Installation, Start-Up, and Service Instructions

CONTENTS

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.

Untrained personnel can perform the basic maintenance functions of cleaning coils and filters and replacing filters. All other 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, and other safety precautions that may apply.

Follow all safety codes. Wear safety glasses and work gloves. Use quenching cloth for unbrazing operations. Have fire extinguishers available for all brazing operations.

⚠ WARNING

Before performing service or maintenance operations on unit, turn off main power switch to unit and install lockout tag to disconnect switch. Electrical shock could cause personal injury.

⚠ WARNING

1. Improper installation, adjustment, alteration, service, or maintenance can cause property damage, personal injury, or loss of life. Refer to the User's Information Manual provided with this unit for more details.
2. Do not store or use gasoline or other flammable vapors and liquids in the vicinity of this or any other appliance.

What to do if you smell gas:

1. DO NOT try to light any appliance.
2. DO NOT touch any electrical switch, or use any phone in your building.
3. IMMEDIATELY call your gas supplier from a neighbor's phone. Follow the gas supplier's instructions.
4. If you cannot reach your gas supplier, call the fire department.

⚠ WARNING

Disconnect gas piping from unit when pressure testing at pressure greater than 0.5 psig. Pressures greater than 0.5 psig will cause gas valve damage resulting in hazardous conditions. If gas valve is subjected to pressure greater than 0.5 psig, it *must* be replaced before use. When pressure testing field-supplied gas piping at pressures of 0.5 psig or less, a unit connected to such piping must be isolated by closing the manual gas valve(s).

IMPORTANT: Units have high ambient temperature operating limits. If limits are exceeded, the units will automatically lock the compressor out of operation. Manual reset of the thermostat will be required to restart the compressor.

INSTALLATION

Inspect unit for transportation damage. If damage is found, file a claim with the transportation agency.

Step 1 — Provide Unit Support

ROOF CURB — Assemble or install accessory roof curb or horizontal supply roof curb in accordance with instructions shipped with this accessory. See Fig. 1 and 2. Install insulation, cant strips, roofing, and counter flashing as shown. Ductwork can be installed to roof curb or horizontal supply roof curb before unit is set in place. Curb or adapter roof curb must be level. This is necessary to permit unit drain to function properly. Unit leveling tolerance is ± $^1/_{16}$ in. per linear ft in any direction. Refer to Accessory Roof Curb or Horizontal Supply Roof Curb Installation Instructions for additional information as required. When accessory roof curb or horizontal supply roof curb is used, unit may be installed on class A, B, or C roof covering material.

IMPORTANT: The gasketing of the unit to the roof curb or adapter roof curb is critical for a watertight seal. Install gasket with the roof curb or adapter as shown in Fig. 2. Improperly applied gasket can also result in air leaks and poor unit performance.

ALTERNATE UNIT SUPPORT — When a curb or adapter cannot be used, install unit on a noncombustible surface. Support unit with sleepers, using unit curb support area. If sleepers cannot be used, support long sides of unit with a minimum of 3 equally spaced 4-in. x 4-in. pads on each side.

Step 2 — Rig and Place Unit

— Do not drop unit; keep upright. Use spreader bars over unit to prevent sling or cable damage. Rollers may be used to move unit across a roof. Level by using unit frame as a reference; leveling tolerance is ± $^1/_{16}$ in. per linear ft in any direction. See Fig. 3 for additional information. Unit operating weight is shown in Table 1.

Four lifting holes are provided in ends of unit base rails as shown in Fig. 3. Refer to rigging instructions on unit.

POSITIONING — Maintain clearance, per Fig. 4, around and above unit to provide minimum distance from combustible materials, proper airflow, and service access.

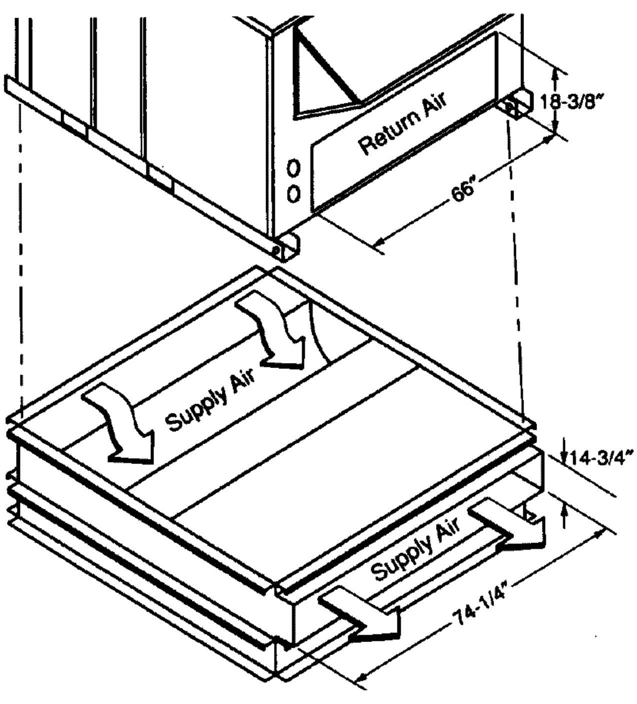
Do not install unit in an indoor location. Do not locate air inlets near exhaust vents or other sources of contaminated air. For proper unit operation, adequate combustion and ventilation air must be provided in accordance with Section 5.3 (Air for Combustion and Ventilation) of the National Fuel Gas Code, ANSI Z223.1 (American National Standards Institute).

Although unit is weatherproof, guard against water from higher level runoff and overhangs.

Locate mechanical draft system flue assembly at least 4 ft from any opening through which combustion products could enter the building, and at least 4 ft from any adjacent building. When unit is located adjacent to public walkways, flue assembly must be at least 7 ft above grade.

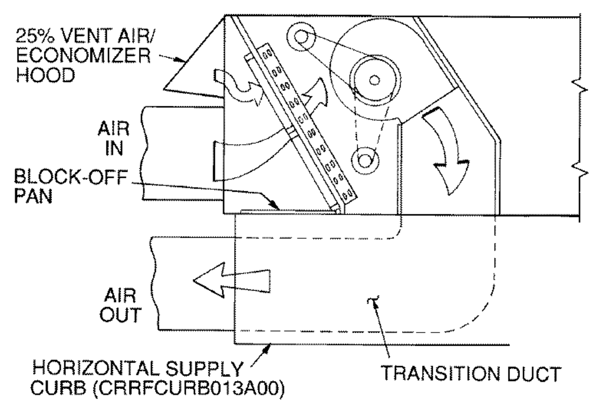
ROOF MOUNT — Check building codes for weight distribution requirements. Unit operating weight is shown in Table 1.

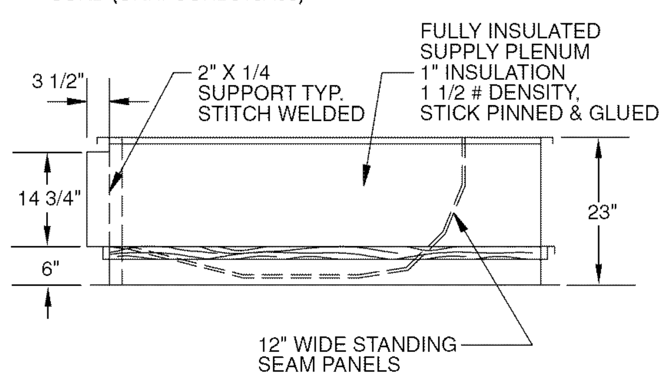
Instructions continued on page 7.



NOTE: CRRFCURB013A00 is a fully factory preassembled horizontal adapter and includes an insulated transition duct. The pressure drop through the adapter curb is negligible.

For horizontal return applications: The power exhaust and barometric relief dampers must be installed in the return air duct.



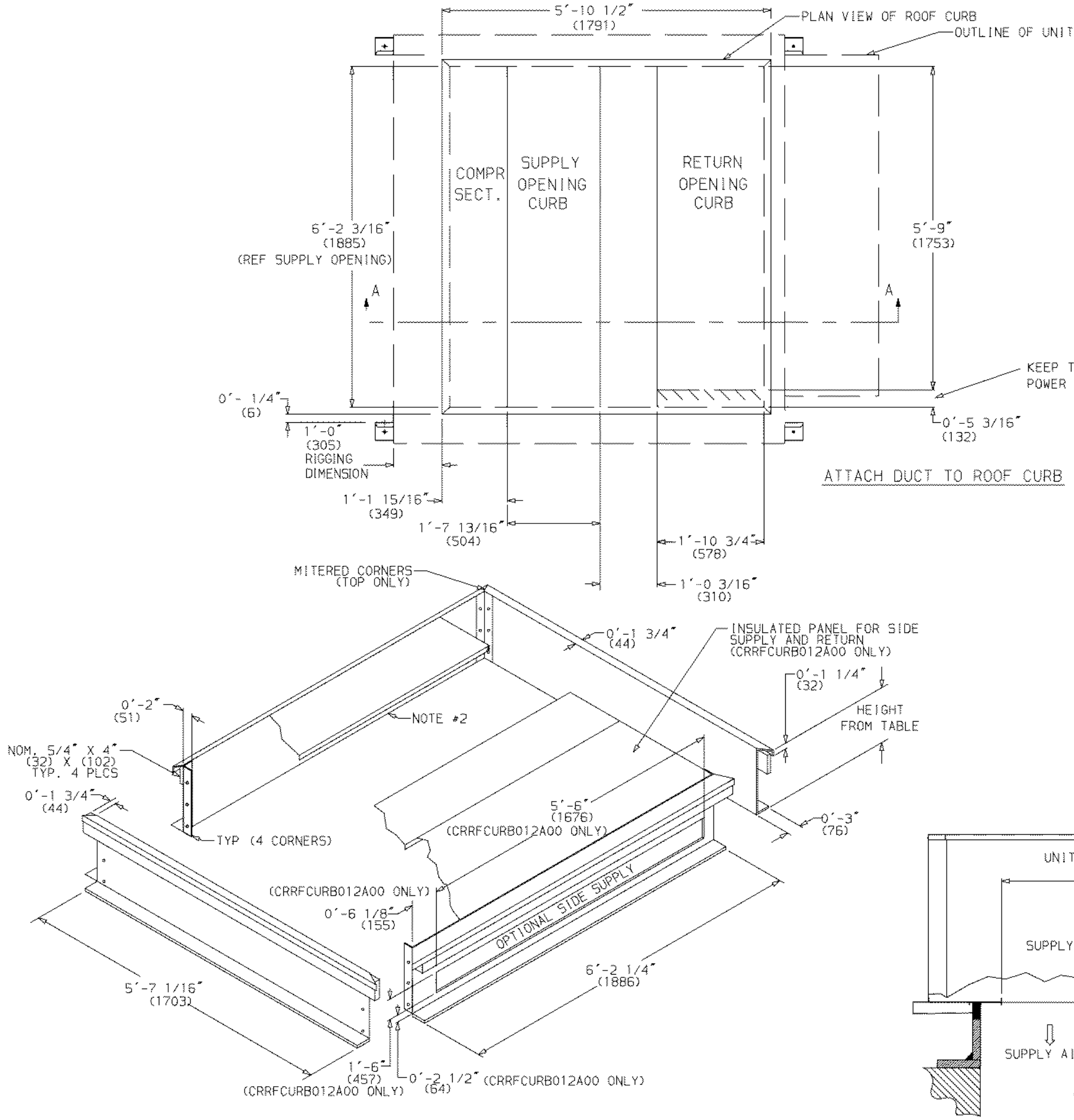


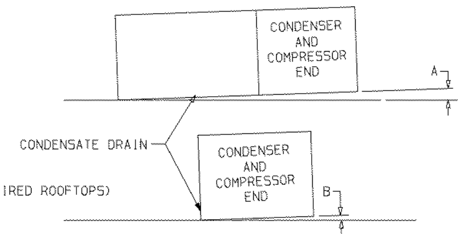
ACCESSORY PACKAGE NO.	CURB HEIGHT	DESCRIPTION
CRRFCURB013A00	1′-11″ (584)	Pre-Assembled, Horizontal Adapter Roof Curb

Fig. 1 — Horizontal Adapter Roof Curb Installation

PKG. NO. REF.	CURB HEIGHT	DESCRIPTION
CRRFCURB010A00	1′-2″ (305)	Standard Curb 14″ High
CRRFCURB011A00	2′-0″ (610)	Standard Curb for Units Requiring High Installation
CRRFCURB012A00	2′-0″ (610)	Side Supply and Return Curb for High Installation

NOTES:
1. Roof curb accessory is shipped disassembled.
2. Insulated panels: 1″ thick neoprene coated $1^1/_2$ lb density.
3. Dimensions in ( ) are in millimeters.
4. ⇨ Direction of airflow.
5. Roof curb: 16 ga. (VA03-56) stl.
6. **A 90 degree elbow must be installed on the supply ductwork below the unit discharge for units equipped with electric heaters.**
7. To prevent the hazard of stagnant water build-up in the drain pan of the indoor section, unit can only be pitched as shown.





DIMENSIONS* (degrees and inches)

UNIT	A		B	
	Deg.	in.	Deg.	in.
ALL	.28	.45	.28	.43

UNIT LEVELING TOLERANCES
*From edge of unit to horizontal.

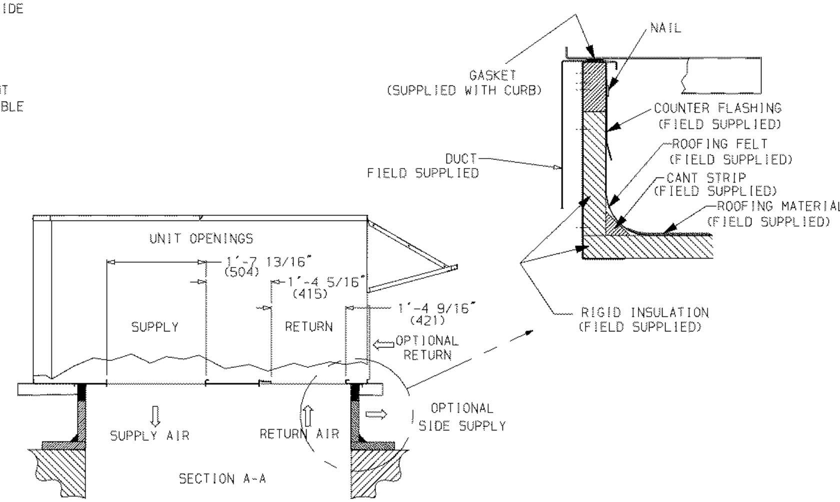
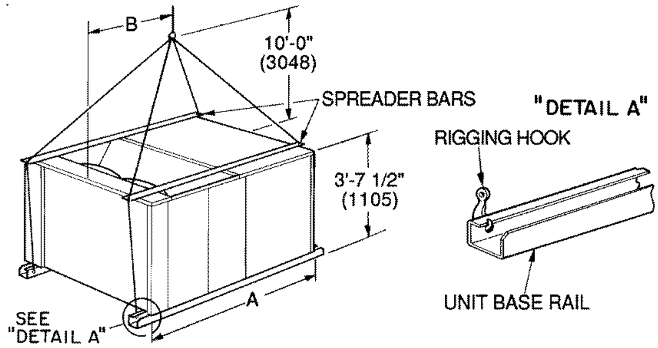


Fig. 2 — Roof Curb Details — 48HJ015,017



NOTES:
1. Dimensions in ( ) are in millimeters.
2. Refer to Fig. 4 for unit operating weights.
3. Remove boards at ends of unit and runners prior to rigging.
4. Rig by inserting hooks into unit base rails as shown. Use corner post from packaging to protect coil from damage. Use bumper boards for spreader bars on all units.
5. Weights do not include optional economizer. Add 90 lb (41 kg) for economizer weight.
6. Weights given are for aluminum evaporator and condenser coil plate fins.
7. Add 75 lb (34 kg) for crating on 48HJ015 and 017 units.
8. Add 150 lb (68 kg) for copper condenser coil. Add 280 lb (127 kg) for copper condenser and evaporator coils.

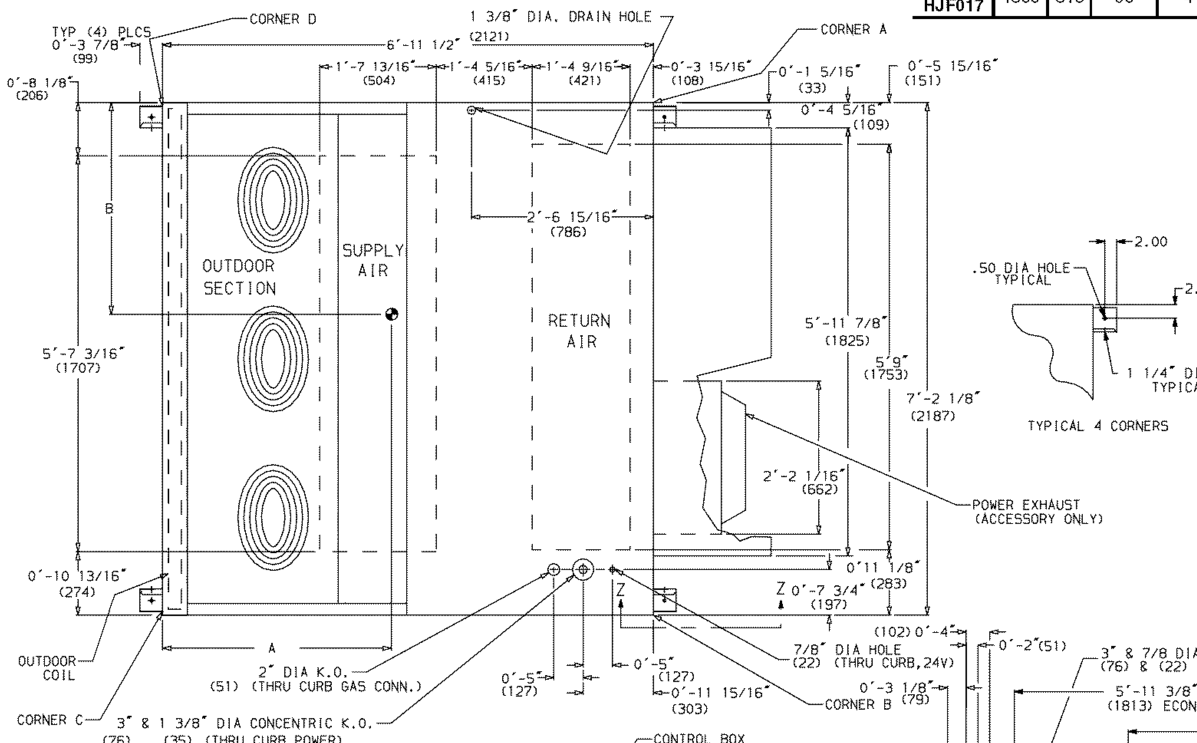
⚠ CAUTION

All panels must be in place when rigging.

UNIT 48HJ	MAXIMUM SHIPPING WEIGHT		DIMENSIONS			
			A		B	
	lb	kg	ft-in.	mm	ft-in.	mm
015	1725	782	6-11$^{1}/_{2}$	2121	4-0	1219
017	1800	816	6-11$^{1}/_{2}$	2121	3-2	964

Fig. 3 — Rigging Details

UNIT	STD UNIT WEIGHT		ECONOMIZER WEIGHT		CORNER A		CORNER B		CORNER C		CORNER D		DIM A		DIM B		DIM C	
	Lb	Kg	Lb	Kg	Lb	Kg	Lb	Kg	Lb	Kg	Lb	Kg	ft-in.	mm	ft-in.	mm	ft-in.	mm
48HJD, HJF015	1725	782	90	41	427	194	390	177	438	199	470	213	3-3	991	3-5	1051	1-10	559
48HJD, HJF017	1800	816	90	41	417	189	399	181	481	218	503	228	3-2	961	3-6	1070	1-10	559



NOTES:

1. Refer to print for roof curb accessory dimensions.
2. Dimensions in ( ) are in millimeters.
3. Center of Gravity.
4. Direction of airflow.
5. Ductwork to be attached to accessory roof curb only.
6. Minimum clearance:
   - Rear: 7′-0″ (2134) for coil removal. This dimension can be reduced to 4′-0″ (1219) if conditions permit coil removal from the top.
   - 4′-0″ (1219) to combustible surfaces, all four sides (includes between units).
   - Left side: 4′-0″ (1219) for proper condenser coil airflow.
   - Front: 4′-0″ (1219) for control box access.
   - Right side: 4′-0″ (1219) for proper operation of damper and power exhaust if so equipped.
   - Top: 6′-0″ (1829) to assure proper condenser fan operation.
   - Bottom: 14″ (356) to combustible surfaces (when not using curb).
   - Control box side: 3′-0″ (914) to ungrounded surfaces, non-combustible.
   - Control box side: 3′-6″ (1067) to block or concrete walls, or other grounded surfaces.
   - Local codes or jurisdiction may prevail.
7. With the exception of clearance for the condenser coil and the damper/ power exhaust as stated in Note #6, a removable fence or barricade requires no clearance.
8. Dimensions are from outside of corner post. Allow 0′-$^{5}/_{16}$″ (8) on each side for top cover drip edge.
9. See drawing 50TJ500352 for service option details.

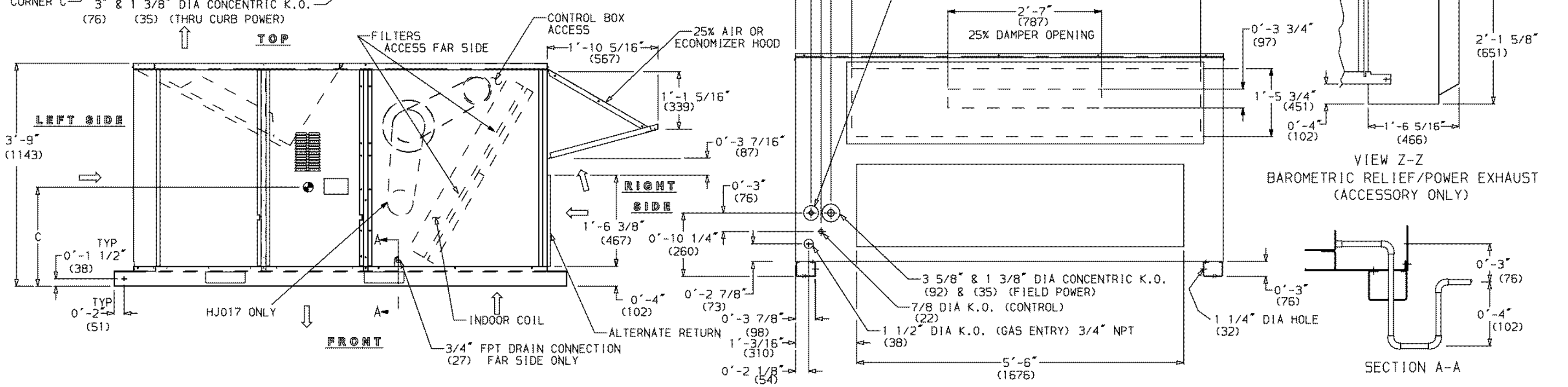


Fig. 4 — Base Unit Dimensions; 48HJ015 and 017

Table 1 — Physical Data

UNIT 48HJD/F		015			017		
		208/230 V	460 V	575 V	208/230 V	460 V	575 V
NOMINAL CAPACITY (tons)		12			15		
OPERATING WEIGHT (lb)							
Unit							
Al/Al*		1725			1800		
Al/Cu*		1875			1950		
Cu/Cu*		2005			2080		
Economizer		90			90		
Roof Curb†		200			200		
MoistureMi$er™ Dehumidification Package		40			40		
COMPRESSOR							
Quantity...Model (Ckt 1, Ckt 2)		2...ZR72KC			1...ZR94KC, 1...ZR72KC		
Number of Refrigerant Circuits		2			2		
Crankcase Heater Watts		70			70		
Loading (% of Full Capacity)		0, 53, 100			0, 60, 100		
Oil (oz) (Ckt 1, Ckt 2)		60,60			85,60		
REFRIGERANT TYPE		R-22					
Expansion Device		TXV					
Operating Charge (lb)							
Circuit 1**		20.7			19.5		
Circuit 2		13.4			13.45		
CONDENSER COIL		Cross-Hatched $^{3}/_{8}$-in. Copper Tubes, Aluminum Lanced, Aluminum Pre-Coated, or Copper Plate Fins					
Rows...Fins/in.		4...15			4...15		
Total Face Area (sq ft)		21.7			21.7		
CONDENSER FAN		Propeller Type					
Nominal Cfm		10,500			10,500		
Quantity...Diameter (in.)		3...22			3...22		
Motor Hp...Rpm		$^{1}/_{2}$...1050			$^{1}/_{2}$...1050		
Watts Input (Total)		1100			1100		
EVAPORATOR COIL		Cross-Hatched $^{3}/_{8}$-in. Copper Tubes, Aluminum Lanced or Copper Plate Fins, Face Split					
Rows...Fins/in.		4...15			4...15		
Total Face Area (sq ft)		17.5			17.5		
EVAPORATOR FAN		Centrifugal Type					
Quantity...Size (in.)		2...12 X 12			2...12 x 12		
Type Drive		Belt			Belt		
Nominal Cfm		5200			6000		
Std Motor Hp		2.9		3.0	5		
Opt Motor Hp		3.7		N/A			
Motor Nominal Rpm		1725			1745		
Std Maximum Continuous Bhp		3.13		3.38	6.13		
Opt Maximum Continuous Bhp		4.26		N/A			
Motor Frame Size		56H			184T		
Fan Rpm Range	Low-Medium Static	895-1147		895-1147	873-1021		
	High Static	1040-1315		N/A	1025-1200		
Motor Bearing Type		Ball			Ball		
Maximum Allowable Rpm		1550			1550		
Motor Pulley Pitch Dia.	Low-Medium Static	3.1/4.1		3.1/4.1	4.9/5.9		
	High Static	3.7/4.7		N/A	4.9/5.9		
Nominal Motor Shaft Diameter (in.)		$^{7}/_{8}$		$^{7}/_{8}$	$1^{1}/_{8}$		
Fan Pulley Pitch Diameter (in.)	Low-Medium Static	6.0		6.0	9.4		
	High Static	6.0		6.0	8.0		
Nominal Fan Shaft Diameter (in.)		$1^{3}/_{16}$		$1^{3}/_{16}$	$1^{7}/_{16}$		
Belt, Quantity...Type... Length (in.)	Low-Medium Static	1...BX...45		1...BX...45	1...BX...50		
	High Static	1...BX...45		1...BX...45	1...BX...48		
Pulley Center Line Distance (in.)		14.5-16.0		14.5-16.0	13.3-14.8		
Speed Change per Full Turn of Movable Pulley Flange (Rpm)	Low-Medium Static	45		45	37		
	High Static	45		N/A	44		
Movable Pulley Maximum Full Turns From Closed Position		6		6	4††		
Factory Speed		3.5		3.5	3.5		
Factory Speed Setting (Rpm)	Low-Medium Static	987		1155	965		
	High Static	1155		N/A	1134		
FURNACE SECTION							
Rollout Switch Cutout Temp (F)***		190			190		
Burner Orifice Diameter (in...drill size)							
Natural Gas (48HJD/48HJF)		0.1285...30/ 0.136...29			0.1285...30/ 0.136...29		
Thermostat Heat Anticipator Setting							
Stage 1 (amps)		0.98	0.8	0.98	0.98	0.8	0.98
Stage 2 (amps)		0.44	0.44	0.44	0.44	0.44	0.44
Gas Input (Btuh)	Stage 1 (48HJD/48HJF)	172,000/230,000			206,000/275,000		
	Stage 2 (48HJD/48HJF)	225,000/300,000			270,000/360,000		
Efficiency (Steady State) (%)		81			81		
Temperature Rise Range (F) (48HJD/48HJF)		15-45/30-60			15-45/20-50		
Manifold Pressure (in. wg)							
Natural Gas		3.3			3.3		
Gas Valve Quantity		1			1		
Gas Valve Pressure Range	(in. wg)	5.5-13.5			5.5-13.5		
	(psig)	0.235-0.487			0.235-0.487		
Field Gas Connection Size (in.-FPT)		$^{3}/_{4}$			$^{3}/_{4}$		
HIGH-PRESSURE SWITCH (psig)							
Cutout		426					
Reset (Auto.)		320					
LOW-PRESSURE SWITCH (psig)							
Cutout		27					
Reset (Auto.)		44					
FREEZE PROTECTION THERMOSTAT (F)							
Opens		30 ± 5					
Closes		45 ± 5					
OUTDOOR-AIR INLET SCREENS		Cleanable					
Quantity...Size (in.)		2...20 x 25 x 1 1...20 x 20 x 1					
RETURN-AIR FILTERS		Throwaway					
Quantity...Size (in.)		4...20 x 20 x 2 4...16 x 20 x 2					

LEGEND

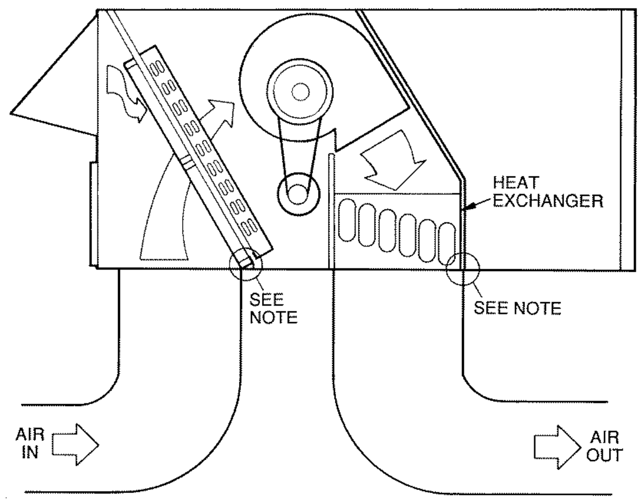
Al — Aluminum
Bhp — Brake Horsepower
Cu — Copper
TXV — Thermostatic Expansion Valve

*Evaporator coil fin material/condenser coil fin material.
†Weight of 14-in. roof curb.
**Circuit 1 uses the lower portion of condenser coil and lower portion of evaporator coils, and Circuit 2 uses the upper portion of both coils.
††Pulley has 6 turns. Due to belt and pulley, moveable pulley cannot be set to 0 to $1^{1}/_{2}$ turns open.
***Rollout switch is manual reset.

Step 3 — Field Fabricate Ductwork — Secure all ducts to building structure. Use flexible duct connectors between unit and ducts as required. Insulate and weatherproof all external ductwork, joints, and roof openings with counter flashing and mastic in accordance with applicable codes.

