Downflow Economizer 3-12.5 Ton Light Commercial Rooftop Units DRC/DRG/DRH/DBC/DBG/DBH Models Installation Instructions

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ATTENTION INSTALLING PERSONNEL

As a professional installer you have an obligation to know the product better than the customer. This includes all safety precautions and related items.

Prior to actual installation, thoroughly familiarize yourself with this instruction manual. Pay special attention to all safety warnings. Often during installation or repair it is possible to place yourself in a position which is more hazardous than when the unit is in operation.

Remember, it is your responsibility to install the product safely and to know it well enough to be able to instruct a customer in its safe use. Safety is a matter of common sense...a matter of thinking before acting. Most dealers have a list of specific good safety practices... follow them.

The precautions listed in this installation manual are intended as supplemental to existing practices. However, if there is a direct conflict between existing practices and the content of this manual, the precautions listed here take precedence.

This product is designed and manufactured to permit installation in accordance with national codes. It is the installer's responsibility to install this unit in accordance with national codes and prevailing local codes and regulations.

GENERAL INFORMATION

This installation and operating manual covers field installed downflow economizers for Daikin commercial package models. These economizers are available with dry bulb or enthalpy sensors and are offered on 3 - 12.5 ton models. Economizers can be ordered for low leak or ultra low leak applications. This economizer kit must be used with a two stage thermostat.

SAFETY CONSIDERATIONS

Installation and servicing of air conditioning equipment can be hazardous due to system pressure and electrical components. Only trained and qualified service personnel should install, repair, or service air conditioning equipment.

All operations should be performed by trained service personnel. When working on air conditioning equipment, observe precautions in the literature, tags and labels attached to the unit or accessory, and other safety precautions that may apply.

Follow all safety codes. Wear safety glasses and work gloves.

WARNING

Only personnel that have been trained to install, adjust, service or repair(hereinafter, "service") the equipment specified in this manual should service the equipment. The manufacturer will not be responsible for any injury or property damage arising from improper service or service procedures. If you service this unit, you assume responsibility for any injury or property damage which may result. In addition, in jurisdictions that require one or more licenses to service the equipment specified in this manual, only licensed personnel should servise the equipment.
Improper installation, adjustment, servicing or repair of the equipment specified in this manual, or attempting to install, adjust, service or repair the equipment specified in this manual without proper training may result in product damage, property damage, personal injury or death.

PROP 65 WARNING
FOR CALIFORNIA CONSUMERS

WARNING

Cancer and Reproductive Harm -
www.P65Warnings.ca.gov

0140M00517-A

WARNING

High Voltage!
Disconnect all power before servicing or installing this unit. Multiple power sources may be present. Failure to do so may cause property damage, personal injury or death.

ECONOMIZER GENERAL INFORMATION

Economizers are used to let free-cooling into the building when the outdoor air is cool enough and therefore eliminating the need to turn on your compressors for mechanical cooling. This is accomplished by the controller sending a command to the economizer to open the damper when the outside air is below the controller inside air set point. This offers an energy savings to the building owner. In the event that free-cooling alone cannot satisfy the cooling demand in the space, the controller will activate the 1st stage of mechanical cooling and both free-cooling and mechanical cooling will be used together.

If the outside air dampers are open and the air becomes too warm (or humid with enthalpy control) the dampers will be commanded to modulate to the minimum position (ventilation) set point. When doing so the compressors will provide mechanical cooling to the building. When the unit is in heating mode the economizer will be at minimum position.

Economizers are also able to open to a minimum position and offer fresh air (ventilation air) into the building to meet code requirements. The controller has the ability to set 2 separate minimum position settings for 2 speed units.

Economizers are provided with dampers, an actuator to control the damper movement, an outside air sensor (if required), a mixed air sensor (if required), a factory mounted controller (if required), all necessary economizer wiring, barometric relief dampers, and an economizer hood.

Part #	Description	Sensor	Tonnage
0270L01156	Downflow Standard Leak	Dry Bulb	3-6
0270L01753	Downflow Standard Leak	Enthalpy	3-6
0270L01123	Downflow Standard Leak	Dry Bulb	7.5-12.5
0270L01754	Downflow Standard Leak	Enthalpy	7.5-12.5
0270L01158	Downflow Ultra Low Leak	Dry Bulb	3-6
0270L01755	Downflow Ultra Low Leak	Enthalpy	3-6
0270L01125	Downflow Ultra Low Leak	Dry Bulb	7.5-12.5
0270L01756	Downflow Ultra Low Leak	Enthalpy	7.5-12.5

TABLE 1 - ECONOMIZER KIT PART NUMBERS

LOCATION

The location for installation of downflow economizers is to be in the return air section. This installation will be common for all Commercial Rooftop Units.

ECONOMIZER INSTALLATION

1. Open carton and inspect contents for damaged or missing parts.
2. Take Filter Access Panel off of unit. Keep for installation back on to unit when economizer installation is complete. See Figure 1.

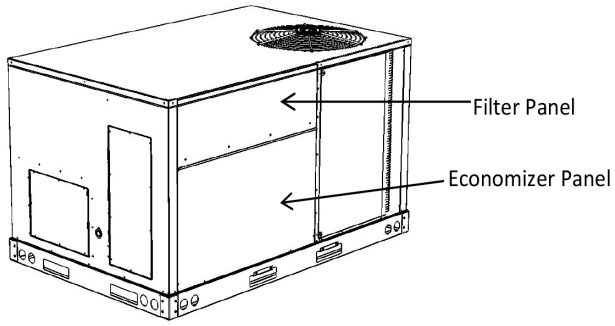


FIGURE 1 - REMOVE PANELS

3. Remove lower panel from return air section of unit. See Figure 1. This panel can be discarded. Keep removed screws for use in later step.
4. Place economizer in return air section of the unit over the downflow duct opening.

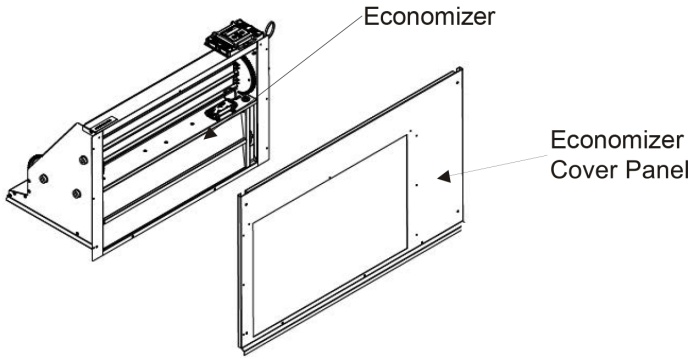


FIGURE 2 - ECONOMIZER AND COVER PANEL

5. Install the economizer cover panel using the screws removed from the lower panel in Step 3. The holes in the economizer should line up with the holes in the cover panel.

