives to MIN POS
No	1 Vdc	No movement of motor
Yes	<1 Vdc	Drives to MIN POS or DCV MAX (highest)
No <sup>(b)</sup>	<1 Vdc	Drives to DCV MAX
Yes	DCV set point	Drives to up to MIN POS or DCV MAX (highest)
No	DCV set point	Drives to DCV MAX

(a) <1 Vdc = no CO2 sensor or failed sensor; 1 Vdc = CO2 sensor working but below CO2 set point and CO2 sensor working and above set point.

(b) Economizer should be powered by fan, if fan is off economizer will spring return damper closed, if fan is on and no occupancy damper will drive to DCV MAX position.

The logic module can operate as either a basic free cooling controller, or it can incorporate additional functions. Table 3, page 6 details the input/output (I/O) logic of the module.

**Table 3. W7212 Economizer I/O Logic**

INPUTS				OUTPUTS			
Demand Control Ventilation (DCV)	Dry Bulb Setpoint <sup>(a)</sup>	Y1	Y2	Compressor		N Terminal <sup>(b)</sup>	
	Outdoor			Stage 1	Stage 2	Occupied <sup>(b)</sup>	Unoccupied <sup>(b)</sup>
							Damper
Below set (DCV LED Off) See Table 2, p. 8 for outdoor damper action if input on AQAQ1 terminals is 1Vdc or < 1Vdc. This is the fault for CO2 sensor failure. If no sensor or Vdc input is added to AQ-AQ1 terminals then use the DCV MAX potentiometer to adjust the minimum position.	High (Free Cooling LED Off)	On	On	On	On	Minimum position	Closed
		On	Off	On	Off		
		Off	Off	Off	Off		
	Low (Free Cooling LED On)	On	On	On	On	Modulating <sup>(c)</sup> (between min. position and fullopen)	Modulating <sup>(c)</sup> (between closed and full-open)
		On	Off	Off	Off		
		Off	Off	Off	Off	Minimum position	Closed
Above set (DCV LED On)	High (Free Cooling LED Off)	On	On	On	On	Modulating <sup>(d)</sup> (between min. position and DCV maximum)	Modulating <sup>(d), (e)</sup> (between closed and DCV maximum)
		On	Off	On	Off		
		Off	Off	Off	Off		
	Low (Free Cooling LED On)	On	On	On	On	Modulating <sup>(f)</sup>	Modulating <sup>(g)</sup>
		On	Off	Off	Off		
		Off	Off	Off	Off		

(a) For single enthalpy control, the module compares outdoor enthalpy to the A,B,C,D,E setpoint.

(b) Power at N terminal determines Occupied/Unoccupied setting:

- W7212: 24 Vac (Occupied), no power (Unoccupied).
- W7213, W7214: No power (Occupied), 24 Vac (Unoccupied).

(c) Modulation is based on the mixed air sensor signal.

(d) Modulation is based on the DCV signal. If the CO2 sensor input (AQ-AQ1) terminals is < 1Vdc or the sensor has failed, the motor will drive to MIN POS or DCV MAX whichever is highest.

(e) Modulation is based on the DCV signal, if the CO2 sensor input (AQ-AQ1) terminals is < 1Vdc or the sensor has failed, the motor will drive DCV MAX in the occupied mode. When power is cut to the economizer (fan is off) then the damper will spring return closed.

(f) Modulation is based on the greater of DCV and mixed air sensor signals, between minimum position and either maximum position (DCV) or fully open (mixed air signal).

(g) Modulation is based on the greater of DCV and mixed air sensor signals, between closed and either maximum position (DCV) or fully open (mixed air signal).