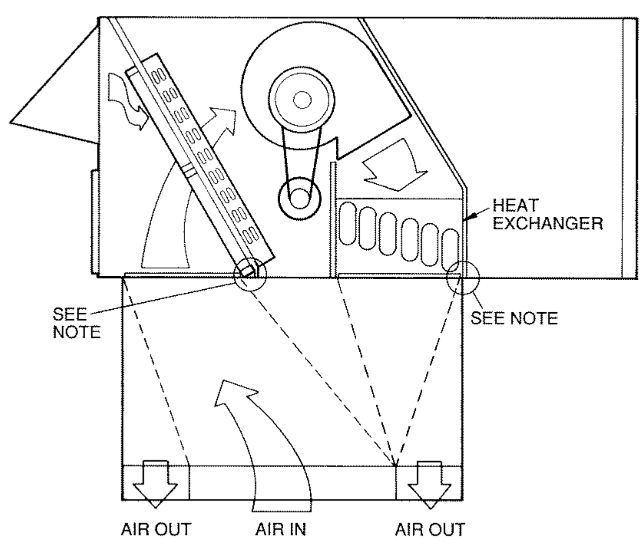
Ducts passing through an unconditioned space must be insulated and covered with a vapor barrier.

Step 4 — Make Unit Duct Connections — Unit is shipped for thru-the-bottom duct connections. Ductwork openings are shown in Fig. 1 and 4. Duct connections are shown in Fig. 5. Field-fabricated concentric ductwork may be connected as shown in Fig. 6 and 7. Attach all ductwork to roof curb and roof curb basepans.



NOTE: Do not drill in this area; damage to basepan may result in water leak.

Fig. 5 — Air Distribution — Thru-the-Bottom



NOTE: Do not drill in this area; damage to basepan may result in water leak.

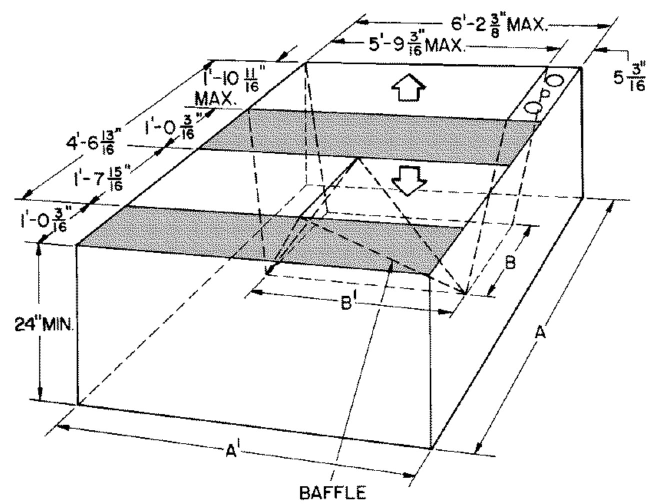
Fig. 6 — Concentric Duct Air Distribution

⚠ WARNING

For vertical supply and return units, tools or parts could drop into ductwork and cause injury. Install a 90-degree turn in the return ductwork between the unit and the conditioned space. If a 90-degree elbow cannot be installed, then a grille of sufficient strength and density should be installed to prevent objects from falling into the conditioned space.

Step 5 — Install Flue Hood and Wind Baffle — Flue hood and wind baffle are shipped secured under main control box. To install, secure flue hood to access panel. See Fig. 8. The wind baffle is then installed over the flue hood.

NOTE: When properly installed, flue hood will line up with combustion fan housing. See Fig. 9.



NOTE: Dimensions A, A′, B, and B′ are obtained from field-supplied ceiling diffuser.

Shaded areas indicate block-off pans.

Fig. 7 — Concentric Duct Details

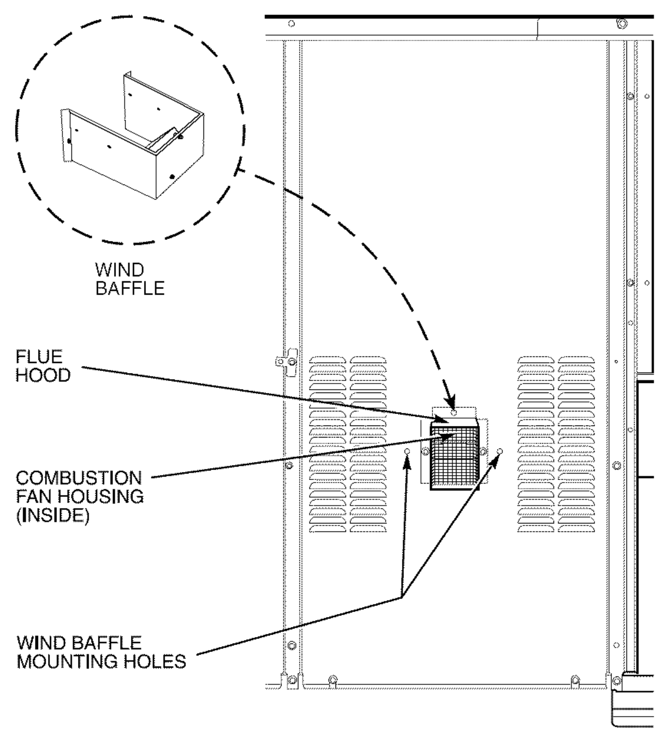


Fig. 8 — Flue Hood Location

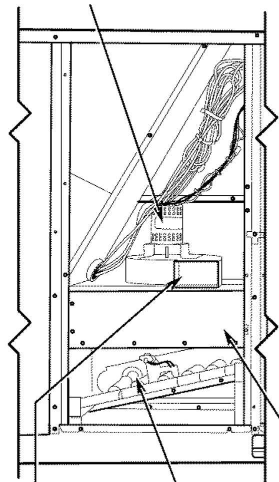


Fig. 9 — Combustion Fan Housing Location

Step 6 — Trap Condensate Drain — See Fig. 10 for drain location. One $^3/_4$-in. half coupling is provided inside unit evaporator section for condensate drain connection. An $8^1/_2$-in. x $^3/_4$-in. diameter and 2-in. x $^3/_4$-in. diameter pipe nipple, coupled to standard $^3/_4$-in. diameter elbows, provides a straight path down through hole in unit base rail (see Fig. 11). A trap at least 4-in. deep must be used.

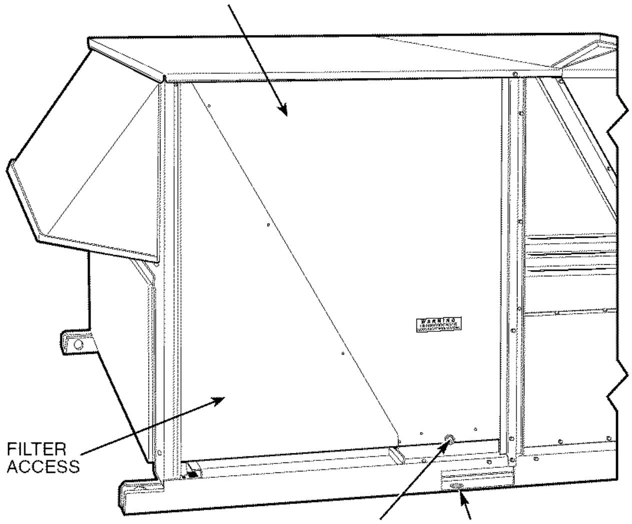


Fig. 10 — Condensate Drain Details (48HJ015 Shown)

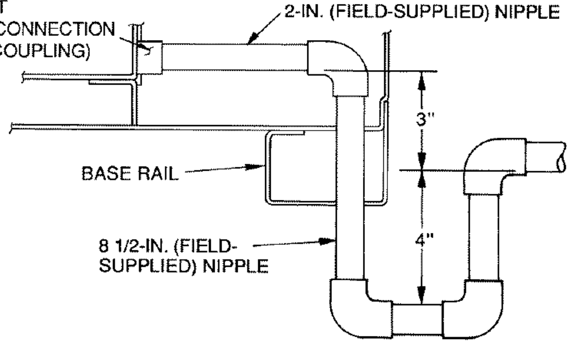


Fig. 11 — Condensate Drain Piping Details

Step 7 — Orifice Change — This unit is factory assembled for heating operation using natural gas at an elevation from sea level to 2000 ft. This unit uses orifice type LH32RFnnn, where "nnn" indicates the orifice size based on drill size diameter in thousands of an inch.

HIGH ELEVATION (Above 2000 ft) — Use accessory high altitude kit when installing this unit at an elevation of 2000 to 7000 ft. For elevations above 7000 ft, refer to Table 2 to identify the correct orifice size for the elevation. See Table 3 for the number of orifices required for each unit size. Purchase these orifices from your local Carrier dealer. Follow instructions in accessory Installation Instructions to install the correct orifices.

Table 2 — Altitude Compensation*

ELEVATION (ft)	NATURAL GAS ORIFICE†	
0-1,999	30	29
2,000	30	29
3,000	31	30
4,000	31	30
5,000	31	30
6,000	31	30
7,000	32	31
8,000	32	31
9,000	33	31
10,000	35	32

*As the height above sea level increases, there is less oxygen per cubic foot of air. Therefore, heat input rate should be reduced at higher altitudes. Includes a 4% input reduction per each 1000 ft.
†Orifices available through your Carrier dealer.

Table 3 — Orifice Quantity

UNIT	ORIFICE QUANTITY
48HJD015	5
48HJF015, 48HJD017	6
48HJF017	7

CONVERSION TO LP (Liquid Propane) GAS — Use accessory LP gas conversion kit when converting this unit for use with LP fuel usage for elevations up to 7000 ft. For elevations above 7000 ft, refer to Table 4 to identify the correct orifice size for the elevation. See Table 3 for the number of orifices required for each unit size. Purchase these orifices from your local Carrier dealer. Follow instructions in accessory Installation Instructions to install the correct orifices.

Table 4 — LP Gas Conversion*

ELEVATION (ft)	LP GAS ORIFICE†
0-1,999	36
2,000	37
3,000	38
4,000	38
5,000	39
6,000	40
7,000	41
8,000	41
9,000	42
10,000	43

*As the height above sea level increases, there is less oxygen per cubic foot of air. Therefore, heat input rate should be reduced at higher altitudes. Includes a 4% input reduction per each 1000 ft.
†Orifices available through your Carrier dealer.

Step 8 — Install Gas Piping —

Unit is equipped for use with natural gas. Installation must conform with local building codes or, in the absence of local codes, with the National Fuel Gas Code, ANSI Z223.1.

Install field-supplied manual gas shutoff valve with a $^1/_8$-in. NPT pressure tap for test gage connection at unit. Field gas piping must include sediment trap and union. See Fig. 12.

⚠ WARNING

Do not pressure test gas supply while connected to unit. Always disconnect union before servicing. Exceeding maximum manifold pressure may cause explosion or injury.

IMPORTANT: Natural gas pressure at unit gas connection must not be less than 5.5 in. wg or greater than 13.5 in. wg.

Size gas-supply piping for 0.5-in. wg maximum pressure drop. Do not use supply pipe smaller than unit gas connection.

Step 9 — Make Electrical Connections

FIELD POWER SUPPLY — Unit is factory wired for voltage shown on unit nameplate.

When installing units, provide a disconnect per NEC (National Electrical Code) requirements of adequate size (see Table 5).

All field wiring must comply with NEC and local requirements.

Route power and ground lines through control box end panel or unit basepan (see Fig. 4) to connections as shown on unit wiring diagram and Fig. 13.

⚠ CAUTION

The correct power phasing is critical in the operation of the scroll compressors. An incorrect phasing will cause the compressor to rotate in the wrong direction. This may lead to premature compressor failure.

⚠ WARNING

The unit must be electrically grounded in accordance with local codes and NEC ANSI/NFPA 70 (National Fire Protection Association) to protect against fire and electrical shock.

Field wiring must conform to temperature limitations for type “T” wire. All field wiring must comply with NEC and local requirements.

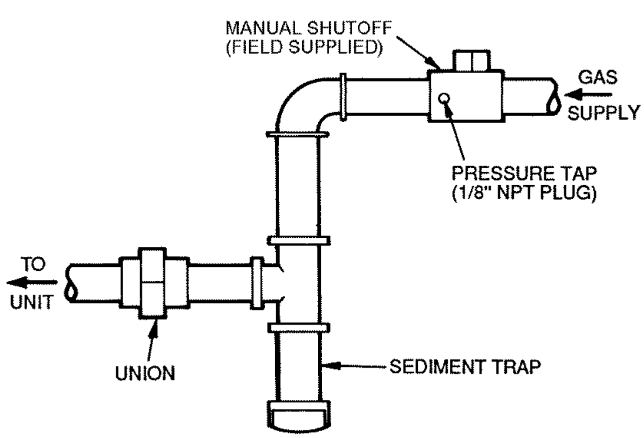


Fig. 12 — Field Gas Piping

Transformer no. 1 is wired for 230-v unit. If 208/230-v unit is to be run with 208-v power supply, the transformer must be rewired as follows:

1. Remove cap from red (208 v) wire.
2. Remove cap from orange (230 v) spliced wire.
3. Replace orange wire with red wire.
4. Recap both wires.

⚠ CAUTION

Be certain unused wires are capped. Failure to do so may damage the transformers.

Operating voltage to compressor must be within voltage range indicated on unit nameplate. On 3-phase units, voltages between phases must be balanced within 2%.

Unit failure as a result of operation on improper line voltage or excessive phase imbalance constitutes abuse and may cause damage to electrical components.

FIELD CONTROL WIRING — Install a Carrier-approved accessory thermostat assembly according to the installation instructions included with accessory. Locate thermostat assembly on a solid interior wall in the conditioned space to sense average temperature.

Route thermostat cable or equivalent single leads of colored wire from subbase terminals through conduit in unit to low-voltage connections as shown on unit label wiring diagram and in Fig. 14.

NOTE: For wire runs up to 50 ft, use no. 18 AWG (American Wire Gage) insulated wire (35 C minimum). For 50 to 75 ft, use no. 16 AWG insulated wire (35 C minimum). For over 75 ft, use no. 14 AWG insulated wire (35 C Minimum). All wire larger than no. 18 AWG cannot be directly connected at the thermostat and will require a junction box and splice at the thermostat.

Set heat anticipator settings as follows:

VOLTAGE	W1	W2
208/230,575	0.98	0.44
460	0.80	0.44

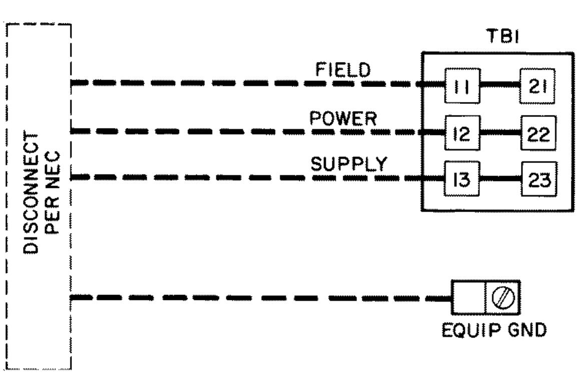
Settings may be changed slightly to provide a greater degree of comfort for a particular installation.

Refer to Accessory Remote Control Panel instructions if required.

OPTIONAL NON-FUSED DISCONNECT — On units with the optional non-fused disconnect, incoming power will be wired into the disconnect switch. Refer to Fig. 15 for wiring for 100 and 200 amp disconnect switches. Units with an MOCP (maximum overcurrent protection) under 100 will use the 100 amp disconnect switch. Units with an MOCP over 100 will use the 200 amp disconnect switch. Refer to the applicable disconnect wiring diagram.

To prevent breakage during shipping, the disconnect handle and shaft are shipped and packaged inside the unit control box. Install the disconnect handle before unit operation. To install the handle and shaft, perform the following procedure:

1. Open the control box door and remove the handle and shaft from shipping location.
2. Loosen the Allen bolt located on the disconnect switch. The bolt is located on the square hole and is used to hold the shaft in place. The shaft cannot be inserted until the Allen bolt is moved.
3. Insert the disconnect shaft into the square hole on the disconnect switch. The end of the shaft is specially cut and the shaft can only be inserted in the correct orientation.



LEGEND

EQUIP — Equipment
GND — Ground
NEC — National Electrical Code
TB — Terminal Board

NOTE: The maximum wire size for TB1 is 2/0.

Fig. 13 — Field Power Wiring Connections

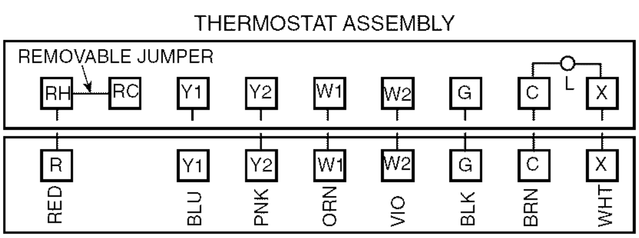


Fig. 14 — Field Control Thermostat Wiring

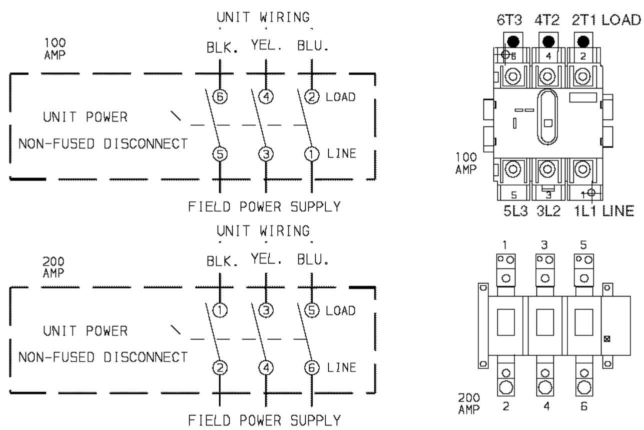
4. Tighten the Allen bolt to lock the shaft into position.
5. Close the control box door.
6. Attach the handle to the external access door with the two screws provided. When the handle is in the ON position, the handle will be vertical. When the handle is in the OFF position, the handle will be horizontal.
7. Turn the handle to the OFF position and close the door. The handle should fit over the end of the shaft when the door is closed.
8. The handle must be in the OFF position to open the control box door.

OPTIONAL CONVENIENCE OUTLET — On units with optional convenience outlet, a 115-v GFI (ground fault interrupt) convenience outlet receptacle is provided for field wiring. Field wiring should be run through the $^7/_8$-in. knockout provided in the basepan near the return air opening.

Step 10 — Make Outdoor-Air Inlet Adjustments

MANUAL OUTDOOR-AIR DAMPER — All units (except those equipped with a factory-installed EconoMi$erIV) have a manual outdoor-air damper to provide ventilation air. (See Step 12 for details on installing the EconoMi$erIV.)

Damper can be preset to admit up to 25% outdoor air into return-air compartment. To adjust, loosen securing screws and move damper to desired setting, then retighten screws to secure damper (Fig. 16).



NOTE: The disconnect takes the place of TB-1 as shown on the unit wiring diagram label and the component arrangement label.

Fig. 15 — Optional Non-Fused Disconnect Wiring

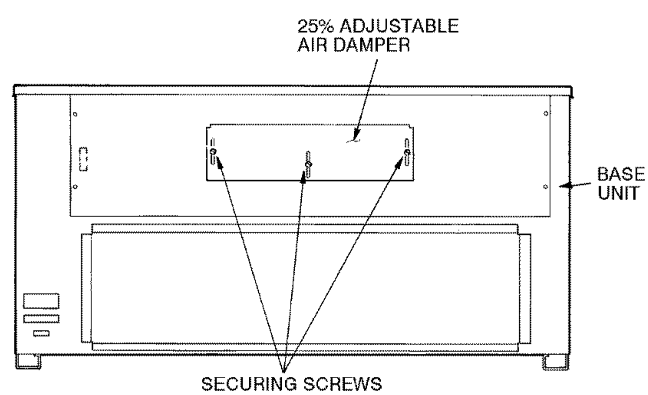


Fig. 16 — Standard 25% Outdoor-Air Section Details

Table 5 — Electrical Data

UNIT 48HJ	NOMINAL VOLTAGE (3 Ph, 60 Hz)	VOLTAGE RANGE		COMPRESSOR No. 1		COMPRESSOR No. 2		OFM			IFM		POWER EXHAUST		COMBUSTION FAN MOTOR	POWER SUPPLY	
		Min	Max	RLA	LRA	RLA	LRA	Qty	Hp	FLA (ea)	Hp	FLA	FLA	LRA	FLA	MCA	MOCP*
015 (Standard IFM)	208/230	187	253	20.7	156	20.7	156	3	0.5	1.7	2.9	8.8/ 8.4	— 4.6	— 18.8	0.57 0.57	60/60 65/65	80/80 80/80
	460	414	506	10	75	10	75	3	0.5	0.8	2.9	4.2	— 2.3	— 6.0	0.3 0.3	29 31	35 40
	575	518	633	8.2	54	8.2	54	3	0.5	0.75	3	3.9	— 2.1	— 4.8	0.57 0.57	25 27	30 30
015 (Optional IFM)	208/230	187	253	20.7	156	20.7	156	3	0.5	1.7	3.7	10.5/11.0	— 4.6	— 18.8	0.57 0.57	62/63 67/67	80/80 80/80
	460	414	506	10	75	10	75	3	0.5	0.8	3.7	4.8	— 2.3	— 6.0	0.3 0.3	30 32	35 40
017	208/230	187	253	32.1	195	20.7	156	3	0.5	1.7	5	15.8/15.8	— 4.6	— 18.8	0.57 0.57	82/82 86/86	110/110 110/110
	460	414	506	16.4	95	10	75	3	0.5	0.8	5	7.9	— 2.3	— 6.0	0.3 0.3	41 43	50 50
	575	518	633	12	80	8.2	54	3	0.5	0.75	5	6	— 2.1	— 4.8	0.57 0.57	31 34	40 45

LEGEND

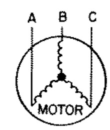
FLA — Full Load Amps
HACR — Heating, Air Conditioning and Refrigeration
IFM — Indoor (Evaporator) Fan Motor
LRA — Locked Rotor Amps
MCA — Minimum Circuit Amps
MOCP — Maximum Overcurrent Protection
NEC — National Electrical Code
OFM — Outdoor (Condenser) Fan Motor
RLA — Rated Load Amps

*Fuse or HACR circuit breaker.

C US INTERTEK LISTED

NOTES:
1. In compliance with NEC requirements for multimotor and combination load equipment (refer to NEC Articles 430 and 440), the overcurrent protective device for the unit shall be fuse or HACR breaker. Canadian units may be fuse or circuit breaker.
2. **Unbalanced 3-Phase Supply Voltage**
   Never operate a motor where a phase imbalance in supply voltage is greater than 2%. Use the following formula to determine the percent of voltage imbalance.
   % Voltage Imbalance
   $$= 100 \times \frac{\text{max voltage deviation from average voltage}}{\text{average voltage}}$$

Example: Supply voltage is 460-3-60.



AB = 452 v
BC = 464 v
AC = 455 v

$$\text{Average Voltage} = \frac{452 + 464 + 455}{3}$$
$$= \frac{1371}{3}$$
$$= 457$$

Determine maximum deviation from average voltage.
(AB) 457 – 452 = 5 v
(BC) 464 – 457 = 7 v
(AC) 457 – 455 = 2 v

Maximum deviation is 7 v.

Determine percent of voltage imbalance.

$$\text{\% Voltage Imbalance} = 100 \times \frac{7}{457}$$
$$= 1.53\%$$

This amount of phase imbalance is satisfactory as it is below the maximum allowable 2%.

> IMPORTANT: If the supply voltage phase imbalance is more than 2%, contact your local electric utility company immediately.

Step 11 — Install Outdoor-Air Hood

> IMPORTANT: If the unit is equipped with the optional EconoMi$erIV component move the outdoor air temperature sensor prior to installing the outdoor-air hood. See the optional EconoMi$erIV and EconoMi$er2 section.

The outdoor-air hood is common to 25% air ventilation and EconoMi$erIV. If EconoMi$erIV is used, all electrical connections have been made and adjusted at the factory. Assemble and install hood in the field.

NOTE: The hood top panel, upper and lower filter retainers, hood drain pan, baffle (size 017), and filter support bracket are secured opposite the condenser end of the unit. The screens, hood side panels, remaining section of filter support bracket, seal strip, and hardware are in a package located inside the return-air filter access panel (Fig. 17).

1. Attach seal strip to upper filter retainer. See Fig. 18.
2. Assemble hood top panel, side panels, upper filter retainer, and drain pan (see Fig. 19).
3. Secure lower filter retainer and support bracket to unit. See Fig. 19. Leave screws loose on size 017 units.
4. Slide baffle (size 017) behind lower filter retainer and tighten screws.
5. Loosen sheet metal screws for top panel of base unit located above outdoor-air inlet opening, and remove screws for hood side panels located on the sides of the outdoor-air inlet opening.
6. Match notches in hood top panel to unit top panel screws. Insert hood flange between top panel flange and unit. Tighten screws.
7. Hold hood side panel flanges flat against unit, and install screws removed in Step 5.
8. Insert outdoor-air inlet screens and spacer in channel created by lower filter retainer and filter support bracket.
9. Attach remaining section of filter support bracket.

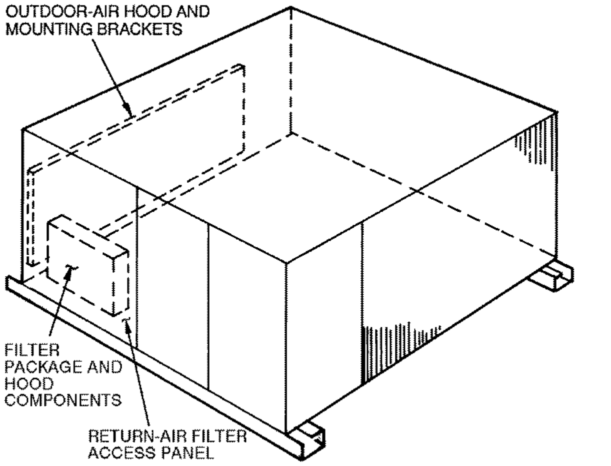


Fig. 17 — Outdoor-Air Hood Component Location

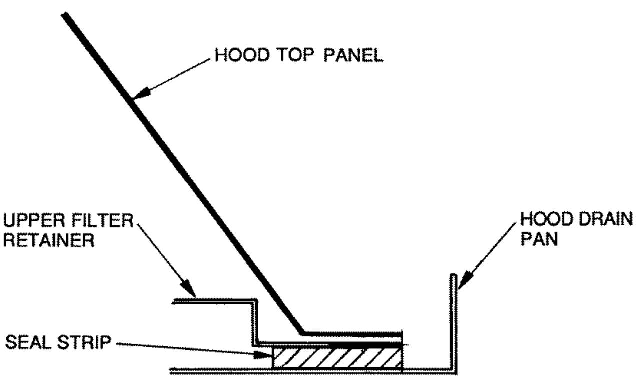


Fig. 18 — Seal Strip Location

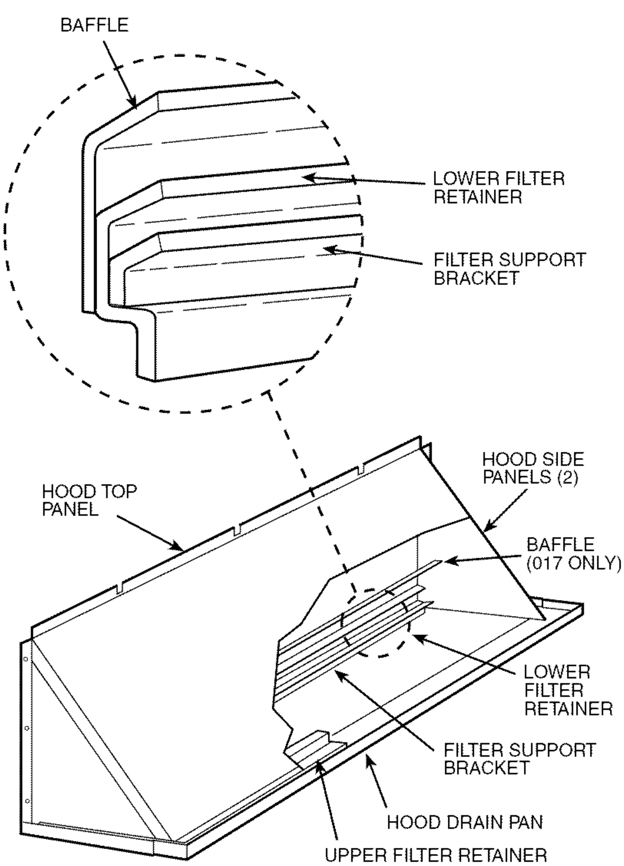


Fig. 19 — Outdoor-Air Hood Details

Step 12 — Install All Accessories —

Install all field-installed accessories. Refer to the accessory installation instructions included with each accessory.

MOTORMASTER® I CONTROL INSTALLATION

Install Field-Fabricated Wind Baffles — Wind baffles must be field-fabricated for all units to ensure proper cooling cycle operation at low ambient temperatures. See Fig. 20 for baffle details. Use 20-gage, galvanized sheet metal, or similar corrosion-resistant metal for baffles. Use field-supplied screws to attach baffles to unit. Screws should be $^{1}/_{4}$-in. diameter and $^{5}/_{8}$-in. long. Drill required screw holes for mounting baffles.

⚠ CAUTION

To avoid damage to the refrigerant coils and electrical components, use recommended screw sizes only. Use care when drilling holes.

Install Motormaster I Controls — Only one Motormaster I control is required per unit. The Motormaster I control must be used in conjunction with the accessory 0° F low ambient kit (purchased separately). The Motormaster I device controls outdoor fan no. 1 while outdoor fans no. 2 and 3 are sequenced off by the accessory 0° F low ambient kit.

Accessory 0° F Low Ambient Kit — Install the accessory 0° F low ambient kit per instruction supplied with accessory.

Sensor Assembly — Install the sensor assembly in the location shown in Fig. 21.

Motor Mount — To ensure proper fan height, replace the existing motor mount with the new motor mount provided with accessory.

Transformer (460 and 575-v Units Only) — On 460 and 575-v units, a transformer is required. The transformer is provided with the accessory and must be field-installed.

