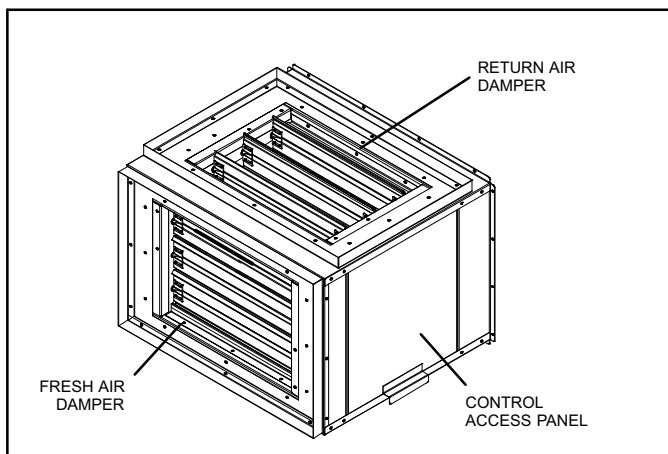


INSTALLATION INSTRUCTIONS FOR ECONOMIZERS (44W94, 44W95 AND 44W96) USED WITH TAA SERIES UNITS



RETAIN THESE INSTRUCTIONS FOR FUTURE REFERENCE

⚠ 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.

⚠ 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.

⚠ 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.

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) Mixing box assembly, control wiring assembly, mixed air sensor (R1) and enthalpy sensor (A7)
- (18) #10-16 x 1/2 SDST screws
- (3) Wire ties

Application

Mixing boxes are used for automatic sensor-controlled introduction of outdoor air into the system through an electro-mechanically controlled damper.

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.

An enthalpy sensor (A7) is used to determine whether outdoor air is suitable for free cooling. The enthalpy sensor is factory-installed in all economizers. Other outdoor and return air (OA and RA) sensor options are available to determine whether outdoor air is suitable for free cooling. See table 1 and the instructions provided with optional sensors.

The mixed air sensor is provided with the economizer and installed according to these instructions.

Table 1. Sensors

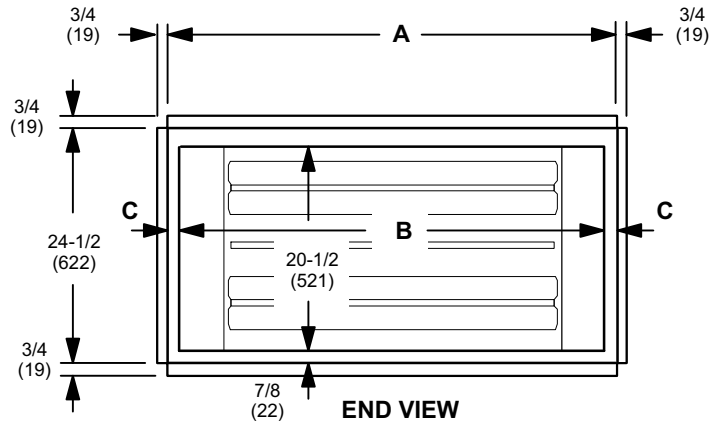
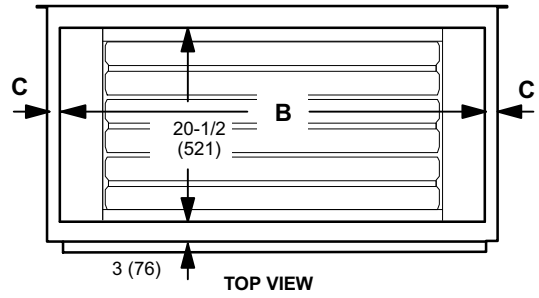
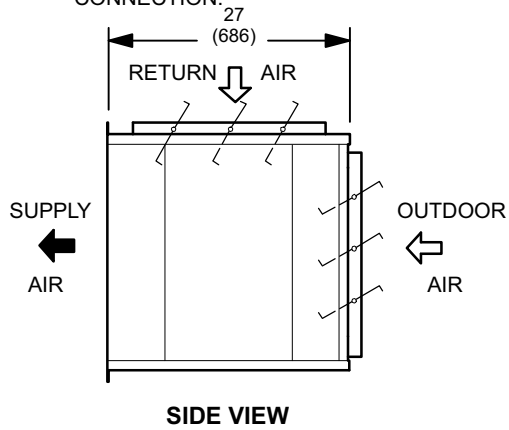
Sensors	Dampers modulate to maintain 55°F mixed air (R1) when:
Single Outside Air (OA) Sensible	OA temperature (RT26) is lower than free cooling setpoint.
Differential Sensible - 1 in OA and 1 in RA	OA temperature (RT26) is lower than return air (RA) temperature (RT27).
Differential Enthalpy - 1 in OA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