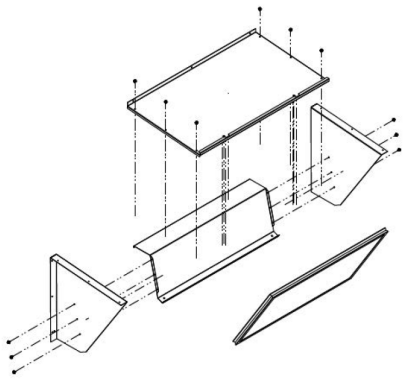


FIGURE 3 - ECONOMIZER HOOD ASSEMBLY

6. Assemble the hood per the exploded view in Figure 3 using the screws provided. Insert the bottom of the aluminum mesh filter so it will rest on the hood divider, then snap the top of the filter into the clips at the top.

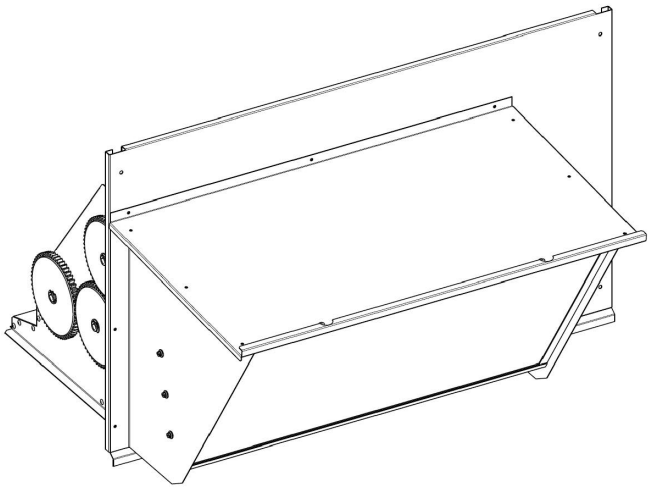


Figure 4 - Finished Hood

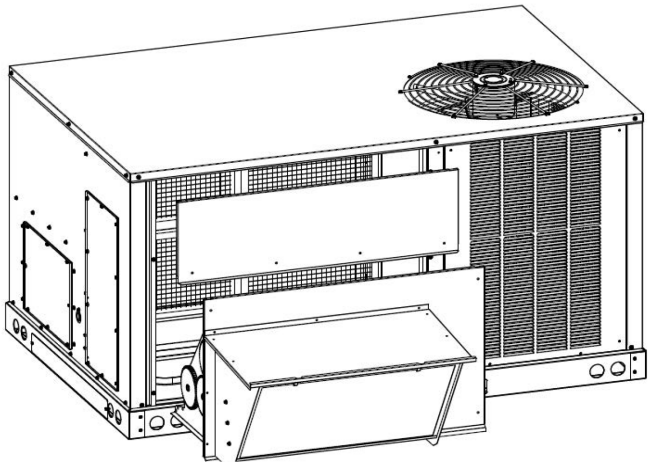


Figure 5 - Install Hood Filter

7. Mount assembled hood onto cover panel and economizer using remaining screws. Screws go through cover panel and engage economizer.

ECONOMIZER WIRING INSTRUCTIONS FOR 3-6 TON UNITS:

1. Remove the jumper plug from the factory installed economizer wire harness. The jumper plug is located on the partition panel in the return air compartment (see Figure 6).

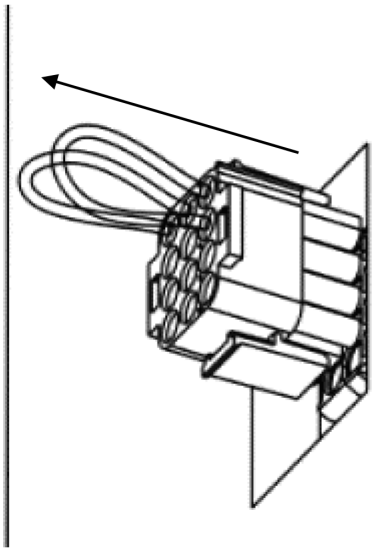


Figure 6 - Remove Jumper Plug

2. Plug in the 12 pin wire harness provided with the economizer kit (see Figure 7).

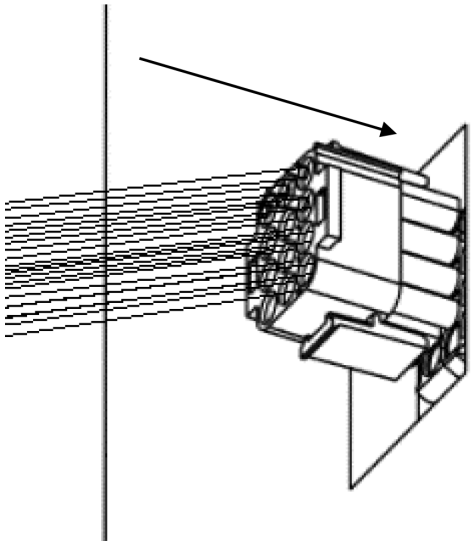


Figure 7 - Attach Economizer Harness

3. Remove the indoor fan compartment cover and locate the factory installed mixed air temperature harness. This harness consists of two black wires and a two pin connector. On some DBG models, this harness may not be factory installed, if your unit does not have this harness, skip to step 4. Once the harness is located, install the mixed air temperature sensor provided with the kit on the side of the blower housing. Connect the mixed air temperature sensor to the factory harness using the adapter harness provided with the economizer kit (see Figure 8). Reinstall the indoor fan compartment cover. Skip to step 5.