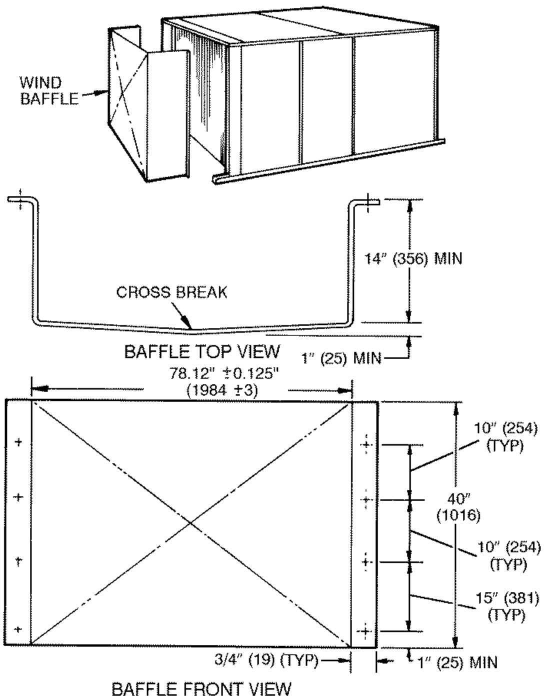
Motormaster I Control — Recommended mounting location is on the inside of the panel to the left of the control box. The control should be mounted on the inside of the panel, vertically, with leads protruding from bottom of extrusion.

Step 13 — Adjust Factory-Installed Options

PREMIERLINK™ CONTROL — The PremierLink controller is available as a special order from the factory and is compatible with the Carrier Comfort Network® (CCN) system. This control is designed to allow users the access and ability to change factory-defined settings, thus expanding the function of the standard unit control board. Carrier's diagnostic standard tier display tools such as Navigator™ device or Scrolling Marquee can be used with the PremierLink controller.

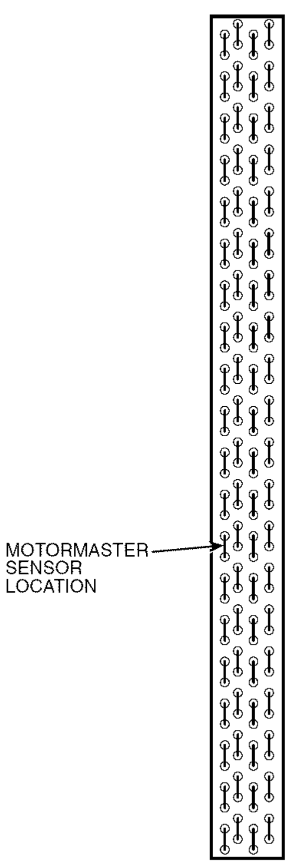
The PremierLink controller (see Fig. 22) requires the use of a Carrier electronic thermostat or a CCN connection for time broadcast to initiate its internal timeclock. This is necessary for broadcast of time of day functions (occupied/unoccupied). No sensors are supplied with the field-mounted PremierLink control. The factory-installed PremierLink control includes only the supply-air temperature (SAT) sensor and the outdoor air temperature (OAT) sensor as standard. An indoor air quality (CO_2) sensor can be added as an option. Refer to Table 6 for sensor usage. Refer to Fig. 23 for PremierLink controller wiring. The PremierLink control may be mounted in the control panel or an area below the control panel.

NOTE: PremierLink controller version 1.3 and later is shipped in Sensor mode. If used with a thermostat, the PremierLink controller must be configured to Thermostat mode.



NOTE: Dimensions in ( ) are in mm.

Fig. 20 — Wind Baffle Details



NOTES:

1. All sensors are located on the eighth hairpin up from the bottom.
2. Field-installed tubing insulation is required to be installed over the TXV (thermostatic expansion valve) bulb and capillary tube for proper operation at low ambients. Tubing insulation is only required on the portion of suction line located between indoor and outdoor section.

Fig. 21 — Motormaster I Sensor Locations

Install the Supply Air Temperature Sensor (SAT) — When the unit is supplied with a factory-mounted PremierLink control, the supply-air temperature (SAT) sensor (33ZCSENSAT) is factory-supplied and wired. The wiring is routed from the PremierLink control over the control box, through a grommet, into the fan section, down along the back side of the fan, and along the fan deck over to the supply-air opening.

The SAT probe is wire-tied to the supply-air opening (on the horizontal opening end) in its shipping position. Remove the sensor for installation. Re-position the sensor in the flange of the supply-air opening or in the supply air duct (as required by local codes). Drill or punch a $^1/_2$-in. hole in the flange or duct. Use two field-supplied, self-drilling screws to secure the sensor probe in a horizontal orientation.

NOTE: The sensor must be mounted in the discharge airsteam downstream of the cooling coil and any heating devices. Be sure the probe tip does not come in contact with any of the unit or heat surfaces.

Outdoor Air Temperature (OAT) Sensor — When the unit is supplied with a factory-mounted PremierLink control, the outdoor-air temperature (OAT) sensor is factory-supplied and wired.

Install the Indoor Air Quality (CO_2) Sensor — Mount the optional indoor air quality (CO_2) sensor according to manufacturer specifications.

A separate field-supplied transformer must be used to power the CO_2 sensor.

Wire the CO_2 sensor to the COM and IAQI terminals of J5 on the PremierLink controller. Refer to the PremierLink Installation, Start-Up, and Configuration Instructions for detailed wiring and configuration information.

ENTHALPY SWITCH/RECEIVER — The accessory enthalpy switch/receiver (33CSENTHSW) senses temperature and humidity of the air surrounding the device and calculates the enthalpy when used without an enthalpy sensor. The relay is energized when enthalpy is high and deenergized when enthalpy is low (based on ASHRAE [American Society of Heating, Refrigeration and Air Conditioning Engineers] 90.1 criteria). If an accessory enthalpy sensor (33CSENTSEN) is attached to the return air sensor input, then differential enthalpy is calculated. The relay is energized when the enthalpy detected by the return air enthalpy sensor is less than the enthalpy at the enthalpy switch/receiver. The relay is deenergized when the enthalpy detected by the return air enthalpy sensor is greater than the enthalpy at the enthalpy switch/receiver (differential enthalpy control). See Fig. 24 and 25.

OUTDOOR ENTHALPY CONTROL (Fig. 26) — Outdoor enthalpy control requires only an enthalpy switch/receiver (33CSENTHSW). The enthalpy switch/receiver is mounted in the outdoor air inlet and calculates outdoor air enthalpy. The enthalpy switch/receiver energizes the relay output when the outdoor enthalpy is above 28 Btu/lb **OR** dry bulb temperature is above 75 F and is deenergized when the outdoor enthalpy is below 27 Btu/lb **AND** dry bulb temperature is below 74.5 F. The relay output is wired to the unit economizer which will open or close depending on the output of the switch.

NOTE: The enthalpy calculation is done using an average altitude of 1000 ft above sea level.

Mounting — Mount the enthalpy switch/receiver in a location where the outdoor air can be sampled (such as the outdoor air intake). The enthalpy switch/receiver is not a NEMA 4 (National Electrical Manufacturers Association) enclosure and should be mounted in a location that is not exposed to outdoor elements such as rain or snow. Use two field-supplied no. 8 x $^3/_4$-in. TEK screws. Insert the screws through the holes in the sides of the enthalpy switch/receiver.

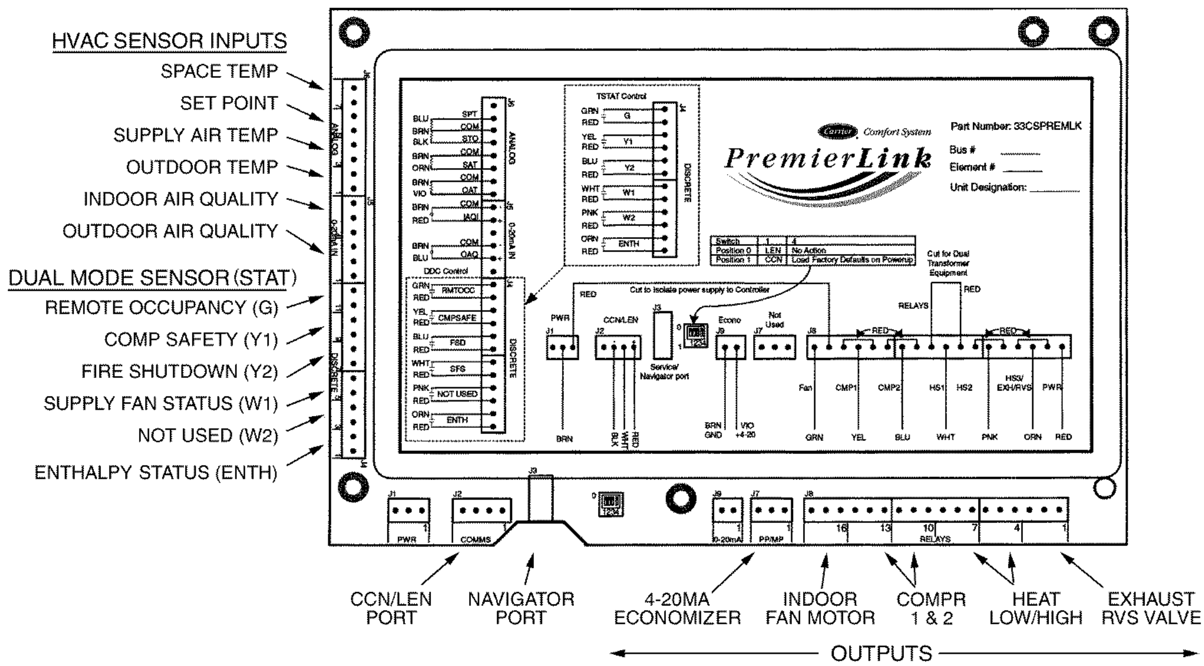


Fig. 22 — PremierLink™ Controller

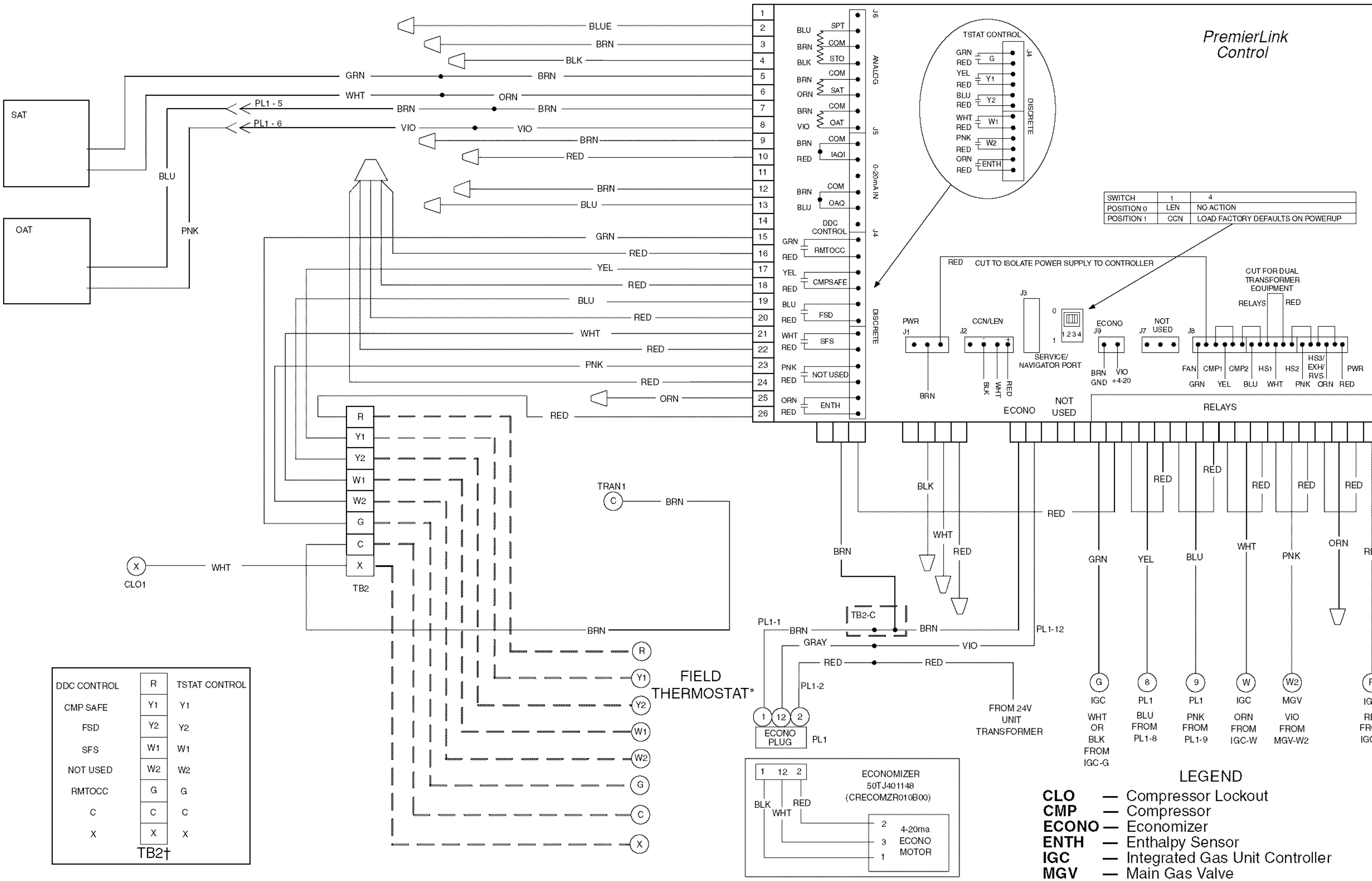
Table 6 — PremierLink Sensor Usage

APPLICATION	OUTDOOR AIR TEMPERATURE SENSOR	RETURN AIR TEMPERATURE SENSOR	OUTDOOR AIR ENTHALPY SENSOR	RETURN AIR ENTHALPY SENSOR
Differential Dry Bulb Temperature with PremierLink* (PremierLink requires 4-20 mA Actuator)	Included — HH79NZ039	Required — 33ZCT55SPT or Equivalent	—	—
Single Enthalpy with PremierLink* (PremierLink requires 4-20 mA Actuator)	Included — Not Used	—	Required — 33CSENTHSW (HH57ZC003) or HH57AC077	—
Differential Enthalpy with PremierLink* (PremierLink requires 4-20 mA Actuator)	Included — Not Used	—	Required — 33CSENTHSW (HH57ZC003) or HH57AC077	Required — 33CSENTSEN or HH57AC078

*PremierLink control requires Supply Air Temperature sensor 33ZCSENSAT and Outdoor Air Temperature sensor HH79NZ039 — Included with factory-installed PremierLink control; field-supplied and field-installed with field-installed PremierLink control.

NOTES:

1. CO_2 Sensors (Optional):
   33ZCSENCO2 — Room sensor (adjustable). Aspirator box is required for duct mounting of the sensor.
   33ZCASPCO2 — Aspirator box used for duct-mounted CO_2 room sensor.
   33ZCT55CO2 — Space temperature and CO_2 room sensor with override.
   33ZCT56CO2 — Space temperature and CO_2 room sensor with override and setpoint.
2. All units include the following standard sensors:
   Outdoor-air sensor — 50HJ540569 — Opens at 67 F, closes at 52 F, not adjustable.
   Mixed-air sensor — HH97AZ001 — (PremierLink control requires supply air temperature sensor 33ZCSENSAT and outdoor air temperature sensor HH79NZ039)
   Compressor lockout sensor — 50HJ540570 — Opens at 35 F, closes at 50 F.



LEGEND

- **CLO** — Compressor Lockout
- **CMP** — Compressor
- **ECONO** — Economizer
- **ENTH** — Enthalpy Sensor
- **IGC** — Integrated Gas Unit Controller
- **MGV** — Main Gas Valve
- **OAT** — Outdoor Air Temperature Sensor
- **PL** — Plug
- **SAT** — Supply Air Temperature Sensor
- **SPT** — Space Temperature Sensor
- **TB** — Terminal Block

*If PremierLink control is in thermostat mode.
†TB2 terminal designations for 24 vac discrete inputs. Default is for DDC control.

Fig. 23 — PremierLink™ Controls Wiring

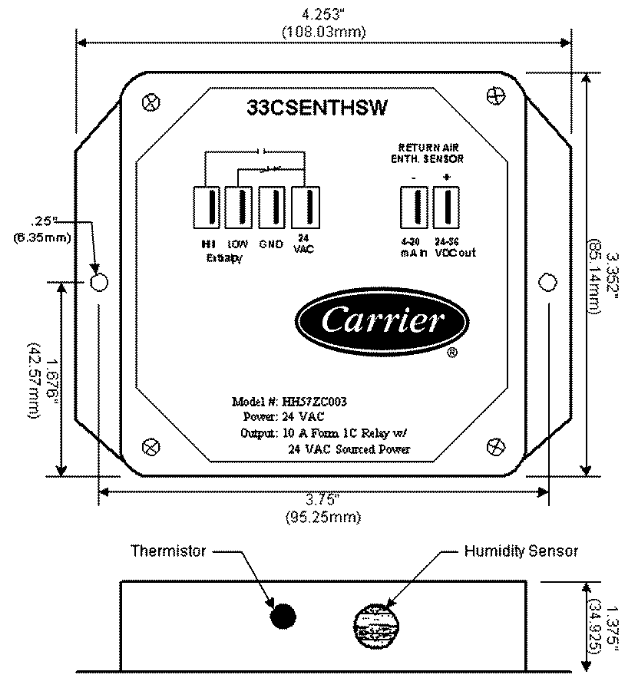


Fig. 24 — Enthalpy Switch/Receiver Dimensions (33CSENTHSW)

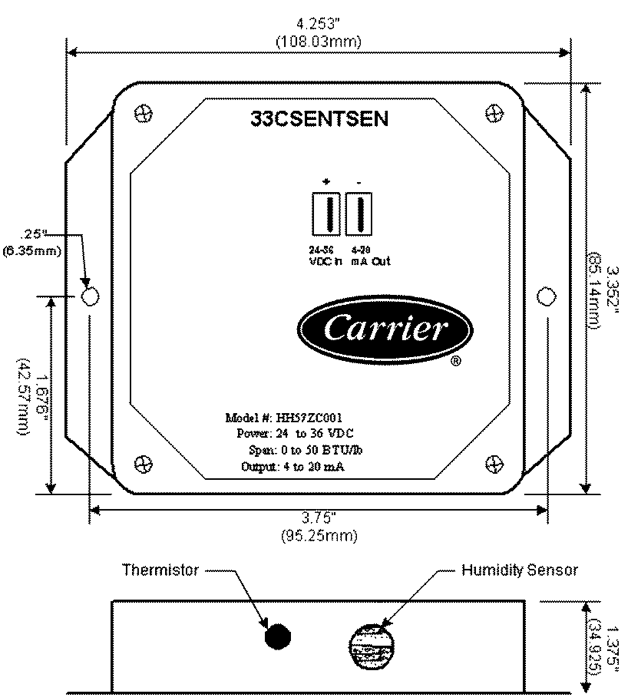


Fig. 25 — Enthalpy Sensor Dimensions (33CSENTSEN)

Wiring — Carrier recommends the use of 18 to 22 AWG (American Wire Gage) twisted pair or shielded cable for all wiring. All connections must be made with $^1/_4$-in. female spade connectors.

A 24-vac transformer is required to power the enthalpy switch/receiver; as shown in Fig. 26, the PremierLink board provides 24 vac. Connect the GND and 24 VAC terminals on the enthalpy switch/receiver to the terminals on the transformer. On some applications, the power from the economizer harness can be used to power the enthalpy switch/receiver. To power the enthalpy switch/receiver from the economizer harness, connect power of the enthalpy switch/receiver to the red and brown wires (1 and 4) on the economizer harness.

For connection to rooftop units with PremierLink™ control, connect the LOW Enthalpy terminal on the enthalpy switch/receiver to J4 — pin 2 of the PremierLink control on the HVAC unit. The switch can be powered through the PremierLink control board if desired. Wire the 24 VAC terminal on the enthalpy switch/receiver to J4 — pin 1 on the PremierLink control. Wire the GND terminal on the enthalpy switch/receiver to J1 — pin 2 on the PremierLink control. The HI Enthalpy terminal is not used. See Fig. 26.

DIFFERENTIAL ENTHALPY CONTROL (Fig. 27) — Differential enthalpy control requires both an enthalpy switch/receiver (33CSENTHSW) and an enthalpy sensor (33CSENTSEN). The enthalpy switch/receiver is mounted in the outdoor air inlet and calculates outdoor air enthalpy. The enthalpy sensor is mounted in the return airstream and calculates the enthalpy of the indoor air.

The enthalpy switch/receiver energizes the HI Enthalpy relay output when the outdoor enthalpy is greater than the indoor enthalpy. The LOW Enthalpy terminal is energized when the outdoor enthalpy is lower than the indoor enthalpy. The relay output is wired to the unit economizer which will open or close depending on the output of the switch.

NOTE: The enthalpy calculation is done using an average altitude of 1000 ft above sea level.

Mounting — Mount the enthalpy switch/receiver in a location where the outdoor air can be sampled (such as the outdoor air intake). The enthalpy switch/receiver is not a NEMA 4 enclosure and should be mounted in a location that is not exposed to outdoor elements such as rain, snow, or direct sunlight. Use two field-supplied no. 8 x $^3/_4$-in. TEK screws. Insert the screws through the holes in the sides of the enthalpy switch/receiver.

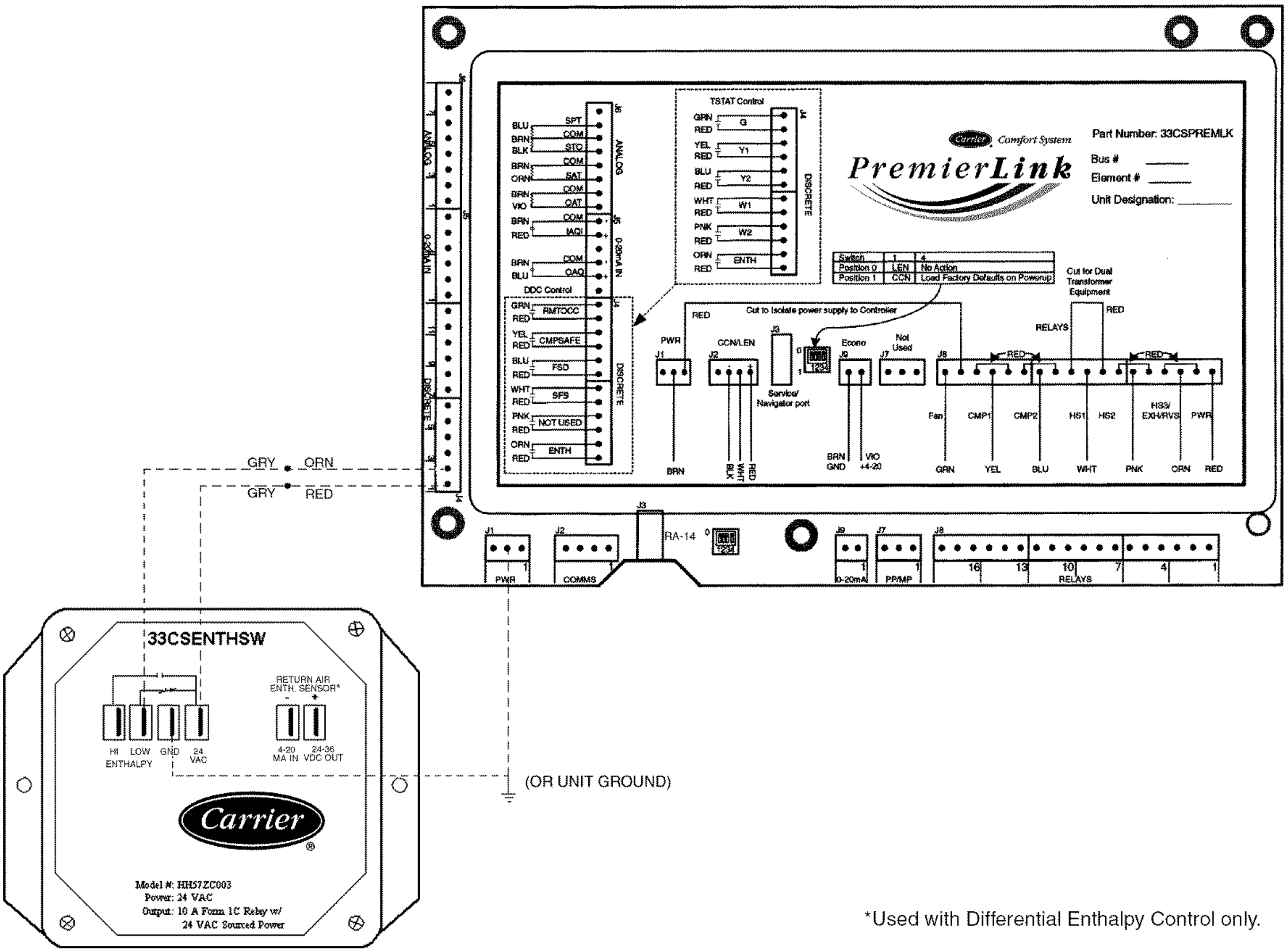
Mount the enthalpy sensor in a location where the indoor air can be sampled (such as the return air duct). The enthalpy sensor is not a NEMA 4 enclosure and should be mounted in a location that is not exposed to outdoor elements such as rain or snow. Use two field-supplied no. 8 x $^3/_4$-in. TEK screws. Insert the screws through the holes in the sides of the enthalpy sensor.

Wiring — Carrier recommends the use of 18 to 22 AWG twisted pair or shielded cable for all wiring. All connections must be made with $^1/_4$-in. female spade connectors.

The PremierLink™ board provides 24-vac to power the enthalpy switch/receiver. Connect the GND and 24 VAC terminals on the enthalpy switch/receiver to the terminals on the transformer. On some applications, the power from the economizer harness can be used to power the enthalpy switch/receiver. To power the enthalpy switch/receiver from the economizer harness, connect power of the enthalpy switch/receiver to the red and brown wires (1 and 4) on the economizer harness.

Connect the LOW Enthalpy terminal on the enthalpy switch/receiver to J4 — pin 2 of the PremierLink control on the HVAC unit. The switch can be powered through the PremierLink control board if desired. Wire the 24 VAC terminal on the enthalpy switch/receiver to J4 — pin 1 on the PremierLink control. Wire the GND terminal on the enthalpy switch/receiver to J1 — pin 2 on the PremierLink control. The HI Enthalpy terminal is not used. See Fig. 26.

Connect the 4-20 mA In terminal on the enthalpy switch/receiver to the 4-20 mA OUT terminal on the return air enthalpy sensor. Connect the 24-36 VDC OUT terminal on the enthalpy switch/receiver to the 24-36 VDC IN terminal on the return air enthalpy sensor. See Fig. 27.



*Used with Differential Enthalpy Control only.

Fig. 26 — Typical Wiring Schematic — Carrier Rooftop Unit with PremierLink™ Controls

Enthalpy Switch/Receiver Jumper Settings — There are two jumpers. One jumper determines the mode of the enthalpy switch/receiver. The other jumper is not used. To access the jumpers, remove the 4 screws holding the cover on the enthalpy switch/receiver and then remove the cover. The factory settings for the jumpers are M1 and OFF.

The mode jumper should be set to M2 for differential enthalpy control. The factory test jumper should remain on OFF or the enthalpy switch/receiver will not calculate enthalpy.

Enthalpy Sensor Jumper Settings — There are two jumpers. One jumper determines the mode of the enthalpy sensor. The other jumper is not used. To access the jumpers, remove the 4 screws holding the cover on the enthalpy sensor and then remove the cover. The factory settings for the jumpers are M3 and OFF.

The mode jumper should be set to M3 for 4 to 20 mA output. The factory test jumper should remain on OFF or the enthalpy sensor will not calculate enthalpy.

ENTHALPY SENSORS AND CONTROL — The enthalpy control (HH57AC077) is supplied as a field-installed accessory to be used with the EconoMi$er2 damper control option. The outdoor air enthalpy sensor is part of the enthalpy control. The separate field-installed accessory return air enthalpy sensor (HH57AC078) is required for differential enthalpy control.

NOTE: The enthalpy control must be set to the "D" setting for differential enthalpy control to work properly.

The enthalpy control receives the indoor and return enthalpy from the outdoor and return air enthalpy sensors and provides a dry contact switch input to the PremierLink controller. Locate the controller in place of an existing economizer controller or near the actuator. The mounting plate may not be needed if existing bracket is used.

A closed contact indicates that outside air is preferred to the return air. An open contact indicates that the economizer should remain at minimum position.

Outdoor Air Enthalpy Sensor/Enthalpy Controller (HH57AC077) — To wire the outdoor air enthalpy sensor, perform the following (see Fig. 28 and 29):

NOTE: The outdoor air sensor can be removed from the back of the enthalpy controller and mounted remotely.

1. Use a 4-conductor, 18 or 20 AWG cable to connect the enthalpy control to the PremierLink controller and power transformer.
2. Connect the following 4 wires from the wire harness located in rooftop unit to the enthalpy controller:
   a. Connect the BRN wire to the 24 vac terminal (TR1) on enthalpy control and to pin 1 on 12-pin harness.
   b. Connect the RED wire to the 24 vac GND terminal (TR) on enthalpy sensor and to pin 4 on 12-pin harness.
   c. Connect the GRAY/ORN wire to J4-2 on PremierLink controller and to terminal (3) on enthalpy sensor.
   d. Connect the GRAY/RED wire to J4-1 on PremierLink controller and to terminal (2) on enthalpy sensor.

NOTE: If installing in a Carrier rooftop, use the two gray wires provided from the control section to the economizer to connect PremierLink controller to terminals 2 and 3 on enthalpy sensor.