* indicates default factory configuration.



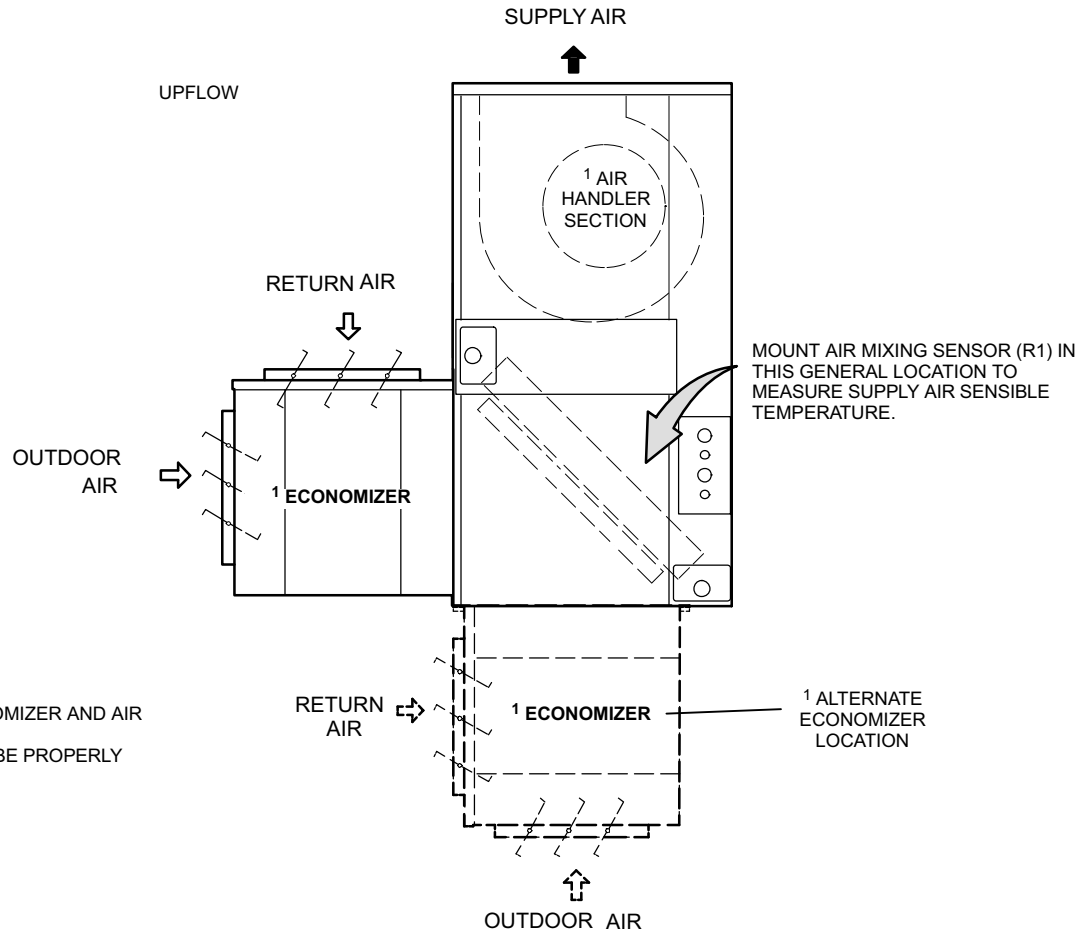
ECONOMIZER DIMENSIONS

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



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

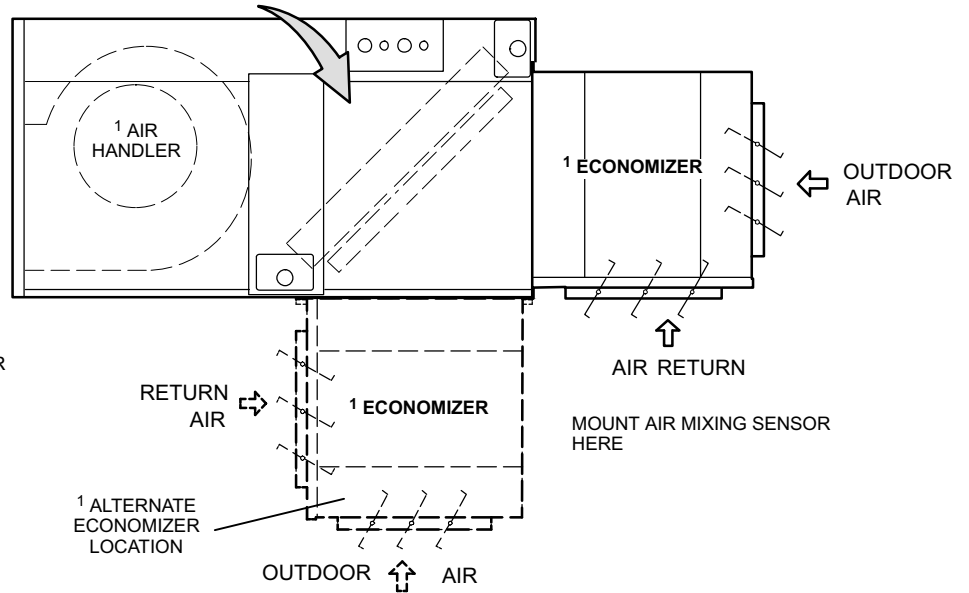
