Small Rooftop Units
Gas Heating/Electric Cooling, Electric Cooling, and Heat Pump Units
3 to 12½ Tons (50/60 Hz)
Accessory Economizer Package

Cancels: IIK 548-36-17 IIK 548-36-26
9/15/95

Installation and Start-Up Instructions

Part Numbers CRECOMZR001A02 and CRECOMZR002A02

PACKAGE USAGE AND CONTENTS

UNIT	PACKAGE NO.	CONTENTS
3 to 6 Tons	CRECOMZR 001A02	1 — Barometric Relief Damper Hood 2 — Hood Sides 1 — Hood Top 1 — Outdoor-Air Inlet Screen 1 — Screen Retainer Cap 2 — Spacers 1 — Horizontal Block-Off Plate 30 — ⅝-in. no. 10 Screws 2 — ¾-in. no. 10 Screws 1 — Economizer with Control Board Attached 1 — Outdoor-Air Thermostat (OAT) 1 — Knob 1 — Supply-Air Thermostat (SAT) 2 — Wirenuts 1 — Wire Tie 3 — Seal Strips 1 — Outdoor-Air Opening Panel
7½ to 12½ Tons	CRECOMZR 002A02	1 — Barometric Relief Damper Hood 2 — Hood Sides 1 — Hood Top 2 — Outdoor-Air Inlet Screens 1 — Screen Retainer Cap 3 — Spacers 1 — Horizontal Block-Off Plate 1 — Vertical Discharge Block-Off Plate 40 — ⅝-in. no. 10 Screws 3 — ¾-in. no. 10 Screws 1 — Economizer with Control Board Attached 1 — Outdoor-Air Thermostat (OAT) 1 — Knob 1 — Supply-Air Thermostat (SAT) 2 — Wirenuts 1 — Wire Tie 1 — Screen Clasp 1 — Bottom Stop 3 — Seal Strips 1 — Outdoor-Air Opening Panel

GENERAL

Accessory economizer package utilizes cool outdoor air to satisfy cooling load and minimize energy consumption. Economizer cooling can be used alone or in conjunction with mechanical cooling.

A standard economizer uses a dry bulb thermostat to sense outdoor-air temperature. For a more efficient system, an accessory solid-state enthalpy control can be substituted for the dry bulb thermostat.

Also available as an economizer accessory is the differential enthalpy control. This system compares the temperature and humidity of outdoor air and return air and then adjusts the economizer position to ensure the lowest enthalpy air is used for cooling.

IMPORTANT: Read these instructions completely before attempting to install the accessory economizer.

INSTALLATION

⚠ WARNING

Turn off unit power! Electrical shock and personal injury could result.

1. Determine quantity of ventilation air required. Record amount of air for use in Step 10.
2. Remove filter access panel by raising panel and swinging panel outward. Panel is now disengaged from track and can be removed. No tools are required to remove filter access panel. Remove indoor coil access panel. Discard panel and save screws. See Fig. 1.
3. Assemble outdoor-air hood top and side plates as shown in Fig. 2. Install seal strips on hood top and sides. Put aside screen retainer and screws for later assembly. *Do not attach hood to unit at this time.*
4. On all 10 and 12½ ton units, install vertical discharge block-off plate over duct openings. See Fig. 3.
5. Slide economizer into unit and secure with screws. See Fig. 4.
6. If barometric pressure relief is required, remove the hold-down screw from the barometric relief damper and mount the barometric relief damper hood around the damper with the 4 screws supplied. The longest part of the hood should be above the top of the damper.
7. To install the economizer for a horizontal discharge application:
   a. Install the economizer so that the motor faces the outdoor-air section and secure with screws. See Fig. 5.
   b. If barometric pressure relief is required, rotate barometric relief damper 90 degrees so that it opens and closes vertically. Mount the barometric damper hood around the damper with the supplied screws. The longest part of the hood should be above the top of the damper.
   c. Install horizontal discharge block-off plate over opening on the access panel. Block-off plate MUST be installed before installing hood assembly. See Fig. 6.

      NOTE: Install spacers at the same time as the horizontal block-off plate using same screws. The spacers are used to cover gaps between the economizer assembly and the unit.