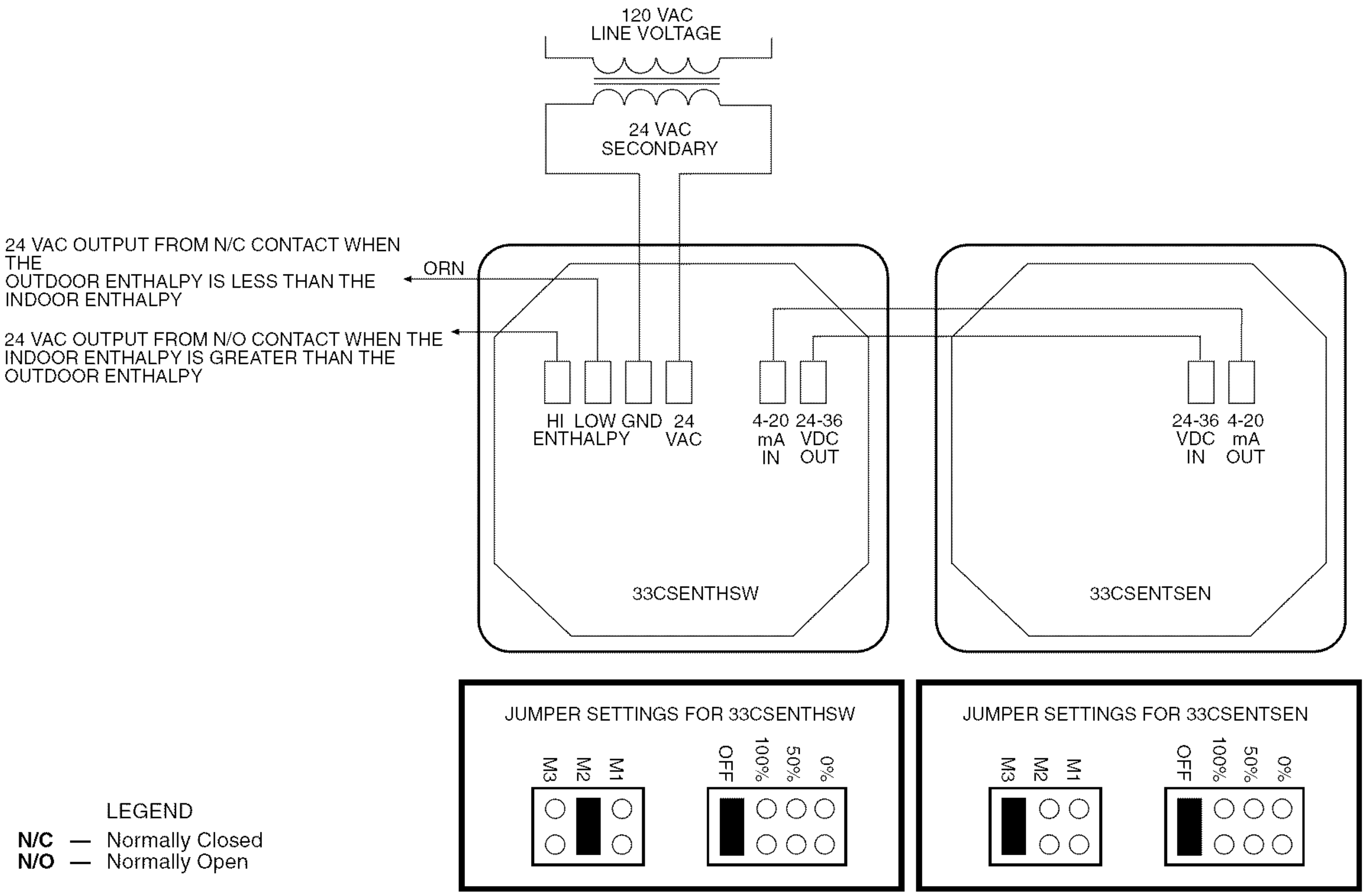
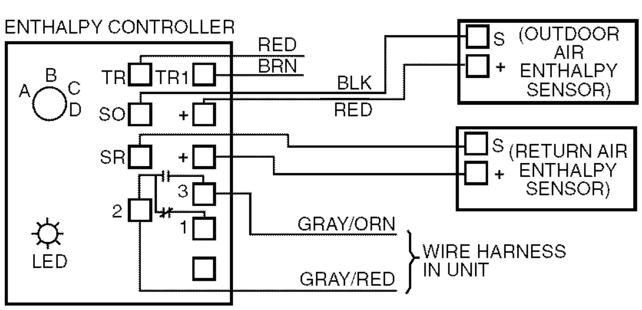


Fig. 27 — Differential Enthalpy Control Wiring



NOTES:
1. Remove factory-installed jumper across SR and + before connecting wires from return air sensor.
2. Switches shown in high outdoor air enthalpy state. Terminals 2 and 3 close on low outdoor air enthalpy relative to indoor air enthalpy.
3. Remove sensor mounted on back of control and locate in outside airstream.

Fig. 28 — Outdoor and Return Air Sensor Wiring Connections for Differential Enthalpy Control

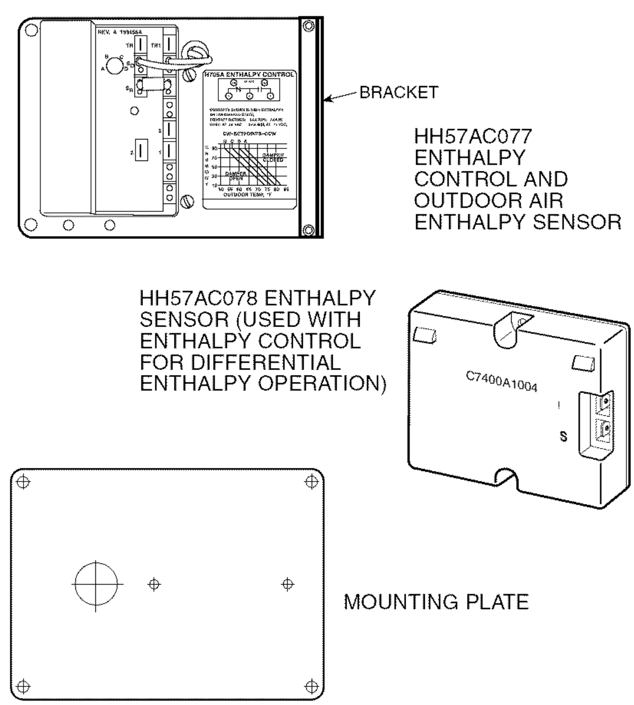


Fig. 29 — Differential Enthalpy Control, Sensor and Mounting Plate (33AMKITENT006)

Return Air Enthalpy Sensor — Mount the return-air enthalpy sensor (HH57AC078) in the return-air duct. The return air sensor is wired to the enthalpy controller (HH57AC077). The outdoor enthalpy changeover set point is set at the controller.

To wire the return air enthalpy sensor, perform the following (see Fig. 28):

1. Use a 2-conductor, 18 or 20 AWG, twisted pair cable to connect the return air enthalpy sensor to the enthalpy controller.
2. At the enthalpy control remove the factory-installed resistor from the (SR) and (+) terminals.
3. Connect the field-supplied RED wire to (+) spade connector on the return air enthalpy sensor and the (SR+) terminal on the enthalpy controller. Connect the BLK wire to (S) spade connector on the return air enthalpy sensor and the (SR) terminal on the enthalpy controller.

OPTIONAL ECONOMI$ERIV AND ECONOMI$ER2 — See Fig. 30 and 31 for EconoMi$erIV component locations. See Fig. 32 for EconoMi$er2 component locations.

NOTE: These instructions are for installing the optional EconoMi$erIV and EconoMi$er2 only. Refer to the accessory EconoMi$erIV or EconoMi$er2 installation instructions when field installing an EconoMi$erIV or EconoMi$er2 accessory.

To complete installation of the optional EconoMi$erIV, perform the following procedure.

1. Remove the EconoMi$erIV hood. Refer to Step 11 — Install Outdoor-Air Hood on page 11 for information on removing and installing the outdoor-air hood.
2. Relocate outdoor air temperature sensor from shipping position to operation position on EconoMi$erIV. See Fig. 30.

IMPORTANT: Failure to relocate the sensor will result in the EconoMi$erIV not operating properly.

3. Re-install economizer hood.
4. Install all EconoMi$erIV accessories. EconoMi$erIV wiring is shown in Fig. 33. EconoMi$er2 wiring is shown in Fig. 34.

Outdoor air leakage is shown in Table 7. Return air pressure drop is shown in Table 8.

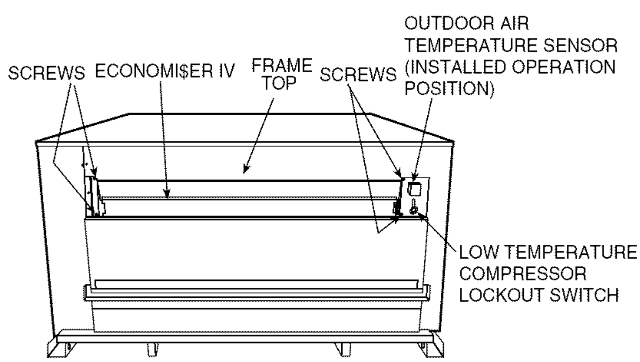


Fig. 30 — EconoMi$erIV Component Locations — End View

ECONOMI$ERIV STANDARD SENSORS

Outdoor Air Temperature (OAT) Sensor — The outdoor air temperature sensor (HH57AC074) is a 10 to 20 mA device used to measure the outdoor-air temperature. The outdoor-air temperature is used to determine when the EconoMi$erIV can be used for free cooling. The sensor must be field-relocated. See Fig. 30. The operating range of temperature measurement is 40 to 100 F.

Supply Air Temperature (SAT) Sensor — The supply air temperature sensor is a 3 K thermistor located at the inlet of the indoor fan. See Fig. 31. This sensor is factory installed. The operating range of temperature measurement is 0° to 158 F. See Table 9 for sensor temperature/resistance values.

The temperature sensor looks like an eyelet terminal with wires running to it. The sensor is located in the "crimp end" and is sealed from moisture.

Low Temperature Compressor Lockout Switch — The Economi$erIV is equipped with an ambient temperature lockout switch located in the outdoor airstream which is used to lock out the compressors below a 42 F ambient temperature. See Fig. 25.

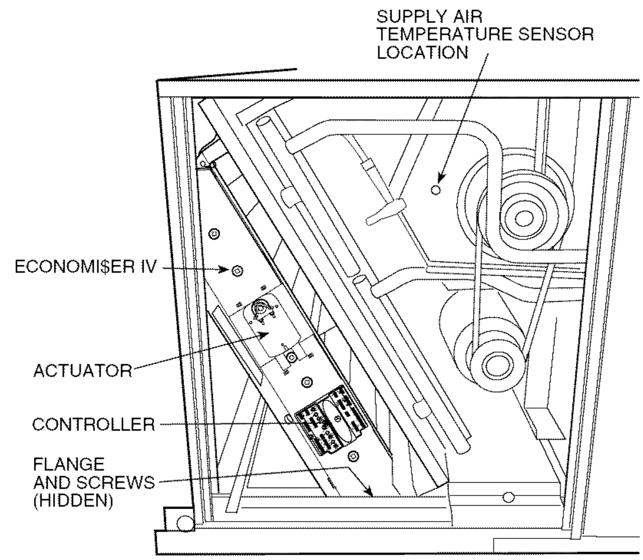


Fig. 31 — EconoMi$erIV Component Locations — Side View

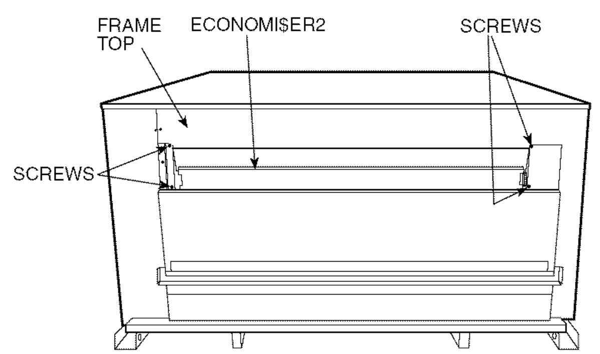
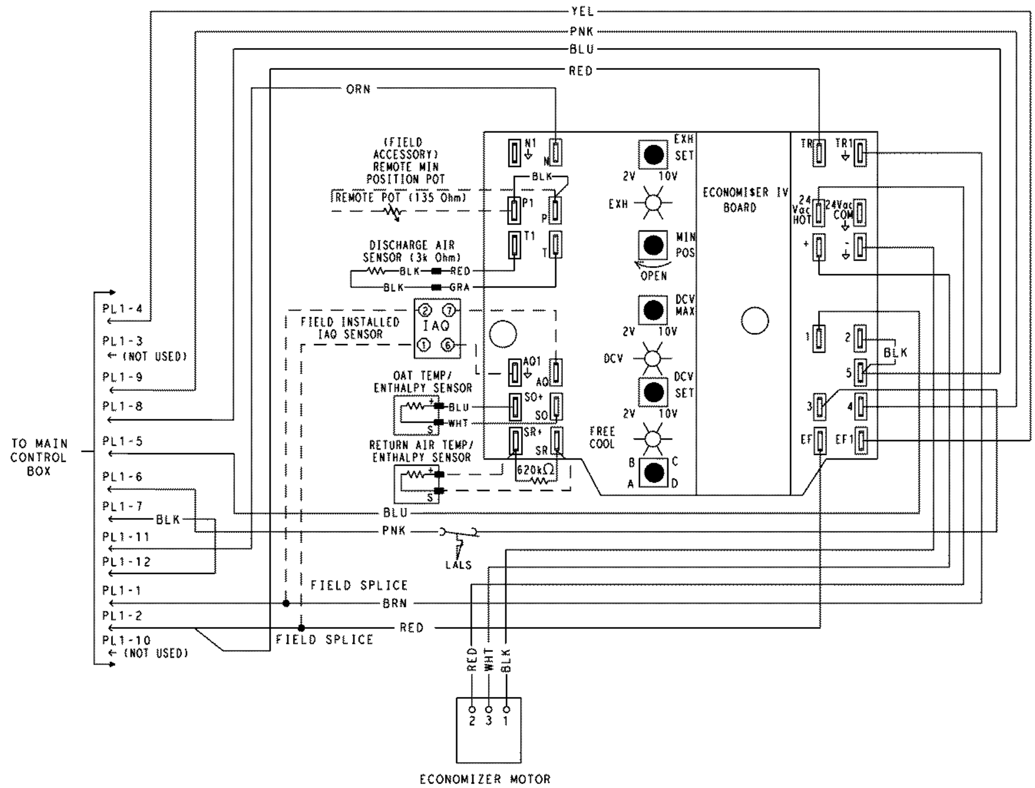


Fig. 32 — EconoMi$er2 Component Locations



LEGEND

DCV — Demand Controlled Ventilation
IAQ — Indoor Air Quality
LALS — Low Temperature Compressor Lockout Switch
OAT — Outdoor-Air Temperature
POT — Potentiometer

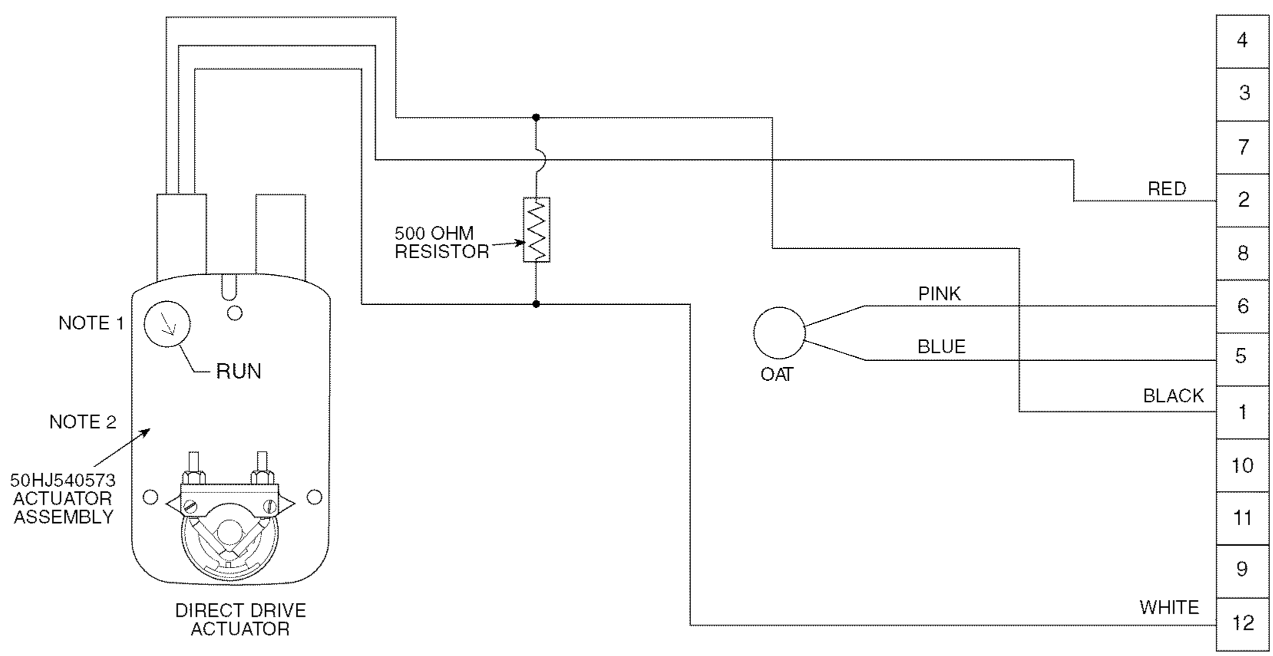
Potentiometer Default Settings:

Power Exhaust	Middle
Minimum Pos.	Fully Closed
DCV Max.	Middle
DCV Set	Middle
Enthalpy	C Setting

NOTES:

1. 620 ohm, 1 watt 5% resistor should be removed only when using differential enthalpy or dry bulb.
2. If a separate field-supplied 24 v transformer is used for the IAQ sensor power supply, it cannot have the secondary of the transformer grounded.
3. For field-installed remote minimum position POT, remove black wire jumper between P and P1 and set control minimum position POT to the minimum position.

Fig. 33 — EconoMi$erIV Wiring



ECONOMI$ER2 PLUG

LEGEND

OAT — Outdoor Air Temperature Sensor

NOTES:

1. Switch on actuator must be in run position for economizer to operate.
2. 50HJ540573 actuator consists of the 50HJ540567 actuator and a harness with 500-ohm resistor.

Fig. 34 — EconoMi$er2 Wiring

Table 7 — Outdoor Air Damper Leakage

	DAMPER STATIC PRESSURE (in. wg)					
	0.2	0.4	0.6	0.8	1.0	1.2
LEAKAGE (cfm)	35	53	65	75	90	102

Table 8 — Return Air Pressure Drop (in. wg)

CFM					
4500	5000	5400	6000	7200	7500
0.040	0.050	0.060	0.070	0.090	0.100

Table 9 — Supply Air Sensor Temperature/ Resistance Values

TEMPERATURE (F)	RESISTANCE (ohms)
–58	200,250
–40	100,680
–22	53,010
–4	29,091
14	16,590
32	9,795
50	5,970
68	3,747
77	3,000
86	2,416
104	1,597
122	1,080
140	746
158	525
176	376
185	321
194	274
212	203
230	153
248	116
257	102
266	89
284	70
302	55

ECONOMI$ERIV CONTROL MODES

> IMPORTANT: The optional EconoMi$er2 does not include a controller. The EconoMi$er2 is operated by a 4 to 20 mA signal from an existing field-supplied controller (such as PremierLink™ control). See Fig. 34 for wiring information.

Determine the EconoMi$erIV control mode before set up of the control. Some modes of operation may require different sensors. Refer to Table 10. The EconoMi$erIV is supplied from the factory with a supply air temperature sensor, a low temperature compressor lockout switch, and an outdoor air temperature sensor. This allows for operation of the EconoMi$erIV with outdoor air dry bulb changeover control. Additional accessories can be added to allow for different types of changeover control and operation of the EconoMi$erIV and unit.

Outdoor Dry Bulb Changeover — The standard controller is shipped from the factory configured for outdoor dry bulb changeover control. The outdoor air and supply air temperature sensors are included as standard. For this control mode, the outdoor temperature is compared to an adjustable set point selected on the control. If the outdoor-air temperature is above the set point, the EconoMi$erIV will adjust the outdoor-air dampers to minimum position. If the outdoor-air temperature is below the set point, the position of the outdoor-air dampers will be controlled to provide free cooling using outdoor air. When in this mode, the LED next to the free cooling set point potentiometer will be on. The changeover temperature set point is controlled by the free cooling set point potentiometer located on the control. See Fig. 35. The scale on the potentiometer is A, B, C, and D. See Fig. 36 for the corresponding temperature changeover values.

Table 10 — EconoMi$erIV Sensor Usage

APPLICATION	ECONOMI$ERIV WITH OUTDOOR AIR DRY BULB SENSOR		
	Accessories Required		
Outdoor Air Dry Bulb	None. The outdoor air dry bulb sensor is factory installed.		
Differential Dry Bulb	CRTEMPSN002A00*		
Single Enthalpy	HH57AC078		
Differential Enthalpy	HH57AC078 and CRENTDIF004A00*		
CO_2 for DCV Control using a Wall-Mounted CO_2 Sensor	33ZCSENCO2		
CO_2 for DCV Control using a Duct-Mounted CO_2 Sensor	33ZCSENCO2† and 33ZCASPCO2**	OR	CRCBDIOX005A00††

*CRENTDIF004A00 and CRTEMPSN002A00 accessories are used on many different base units. As such, these kits may contain parts that will not be needed for installation.
†33ZCSENCO2 is an accessory CO_2 sensor.
**33ZCASPCO2 is an accessory aspirator box required for duct-mounted applications.
††CRCBDIOX005A00 is an accessory that contains both 33ZCSENCO2 and 33ZCASPCO2 accessories.

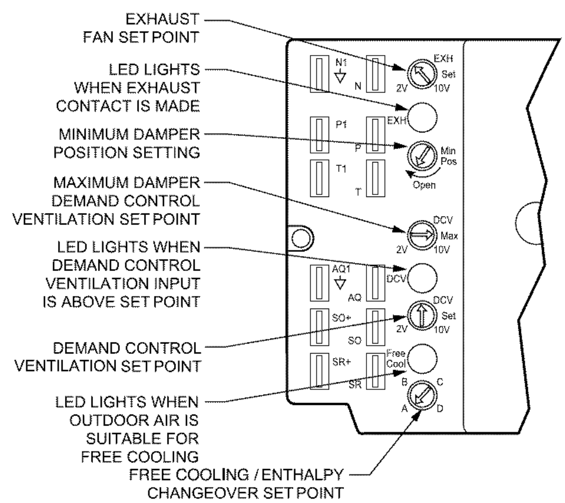


Fig. 35 — EconoMi$erIV Controller Potentiometer and LED Locations

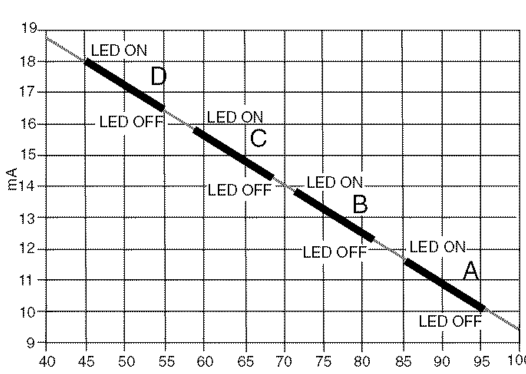


Fig. 36 — Outside Air Temperature Changeover Set Points

Differential Dry Bulb Control — For differential dry bulb control the standard outdoor dry bulb sensor is used in conjunction with an additional accessory return air sensor (part number CRTEMPSN002A00). The accessory sensor must be mounted in the return airstream. See Fig. 37. Wiring is provided in the EconoMi$erIV wiring harness. See Fig. 33.

In this mode of operation, the outdoor-air temperature is compared to the return-air temperature and the lower temperature airstream is used for cooling. When using this mode of changeover control, turn the free cooling/enthalpy set point potentiometer fully clockwise to the D setting. See Fig. 35.

Outdoor Enthalpy Changeover — For enthalpy control, accessory enthalpy sensor (part number HH57AC078) is required. Replace the standard outdoor dry bulb temperature sensor with the accessory enthalpy sensor in the same mounting location. See Fig. 30. When the outdoor air enthalpy rises above the outdoor enthalpy changeover set point, the outdoor-air damper moves to its minimum position. The outdoor enthalpy changeover set point is set with the outdoor enthalpy set point potentiometer on the EconoMi$erIV controller. The set points are A, B, C, and D. See Fig. 38. The factory-installed 620-ohm jumper must be in place across terminals SR and SR+ on the EconoMi$erIV controller. See Fig. 33 and 39.

Differential Enthalpy Control — For differential enthalpy control, the EconoMi$erIV controller uses two enthalpy sensors (HH57AC078 and CRENTDIF004A00), one in the outside air and one in the return airstream on the EconoMi$erIV frame. The EconoMi$erIV controller compares the outdoor air enthalpy to the return air enthalpy to determine EconoMi$erIV use. The controller selects the lower enthalpy air (return or outdoor) for cooling. For example, when the outdoor air has a lower enthalpy than the return air and is below the set point, the EconoMi$erIV opens to bring in outdoor air for free cooling.

Replace the standard outside air dry bulb temperature sensor with the accessory enthalpy sensor in the same mounting location. See Fig. 30. Mount the return air enthalpy sensor in the return airstream. See Fig. 37. The outdoor enthalpy changeover set point is set with the outdoor enthalpy set point potentiometer on the EconoMi$erIV controller. When using this mode of changeover control, turn the enthalpy set point potentiometer fully clockwise to the D setting.

NOTE: Remove 620-ohm resistor if differential enthalpy sensor is installed.

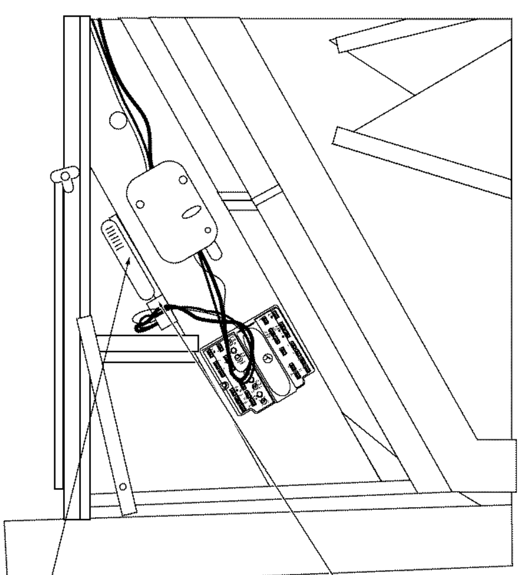


Fig. 37 — Return Air Temperature or Enthalpy Sensor Mounting Location

Indoor Air Quality (IAQ) Sensor Input — The IAQ input can be used for demand control ventilation (DCV) control based on the level of CO_2 measured in the space or return air duct.

Mount the accessory IAQ sensor according to manufacturer specifications. The IAQ sensor should be wired to the AQ and AQ1 terminals of the controller. Adjust the DCV potentiometers to correspond to the DCV voltage output of the indoor air quality sensor at the user-determined set point. See Fig. 40.

If a separate field-supplied transformer is used to power the IAQ sensor, the sensor must not be grounded or the EconoMi$erIV control board will be damaged.

Exhaust Set Point Adjustment — The exhaust set point will determine when the exhaust fan runs based on damper position (if accessory power exhaust is installed). The set point is modified with the Exhaust Fan Set Point (EXH SET) potentiometer. See Fig. 35. The set point represents the damper position above which the exhaust fan will be turned on. When there is a call for exhaust, the EconoMi$erIV controller provides a 45 ± 15 second delay before exhaust fan activation to allow the dampers to open. This delay allows the damper to reach the appropriate position to avoid unnecessary fan overload.

Minimum Position Control — There is a minimum damper position potentiometer on the EconoMi$erIV controller. See Fig. 35. The minimum damper position maintains the minimum airflow into the building during the occupied period.

When using demand ventilation, the minimum damper position represents the minimum ventilation position for VOC (volatile organic compound) ventilation requirements. The maximum demand ventilation position is used for fully occupied ventilation.

When demand ventilation control is not being used, the minimum position potentiometer should be used to set the occupied ventilation position. The maximum demand ventilation position should be turned fully clockwise.

Adjust the minimum position potentiometer to allow the minimum amount of outdoor air, as required by local codes, to enter the building. Make minimum position adjustments with at least 10° F temperature difference between the outdoor and return-air temperatures.

To determine the minimum position setting, perform the following procedure:

1. Calculate the appropriate mixed-air temperature using the following formula:

   $$(T_O \times \frac{OA}{100}) + (TR \times \frac{RA}{100} = T_M$$

   T_O = Outdoor-Air Temperature
   OA = Percent of Outdoor Air
   T_R = Return-Air Temperature
   RA = Percent of Return Air
   T_M = Mixed-Air Temperature

   As an example, if local codes require 10% outdoor air during occupied conditions, outdoor-air temperature is 60 F, and return-air temperature is 75 F.

   (60 x .10) + (75 x .90) = 73.5 F
2. Disconnect the supply-air sensor from terminals T and T1.
3. Ensure that the factory-installed jumper is in place across terminals P and P1. If remote damper positioning is being used, make sure that the terminals are wired according to Fig. 33 and that the minimum position potentiometer is turned fully clockwise.
4. Connect 24 vac across terminals TR and TR1.
5. Carefully adjust the minimum position potentiometer until the measured mixed-air temperature matches the calculated value.
6. Reconnect the supply-air sensor to terminals T and T1.