ECONOMIZER APPLICATIONS



1 NOTE - ECONOMIZER AND AIR HANDLER MUST BE PROPERLY SUPPORTED.

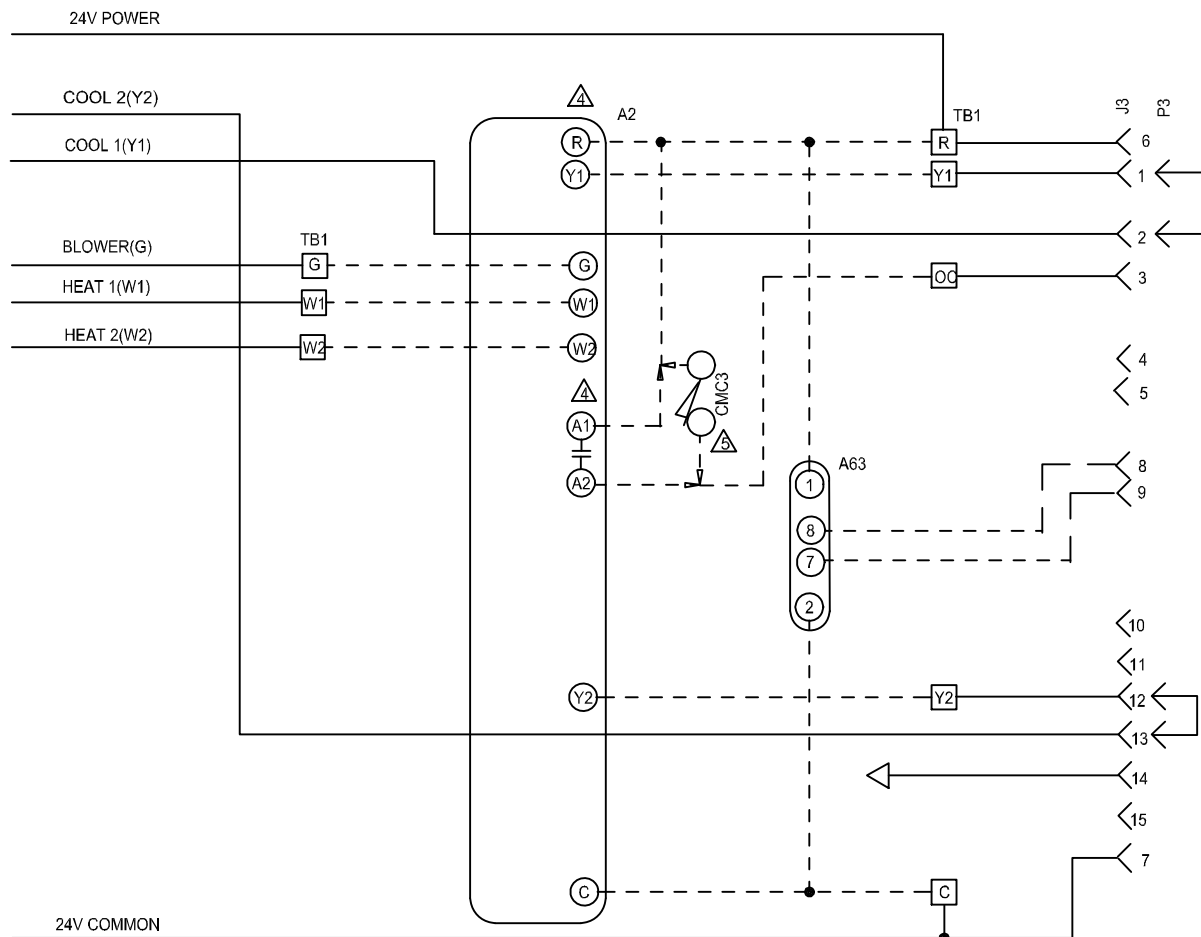
MOUNT AIR MIXING SENSOR (R1) IN THIS GENERAL LOCATION TO MEASURE SUPPLY AIR SENSIBLE TEMPERATURE.