Settings and Adjustments

**NOTICE**

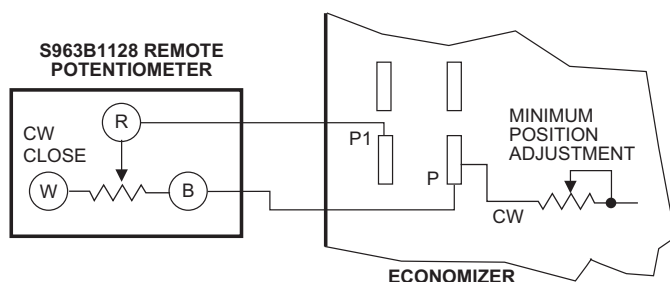
**Equipment Damage!**

Excessive force can damage potentiometer controls. Use a small screwdriver or the plastic tool provided with the economizer when adjusting all potentiometers located on the unit.

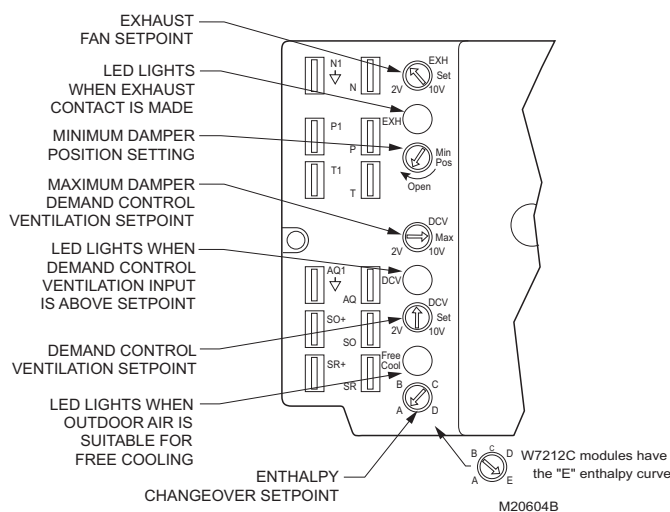
Potentiometers with screwdriver adjustment slots, located on device face, provide adjustments for several parameters (see Fig. 9 for locations on device):

- DCV setpoint
- Minimum damper position
- DCV maximum damper position
- Enthalpy changeover
- Exhaust setpoint

**Figure 9. S963B1128 Remote Potentiometer used with logic module for remote damper control**



**Figure 10. Potentiometer and LED locations**



**Demand Control Ventilation Setpoint**

The logic module modulates the outdoor damper to provide ventilation based on the 2-10 Vdc DCV input (AQ-AQ1 terminals). With no cooling signal, the DCV overrides the outdoor air damper when ventilation requires additional outdoor air.

EXAMPLE: CO2 sensor with 2 to 10 Vdc output range 0 to 2000 ppm. Two (2) Vdc is equal to 0 ppm, 10 Vdc is equal to 2000 ppm, threshold is determined to be 1000 ppm. DCV potentiometer to be set at 6 Vdc.

Adjust the potentiometer with a small screwdriver by turning the pot to the fully CCW then fully CW positions to determine the end stops. Set the pot for 6 Vdc in the mid position.

**Adjusting Minimum and Maximum Positions**

The minimum position is defined by the minimum outdoor airflow required in the building during the occupied period. The MIN POS and DCV MAX position potentiometers allow the installer to set the proper ventilation based on occupancy established by ASHRAE standard 62.1. When used with a CO2 occupancy sensor the minimum position will modulate between the MIN POS pot setting and the DCV MAX pot setting based on the CO2 input to the AQ-AQ1 terminals from the CO2 sensor located in the space.

When a CO2 sensor is NOT USED with the unit, the OA dampers will modulate based on the actions in Table 1. Setting the DCV maximum position of the damper prevents the introduction of large amounts of hot or cold air into the space by preventing the dampers from opening 100% during a call for additional ventilation. On a call for cooling AND the OA is good for economizing, the unit will override the DCV MAX setting and allow the dampers to drive full open.

**Important:** With the DCV maximum position set below the minimum position, the minimum position overrides the maximum position.