CONTROL CURVE	CONTROL POINT APPROX. °F (°C) AT 50% RH
A	73 (23)
B	70 (21)
C	67 (19)
D	63 (17)

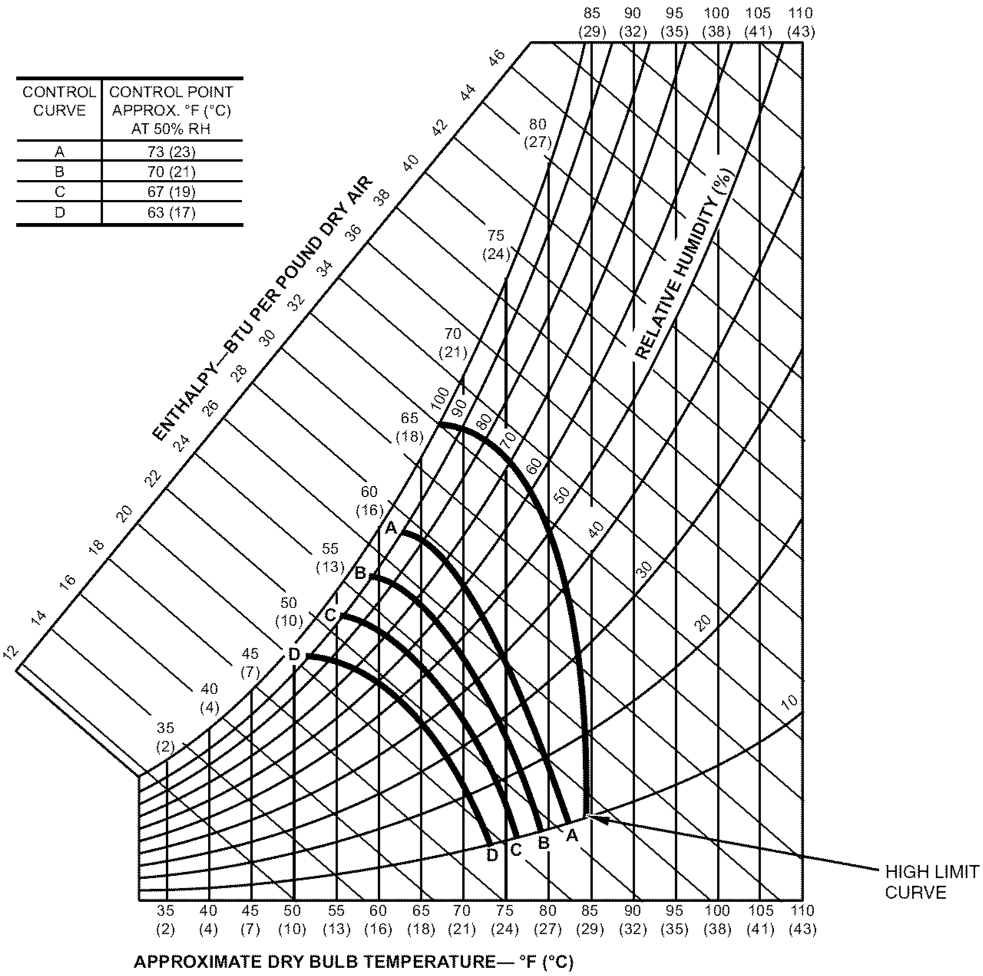


Fig. 38 — Enthalpy Changeover Set Points

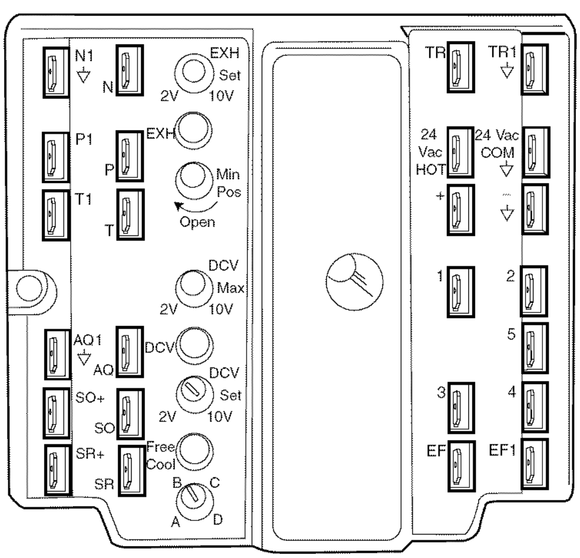


Fig. 39 — EconoMi$erIV Controller

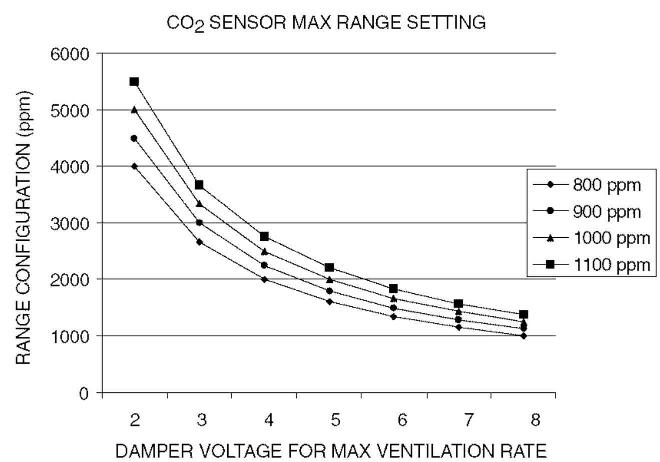


Fig. 40 — CO_2 Sensor Maximum Range Setting

Remote control of the EconoMi$erIV damper is desirable when requiring additional temporary ventilation. If a field-supplied remote potentiometer (Honeywell part number S963B1128) is wired to the EconoMi$erIV controller, the minimum position of the damper can be controlled from a remote location.

To control the minimum damper position remotely, remove the factory-installed jumper on the P and P1 terminals on the EconoMi$erIV controller. Wire the field-supplied potentiometer to the P and P1 terminals on the EconoMi$erIV controller. See Fig. 39.

Damper Movement — Damper movement from full open to full closed (or vice versa) takes $2^1/_2$ minutes.

Thermostats — The EconoMi$erIV control works with conventional thermostats that have a Y1 (cool stage 1), Y2 (cool stage 2), W1 (heat stage 1), W2 (heat stage 2), and G (fan). The EconoMi$erIV control does not support space temperature sensors. Connections are made at the thermostat terminal connection board located in the main control box.

Occupancy Control — The factory default configuration for the EconoMi$erIV control is occupied mode. Occupied status is provided by the red jumper from terminal 9 to terminal 10 on TB2. When unoccupied mode is desired, install a field-supplied timeclock function in place of the jumper between terminals 9 and 10 on TB2. See Fig. 33. When the timeclock contacts are closed, the EconoMi$erIV control will be in occupied mode. When the timeclock contacts are open (removing the 24-v signal from terminal N), the EconoMi$erIV will be in unoccupied mode.

Demand Controlled Ventilation (DCV) — When using the EconoMi$erIV for demand controlled ventilation, there are some equipment selection criteria which should be considered. When selecting the heat capacity and cool capacity of the equipment, the maximum ventilation rate must be evaluated for design conditions. The maximum damper position must be calculated to provide the desired fresh air.

Typically the maximum ventilation rate will be about 5 to 10% more than the typical cfm required per person, using normal outside air design criteria.

A proportional anticipatory strategy should be taken with the following conditions: a zone with a large area, varied occupancy, and equipment that cannot exceed the required ventilation rate at design conditions. Exceeding the required ventilation rate means the equipment can condition air at a maximum ventilation rate that is greater than the required ventilation rate for maximum occupancy. A proportional-anticipatory strategy will cause the fresh air supplied to increase as the room CO_2 level increases even though the CO_2 set point has not been reached. By the time the CO_2 level reaches the set point, the damper will be at maximum ventilation and should maintain the set point.

In order to have the CO_2 sensor control the economizer damper in this manner, first determine the damper voltage output for minimum or base ventilation. Base ventilation is the ventilation required to remove contaminants during unoccupied periods. The following equation may be used to determine the percent of outside-air entering the building for a given damper position. For best results there should be at least a 10 degree difference in outside and return-air temperatures.

$$(T_O \times \frac{OA}{100}) + (TR \times \frac{RA}{100} = T_M$$

T_O = Outdoor-Air Temperature

OA = Percent of Outdoor Air

T_R = Return-Air Temperature

RA = Percent of Return Air

T_M = Mixed-Air Temperature

Once base ventilation has been determined, set the minimum damper position potentiometer to the correct position.

The same equation can be used to determine the occupied or maximum ventilation rate to the building. For example, an output of 3.6 volts to the actuator provides a base ventilation rate of 5% and an output of 6.7 volts provides the maximum ventilation rate of 20% (or base plus 15 cfm per person). Use Fig. 40 to determine the maximum setting of the CO_2 sensor. For example, a 1100 ppm set point relates to a 15 cfm per person design. Use the 1100 ppm curve on Fig. 40 to find the point when the CO_2 sensor output will be 6.7 volts. Line up the point on the graph with the left side of the chart to determine that the range configuration for the CO_2 sensor should be 1800 ppm. The EconoMi$erIV controller will output the 6.7 volts from the CO_2 sensor to the actuator when the CO_2 concentration in the space is at 1100 ppm. The DCV set point may be left at 2 volts since the CO_2 sensor voltage will be ignored by the EconoMi$erIV controller until it rises above the 3.6 volt setting of the minimum position potentiometer.

Once the fully occupied damper position has been determined, set the maximum damper demand control ventilation potentiometer to this position. Do not set to the maximum position as this can result in over-ventilation to the space and potential high-humidity levels.

CO_2 Sensor Configuration — The CO_2 sensor has preset standard voltage settings that can be selected anytime after the sensor is powered up. See Table 11.

Use setting 1 or 2 for Carrier equipment. See Table 11.

1. Press Clear and Mode buttons. Hold at least 5 seconds until the sensor enters the Edit mode.
2. Press Mode twice. The STDSET Menu will appear.
3. Use the Up/Down button to select the preset number. See Table 11.
4. Press Enter to lock in the selection.
5. Press Mode to exit and resume normal operation.

The custom settings of the CO_2 sensor can be changed anytime after the sensor is energized. Follow the steps below to change the non-standard settings:

1. Press Clear and Mode buttons. Hold at least 5 seconds until the sensor enters the Edit mode.
2. Press Mode twice. The STDSET Menu will appear.
3. Use the Up/Down button to toggle to the NONSTD menu and press Enter.
4. Use the Up/Down button to toggle through each of the nine variables, starting with Altitude, until the desired setting is reached.
5. Press Mode to move through the variables.
6. Press Enter to lock in the selection, then press Mode to continue to the next variable.

Dehumidification of Fresh Air with DCV Control — Information from ASHRAE indicates that the largest humidity load on any zone is the fresh air introduced. For some applications, a field-supplied energy recovery unit is added to reduce the moisture content of the fresh air being brought into the building when the enthalpy is high. In most cases, the normal heating and cooling processes are more than adequate to remove the humidity loads for most commercial applications.

If normal rooftop heating and cooling operation is not adequate for the outdoor humidity level, an energy recovery unit and/or a dehumidification option should be considered.

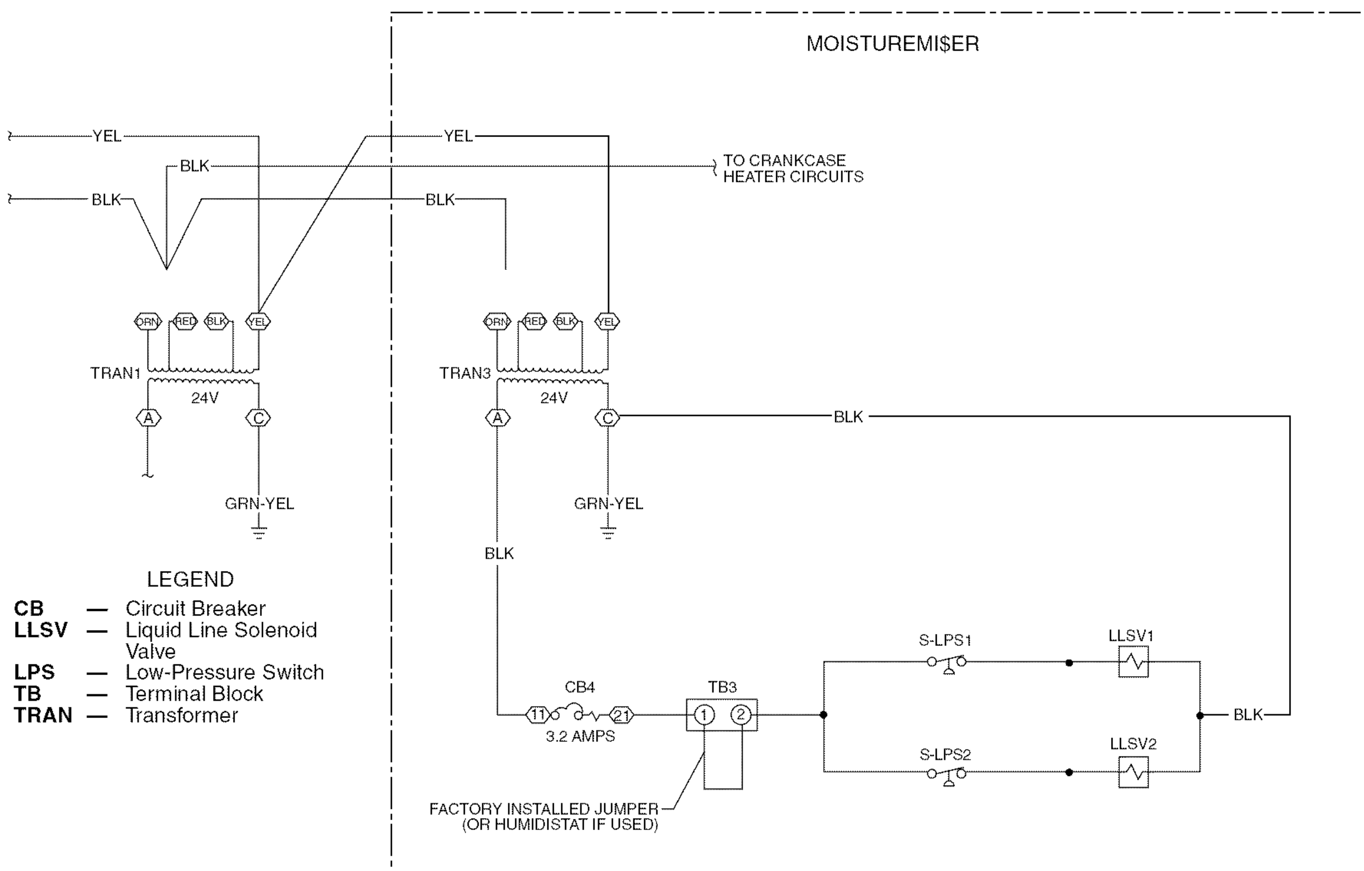
Table 11 — CO_2 Sensor Standard Settings

SETTING	EQUIPMENT	OUTPUT	VENTILATION RATE (cfm/Person)	ANALOG OUTPUT	CO_2 CONTROL RANGE (ppm)	OPTIONAL RELAY SETPOINT (ppm)	RELAY HYSTERESIS (ppm)
1	Interface w/Standard Building Control System	Proportional	Any	0-10V 4-20 mA	0-2000	1000	50
2		Proportional	Any	2-10V 7-20 mA	0-2000	1000	50
3		Exponential	Any	0-10V 4-20 mA	0-2000	1100	50
4	Economizer	Proportional	15	0-10V 4-20 mA	0-1100	1100	50
5		Proportional	20	0-10V 4-20 mA	0- 900	900	50
6		Exponential	15	0-10V 4-20 mA	0-1100	1100	50
7		Exponential	20	0-10V 4-20 mA	0- 900	900	50
8	Health & Safety	Proportional	—	0-10V 4-20 mA	0-9999	5000	500
9	Parking/Air Intakes/ Loading Docks	Proportional	—	0-10V 4-20 mA	0-2000	700	50

LEGEND
ppm — Parts Per Million

**Step 14 — Install Humidistat for Optional MoistureMi$er™ Package —** MoistureMi$er dehumidification package operation can be controlled by field installation of a Carrier-approved humidistat. To install the humidistat perform the following procedure:

1. Locate humidistat on a solid interior wall in the conditioned space. Location should be a well ventilated area to sense average humidity.
2. Route thermostat cable or equivalent single leads of colored wire from Humidistat terminals through conduit in unit to the low voltage connection on the 2-pole terminal strip (TB3) as shown in Fig. 41 and Fig. 42. See Fig. 43 for operational diagram.



LEGEND

CB — Circuit Breaker
LLSV — Liquid Line Solenoid Valve
LPS — Low-Pressure Switch
TB — Terminal Block
TRAN — Transformer

Fig. 41 — Typical MoistureMi$er Dehumidification Package Humidistat Wiring Schematic (460 V Unit Shown)

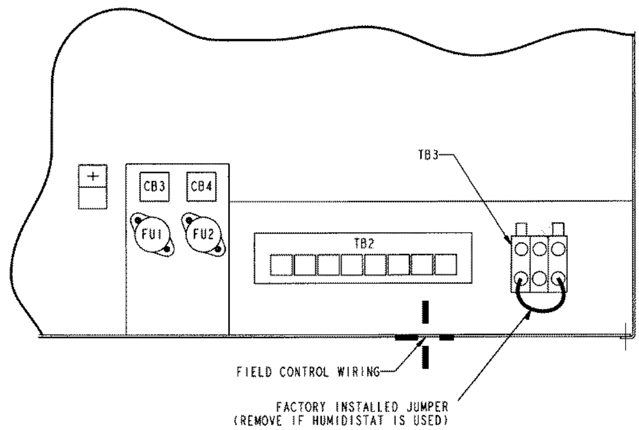
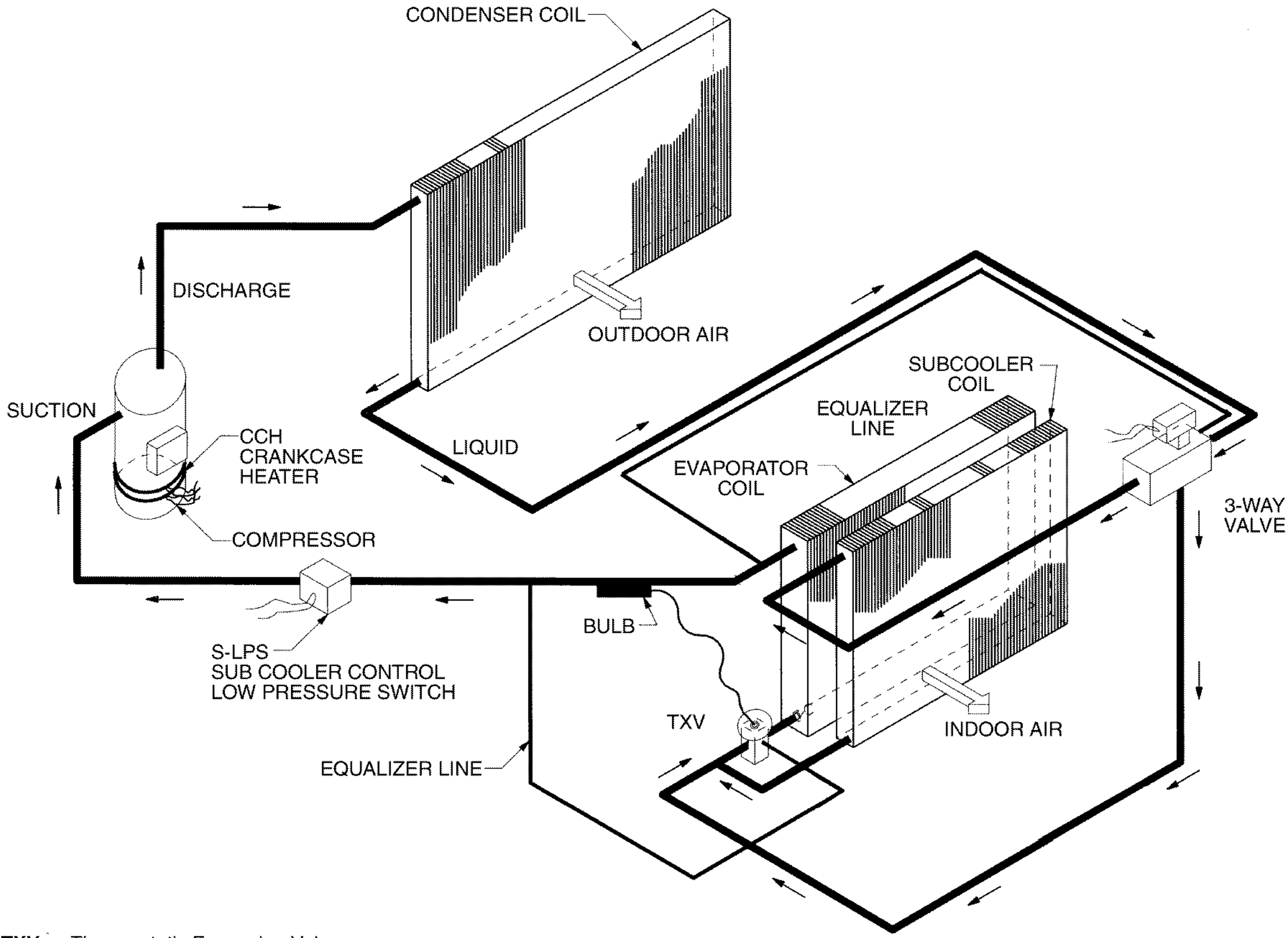


Fig. 42 — Typical MoistureMi$er™ Dehumidification Package Control Box



TXV — Thermostatic Expansion Valve

Fig. 43 — MoistureMi$er Dehumidification Package Operation Diagram

START-UP

Use the following information and Start-Up Checklist on page CL-1 to check out unit PRIOR to start-up.

Unit Preparation — Check that unit has been installed in accordance with these installation instructions and all applicable codes.

COMPRESSOR MOUNTING — Compressors are internally spring mounted. Do not loosen or remove compressor hold-down bolts.

REFRIGERANT SERVICE PORTS — Each refrigerant system has a total of 3 Schrader-type service gage ports. One port is located on the suction line, one on the compressor discharge line, and one on the liquid line. In addition Schrader-type valves are located underneath the low-pressure switches. Be sure that caps on the ports are tight.

COMPRESSOR ROTATION — It is important to be certain the compressors are rotating in the proper direction. To determine whether or not compressors are rotating in the proper direction:

1. Connect service gages to suction and discharge pressure fittings.
2. Energize the compressor.
3. The suction pressure should drop and the discharge pressure should rise, as is normal on any start-up.

If the suction pressure does not drop and the discharge pressure does not rise to normal levels:

1. Note that the evaporator fan is probably also rotating in the wrong direction.
2. Turn off power to the unit.
3. Reverse any two of the incoming power leads.
4. Turn on power to the compressor.

The suction and discharge pressure levels should now move to their normal start-up levels.

NOTE: When compressors are rotating in the wrong direction, the unit will have increased noise levels and will not provide heating and cooling.

After a few minutes of reverse operation, the scroll compressor internal overload protection will open, which will activate the unit's lockout and requires a manual reset. Reset is accomplished by turning the thermostat on and off.

INTERNAL WIRING — Check all electrical connections in unit control boxes; tighten as required.

CRANKCASE HEATER(S) — Crankcase heater(s) is energized as long as there is power to the unit and the compressor is not operating.

IMPORTANT: Unit power must be on for 24 hours prior to start-up. Otherwise, damage to compressor may result.

EVAPORATOR FAN — Fan belt and variable pulleys are factory-installed. Remove tape from the fan pulley. See Tables 12-17 for fan performance data. Be sure that fans rotate in the proper direction. See Table 18 for air quantity limits. See Table 19 for evaporator fan motor specifications. See Tables 20 and 21 for static pressure information for accessories and options. See Table 22 for fan rpm at various motor pulley settings. To alter fan performance, see Evaporator Fan Performance Adjustment section on page 38.

NOTE: A $3^1/_2$-in. bolt and threaded plate are included in the installer's packet. They can be added to the motor support channel below the motor mounting plate to aid in raising the fan motor.

CONDENSER-FANS AND MOTORS — Condenser fans and motors are factory set. Refer to Condenser-Fan Adjustment section (page 40) as required. Be sure that fans rotate in the proper direction.

RETURN-AIR FILTERS — Check that correct filters are installed in filter tracks (see Table 1). Do not operate unit without return-air filters.

OUTDOOR-AIR INLET SCREENS — Outdoor-air inlet screens must be in place before operating unit.

GAS HEAT — Verify gas pressures before turning on heat as follows:

1. Turn off manual gas stop.
2. Connect pressure gage to supply gas pressure tap (see Fig. 12).
3. Connect pressure gage to manifold pressure tap on gas valve.
4. Turn on manual gas stop and set thermostat to HEAT position. After the unit has run for several minutes, verify that incoming pressure is 5.5 in. wg or greater, and that the manifold pressure is 3.3 in. wg. If manifold pressure must be adjusted, refer to Gas Valve Adjustment section on page 40.
5. After unit has been in operation for 5 minutes, check temperature rise across the heat exchangers. See unit informative plate for correct rise limits of the heat supplied. Air quantities may need to be adjusted to bring the actual rise to within the allowable limits.

Table 12 — Fan Performance — 48HJD015 (Low Heat Units with Standard Indoor Fan Motor)*

AIRFLOW (CFM)	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
3750	649	895	0.94	665	967	1.03	747	1150	1.25	821	1342	1.49	892	1527	1.72
4000	675	1014	1.08	696	1097	1.18	776	1292	1.42	849	1495	1.68	919	1689	1.92
4250	701	1141	1.24	725	1236	1.35	804	1442	1.61	877	1656	1.88	945	1859	2.14
4500	726	1274	1.40	754	1382	1.54	832	1599	1.81	903	1824	2.09	970	2037	2.36
4750	751	1415	1.58	783	1538	1.73	859	1765	2.02	929	2001	2.32	995	2224	2.60
5000	775	1563	1.76	811	1702	1.94	886	1940	2.24	954	2188	2.55	1019	2419	2.84
5250	798	1719	1.96	839	1875	2.16	911	2125	2.47	979	2384	2.80	1042	2625	3.09
5500	822	1884	2.17	866	2060	2.39	937	2321	2.72	1003	2592	3.05	—	—	—
5750	844	2058	2.39	893	2256	2.64	962	2528	2.97	1026	2810	3.32	—	—	—
6000	867	2243	2.62	920	2464	2.90	987	2748	3.24	—	—	—	—	—	—
6250	889	2438	2.86	946	2687	3.17	—	—	—	—	—	—	—	—	—

AIRFLOW (CFM)	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
3750	997	1756	2.01	1030	1988	2.30	1094	2236	2.61	1156	2497	2.94	1214	2769	3.27
4000	1023	1931	2.23	1054	2173	2.53	1116	2431	2.86	1176	2702	3.19	—	—	—
4250	1048	2114	2.46	1076	2366	2.77	1137	2634	3.10	—	—	—	—	—	—
4500	1073	2304	2.70	1098	2566	3.02	—	—	—	—	—	—	—	—	—
4750	1096	2504	2.94	1119	2775	3.28	—	—	—	—	—	—	—	—	—
5000	1119	2712	3.20	—	—	—	—	—	—	—	—	—	—	—	—
5250	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5750	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6250	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower
FIOP — Factory-Installed Option
Watts — Input Watts to Motor

*Standard low-medium static drive range is 895 to 1147 rpm. Alternate high-static drive range is 1040 to 1315 (for 208/230 and 460-v units). The alternate high-static drive is not available for 575-v units. Other rpms require a field-supplied drive.

NOTES:
1. Maximum continuous bhp for the standard motor is 3.13 (for 208/230 and 460-v units) or 3.38 (for 575-v units). The maximum continuous watts is 2700 (for 208/230 and 460-v units) or 3065 (for 575-v units). Do not adjust motor rpm such that motor maximum bhp and/or watts is exceeded at the maximum operating cfm.
2. Static pressure losses (i.e., economizer) must be added to external static pressure before entering Fan Performance table.
3. Interpolation is permissible. Do not extrapolate.
4. Fan performance is based on wet coils, clean filters, and casing losses. See Tables 20 and 21 for accessory/FIOP static pressure information.
5. Extensive motor and drive testing on these units ensures that the full bhp and watts range of the motor can be utilized with confidence. Using fan motors up to the watts or bhp rating shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.
6. Use of a field-supplied motor may affect wiring size. Contact your Carrier representative for details.

Table 13 — Fan Performance — 48HJD015 (Low Heat Units with Optional Indoor Fan Motor)*

AIRFLOW (CFM)	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
3750	649	895	0.94	665	967	1.03	747	1150	1.25	821	1342	1.49	892	1527	1.72
4000	675	1014	1.08	696	1097	1.18	776	1292	1.42	849	1495	1.68	919	1689	1.92
4250	701	1141	1.24	725	1236	1.35	804	1442	1.61	877	1656	1.88	945	1859	2.14
4500	726	1274	1.40	754	1382	1.54	832	1599	1.81	903	1824	2.09	970	2037	2.36
4750	751	1415	1.58	783	1538	1.73	859	1765	2.02	929	2001	2.32	995	2224	2.60
5000	775	1563	1.76	811	1702	1.94	886	1940	2.24	954	2188	2.55	1019	2419	2.84
5250	798	1719	1.96	839	1875	2.16	911	2125	2.47	979	2384	2.80	1042	2625	3.09
5500	822	1884	2.17	866	2060	2.39	937	2321	2.72	1003	2592	3.05	1065	2841	3.36
5750	844	2058	2.39	893	2256	2.64	962	2528	2.97	1026	2810	3.32	1087	3069	3.63
6000	867	2243	2.62	920	2464	2.90	987	2748	3.24	1049	3042	3.60	1108	3308	3.91
6250	889	2438	2.86	946	2687	3.17	1011	2981	3.52	1072	3286	3.88	1130	3559	4.20

AIRFLOW (CFM)	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
3750	997	1756	2.01	1030	1988	2.30	1094	2236	2.61	1156	2497	2.94	1214	2769	3.27
4000	1023	1931	2.23	1054	2173	2.53	1116	2431	2.86	1176	2702	3.19	1233	2984	3.53
4250	1048	2114	2.46	1076	2366	2.77	1137	2634	3.10	1196	2914	3.44	1251	3206	3.79
4500	1073	2304	2.70	1098	2566	3.02	1157	2844	3.36	1214	3133	3.70	1268	3433	4.05
4750	1096	2504	2.94	1119	2775	3.28	1177	3062	3.62	1232	3360	3.97	1285	3666	4.32
5000	1119	2712	3.20	1140	2993	3.54	1196	3288	3.89	1249	3592	4.24	1301	3905	4.59
5250	1142	2931	3.46	1159	3220	3.81	1214	3523	4.16	1266	3832	4.51	1316	4148	4.86
5500	1163	3160	3.74	1179	3457	4.08	1231	3765	4.43	1282	4077	4.78	1331	4395	5.14
5750	1184	3399	4.01	1197	3702	4.36	1248	4014	4.71	1297	4328	5.06	1345	4644	5.41
6000	1205	3649	4.30	1215	3957	4.65	1265	4270	5.00	1312	4581	5.34	1359	4893	5.69
6250	1225	3910	4.60	1233	4219	4.94	1281	4531	5.29	1327	4837	5.63	1372	5141	5.97

LEGEND

Bhp — Brake Horsepower
FIOP — Factory-Installed Option
Watts — Input Watts to Motor

*Standard low-medium static drive range is 895 to 1147 rpm. Alternate high-static drive range is 1040 to 1315. Other rpms require a field-supplied drive.

NOTES:

1. [shaded] Field-supplied motor.
2. Maximum continuous bhp for the optional motor is 4.26. The maximum continuous watts is 3610. Do not adjust motor rpm such that motor maximum bhp and/or watts is exceeded at the maximum operating cfm.
3. Static pressure losses (i.e., economizer) must be added to external static pressure before entering Fan Performance table.
4. Interpolation is permissible. Do not extrapolate.
5. Fan performance is based on wet coils, clean filters, and casing losses. See Tables 20 and 21 for accessory/FIOP static pressure information.
6. Extensive motor and drive testing on these units ensures that the full bhp and watts range of the motor can be utilized with confidence. Using fan motors up to the watts or bhp rating shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.
7. Use of a field-supplied motor may affect wiring size. Contact your Carrier representative for details.