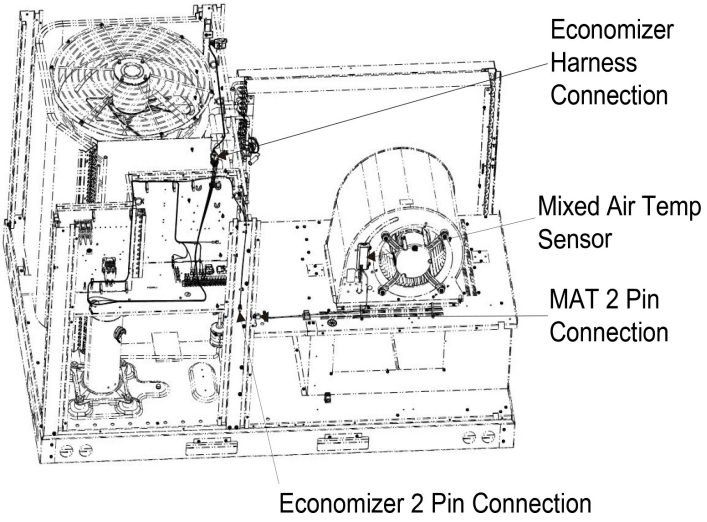


FIGURE 8
INDOOR FAN SECTION/MIXED AIR SENSOR FOR 3-6 TON

4. Some DBG units may not have a factory installed mixed air temperature harness in the blower compartment. In this case, install the mixed air temperature sensor in the return air compartment (see Figure 9 for mounting location). Use the 2 cutting screws provided with the kit to mount the sensor. Disconnect the existing mixed air temperature sensor wire harness from the W7220 control module. Locate the mixed air temperature wire harness packaged with the sensor and connect one end to the mixed air temperature sensor and the other end to the W7220 module (see Figure 10). Secure the disconnected mixed air temperature harness so that it does not interfere with any moving parts.

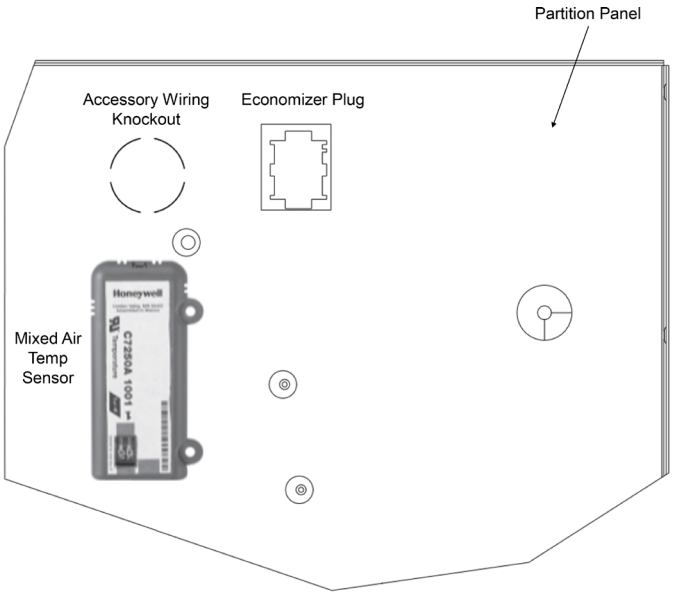


FIGURE 9

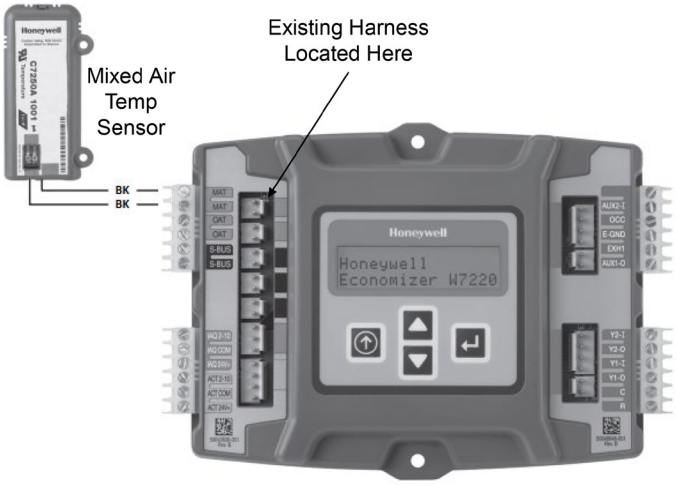


FIGURE 10

5. Program the W7220 controller to the needs of your specific application. Table 4 below details the Menu structure of the controller.
6. Reinstall the unit's flter access panel above economizer.

ECONOMIZER WIRING INSTRUCTIONS FOR 7.5-12.5 TON UNITS:

1. Remove the jumper plug from the factory installed economizer wire harness. This plug is located on the partition panel in the return air compartment (see Figure 6).
2. Plug in the 12 pin wire harness provided with the economizer kit (see Figure 7).

NOTE: FOR DBC/DBG 7.5 TO 12.5 TON AND DBH 12.5 TON UNITS, THE FACTORY INSTALLED ECONOMIZER WIRE HARNESS AND JUMPER PLUG WILL BE HANGING FROM THE EVAPORATOR COIL BLOCKOFF (SEE FIGURE 11).

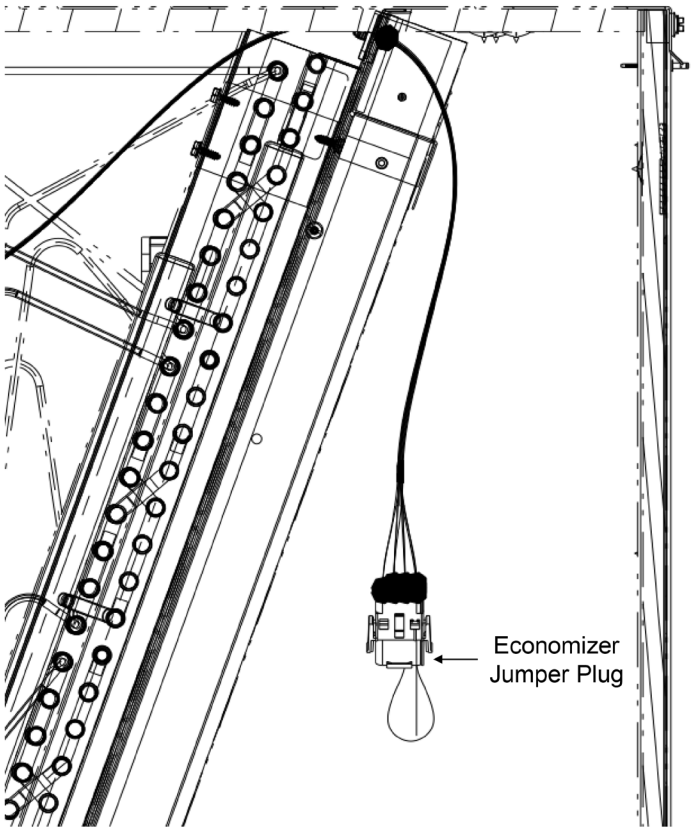


Figure 11

3. Remove the indoor fan compartment cover and locate the factory installed mixed air temperature harness. This harness consists of two black wires and a two pin connector. Once the harness is located, install the mixed air temperature sensor provided with the kit on the side of the blower housing. Connect the mixed air temperature sensor to the harness using the adapter harness provided with the economizer kit (see Figure 12). Reinstall the indoor fan compartment cover.

