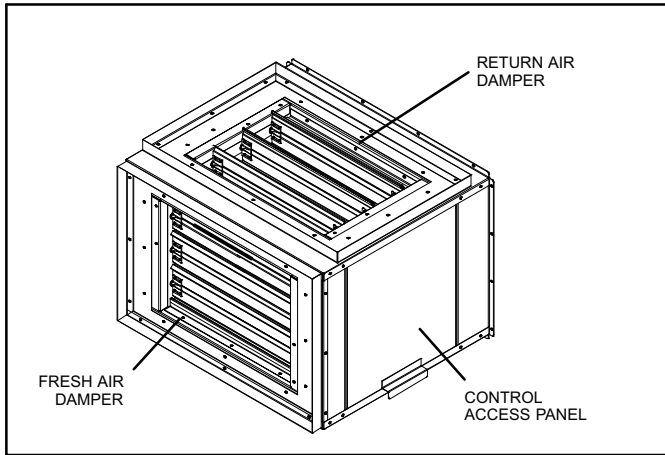


507234-01
3/2014
Supersedes 506956-01

TAA ECONOMIZERS

INSTALLATION INSTRUCTIONS FOR ECONOMIZERS USED WITH TAA SERIES UNITS



Shipping and Packing List

Check parts for shipping damage; if any damage is found, immediately contact the last shipping carrier.

Package 1 of 1 contains the following:

- (1) Economizer assembly
- (1) Bag assembly containing:
 - 1- Outdoor air sensor (A7 for std. economizers, RT26 for high performance economizers)
 - 1- Mixed air sensor
- 18- #10-16 x 1/2 SDST screws
- 1- Title 24 certificate
- 1- Honeywell control manual

RETAIN THESE INSTRUCTIONS FOR FUTURE REFERENCE

Application

Economizers are used for automatic sensor-controlled introduction of outdoor air into the system through an electro-mechanically controlled damper. See table 1 for usage.

⚠ WARNING

Improper installation, adjustment, alteration, service or maintenance can cause personal injury, loss of life, or damage to property.

Installation and service must be performed by a licensed professional installer (or equivalent) or a service agency.

Table 1. Application


Unit	Unit	Economizer Control
072, 090	44W94 / 102133-01	Std. - W7212
120, 150	44W95 / 102133-02	Std. - W7212
180, 240	44W96 / 102133-03	Std. - W7212
072, 090	10U48 / 102133-04	Hi Performance - W7220
120, 150	10U49 / 102133-05	Hi Performance - W7220
180, 240	10U50 / 102133-06	Hi Performance - W7220

⚠ CAUTION

Physical contact with metal edges and corners while applying excessive force or rapid motion can result in personal injury. Be aware of, and use caution when working near these areas during installation or while servicing this equipment.

Economizers are used with TAA units in upflow and horizontal air discharge applications. For units equipped with an inverter (VFD) driven indoor blower motor, refer to the VFD kit installation instructions for additional setup requirements. Economizer dampers will modulate to maintain 55°F (13°C) supply air when outdoor air is suitable. The mixed air temperature sensor (R1) measures the supply air sensible temperature.

⚠ WARNING

 Electric Shock Hazard. Can cause injury or death.

Line voltage is present at all components on units with single-pole contactors, even when unit is not in operation!

Unit may have multiple power supplies. Disconnect all remote electric power supplies before opening access panel.

Unit must be grounded in accordance with national and local codes.

On standard economizers, an outdoor enthalpy sensor (A7) is used to determine whether outdoor air is suitable for free cooling. On high performance economizers, sensible sensor (RT26) is used to determine whether outdoor air is suitable for free cooling. Other outdoor and return air (OA and RA) sensor options are available to determine whether



outdoor air is suitable for free cooling. For differential control, install the second outdoor air sensor in the return air as shown in figure 1. See table 2 and the instructions provided with optional sensors.

The mixed air sensor (R1) and outdoor air sensor (A7 or RT26) are provided with the economizer and installed according to these instructions.

Table 2. Sensors

Sensors	Dampers modulate to maintain 55°F mixed air (R1) when:
Single Outside Air (OA) Sensible	OA temperature (RT26) is lower than free cooling setpoint.
Single Outside Air (OA) Enthalpy	OA temperature and humidity (A7) is lower than free cooling setpoint.
Differential Sensible - 1 in OA and 1 in RA	OA temperature (RT26) is lower than return air (RA) temperature (RT27).
Differential Enthalpy - 1 in OA and 1 in RA*	OA temperature and humidity (A7) is lower than RA temperature and humidity (A62).

Table of Contents

General Page 2

 Standard Economizer Page 2

 High Performance Economizer Page 2

 Indoor Air Quality Page 2

Economizer - Installation Page 5

Standard Economizer - Thermostat Diagram Page 7

Standard Economizer - Wiring Diagram Page 8

High Performance Sensor Connections Page 9

High Performance Economizer -Wiring Diagram
..... Page 10

Standard Economizer - A6 Control Page 11

Standard Economizer - System Check Page 13

Standard Economizer - Sequence of Operation Page 13

High Performance Economizer Page 14

 Initial Setup Page 14

 Using the Key pad Page 14

 Menu Structure Page 14

 Setup and Configuration Page 14

 Alarm Monitoring Page 15

High Performance Economizer - Settings ... Page 16

 Free Cooling Setpoints Page 16

 Damper Minimum Position Page 16

 Demand Controlled Ventilation (DCV) . Page 18

High Performance Economizer -
 Sequence of Operation Page 19

Maintenance Page 20

General

Standard Economizer

The standard economizer is equipped with a W7212 economizer control module A6. The default outdoor enthalpy sensor (A7) is provided in this kit. Install sensor as close as possible to inlet of incoming outdoor air.

High Performance Economizer

The high performance economizer is equipped with a W7220 control module A6. The default outdoor air sensor (RT26) is provided in this kit. Install sensor as close as possible to inlet of incoming outdoor air. This application provides low leak, fault detection and diagnostic capabilities. The default OA temperature sensor or high limit sensor (RT26) is a CEC approved, California Title 24 fixed dry bulb device (provided in this kit). See table 2 for outdoor and return air (OA and RA) sensor options. Refer to manufacturer's instructions provided for more details.

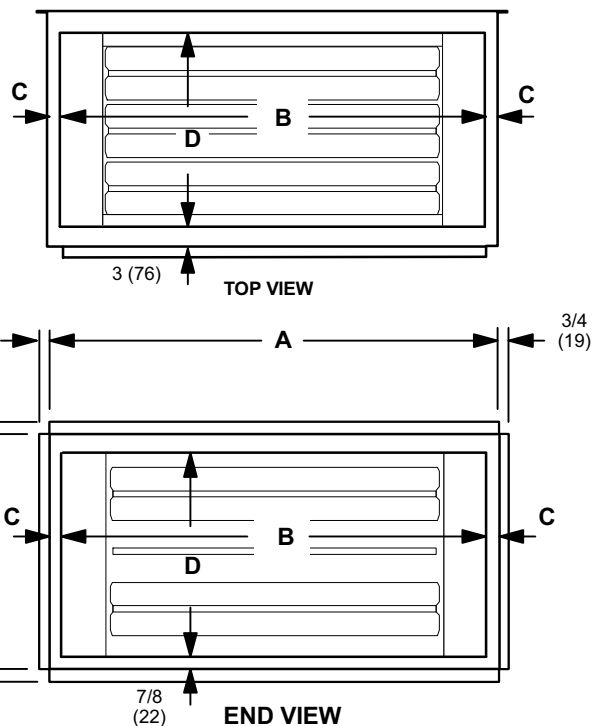
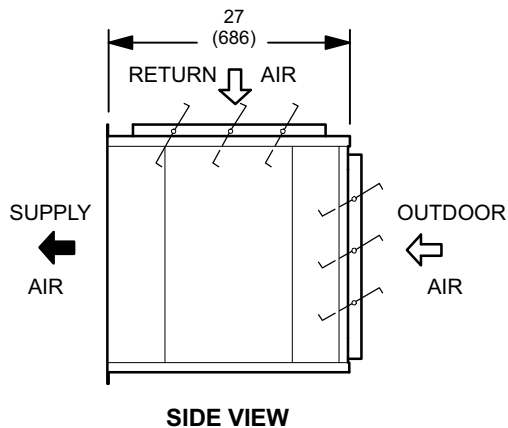
IAQ Sensing (A63)

An IAQ sensor is used when demand control ventilation (DCV) is specified. Damper minimum position can be set lower than traditional minimum air requirements resulting in cost savings. The IAQ sensor allows the A6 to open dampers to traditional ventilation requirements as room occupancy (CO₂) increases.

For proper operation, the IAQ sensor must provide a 2-10VDC, 100 ohm impedance signal. Connect sensor leads to wires in control box labeled IAQ and IAQ-COM.

STANDARD AND HIGH PERFORMANCE ECONOMIZER DIMENSIONS

NOTE- ECONOMIZER SECTION MAY BE ROTATED 180° FOR BOTTOM RETURN AIR CONNECTION.