Table 14 — Fan Performance — 48HJD017 (Low Heat Units)*

AIRFLOW (CFM)	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
4500	753	1307	1.53	761	1330	1.56	840	1572	1.84	912	1822	2.14	980	2080	2.44
4800	747	1384	1.62	790	1515	1.78	866	1765	2.07	936	2023	2.37	1002	2289	2.68
5100	741	1465	1.72	820	1718	2.01	893	1977	2.32	961	2243	2.63	1025	2516	2.95
5700	810	1911	2.24	882	2182	2.56	950	2459	2.88	1014	2741	3.21	1075	3029	3.55
6000	844	2164	2.54	914	2444	2.87	980	2730	3.20	1042	3021	3.54	1100	3317	3.89
6300	879	2439	2.86	947	2729	3.20	1010	3023	3.55	1070	3322	3.90	1127	3626	4.25
6600	915	2737	3.21	980	3035	3.56	1041	3338	3.91	1099	3645	4.28	1155	3957	4.64
6900	950	3057	3.59	1013	3364	3.95	1072	3675	4.31	1129	3991	4.68	1183	4311	5.06
7200	986	3401	3.99	1047	3717	4.36	1104	4037	4.74	1159	4361	5.11	1211	4689	5.50
7500	1022	3770	4.42	1081	4095	4.80	1136	4423	5.19	1189	4755	5.58	1241	5091	5.97

AIRFLOW (CFM)	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
4500	1044	2345	2.75	1105	2619	3.07	1163	2899	3.40	1218	3187	3.74	1271	3481	4.08
4800	1065	2561	3.00	1124	2841	3.33	1180	3127	3.67	1235	3420	4.01	1287	3720	4.36
5100	1086	2795	3.28	1144	3082	3.61	1199	3375	3.96	1252	3674	4.31	1304	3979	4.67
5700	1132	3324	3.90	1187	3624	4.25	1240	3929	4.61	1291	4241	4.97	1341	4558	5.35
6000	1157	3619	4.24	1210	3925	4.60	1262	4239	4.97	1312	4557	5.34	1361	4880	5.72
6300	1182	3935	4.62	1234	4249	4.98	1285	4569	5.36	1334	4894	5.74	—	—	—
6600	1208	4274	5.01	1259	4595	5.39	1309	4922	5.77	—	—	—	—	—	—
6900	1235	4636	5.44	1285	4964	5.82	—	—	—	—	—	—	—	—	—
7200	1262	5021	5.89	—	—	—	—	—	—	—	—	—	—	—	—
7500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

AIRFLOW (CFM)	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)														
	2.2			2.4			2.6			2.8			3.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
4500	1322	3781	4.43	1372	4088	4.79	1419	4400	5.16	1466	4719	5.53	1511	5042	5.91
4800	1337	4025	4.72	1386	4337	5.09	1433	4655	5.46	1479	4978	5.84	—	—	—
5100	1353	4290	5.03	1401	4607	5.40	1448	4930	5.78	—	—	—	—	—	—
5700	1388	4881	5.72	—	—	—	—	—	—	—	—	—	—	—	—
6000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6300	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6600	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
7200	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
7500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower
FIOP — Factory-Installed Option
Watts — Input Watts to Motor

*Standard low-medium static drive range is 873 to 1021 rpm. Alternate high-static drive range is 1025 to 1200. Other rpms require a field-supplied drive.

NOTES:

1. Maximum continuous bhp for the standard motor is 6.13. The maximum continuous watts is 5180. Do not adjust motor rpm such that motor maximum bhp and/or watts is exceeded at the maximum operating cfm.
2. Static pressure losses (i.e., economizer) must be added to external static pressure before entering Fan Performance table.
3. Interpolation is permissible. Do not extrapolate.
4. Fan performance is based on wet coils, clean filters, and casing losses. See Tables 20 and 21 for accessory/FIOP static pressure information.
5. Extensive motor and drive testing on these units ensures that the full bhp and watts range of the motor can be utilized with confidence. Using fan motors up to the watts or bhp rating shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.
6. Use of a field-supplied motor may affect wiring size. Contact your Carrier representative for details.

Table 15 — Fan Performance — 48HJF015 (High Heat Units with Standard Indoor Fan Motor)*

AIRFLOW (CFM)	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
3750	628	888	0.93	684	1027	1.08	761	1234	1.30	835	1454	1.53	906	1584	1.79
4000	660	1015	1.09	717	1168	1.25	793	1388	1.48	865	1620	1.73	935	1756	2.01
4250	691	1151	1.25	749	1317	1.43	823	1550	1.68	894	1793	1.95	963	1937	2.24
4500	721	1295	1.43	780	1474	1.62	853	1719	1.89	923	1973	2.17	989	2126	2.47
4750	751	1448	1.62	810	1641	1.83	882	1896	2.12	951	2159	2.41	1016	2326	2.72
5000	781	1610	1.82	841	1817	2.06	911	2081	2.36	978	2353	2.66	1041	2536	2.98
5250	810	1783	2.04	871	2003	2.29	939	2277	2.61	1005	2556	2.93	1066	2757	3.25
5500	839	1967	2.27	900	2200	2.54	967	2482	2.87	1031	2768	3.20	—	—	—
5750	868	2163	2.52	929	2410	2.81	994	2699	3.15	—	—	—	—	—	—
6000	896	2373	2.78	958	2634	3.09	—	—	—	—	—	—	—	—	—
6250	924	2596	3.06	—	—	—	—	—	—	—	—	—	—	—	—

AIRFLOW (CFM)	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
3750	975	1829	2.07	1041	2091	2.36	1099	2343	2.65	1161	2521	2.97	1219	2801	3.30
4000	1002	2010	2.30	1066	2279	2.60	1124	2540	2.90	1183	2738	3.23	—	—	—
4250	1028	2198	2.54	1090	2474	2.86	1147	2743	3.17	—	—	—	—	—	—
4500	1053	2395	2.79	1114	2675	3.11	—	—	—	—	—	—	—	—	—
4750	1077	2601	3.05	—	—	—	—	—	—	—	—	—	—	—	—
5000	1101	2816	3.31	—	—	—	—	—	—	—	—	—	—	—	—
5250	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
5750	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6250	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower
FIOP — Factory-Installed Option
Watts — Input Watts to Motor

*Standard low-medium static drive range is 895 to 1147 rpm. Alternate high-static drive range is 1040 to 1315 (for 208/230 and 460-v units). The alternate high-static drive is not available for 575-v units. Other rpms require a field-supplied drive.

NOTES:

1. Maximum continuous bhp for the standard motor is 3.13 (for 208/230 and 460-v units) or 3.38 (for 575-v units). The maximum continuous watts is 2700 (for 208/230 and 460-v units) or 3065 (for 575-v units). Do not adjust motor rpm such that motor maximum bhp and/or watts is exceeded at the maximum operating cfm.
2. Static pressure losses (i.e., economizer) must be added to external static pressure before entering Fan Performance table.
3. Interpolation is permissible. Do not extrapolate.
4. Fan performance is based on wet coils, clean filters, and casing losses. See Tables 20 and 21 for accessory/FIOP static pressure information.
5. Extensive motor and drive testing on these units ensures that the full bhp and watts range of the motor can be utilized with confidence. Using fan motors up to the watts or bhp rating shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.
6. Use of a field-supplied motor may affect wiring size. Contact your Carrier representative for details.

Table 16 — Fan Performance — 48HJF015 (High Heat Units with Optional Indoor Fan Motor)*

AIRFLOW (CFM)	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)														
	0.2			0.4			0.6			0.8			1.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
3750	628	888	0.93	684	1027	1.08	761	1234	1.30	835	1454	1.53	906	1584	1.79
4000	660	1015	1.09	717	1168	1.25	793	1388	1.48	865	1620	1.73	935	1756	2.01
4250	691	1151	1.25	749	1317	1.43	823	1550	1.68	894	1793	1.95	963	1937	2.24
4500	721	1295	1.43	780	1474	1.62	853	1719	1.89	923	1973	2.17	989	2126	2.47
4750	751	1448	1.62	810	1641	1.83	882	1896	2.12	951	2159	2.41	1016	2326	2.72
5000	781	1610	1.82	841	1817	2.06	911	2081	2.36	978	2353	2.66	1041	2536	2.98
5250	810	1783	2.04	871	2003	2.29	939	2277	2.61	1005	2556	2.93	1066	2757	3.25
5500	839	1967	2.27	900	2200	2.54	967	2482	2.87	1031	2768	3.20	1090	2991	3.54
5750	868	2163	2.52	929	2410	2.81	994	2699	3.15	1056	2990	3.48	1114	3237	3.83
6000	896	2373	2.78	958	2634	3.09	1021	2929	3.43	1081	3225	3.78	1137	3497	4.13
6250	924	2596	3.06	986	2872	3.38	1047	3172	3.74	1106	3473	4.09	1160	3769	4.44

AIRFLOW (CFM)	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg)														
	1.2			1.4			1.6			1.8			2.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
3750	975	1829	2.07	1041	2091	2.36	1099	2343	2.65	1161	2521	2.97	1219	2801	3.30
4000	1002	2010	2.30	1066	2279	2.60	1124	2540	2.90	1183	2738	3.23	1240	3023	3.57
4250	1028	2198	2.54	1090	2474	2.86	1147	2743	3.17	1205	2962	3.50	1260	3251	3.84
4500	1053	2395	2.79	1114	2675	3.11	1170	2951	3.43	1226	3194	3.78	1279	3487	4.12
4750	1077	2601	3.05	1136	2885	3.38	1191	3168	3.71	1245	3435	4.06	1297	3731	4.41
5000	1101	2816	3.31	1158	3104	3.65	1212	3392	3.99	1265	3683	4.34	1315	3981	4.69
5250	1124	3042	3.59	1179	3332	3.93	1232	3626	4.28	1283	3940	4.63	1332	4239	4.98
5500	1146	3279	3.88	1200	3570	4.22	1252	3870	4.58	1301	4203	4.92	1348	4501	5.27
5750	1168	3528	4.17	1220	3819	4.51	1271	4125	4.87	1318	4471	5.22	1364	4769	5.57
6000	1189	3789	4.47	1239	4080	4.81	1289	4389	5.18	1335	4742	5.52	1380	5038	5.87
6250	1210	4062	4.78	1258	4351	5.12	1307	4664	5.49	1351	5015	5.83	1394	5307	6.17

LEGEND

Bhp — Brake Horsepower
FIOP — Factory-Installed Option
Watts — Input Watts to Motor

*Standard low-medium static drive range is 895 to 1147 rpm. Alternate high-static drive range is 1040 to 1315. Other rpms require a field-supplied drive.

NOTES:

1. [shaded] Field-supplied motor.
2. Maximum continuous bhp for the standard motor is 4.26. The maximum continuous watts is 3610. Do not adjust motor rpm such that motor maximum bhp and/or watts is exceeded at the maximum operating cfm.
3. Static pressure losses (i.e., economizer) must be added to external static pressure before entering Fan Performance table.
4. Interpolation is permissible. Do not extrapolate.
5. Fan performance is based on wet coils, clean filters, and casing losses. See Tables 20 and 21 for accessory/FIOP static pressure information.
6. Extensive motor and drive testing on these units ensures that the full bhp and watts range of the motor can be utilized with confidence. Using fan motors up to the watts or bhp rating shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.
7. Use of a field-supplied motor may affect wiring size. Contact your Carrier representative for details.

Table 17 — Fan Performance — 48HJF017 (High Heat Units)*

AIRFLOW (CFM)	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg) 0.2			0.4			0.6			0.8			1.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
4500	753	1307	1.53	786	1404	1.65	861	1644	1.93	932	1893	2.22	997	2150	2.52
4800	747	1384	1.62	818	1603	1.88	890	1852	2.17	958	2108	2.47	1022	2373	2.78
5100	775	1571	1.84	850	1822	2.14	920	2079	2.44	986	2344	2.75	1048	2616	3.07
5700	849	2054	2.41	918	2323	2.73	982	2598	3.05	1044	2879	3.38	1102	3166	3.71
6000	886	2329	2.73	952	2607	3.06	1015	2891	3.39	1074	3180	3.73	1130	3474	4.08
6300	924	2628	3.08	987	2915	3.42	1047	3207	3.76	1105	3504	4.11	1160	3807	4.46
6600	962	2951	3.46	1023	3246	3.81	1081	3547	4.16	1136	3853	4.52	1190	4163	4.88
6900	1000	3298	3.87	1059	3603	4.23	1115	3912	4.59	1168	4225	4.96	1220	4543	5.33
7200	1038	3672	4.31	1095	3986	4.67	1149	4303	5.05	1201	4625	5.42	1251	4950	5.81
7500	1077	4072	4.78	1131	4394	5.15	1184	4720	5.54	1234	5050	5.92	—	—	—

AIRFLOW (CFM)	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg) 1.2			1.4			1.6			1.8			2.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
4500	1060	2414	2.83	1119	2685	3.15	1175	2964	3.48	1230	3250	3.81	1282	3542	4.15
4800	1082	2644	3.10	1140	2922	3.43	1195	3207	3.76	1248	3498	4.10	1299	3795	4.45
5100	1106	2894	3.39	1163	3178	3.73	1216	3470	4.07	1268	3767	4.42	1319	4071	4.77
5700	1157	3459	4.06	1211	3757	4.41	1262	4061	4.76	1312	4371	5.13	1360	4686	5.50
6000	1184	3774	4.43	1236	4080	4.79	1287	4391	5.15	1335	4707	5.52	1382	5029	5.90
6300	1212	4114	4.83	1263	4427	5.19	1312	4745	5.57	1359	5067	5.94	—	—	—
6600	1241	4478	5.25	1290	4798	5.63	1338	5122	6.01	—	—	—	—	—	—
6900	1270	4866	5.71	—	—	—	—	—	—	—	—	—	—	—	—
7200	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
7500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

AIRFLOW (CFM)	AVAILABLE EXTERNAL STATIC PRESSURE (in. wg) 2.2			2.4			2.6			2.8			3.0		
	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp	Rpm	Watts	Bhp
4500	1332	3841	4.50	1381	4145	4.86	1428	4456	5.23	1473	4772	5.60	1518	5095	5.98
4800	1349	4100	4.81	1397	4409	5.17	1443	4725	5.54	1488	5046	5.92	—	—	—
5100	1367	4380	5.14	1414	4695	5.51	1460	5016	5.88	—	—	—	—	—	—
5700	1407	5007	5.87	—	—	—	—	—	—	—	—	—	—	—	—
6000	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6300	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6600	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
6900	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
7200	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
7500	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

LEGEND

Bhp — Brake Horsepower
FIOP — Factory-Installed Option
Watts — Input Watts to Motor

*Standard low-medium static drive range is 873 to 1021 rpm. Alternate high-static drive range is 1025 to 1200. Other rpms require a field-supplied drive.

NOTES:

1. Maximum continuous bhp for the standard motor is 6.13. The maximum continuous watts is 5180. Do not adjust motor rpm such that motor maximum bhp and/or watts is exceeded at the maximum operating cfm.
2. Static pressure losses (i.e., economizer) must be added to external static pressure before entering Fan Performance table.
3. Interpolation is permissible. Do not extrapolate.
4. Fan performance is based on wet coils, clean filters, and casing losses. See Tables 20 and 21 for accessory/FIOP static pressure information.
5. Extensive motor and drive testing on these units ensures that the full bhp and watts range of the motor can be utilized with confidence. Using fan motors up to the watts or bhp rating shown will not result in nuisance tripping or premature motor failure. Unit warranty will not be affected.
6. Use of a field-supplied motor may affect wiring size. Contact your Carrier representative for details.

Table 18 — Air Quantity Limits

UNIT 48HJ	MINIMUM CFM	MAXIMUM CFM
015	3600	6,000
017	4500	7,500

Table 19 — Evaporator Fan Motor Specifications

UNIT 48HJ	NOMINAL Hp	VOLTAGE	MAX WATTS	EFF.	MAX BHP	MAX BkW	MAX AMPS
015 (Standard Motor)	2.9	208	2700	85.8%	3.13	2.34	9.46
	2.9	230	2700	85.8%	3.13	2.34	8.6
	2.9	460	2700	85.8%	3.13	2.34	4.3
	3	575	3065	81.7%	3.38	2.53	3.9
015 (Optional Motor)	3.7	208	3610	85.8%	4.26	3.18	10.5
	3.7	230	3610	85.8%	4.26	3.18	10.5
	3.7	460	3610	85.8%	4.26	3.18	4.8
017	5	208	5180	87.5%	6.13	4.57	15.8
	5	230	5180	87.5%	6.13	4.57	15.8
	5	460	5180	87.5%	6.13	4.57	7.9
	5	575	5180	87.5%	6.13	4.57	6.0

LEGEND

BHP — Brake Horsepower

Table 20 — Accessory/FIOP EconoMi$erIV or EconoMi$er2 Static Pressure (in. wg)

UNIT 48HJ	UNIT VOLTAGE	CFM	ECONOMIZER PRESSURE DROP
015, 017	All	3,750	.03
		4,000	.03
		5,000	.05
		6,000	.07
		7,500	.10

LEGEND

FIOP — Factory-Installed Option

NOTES:
1. The factory-assembled horizontal adapter substantially improves fan performance.
2. The static pressure must be added to external static pressure. The sum and the evaporator entering-air cfm should then be used in conjunction with the Fan Performance table to determine blower rpm, bhp, and watts.

Table 21 — MoistureMi$er™ Dehumidification Package Static Pressure Drop (in. wg)

UNIT SIZE 48HJ	UNIT NOMINAL TONS	CFM PER TON		
		300	400	500
015	12	.026	.045	.071
017	15	.040	.071	.111

Table 22 — Fan Rpm and Motor Pulley Settings*

48HJ (No. Turns Open)	0	1/2	1	1 1/2	2	2 1/2	3	3 1/2	4	4 1/2	5	5 1/2	6
015 (208/230, 460, 575 v)†	1147	1124	1101	1078	1055	1032	1010	987	964	941	918	895	††
015 (208/230, 460 v)**	1315	1292	1269	1246	1223	1200	1178	1155	1132	1109	1086	1063	1040
017†	††	††	††	††	1021	1002	984	965	947	928	910	891	873
017**	††	††	††	††	1200	1178	1156	1134	1112	1091	1069	1047	1025

*Approximate fan rpm shown.
†Indicates standard drive package.
**Indicates alternate drive package.
††Due to belt and pulley style, pulley cannot be set to this number of turns open.

Operating Sequence

COOLING, UNITS WITHOUT ECONOMIZER — When thermostat calls for cooling, terminals G and Y1 are energized. The indoor (evaporator) fan contactor (IFC), compressor contactor no. 1 (C1) and outdoor-fan contactor (OFC) are energized, and evaporator-fan motor, compressor no. 1, and both condenser fans start. The condenser-fan motors run continuously while unit is cooling. If the thermostat calls for a second stage of cooling by energizing Y2, compressor contactor no. 2 (C2) is energized and compressor no. 2 starts.

When the thermostat is satisfied, C1 and C2 are deenergized and the compressors and outdoor (condenser) fan motors (OFM) shut off. After a 30-second delay, the indoor (evaporator) fan motor (IFM) shuts off. If the thermostat fan selector switch is in the ON position, the evaporator-fan motor will run continuously.

HEATING, UNITS WITHOUT ECONOMIZER — When the thermostat calls for heating, terminal W1 is energized. In order to prevent thermostat short-cycling, the unit is locked into the Heating mode for at least 1 minute when W1 is energized. The induced-draft motor (IDM) is then energized and the burner ignition sequence begins. The indoor (evaporator) fan motor (IFM) is energized 45 seconds after a flame is ignited. On units equipped for two stages of heat, when additional heat is needed, W2 is energized and the high-fire solenoid on the main gas valve (MGV) is energized. When the thermostat is satisfied and W1 and W2 are deenergized, the IFM stops after a 45-second time-off delay.

COOLING, UNITS WITH ECONOMI$ERIV — When free cooling is not available, the compressors will be controlled by the zone thermostat. When free cooling is available, the outdoor-air damper is modulated by the EconoMi$erIV control to provide a 50 to 55 F supply-air temperature into the zone. As the supply-air temperature fluctuates above 55 or below 50 F, the dampers will be modulated (open or close) to bring the supply-air temperature back within the set point limits.

For EconoMi$erIV operation, there must be a thermostat call for the fan (G). This will move the damper to its minimum position during the occupied mode.

Above 50 F supply-air temperature, the dampers will modulate from 100% open to the minimum open position. From 50 F to 45 F supply-air temperature, the dampers will maintain at the minimum open position. Below 45 F the dampers will be completely shut. As the supply-air temperature rises, the dampers will come back open to the minimum open position once the supply-air temperature rises to 48 F.

If optional power exhaust is installed, as the outdoor-air damper opens and closes, the power exhaust fan will be energized and deenergized.

If field-installed accessory CO_2 sensors are connected to the EconoMi$erIV control, a demand controlled ventilation strategy will begin to operate. As the CO_2 level in the zone increases above the CO_2 set point, the minimum position of the damper will be increased proportionally. As the CO_2 level decreases because of the increase in fresh air, the outdoor-air damper will be proportionally closed. Damper position will follow the higher demand condition from DCV mode or free cooling mode.

Damper movement from full closed to full open (or vice versa) will take between $1^1/_2$ and $2^1/_2$ minutes.

If free cooling can be used as determined from the appropriate changeover command (switch, dry bulb, enthalpy curve, differential dry bulb, or differential enthalpy), a call for cooling (Y1 closes at the thermostat) will cause the control to modulate the dampers open to maintain the supply air temperature set point at 50 to 55 F.

As the supply-air temperature drops below the set point range of 50 to 55 F, the control will modulate the outdoor-air dampers closed to maintain the proper supply-air temperature.

HEATING, UNITS WITH ECONOMI$ERIV — When the room thermostat calls for heat, the heating controls are energized as described in the Heating, Units Without Economizer section. When the indoor fan is energized, the economizer damper moves to the minimum position. When the indoor fan is off, the economizer damper is fully closed.

COOLING, UNITS WITH ECONOMI$ER2, PREMIERLINK™ CONTROL AND A THERMOSTAT — When free cooling is not available, the compressors will be controlled by the PremierLink control in response to the Y1 and Y2 inputs from the thermostat.

The PremierLink control will use the following information to determine if free cooling is available:

- Indoor fan has been on for at least 30 seconds.
- The SPT, SAT, and OAT inputs must have valid readings.
- OAT must be less than 75 F.
- OAT must be less than SPT.
- Enthalpy must be LOW (may be jumpered if an enthalpy sensor not available).
- Economizer position is NOT forced.

Pre-cooling occurs when the is no call from the thermostat except G. Pre-cooling is defined as the economizer modulates to provide 70 F supply air.

When free cooling is available the PremierLink control will control the compressors and economizer to provide a supply-air temperature determined to meet the Y1 and Y2 calls from the thermostat using the following three routines. The three control routines are based on OAT.

The 3 routines are based on OAT where:

SASP = Supply Air Set Point

DXCTLO = Direct Expansion Cooling Lockout Set Point

PID = Proportional Integral

Routine 1 (OAT < DXCTLO)

- Y1 energized – economizer maintains a SASP = (SATLO1 + 3).
- Y2 energized – economizer maintains a SASP = (SATLO2 + 3).

Routine 2 (DXCTLO < OAT < 68 F)

- If only Y1 energized, the economizer maintains a SASP = (SATLO1 + 3).
- If SAT > SASP + 5 and economizer position > 80%, economizer will go to minimum position for 3 minutes or until SAT > 68 F.
- First stage of mechanical cooling will be energized.
- Integrator resets.
- Economizer opens again and controls to current SASP after stage one on for 90 seconds.
- With Y1 and Y2 energized economizer maintains an SASP = SATLO2 + 3.
- If SAT > SASP + 5 and economizer position >80%, economizer will go to minimum position for 3 minutes or until SAT > 68 F.
- If compressor one is on then second stage of mechanical cooling will be energized. Otherwise the first stage will be energized.
- Integrator resets.
- Economizer opens again and controls to SASP after stage one on for 90 seconds.

Routine 3 (OAT > 68)

- Economizer is opened 100%.
- Compressors 1 and 2 are cycled based on Y1 and Y2 using minimum on and off times and watching the supply air temperature as compared to SATLO1 and SATLO2 set points.

If optional power exhaust is installed, as the outdoor-air damper opens and closes, the power exhaust fans will be energized and deenergized.

If field-installed accessory CO_2 sensors are connected to the PremierLink™ control, a PID-controlled demand ventilation strategy will begin to operate. As the CO_2 level in the zone increases above the CO_2 set point, the minimum position of the damper will be increased proportionally. As the CO_2 level decreases because of the increase in fresh air, the outdoor-air damper will be proportionally closed.

HEATING, UNITS WITH ECONOMI$ER2, PREMIERLINK CONTROL AND A THERMOSTAT — When the thermostat calls for heating, terminal W1 is energized. The PremierLink control will move the economizer damper to the minimum position if there is a call for G and closed if there is a call for W1 without G. In order to prevent thermostat from short cycling, the unit is locked into the heating mode for at least 10 minutes when W1 is energized. The induced-draft motor is then energized and the burner ignition sequence begins.

On units equipped for two stages of heat, when additional heat is needed, W2 is energized and the high-fire solenoid on the main gas valve (MGV) is energized. When the thermostat is satisfied and W1 is deenergized, the IFM stops after a 45-second time-off delay unless G is still maintained.

COOLING, UNITS WITH ECONOMI$ER2, PREMIERLINK CONTROL AND A ROOM SENSOR — When free cooling is not available, the compressors will be controlled by the PremierLink controller using a PID Error reduction calculation as indicated by Fig 44.

The PremierLink controller will use the following information to determine if free cooling is available:

- Indoor fan has been on for at least 30 seconds.
- The SPT, SAT, and OAT inputs must have valid readings.
- OAT must be less than 75 F.
- OAT must be less than SPT.
- Enthalpy must be LOW (may be jumpered if and enthalpy sensor is not available).
- Economizer position is NOT forced.

When free cooling is available, the outdoor-air damper is positioned through the use of a Proportional Integral (PID) control process to provide a calculated supply-air temperature into the zone. The supply air will maintain the space temperature between the heating and cooling set points as indicated in Fig. 45.

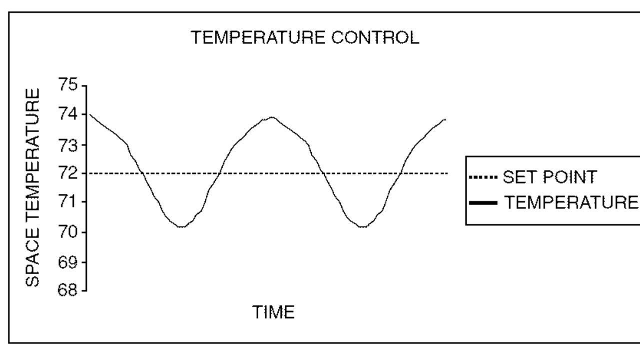
The PremierLink will integrate the compressors stages with the economizer based on similar logic as the three routines listed in the previous section. The SASP will float up and down based on the error reduction calculations that compare space temperature and space set point.

When outdoor-air temperature conditions require the economizer to close for a compressor stage-up sequence, the economizer control integrator is reset to zero after the stage-up sequence is completed. This prevents the supply-air temperature from dropping too quickly and creating a freeze condition that would make the compressor turn off prematurely.

The high space set point is used for DX (direct expansion) cooling control, while the economizer space set point is a calculated value between the heating and cooling set points. The economizer set point will always be at least one degree below the cooling set point, allowing for a smooth transition from mechanical cooling with economizer assist, back to economizer cooling as the cooling set point is achieved. The compressors may be used for initial cooling then the PremierLink controller will modulate the economizer using an error reduction calculation to hold the space temperature between the heating and cooling set points. See Fig. 45.

The controller uses the following conditions to determine economizer cooling:

- Enthalpy is Low
- SAT reading is available
- OAT reading is available
- SPT reading is available
- OAT ≤ SPT
- Economizer Position is NOT forced



NOTE: PremierLink control performs smart staging of 2 stages of DX cooling and up to 3 stages of heat.

Fig. 44 — DX Cooling Temperature Control Example

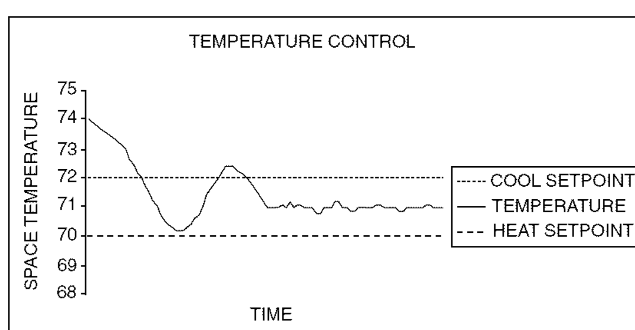


Fig. 45 — Economizer Temperature Control Example

If any of the above conditions are **not** met, the economizer submaster reference (ECSR) is set to maximum limit and the damper moves to minimum position. The operating sequence is complete. The ECSR is recalculated every 30 seconds.

If an optional power exhaust is installed, as the outdoor-air damper opens and closes, the power exhaust fans will be energized and deenergized.

If field-installed accessory CO_2 sensors are connected to the PremierLink™ control, a PID-controlled demand ventilation strategy will begin to operate. As the CO_2 level in the zone increases above the CO_2 set point, the minimum position of the damper will be increased proportionally. As the CO_2 level decreases because of the increase in fresh air, the outdoor-air damper will be proportionally closed.

HEATING, UNIT WITH ECONOMI$ER2, PREMIERLINK CONTROL AND A ROOM SENSOR — Every 40 seconds the controller will calculate the required heat stages (maximum of 3) to maintain supply air temperature (SAT) if the following qualifying conditions are met:

- Indoor fan has been on for at least 30 seconds.
- COOL mode is not active.
- OCCUPIED, TEMP.COMPENSATED START or HEAT mode is active.
- SAT reading is available.
- Fire shutdown mode is not active.

If all of the above conditions are met, the number of heat stages is calculated; otherwise the required number of heat stages will be set to 0.

If the PremierLink controller determines that heat stages are required, the economizer damper will be moved to minimum position if occupied and closed if unoccupied.

Staging should be as follows:

If Heating PID STAGES=2

- HEAT STAGES=1 (75% capacity) will energize HS1
- HEAT STAGES=2 (100% capacity) will energize HS2

In order to prevent short cycling, the unit is locked into the Heating mode for at least 10 minutes when HS1 is deenergized. When HS1 is energized the induced-draft motor is then energized and the burner ignition sequence begins. On units equipped for two stages of heat, when additional heat is needed, HS2 is energized and the high-fire solenoid on the main gas valve (MGV) is energized. When the space condition is satisfied and HS1 is deenergized the IFM stops after a 45-second time-off delay unless in the occupied mode. The fan will run continuously in the occupied mode as required by national energy and fresh air standards.

SERVICE

⚠ WARNING

Before performing service or maintenance operations on unit, turn off main power switch to unit and install lockout tag on disconnect switch. Electrical shock could cause personal injury.

Cleaning — Inspect unit interior at beginning of each heating and cooling season and as operating conditions require (see Fig. 46). Remove unit top panel and/or side panels for access to unit interior.

EVAPORATOR COIL — Clean as required with commercial coil cleaner.