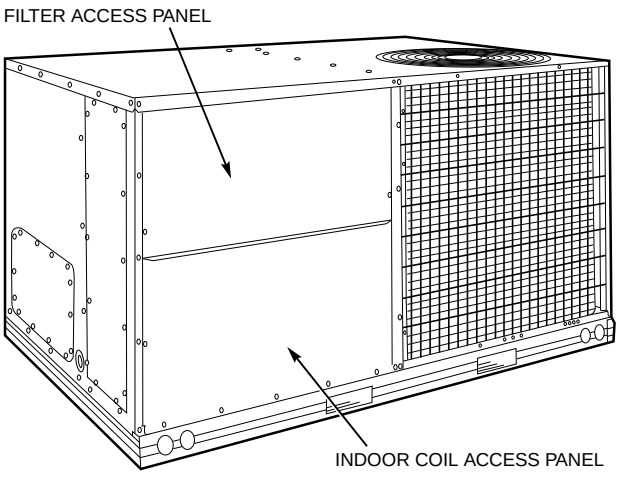


Fig. 1 — Typical Access Panel Locations

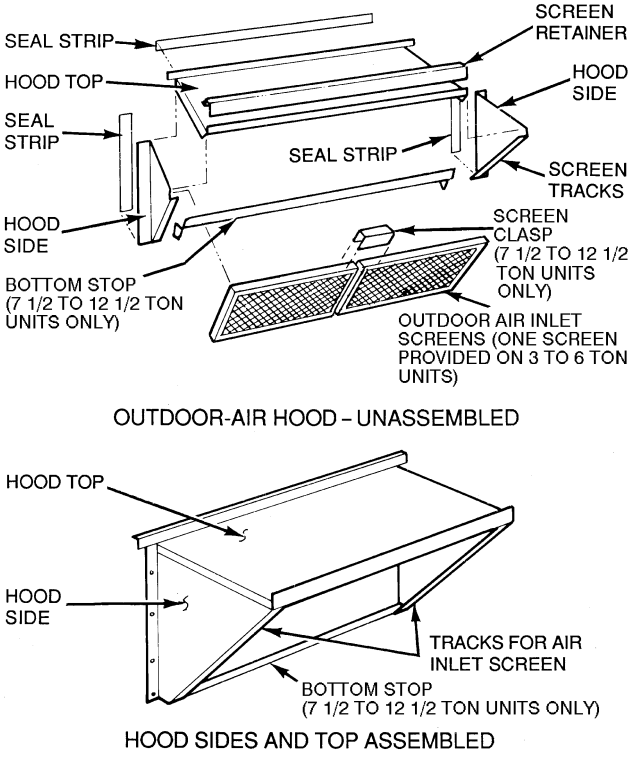


Fig. 2 — Outdoor-Air Hood Details

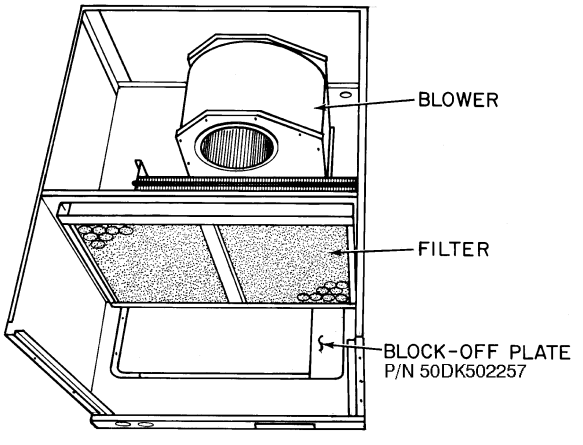


Fig. 3 — Vertical Block-Off Plate Installation (10 and 12½ Ton Units Only)