**Notes:**

- When the mixed air sensor takes control based on an increased requirement for cooling, it overrides the DCV maximum position potentiometer and can drive the damper full-open.
- If the mixed air temperature drops to 45°F, the mixed air sensor overrides the DCV and closes the damper to protect from freezing the hot or chilled water coils. Control returns to normal once the mixed air temperature rises to 48°F. Some models of the W7212 close the damper fully and others close the damper to minimum position. Check the label on the box for position of damper on freeze protection. If the CO2 sensor should fail, the W7212 defaults to DCV maximum, providing minimum ventilation for the maximum design occupancy.

## Minimum Position Adjustment

The following provides basic guidelines for minimum position selection and adjustment.

### Important:

- Adjust the minimum position potentiometer to allow the minimum amount of outdoor air for building effluents, as required by local codes, to enter the building.
- This procedure requires use of a quality thermometer capable of reading to 0.5° F [0.25°C].

**Note:** Make ventilation adjustments with at least a 10°F [6°C] temperature difference between outdoor and return air.

1. Calculate the appropriate mixed air temperature, see Equation 1. Equation 1 will be used to set the damper positions for MIN POS and DCV MAX. Without a DCV sensor connected to AQ-AQ1, use the MIN POS pot and this procedure to adjust the damper positions for minimum OA when the space is occupied. When using a DCV sensor you will need to set the MIN POS and DCV MAX positions using this procedure. DCV MAX will be the same as the MIN POS above (without a DCV sensor) and the MIN POS will lower than the DCV MAX %.
2. Disconnect mixed air sensor from terminals T and T1.
3. Place a jumper across terminals T and T1.
4. Ensure that either the factory-installed jumper is in place across terminals P and P1 or, if remote damper position is required, that it is wired according to Figure 9, p. 9 and the MIN POS potentiometer is turned fully clockwise.
5. Connect 24 Vac across terminals TR and TR1.
6. Carefully adjust the potentiometer on the face of the device with a small screwdriver until the mixed air temperature reaches the calculated value.

**Note:** Ensure that the sensed air is well mixed.

7. If all minimum (MIN POS) and maximum position (DCV MAX) adjustments are complete, remove the T-T1 jumper and reconnect the mixed air sensor.

### Equation 1. Formula to aid minimum position adjustment.

$$(TO \times OA) + (TR \times RA) = TM$$

Where:

TO = Outdoor air temperature

OA = Percent of outdoor air

TR = Return air temperature

RA = Percent of return air

TM = Resulting mixed air temperature

**Note:** The following sample calculation uses only Fahrenheit temperature.

EXAMPLE: Assume local codes require 10% outdoor air during occupied conditions, outdoor air is 60°F and return air is 75°F. Under these conditions, what is the temperature of the mixed air?

$$(0.1 \times 60^\circ\text{F}) + (0.9 \times 75^\circ\text{F}) = 6.0^\circ\text{F} + 67.5^\circ\text{F} = 73.5^\circ\text{F}$$

Mixed air will be 73.5°F when OA is 60°F and RA is 75°F with 10 percent outdoor air entering the building.

**Note:** If setting MIN POS and DCV MAX position, you will need to adjust the MIN POS for the building effluent (low occupancy) airflow and adjust the DCV MAX using the minimum airflow for maximum occupancy.

## Enthalpy Changeover Setpoint

### Outdoor Enthalpy Changeover Setpoint (Single Enthalpy)

Single enthalpy compares the outdoor air conditions to a set A, B, C, or D (E) curve for humidity and temperature conditions. The installer must set the onboard potentiometer to the desired curve. The outdoor enthalpy changeover setpoint returns the outdoor air damper to minimum position. Enthalpy setpoint scale markings located in the device are A, B, C, D and E. See Figure 10, p. 9 for the corresponding control points. The factory-installed 620-ohm jumper must be in place across terminals SR and SR+.

Temperature and humidity conditions to the left of the selected curve will allow the dampers to open for free cooling, temperature, and humidity conditions to the right of the curve will return the OA damper to minimum position (this is either MIN POS if using a CO2 sensor or DCV MAX if a CO2 sensor is NOT used).