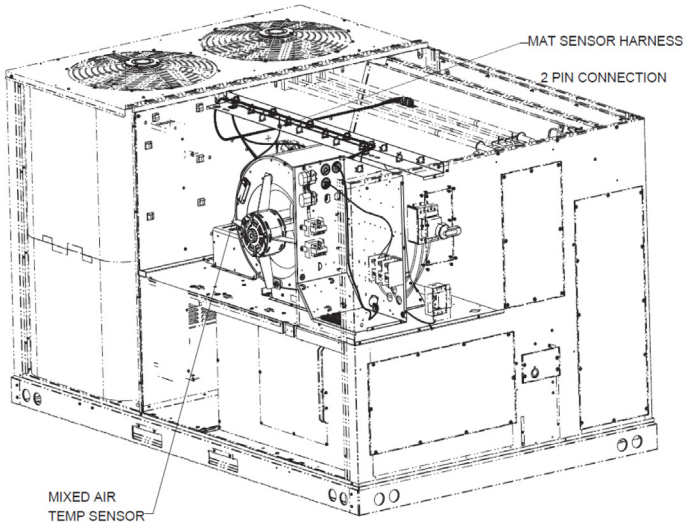


Figure 12 - Indoor Fan Section/Mixed Air Sensor 7.5-12.5 Ton

4. Program the W7220 controller to the needs of your specific application. Table 4 below details the Menu structure of the controller.
5. Reinstall the unit's filter access panel above economizer.

DOWNFLOW ECONOMIZER STATIC PRESSURE DROP VALUES:

See the tables below for static pressure drop values when the downflow economizer kit is installed.

3-6 Tons		
Cabinet	**CFM**	**Static Pressure Drop**
3 Ton	900	.03"
	1,200	.05"
	1,500	.08"
4 Ton	1,200	.06"
	1,600	.10"
	2,000	.14"
5 Ton	1,500	.08"
	2,000	.14"
	2,500	.22"
6 Ton	1,800	.13"
	2,400	.22"
	3,000	.33"

Table 2

7.5-12.5 Tons		
Cabinet	**CFM**	**Static Pressure Drop**
7.5 Ton	2,250	.04"
	3,000	.07"
	3,750	.11"
8.5 Ton	2,550	.06"
	3,400	.10"
	4,250	.16"
10 Ton	3,000	.08"
	4,000	.13"
	5,000	.22"
12.5 Ton	3,750	.14"
	5,000	.24"
	6,250	.36"

Table 3

INTERFACE OVERVIEW

This Section describes how to use the Economizer's user interface for:

- Keypad and menu navigation
- Settings and parameter changes
- Menu structure and selection

User interface

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.

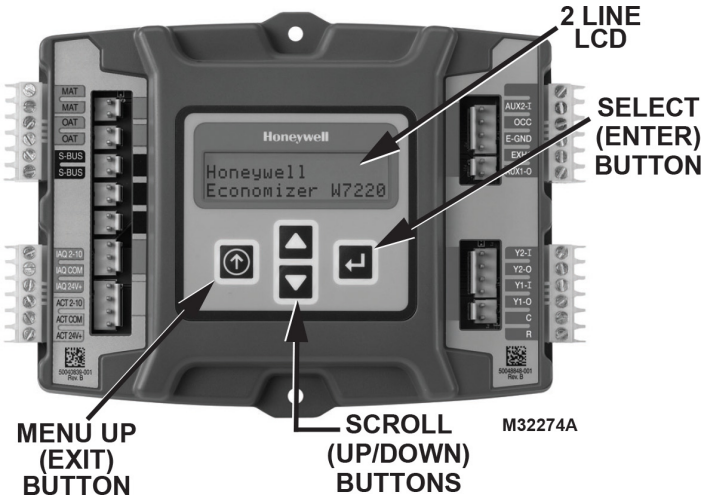


Figure 13 - Economizer LED and Keypad Layout

Keypad

The four navigation buttons illustrated in Figure 13 are used to scroll through the menus and menu items, select menu items, and to change parameter and configuration settings.

Using the Keypad with Menus

- To use the keypad when working with menus:
- Press the ▲ button to move to the previous menu.
- Press the ▼ button to move to the next menu.
- Press the ↵ button (Enter) to display the first item in the currently displayed menu.
- Press the ⓣ button (Menu up) to exit a menu's item and return to the list of menus.

Using the Keypad with Settings and Parameters

To use the keypad when working with Setpoints, System and Advanced Settings, Checkout tests, and Alarms:

- Navigate to the desired menu.
- Press the ↵ Button (Enter) to display the first item in the currently displayed menu.
- Use the ▲ and ▼ buttons to scroll to the desired parameter.
- Press the ↵ button (Enter) to display the value of the currently displayed item.
- Press the ▲ button to increase (change) the displayed parameter value.[a]
- Press the ▼ button to decrease (change) the displayed parameter value.[a]
- Press the ↵ button to accept the displayed value and stores it in non-volatile RAM.
- CHANGE STORED displays.
- Press the ⓣ button (Menu Up/Exit) to return to the previous menu.

[a]When values are displayed, pressing and holding the ▲ or ▼ button causes the display to automatically increment.

Menu Structure

Table 4 illustrates the complete hierarchy of menus and parameters for the JADE™ Economizer system.

The Menus in display order are:

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

IMPORTANT

Table 2 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).

Setup and configuration

Before before placed into service, the JADE™ Economizer module must be setup and configured for the installed system.

IMPORTANT

During setup, the Economizer module is live at all times.

The setup process uses a hierarchical menu structure that is easy to use. You press the ▲ and ▼ arrow buttons to move forward and backward through the menus and press the ↵ button to select and confirm setup item changes.