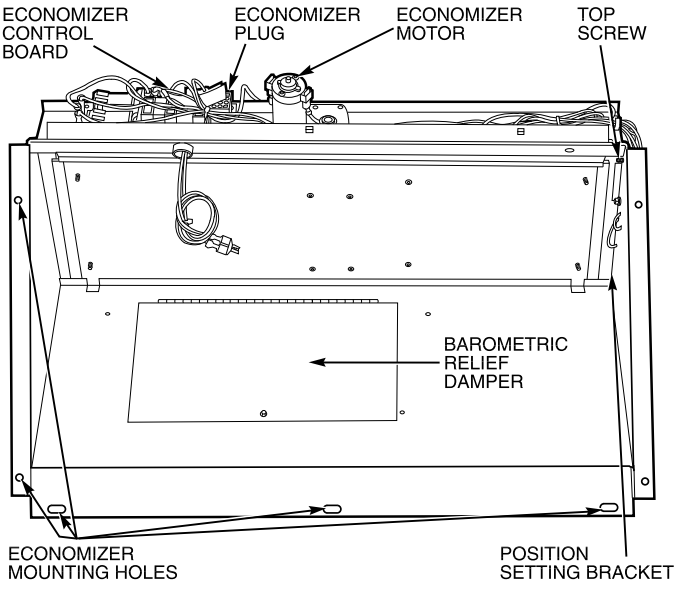


Fig. 4 — Economizer Installation

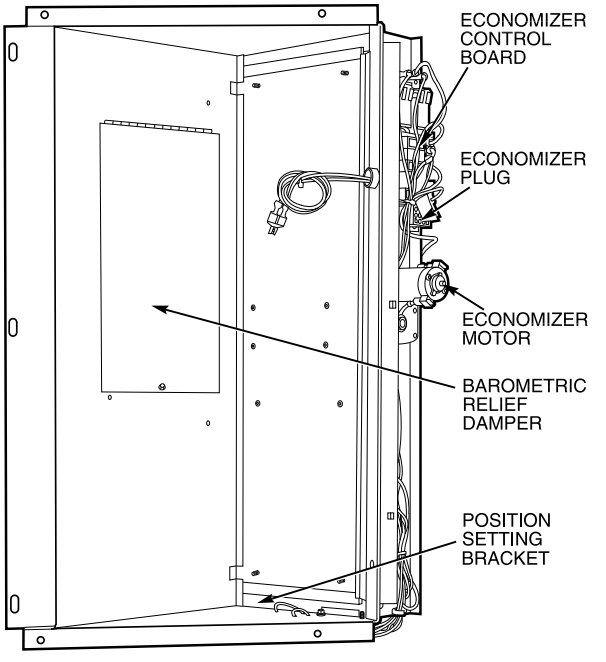


Fig. 5 — Horizontal Discharge Economizer Installation

8. Plug the male plug of the unit economizer wiring harness into the economizer control board. See Fig. 7.
9. As shown in Fig. 8, remove the indoor fan motor access panel. Save all screws.
10. Determine damper position setting; see Fig. 9 or 10. Adjust damper setting by adjusting screws on the position setting bracket. See Fig. 4 and 11. Slide position setting bracket until the top screw is in the position determined by Fig. 9 or 10. Tighten screws.
11. Install outdoor-air opening panel with screws from Step 2.
12. Fasten hood top and side plate assembly and bottom stop (on 7½ to 12½ ton units) to unit with screws provided. See Fig. 2.