Model No. (Air Handler Usage)	A		B		C		D	
	in.	mm	in.	mm	in.	mm	in.	mm
T2ECON31L-1 / T2ECON31L-1- (072-090)	32	813	30	762	1	25	20-1/2	521
T2ECON31M-1 / T2ECON31M-1- (120-150)	51-1/2	1308	45	1143	3-1/4	83	20-1/2	521
T2ECON31N-1 / T2ECON31N-1- (180-240)	72	1829	60	1524	6	152	20-1/2	521
T2ECON34L-1 / T2ECON31L-1- (072-090)	32	813	30	762	1	25	20-1/4	514
T2ECON34M-1 / T2ECON31M-1- (120-150)	51-1/2	1308	45	1143	3-1/4	83	20-1/4	514
T2ECON34N-1 / T2ECON31N-1- (180-240)	72	1829	60	1524	6	152	20-1/4	514

STANDARD AND HIGH PERFORMANCE ECONOMIZER APPLICATIONS

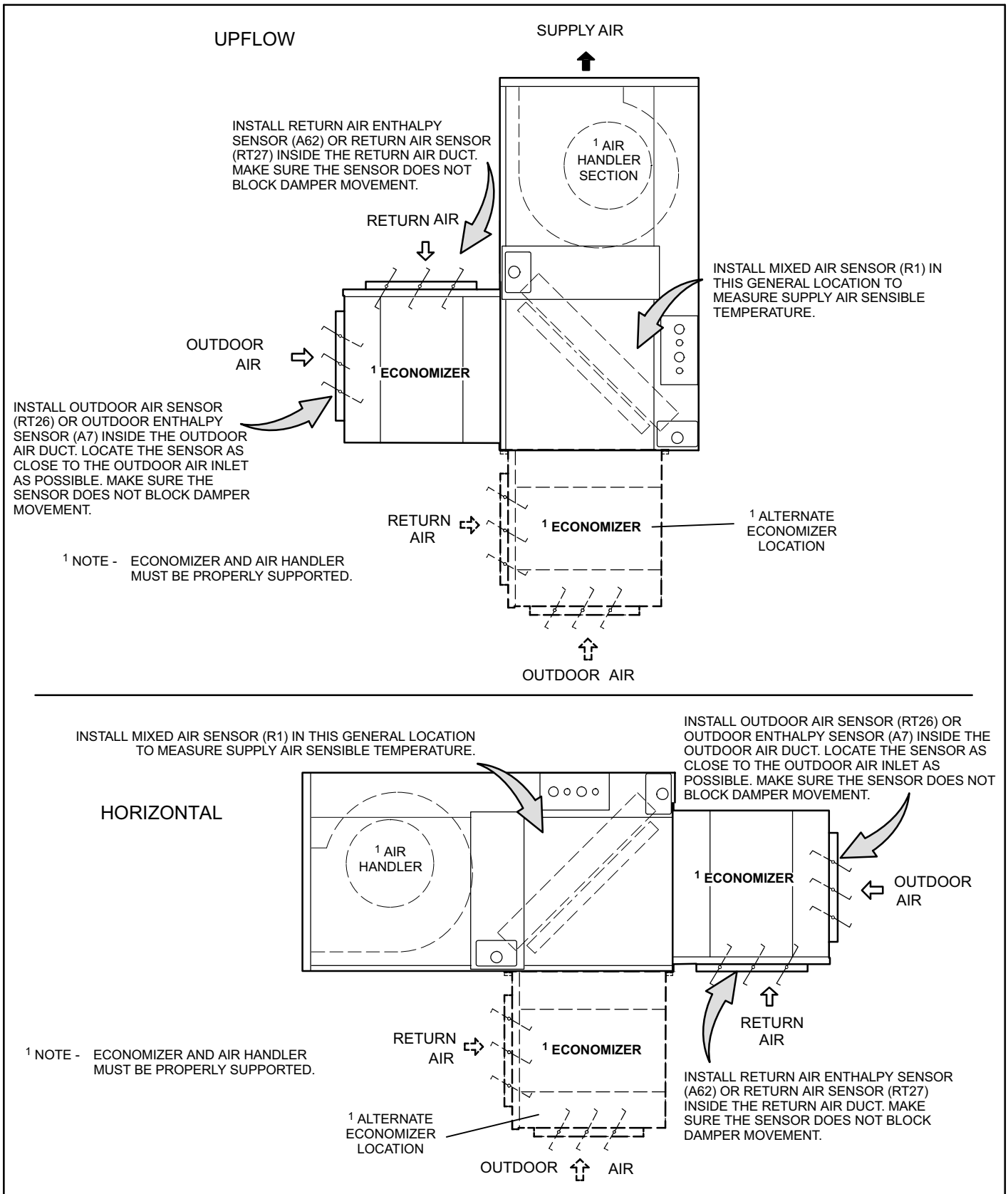


Figure 1. Upflow and Horizontal Applications

Economizer Installation

UPFLOW OR HORIZONTAL APPLICATIONS

1. Disconnect all power to the unit.
2. Determine the application (upflow or horizontal).
3. Attach economizer over return air opening with screws provided (figure 2).
4. Remove control access panel on both the economizer and TAA unit.

NOTE — Ensure the mixed air sensor is mounted down stream of evaporator.

5. Remove and discard existing **P3** jumper plug from **J3** jack on unit wiring harness (figure 3).
6. Connect economizer wiring harness connector **P4** into air handler jack **J3**.

WARNING

Do not connect economizer plug P4 to air handler J2 when using a temperature control system. Control damage could result. See control wiring diagram for proper jack/plug connections.

7. Use wire ties to secure excess coiled wire to blower motor capacitor leads.

8. Install outdoor air sensor (A7 or RT26) as close as possible to inlet of outdoor air.
9. *Std. Economizer Installations -*
Route wires marked SO and SO+ from economizer to A7 enthalpy sensor. Make wiring connections as shown in figure 4 and 5.

High Performance Installations -

Route wires marked OAT from economizer to RT26 outdoor air sensor. Make wiring connections as shown in figure 6 and 7.

10. Install mixed air sensor as shown in figures 1 and 3.
11. *Std. Economizer Installations -*
Route black wires (marked T and T1) from economizer to R1 mixed air sensor. Make wiring connections as shown in figure 4 and 5.

High Performance Installations -

Route plug with two wires from economizer to R1 mixed air sensor. Make wiring connections as shown in figure 6 and 7.

12. Replace control access panel on economizer and unit.
13. Place return and fresh air ducts to economizer and seal air tight.

NOTE — Economizer section may be rotated 180° for bottom return air connections (figure 1).