Time-out and Screensaver

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

TABLE 4 - MENU STRUCTURE[a]

Menu	Parameter	Parameter Default Value	Parameter Range and Increment[b]	Notes
STATUS	ECON AVAIL	NO	YES/NO	YES = economizing available; the system can use Outdoor Air for free cooling when required.
	ECONOMIZING	NO	YES/NO	YES = Outdoor Air being used for 1st stage cooling.
	OCCUPIED	NO	YES/NO	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[c]	COOL HEAT	Displays COOL or HEAT when system is set to heat pump (non- conventional)
	COOL Y1-IN	OFF	ON/OFF	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	OFF	ON/OFF	Cool Stage 1 Relay Output to mechanical cooling (Y1-OUT terminal).
	COOL Y2-IN	OFF	ON/OFF	Y2-I signal from space thermostat or unitary controller for second stage cooling. ON = 24 Vac on term Y2-I OFF = 0 Vac on term Y2-I
	COOL Y2-OUT	OFF	ON/OFF	Cool Stage 2 Relay Output to mechanical cooling (Y2-OUT terminal).
	MA TEMP	_ _._ ºF	-40 to 150 ºF	Displays value of measured mixed air from MAT sensor. Displays --.- if not connected, short, or out- of-range.
	DA TEMP	_ _._ ºF	-40 to 150 ºF	Displays when Discharge Air Sylk Bus sensor is connected and displays measured discharge air temperature. Displays --.-°F if sensor sends invalid value, if not connected, short or out-of-range.
	OA TEMP	_ _._ ºF	-40 to 140 ºF	Displays measured value of outdoor air temperature. Displays --°F if sensor sends invalid value, if not connected, short or out-of-range.
	OA HUM	_ _ %	0 to 100%	Displays measured value of outdoor humidity from OA Sylkbus sensor. Displays --% if not connected, short, or out- of-range.
	RA TEMP	_ _._ ºF	0 to 140 ºF	Displays measured value of return air temperature from RA Sylkbus sensor. Displays --°F if sensor sends invalid value, if not connected, short or out-of-range.
	RA HUM	_ _ %	0 to 100%	Displays measured value of return air humidity from RA Sylkbus sensor. Displays --% if sensor sends invalid value, if not connected, short or out-of-range.
	IN CO2	_ _ _ ppm	0 to 2000 ppm	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. See note on page 10 concerning C7632 sensor.
	DCV STATUS	n/a	ON/OFF	Displays ON if above setpoint and OFF if below setpoint, and ONLY if a CO2 sensor is connected.
	DAMPER OUT	2.0V	2.0 to 10.0 V	Displays output voltage or position to the damper actuator.[e]
	ACT POS	n/a	0 to 100%	Displays actual position of actuator.
	ACT COUNT	n/a	1 to 65,535	Displays number of times actuator has cycled. 1 Cycle equals the sum of 180° of movement in any direction.
	ACTUATOR	n/a	OK/Alarm (on Alarm menu)	Displays Error if voltage or torque is below actuator range
	EXH1 OUT	OFF	ON/OFF	Output of EXH1 terminal. Displays ON when damper position reaches programmed percentage setpoint. ON = 24 Vac Output; OFF = No Output.

TABLE 4 - MENU STRUCTURE[a] (Continued)

Menu	Parameter	Parameter Default Value	Parameter Range and Increment[b]	Notes
STATUS	EXH2 OUT	OFF	ON/OFF	EXHAUST STAGE 2 RELAY OUTPUT Output of AUX terminal; displays only if AUX - EXH2 ON - relay closed OFF - relay open
	ERV	OFF	ON/OFF	ENERGY RECOVERY UNIT RELAY OUTPUT Output of AUX terminal; displays only if AUX - ERV ON - relay closed OFF - relay open
	MECH COOL ON	0	0, 1, or 2	Displays stage of mechanical cooling that is active.
	FAN SPEED	n/a	LOW or HIGH	SUPPLY FAN SPEED Displays speed setting of fan on a 2-speed fan unit.
	W (HEAT ON)	n/a	ON/OFF	HEAT DEMAND STATUS Displays status of heat demand on a 2-speed fan unit.
	MAT SET	53°F (12°C)	38° to 70°F; (3° to 18°C) increment by 1	MIXED AIR SETPOINT Setpoint determines where the economizer will modulate the OA damper to maintain the mixed air temperature.
SET POINTS	LOW T LOCK	32°F (0°C)	-45° to 80°F; (-43° to 27°C) increment by 1	COMPRESSOR LOW TEMPERATURE LOCKOUT Setpoint determines outdoor temperature when the mechanical cooling cannot be turned on.
	DRYBLB SET	63°F (17°C)	48° to 80°F (9° to 27°C) increment by 1	OA DRY BULB TEMPERATURE CHANGEOVER SETPOINT Setpoint determines where the economizer will assume outdoor air temperature is good for free cooling; e.g.: at 63°F (17°C), unit will economize at 62°F (16.7°C) and below and not economize at 64°F (17.8°C) and
	DRYBLB DIF (Available firmware 1.15, June 2018 and later)	0°F	0 to 6°F increment by 2	Drybulb Differential will only show if using dual drybulb, i.e., when an outdoor air temperature sensor C7250 is attached to OAT terminals, an a C74008 enthalpy sensor is wired to 8-Bus and configured for RAT (return air). Free cooling will be assumed whe
	ENTH CURVE	ES3	ES1, ES2, ES3, ES4, or ES5	ENTHALPY CHANGEOVER CURVE (Requires enthalpy sensor option) Enthalpy boundary *curves* for economizing using single enthalpy.
	DCV SET	1100ppm	500 to 2000 ppm; increment by 100	DEMAND CONTROL VENTILATION SETPOINT Displays only if CO2 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.
	MIN POS	2.8 V	2 to 10 Vdc	VENTILATION MINIMUM POSITION. Only displayed if controller is set for single speed unit under FAN TYPE, and if DCV is NOT used.
	MIN POS L	3.2 V	2 to 10 Vdc	VENTILATION MINIMUM POSITION AT LOW SPEED Displays ONLY if used on 2 speed units and CO2 sensor is NOT used.
	MIN POS H	2.8 V	2 to 10 Vdc	VENTILATION MINIMUM POSITION AT HIGH SPEED Displays ONLY if used 2 speed units and CO2 sensor is NOT used.
	VENTMAX L	2.8 V	2 to 10 Vdc	DCV MAXIMUM DAMPER POSITION AT LOW SPEED (Requires CO2 sensor connected)
	VENTMAX H	4.4 V	2 to 10 Vdc	DCV MAXIMUM DAMPER POSITION AT HIGH SPEED (Requires CO2 sensor connected)
	VENTMIN L	2.25 V	2 to 10 Vdc	DCV MINIMUM DAMPER POSITION AT LOW SPEED (Requires CO2 sensor connected)
	VENTMIN H	2.8 V	2 to 10 Vdc	DCV MINIMUM DAMPER POSITION AT HIGH SPEED (Requires CO2 sensor connected)
	ERV OAT SP	32°F (0°C)	0° to 50°F; (-18° to 10°C) increment by 1	ENERGY RECOVERY VENTILATION UNIT OUTDOOR AIR TEMPERATURE SETPOINT Only displayed when AUX1 O = ERV
	EXH1 SET	50%	0 to 100%	Exhaust fan set point for single speed units. Based on OA Damper position to activate power exhaust.
	EXH1 L SET	65%	0 to 100% increment by 1	EXHAUST FAN SETPOINT AT LOW SPEED (on 2 speed unit) Setpoint for OA damper position when exhaust fan is powered by the economizer
	EXH1 H SET	50%	0 to 100% increment by 1	EXHAUST FAN SETPOINT AT HIGH SPEED (on 2 speed unit) Setpoint for OA damper position when exhaust fan is powered by the economizer
	EXH2 L SET	80%	0 to 100% increment by 1	EXHAUST FAN STAGE 2 SETPOINT AT LOW SPEED Setpoint for OA damper position when exhaust fan 1 is powered by the economizer. Only used when AUX1-0 is set to EHX2. Note: Standard power exhaust kits have only 1 speed, therefore EXH2 is not applicable.
	EXH2 H SET	75%	0 to 100% increment by 1	EXHAUST FAN STAGE 2 SETPOINT AT HIGH SPEED Setpoint for OA damper position when exhaust fan 1 is powered by the economizer. Only used when AUX1-0 is set to EHX2. Note: Standard power exhaust kits have only 1 speed, therefore EXH2 is not applicable.