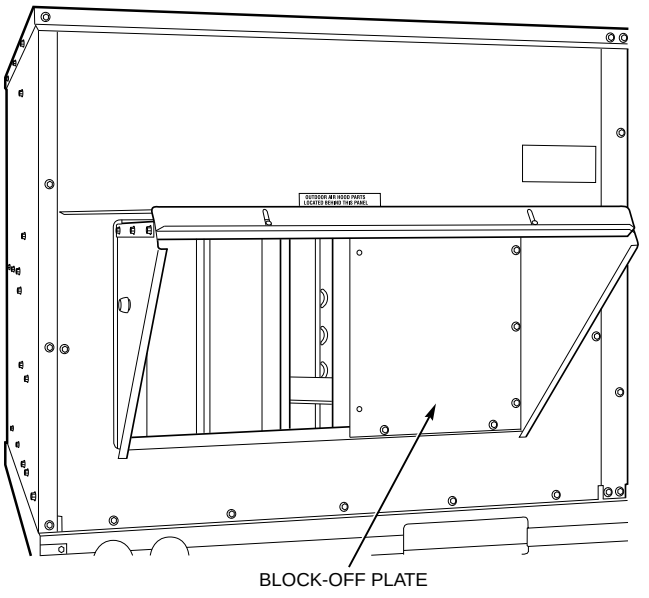


Fig. 6 — Horizontal Discharge Block-Off Plate

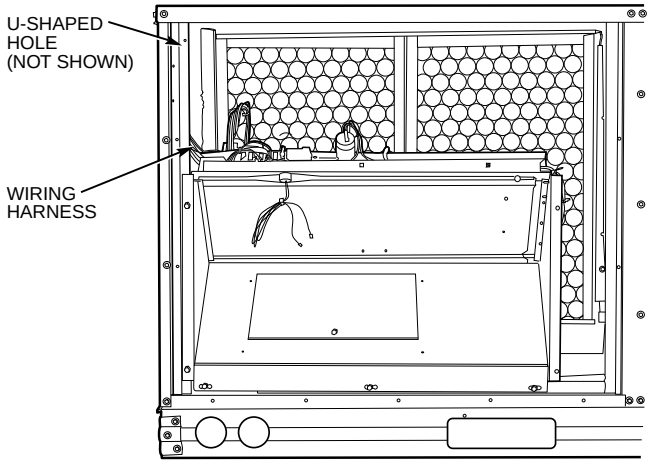


Fig. 7 — Typical Economizer and Wiring Harness

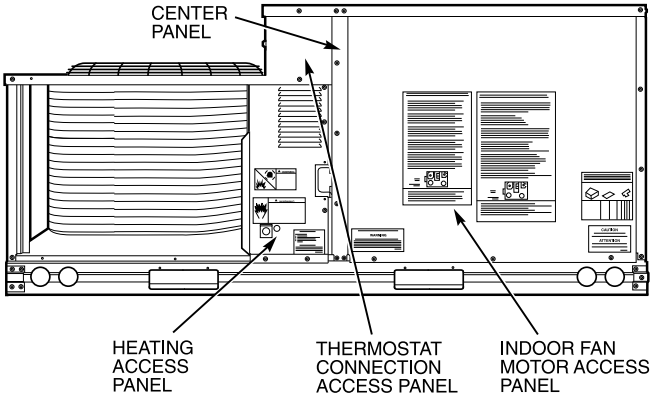
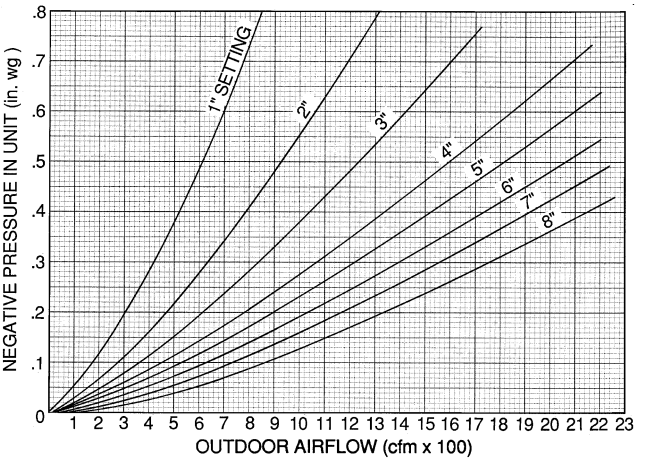


Fig. 8 — Typical Access Panel Locations (3 to 6 Ton, Standard Efficiency Unit Shown)

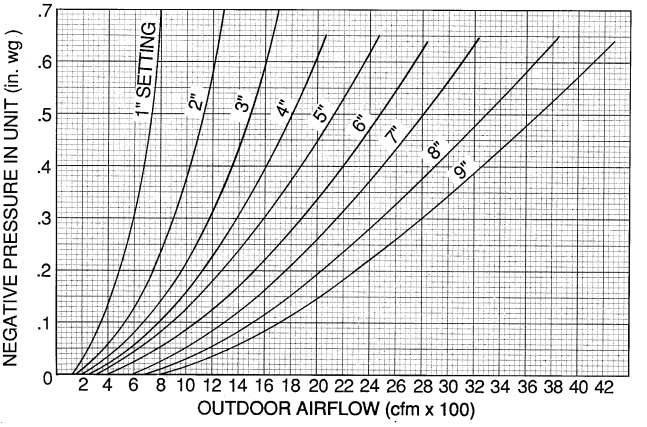
13. Remove tape from outdoor-air thermostat (OAT). Fasten OAT to inside of hood using screws and speed clips provided. See Fig. 12. Make sure OAT terminals are up.
14. Place knob supplied with economizer on OAT. Set for 3 F below indoor room thermostat setting. If accessory solid-state enthalpy control (EC) is used instead of the OAT, see instructions shipped with EC for installation and adjustment.
15. Connect OAT per Fig. 13.
16. Slide outdoor-air inlet screen(s) into screen track of hood side plates. On 7½ to 12½ ton units, clamp screens together using clasp provided. While holding screen(s) in place, fasten screen retainer to hood using screws provided.

    NOTE: Only 1 screen is provided with 3 to 6 ton units.



EXAMPLE: Given —
Negative Pressure . . . . . 0.2 in. wg
Outdoor Air . . . . . 1100 cfm
Determine —
Setting = 6 in.

Fig. 9 — Economizer Minimum Position Setting (3 to 6 Ton Units)



EXAMPLE: Given —
Negative Pressure . . . . . 0.1 in. wg
Outdoor Air . . . . . 1100 cfm
Determine —
Setting = 6 in.

Fig. 10 — Economizer Minimum Position Setting (7½ to 12½ Ton Units)

17. Mount supply-air thermostat (SAT) to the lower left portion of the indoor blower housing with the screws provided (see Fig. 14). Attach the loose wires from the economizer wiring harness to the thermostat as follows:
    a. Connect the violet wire to terminal T1.
    b. Connect the pink wire to terminal T2.
    c. Connect the white wire to the 24 vac terminal.
    d. Connect the brown wire to terminal COM.
18. Replace indoor fan motor access panel using screws saved in Step 9.
19. Replace filter access panel.
20. Turn on base unit power.
21. Barometric relief damper characteristics are shown in Fig. 15 and 16.