14. Restore power to the unit.

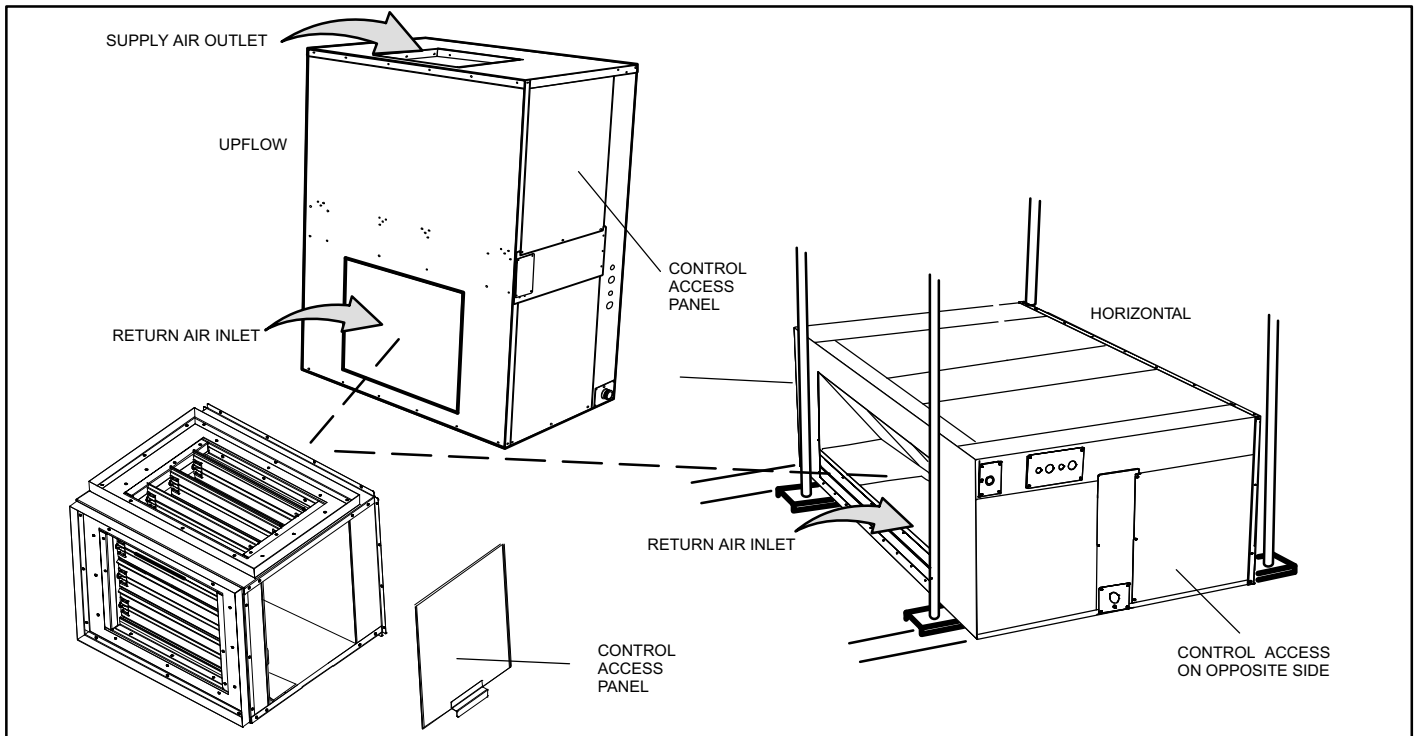


Figure 2. Upflow and Horizontal Applications

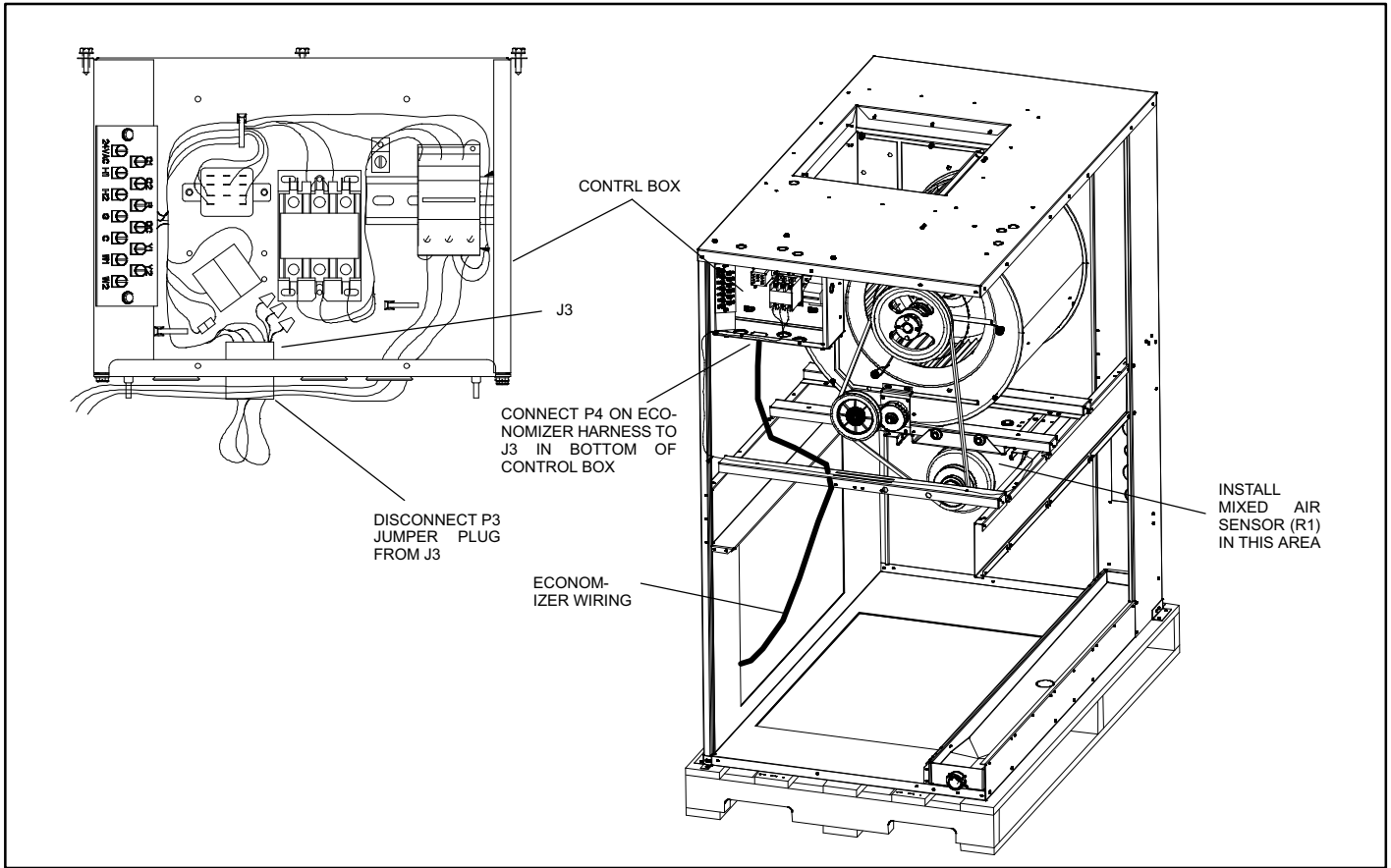
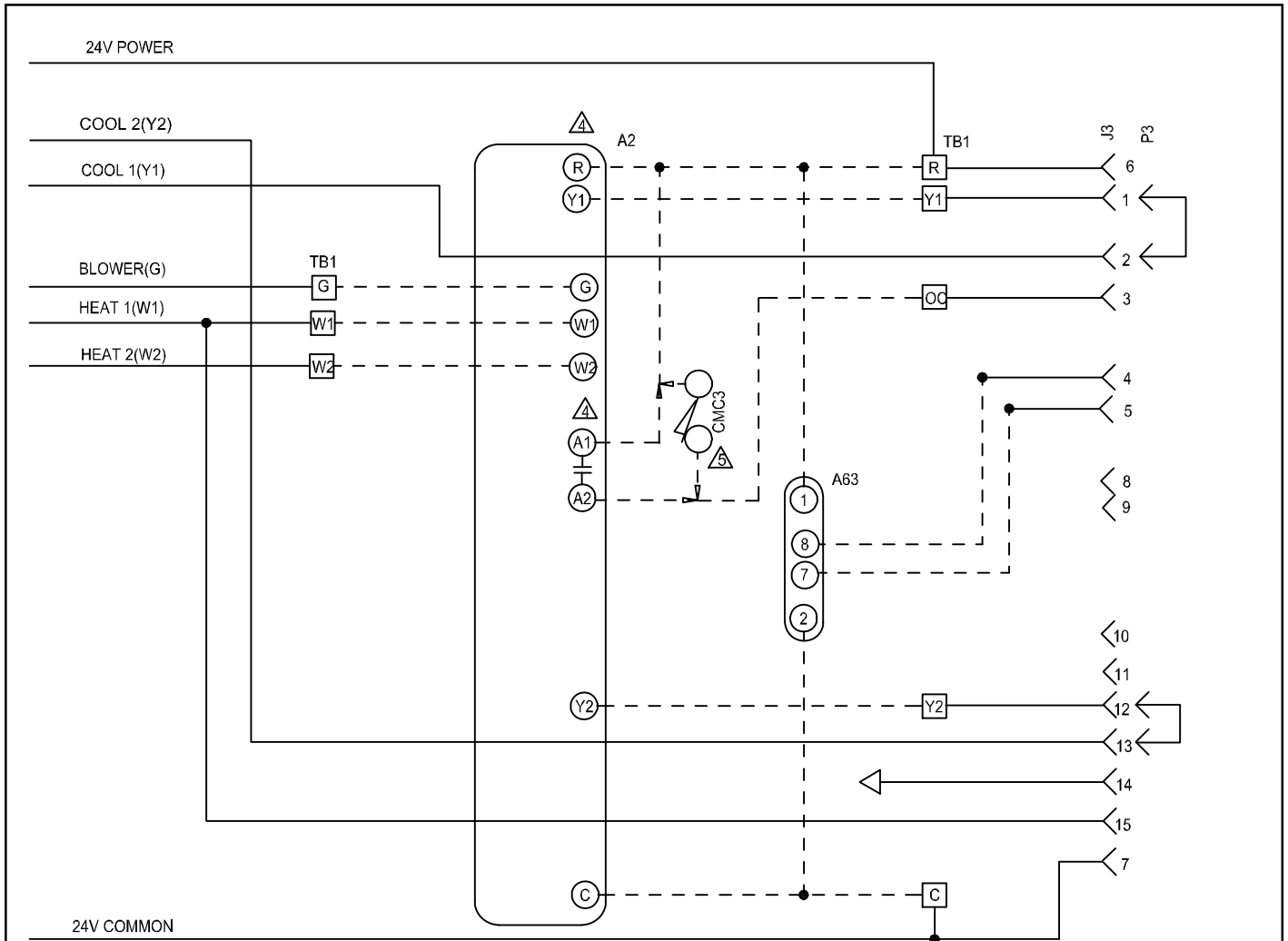


Figure 3. Upflow and Horizontal Applications



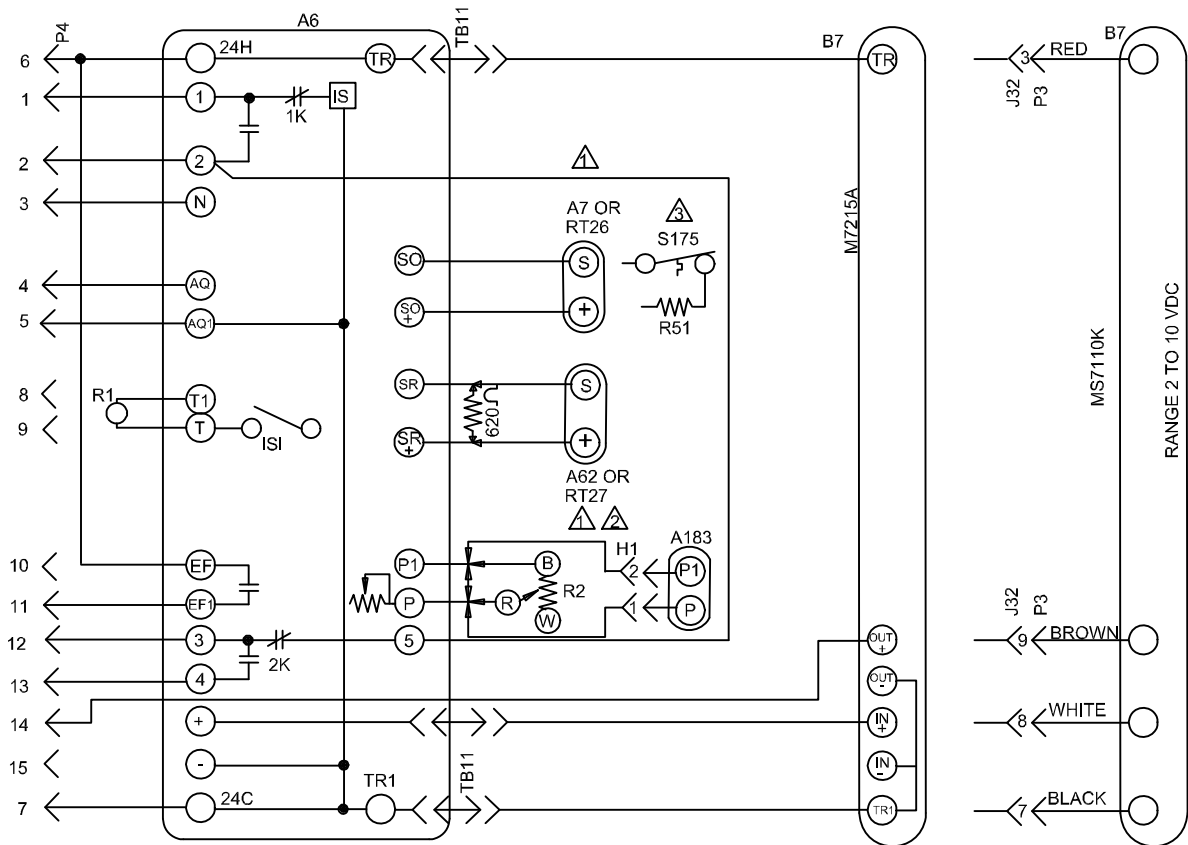
KEY	COMPONENT
A2	SENSOR-ELECTRONIC
A63	SENSOR-CO2
CMC3	CLOCK-TIME
J3	JACK-UNIT ECONOMIZER
P3	PLUG-LESS ECONOMIZER
TB1	TERMINAL STRIP-CLASS II VOLTAGE