HORIZONTAL



1 NOTE - ECONOMIZER AND AIR HANDLER MUST BE PROPERLY SUPPORTED.

Figure 1. Upflow and Horizontal Applications



- ⚠ 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

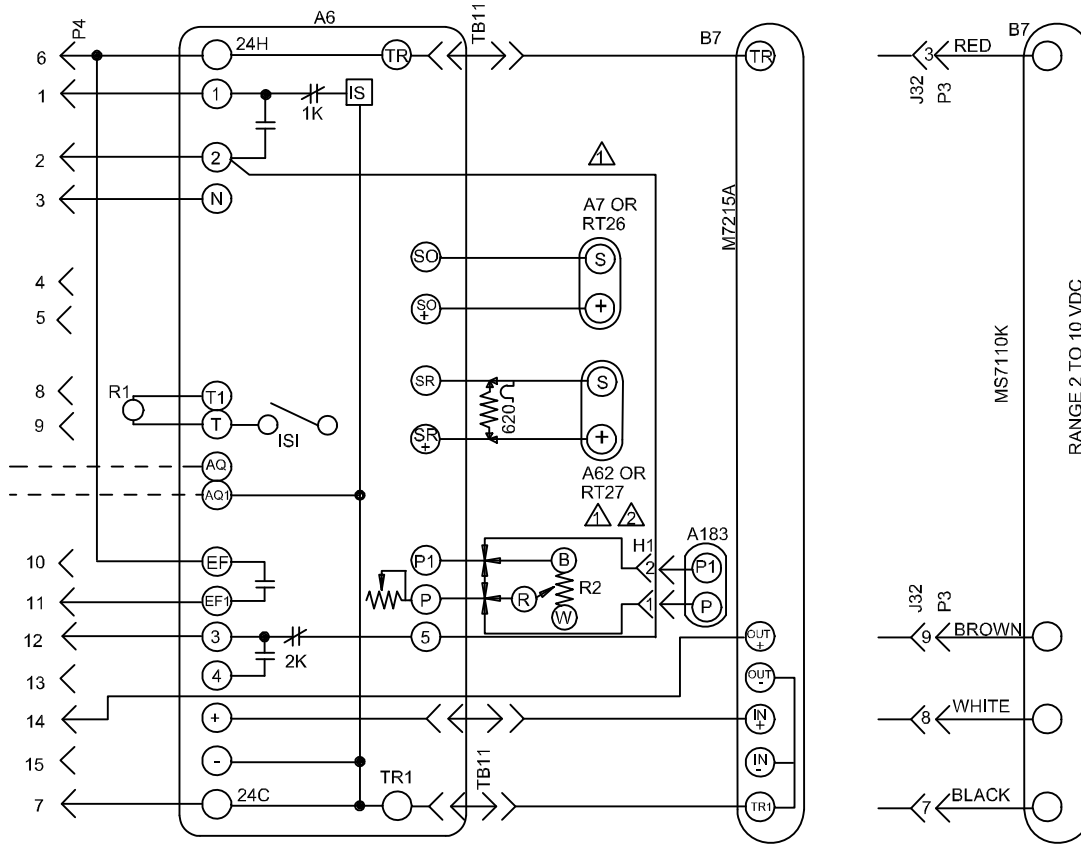
KEY	COMPONENT
A2	SENSOR-ELECTRONIC
A63	SENSOR-CO2
CMC3	CLOCK-TIME
J3	JACK-UNIT ECONOMIZER
P3	PLUG-LESS ECONOMIZER
TB1	TERMINAL STRIP-CLASS II VOLTAGE