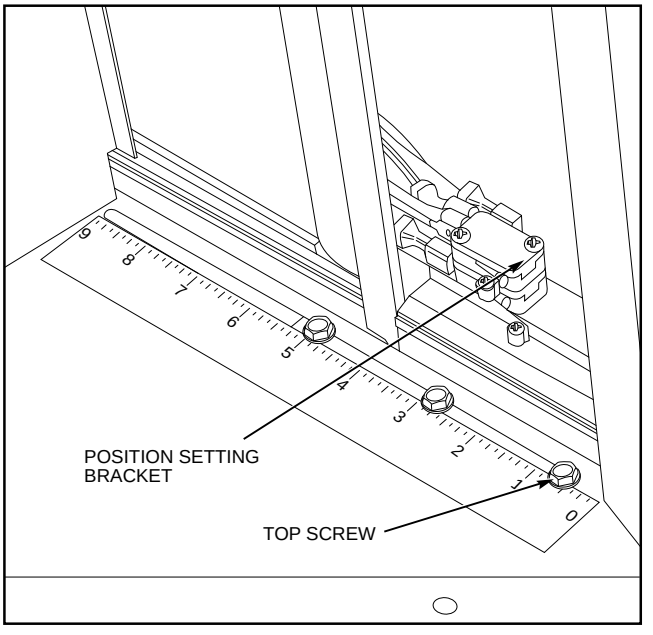
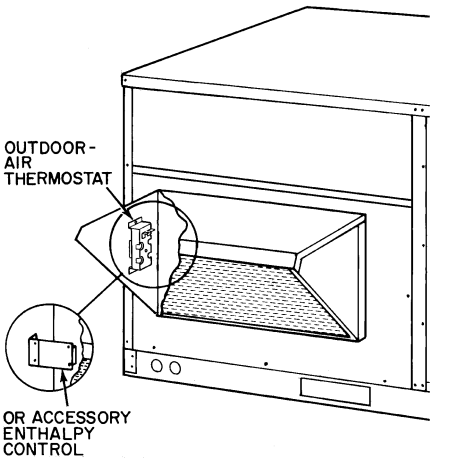
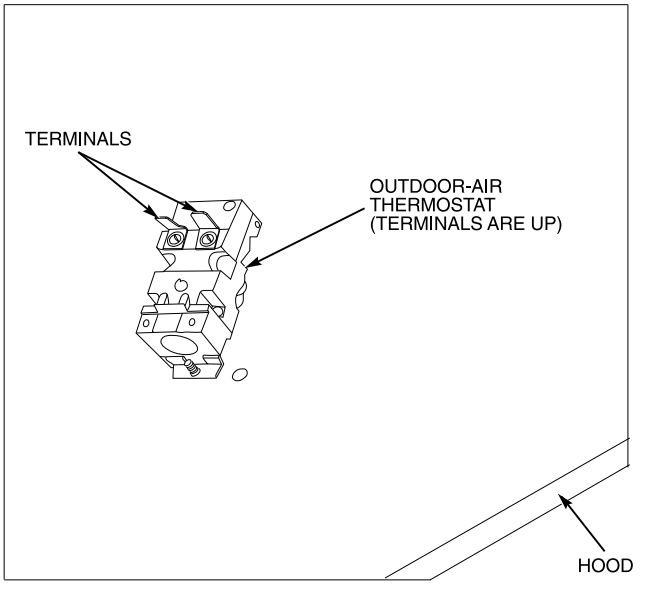