- THERMOSTAT SUPPLIED BY USER
- REMOVE P3 WHEN ECONOMIZER IS USED
- J3 MAXIMUM LOAD 20VA 24VAC CLASS II
- T7300 THERMOSTAT
- TIME CLOCK CONTACTS (OPT) CLOSED OCCUPIED

DESIGNATES OPTIONAL WIRING
 CLASS II FIELD WIRING

04/14		WIRING DIAGRAM	04/14
		537720-01	
ACCESSORIES			
ELECTRONIC OR ELECTROMECHANICAL THERMOSTAT TAA, TPA UNITS			
SECTION C			REV. 0
Supersedes		New Form No. 537720-01	

Figure 4. Typical TAA Control Wiring



KEY	COMPONENT
A6	CONTROL-SOLID STATE ENTHALPY
A7	SENSOR-SOLID STATE ENTHALPY
A62	SENSOR-ENTHALPY, INDOOR
A183	CONTROL, VFD BOARD
B7	MOTOR-DAMPER, ECONOMIZER
J32	JACK-ECONOMIZER ADAPTOR
P3	PLUG - LESS ECONOMIZER
P4	PLUG - ECONOMIZER
R1	SENSOR-MIXED AIR OR SUPPLY AIR
R2	POT-MINIMUM POSITION
RT26	SENSOR-OUTDOOR AIR TEMP
RT27	SENSOR-INDOOR AIR TEMP
TB11	TERMINAL STRIP

- ▲ RT26 AND RT27, TEMPERATURE SENSORS MAY BE USED INSTEAD OF A7 AND A62 ENTHALPY SENSORS
- ▲ A62 ENTHALPY SENSOR OR RT27 USED FOR DIFFERENTIAL SENSING
- ▲ OPTIONAL OUTDOOR THERMOSTAT TO REPLACE RT26 SENSIBLE SENSOR
 ←-----→ DESIGNATES OPTIONAL WIRING
 ----- CLASS II FIELD WIRING

04/14		WIRING DIAGRAM	04/14
		537727-01	
ACCESSORIES			
ECONOMIZER FOR TSA, TPA UNITS			
SECTION D			REV. 0
Supersedes		New Form No. 537727-01	

Figure 5. Standard (W7212) Economizer Control Wiring

High Performance Economizer Sensor Connections

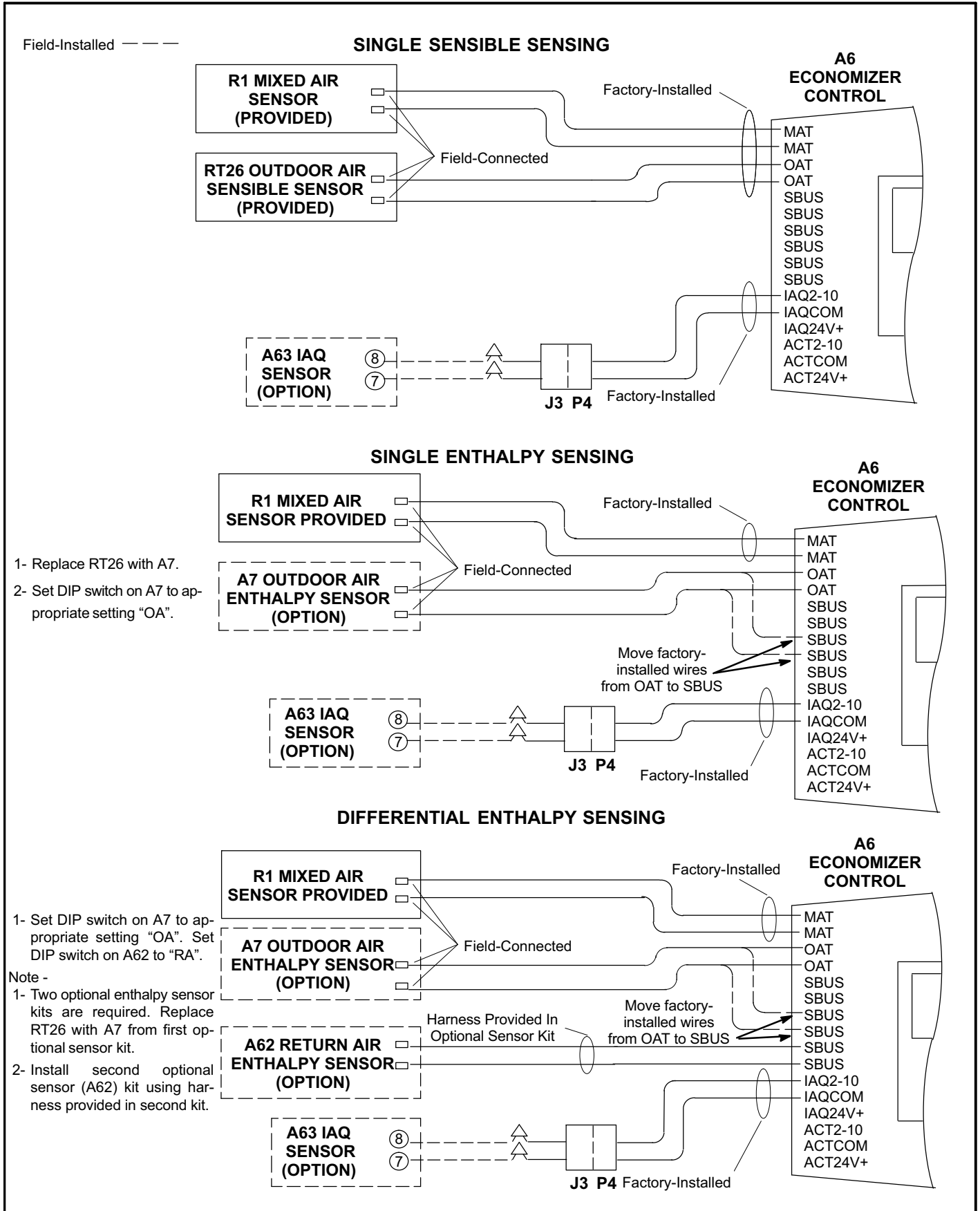


Figure 6. High Performance (W7220) Sensor Wiring

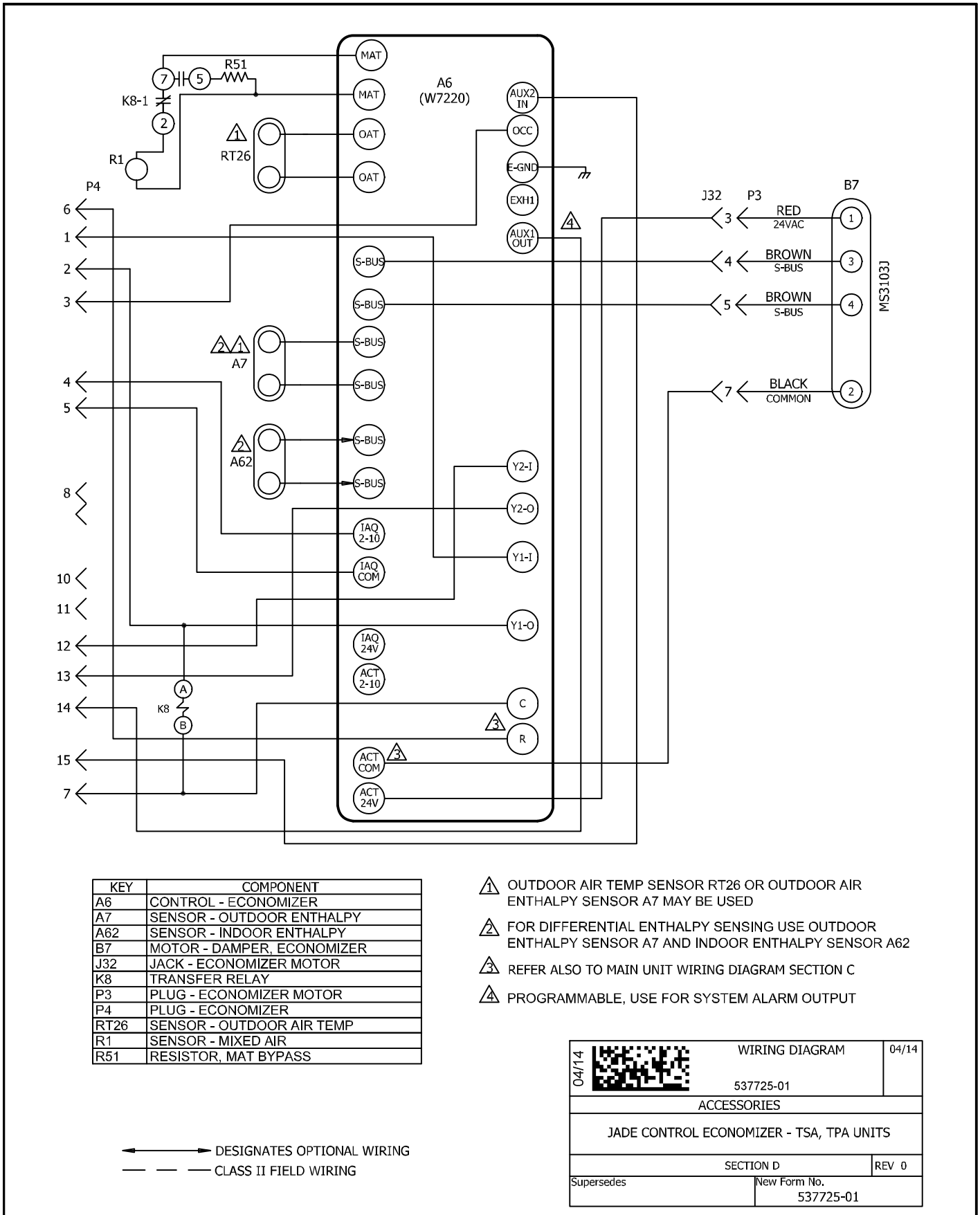


Figure 7. High Performance (W7220) Economizer Control Wiring

Standard Economizer - A6 Control

LEDS

A steady green Free Cool LED indicates that outdoor air is suitable for free cooling. A steady green DCV LED indicates that the IAQ reading is higher than setpoint requiring more fresh air. See figure 8.