DESIGNATES OPTIONAL WIRING
 CLASS II FIELD WIRING

01/12		WIRING DIAGRAM	01/12
537518-01			
ACCESSORIES			
ELECTRONIC OR ELECTROMECHANICAL THERMOSTAT TAA, TPA UNITS			
SECTION C			REV 0
Supersedes 535,774W		New Form No. 537518-01	

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Figure 2. 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

- ▲ A62 ENTHALPY SENSOR OR RT27 USED FOR DIFFERENTIAL SENSING
- ▲ RT26 AND RT27, TEMPERATURE SENSORS MAY BE USED INSTEAD OF A7 AND A62 ENTHALPY SENSORS
- — — — — DESIGNATES OPTIONAL WIRING
- CLASS II FIELD WIRING

01/12	WIRING DIAGRAM	01/12
	537520-01	
ACCESSORIES		
ECONOMIZER FOR TSA, TPA UNITS		
SECTION D		REV 0
Supersedes	New Form No.	
535,779W	537520-01	
© 2012		Lennox Commercial

Figure 3. Economizer Control Wiring

Installation

1. Disconnect all power to the unit.
2. Determine the application (upflow or horizontal).

UPFLOW OR HORIZONTAL APPLICATIONS

1. Attached mixing box over return opening with screws provided (figure 4)
2. Remove control access panel on both the mixing box and TAA unit.

NOTE — Wiring and controls are the same regardless of unit size or application.

3. Route mixing box wiring harness and mixed air sensor wiring over indoor air blower and make necessary connections. For mounting location of mixed air sensor see figure 1.

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

4. Remove and discard existing **P3** plug from **J3** jack on unit wiring harness (figure 2).
5. Mixing box wiring harness connector **P4** plugs into air handler's mating jack **J3**.
6. Use provided wire ties to secure excess coiled wire to blower motor capacitor leads.

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. Replace control access panel on mixing box and unit.
8. Place return and fresh air ducts to mixing box and seal weather tight .

NOTE — Mixing box section maybe rotated 180° for bottom return air connections (figure 1).