TABLE 4 - MENU STRUCTURE[a] (Continued)

Menu	Parameter	Parameter Default Value	Parameter Range and Increment[b]	Notes
SYSTEM SETUP	INSTALL	01/01/10		Display order = MM/DD/YY Setting order = DD, MM, then YY.
	UNITS DEG	°F	°F or °C	Sets economizer controller in degrees Fahrenheit or Celsius
	EQUIPMENT	CONV	Conventional or HP	Always set to CONV even for heat pump
	AUX2 I	W1	Always set to W1	Always set to W1
	FAN TYPE	2 speed	1 speed/2 speed	Sets the economizer controller for operation of 1 speed or 2 speed indoor fan system. Note: Default settings may vary.
	FAN CFM	5000cfm	100 to 15000 cfm; increment by 100	UNIT DESIGN AIRFLOW (CFM) Enter ONLY if using DCVCAL ENA = AUTO
	AUX1 OUT	NONE	NONE ERV EXH2 SYS	Select OUTPUT for AUX1 0 relay NONE = not configured (output is not used) ERV = Energy Recovery Ventilator[d] EXH2 = second damper position relay closure for second exhaust fan SYS = use output as an FDD remote alarm signal
	OCC	INPUT	INPUT or ALWAYS	Always set to INPUT
	FACTORY DEFAULT	NO	NO or YES	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	MALO SET	45°F (7°C)	35° TO 55°F; (2° to 12°C) incremnted by 1°	MIXED AIR TEMPERATURE LOW LIMIT Temperature to achieve Freeze Protection (close damper and alarm if temperature falls below setup value)
	FREEZE POS	CLO	CLO or MIN	FREEZE PROTECTION DAMPER POSITION Damper position when freeze protection is active CLO = closed Min = MIN POS or VENTMIN
	CO2 ZERO	0ppm	0 to 500 ppm; increment by 10	CO2 ppm level to match CO2 sensor start level
	CO2 SPAN	2000ppm	1000 to 3000 ppm; increment by 50	CO2 ppm span to match CO2 sensor
	STG3 DLY	2.0h	0 min, 5 min, 15 min, then 15 min intervals. Up to 4 h or OFF	COOLING STAGE 3 DELAY Delay after stage 2 for cool has been active. Turns on 2nd stage of cooling when economizer is 1st stage and mechanical cooling is 2nd
	SD DMPR POS	CLO	CLO or OPEN	Function NOT AVAILABLE with 2-speed mode
	DCVCAL ENA	MAN	manual or auto	Turns on the DCV automatic control of the dampers. Resets ventilation. For single speed units only.
	MATTCAL	0.0°F (or C)	+/--2.5°F (+/--1.4°C)	MIXED AIR TEMPERATURE CALIBRATION Allows for the operator to adjust for an out of calibration mixed air temperature (MAT) sensor
	OAT CAL	0.0°F (or C)	+/--2.5°F (+/--1.4°C)	OUTSIDE AIR TEMPERATURE CALIBRATION Allows for the operator to adjust for an out of calibration outside air temperature (OAT) sensor
	OAH CAL	0% RH	+/--10%RH	OUTSIDE AIR HUMIDITY CALIBRATION Allows for the operator to adjust for an out of calibration outside air enthalpy sensor
	RAT CAL	0.0°F (or C)	+/--2.5°F (+/--1.4°C)	RETURN AIR TEMPERATURE CALIBRATION Allows for the operator to adjust for an out of calibration return air temperature (RA) sensor
	RAH CAL	0% RH	+/--10%RH	RETURN AIR HUMIDITY CALIBRATION Allows for the operator to adjust for an out of calibration return air enthalpy sensor
	DAT CAL	0.0°F (or C)	+/--2.5°F (+/--1.4°C)	DISCHARGE AIR TEMPERATURE CALIBRATION Allows for the operator to adjust for an out of calibration discharge air temperature (DAT) sensor
	2SP FAN DELAY	5 Minutes	0 to 20 minutes in 1 minute increments	TIME DELAY ON 2nd STAGE ECONOMIZING While in the Economizing mode, this is the delay between thermostat Y2 call and Y1--O output to mechanical cooling stage, to allow high speed fan operation to attempt to cool space first.