FREE COOLING SETPOINT

Single Temperature or Enthalpy Sensing:

The economizer control (A6) setpoint may be adjustable.

Free cooling will be enabled when outdoor air temperature or enthalpy are lower than the free cooling setpoint. The free cooling setpoints for sensible temperature sensors is 55°F. Table 3 shows the free cooling setpoints for enthalpy sensors. Use the recommended setpoint and adjust as necessary.

For example: At setting A (table 3), free cooling will be enabled when outdoor air enthalpy is lower than 73°F and 50% RH. If indoor air is too warm or humid, lower the setpoint to B. At setting B, free cooling will be enabled at 70°F and 50% RH.

Table 3. Enthalpy Free Cooling Setpoints

Control Setting	Enthalpy Setpoint At 50% RH
A*	73° F (23° C)
B	70° F (21° C)
C	67° F (19° C)
D	63° F (17° C)

*Setting A is recommended.

Differential Sensing:

Two sensors can be used to compare outdoor air to return air. When outdoor air is cooler than return air, outdoor air is suitable for free cooling. Adjust the free cooling setpoint to D in this application.

When return air is cooler than outdoor air, the damper will modulate to the minimum position.

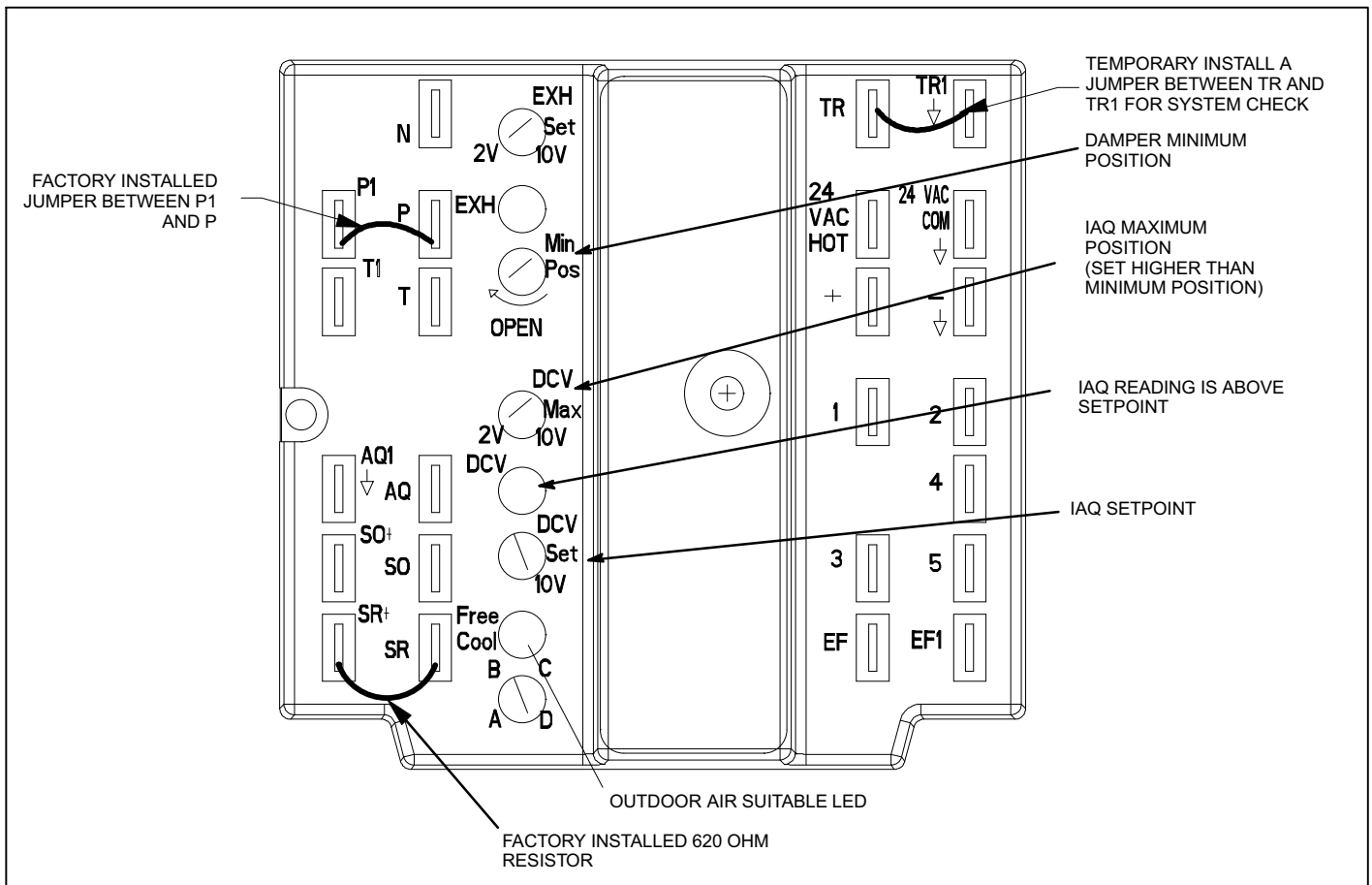


Figure 8. A6 Economizer Control

DAMPER MINIMUM POSITION SETTING

NOTE — Installed a jumper between TB1 R and OC terminals to maintain occupied status (allowing minimum fresh air). See figure 9. When using an electronic thermostat or energy management system with an occupied/unoccupied feature, remove jumper. Make wire connections to R and OC as shown in literature provided with thermostat or energy management system. Either the jumper wire or optional device must be connected to A1 and A2 for the economizer to function.

NOTE — If below 50 degrees add jumper from T to T1 during adjustment. (if not the OAD will not open) and to jumper R to OC on TAA terminal strip.

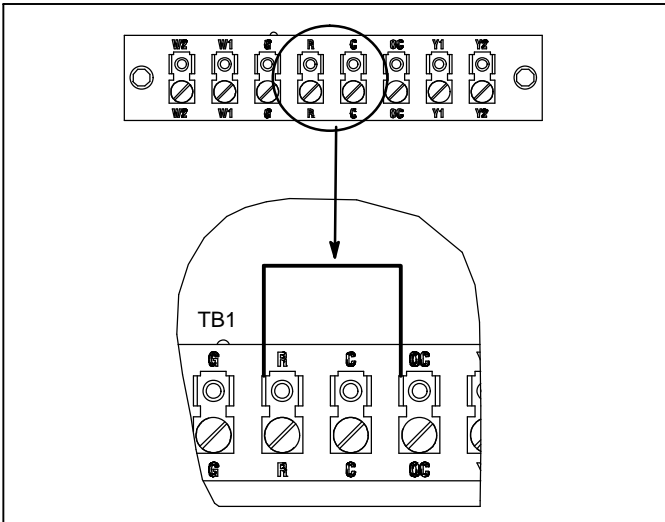


Figure 9. TB1 Terminal R and OC Jumpers

1. Set thermostat to occupied mode if the feature is available. Make sure jumper is in place between TB1 terminals R and OC if using a thermostat which does not have the feature.
2. Rotate MIN POS SET potentiometer to approximate desired fresh air percentage.

NOTE — On units equipped with an inverter (VFD) driven supply air blower motor, the VFD control board located in the external MSAV mounting box is controlling the minimum damper position of the economizer. Refer to the VFD kit installation instruction for further information.

NOTE — Damper minimum position can be set lower than traditional minimum air requirements when an IAQ sensor is specified.

3. Measure outdoor air temperature. Mark the point on the bottom line of chart 2 and label the point “A” (40°F, 4°C shown).
4. Measure return air temperature. Mark that point on the top line of chart 2 and label the point “B” (74°F, 23°C shown).
5. Measure mixed air (outdoor and return air) temperature. Mark that point on the top line of chart 2 and label point “C” (70°F, 21°C shown).
6. Draw a straight line between points A and B.
7. Draw a vertical line through point C.
8. Draw a horizontal line where the two lines meet. Read the percent of fresh air intake on the side.
9. If fresh air percentage is less than desired, adjust MIN POS SET potentiometer clockwise (further open). If fresh air percentage is more than desired, adjust MIN POS SET potentiometer counterclockwise (less open). Repeat steps 3 through 8 until calculation reads desired fresh air percentage.

DCV SET AND DCV MAX SETTINGS

The **DCV SET** potentiometer is factory-set at approximately 50% of the potentiometer range. Using a standard 1-2000ppm CO₂ sensor, dampers will start to open when the IAQ sensor reads approximately 1000ppm. Adjust the **DCV SET** potentiometer to the approximate setting specified by the controls contractor. Refer to figure 8.

The **DCV MAX** potentiometer is factory-set at approximately 50% of the potentiometer range or 6VDC. Dampers will open approximately half way when CO₂ rises above setpoint. Adjust the **DCV MAX** potentiometer to the approximate setting specified by the controls contractor. Refer to figure 8.

NOTE — **DCV MAX** must be set higher than economizer minimum position setting for proper demand control ventilation.