Fig. 11 — Minimum Position Setting Bracket





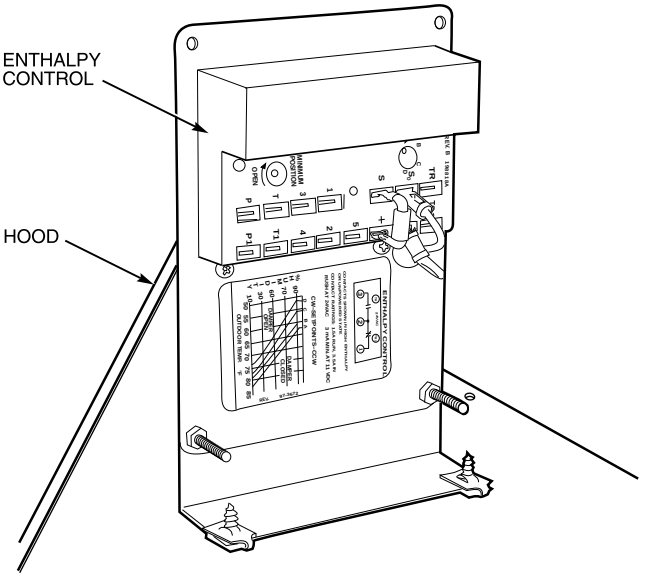


Fig. 12 — Outdoor-Air Thermostat/Enthalpy Control Installation

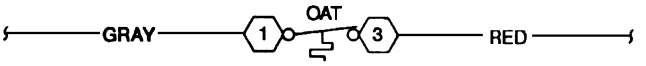


Fig. 13 — Wiring Connections for Outdoor-Air Thermostat

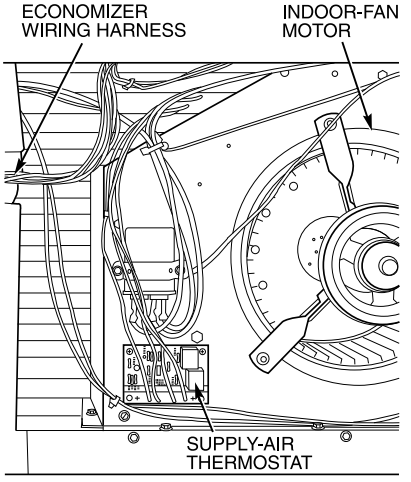


Fig. 14 — Typical Economizer Supply-Air Thermostat

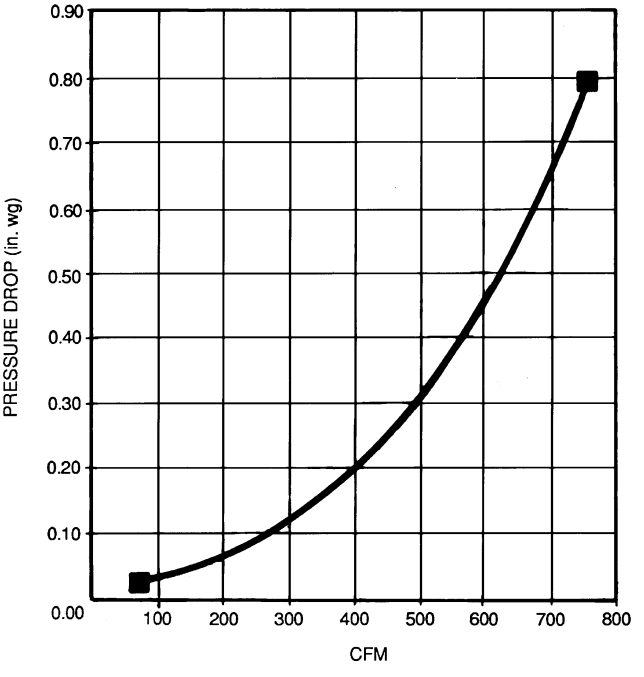


Fig. 15 — Barometric Relief Damper Characteristics — 3 to 6 Ton Units

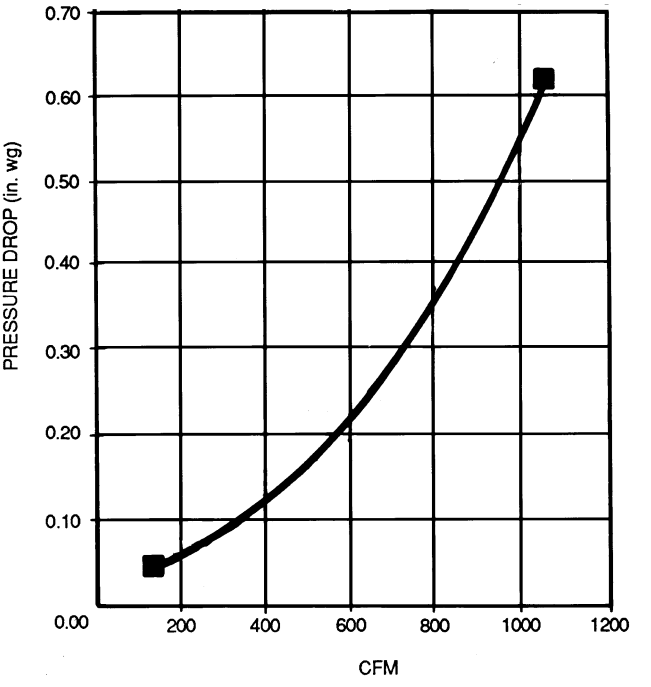


Fig. 16 — Barometric Relief Damper Characteristics — 7½ to 12½ Ton Units

START-UP

Operating Sequence

COOLING

3 to 6 Ton Units — When the outdoor-air temperature is above the OAT setting and the room thermostat calls for cooling, the compressor contactor is energized to start the compressor and outdoor-fan motor. The indoor-fan motor (IFM) is energized and the economizer damper moves to the minimum position. After the thermostat is satisfied, the damper moves to the fully closed position when indoor-fan motor is deenergized.