9. Restore power to the unit.

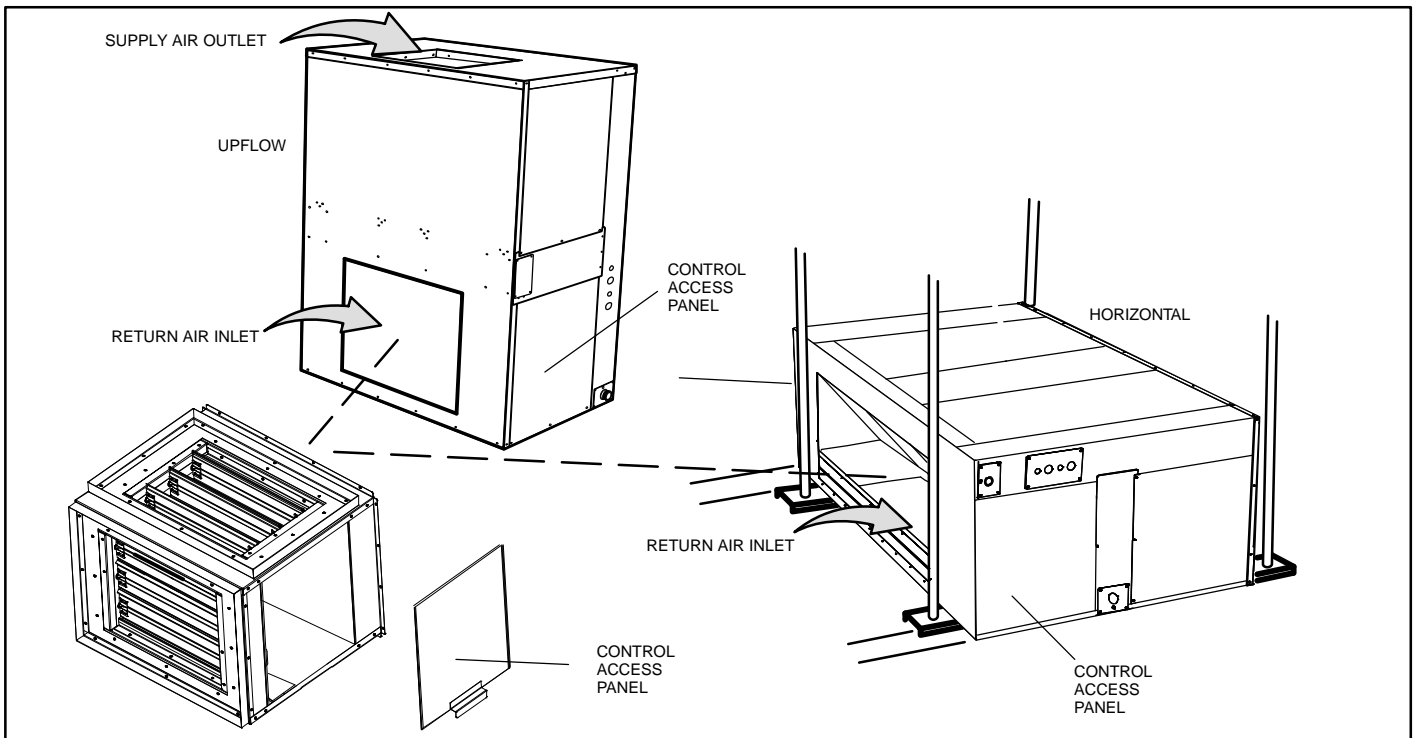


Figure 4. Upflow and Horizontal Applications

Operation

COOLING MODE

1. On a call for cooling, with ambient temperature and humidity above enthalpy 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.

Enthalpy Control

LED'S

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 7.

FREE COOLING SETPOINT

Single Temperature or Enthalpy Sensing:

The enthalpy 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 2 shows the free cooling setpoints for enthalpy sensors. Use the recommended setpoint and adjust as necessary.

For example: At setting A (table 2), 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 2. 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.

DAMPER MINIMUM POSITION SETTING

NOTE — Installed a jumper between TB1 R and OC terminals to maintain occupied status (allowing minimum fresh air). See figure 5. 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.

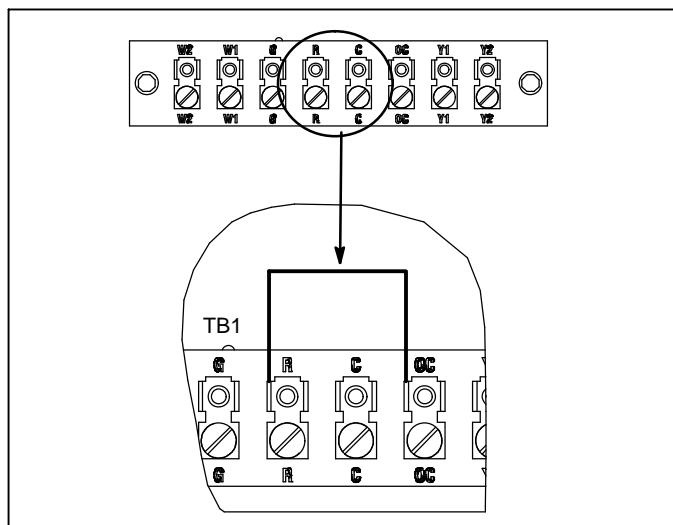


Figure 5. TB1 Terminal R and OC Jumpers

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.