TABLE 4 - MENU STRUCTURE[a] (Continued)

Menu	Parameter	Paremeter Default Value	Parameter Range and Increment[b]	Notes
CHECKOUT[f]	DAMPER VMIN-HS	n/a	n/a	Positions damper to VMIN position.
	DAMPER VMAX-(LS)	n/a	n/a	Posi tions damper to VMAX posi tion. With 2-speed fan units the damper will position to VMAX low speed fan.
	DAMPER OPEN	n/a	n/a	Positions damper to the full open position. Exhaust fan contacts enable during the DAMPER OPEN test.
	DAMPER CLOSE	n/a	n/a	Postions damper to the fully closed position.
	CONNECT Y1-0	n/a	n/a	Closes the Y1-0 relay (Y1-0) See CAUTION on page 24
	CONNECT Y2-0	n/a	n/a	Closes the Y2-0 relay (Y2-0) See CAUTION on page 24
	CONNECT AUX1-O	n/a	n/a	Energi zes the AUX1-0 output. If AUX 1-0 setting i s : • NONE - no action taken • ERV - 24 Vac out. Turns on or signals an ERV that the conditions are not good for economizing but are good for ERV operations.[d] • SYS - 24 Vac out. Issues a system alarm.
	CONNECT EXH1	n/a	n/a	Closes the power exhaust fan 1 relay (EXH1)
ALARMS(_)	MA T SENS ERR	n/a	n/a	Alarms display only when they are active. The menu title “ALARMS (_)” includes the number of active alarms in parenthesis ().
	CO2 SENS ERR	n/a	n/a	
	OA T SENS ERR	n/a	n/a	
	DA ENTHL ERR	n/a	n/a	
	SYS ALARM	n/a	n/a	When AUX1-0 is set to SYS and there i s any alarm (e.g., failed sensors , etc.), the AUX1-0 terminal has 24 Vac out.
	ACT UNDER V	n/a	n/a	Voltage received by Actuator is above expected range
	ACT OVER V	n/a	n/a	Vol tage received by Actuator is above expected range
	ACT STALLED	n/a	n/a	Actuator s topped before achieving commanded position
	NOTE: The alarms listed are examples. Additional alarms display depending on the parameter settings and configuration.			

a) Table 4 illustrates the complete hierarchy. Your menu parameters may be different depending on your configuration. For example if you do not have a DCV (CO2) sensor, then none of the DCV parameters appear.

b) When values are displayed, pressing and holding the .A or T button causes the display to automatically increment.

c) n/a = not applicable

d) ERV Operation: When in Cooling mode AND the conditions are NOT OK for economizing - the ERV terminal will be energized. In the Heating mode the ERV terminal will be energized when the OA is below the ERV OAT setpoint in the setpoint menu.

e) When used with Honeywell communicating actuator the damper out is reported in percentage open versus Vdc.

f) After 10 minutes without a command or mode change, the controller will change to normal operation.

g) When using the C7632 (or any 0-10 Vdc CO2 sensor) with the Jade you will need to set the CO2ZERO to 400 ppm and the CO2SPAN to 1600 ppm in the ADVANCED SETUP menu.

DRY BULB OUTSIDE AIR SENSOR

The C7250 dry bulb sensor comes factory installed and wired on the economizer for dry bulb outside air. See Figure12 and 13. It will be located on the economizer divider that separates the outdoor air and the return air sections of the economizer. When the temperature falls below the controller set point this allows the unit to economize with outdoor air only. In the event that the outside air alone cannot provide the cooling load required, the controller will also run the unit's 1st stage of cooling simultaneously. The dry bulb sensor has a controller setpoint default of 63 degrees, and has a range to 48 – 80 degrees. California's Title 24 requires economizer high limits per Table 5 below.

NOTE: A 2ND C7250 SENSOR IS PROVIDE IS THE PARTS KIT TO BE USED AS THE MIXED AIR SENSOR, AND IS FIELD INSTALLED. SEE WIRING DIAGRAM.

FIGURE 14
C7250 DRY BULB AND MIXED AIR TEMPERATURE SENSOR

ENTHALPY SENSOR

A factory installed (C7400S) enthalpy sensor is available to control the free-cooling change-over with both temperature and humidity. When the enthalpy is below the set point this allows the unit to economize with outdoor air only. If all of the values calculated are below the minimum values this will allow the economizer to enter free-cooling mode. The sensor is shipped factory installed, mounted, and wired. See Table 5 and Figure 15.

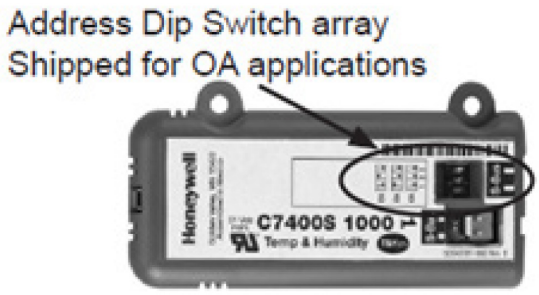


FIGURE 15
C7400S ENTHALPY SENSOR

NOTE: THE C7400S SENSOR CAN ALSO BE USED FOR A DIFFERENTIAL RETURN AIR SENSOR. IN THIS CASE, SET THE DIPSWITCHES TO ON-OFF-OFF. SEE TABLE 5.

Table 140.4-B AIR ECONOMIZER HIGH LIMIT SHUT OFF CONTROL REQUIREMENTS

Device Type[a]	Climate Zones	Required High Limit (Economizer Off When): *DESCRIPTION*
Fixed Dry Bulb	1, 3, 5, 11-16	Outdoor air temperature exceeds 75°F
	2, 4, 10	Outdoor air temperature exceeds 73°F
	6, 8, 9	Outdoor air temperature exceeds 71°F
	7	Outdoor air temperature exceeds 69°F
Differential Dry Bulb	1, 3, 5, 11-16	Outdoor air temperature exceeds return air temperature
	2, 4, 10	Outdoor air temperature exceeds return air temperature minus 2°F
	6, 8, 9	Outdoor air temperature exceeds return air temperature minus 4°F
	7	Outdoor air temperature exceeds return air temperature minus 6°F
Fixed Enthalpy[b] + Fixed Dry Bulb	All	Outdoor air enthalpy exceeds 28 Btu/lb of dry air[b] or Outdoor air temperature exceeds 75°F

a) Only the high limit control devices listed are allowed to be used and at the setpoints listed. Others such as Dew Point, Fixed Enthalpy, Electronic Enthalpy, and Differential Enthalpy Controls, may not be used in any climate zone for compliance with Section 140.4(e)1 unless approval for use is provided by the Energy Commission Executive Director.

b) At altitudes substantially different than sea level, the Fixed Enthalpy limit value shall be set to the enthalpy value at 75°F and 50% relative humidity. As an example, at approximately 6,000 foot elevation, the fixed enthalpy limit is approximately 30.7 Btu/lb.