When the outdoor-air temperature is below the OAT setting and the thermostat calls for Y1 and G, the economizer damper moves to the minimum position when the indoor fan starts. The first stage of cooling is provided by the economizer. If the supply-air temperature is above 57 F, a switch on the supply-air thermostat is closed between the T2 terminal and the 24 vac terminal. This causes the damper to continue to modulate open until the supply-air temperature falls below 55 F or the damper reaches the fully open position.

When the supply-air temperature is between 55 F and 52 F, the supply-air thermostat has open switches between the T2 and 24 vac terminals and between the T1 and 24 vac terminals. This causes the economizer damper to remain in an intermediate open position.

If the supply-air temperature falls below 52 F, a switch on the supply-air thermostat is closed between the T1 terminal and the 24 vac terminal. This causes the damper to modulate closed until the supply-air temperature rises above 55 F or the damper reaches the minimum position.

When the supply-air temperature is between 55 F and 57 F, the supply-air thermostat has open switches between the T2 and 24 vac terminals. This causes the economizer damper to remain in an intermediate open position.

If the outdoor air alone cannot satisfy the cooling requirements of the conditioned space, economizer cooling is integrated with mechanical cooling, providing second stage cooling. The compressor and outdoor fan will be energized and the position of the economizer damper will be determined by the supply-air temperature.

When the second stage of cooling is satisfied, the compressor and outdoor-fan motor will be deenergized. The damper position will be determined by the supply-air temperature.

When the first stage of cooling is satisfied, and the IFM is deenergized, the damper will move to fully closed position.

7½ to 12½ Ton Units — When the outdoor-air temperature is above the OAT setting and the room thermostat calls for cooling, the compressor contactor no. 1 is energized to start compressor no. 1 and outdoor-fan motor. The indoor-fan motor (IFM) is energized and the economizer damper moves to the minimum position. Upon a further call for cooling, compressor contactor no. 2 will be energized, starting compressor no. 2. After the thermostat is satisifed and the IFM is deenergized, the damper moves to the fully closed position.

When the outdoor-air temperature is below the OAT setting and the thermostat calls for Y1 and G, the economizer damper moves to the minimum position when the indoor fan starts. The first stage of cooling is provided by the economizer. If the supply-air temperature is above 57 F, a switch on the supply-air thermostat is closed between the T2 terminal and the 24 vac terminal. This causes the damper to continue to modulate open until the supply-air temperature falls below 55 F or the damper reaches the fully open position.

When the supply-air temperature is between 55 F and 52 F, the supply-air thermostat has open switches between the T2 and 24 vac terminals and between the T1 and 24 vac terminals. This causes the economizer damper to remain in an intermediate open position.

If the supply-air temperature falls below 52 F, a switch on the supply-air thermostat is closed between the T1 terminal and the 24 vac terminal. This causes the damper to modulate closed until the supply-air temperature rises above 55 F or the damper reaches the minimum position.

When the supply-air temperature is between 55 F and 57 F, the supply-air thermostat has open switches between the T2 and 24 vac terminals. This causes the economizer damper to remain in an intermediate open position.

If the outdoor air alone cannot satisfy the cooling requirements of the conditioned space, economizer cooling is integrated with mechanical cooling, providing second stage cooling. Compressor no. 1 and outdoor fan will be energized, and the position of the economizer damper will be determined by the supply-air temperature. Compressor no. 2 is locked out.

When the second stage of cooling is satisfied, the compressor and outdoor-fan motor will be deenergized. The damper position will be determined by the supply-air temperature.

When the first stage of cooling is satisfied, the damper will move to fully closed position.

HEATING — When the room thermostat calls for heat, the heating controls are energized as described in the base unit Installation, Start-Up and Service Instructions. The indoor-fan motor (IFM) is energized and the economizer damper moves to the minimum position. When the thermostat is satisfied, the damper moves to the fully closed position.

VENTILATION (CONTINUOUS FAN) — When the room thermostat is set for continuous fan, the economizer damper remains at minimum position for as long as the indoor fan is energized. When the indoor fan cycles off, the damper moves to the fully closed position.