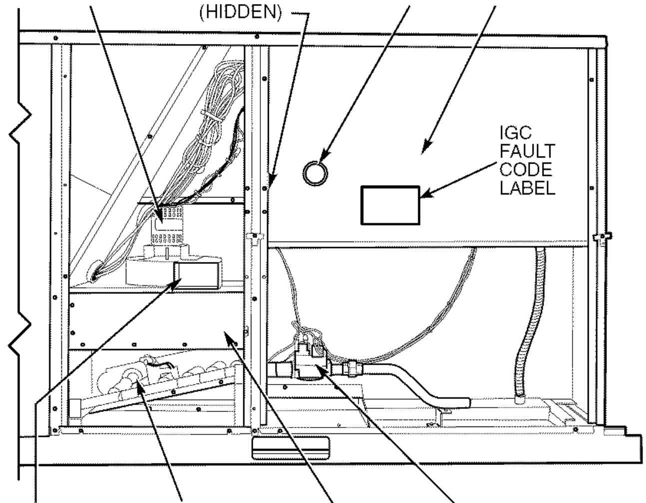


Fig. 46 — Typical Gas Heating Section

CONDENSER COIL — Clean condenser coil annually and as required by location and outdoor-air conditions. Inspect coil monthly; clean as required.

CONDENSATE DRAIN — Check and clean each year at start of cooling season. In winter, keep drains and traps dry.

FILTERS — Clean or replace at start of each heating and cooling season, or more often if operating conditions require. Refer to Table 1 for type and size.

OUTDOOR-AIR INLET SCREENS — Clean screens with steam or hot water and a mild detergent. Do not use throwaway filters in place of screens. See Table 1 for quantity and size.

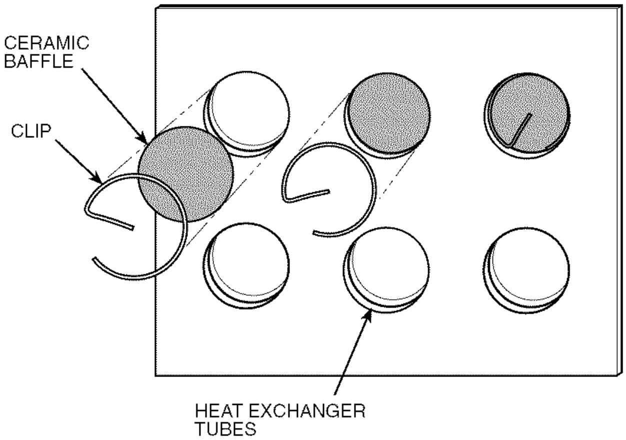
MAIN BURNER — At the beginning of each heating season, inspect for deterioration or blockage due to corrosion or other causes. Observe the main burner flames. Refer to Main Burners section on page 41.

FLUE GAS PASSAGEWAYS — The flue collector box and heat exchanger cells may be inspected by removing heat exchanger access panel (Fig. 4), flue box cover, and main burner assembly. Refer to Main Burners section on page 41 for burner removal sequence. If cleaning is required, remove heat exchanger baffles and clean tubes with a wire brush.

Use caution with ceramic heat exchanger baffles. When installing retaining clip, be sure the center leg of the clip extends inward toward baffle. See Fig. 47.

COMBUSTION-AIR BLOWER — Clean periodically to assure proper airflow and heating efficiency. Inspect blower wheel every fall and periodically during heating season. For the first heating season, inspect blower wheel bi-monthly to determine proper cleaning frequency.

To inspect blower wheel, remove heat exchanger access panel. Shine a flashlight into opening to inspect wheel. If cleaning is required, remove motor and wheel assembly by removing screws holding motor mounting plate to top of combustion fan housing. The motor and wheel assembly will slide up and out of the fan housing. Remove the blower wheel from the motor shaft and clean with a detergent or solvent. Replace motor and wheel assembly.



NOTE: One baffle and clip will be in each upper tube of the heat exchanger.

Fig. 47 — Removing Heat Exchanger Ceramic Baffles and Clips

Lubrication

COMPRESSORS — Each compressor is charged with the correct amount of oil at the factory. Conventional white oil (Sontex 200LT) is used. White oil is compatible with 3GS oil, and 3GS oil may be used if the addition of oil is required. See compressor nameplate for original oil charge. A complete recharge should be four ounces less than the original oil charge When a compressor is exchanged in the field it is possible that a major portion of the oil from the replaced compressor may still be in the system. While this will not affect the reliability of the replacement compressor, the extra oil will add rotor drag and increase power usage. To remove this excess oil, an access valve may be added to the lower portion of the suction line at the inlet of the compressor. The compressor should then be run for 10 minutes, shut down and the access valve opened until no oil flows. This should be repeated twice to make sure the proper oil level has been achieved.

FAN SHAFT BEARINGS — For size 015 units, bearings are permanently lubricated. No field lubrication is required. For size 017 units, lubricate bearings at least every 6 months with suitable bearing grease. Extended grease line is provided for far side fan bearing (opposite drive side). Typical lubricants are given below:

MANUFACTURER	LUBRICANT
Texaco	Regal AFB-2*
Mobil	Mobilplex EP No. 1
Sunoco	Prestige 42
Texaco	Multifak 2

*Preferred lubricant because it contains rust and oxidation inhibitors.

CONDENSER AND EVAPORATOR-FAN MOTOR BEARINGS — The condenser-fan and evaporator-fan motors have permanently sealed bearings, so no field lubrication is necessary.

Evaporator Fan Performance Adjustment (Fig. 48-50)

— Fan motor pulleys are factory set for speed shown in Table 1.

To change fan speeds:

1. Shut off unit power supply.
2. a. Size 015 only: Loosen belt by loosening carriage nuts holding motor mount assembly to fan scroll side plates (A and B).
   b. Size 017 only: Loosen nuts on the 2 carriage bolts in the mounting base. Install jacking bolt and plate under motor base (bolt and plate are shipped in installer's packet). Using bolt and plate, raise motor to top of slide and remove belt. Secure motor in this position by tightening the nuts on the carriage bolts.
3. Loosen movable-pulley flange setscrew (see Fig. 48).

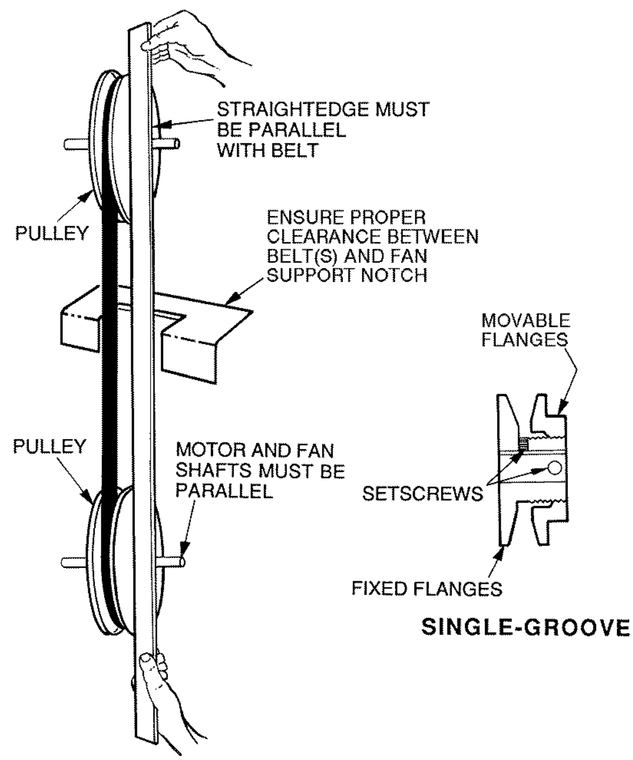


Fig. 48 — Evaporator-Fan Alignment and Adjustment

4. Screw movable flange toward fixed flange to increase speed and away from fixed flange to decrease speed. Increasing fan speed increases load on motor. Do not exceed maximum speed specified in Table 1.

   See Table 18 for air quantity limits.
5. Set movable flange at nearest keyway of pulley hub and tighten setscrew. (See Table 1 for speed change for each full turn of pulley flange.)
6. Replace and tighten belts (see Belt Tension Adjustment section on page 40).

To align fan and motor pulleys:

1. Loosen fan pulley setscrews.
2. Slide fan pulley along fan shaft.
3. Make angular alignment by loosening motor from mounting plate.

Evaporator Fan Service and Replacement

48HJ015 UNITS (See Fig. 49)

NOTE: To remove belts only, follow Steps 1-6.

1. Remove filter and supply-air section panels.
2. Remove unit top panel.
3. Loosen carriage nuts A and B holding motor mount assembly to fan scroll side plates.
4. Loosen screw C.
5. Rotate motor mount assembly (with motor attached) as far as possible away from evaporator coil.
6. Remove belt.
7. Rotate motor mount assembly back past original position toward evaporator coil.
8. Remove motor mounting nuts D and E (both sides).

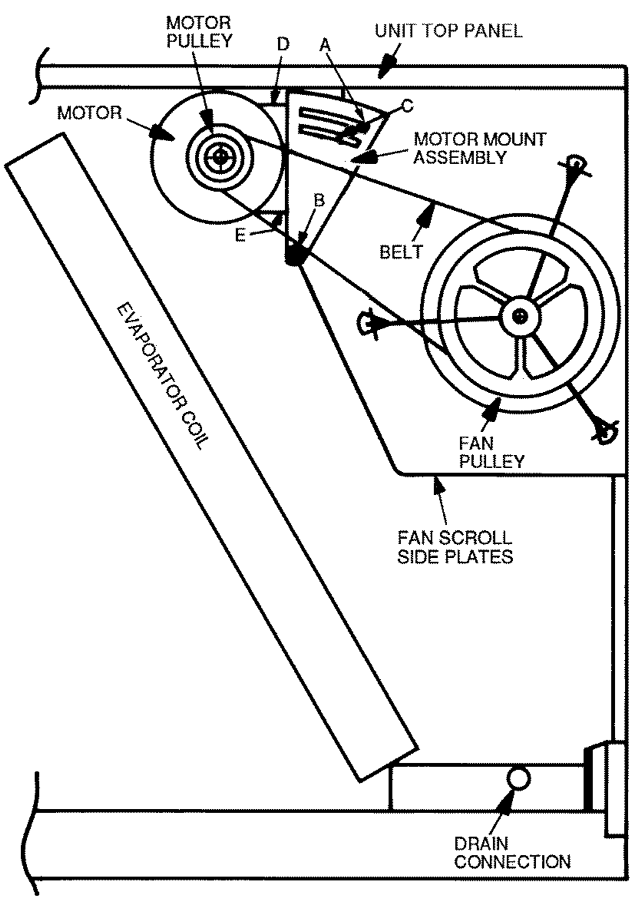
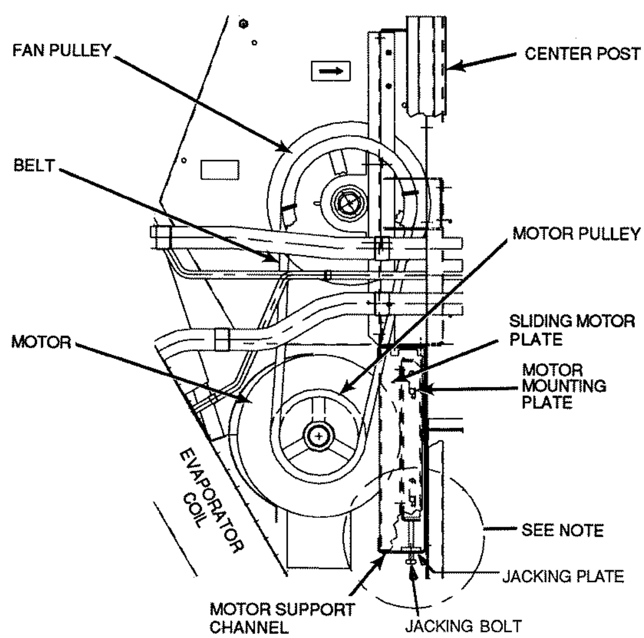


Fig. 49 — 48HJ015 Evaporator-Fan Motor Adjustment

9. Lift motor up through top of unit.
10. Reverse above procedure to reinstall motor.
11. Check and adjust belt tension as necessary.

48HJ017 UNITS (See Fig. 50) — The 48HJ017 units use a fan motor mounting system that features a slide-out motor mounting plate. To replace or service the motor, slide out the bracket.

1. Remove the evaporator-fan access panel and the heating control access panel.
2. Remove the center post (located between the evaporator fan and heating control access panels) and all screws securing it.
3. Loosen nuts on the 2 carriage bolts in the motor mounting base.
4. Using jacking bolt under motor base, raise motor to top of slide and remove belt. Secure motor in this position by tightening the nuts on the carriage bolts.
5. Remove the belt drive.
6. Remove jacking bolt and tapped jacking bolt plate.
7. Remove the 2 screws that secure the motor mounting plate to the motor support channel.
8. Remove the 3 screws from the end of the motor support channel that interfere with the motor slide path.
9. Slide out the motor and motor mounting plate.
10. Disconnect wiring connections and remove the 4 mounting bolts.
11. Remove the motor.
12. To install the new motor, reverse Steps 1-11.



NOTE: A $3^1/_2$-in. bolt and threaded plate are included in the installer's packet. They should be added to the motor support channel below the motor mounting plate to aid in raising the motor. The plate part number is 50DP503842. The adjustment bolt is $^3/_8$ - 16 x $1^3/_4$-in. LG.

Fig. 50 — 48HJ017 Evaporator-Fan Motor Section

Belt Tension Adjustment — To adjust belt tension:

1. Loosen fan motor bolts.
2. a. Size 015 Units:

   Move motor mounting plate up or down for proper belt tension ($^1/_2$ in. deflection with one finger).

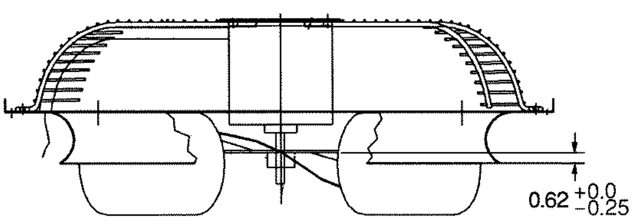
   b. Size 017 Units:

   Turn motor jacking bolt to move motor mounting plate up or down for proper belt tension ($^3/_8$ in. deflection at midspan with one finger [9 lb force]).
3. Tighten nuts.
4. Adjust bolts and nut on mounting plate to secure motor in fixed position.

Condenser-Fan Adjustment

48HJ015 AND 017 UNITS (Fig. 51)

1. Shut off unit power supply.
2. Remove access panel(s) closest to the fan to be adjusted.
3. Loosen fan hub setscrews.
4. Adjust fan height on shaft using a straightedge placed across the fan orifice.
5. Tighten setscrews and replace panel(s).
6. Turn on unit power.



NOTE: Dimension is in inches.

Fig. 51 — Condenser Fan Adjustment, 48HJ015 and 017

Power Failure — Dampers have a spring return. In event of power failure, dampers will return to fully closed position until power is restored. *Do not manually operate damper motor.*

Refrigerant Charge — Amount of refrigerant charge is listed on unit nameplate and in Table 1. Refer to Carrier GTAC II; Module 5; Charging, Recovery, Recycling, and Reclamation section for charging methods and procedures. Unit panels must be in place when unit is operating during charging procedure.

NOTE: Do not use recycled refrigerant as it may contain contaminants.

NO CHARGE — Use standard evacuating techniques. After evacuating system, weigh in the specified amount of refrigerant (refer to Table 1).

LOW CHARGE COOLING — Using cooling charging chart (see Fig. 52), add or remove refrigerant until conditions of the chart are met. Note that charging chart is different from those normally used. An accurate pressure gage and temperature-sensing device is required. Charging is accomplished by ensuring the proper amount of liquid subcooling. Measure liquid line pressure at the liquid line service valve using pressure gage. Connect temperature sensing device to the liquid line near the liquid line service valve and insulate it so that outdoor ambient temperature does not affect reading.

TO USE THE COOLING CHARGING CHART — Use the above temperature and pressure readings, and find the intersection point on the cooling charging chart. If intersection point on chart is above line, add refrigerant. If intersection point on chart is below line, carefully recover some of the charge. Recheck suction pressure as charge is adjusted.

NOTE: Indoor-air cfm must be within normal operating range of unit. All outdoor fans must be operating.

The TXV (thermostatic expansion valve) is set to maintain between 15 and 20 degrees of superheat at the compressors. The valves are factory set and should not require re-adjustment.

MOISTUREMI$ER™ SYSTEM CHARGING — The system charge for units with the MoistureMi$er option is greater than that of the standard unit alone. The charge for units with this option is indicated on the unit nameplate drawing. To charge systems using the MoistureMi$er dehumidification package, fully evacuate, recover, and re-charge the system to the nameplate specified charge level. To check or adjust refrigerant charge on systems using the MoistureMi$er dehumidification package, charge per the standard subcooling charts. The subcooler MUST be deenergized to use the charging charts. The charts reference a liquid pressure (psig) and temperature at a point between the condenser coil and the subcooler coil. A tap is provided on the unit to measure liquid pressure entering the subcooler (leaving the condenser).

Gas Valve Adjustment

NATURAL GAS — The gas valve opens and closes in response to the thermostat or limit control.

When power is supplied to valve terminals D1 and C2, the main valve opens to its preset position.

The regular factory setting is stamped on the valve body (3.3 in. wg).

To adjust regulator:

1. Set thermostat at setting for no call for heat.
2. Turn main gas valve to OFF position.
3. Remove $^1/_8$-in. pipe plug from manifold or gas valve pressure tap connection. Install a suitable pressure-measuring device.
4. Set main gas valve to ON position.
5. Set thermostat at setting to call for heat.
6. Remove screw cap covering regulator adjustment screw (See Fig. 53).
7. Turn adjustment screw clockwise to increase pressure or counterclockwise to decrease pressure.
8. Once desired pressure is established, set thermostat setting for no call for heat, turn off main gas valve, remove pressure-measuring device, and replace $^1/_8$-in. pipe plug and screw cap.

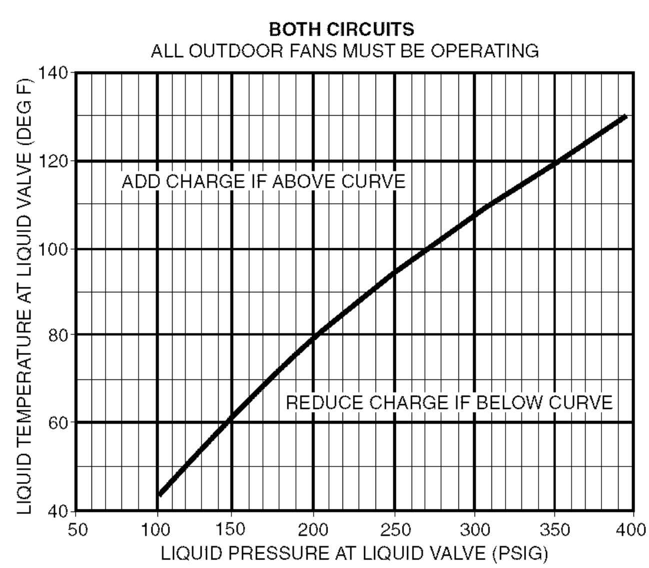


Fig. 52 — Cooling Charging Chart

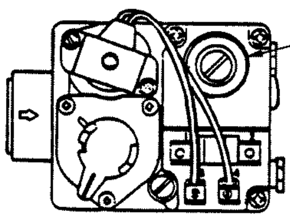


Fig. 53 — Gas Valve

Main Burners — For all applications, main burners are factory set and should require no adjustment.

MAIN BURNER REMOVAL

1. Shut off (field-supplied) manual main gas valve.
2. Shut off power to unit.
3. Remove unit control box access panel, burner section access panel, and center post (Fig. 4).
4. Disconnect gas piping from gas valve inlet.
5. Remove wires from gas valve.
6. Remove wires from rollout switch.
7. Remove sensor wire and ignitor cable from IGC board.
8. Remove 2 screws securing manifold bracket to basepan.
9. Remove 2 screws that hold the burner support plate flange to the vestibule plate.
10. Lift burner assembly out of unit.

CLEANING AND ADJUSTMENT

1. Remove burner rack from unit as described in Main Burner Removal section above.
2. Inspect burners, and if dirty, remove burners from rack.
3. Using a soft brush, clean burners and crossover port as required.
4. Adjust spark gap. See Fig. 54.
5. Reinstall burners on rack.
6. Reinstall burner rack as described above.

Filter Drier — Replace whenever refrigerant system is exposed to atmosphere.

Protective Devices

COMPRESSOR PROTECTION

Overcurrent — Each compressor has internal line break motor protection.

Crankcase Heater — The 48HJ units are equipped with a 70-watt crankcase heater to prevent absorption of liquid refrigerant by oil in the crankcase when the compressor is idle. The crankcase heater is energized whenever there is main power to the unit and the compressor is not energized.

IMPORTANT: After prolonged shutdown or servicing, energize the crankcase heaters for 24 hours before starting the compressors.

Overtemperature — Each compressor has an internal protector to protect it against excessively high discharge gas temperatures.

Compressor Lockout — If any of the safeties (high-pressure, low-pressure, freeze protection thermostat, compressor internal thermostat) trip, or if there is loss of power to the compressors, the cooling lockout (CLO) will lock the compressors off. To reset, manually move the thermostat setting.

EVAPORATOR FAN MOTOR PROTECTION — On size 015 units, an internal protector with auto-reset is included in the indoor fan motor as a protection against overcurrent.

On size 017 units, a manual reset, calibrated trip, magnetic circuit breaker protects against overcurrent. Do not bypass connections or increase the size of the breaker to correct trouble. Determine the cause and correct it before resetting the breaker.

CONDENSER-FAN MOTOR PROTECTION — Each condenser-fan motor is internally protected against overtemperature.

HIGH-PRESSURE AND LOW-PRESSURE SWITCHES — If either switch trips, or if the compressor overtemperature switch activates, that refrigerant circuit will be automatically locked out by the CLO. To reset, manually move the thermostat setting.

FREEZE PROTECTION THERMOSTAT (FPT) — An FPT is located on the top and bottom of the evaporator coil. They detect frost build-up and turn off the compressor, allowing the coil to clear. Once the frost has melted, the compressor can be reenergized by resetting the compressor lockout.

Relief Devices — All units have relief devices to protect against damage from excessive pressures (i.e., fire). These devices protect the high and low side.

Control Circuit, 24-V — This control circuit is protected against overcurrent by a 3.2 amp circuit breaker. Breaker can be reset. If it trips, determine cause of trouble before resetting. See Fig. 55 and 56.

Replacement Parts — A complete list of replacement parts may be obtained from any Carrier distributor upon request.

Diagnostic IGC Control LEDs — The IGC board has LEDs for diagnostic purposes. Refer to Troubleshooting section on page 45.

Optional Hinged Access Doors — When the optional service package is ordered or the if the hinged access doors option is ordered, the unit will be provided with external and internal hinged access doors to facilitate service.

Four external hinged access doors are provided. All external doors are provided with 2 large $^{1}/_{4}$ turn latches with folding bail-type handles. (Compressor access doors have one latch.) A single door is provided for filter and drive access. One door is provided for control box access. The control box access door is interlocked with the non-fused disconnect which must be in the OFF position to open the door. Two doors are provided for access to the compressor compartment.

Two internal access doors are provided inside the filter/drive access door. The filter access door (on the left) is secured by 2 small $^{1}/_{4}$ turn latches with folding bail-type handles. This door must be opened prior to opening the drive access door. The drive access door is shipped with 2 sheet metal screws holding the door closed. Upon initial opening of the door, these screws may be removed and discarded. The door is then held shut by the filter access door, which closes over it.

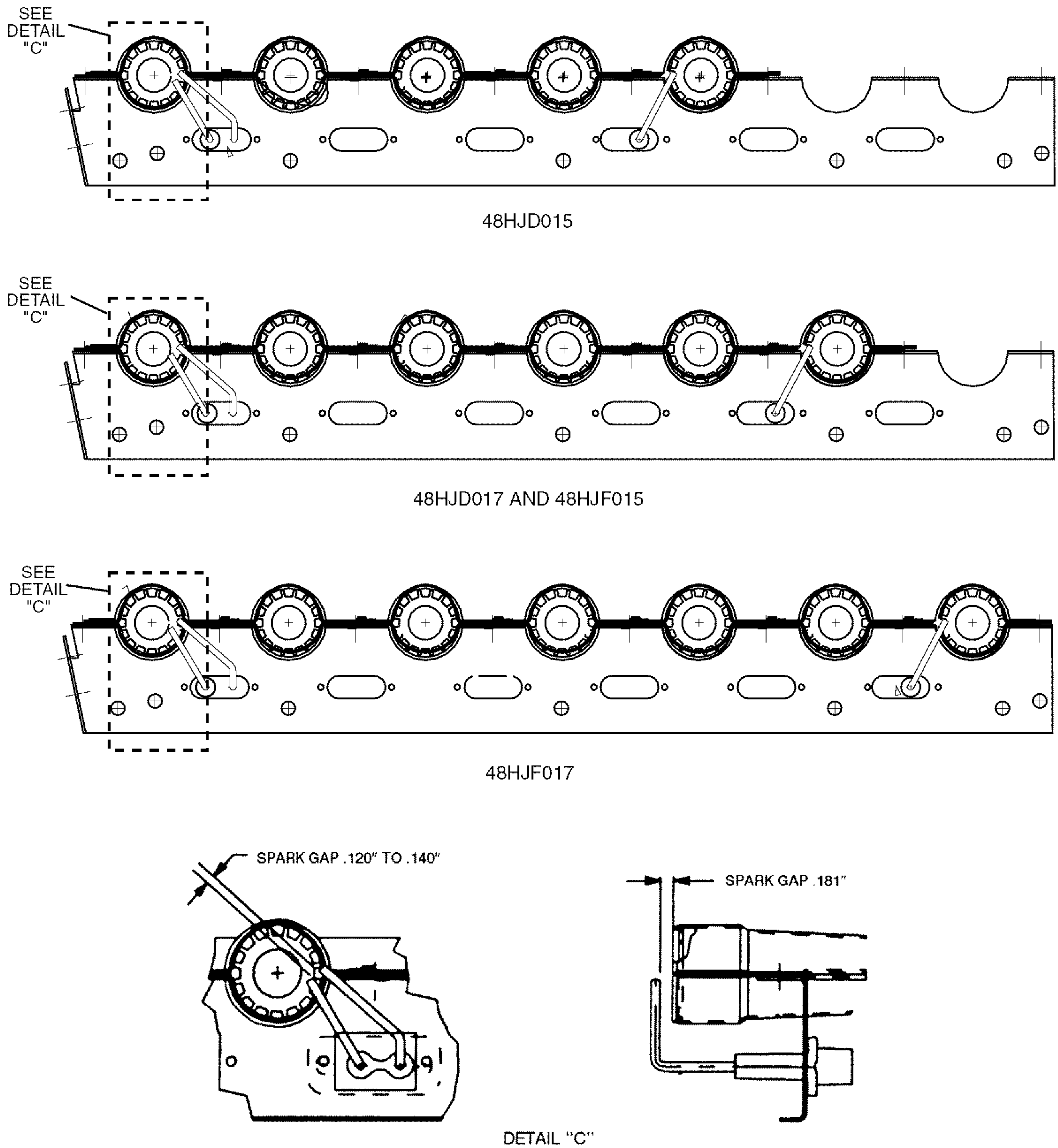


Fig. 54 — Spark Gap Adjustment

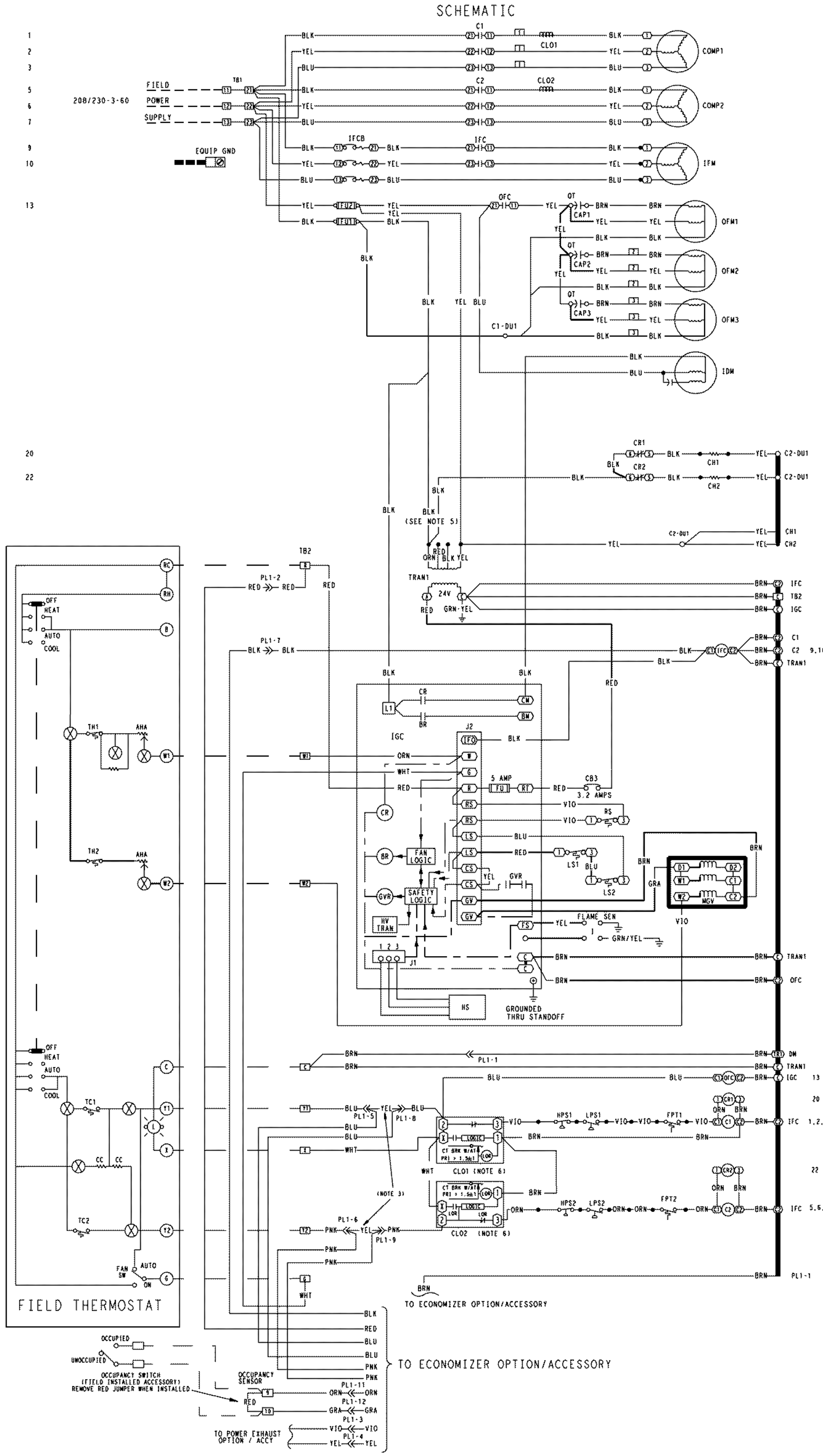


Fig. 55 — Typical Wiring Schematic (48HJ017, 208/230 V Shown)