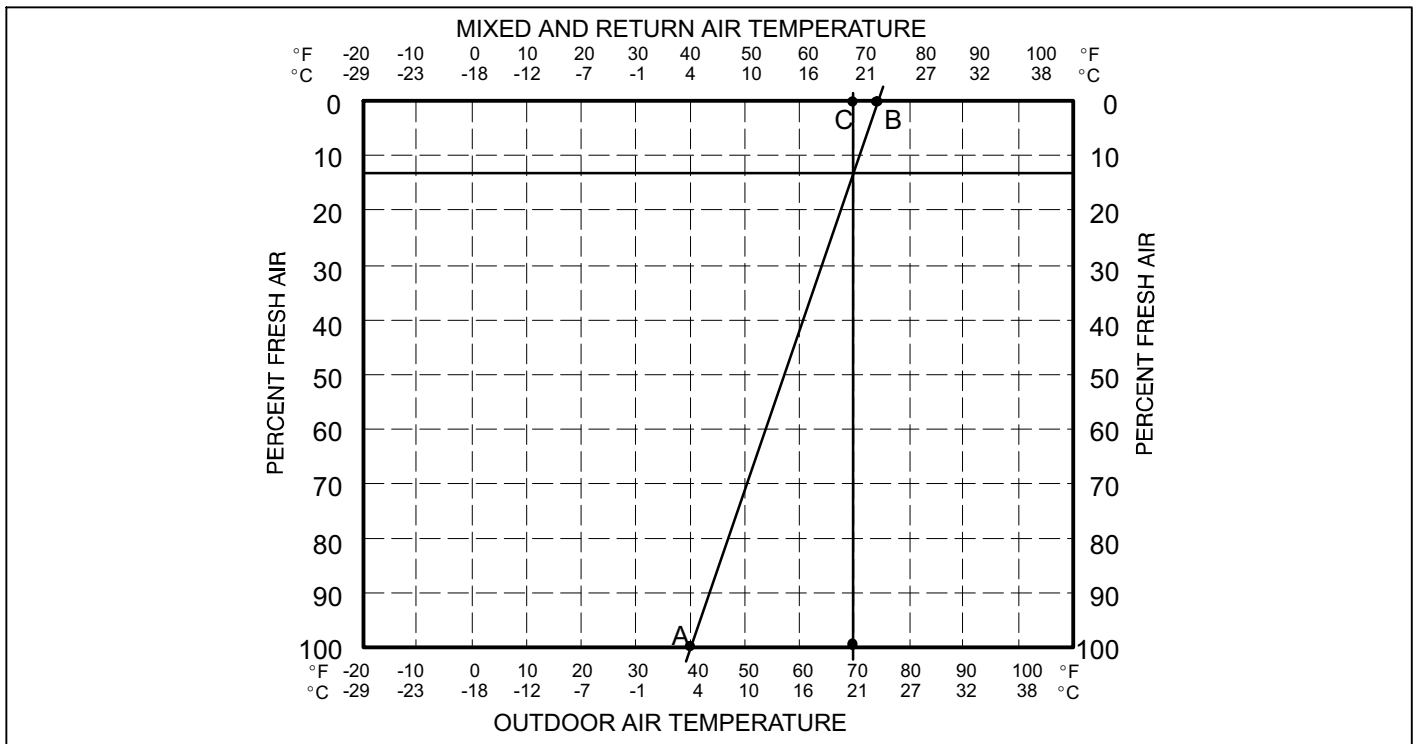


Figure 10. Calculate Minimum Fresh Air Percentage

Standard Economizer - System Check

1. Disconnect main power to unit.
2. Install jumper to auxiliary contacts of blower contactor (B3) in air handler control box.
3. Turn thermostat control to OFF position.
4. Remove economizer control access cover (figure 2).
5. Install jumper on damper motor terminal TR and TR1 (figure 8).
6. Restore power to unit. Damper should drive to fully opened position (requires 1-1/2 minutes for full travel). Observe travel for proper damper operation.
7. Disconnect power to unit. Damper should spring return to closed position.
8. Remove jumper installed on step 5 then restore power to unit. Adjust minimum vent position on potentiometer on control module. Replace control access cover.
9. Disconnect power to unit and remove jumper on auxiliary contacts of blower contactor in main unit control box. Restore power to unit.

Standard Economizer - Operation

COOLING MODE

1. On a call for cooling, with ambient temperature and humidity above A6 economizer control set point damper will open to minimum vent position and cooling demand is satisfied by compressor.
2. On a call for cooling, with outside air temperature and humidity (A7) is lower than return air temperature and humidity (A62), the damper will modulate to control supply air temperature at 55°F (13°C). If additional cooling is required, compressor will be energized through second stage of thermostat.

HEATING MODE

1. On a call for heat during day operation, the damper will open to the minimum vent position.
2. On a call for heat during night operation (requires optional field-provided night thermostat with clock), the damper will remain closed.

High Performance Economizer - A6 Control

NOTE - The A6 economizer control will be in the "setup" mode for the first sixty minutes after powered. If a sensor for outdoor air or SBUS device (sensor, actuator) is disconnected during the set up mode, the A6 will not alarm that failure. The R1 mixed air sensor is a system "critical" sensor; if the mixed air sensor is removed during the set up mode, the A6 will alarm. After sixty minutes the A6 will change to operation mode and all components removed or failed will alarm in the operation mode.

INITIAL SETUP

A default program must be modified for proper operation in each application. This is done during the initial setup procedure. See *Setup and Configuration* -.

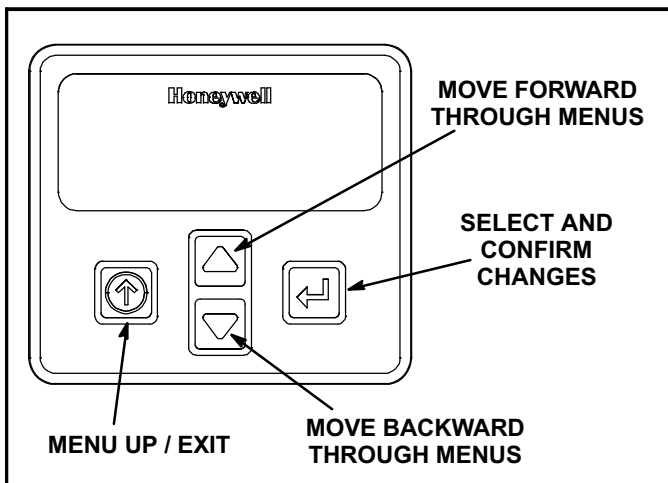


Figure 11. A6 Economizer Control Keypad

USING THE KEYPAD

Use the keypad as follows:

- Navigate to the desired menu.
- Press the \leftarrow button (enter) to display the first item in the currently displayed menu.
- Use the \blacktriangle and \blacktriangledown buttons to scroll to the desired parameter.
- Press the \leftarrow enter button (enter) to display the value of the currently displayed item.
- Press the \blacktriangle button to increase (change) the displayed parameter value.^a
- Press the \blacktriangledown button to decrease (change) the displayed parameter value.^a
- Press the \leftarrow enter button (enter) to accept the displayed value and store it in non-volatile RAM.

- CHANGE STORED displays.
- Press the \leftarrow button (enter) to return to the current menu parameter.
- Press the \uparrow button (MenuUp/Exit) to return to the previous menu.

^aWhen values are displayed, pressing and holding the \blacktriangle or \blacktriangledown button causes the display to automatically increment.

MENU STRUCTURE

The menus in display order are:

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

For a complete list of parameters refer to the Honeywell installation manual provided in this kit.

IMPORTANT - Menu parameters will be different depending on each configuration. For example: if a DCV (CO₂) sensor is not used, none of the DCV parameters will appear and only MIN POS will display. If a CO₂ sensor is used, the DCV SET, VENTMIN and VENTMAX will appear.

SETUP AND CONFIGURATION

Program the following parameters into the controller. Navigate to the specific menus to make the changes required.

IMPORTANT - During setup, the economizer control is live at all times.

The setup process uses a hierarchical menu structure. Press the \blacktriangle and \blacktriangledown arrow buttons to move forward and backward through the menus and press the \leftarrow button to select and confirm setup item changes.

1. In the **SYSTEM SETUP** Menu

INSTALL	(MM/DD/YY) enter installation date
EQUIPMENT	(CONV)
AUX2 IN	(HEAT W1)
FAN SPEED	(1SPEED CAV unit) (2SPEED MSAV unit)
FAN CFM	() enter highest indoor blower capacity of rooftop unit.
AUX1 OUT	(NONE) change to SYS if A6 controller is wired for remote alarm monitoring.
OCC	(INPUT)

**High Performance Economizer -
A6 Control** (continued)

2. In the **ADVANCED SETUP** Menu

- MA LO SET (45°F)
- FREEZE POS (CLOSE)
- STG3 DLY (2HRS)
- SD DMPR POS (CLOSED)

3. In the **SETPOINTS** Menu

- MA SET (55°F)
- LO T LOCK (32°F)
- MIN POS (VDC) refer to minimum position setting section for details.

ALARM MONITORING

The controller is equipped with a 24V output signal that can be configured for remote alarm monitoring.

In the "SYSTEM SETUP" menu change the "AUX1 OUT" setting to "SYS". Refer to figure 12 for wiring connections provided.

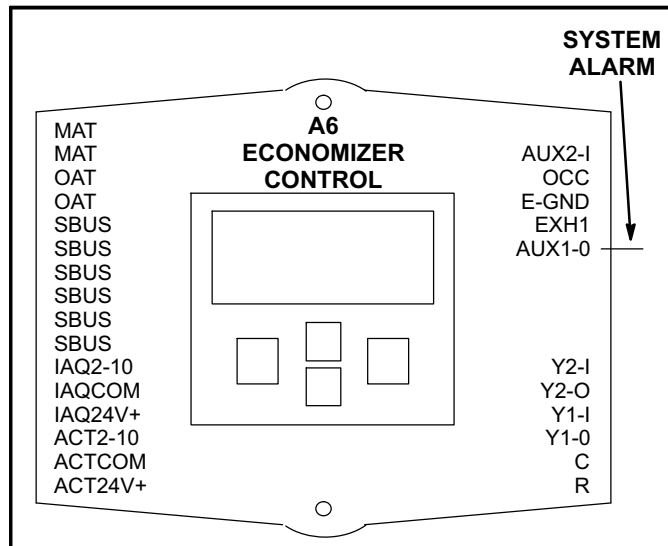


Figure 12. A6 Control High Performance Terminals

High Performance Economizer - Settings

FREE COOLING SETPOINT

Single OA Sensible Sensing (Default) -

The default free cooling setpoint or high limit setpoint is 63°F. This means that the outdoor air is suitable for free cooling at 62°F and below and not suitable at 64°F and above. This setpoint is adjustable.

For *California Title 24* compliance, adjust the free cooling setpoint based on:

- The climate zone where the unit is installed. See table 4.

- The setpoint requirement published by the California Energy Commission. See *Section 140.4 - Prescriptive Requirements for Space Conditioning Systems of the 2013 Building Energy Efficiency Standards*.

Note - Values in the referenced standard will supersede values listed in table 4.