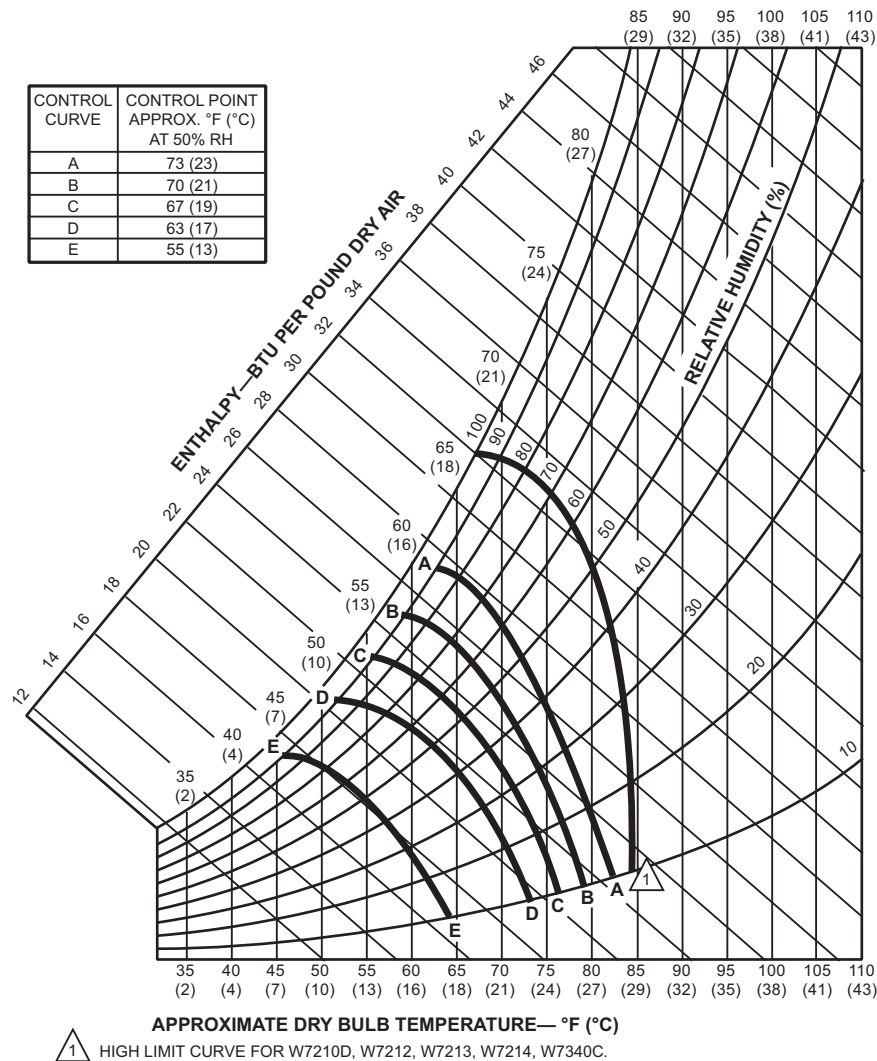
### Differential Enthalpy Changeover Setting

Differential enthalpy control uses two C7400 Enthalpy Sensors connected to one logic module. The logic module compares outdoor air to return air.

**Note:** Turn the enthalpy setpoint potentiometer fully clockwise to the D (or E setting for W7212C) setting.

The logic module selects the lower enthalpy air (return or outdoor) for cooling. For example, when outdoor air has lower enthalpy than return air, the module calls to open the outdoor air damper to bring in outdoor air for free cooling.

Figure 11. Potentiometer and LED locations (W7212 shown)



### Exhaust Setpoint

The exhaust setpoint determines when the exhaust fan runs based on damper position. When the exhaust fan call is made, the module provides a 60 ±30 second delay before exhaust fan activation. This delay allows the damper to reach the appropriate position to avoid unnecessary fan overload.

#### Notes:

- EF and EF1 are 24V dry contacts only. An external line voltage contactor is required to operate the exhaust fan.
- When the exhaust fan is deactivated the EF and EF1 contacts open immediately.