1000ppm. Adjust the **DCV SET** potentiometer to the approximate setting specified by the controls contractor. Refer to figure 7.

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 7.

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

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

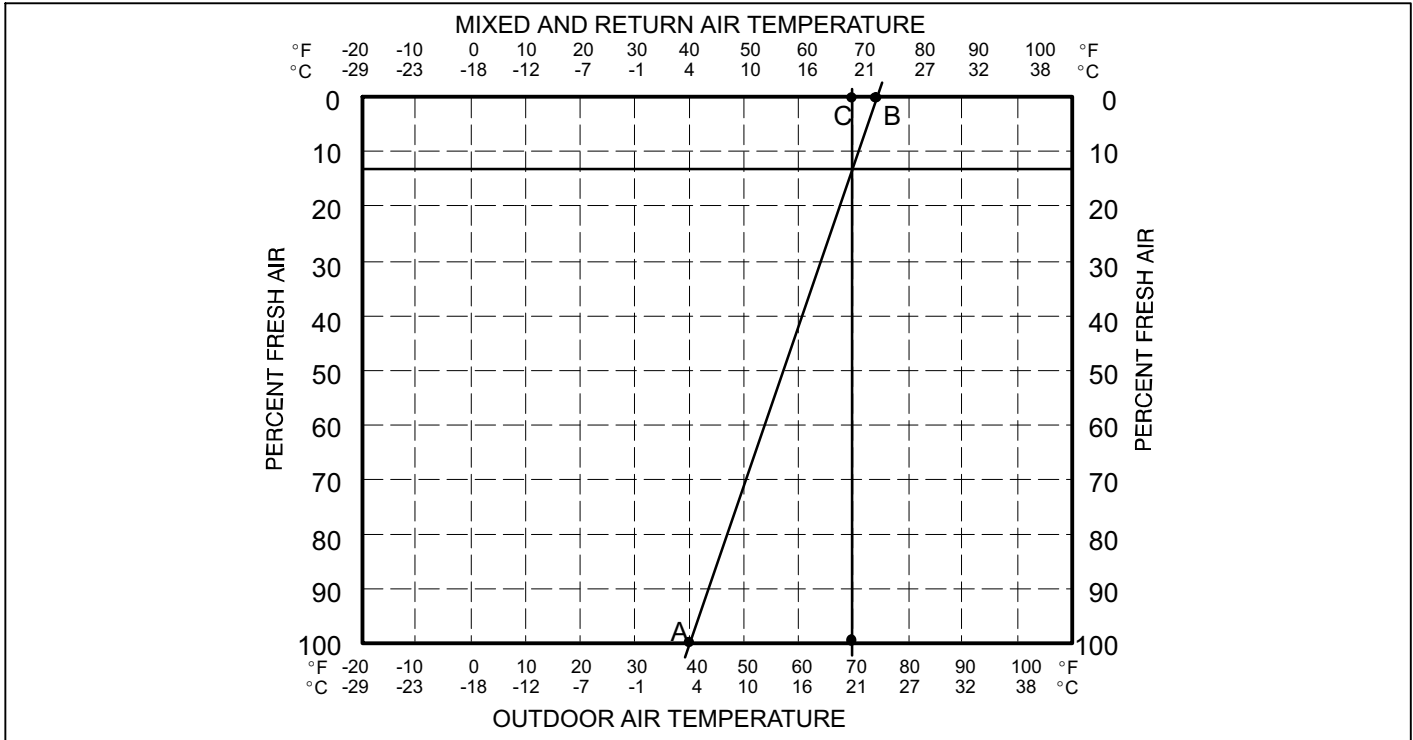