Table 4. Free Cooling Setpoint - Single Sensible

Climate Zone	Setpoint
1, 3, 5, 11-16	75°F
2, 4, 10	73°F
6, 8, 9	71°F
7	69°F

To adjust the setpoint, navigate to the “*SETPOINTS*” menu and change the “*DRYBLB SET*” parameter accordingly.

Single OA Enthalpy Sensing (Optional)

The controller uses enthalpy boundary “curves” for economizing when used with an enthalpy sensor. Refer to the Honeywell installation instruction for details.

Differential Sensing (Optional)

Two sensors can be used to compare outdoor air to return air. When outdoor air is cooler than return air, outdoor air is suitable for free cooling. When return air is cooler than outdoor air, the damper will modulate to the minimum position.

DAMPER MINIMUM POSITION

NOTE - 24 volts must be provided at unit TB1 terminals **R** and **OC** to enable economizer operation (allowing minimum fresh air). Typically a separately ordered thermostat or energy management system with an occupied/unoccupied output is connected between TB1 **R** and **OC** terminals. The thermostat will provide 24 volts to the A6 economizer control during the occupied time

period to enable economizer minimum position. If a device is not used to enable the economizer, install a jumper wire between TB1 terminals **R** and **OC** to maintain minimum position continuously. See figure 13.

Make wire connections to TB1 terminals **R** and **OC** as shown in literature provided with thermostat or energy management system.

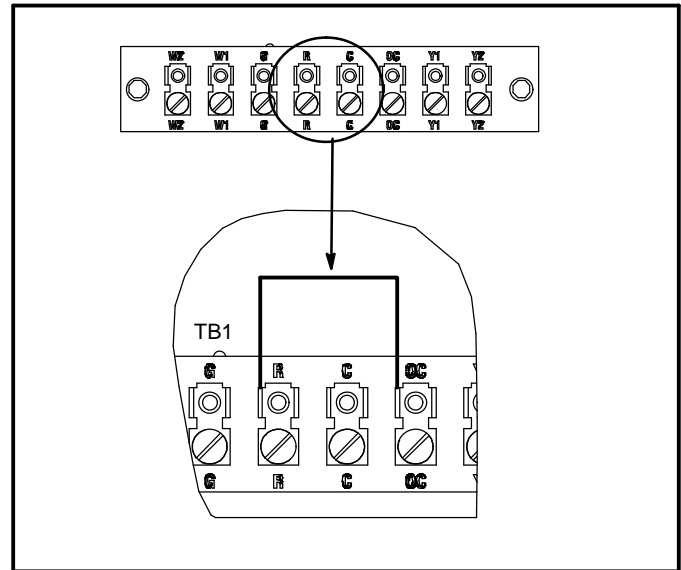


Figure 13. TB1 Terminal R and OC Jumper

UNITS WITH 1-SPEED SUPPLY AIR BLOWER

1. Set thermostat to occupied mode if the feature is available. Make sure jumper is in place between TB1 terminals R and OC if using a thermostat which does not have the feature.
2. Turn on the blower using the thermostat or a jumper between TB1 terminals R and G.
3. Navigate to the “*SETPOINTS*” menu and select “*MIN POS*”. Adjust value (2-10VDC) to the approximate desired fresh air percentage.

3.0 VDC - 12% Open Damper

3.5 VDC - 18% Open Damper

4.0 VDC - 25% Open Damper

4.5 VDC - 31% Open Damper

5.0 VDC - 37% Open Damper

5.5 VDC - 43% Open Damper

6.0 VDC - 50% Open Damper

NOTE - Damper minimum position can be set lower than traditional minimum air requirements when an IAQ sensor is specified.

4. Measure outdoor air temperature. Mark the point on the bottom line of chart 1 and label the point “A” (40°F, 4°C shown).

High Performance Economizer - Settings (continued)

5. Measure return air temperature. Mark that point on the top line of chart 1 and label the point "B" (74°F, 23°C shown).
6. Measure mixed air (outdoor and return air) temperature. Mark that point on the top line of chart 1 and label point "C" (70°F, 21°C shown).
7. Draw a straight line between points A and B.
8. Draw a vertical line through point C.
9. Draw a horizontal line where the two lines meet. Read the percent of fresh air intake on the side.
10. Repeat steps 3 through 8 until calculation reads desired fresh air percentage.

If fresh air percentage is less than desired, use the A6 keypad to adjust "MIN POS" values higher (further open). If fresh air percentage is more than desired, adjust "MIN POS" values lower (less open). Repeat steps 3 through 8 until calculation reads desired fresh air percentage.

UNITS WITH 2-SPEED SUPPLY AIR BLOWER

NOTE - AFTER setting minimum positions, set the "VENT SPEED" switch on the VFD control board to "LO". See figure 14. Minimum position potentiometers do not function when the unit is equipped with a W7220 economizer control.

1. Set thermostat to occupied mode if the feature is available. Make sure a jumper is in place between TB1 terminals R and OC when using a thermostat which does not have this feature.
2. **Minimum damper position setting - Low Speed**
Switch the blower speed setting on the VFD control board to "LO".

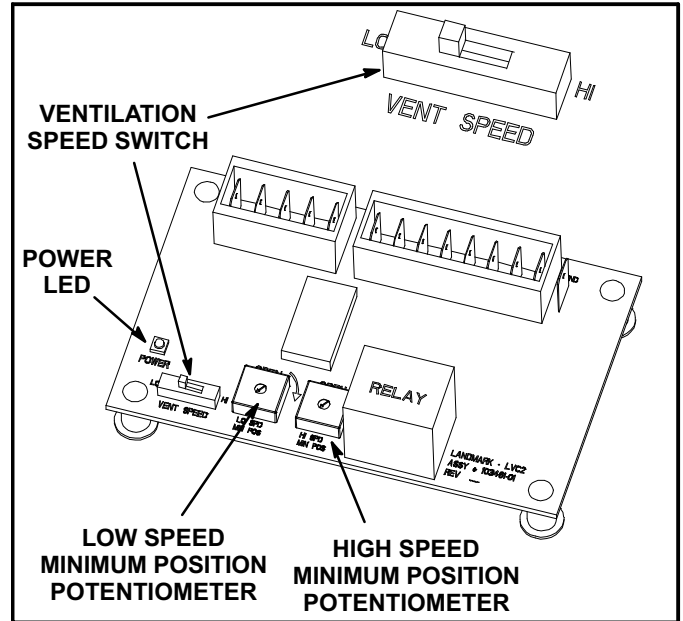
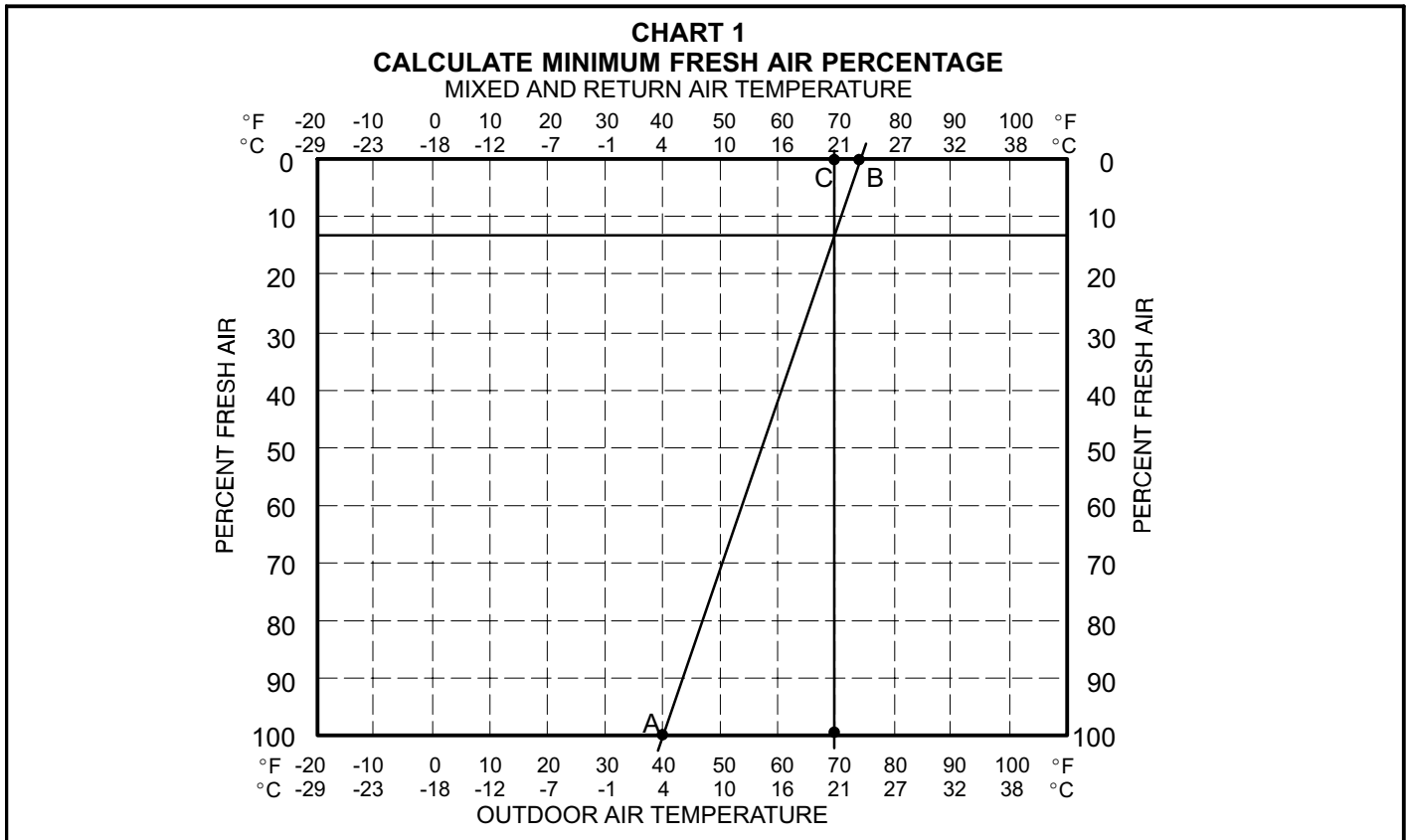


Figure 14. LVC2 (A183) VFD Control Board



High Performance Economizer - Settings (continued)

3. Turn on the indoor blower using the thermostat or by placing a jumper between TB1 terminals R and G. The inverter or variable frequency drive (VFD) should display "40.00Hz".
4. Navigate to the "SETPOINTS" menu and select "MIN POS L". Adjust value (2-10VDC) to the approximate desired fresh air percentage and save the input.
 - 3.0 VDC - 12% Open Damper
 - 3.5 VDC - 18% Open Damper
 - 4.0 VDC - 25% Open Damper
 - 4.5 VDC - 31% Open Damper
 - 5.0 VDC - 37% Open Damper
 - 5.5 VDC - 43% Open Damper
 - 6.0 VDC - 50% Open Damper

NOTE - Damper minimum position can be set lower than traditional minimum air requirements when an IAQ sensor is specified.