TROUBLESHOOTING

PROBLEM	CAUSE	REMEDY
Damper does not open.	Indoor (evaporator) fan is off.	1. Check to ensure that 24 vac is present at terminal C1 on the IFC or that 24 vac is present at the IFO terminal. Check whether 24 vac is present at PL6-1 (red wire) and/or PL6-3 (black wire). If 24 vac is not present, check wiring (see unit label diagram). 2. Check proper thermostat connection to G on the connection board.
	No power to economizer motor.	1. Check that SW3 is properly making contact with the damper blade. Check that SW1 is in the NC (normally closed) position. 2. Check diode D18. If diode is not functioning properly, replace D18. 3. Confirm that the economizer control board is grounded properly at PL6-4 (brown wire) and at brown terminal of the economizer control board (brown wire). The economizer motor must also be grounded properly at the negative motor terminal (brown wire). 4. Verify SW1 and SW3 are working and wired properly (see unit label diagram). 5. Check for 24 vac input at both PL6-1 (red wire) and PL6-3 (black wire). If 24 vac not present, check unit wiring (see unit label diagram). If 24 vac is found in both places, check for 24 vac at the yellow terminal of the economizer control board (yellow wire). If 24 vac power is not present, replace the economizer control board.
	Economizer motor failure.	If the indoor (evaporator) fan and economizer motor are energized, verify that there is a minimum of 18 vdc at the positive motor terminal. If the motor is not operating, replace the motor.
Economizer operation limited to minimum position.	OAT or EC set too high.	1. Set at correct temperature (3 F below indoor space temperature). 2. Check OAT or EC by setting above outdoor temperature or humidity level. If the OAT or EC switches do not close, replace OAT or EC.
	Economizer control board incorrectly wired or not functioning.	1. Perform the following tests when OAT or EC is closed, Y1 is called for, and damper is at minimum position. Confirm 24 vac on gray terminal of the economizer control board (gray wire). If 24 vac is not present, check wiring (see unit label diagram). 2. Verify that SW1 and SW3 are wired correctly and working properly (see unit label diagram). 3. Check to ensure that 24 vac exists at PL6-2 (blue wire). If 24 vac is not present, check wiring (see unit wiring label diagram). 4. Check 24 vac output at PL6-10 (white wire). If 24 vac is not present, replace economizer control board.
	Incorrect SAT wiring or inoperative SAT.	1. After verifying that the OAT and EC settings and the economizer control board wiring are correct, check to ensure that the 24 vac terminal of the SAT has 24 vac (white wire). If OAT, EC, and control board are functioning and wired properly and no 24 vac exists, check wiring (see unit label diagram). 2. If supply-air temperature is greater than 57 F, 24 vac should be found at terminal T2 on the SAT (pink wire). If 24 vac is not present, replace SAT.
Damper does not close.	Incorrect economizer wiring.	1. Verify that SW2 and SW4 are wired and working properly (see unit label diagram). 2. Check diode D19. If diode is not functioning properly, replace D19.
	Incorrect damper actuator wiring or inoperative economizer circuit board.	1. After verifying that the wiring is correct, modulate the damper to the minimum position. Remove the calls for G. 2. If the damper does not move, check for 24 vac at PL6-1 (red wire). If 24 vac is not present, check wiring (see unit label diagram). 3. If damper still does not move, check for 24 vac at blue terminal of economizer control board (blue wire). If 24 vac is not present, replace the economizer circuit board.
	Incorrect SAT wiring or inoperative SAT.	1. After verifying that the wiring is correct and the economizer control board is functioning properly, place the OAT or EC switch in the closed position. Place a call for Y1 and open the damper to the fully open position. Confirm that the 24 vac terminal of the SAT has 24 vac (white wire). If 24 vac is not present, check wiring (see unit label diagram). 2. If supply-air temperature is less than 52 F, 24 vac should be found at terminal T1 on the SAT (violet wire). If 24 vac not found, replace SAT.
	Economizer motor failure.	If economizer control board and SAT are functioning properly, verify that there is a minimum of 18 vdc at the positive motor terminal. If a minimum of 18 vdc is present and the motor is still not operating, replace the motor.
Economizer damper does not close on power loss.	Insufficient battery power, inoperative economizer control board.	1. Check voltage potential across batteries. If lower than 14 vdc, replace close-on-power-loss power supply (9-v alkaline batteries). Check this emergency power supply on a regular basis or whenever the filters are changed. 2. If the close-on-power-loss and economizer control board are functioning properly, check for 14 vdc or higher at the blue terminal of the economizer control board (blue wire) when power is disconnected from unit. If 14 vdc is not present, replace the control board.

LEGEND

C1 — Common Power
EC — Enthalpy Control
IFC — Indoor (Evaporator) Fan Contactor
IFO — Indoor (Evaporator) Fan On
OAT — Outdoor-Air Thermostat
PL — Plug
SAT — Supply-Air Thermostat
SW — Economizer Position Switch