Figure 6. Calculate Minimum Fresh Air Percentage

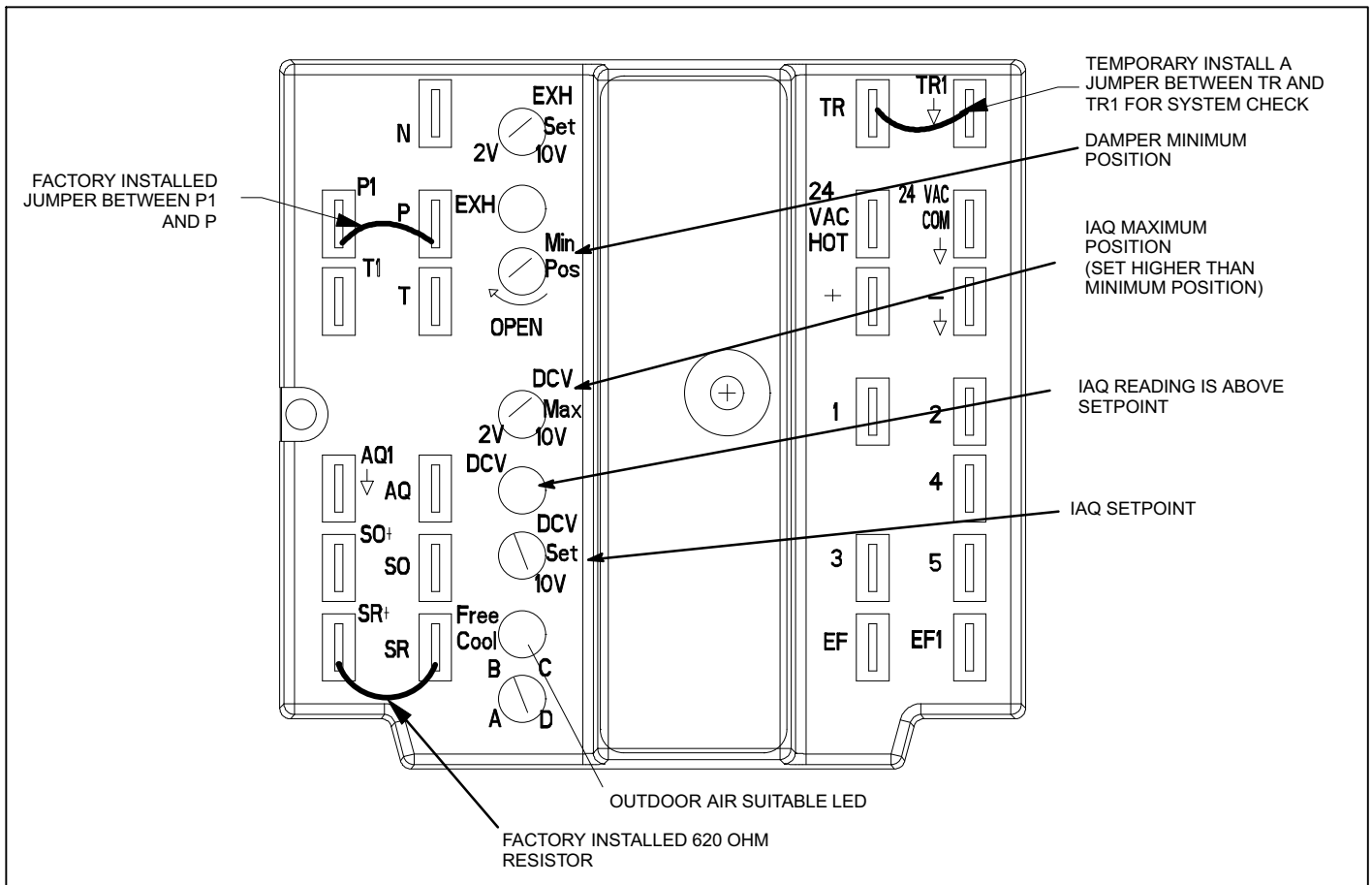


Figure 7. A6 Enthalpy Control

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 4).
5. Install jumper on damper motor terminal TR and TR1 (figure 7).
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.

Maintenance

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