5. Navigate to the "CHECKOUT" menu and select "VMAX-LS". Press ←.
6. Display will read "DAMPER VMAX-LS RUN?". Press ←.
7. Damper will drive to the setpoint value stored in step 4.
8. Measure outdoor air temperature. Mark the point on the bottom line of chart 1 and label the point "A" (40°F, 4°C shown).
9. Measure return air temperature. Mark that point on the top line of chart 1 and label the point "B" (74°F, 23°C shown).
10. Measure mixed air (outdoor and return air) temperature. Mark that point on the top line of chart 1 and label point "C" (70°F, 21°C shown).
11. Draw a straight line between points A and B.
12. Draw a vertical line through point C.
13. Draw a horizontal line where the two lines meet. Read the percent of fresh air intake on the side.
14. Repeat steps 4 through 13 until calculation reads desired fresh air percentage.

*If fresh air percentage is less than desired, use the A6 keypad to adjust "MIN POS L" values higher (further open).
If fresh air percentage is more than desired, adjust "MIN POS L" values lower (less open).*

15. **Minimum damper position setting - High Speed**
Switch the blower speed setting on the VFD control board to "HI". The VFD should display "60.00HZ".

16. Navigate to the "SETPOINTS" menu and select "MIN POS H". Adjust value (2-10VDC) to the approximate desired fresh air percentage.
 - 3.0 VDC - 12% Open Damper
 - 3.5 VDC - 18% Open Damper
 - 4.0 VDC - 25% Open Damper
 - 4.5 VDC - 31% Open Damper
 - 5.0 VDC - 37% Open Damper
 - 5.5 VDC - 43% Open Damper
 - 6.0 VDC - 50% Open Damper

NOTE - Damper minimum position can be set lower than traditional minimum air requirements when an IAQ sensor is specified.

17. Navigate to the "CHECKOUT" menu and select "VMAX-HS". Press ←.
 18. Display will read "DAMPER VMAX-HS RUN?". Press ←.
 19. Damper will drive to the setpoint value stored in step 16.
 20. Measure outdoor air temperature. Mark the point on the bottom line of chart 1 and label the point "A" (40°F, 4°C shown).
 21. Measure return air temperature. Mark that point on the top line of chart 1 and label the point "B" (74°F, 23°C shown).
 22. Measure mixed air (outdoor and return air) temperature. Mark that point on the top line of chart 1 and label point "C" (70°F, 21°C shown).
 23. Draw a straight line between points A and B.
 24. Draw a vertical line through point C.
 25. Draw a horizontal line where the two lines meet. Read the percent of fresh air intake on the side.
 26. Repeat steps 16 through 25 until calculation reads desired fresh air percentage.
- If fresh air percentage is less than desired, use the A6 keypad to adjust "MIN POS H" values higher (further open). If fresh air percentage is more than desired, adjust "MIN POS H" values lower (less open).
27. **Set the "VENT SPEED" switch on the VFD control board to "LO".**

DEMAND CONTROL VENTILATION (DCV)

When a 2-10VDC CO₂ sensor is wired to the controller (leads provided), the DCV SET, VENTMIN, and VENTMAX parameters will appear under "SETPOINTS" menu. Navigate to the "SETPOINTS" menu to adjust setpoints as desired. Refer to the Honeywell manual provided for more details.

High Performance Economizer - Sequence of Operation

Refer to tables 5, 6, 7 or 8.

When the outdoor air is suitable and a thermostat demand calls for 1st. stage cooling (Y1), the economizer will modulate the dampers between the minimum and fully open positions to maintain a 55°F (12.8°C) mixed air temperature. When there is an increased thermostat demand for second stage cooling (Y2), the economizer damper opens 100% and the economizer controller (A6) will bring on the compressor. At that point, K8 relay will switch from the R1 mixed air sensor to R51 resistor allowing the economizer damper to stay open 100%. The

damper will stay open 100% with the compressor running simultaneously until Y2 demand is met.

NOTE – Because of the sensor location, the mixed air temperature displayed on the economizer controller (A6) is only true when no mechanical cooling or heating is initiated. During mechanical cooling (compressor running), the MA temperature displayed will be the temperature equivalent of the fixed resistor and not the actual MA temperature.

TROUBLESHOOTING, ALARMS AND CHECKOUT TESTS

Refer to the Honeywell manual provided for details.

Table 5. Economizer Operation - No DCV (CO₂ Sensor, 1-Speed Supply Fan)

DCV	OA Good to Economize?	Y1-I	Y2-I	Y1-O	Y2-O	Occupied	Unoccupied
None	No	Off	Off	0-v/Off	0-v/Off	MIN POS	Closed
		On	Off	24-v/On	0-v/Off	MIN POS	Closed
		On	On	24-v/On	24-v/On	MIN POS	Closed
None	Yes	Off	Off	0-v/Off	0-v/Off	MIN POS	Closed
		On	Off	0-v/Off	0-v/Off	MIN POS to Full-Open	Closed to Full-Open
		On	On	24-v/On	0-v/Off	Full-Open	Full-Open

Table 6. Economizer Operation - With DCV (CO₂ Sensor, 1-Speed Supply Fan)

DCV	OA Good to Economize?	Y1-I	Y2-I	Y1-O	Y2-O	Occupied	Unoccupied
Below set	No	Off	Off	0-v/Off	0-v/Off	VENTMIN	Closed
		On	Off	24-v/On	0-v/Off	VENTMIN	Closed
		On	On	24-v/On	24-v/On	VENTMIN	Closed
	Yes	Off	Off	0-v/Off	0-v/Off	VENTMIN	Closed
		On	Off	0-v/Off	0-v/Off	VENTMIN to Full-Open	Closed to Full-Open
		On	On	24-v/On	0-v/Off	Full-Open	Full-Open
Above set	No	Off	Off	0-v/Off	0-v/Off	VENTMIN to VENTMAX	Closed
		On	Off	24-v/On	0-v/Off	VENTMIN to VENTMAX	Closed
		On	On	24-v/On	24-v/On	VENTMIN to VENTMAX	Closed
	Yes	Off	Off	0-v/Off	0-v/Off	VENTMIN to VENTMAX	Closed
		On	Off	0-v/Off	0-v/Off	VENTMIN to Full-Open	Closed to Full-Open
		On	On	24-v/On	0-v/Off	Full-Open	Full-Open

High Performance Economizer - Sequence of Operation (continued)

Table 7. Economizer Operation - No DCV (CO₂ Sensor, 2-Speed Supply Fan)

DCV	OA Good to Economize?	Y1-I	Y2-I	Fan Speed	Y1-O	Y2-O	Occupied	Unoccupied
None	No	Off	Off	Low	0-v/Off	0-v/Off	MIN POS L	Closed
		On	Off	Low	24-v/On	0-v/Off	MIN POS L	Closed
		On	On	High	24-v/On	24-v/On	MIN POS H	Closed
None	Yes	Off	Off	Low	0-v/Off	0-v/Off	MIN POS L	Closed
		On	Off	High	0-v/Off	0-v/Off	MIN POS L to Full-Open	Closed to Full-Open
		On	On	High	Delay (b) 24-v/On	0-v/Off	Full-Open	Full-Open

(b) With 2SP FAN DELAY (Advance Setup Menu), when in the economizing mode, there is a delay for the high speed fan to try to satisfy the call for second-stage cooling by turning on the fan to high and opening the OA dampers to 100% before the first-stage mechanical cooling is enabled.

Table 8. Economizer Operation - With DCV (CO₂ Sensor, 2-Speed Supply Fan)

DCV	OA Good to Economize?	Y1-I	Y2-I	Fan Speed	Y1-O	Y2-O	Occupied	Unoccupied
Below set	No	Off	Off	Low	0-v/Off	0-v/Off	VENTMIN L	Closed
		On	Off	Low	24-v/On	0-v/Off	VENTMIN L	Closed
		On	On	High	24-v/On	24-v/On	VENTMIN H	Closed
	Yes	Off	Off	Low	0-v/Off	0-v/Off	VENTMIN L	Closed
		On	Off	High	0-v/Off	0-v/Off	VENTMIN L to Full-Open	Closed to Full-Open
		On	On	High	Delay (b) 24-v/On	0-v/Off	Full-Open	Full-Open
Above set	No	Off	Off	Low	0-v/Off	0-v/Off	VENTMIN L to VENTMAX L	Closed
		On	Off	Low	24-v/On	0-v/Off	VENTMIN L to VENTMAX L	Closed
		On	On	High	24-v/On	24-v/On	VENTMIN H to VENTMAX H	Closed
	Yes	Off	Off	Low	0-v/Off	0-v/Off	VENTMIN L to VENTMAX L	Closed
		On	Off	High	0-v/Off	0-v/Off	VENTMIN L to Full-Open	Closed to Full-Open
		On	On	High	Delay (b) 24-v/On	0-v/Off	Full-Open	Full-Open

(b) With 2SP FAN DELAY (Advance Setup Menu), when in the economizing mode, there is a delay for the high speed fan to try to satisfy the call for second-stage cooling by turning on the fan to high and opening the OA dampers to 100% before the first-stage mechanical cooling is enabled.

Maintenance

1. Damper motor is prelubricated and does not require further lubrication.
2. Make visual inspection of dampers and linkage assemblies during routine maintenance.