TABLE 5
CALIFORNIA TITLE 24 REGIONAL HIGH LIMIT DRY BULB TEMPERATURE SETTINGS

CO2 SENSOR

A CO2 Sensor can be mounted in the return air duct of the unit or wall mounted in the space served by the unit. Any CO2 Sensor with a 2-10 VDC or 0-10 VDC output can be used. If a 0-10 VDC sensor is used, see note g on page 10. The CO2 sensor connects to the IAQ wire leads provided with the economizer assembly.

DIFFERENTIAL RETURN SENSORS

Differential return sensors are to be mounted in the return air duct. The C7400S sensor can be used for differential return dry bulb or enthalpy. See Table 6 to set dip switches appropriately. Mount differential sensor in return duct and wire per Figure 13.

Use	DIP Switch Positions for Switches 1, 2, & 3		
	1	2	3
DA[a]	OFF	ON	OFF
RA[b]	ON	OFF	OFF
OA[c]	OFF	OFF	OFF
a) DA = Discharge Air or Supply Sensor			
b) RA = Return Air			
c) OA = Outside Air			

TABLE 6
C7400S DIPSWITCH SETTINGS

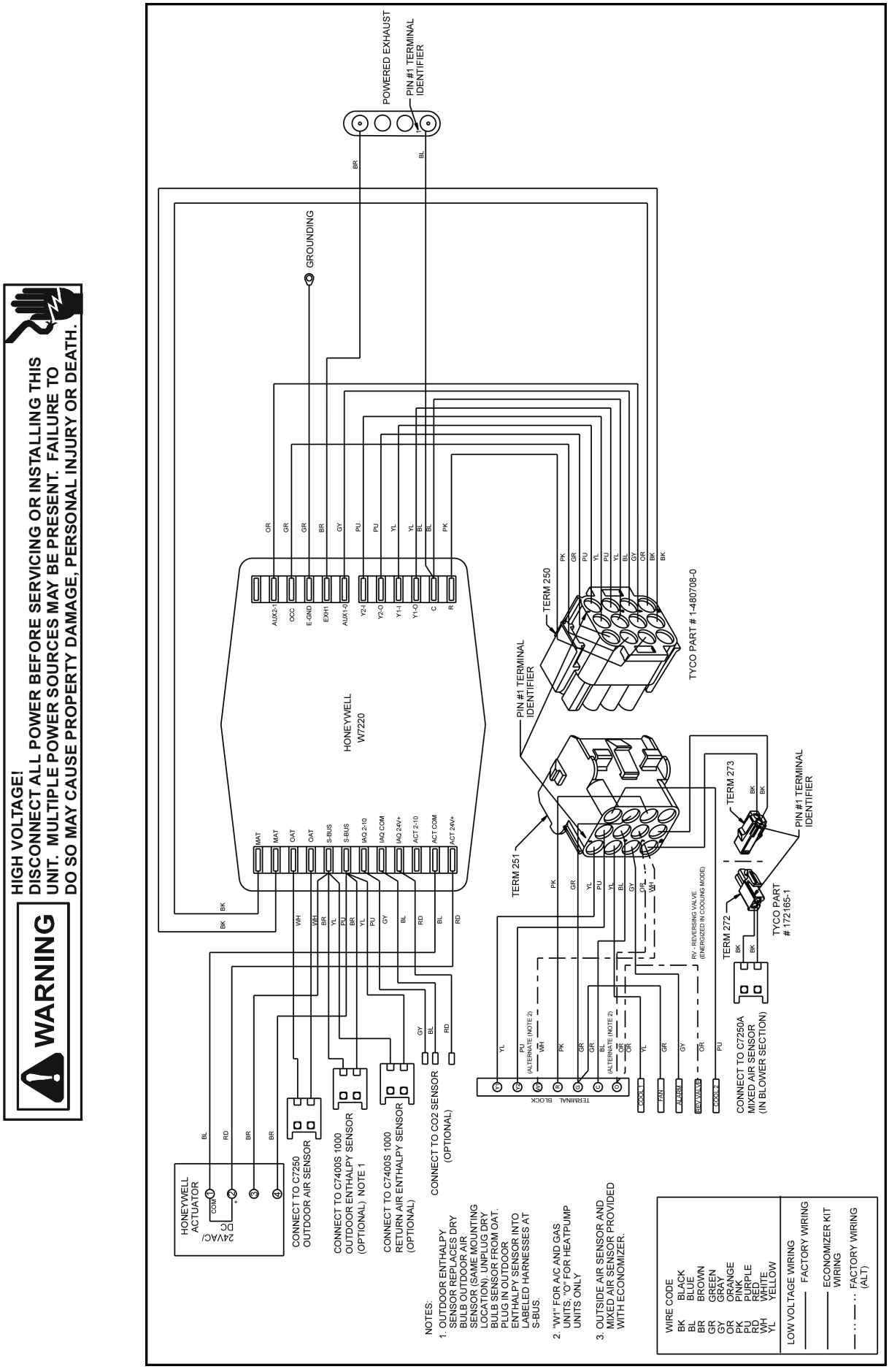
ECONOMIZER SEQUENCE OF OPERATIONS FOR W7220

Wiring of Controller below

This sequence assumes employment of a single enthalpy economizer using a two stage thermostat.

1. A call for cooling comes from room thermostat.
2. The enthalpy sensor determines if the atmospheric conditions are conducive for using outside air for cooling. If YES, go to step 3. If NO, or if outdoor air temperature rises above enthalpy set point, go to step 4.
3. The outside air dampers open and modulate to maintain a mixed air temperature (outside air+indoor air) of 53 degrees F (this is adjustable on the controller. Default is 53 degrees). If the outdoor air is insufficient to satisfy the thermostat alone and a second stage of cooling is required, the compressor starts and works in conjunction with the economizer to cool the space. (Go to step 5.)
4. Outdoor air dampers open to minimum position and the compressor engages to provide mechanical cooling.
5. When the thermostat is satisfied the outside air dampers return to the minimum position.

JADE ECONOMIZER WIRING DIAGRAM



Wiring is subject to change. Always refer to the unit wiring diagram and accessory wiring diagram booklet for the most up-to-date wiring.

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