### Adjustable Exhaust Setpoint

These logic modules have an adjustable exhaust setpoint. This potentiometer allows the installer to adjust the damper position at which the EF and EF1 exhaust fan contacts are made.

**Note:** The 60 ±30 second delay allows the outdoor damper to reach the exhaust setpoint prior to the EF and EF1 contacts being made.

Checkout and Troubleshooting

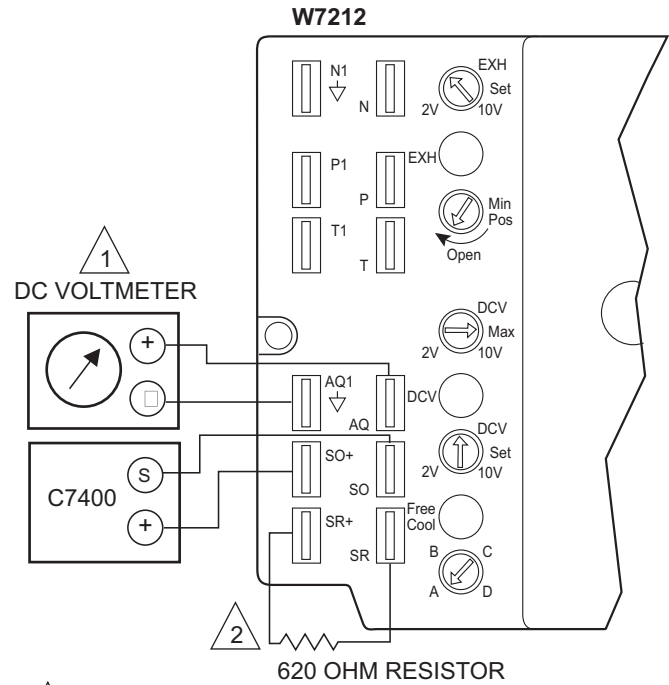
Checkout requires a 9V battery, 620 ohm, 1.2K ohm, 5.6K ohm, and 6.8K ohm resistors. Use Table 4, page. 10 and Figure 12, page 10 for checkout.

**NOTICE**

**Equipment Damage!**

Excessive force can damage potentiometer controls. Use a small screwdriver or the plastic tool provided with the economizer when adjusting all potentiometers located on the unit.

Figure 12. Meter location for checkout



1 INSERT DC VOLT METER BETWEEN AQ AND AQ1 FOR CHECKOUT AND TROUBLESHOOTING.

2 JUMPER USED FOR SINGLE ENTHALPY CONTROL.

Table 4. Checkout for W7212 economizer

Step	Checkout Procedure	Proper Response
1.	<b>CHECKOUT PREPARATION FOR ECONOMIZING ONLY</b>	
	Disconnect power at TR and TR1.	All LED are off; Exhaust Fan contacts are open.
	Disconnect devices at P and P1.	
	Jumper P to P1 (defaults to on board MIN POS potentiometer).	
	Place 5.6K ohm resistor across T and T1 (Blue sleeve provides input to economizer that the MAT is between 50-55° F).	
	Jumper TR to 1 (call for cooling from the thermostat).	
	W7212 <i>only</i> : Jumper TR to N (places economizer in occupied mode).	
	If connected, remove C7400 Enthalpy Sensor from terminals SO and +.	
	Connect 1.2K ohm, from 4074EJM Checkout Resistor kit, (purple sleeve) across terminals SO and + (makes OA enthalpy high).	
	Place 620 ohm resistor (white sleeve) across SR and + (makes return enthalpy lower than OA).	
	Set MIN POS and DCV MAX potentiometers fully CCW.	
	Turn DCV setpoint potentiometer mid position (this sets the DCV ventilation at approximately 1000 ppm).	
	Turn exhaust potentiometer to mid position (motor will be approximately 50% open when the exhaust fan contacts make).	
	Set enthalpy potentiometer to D.	
W7214 <i>only</i> : Jumper TR to O.		
Apply power (24 Vac) to terminals TR and TR1.		