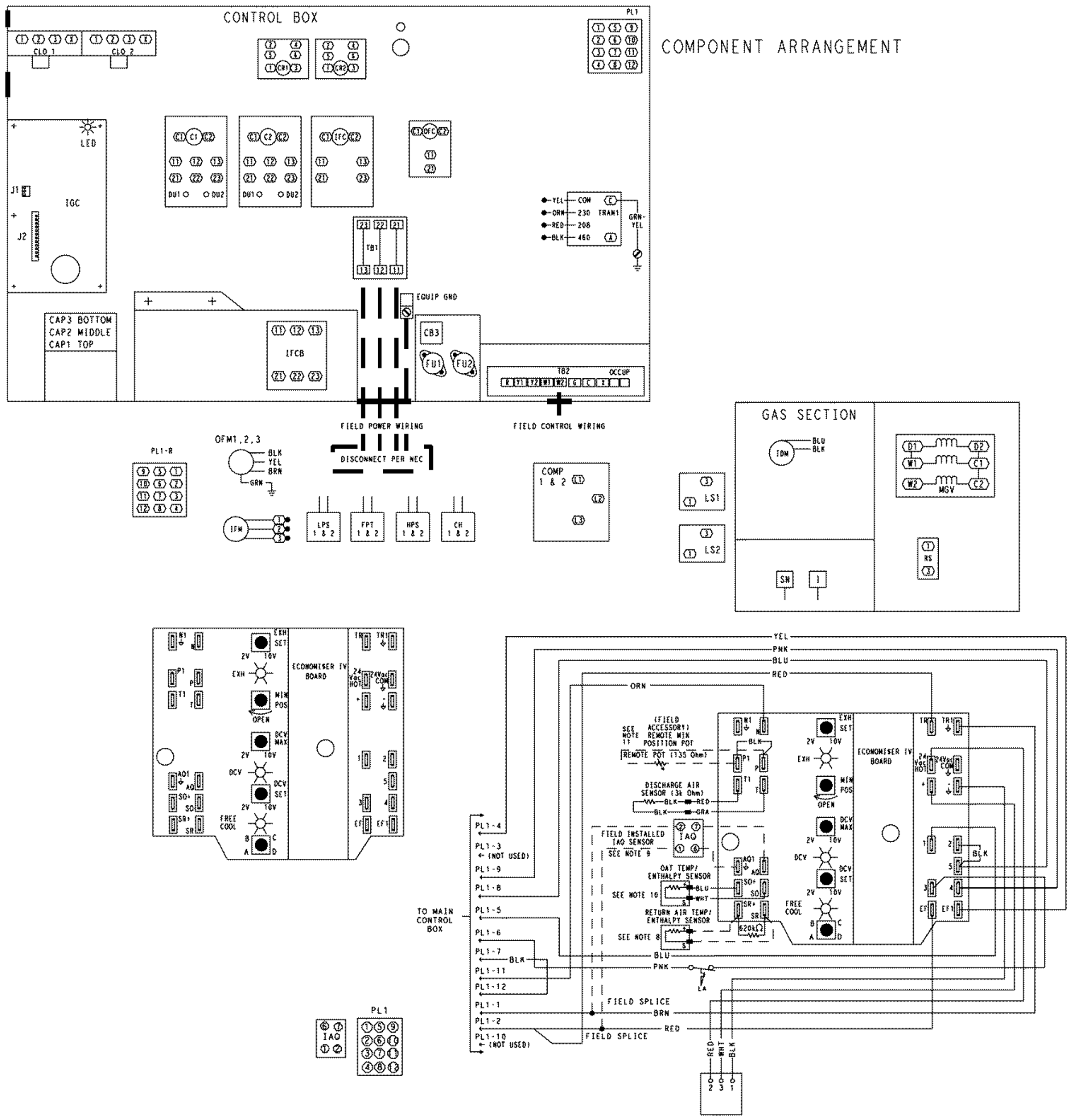


Fig. 56 — Typical Component Arrangement (48HJ017 Unit Shown)

LEGEND AND NOTES FOR FIG 55 AND 56

LEGEND

AHA — Adjustable Heat Anticipator
BKR W/AT — Breaks with Turn Amps
C — Contactor, Compressor
CAP — Capacitor
CB — Circuit Breaker
CC — Cooling Compensator
CH — Crankcase Heater
CLO — Compressor Lockout
COMP — Compressor Motor
CR — Control Relay
DM — Damper Motor
DU — Dummy Terminal
EQUIP — Equipment
FPT — Freeze Protection Thermostat
FU — Fuse
GND — Ground
HPS — High-Pressure Switch
HS — Hall Effect Sensor
HV — High Voltage
I — Ignitor
IAQ — Indoor Air Quality Sensor
IDM — Induced-Draft Motor
IFC — Indoor-Fan Contactor
IFCB — Indoor-Fan Circuit Breaker
IFM — Indoor-Fan Motor
IGC — Integrated Gas Unit Controller
L — Light
LED — Light-Emitting Diode
LOR — Lockout Relay
LPS — Low-Pressure Switch
LS — Limit Switch
MGV — Main Gas Valve
NEC — National Electrical Code
OAT — Outdoor Air Temperature Sensor
OCCUP — Occupancy Sensor
OFC — Outdoor-Fan Contactor
OFM — Outdoor-Fan Motor
PL — Plug Assembly
PRI — Primary
QT — Quadruple Terminal
RAT — Return Air Temperature Sensor
RS — Rollout Switch
SN — Sensor
SW — Switch
TB — Terminal Block
TC — Thermostat Cooling
TH — Thermostat Heating
TRAN — Transformer

(symbol) Terminal (Marked)
(symbol) Terminal (Unmarked)
(symbol) Terminal Block
(symbol) Splice
(symbol) Factory Wiring
(symbol) Field Control Wiring
(symbol) Option/Accessory Wiring
(symbol) To indicate common potential only; not to represent wiring.

NOTES:
1. Compressor and/or fan motor(s) thermally protected three phase motors protected against primary single phasing conditions.
2. If any of the original wire furnished must be replaced, it must be replaced with Type 90° C or its equivalent.
3. Jumpers are omitted when unit is equipped with economizer.
4. IFCB must trip amps is equal to or less than 140% FLA.
5. On TRAN1 use BLK lead for 460-v power supply and ORN lead for 575-v power supply.
6. The CLO locks out the compressor to prevent short cycling on compressor overload and safety devices; before replacing CLO check these devices.
7. Number(s) indicates the line location of used contacts. A bracket over (2) numbers signifies a single pole, double throw contact. An underlined number signifies a normally closed contact. Plain (no line) number signifies a normally open contact.
8. 620 Ohm, 1 watt, 5% resistor shold be removed only when using differential enthalpy or dry bulb.
9. If a separate field supplied 24 v transformer is used for the IAQ sensor power supply, it cannot have the secondary of the transformer grounded.
10. OAT sensor is shipped inside unit and must be relocated in the field for proper operation.
11. For field installed remote minimum position POT. remove black wire jumper between P and P1 and set control minimum position POT to the minimum position.

TROUBLESHOOTING

Unit Troubleshooting — Refer to Tables 23-25 and Fig. 57.

**EconoMi$erIV Troubleshooting —** See Table 26 for EconoMi$erIV logic.

A functional view of the EconoMi$erIV is shown in Fig. 58. Typical settings, sensor ranges, and jumper positions are also shown. An EconoMi$erIV simulator program is available from Carrier to help with EconoMi$erIV training and troubleshooting.

ECONOMI$ERIV PREPARATION — This procedure is used to prepare the EconoMi$erIV for troubleshooting. No troubleshooting or testing is done by performing the following procedure.

NOTE: This procedure requires a 9-v battery, 1.2 kilo-ohm resistor, and a 5.6 kilo-ohm resistor which are not supplied with the EconoMi$erIV.

IMPORTANT: Be sure to record the positions of all potentiometers before starting troubleshooting.

1. Disconnect power at TR and TR1. All LEDs should be off. Exhaust fan contacts should be open.
2. Disconnect device at P and P1.
3. Jumper P to P1.
4. Disconnect wires at T and T1. Place 5.6 kilo-ohm resistor across T and T1.
5. Jumper TR to 1.
6. Jumper TR to N.
7. If connected, remove sensor from terminals S_O and +. Connect 1.2 kilo-ohm 4074EJM checkout resistor across terminals S_O and +.
8. Put 620-ohm resistor across terminals S_R and +.
9. Set minimum position, DCV set point, and exhaust potentiometers fully CCW (counterclockwise).
10. Set DCV maximum position potentiometer fully CW (clockwise).
11. Set enthalpy potentiometer to D.
12. Apply power (24 vac) to terminals TR and TR1.

DIFFERENTIAL ENTHALPY — To check differential enthalpy:

1. Make sure EconoMi$erIV preparation procedure has been performed.
2. Place 620-ohm resistor across S_O and +.
3. Place 1.2 kilo-ohm resistor across S_R and +. The Free Cool LED should be lit.
4. Remove 620-ohm resistor across S_O and +. The Free Cool LED should turn off.
5. Return EconoMi$erIV settings and wiring to normal after completing troubleshooting.

SINGLE ENTHALPY — To check single enthalpy:

1. Make sure EconoMi$erIV preparation procedure has been performed.
2. Set the enthalpy potentiometer to A (fully CCW). The Free Cool LED should be lit.
3. Set the enthalpy potentiometer to D (fully CW). The Free Cool LED should turn off.
4. Return EconoMi$erIV settings and wiring to normal after completing troubleshooting.

DCV (Demand Controlled Ventilation) AND POWER EXHAUST — To check DCV and Power Exhaust:

1. Make sure EconoMi$erIV preparation procedure has been performed.
2. Ensure terminals AQ and AQ1 are open. The LED for both DCV and Exhaust should be off. The actuator should be fully closed.
3. Connect a 9-v battery to AQ (positive node) and AQ1 (negative node). The LED for both DCV and Exhaust should turn on. The actuator should drive to between 90 and 95% open.
4. Turn the Exhaust potentiometer CW until the Exhaust LED turns off. The LED should turn off when the potentiometer is approximately 90%. The actuator should remain in position.
5. Turn the DCV set point potentiometer CW until the DCV LED turns off. The DCV LED should turn off when the potentiometer is approximately 9 v. The actuator should drive fully closed.
6. Turn the DCV and Exhaust potentiometers CCW until the Exhaust LED turns on. The exhaust contacts will close 30 to 120 seconds after the Exhaust LED turns on.
7. Return EconoMi$erIV settings and wiring to normal after completing troubleshooting.

DCV MINIMUM AND MAXIMUM POSITION — To check the DCV minimum and maximum position:

1. Make sure EconoMi$erIV preparation procedure has been performed.
2. Connect a 9-v battery to AQ (positive node) and AQ1 (negative node). The DCV LED should turn on. The actuator should drive to between 90 and 95% open.
3. Turn the DCV Maximum Position potentiometer to midpoint. The actuator should drive to between 20 and 80% open.
4. Turn the DCV Maximum Position potentiometer to fully CCW. The actuator should drive fully closed.
5. Turn the Minimum Position potentiometer to midpoint. The actuator should drive to between 20 and 80% open.
6. Turn the Minimum Position Potentiometer fully CW. The actuator should drive fully open.
7. Remove the jumper from TR and N. The actuator should drive fully closed.
8. Return EconoMi$erIV settings and wiring to normal after completing troubleshooting.

SUPPLY-AIR INPUT — To check supply-air input:

1. Make sure EconoMi$erIV preparation procedure has been performed.
2. Set the Enthalpy potentiometer to A. The Free Cool LED turns on. The actuator should drive to between 20 and 80% open.
3. Remove the 5.6 kilo-ohm resistor and jumper T to T1. The actuator should drive fully open.
4. Remove the jumper across T and T1. The actuator should drive fully closed.
5. Return EconoMi$erIV settings and wiring to normal after completing troubleshooting.

ECONOMI$ERIV TROUBLESHOOTING COMPLETION — This procedure is used to return the EconoMi$erIV to operation. No troubleshooting or testing is done by performing the following procedure.

1. Disconnect power at TR and TR1.
2. Set enthalpy potentiometer to previous setting.
3. Set DCV maximum position potentiometer to previous setting.
4. Set minimum position, DCV set point, and exhaust potentiometers to previous settings.
5. Remove 620-ohm resistor from terminals S_R and +.

6. Remove 1.2 kilo-ohm checkout resistor from terminals S_O and +. If used, reconnect sensor from terminals S_O and +.
7. Remove jumper from TR to N.
8. Remove jumper from TR to 1.
9. Remove 5.6 kilo-ohm resistor from T and T1. Reconnect wires at T and T1.
10. Remove jumper from P to P1. Reconnect device at P and P1.
11. Apply power (24 vac) to terminals TR and TR1.

Table 23 — Cooling Service Analysis

PROBLEM	CAUSE	REMEDY
Compressor and Condenser Fan Will Not Start.	Power failure.	Call power company.
	Fuse blown or circuit breaker tripped.	Replace fuse or reset circuit breaker.
	Defective thermostat, contactor, transformer, or control relay.	Replace component.
	Insufficient line voltage.	Determine cause and correct.
	Incorrect or faulty wiring.	Check wiring diagram and rewire correctly.
	Thermostat setting too high.	Lower thermostat setting below room temperature.
Compressor Will Not Start but Condenser Fan Runs.	Faulty wiring or loose connections in compressor circuit.	Check wiring and repair or replace.
	Compressor motor burned out, seized, or internal overload open.	Determine cause. Replace compressor.
	Defective overload.	Determine cause and replace.
	Compressor locked out	Determine cause for safety trip and reset lockout.
	One leg of 3-phase power dead.	Replace fuse or reset circuit breaker. Determine cause.
Compressor Cycles (other than normally satisfying thermostat).	Refrigerant overcharge or undercharge.	Recover refrigerant, evacuate system, and recharge to nameplate.
	Defective compressor.	Replace and determine cause.
	Insufficient line voltage.	Determine cause and correct.
	Blocked condenser.	Determine cause and correct.
	Defective overload.	Determine cause and replace.
	Defective thermostat.	Replace thermostat.
	Faulty condenser-fan motor.	Replace.
	Restriction in refrigerant system.	Locate restriction and remove.
Compressor Operates continuously.	Dirty air filter.	Replace filter.
	Unit undersized for load.	Decrease load or increase unit size.
	Thermostat set too low.	Reset thermostat.
	Low refrigerant charge.	Locate leak, repair, and recharge.
	Air in system.	Recover refrigerant, evacuate system, and recharge.
	Condenser coil dirty or restricted.	Clean coil or remove restriction.
Excessive Head Pressure.	Dirty air filter.	Replace filter.
	Dirty condenser coil.	Clean coil.
	Refrigerant overcharged.	Recover excess refrigerant.
	Faulty TXV.	1. Check TXV bulb mounting and secure tightly to suction line. 2. Replace TXV if stuck open or closed.
	Air in system.	Recover refrigerant, evacuate system, and recharge.
	Condenser air restricted or air short-cycling.	Determine cause and correct.
Head Pressure Too Low.	Low refrigerant charge.	Check for leaks, repair, and recharge.
	Restriction in liquid tube.	Remove restriction.
Excessive Suction Pressure.	High heat load.	Check for source and eliminate.
	Faulty TXV.	1. Check TXV bulb mounting and secure tightly to suction line. 2. Replace TXV if stuck open or closed.
	Refrigerant overcharged.	Recover excess refrigerant.
Suction Pressure Too Low.	Dirty air filter.	Replace filter.
	Low refrigerant charge.	Check for leaks, repair, and recharge.
	Metering device or low side restricted.	Remove source of restriction.
	Faulty TXV.	1. Check TXV bulb mounting and secure tightly to suction line. 2. Replace TXV if stuck open or closed.
	Insufficient evaporator airflow.	Increase air quantity. Check filter and replace if necessary.
	Temperature too low in conditioned area.	Reset thermostat.
	Field-installed filter drier restricted.	Replace.

LEGEND

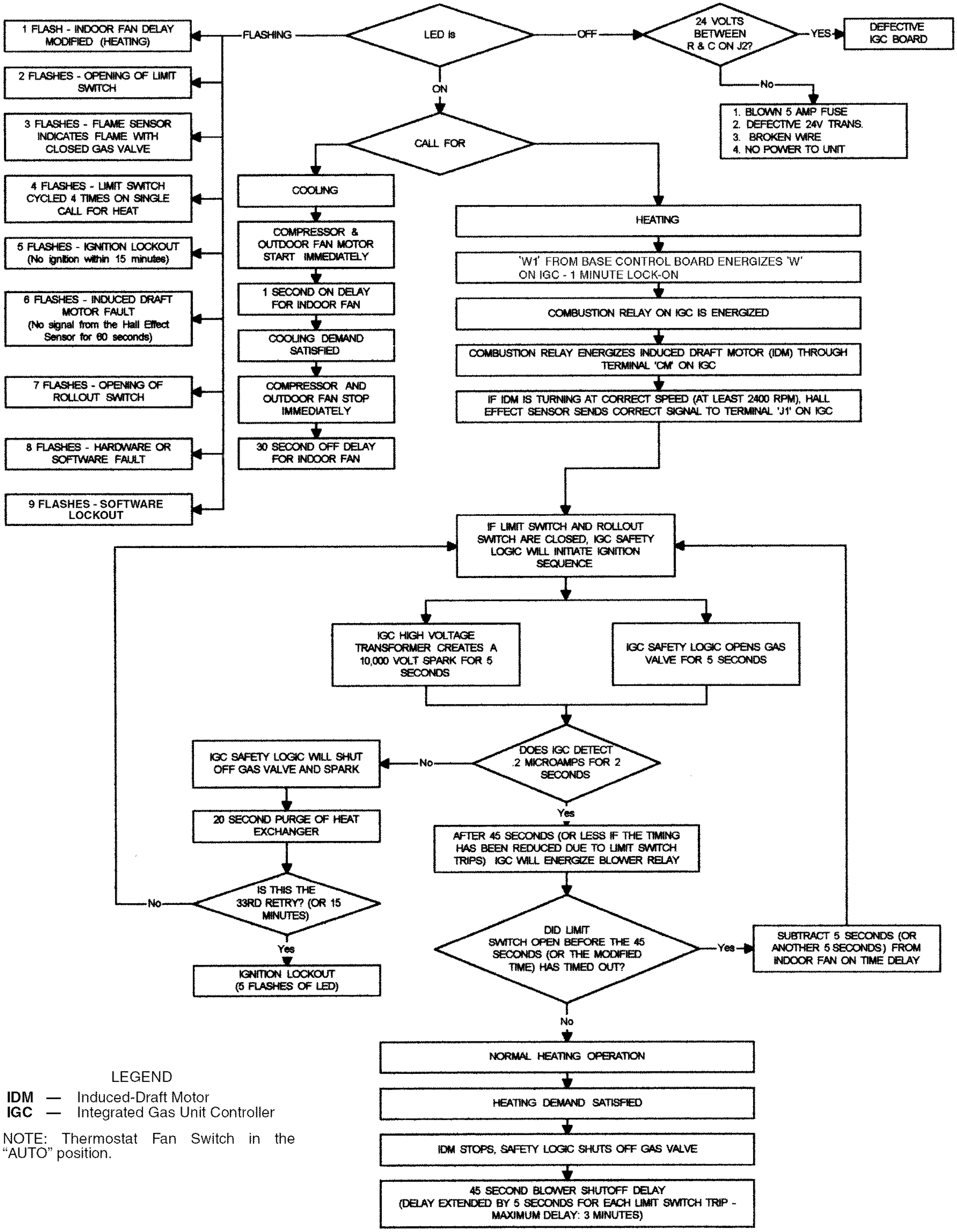
TXV — Thermostatic Expansion Valve

Table 24 — Heating Service Analysis

PROBLEM	CAUSE	REMEDY
Burners Will Not Ignite.	Misaligned spark electrodes.	Check flame ignition and sensor electrode positioning. Adjust as needed.
	No gas at main burners.	Check gas line for air; purge as necessary. After purging gas line of air, allow gas to dissipate for at least 5 minutes before attempting to relight unit.
		Check gas valve.
	Water in gas line.	Drain water and install drip leg to trap water.
	No power to furnace.	Check power supply, fuses, wiring, and circuit breaker.
	No 24 v power supply to control circuit.	Check transformer. Transformers with internal overcurrent protection require a cool-down period before resetting. Check 24-v circuit breaker; reset if necessary.
	Miswired or loose connections.	Check all wiring and wire nut connections.
	Burned-out heat anticipator in thermostat.	Replace thermostat.
	Broken thermostat wires.	Run continuity check. Replace wires if necessary.
Inadequate Heating.	Dirty air filter.	Clean or replace filter as necessary.
	Gas input to unit too low.	Check gas pressure at manifold. Clock gas meter for input. If too low, increase manifold pressure or replace with correct orifices.
	Unit undersized for application.	Replace with proper unit or add additional unit.
	Restricted airflow.	Clean filter, replace filter, or remove any restrictions.
	Blower speed too low.	Install alternate motor, if applicable, or adjust pulley to increase fan speed.
	Limit switch cycles main burners.	Check rotation of blower, thermostat heat anticipator settings, and temperature rise of unit. Adjust as needed.
	Too much outdoor air.	Adjust minimum position.
		Check economizer operation.
Poor Flame Characteristics.	Incomplete combustion (lack of combustion air) results in: Aldehyde odors, CO, sooting flame, or floating flame.	Check all screws around flue outlets and burner compartment. Tighten as necessary.
		Cracked heat exchanger.
		Overfired unit — reduce input, change orifices, or adjust gas line or manifold pressure.
		Check vent for restriction. Clean as necessary.
		Check orifice to burner alignment.
Burners Will Not Turn Off.	Unit is locked into Heating mode for a one minute minimum.	Wait until mandatory one minute time period has elapsed or power to unit.

Table 25 — MoistureMi$er™ Dehumidification Subcooler Service Analysis

PROBLEM	CAUSE	REMEDY
Subcooler Will Not Energize	No power to subcooler control transformer.	Check power source. Ensure all wire connections are tight.
	No power from subcooler control transformer to liquid line three-way valve.	1. Fuse open; check fuse. Ensure continuity of wiring. 2. Subcooler control low-pressure switch open. Cycle unit off and allow low-pressure switch to reset. Replace switch if it will not close. 3. Transformer bad; check transformer.
	Liquid line three-way valve will not operate.	1. Solenoid coil defective; replace. 2. Solenoid valve stuck closed; replace.
Subcooler Will Not Deenergize	Liquid Line three-way valve will not close.	Valve is stuck open; replace.
Low System Capacity	Low refrigerant charge or frosted coil.	1. Check charge amount. See system charging section. 2. Evaporator coil frosted; check and replace subcooler control low-pressure switch if necessary.



LEGEND

IDM — Induced-Draft Motor
IGC — Integrated Gas Unit Controller

NOTE: Thermostat Fan Switch in the "AUTO" position.

Fig. 57 — IGC Control (Heating and Cooling)

Table 26 — EconoMi$erIV Input/Output Logic

INPUTS					OUTPUTS			
	Enthalpy*				Compressor		N Terminal†	
Demand Control Ventilation (DCV)	Outdoor	Return	Y1	Y2	Stage 1	Stage 2	Occupied	Unoccupied
							Damper	
Below set (DCV LED Off)	High (Free Cooling LED Off)	Low	On	On	On	On	Minimum position	Closed
			On	Off	On	Off		
			Off	Off	Off	Off		
	Low (Free Cooling LED On)	High	On	On	On	Off	Modulating** (between min. position and full-open)	Modulating** (between closed and full-open)
			On	Off	Off	Off		
			Off	Off	Off	Off	Minimum position	Closed
Above set (DCV LED On)	High (Free Cooling LED Off)	Low	On	On	On	On	Modulating†† (between min. position and DCV maximum)	Modulating†† (between closed and DCV maximum)
			On	Off	On	Off		
			Off	Off	Off	Off		
	Low (Free Cooling LED On)	High	On	On	On	Off	Modulating***	Modulating†††
			On	Off	Off	Off		
			Off	Off	Off	Off		

*For single enthalpy control, the module compares outdoor enthalpy to the ABCD set point.
†Power at N terminal determines Occupied/Unoccupied setting: 24 vac (Occupied), no power (Unoccupied).
**Modulation is based on the supply air sensor signal.
††Modulation is based on the DCV signal.
***Modulation is based on the greater of DCV and supply air sensor signals, between minimum position and either maximum position (DCV) or fully open (supply air signal).
†††Modulation is based on the greater of DCV and supply air sensor signals, between closed and either maximum position (DCV) or fully open (supply air signal).

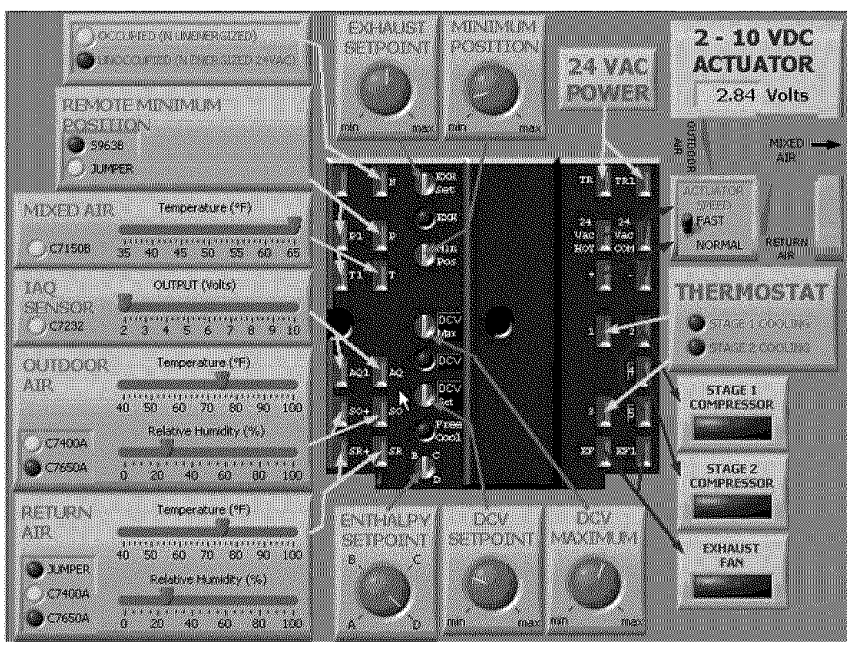


Fig. 58 — EconoMi$erIV Functional View

INDEX

SERVICE TRAINING

Packaged Service Training programs are an excellent way to increase your knowledge of the equipment discussed in this manual, including:

- Unit Familiarization
- Installation Overview
- Maintenance
- Operating Sequence

A large selection of product, theory, and skills programs are available, using popular video-based formats and materials. All include video and/or slides, plus companion book.

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START-UP CHECKLIST

MODEL NO.: ______________________ SERIAL NO.: ______________________

DATE: ______________________ TECHNICIAN: ______________________

I. PRE-START-UP

- ☐ VERIFY THAT ALL PACKING MATERIALS HAVE BEEN REMOVED FROM UNIT
- ☐ VERIFY INSTALLATION OF INDOOR FAN MOTOR ADJUSTMENT BOLT (015) OR ADJUSTMENT BOLT AND PLATE (017 ONLY)
- ☐ VERIFY INSTALLATION OF OUTDOOR AIR HOOD
- ☐ VERIFY INSTALLATION OF FLUE HOOD AND WIND BAFFLE
- ☐ VERIFY THAT CONDENSATE CONNECTION IS INSTALLED PER INSTRUCTIONS
- ☐ VERIFY THAT ALL ELECTRICAL CONNECTIONS AND TERMINALS ARE TIGHT
- ☐ VERIFY GAS PRESSURE TO UNIT GAS VALVE IS WITHIN SPECIFIED RANGE
- ☐ CHECK GAS PIPING FOR LEAKS
- ☐ CHECK THAT FILTERS ARE CLEAN AND IN PLACE
- ☐ CHECK THAT OUTDOOR AIR INLET SCREENS ARE IN PLACE
- ☐ VERIFY THAT UNIT IS LEVEL
- ☐ CHECK FAN WHEEL AND PROPELLER FOR LOCATION IN HOUSING/ORIFICE, AND VERIFY SETSCREW IS TIGHT
- ☐ VERIFY THAT FAN SHEAVES ARE ALIGNED AND BELTS ARE PROPERLY TENSIONED
- ☐ VERIFY THAT SCROLL COMPRESSORS ARE ROTATING IN THE CORRECT DIRECTION
- ☐ VERIFY THAT CRANKCASE HEATER HAS BEEN ENERGIZED 24 HOURS BEFORE START-UP

II. START-UP

ELECTRICAL

SUPPLY VOLTAGE L1-L2 ________ L2-L3 ________ L3-L1 ________

COMPRESSOR AMPS — COMPRESSOR NO. 1 L1 ________ L2 ________ L3 ________

— COMPRESSOR NO. 2 L1 ________ L2 ________ L3 ________

SUPPLY FAN AMPS ________ EXHAUST FAN AMPS ________

TEMPERATURES

OUTDOOR-AIR TEMPERATURE ________ F DB (Dry-Bulb)

RETURN-AIR TEMPERATURE ________ F DB ________ F WB (Wet-Bulb)

COOLING SUPPLY AIR ________ F

GAS HEAT SUPPLY AIR ________ F

PRESSURES

GAS INLET PRESSURE ______ IN. WG

GAS MANIFOLD PRESSURE STAGE NO. 1 ______ IN. WG STAGE NO. 2 ______ IN. WG

REFRIGERANT SUCTION CIRCUIT NO. 1 ______ PSIG CIRCUIT NO. 2 ______ PSIG

REFRIGERANT DISCHARGE CIRCUIT NO. 1 ______ PSIG CIRCUIT NO. 2 ______ PSIG

- ☐ VERIFY REFRIGERANT CHARGE USING CHARGING CHART ON PAGE 40.

GENERAL

- ☐ ECONOMIZER MINIMUM VENT AND CHANGEOVER SETTINGS TO JOB REQUIREMENTS

CUT ALONG DOTTED LINE

CUT ALONG DOTTED LINE

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