Step	Checkout Procedure	Proper Response
2.	<b>DIFFERENTIAL ENTHALPY</b>	
	Execute step one, Checkout Preparation.	-
	Turn DCV MAX to mid position.	
	Place 620 ohm resistor across SO and + (white sleeve resistor makes OA enthalpy low).	-
	Place 1.2K ohm resistor across SR and + (purple sleeve resistor makes RA enthalpy high).	Free cool LED turns on; motor drives to approximately 45 degrees (half) open.
	Remove 620 ohm resistor from SO and +.	Free cool LED turns off; motor drives closed
3.	<b>SINGLE ENTHALPY</b>	
	Execute step one, Checkout Preparation.	-
	Turn DCV MAX to mid position.	
	Set enthalpy potentiometer to A (fully CCW).	Free cool LED turns on; motor drives to approximately 45 degrees (half) open.
	Set enthalpy potentiometer to D or E for W7212C (fully CW).	Free cool LED turns off; motor drives closed.
4.	<b>DCV AND EXHAUST</b>	
	Execute step one, Checkout Preparation.	-
	LED for both DCV and Exhaust should be off.	
	Turn DCV MAX to mid position.	Motor drives to mid position, 45 degrees open.
	Turn MIN POS fully CW.	Motor drives fully open.
	Turn MIN POS and DCV MAX to fully CCW.	Motor drives closed.
	Turn DCV MAX to mid position. Connect 9V battery positive to AQ and negative to AQ1.	LED for both DCV and Exhaust turn on. Actuator drives to 45 degrees open.
	Remove jumper from N terminal (economizer goes into not occupied mode).	Motor remains at 45 degrees open.
	Adjust DCV MAX towards CW.	Motor will move to position set by DCV MAX pot.
	Adjust DCV MAX to fully CCW.	Motor will drive closed.
	Reconnect jumper to N terminal.	
	Adjust DCV MAX and MIN POS pots.	Motor will drive to the most open position of the pots.
	Adjust DCV MAX and MIN POS pots to fully CCW.	
	Remove power from N terminal adjust MIN POS towards CW	Motor should not move.
Adjust DCV MAX towards CW.	Motor will move to position set by DCV MAX pot.	

Step	Checkout Procedure	Proper Response
5.	<b>MINIMUM AND MAXIMUM POSITION</b>	
	Execute step one, Checkout Preparation.	-
	Connect 9V battery positive to AQ and negative to AQ1. Adjust DCV MAX potentiometer to mid position.	DCV LED turns on. Actuator drives to 45 degrees open.
	Turn DCV maximum position potentiometer to fully CCW.	Actuator drives fully closed.
	Turn minimum position potentiometer to midpoint.	Actuator drives to 45 degrees open.
	Turn minimum position potentiometer fully CW.	Actuator drives fully open.
	Turn MIN POS to fully CCW.	Actuator drives fully closed.
	W7212: Remove jumper from TR and N.	Actuator drives fully closed.
	W7214: Jumper TR to O.	
6.	<b>MIXED AIR INPUT</b>	
	Execute step one, Checkout Preparation.	-
	Turn DCV MAX to mid position; set enthalpy potentiometer to A.	Free cool LED turns on. Actuator drives to 45 degrees open.
	Remove 5.6K ohm resistor (green sleeve) and place jumper from T and T1.	Actuator drives to 45 degrees open.
	Remove jumper from T and T1 and leave open.	Actuator drives fully closed.
7.	<b>HEAT PUMP INPUT – W7213, W7214 ONLY</b>	
	Execute step one, Checkout Preparation.	-
	Turn DCV MAX to mid position; set enthalpy potentiometer to A.	Free cool LED turns on. Actuator drives to 45 degrees open.
	W7213: Jumper TR to B. W7214: Remove jumper from TR and O.	Free cool LED turns off. Actuator drives fully closed.

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